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Thorax

AN INTERNATIONAL JOURNAL OF RESPIRATORY MEDICINE

British Thoracic Society Winter Meeting 2023

QEII Centre
Broad Sanctuary
Westminster
London SW1P 3EE

22 to 24 November 2023

Programme and Abstracts

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PROGRAMME

AND

ABSTRACTS

Thorax

British Thoracic Society
Winter Meeting 2023

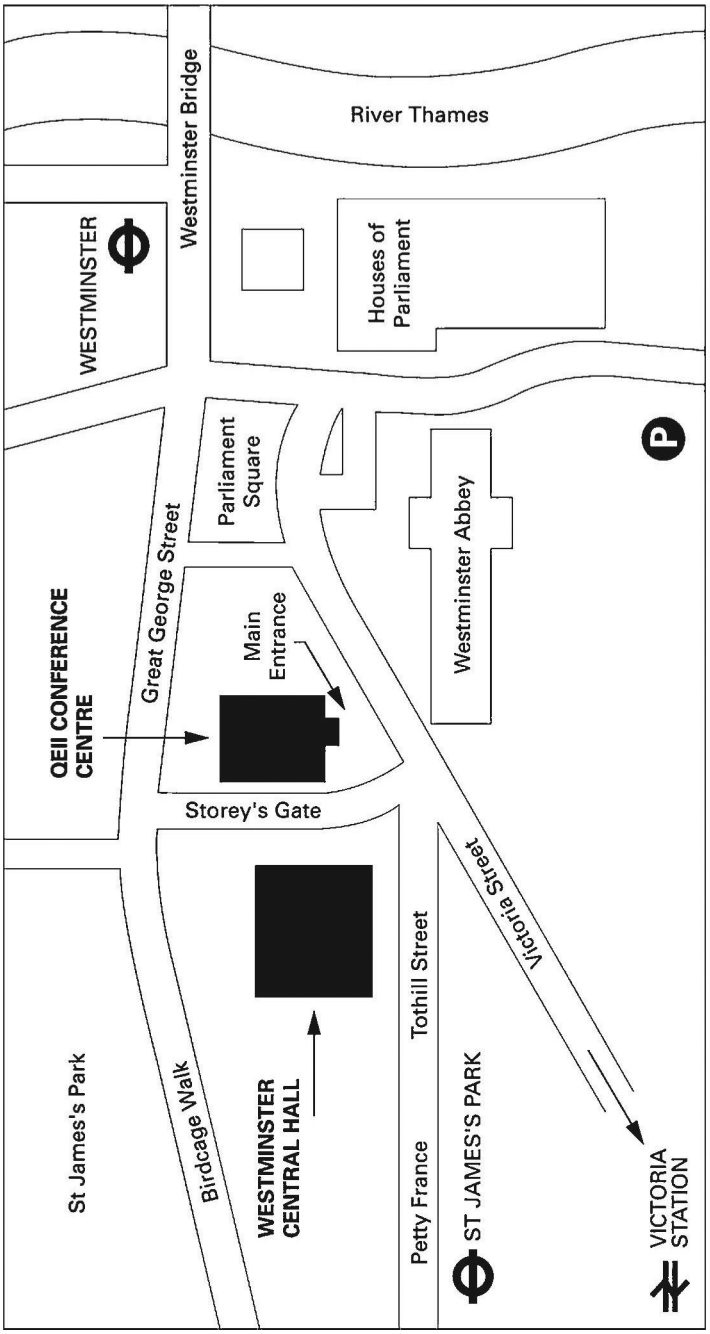
QEII Centre
Broad Sanctuary
Westminster
London SW1P 3EE

Wednesday 22 to Friday 24 November 2023
Programme and Abstracts

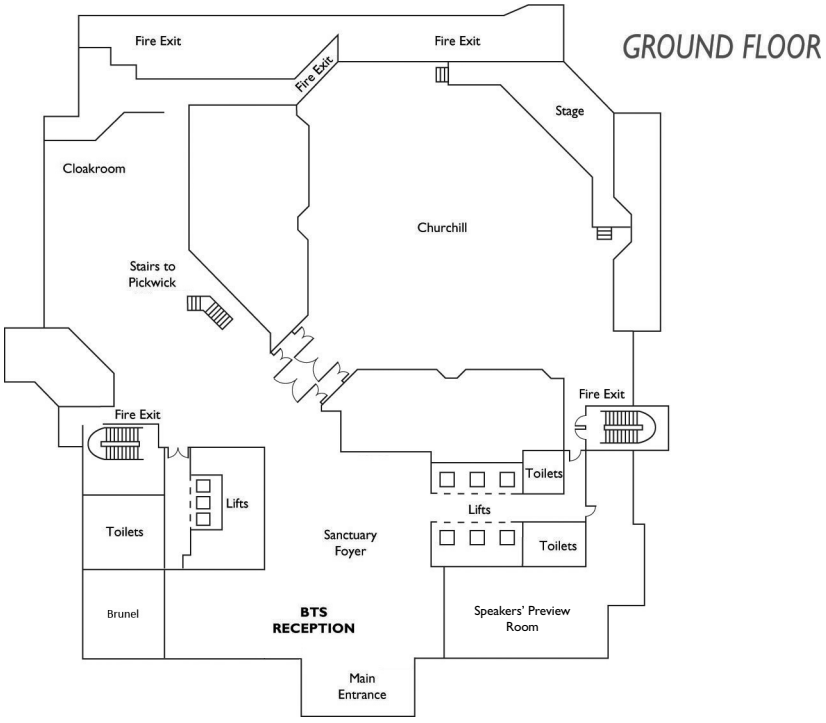
Approved by the Federation of the Royal Colleges of Physicians of the UK for 18 category 1 (external) credits (6 credits per day).
Code: 145912

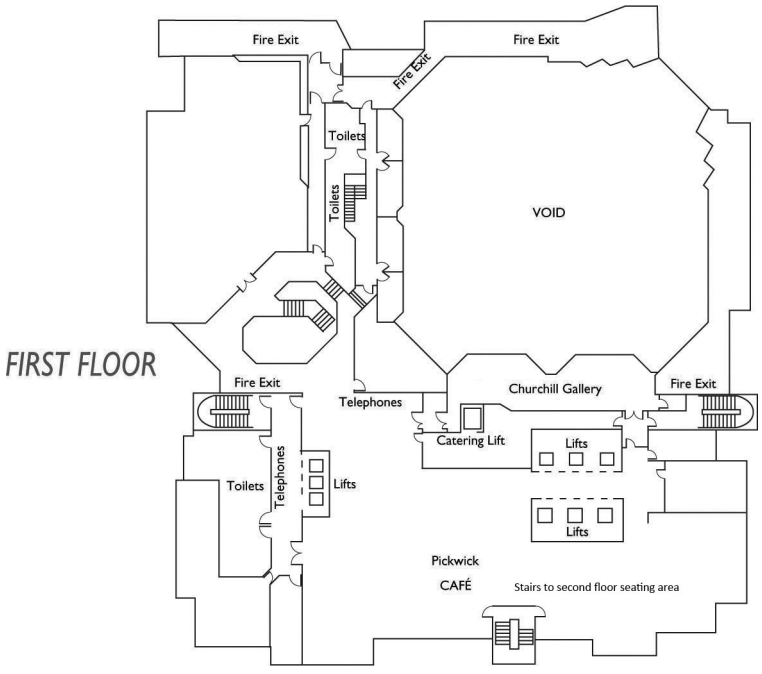
Map to the QEII Centre

PowerPoint preview facilities will be available throughout the three days of the Meeting on the ground floor of the Centre. All presenters and chairs should report to the Speakers' section of the Registration Desks on arrival.



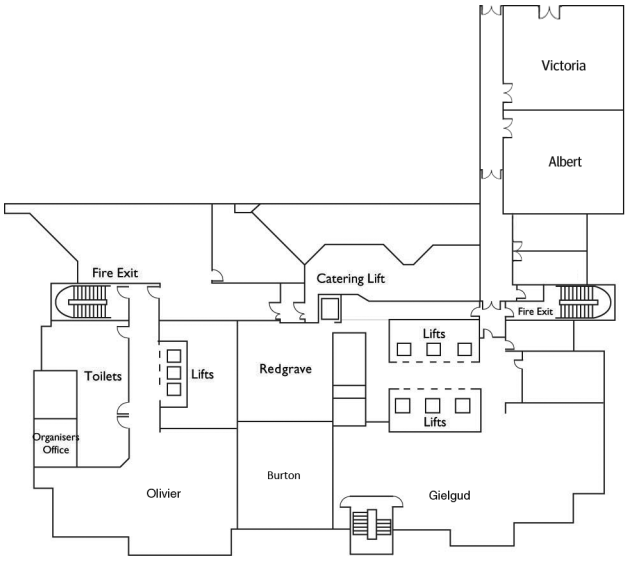
The QEII Centre - Ground and First Floors



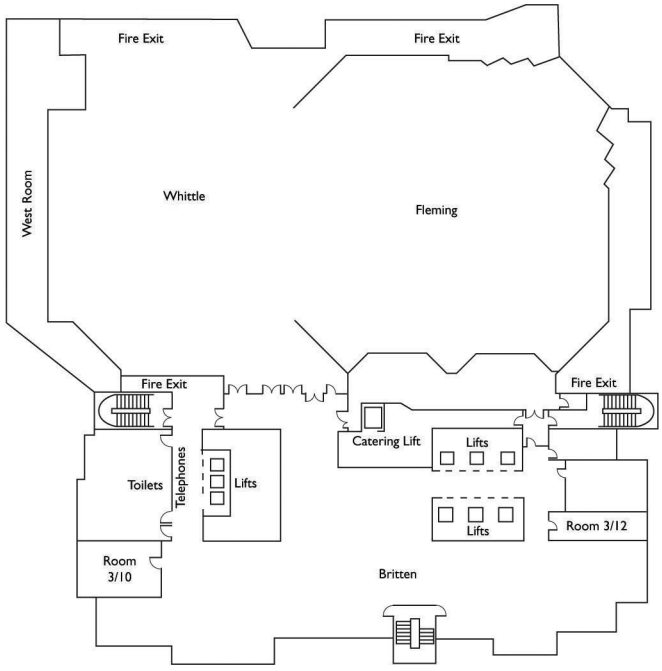


Full café facilities will be open in the Pickwick on the 1st floor from 8.00am to 4.00pm on Wednesday 22 and Thursday 23 November and from 8.00am to 2.30pm on Friday 24 November. A snack bar, serving hot and cold drinks, sandwiches and confectionery only, will be open at the same times in the Whittle & Fleming on the 3rd floor.

The QEII Centre - Second and Third Floors



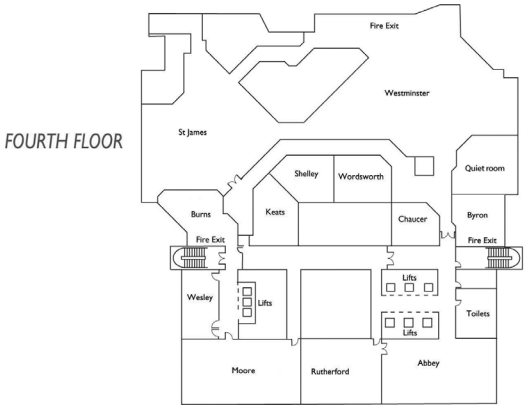
SECOND FLOOR

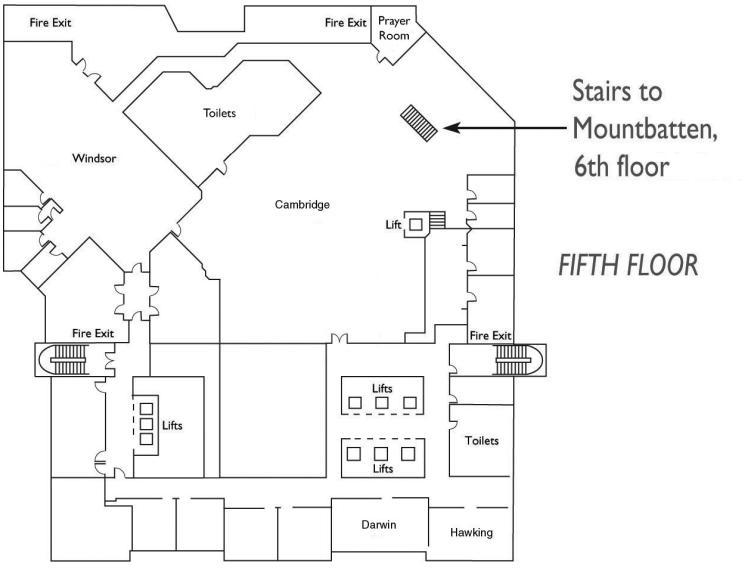


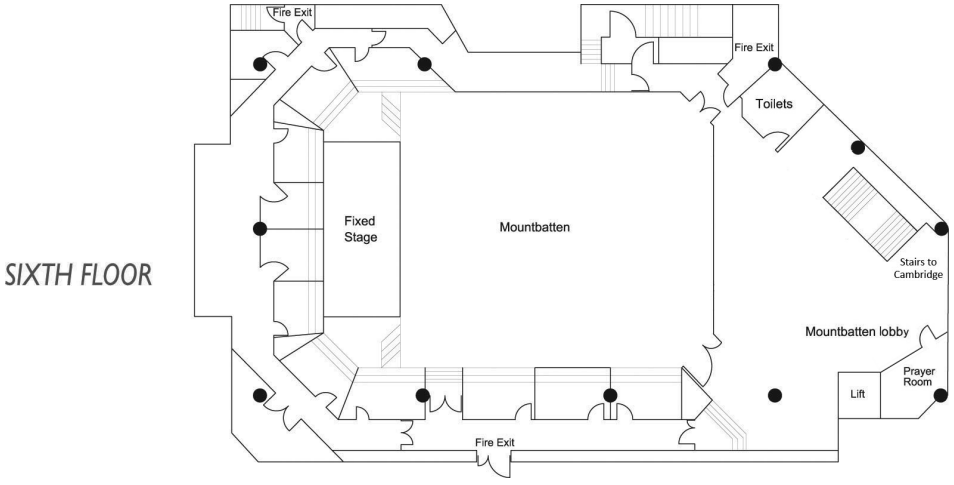
THIRD FLOOR

Full café facilities will be open in the Pickwick on the 1st floor from 8.00am to 4.00pm on Wednesday 22 and Thursday 23 November and from 8.00am to 2.30pm on Friday 24 November. A snack bar, serving hot and cold drinks, sandwiches and confectionery only, will be open at the same times in the Whittle & Fleming on the 3rd floor.

The QEII Centre - Fourth, Fifth and Sixth Floors







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DAILY PROGRAMME

WEDNESDAY 22 NOVEMBER 2023

Time	Details			Location/Floor
8.00am-9.00am	COFFEE/TEA			Whittle & Fleming/3rd
8.45am-4.00pm 10.00am-11.00am	Poster viewing Authors present	P1-P8	"Blowing in the wind" – Management of pneumothorax	Whittle & Fleming /3rd
		P9-P17	"Drug-stabbing time" – Treating thoracic malignancy	
		P18-P30	"Walk this way" – Innovations in pulmonary rehabilitation	
		P31-P44	"Danger! High voltage" – Diagnosis and management of sleep disordered breathing and respiratory failure	
		P45-P58	"The heat is on" – Can we get greener in asthma?	
8.45am-4.00pm	Moderated poster viewing	M1-M12	"The long and winding road" – Optimising patient experience of respiratory care	Cambridge/5th
8.00am-8.30am	BTS Journal Club		Cough	Albert/2nd
8.30am-10.30am	Joint BTS/BALR symposium (part I)		Another brick in the wall: cell interactions with the lung matrix	Windsor/5th
8.45am-10.15am	Symposium		Beat it: asthma, hormones, mucus and infection	Churchill/Ground
8.45am-10.15am	Symposium		Transport fumes, flavourings and fires: emerging risks in OELD	Mountbatten/6th
8.45am-10.05am	Spoken session	S1-S5	"The drugs do work!" – New treatments in cough	St James/4th
8.45am-10.05am	Spoken session	S6-S10	"Survivor" – Prognostic indicators in ILD	Westminster/4th
8.45am-10.05am	Spoken session	S11-S15	"Don't want to miss a thing" – Novel diagnostics in malignant effusion and pleural infection	Moore/4th
8.45am-10.20am	Spoken session	S16-S21	"Shake it off" – Recovery from COVID-19	Abbey/4th
8.45am-10.20am	Spoken session	S22-S27	"The beat goes on" – Novel data in mucociliary disorders: PCD, CF and bronchiectasis	Rutherford/4th
10.00am-11.00am	COFFEE/TEA			Whittle & Fleming and Britten/3rd
10.45am-11.50am	Spoken session	S28-S31	"How to save a life" – T2 inflammatory profiles in COPD	St James/4th
10.45am-12.05pm	Spoken session	S32-S36	"Revolution" – Updates from UK cancer screening	Westminster/4th
10.45am-12.05pm	Spoken session	S37-S41	"Right here, right now" – Bench to bedside in pulmonary vascular disease	Moore/4th
10.45am-12.15pm	Symposium		What must be done to "END TB"?	Churchill/Ground
10.45am-12.15pm	Symposium		Novel physiological biomarkers in the diagnosis of respiratory and sleep disorders	Mountbatten/6th

Please see page Axii for a complete list of the days and times of BTS Specialist Advisory Group open meetings.

Coffee and tea are complimentary ONLY during the coffee/tea break times shown. Outside these times, drinks may be purchased from the café in the Pickwick (1st floor), or the snack bar in the Whittle & Fleming (3rd floor).

10.45am-12.20pm	Spoken session	S42-S47	"The kids aren't alright" – Does this child have asthma, or something else?	Abbey/4th
11.00am-1.00pm	Joint BTS/BALR symposium (part 2)		Another brick in the wall: cell interactions with the lung matrix	Windsor/5th
11.00am-12.00pm	SAG open meeting		Occupational & Environmental Lung Disease	Rutherford/4th
11.00am-12.00pm	SAG open meeting		Cough	Albert/2nd
11.00am-12.00pm	SAG open meeting		Specialty Trainee	Victoria/2nd
12.00pm-2.00pm	LUNCH	*Not included in the delegate fee. Card payments only*		Pickwick / 1st and Whittle & Fleming/3rd
12.30pm-1.30pm	SAG open meeting		TB & NTM	Albert/2nd
1.15pm-2.00pm	Award Lectures		BTS/A+LUK/BALR Award Lectures	Churchill/Ground
2.00pm-3.00pm	SAG open meeting		COPD	Albert/2nd
2.00pm-3.00pm	SAG open meeting		Interstitial and Rare Lung Disease	Victoria/2nd
2.15pm-3.15pm	Poster discussion	P1-P8	"Blowing in the wind" – Management of pneumothorax	St James/4th
2.15pm-3.25pm	Poster discussion	P9-P17	"Drug-stabbing time" – Treating thoracic malignancy	Rutherford/4th
2.15pm-3.45pm	Symposium		Preventing respiratory infections: rising to the challenge	Churchill/Ground
2.15pm-3.45pm	Joint BTS/BPRS symposium		Chest wall deformities: who, why, what to do and when?	Mountbatten/6th
2.15pm-3.45pm	Award symposium	T1-T6	BTS/BALR/A+LUK Early Career Investigator Award Symposium	Windsor/5th
2.15pm-3.45pm	Moderated Poster discussion	M1-M12	"The long and winding road" – Optimising patient experience of respiratory care	Cambridge/5th
2.15pm-3.50pm	Poster discussion	P18-P30	"Walk this way" – Innovations in pulmonary rehabilitation	Moore/4th
2.15pm-4.00pm	Poster discussion	P31-P44	"Danger! High voltage" – Diagnosis and management of sleep disordered breathing and respiratory failure	Westminster/4th
2.15pm-4.00pm	Poster discussion	P45-P58	"The heat is on" – Can we get greener in asthma?	Abbey/4th
3.15pm-4.15pm	COFFEE/TEA			Whittle & Fleming and Britten/3rd
4.15pm-4.45pm	Award presentations			Churchill/Ground
4.45pm-5.30pm	The BTS President's Address		"#Respisbest"	Churchill/Ground
5.45pm-6.15pm	BTS AGM		BTS Annual General Meeting (BTS members only)	Churchill/Ground

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DAILY PROGRAMME

THURSDAY 23 NOVEMBER 2023

Time	Details			Location/Floor
8.00am-9.00am	COFFEE/TEA			Whittle & Fleming/3rd
8.45am-4.00pm	Poster viewing	P59-P69	"Sweet child of mine" – Innovations in paediatric lung disease	Whittle & Fleming/3rd
10.00am-11.00am	Authors present	P70-P81	"I still haven't found what I'm looking for" – Cancer diagnosis: imaging and bronchoscopy	
		P82-P93	"When the going gets tough" – Difficult infection and NTM	
		P94-P106	"Take my breath away" – Novel diagnostics in respiratory disease	
		P107-P118	"It's not easy being green" – Suppurative lung diseases	
		P119-P131	"The way you make me feel" – Beyond the basics in asthma	
		P132-P144	"Just like a pill" – TB treatment challenges and outcomes	
		P145-P151	"Drop the pressure" – Investigating and treating pulmonary vascular disease	
8.45am-4.00pm	Moderated poster viewing	M13-M26	"Against all odds" – Fight for the future of asthma	Cambridge/5th
8.00am-8.30am	BTS Journal Club		Asthma	Albert/2nd
8.45am-9.45am	SAG open meeting		Sleep Apnoea	Victoria/2nd
8.45am-9.50am	Spoken session	S48-S51	"Don't stop believing" – Tumour biology: implications for treatment	Moore/4th
8.45am-10.05am	Spoken session	S52-S56	"Running up that hill" – Rehabilitation interventions in chronic respiratory diseases	Abbey/4th
8.45am-10.05am	Spoken session	S57-S61	"Working 9 to 5" – Occupation risk to the lung	Rutherford/4th
8.45am-10.15am	Symposium		Scientific year in review – Respiratory infections	Churchill/Ground
8.45am-10.15am	Symposium		Cutting edge diagnostics in malignant pleural disease	Mountbatten/6th
8.45am-10.15am	Symposium		The critical care journey of respiratory failure: acute management to weaning	Windsor/5th
8.45am-10.20am	Spoken session	S62-S67	"It's complicated" – Answering the unanswered in asthma biologics	St James/4th
8.45am-10.20am	Spoken session	S68-S73	"It's not unusual" – Rare and ILD biology	Westminster/4th
10.00am-11.00am	COFFEE/TEA			Whittle & Fleming and Britten/3rd
10.45am-12.05pm	Spoken session	S74-S78	"You know I'm no good" – Innovative approaches to smoking cessation	Westminster/4th
10.45am-12.30pm	Symposium		Plenary scientific	Churchill/Ground
10.45am-11.45am	SAG open meeting		Global Lung Health	Rutherford/4th
10.45am-11.45am	SAG open meeting		Critical Care, Respiratory Failure and Mechanical Ventilation	Albert/2nd
10.45am-11.45am	Open meeting		BTS/ARTP Joint Strategy Board	Victoria/2nd

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DAILY PROGRAMME (cont.) THURSDAY 23 NOVEMBER 2023

12.00pm-2.00pm	LUNCH	*Not included in the delegate fee. Card payments only*		Pickwick /1st and Whittle & Fleming/3rd
12.45pm-2.00pm	Open session		National Respiratory Audit Programme	Abbey/4th
1.00pm-1.45pm	BTS Clinical Lecture		Population health and precision medicine in respiratory disease – can we achieve both?	Churchill/Ground
2.00pm-3.00pm	SAG open meeting		Pleural Disease	Albert/2nd
2.00pm-3.00pm	SAG open meeting		Pharmacist	Victoria/2nd
2.15pm-3.40pm	Poster discussion	P59-P69	"Sweet child of mine" – Innovations in paediatric lung disease	Rutherford/4th
2.15pm-3.45pm	Symposium		When we were young: the influence of COPD	Churchill/Ground
2.15pm-3.45pm	Symposium		Hot topics in sleep	Mountbatten/6th
2.15pm-3.45pm	Symposium		BTS audit and quality improvement	Windsor/5th
2.15pm-3.45pm	Poster discussion	P70-P81	"I still haven't found what I'm looking for" – Cancer diagnosis: imaging and bronchoscopy	Westminster/4th
2.15pm –3.45pm	Poster discussion	P82-P93	"When the going gets tough" – Difficult infection and NTM	Moore/4th
2.15pm-3.50pm	Spoken session	S79-S84	"Bad blood" – Biomarkers and mechanisms in long-COVID	St James/4th
2.15pm-3.50pm	Poster discussion	P94-P106	"Take my breath away" – Novel diagnostics in respiratory disease	Abbey/4th
2.15pm-4.00pm	Moderated Poster discussion	M13-M26	"Against all odds" – Fight for the future of asthma	Cambridge/5th
3.30pm-4.30pm	COFFEE/TEA			Whittle & Fleming and Britten/3rd
4.15pm-5.15pm	SAG open meeting		Lung Cancer and Mesothelioma	Victoria/2nd
4.15pm-5.30pm	Symposium		'Levelling up' – Respiratory health inequality and how we can address it	Windsor/5th
4.15pm-5.35pm	Spoken session	S85-S89	"Total eclipse of the heart" – COPD and cardiovascular disease	St James/4th
4.15pm-5.45pm	Symposium		Into thin air: innovations in pneumothorax	Churchill/Ground
4.15pm-5.45pm	Joint BTS/BPRS symposium		Pulmonary manifestations of systemic disease	Mountbatten/6th
4.15pm-5.45pm	Poster discussion	P107-P118	"It's not easy being green" – Suppurative lung diseases	Abbey/4th
4.15pm-5.45pm	Symposium		Treatable traits in chronic cough: the new BTS Clinical Statement on Chronic Cough in Adults	Albert/2nd
4.15pm-5.50pm	Poster discussion	P119-P131	"The way you make me feel" – Beyond the basics in asthma	Westminster/4th
4.15pm-5.50pm	Poster discussion	P132-P144	"Just like a pill" – TB treatment challenges and outcomes	Moore/4th
4.15pm-5.15pm	Poster discussion	P145-P151	"Drop the pressure" – Investigating and treating pulmonary vascular disease	Rutherford/4th
5.45pm-7.00pm	The President's Reception – All welcome!			Britten/3rd

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DAILY PROGRAMME

FRIDAY 24 NOVEMBER 2023

Time	Details			Location/Floor
8.00am-9.00am	COFFEE/TEA			Whittle & Fleming/3rd
8.45am-2.00pm	Poster viewing	P152-P162	"Fever!" – COVID-19 and pneumonia	Whittle & Fleming/3rd
10.00am-11.00am	Authors present	P163-P174	"Two way traffic" – Challenging the status quo in asthma	
		P175-P187	"You ain't seen nothing yet" – Imaging across COPD, nodules and lung cancer screening	
		P188-P200	"Getting better" – ILD: from genes to therapy	
		P201-P211	"Simply the best" – Exacerbations, senescence and quality of life in COPD	
		P212-P225	"The show must go on" – What more do we know about cough?	
		P226-P239	"Call me maybe" – Virtual management of respiratory disease	
8.45am-4.00pm	Moderated poster viewing	M27-M35	"My way" – Innovative pathways in asthma management	Cambridge/5th
8.00am-8.30am	BTS Journal Club		Transplantation	Albert/2nd
8.30am-10.00am	Symposium		New frontiers in lung cancer diagnosis and management	Churchill/Ground
8.30am-10.00am	Symposium		"I'm not old, I've just been young for a very long time"	Mountbatten/6th
8.30am-10.00am	Symposium		Rehabilitation in respiratory disease: where next?	Windsor/5th
8.30am-10.05am	Spoken session	S90-S95	"Light my fire" – A deeper dive into inflamed airways	St James/4th
8.30am-10.05am	Spoken session	S96-S101	"Scar tissue" – Pathogenesis of lung fibrosis	Westminster/4th
8.30am-10.05am	Spoken session	S102-S107	"Insomnia" – Screening, management and complications of sleep disordered breathing	Moore/4th
8.30am-10.05am	Spoken session	S108-S113	"Mirrorball" – The many reflections of respiratory viral infection	Abbey/4th
9.00am-10.00am	SAG open meeting		Pulmonary Embolism and other Pulmonary Vascular Diseases	Rutherford/4th
9.00am-10.00am	SAG open meeting		Bronchiectasis	Albert/2nd
9.00am-10.15am	SAG open meeting		Asthma	Victoria/2nd
10.00am-11.00am	COFFEE/TEA			Whittle & Fleming and Britten/3rd
10.30am-12.00pm	Symposium		Under pressure: understanding COPD exacerbations	Churchill/Ground
10.30am-12.00pm	Symposium		Early detection of ILD: addressing an unmet need	Mountbatten/6th
10.30am-12.05pm	Spoken session	S114-S119	"The winner takes it all" – Therapy in asthma	St James/4th
10.30am-12.05pm	Spoken session	S120-S125	"The great pretender" – Hot topics in TB	Westminster/4th

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10.30am-12.05pm	Spoken session	S126-S131	"Ebony and ivory" – Where real world and lab data meet	Moore/4th
10.30am-12.05pm	Spoken session	S132-S137	"Every breath you take" – New findings from the physiology lab	Abbey/4th
10.30am-11.30am	SAG open meeting		Acute and Complex Pulmonary Infections	Rutherford/4th
10.30am-11.30am	SAG open meeting		Pulmonary Rehabilitation	Victoria/2nd
10.30am-11.30am	SAG open meeting		Nurse	Albert/2nd
10.45am-11.50am	Spoken session	S138-S141	"Bridge over troubled waters" – Managing the exudative effusion	Windsor/5th
12.00pm-2.00pm	LUNCH	*Not included in the delegate fee. Card payments only*		Pickwick /1st and Whittle & Fleming/3rd
12.30pm-1.15pm	The Morriston Davies Lecture		Smarter trials for better health	Churchill/Ground
1.30pm-2.30pm	SAG open meeting		Tobacco Dependency	Albert/2nd
1.30pm-2.30pm	SAG open meeting		Cystic Fibrosis	Victoria/2nd
1.30pm-2.55pm	Poster discussion	P152-P162	"Fever!" – COVID-19 and pneumonia	Westminster/4th
1.30pm-3.00pm	Symposium		Pulmonary embolic disease: current controversies and complications	Churchill/Ground
1.30pm-3.00pm	BTS STAG scientific symposium		Immunometabolism for respiratory physicians and scientists	Mountbatten/6th
1.30pm-3.00pm	Symposium		How can we address inequalities in nursing care?	Windsor/5th
1.30pm-3.00pm	Poster discussion	P163-P174	"Two way traffic" – Challenging the status quo in asthma	St James/4th
1.30pm-3.05pm	Poster discussion	P175-P187	"You ain't seen nothing yet" – Imaging across COPD, nodules and lung cancer screening	Moore/4th
1.30pm-3.05pm	Poster discussion	P188-P200	"Getting better" – ILD: from genes to therapy	Abbey/4th
3.00pm-3.30pm	COFFEE/TEA			Britten/3rd
3.15pm-4.25pm	Moderated Poster discussion	M27-M35	"My way" – Innovative pathways in asthma management	Cambridge/5th
3.15pm-4.35pm	Spoken session	S142-S146	"Welcome to the jungle" – Diving into the airway mycobiomes	Windsor/5th
3.15pm-4.40pm	Poster discussion	P201-P211	"Simply the best" – Exacerbations, senescence and quality of life in COPD	St James/4th
3.15pm-4.45pm	Symposium		Lung cancer screening: treating smokers, finding respiratory disease	Churchill/Ground
3.15pm-4.45pm	Symposium		Highlights and updates from *Thorax*	Mountbatten/6th
3.15pm-5.00pm	Poster discussion	P212-P225	"The show must go on" – What more do we know about cough?	Westminster/4th
3.15pm-5.00pm	Poster discussion	P226-P239	"Call me maybe" – Virtual management of respiratory disease	Moore/4th

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OPEN MEETINGS OF THE BTS SPECIALIST ADVISORY GROUPS

Open meetings of the British Thoracic Society Specialist Advisory Groups (SAGs) will take place during the Winter Meeting. All participants are welcome to attend and hear more about the work of the SAGs and be involved in planning symposia for future Summer and Winter Meeting programmes.

WEDNESDAY 22 NOVEMBER

Time	Specialist Advisory Group	Location
11.00am – 12.00pm	Occupational and Environmental Lung Disease	Rutherford, 4th floor
11.00am – 12.00pm	Cough	Albert, 2nd floor
11.00am – 12.00pm	Specialty Trainee	Victoria, 2nd floor
12.30pm – 1.30pm	TB and Non-Tuberculous Mycobacteria	Albert, 2nd floor
2.00pm – 3.00pm	Interstitial and Rare Lung Disease	Victoria, 2nd floor
2.00pm – 3.00pm	COPD	Albert, 2nd floor

THURSDAY 23 NOVEMBER

Time	Specialist Advisory Group	Location
8.45am – 9.45am	Sleep Apnoea	Victoria, 2nd floor
10.45am – 11.45am	Global Lung Health	Rutherford, 4th floor
10.45am – 11.45am	Critical Care, Respiratory Failure and Mechanical Ventilation	Albert, 2nd floor
10.45am – 11.45am	BTS/ARTP Joint Strategy Board	Victoria, 2nd floor
2.00pm – 3.00pm	Pleural Disease	Albert, 2nd floor
2.00pm – 3.00pm	Pharmacist	Victoria, 2nd floor
4.15pm – 5.15pm	Lung Cancer and Mesothelioma	Victoria, 2nd floor

FRIDAY 24 NOVEMBER

Time	Specialist Advisory Group	Location
9.00am – 10.00am	Pulmonary Embolism and other Pulmonary Vascular Diseases	Rutherford, 4th floor
9.00am – 10.00am	Bronchiectasis	Albert, 2nd floor
9.00am – 10.15am	Asthma	Victoria, 2nd floor
10.30am – 11.30am	Acute and Complex Pulmonary Infections	Rutherford, 4th floor
10.30am – 11.30am	Nurse	Albert, 2nd floor
10.30am – 11.30am	Pulmonary Rehabilitation	Victoria, 2nd floor
1.30pm – 2.30pm	Tobacco Dependency	Albert, 2nd floor
1.30pm – 2.30pm	Cystic Fibrosis	Victoria, 2nd floor

BTS MEDAL AND AWARD PRESENTATIONS

Wednesday 22 November at 4.15pm in the Churchill, Ground floor

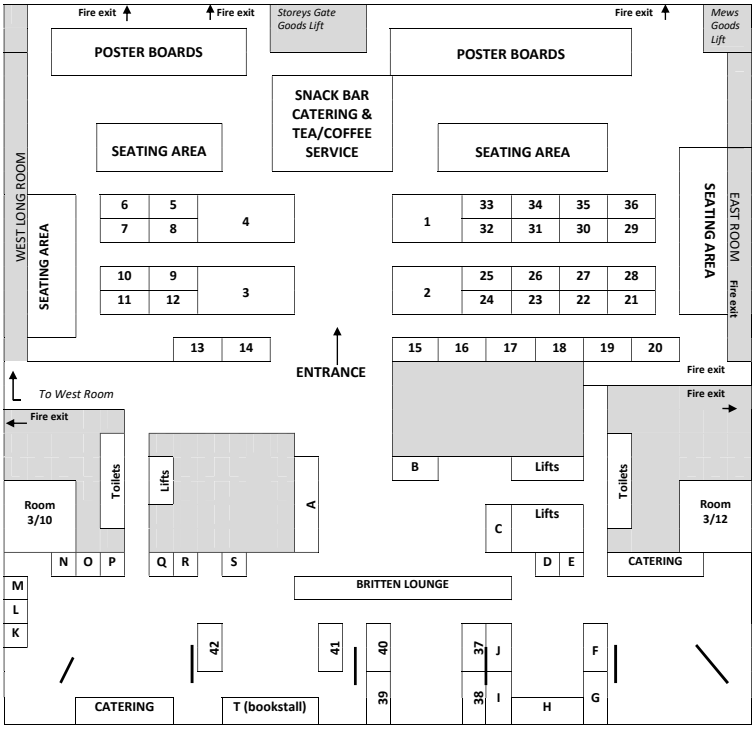
The presentations will be made just before the BTS President's Address, for the annual BTS Medal, BTS Award for Meritorious Service, BTS President's Award, the BTS/BALR/A+LUK Early Career Investigator Awards, BTS Medical Student Awards, BTS/A+LUK/BALR/Lecture Awards, and the BTS/NIHR Awards. Please come along to this session to congratulate the winners.

THE BTS PRESIDENT'S RECEPTION

Thursday 23 November from 5.45pm to 7.00pm in the Britten, 3rd floor

All participants are warmly invited to join us for this social occasion.

FLOOR PLAN OF THE EXHIBITION STANDS



Exhibitors and stand numbers

36	Aerogen
24	Ambu
15	APR Medtech
26 & 27	Aquilant
2	AstraZeneca
7	BD
23	Broncus/Uptake Medical
4	Chiesi
12	Creo Medical
9	CSL Vifor
10 & 11	Erbe Medical UK Ltd
25	Fisher & Paykel Healthcare
40	General Medicine Group
1	GSK
18	Guardant Health
31 & 32	Insmed
16	Inspire Medical Systems
34	It's Interventional
20	Medtronic
8	Niox Healthcare Ltd
29	NuvoAir
17	Olympus
14	Orion Pharma (UK)
19	Pulm-One
6	Rocket Medical
3, 21 & 22	Sanofi
5	Stirling Anglian
30 & 35	Teva
13	Tintron Laboratories
33	Trudell Medical International
28	Vertex
42	Vitalograph

Charity and non-commercial stands

D	Action for Pulmonary Fibrosis
H	Association for Respiratory Technology & Physiology (ARTP)
G	Association of Chartered Physiotherapists in Respiratory Care (ACPRC)
J	Association of Respiratory Nurses (ARNS)
F	Asthma + Lung UK
I	British Association for Lung Research (BALR)
A	British Thoracic Society (BTS) & Respiratory Futures
R	DCAction
38	LifeArc
41	the limbic
39	The Living Airway Biobank
S	Mesothelioma UK
B	National Respiratory Audit Programme (NRAP)
C	NHS England LeDer Team
37	NHS Wye Valley Trust
Q	NTM Patient Care UK and NTM Network UK
E	PCD Support UK
P	Tracheo-Oesophageal Fistula Support (TOFS)

8.00am-9.00am
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

8.45am-4.00pm
Whittle & Fleming, 3rd floor
POSTER VIEWING
Authors present: 10.00am – 11.00am

P1-P8
"Blowing in the wind" – Management of pneumothorax
Discussion of abstracts will take place from 2.15pm to 3.15pm in the St James, 4th floor

P9-P17
"Drug-stabbing time" – Treating thoracic malignancy
Discussion of abstracts will take place from 2.15pm to 3.25pm in the Rutherford, 4th floor

P18-P30
"Walk this way" – Innovations in pulmonary rehabilitation
Discussion of abstracts will take place from 2.15pm to 3.50pm in the Moore, 4th floor

P31-P44
"Danger! High voltage" – Diagnosis and management of sleep disordered breathing and respiratory failure
Discussion of abstracts will take place from 2.15pm to 4.00pm in the Westminster, 4th floor

P44-P58
"The heat is on" – Can we get greener in asthma?
Discussion of abstracts will take place from 2.15pm to 4.00pm in the Abbey, 4th floor

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8.45am-4.00pm
Cambridge, 5th floor
MODERATED POSTER VIEWING

M1-M12
"The long and winding road" – Optimising patient experience of respiratory care
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Cambridge, 5th floor

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8.00am – 8.30am
Albert, 2nd floor
BTS JOURNAL CLUB

COUGH

Dr Arietta Spinou (London)

Learning objectives

- *To review recent published evidence in the field of acute and chronic cough.*

So that delegates may review the papers in advance of the session, references to the papers to be discussed are available on the BTS website and Winter Meeting App.

8.30am-10.30am
Windsor, 5th floor
SYMPOSIUM

JOINT BTS/BALR SYMPOSIUM PART 1 – ANOTHER BRICK IN THE WALL: CELL INTERACTIONS WITH THE LUNG MATRIX

Chaired by: Dr Katy Roach (Leicester) and Dr Owen Tomlinson (Exeter)

8.30am	Symphony: insights from multicellular models Dr Charlotte Dean (London)
9.10am	Start me up: fibroblasts at the centre of the matrix Professor Janette K Burgess (Groningen)
9.50am	Squeeze box: influence of smooth muscle Dr Amanda Tatler (Nottingham)

Learning objectives

- *To provide an overview of how multicellular models are informing our understanding of the cellular interactions and pathways involved in airway remodelling with a specific focus on the extracellular matrix.*
- *To highlight the controlling role of the fibroblast in remodelling the lung extracellular matrix and how it can be therapeutically targeted.*
- *To understand the smooth muscle cell drivers to lung extracellular matrix remodelling.*

8.45am-10.15am
Churchill, Ground floor
SYMPOSIUM

BEAT IT: ASTHMA, HORMONES, MUCUS AND INFECTION

Chaired by: Dr Maisha Jabeen (Oxford) and Professor David Jackson (London)

8.45am Hormones and asthma: what the science tells us

Dr Dawn Newcomb (Nashville)

9.15am Mucus and asthma: causes and management

Professor Parameswaran Nair (Hamilton, Ontario)

9.45am Asthma and the microbiome

Dr Sarah Diver (Leicester)

Learning objectives

- *To learn about the role of sex hormones in asthma.*
- *To learn about the causes and management of mucus production in asthma.*
- *To review the role of the microbiome in asthma.*

8.45am – 10.15am
Mountbatten, 6th floor
SYMPOSIUM

TRANSPORT FUMES, FLAVOURINGS AND FIRES: EMERGING RESPIRATORY RISKS IN OCCUPATIONAL AND ENVIRONMENTAL LUNG DISEASES

Chaired by: Dr Peter Reid (Edinburgh) and Dr Ruth Wiggans (Manchester)

8.45am The respiratory hazards of transport emissions: trains, ships and automobiles: where are we?

Dr Matthew Loxham (Southampton)

9.15am Emerging occupational lung diseases associated with the food flavourings industries: what we can learn

Dr Kristin Cummings (Richmond, California)

9.45am The respiratory risks of fire smoke exposure

Dr Johanna Feary (London)

Learning objectives

- *To be aware of the components of transport-related air pollution and the respiratory risks of exposure and how to mitigate against them.*
- *To appreciate the respiratory diseases caused by exposure to food flavourings.*
- *To understand the respiratory risks of fire smoke exposure including wildfires.*

8.45am-10.05am
St James, 4th floor
SPOKEN SESSION: S1-S5

"The drugs do work!" – New treatments in cough

Chaired by: Professor Ian Pavord (Oxford) and Dr Nicola Roberts (Edinburgh)

8.50am **S1**

A phase 3b trial of gefapixant, a P2X3-receptor antagonist, in women with chronic cough and stress urinary incontinence

SS Birring, L Cardozo, P Dicpinigaitis, R Dmochowski, AS Afzal, C La Rosa, S Lu, A Martin Nguyen, R Yao, P Reyfman

9.05am **S2**

PAciFy Cough: a randomised, double-blind, placebo-controlled, two-way crossover trial of MST for the treatment of cough in idiopathic pulmonary fibrosis

Z Wu, LG Spencer, W Banya, J Westoby, P Rivera-Ortega, N Chaudhuri, I Jakupovic, B Patel, M Thillai, A West, M Wijsenbeek, TM Maher, JA Smith, PL Molyneaux

9.20am **S3**

Gefapixant efficacy and safety in participants with history of refractory or unexplained chronic cough for ≥1 vs <1 year

JA Smith, I Satia, SS Birring, L McGarvey, S Lu, A Martin Nguyen, J Xu, P Reyfman, E Urdaneta, G Philip, C La Rosa

9.35am **S4**

The impact of inhaled tussive agents on the urge to cough in refractory/unexplained chronic cough patients

J King, J Wingfield-Digby, B Al-Sheklly, S Galgani, K Holt, R Dockry, PA Marsden, JA Smith

9.50am **S5**

Early cough severity changes over the first 4 weeks of treatment with gefapixant in two phase 3 studies

AH Morice, SS Birring, P Dicpinigaitis, Q Li, E Urdaneta, G Philip, C La Rosa

8.45am-10.05am
Westminster, 4th floor
SPOKEN SESSION: S6-S10

"Survivor" – Prognostic indicators in interstitial lung disease

Chaired by: Dr Puja Mehta (London) and Dr Sheetu Singh (Jaipur)

8.50am **S6**

Social predictors of mortality in idiopathic pulmonary fibrosis

R Shankar, C Hadinnapola, A Clark, AM Wilson

9.05am **S7**

Predicting outcomes from acute exacerbations of interstitial lung disease: a multicentre observational study

AT Goodwin, H Lawrence, C Byrne, C Tunnell, CH Hon, A Burzic, HX Tan, C Flynn, S Toor, WAK Chua, JM Ruanto, QM Waleed, S Anis, M Al-Aghbari, A Alazhari, HN Shivamoggi, SA Hadi, W Chang, YL Pang, K Bhardwaj, K Nataraju, M Black, A Na, J Hutchinson, ZS Ong, T Pabla, D Williams, M Bawamia, SW Shah, A Ussaid, G Saini, B Gooptu, H Virk

9.20am **S8**

The burden of comorbidity in idiopathic pulmonary fibrosis versus chronic obstructive pulmonary disease

R Chapman, B Ozaltin, K Direk, J Jacob

9.35am **S9**

National UK experience of the treatment of progressive fibrosing interstitial lung disease with nintedanib

G Dixon, S Hague, H Thould, AMN Khin, S Mulholland, UK ILD Collaboration, M Gibbons, SL Barratt

9.50am **S10**

The prognostic implications of acutely deteriorating interstitial lung disease in patients with idiopathic inflammatory myositis

V Krishnan, P Dobson, TC Aw, N Bandarage Chandramal, PL Molyneaux, V Kouranos, J Donovan, M Kokosi, P George, A Devaraj, S Desai, R Hewitt, S Bax, GR Jenkins, J Alcada, F Chua

8.45am-10.05am
Moore, 4th floor
SPOKEN SESSION: S11-S15

"Don't want to miss a thing" – Novel diagnostics in malignant effusion and pleural infection

Chaired by: Professor Kevin Blyth (Glasgow) and Dr Amelia Clive (Bristol)

8.50am **S11**

Serial sampling for novel biomarker evaluation in malignant pleural effusion: the predictive potential of pleural fluid suPAR

A Dipper, DT Arnold, K Elvers, N Maskell, R Bhatnagar

9.05am **S12**

16s rRNA sequencing to identify causative organisms in pleural infections

M Siow, L Prtak, EO Bedawi

9.20am **S13**

Role of frozen section during medical thoracoscopy for decision making in a country with decreasing TB burden

T Kim, YJ Hong, HW Kim, JS Kim, JH Ahn, JH Ha

9.35am **S14**

A surge of paediatric thoracic empyema: identifying trends and lessons from the UK invasive Group A Streptococcus (iGAS) outbreak during 2022-2023

E Xilas, K Cao, W Jawaid, A Aslam

9.50am **S15**

Sensitivity of surgical pleural biopsies following a previous negative pleural biopsy

DK Sethi, EK Mishra

8.45am – 10.20am
Abbey, 4th floor
SPOKEN SESSION: S16 – S21

"Shake it off" – Recovery from COVID-19

Chaired by: Professor Charlotte Bolton (Nottingham) and Dr Hamish McAuley (Leicester)

8.50am **S16**

Recovery, burden of symptoms and health related quality of life (HRQoL) at 1-year post COVID-19 hospitalisation in patients with pre-existing airways diseases: results from a prospective UK cohort study (PHOSP-COVID)

O Elneima, HJC McAuley, JR Hurst, S Walker, S Siddiqui, P Novotny, JK Quint, P Pfeffer, A Sheikh, JS Brown, M Shankar-Hari, C Echevarria, RA Evans, LV Wain, LG Heaney, A De Soyza, CE Brightling

9.05am **S17**

Greater adiposity is associated with non-recovery at one year following hospitalisation for COVID-19: results from a prospective UK cohort study (PHOSP-COVID)

HJC McAuley, CA Flynn, LE Latimer, G Mills, M Baldwin, CE Bolton, CE Brightling, O Elneima, PL Greenhaff, WDC Man, SJ Singh, MC Steiner, LV Wain, J Lord, RA Evans, NJ Greening

9.20am **S18**

Long-term symptom profiles after COVID-19 vs other acute respiratory infections: a population-based observational study

G Vivaldi, P Pfeffer, M Talaei, J Basera, SO Shaheen, AR Martineau

9.35am **S19**

Gas exchange imaging using dissolved-phase 129Xe MRI in post COVID cohorts

LC Saunders, GJ Collier, LJ Smith, PJC Hughes, H Marshall, HF Chan, A Biancardi, J Grist, S Strickland, L Gustafsson, LP Ho, I Hall, A Goodwin, T Meersman, G Pavlovskaya, J Brooke, I Stewart, R Lawson, L Watson, F Gleeson, G Jenkins, AAR Thompson, JM Wild

9.50am **S20**

Long-COVID: a multi-faceted syndrome explored in the EXPLAIN study (HypErpolarised Xenon Magnetic Resonance PuLmonary ImAging In PatieNts with Long-COVID)

KL Ng, L Saunders, G Collier, J Grist, S Strickland, L Gustafsson, L Smith, RI Evans, G Vuddamalay, H Walters, SA Jones, S Renju Thomas, A Laws, V Matthews, N Kainth, L Pearce, A Elbehairy, K Jacob, G Abu Eid, J Rodgers, A McIntyre, M Durrant, K Yeung, W Hickes, A Horsley, HE Davies, AAR Thompson, N Rahman, J Wild, FV Gleeson, E Fraser

10.05am **S21**

Small airways function in patients with long COVID-19 syndrome following hospitalisation

A Vontetsianos, N Chynkiamis, C Anagnostopoulou, C Lekka, N Anagnostopoulos, G Kaltsakas, I Vogiatzis, N Koulouris

8.45am-10.20am
Rutherford, 4th floor
SPOKEN SESSION: S22-S27

"The beat goes on" – Novel data in mucociliary disorders

Chaired by: Professor Jane Lucas (Southampton) and Dr Anand Shah (London)

8.50am **S22**

Longitudinal changes in chest CT imaging in children with primary ciliary dyskinesia

OK Fitzpatrick-Nash, T Semple, S Akbar, S Carr

9.05am **S23**

Antimicrobial management guidelines for children with primary ciliary dyskinesia – a Delphi Consensus

M Narayanan, WT Walker, P Kenia, EA Robson, JS Lucas, CO Callaghan, C Hogg, T Doctor, S Bentley, P Kalima, SB Carr

9.20am **S24**

Proteomics reveals distinct drivers of cystic fibrosis lung function and quality of life outcomes: post-hoc analysis of the AZTEC-CF study

F Frost, S Pottenger, D Neill, D Nazareth, J Fothergill

9.35am **S25**

Benefits of lumacaftor/ivacaftor (LUM/IVA) initiation in children with CF aged 2 through 5 years: interim results from an ongoing registry-based study

C Kim, M Higgins, R Zahigian, A Zolin, L Naehrlich

9.50am **S26**

Clinical, microbial and inflammatory characterisation of eosinophilic bronchiectasis

J Pollock, M Shuttleworth, M Long, AJ Dicker, H Richardson, S Aliberti, J Altenburg, F Blasi, SH Chotimall, A De Soyza, K Dimakou, R Dhar, JS Elborn, P Goeminne, C Haworth, M Loebinger, N Lorent, R Menendez, E Polverino, P Regis-Burgel, F Ringshausen, O Sibila, M Shteinberg, A Spinou, A Torres, M Vendrell, T Welte, A Shoemark, JD Chalmers

10.05am **S27**

The relationship between neutrophilic inflammation and the airway microbiome using novel full length 16s rRNA sequencing in bronchiectasis

E Johnson, M Shuttleworth, E Cant, A Dicker, H Richardson, E Kewin, A De Soyza, K Dimakou, M Shteinberg, A Spinou, F Ringshausen, N Lorent, P Goeminne, M Loebinger, SH Chotirmall, R Dhar, C Haworth, J Altenburg, F Blasi, T Welte, O Sibila, S Aliberti, A Shoemark, JD Chalmers

10.00am-11.00am
Whittle & Fleming and Britten, 3rd floor

COFFEE/TEA BREAK

10.45am-11.50am
St James, 4th floor
SPOKEN SESSION: S28-S31

"How to save a life" – T2 inflammatory profiles in COPD

Chaired by: Dr Imran Howell (Oxford) and Professor Parameswaran Nair (Hamilton, Ontario)

10.50am **S28**

Non-invasive nasal sampling using nasosorption may identify COPD inflammatory profiles and have a role as a diagnostic tool in exacerbations

HLB Owles, JR Baker, P Fenwick, SL Elkin, KC Kasmi, PJ Barnes, LE Donnelly

11.05am **S29**

Association between stable state blood eosinophils counts (BEC), basophils and eosinophil/basophil ratio (EBR) with COPD exacerbations

A Prasad, C Echevarria, J Steer, SC Bourke

11.20am **S30**

Temporal stability of blood eosinophil endotype in COPD

A Prasad, C Echevarria, J Steer, SC Bourke

11.35am **S31**

Efficacy of Dupilumab in chronic obstructive pulmonary disease with Type 2 inflammation by baseline blood eosinophil count

M Bafadhel, SP Bhatt, KF Rabe, NA Hanania, CF Vogelmeier, J Cole, SA Christenson, A Papi, D Singh, E Laws, ER Mortensen, J Maloney, X Lu, D Bauer, A Bansal, LB Robinson, RM Abdulai

10.45am-12.05pm
Westminster, 4th floor
SPOKEN SESSION: S32-S36

"Revolution" – Updates from UK cancer screening

Chaired by: Professor David Baldwin (Nottingham) and Dr Patrick Goodley (Manchester)

10.50am **S32**

Implementing lung cancer screening in the UK: baseline results from the NHS England National 'Targeted Lung Health Check' Programme

RW Lee, H Balata, T Bartholomeuz, R Booton, M Callister, L Cheyne, P Crosbie, C Daneshvar, D Desai, A Devaraj, S Grundy, I Hussein, D McGeachy, J Messenger, J Howells, S Janes, M Muller, C Osborne, J Page, S Quaife, S Raza, A Randle, J Rawlinson, P Richards, A Stevenson, G Tsaknis, A Ward, * Site Clinical Leads & Project Team, Ipsos, * TLHC Expert Advisory Group, P Sasieni, D Baldwin, A Nair

11.05am **S33**

Performance of volume and diameter thresholds in predicting and excluding malignancy in screen-detected solid nodules in the SUMMIT study

AW Creamer, C Horst, JL Dickson, S Tisi, H Hall, P Verghese, R Prendecki, A Bhamani, K Gyertson, A Hacker, L Farrelly, A Devaraj, A Nair, A Hackshaw, SM Janes

11.20am **S34**

Targeted Lung Health Check – Nodules: prior imaging

A Mehmood, B Rowlands, A Iyer, R Riordan, C Daneshvar

11.35am **S35**

Real-world impact of Targeted Lung Health Check (TLHC) programme on downstream activities in the secondary care and beyond: a pilot site experience

S Hussain, A Nasimudeen, D Trushell-Pottinger, I Waldron, J Page, S Matthews, M Kyi,

11.50am **S36**

Outcomes after curative treatment for patients diagnosed with clinical stage I lung cancer in the Yorkshire Lung Screening Trial

H Bailey, PAJ Crosbie, M Darby, K Franks, R Gabe, MPT Kennedy, HZ Tam, A Brunelli, MEJ Callister

10.45am-12.05pm
Moore, 4th floor
SPOKEN SESSION: S37-S41

"Right here, right now" – Bench to bedside in pulmonary vascular disease

Chaired by: Professor David Kiely (Sheffield) and Dr Elaine Soon (Cambridge)

10.50am **S37**

Mutations in GCN2 cause pulmonary vascular disease via dysfunctional inflammatory pathways

M Schweining, M Southwood, S Moore, A Crosby, R Kay, K Kishore, R Thompson, NW Morrell, SJ Marciniak, E Soon

11.05am **S38**

Incidence and phenotypic predictors of arrhythmias in idiopathic pulmonary arterial hypertension

SA Reddy, JT Middleton, SL Nethercott, GJ Polwarth, J Pepke-Zaba, CA Martin, AMK Rothman, MR Toshner

11.20am **S39**

Long term outcome in chronic thromboembolic pulmonary hypertension in the multimodality treatment era: a UK national cohort analysis

H Ghani, P Appenzeller, A Reddy, K Bunclark, J Cannon, K Sheares, M Toshner, D Taboada, S Hoole, G Coghlan, D Jenkins, C Ng, J Taghavi, S Tsui, N Screaton, A Rugierro, L D'Errico, J Pepke-Zaba

11.35am **S40**

ERUPT: Evaluation of Real-world Use of Pulmonary embolism (PE) Thrombolysis

R Sobala, R Thompson, JCT Kibbler, A Jha, INSPIRE Collaborators, A De Soyza

11.50am **S41**

A retrospective review of the causes and circumstances of death of patients with PAH and CTEPH

E Lyka, I Akbar, JE Cannon, J Pepke-Zaba, KK Sheares, D Taboada, MR Toshner, K Bunclark

10.45am-12.15pm
Churchill, Ground floor
SYMPOSIUM

WHAT MUST BE DONE TO "END TB"?

Chaired by: Dr Martin Dedicoat (Birmingham) and Dr Kerry Millington (Liverpool)

10.45am TB control: a global health perspective
Professor Jeremiah Chakaya Muhwa (Nairobi)

11.07am Science of TB control
Professor JoAnne Flynn (Pittsburgh)

11.29am "Ending TB" as one of many poverty-related threats to lung health: learning from Africa
Dr Obianuju Ozoh (Lagos)

11.51am What makes a difference to people in TB clinics?
Dr Jessica Potter (London)

Learning objectives

- *To describe the host-pathogen interactions that can limit TB infection and disease, stop transmission and control TB.*
- *To understand and define the key areas that need to be addressed if we are to eliminate TB by providing better health and care for all.*
- *To have a better understanding of the challenges on the ground of work to end TB whilst simultaneously tackling other poverty-related threats to lung health.*
- *To outline the individual psychosocial and broader structural system factors that can be improved to optimise TB control in a UK setting.*

10.45am-12.15pm
Mountbatten, 6th floor
SYMPOSIUM

NOVEL PHYSIOLOGICAL BIOMARKERS IN THE DIAGNOSIS OF RESPIRATORY AND SLEEP DISORDERS

Chaired by: Dr Julie Lloyd (Birmingham) and Dr Joanna Shakespeare (Coventry)

10.45am Hyperpolarised MRI and multiple breath washout: ready for the clinic?
Dr Laurie Smith (Sheffield)

11.15am Breathomics and acute breathlessness
Professor Salman Siddiqui (London)

11.45am Artificial intelligence and wearables in the diagnosis of sleep disorders
Dr Cathy Goldstein (Ann Arbor, Michigan)

Learning objectives

- *To discuss the role of novel imaging and physiology techniques in respiratory medicine.*
- *To identify the diagnostic value of exhaled breath biomarkers in the differential diagnosis of acutely breathless patients.*
- *To discuss the role of novel diagnostics for sleep disorders utilising artificial intelligence and digital health.*

10.45am-12.20pm
Abbey, 4th floor
SPOKEN SESSION: S42-S47

"The kids aren't alright" – Does this child have asthma, or something else?

Chaired by: Dr Prasad Nagakumar (Birmingham) and Professor Clare Murray (Manchester)

10.50am **S42**
Diagnosing asthma in children – how can it be improved?
L Healy, R Wang, S Drake, M Bennett, S Fowler, A Simpson, CS Murray

11.05am **S43**
Stability of blood eosinophil count and fractional exhaled nitric oxide over time in preschool children with wheeze
A Perikleous, SJ Bowen, C Griffiths, I Pavord, M Rosenthal, L Fleming, A Bush

11.20am **S44**
Developing a quality of life outcome measure for paediatric severe asthma: a qualitative study
A Rattu, S Easton, G Roberts

11.35am **S45**
Forced oscillometry technique in children with preschool wheeze: feasibility and relationship to clinical parameters

F Alabdulkareem, Y Bingham, S Irving, S Saglani

11.50am **S46**

The utility of cardiopulmonary exercise testing in the diagnosis of exercise induced laryngeal obstruction in children and adolescents

PD Burns, K Hamlett, DM Wynne, PL Davies, RM Lennon, RJ Langley

12.05pm **S47**

Do high tidal volumes at peak exercise cause exercise induced laryngeal obstruction (EILO)?

FM Smith, C Richardson, N Orr, S Sonnappa

11.00am-1.00pm
Windsor, 5th floor
SYMPOSIUM

JOINT BTS/BALR SYMPOSIUM PART 2 – ANOTHER BRICK IN THE WALL: CELL INTERACTIONS WITH THE LUNG MATRIX

Chaired by: Dr Kylie Belchamber (Birmingham) and Professor Karl Staples (Southampton)

11.00am I don't WNT to miss a thing: epithelial control of airway remodelling

Dr Yan Hu (Denver)

11.40am Eat, sleep, rave, repeat: macrophages as guardians of the matrix

Professor Clare Lloyd (London)

12.20pm B(eat) it: plasma cell depletion protects against fibrosis

Associate Professor Cecilia Prêle (Perth)

Learning objectives

- *To highlight the controlling role of the epithelium in remodelling the lung extracellular matrix and the WNT pathway in particular, and how it can be therapeutically targeted.*
- *To understand the mechanisms by which macrophages drive lung extracellular matrix remodelling.*
- *To highlight new research demonstrating the role of B cells in lung remodelling.*

11.00am-12.00pm
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Occupational and Environmental Lung Disease

11.00am-12.00pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Cough

11.00am-12.00pm
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Speciality Trainee

12.00pm-2.00pm
Pickwick, 1st floor and Whittle & Fleming, 3rd floor

LUNCH (Not included in the delegate fee. Card payments only)

12.30pm-1.30pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Tuberculosis and Non-Tuberculous Mycobacteria

1.15pm-2.00pm
Churchill, Ground floor
AWARD LECTURES

BTS/A+LUK/BALR Lecture Awards

Chaired by: Professor James Chalmers (Dundee) and Professor Karl Staples (Southampton)

Judged by: Professor Mona Bafadhel (London), Professor James Chalmers (Dundee) and Professor Karl Staples (Southampton)

1.20pm Asthma … time is of the essence

Dr Hannah Durrington (Manchester)

1.40pm Immune and lung epithelial development in health and disease

Dr Marko Nikolic (London)

2.00pm-3.00pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

COPD

2.00pm-3.00pm
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Interstitial and Rare Lung Disease

2.15pm-3.15pm
St James, 4th floor
POSTER DISCUSSION: P1 – P8

"Blowing in the wind" – Management of pneumothorax

Chaired by: Dr Rahul Bhatnagar (Bristol) and Dr Mark Roberts (Nottingham)

P1 Which clinical factors are predictive of outcome in primary spontaneous pneumothorax management?

M Zain, NM Rahman, RJ Hallifax

P2 "To drain or not to drain? That is the question": a UK-wide physician survey of practice to understand the management of pneumothorax after CT-guided lung biopsy

B Iqbal, D Addala, A Sundaralingam, A Elsheikh, S Guo, J Wrightson, R Hallifax, NM Rahman

P3 Survey of pleural procedures performed by general medical registrars

M Khan, R Nixon, D Davies

P4 Pneumothorax trends 2010-2020: a single centre retrospective study

J Hyman, A Aujayeb

P5 Conservative management of large primary spontaneous pneumothorax – an inner city, tertiary centre experience

J Zhang, SW Chua, J Liang, M Malik, O Kadwani

P6 Current management of primary spontaneous pneumothorax in a teaching hospitals and suitability for an ambulatory pathway

O Mohammad, D Peat, S Gudur, M Hassan

P7 An evaluation of the content, readability, and reliability of publicly available web-based information on pneumothorax surgery in Ireland

M Ho, S Abrar, P Higgins, K Doddakula

P8 My Pneumothorax Journey. A primary spontaneous pneumothorax patient information resource

C Craig, M Aboushehata, I Penman, J Robinson, M Antony, M Evison, M Haris

2.15pm-3.25pm
Rutherford, 4th floor
POSTER DISCUSSION: P9-P17

"Drug-stabbing time" – Treating thoracic malignancy

Chaired by: Dr Anna Bibby (Bristol) and Dr Luke Wylie (Cambridge)

P9 Improving the use of adjuvant chemotherapy for lung cancer

J Scott, N Thakur, T Joy, MH Lawson

P10 "Something like a house of horrors": a mixed methods study examining the reasons for refusal of potentially curative treatment in early-stage lung cancer

H Morgan, R Hubbard, D Baldwin, R Murray, M Bains, EL O'Dowd

P11 The relationship between systemic inflammation and survival in good performance status in patients with advanced, inoperable NSCLC: a comparison of composite ratios and cumulative scores

S Will, F O'Rourke, H Nguyen Lee, C Maseland, E Cranfield, RD Dolan, N MacLeod, DC Millan, J McGovern

P12 The relationship between 18-F-FDG-PETCT-derived tumour metabolic activity, TNM stage, systemic inflammation, serum LDH and survival in patients with advanced, inoperable NSCLC

F O'Rourke, S Will, C Maseland, E Cranfield, RD Dolan, N MacLeod, S Han, DC Millan, J McGovern

P13 Patient survival with Malignant Pleural Effusions (MPE): a retrospective cohort study looking at LENT and clinical PROMISE score categories and survival

A Yousuf, H Virk, J Cassar, H Samarasinghe, D ElSawy, S Mohammad, S Ajmal, R Sudhir, R Panchal

P14 Patients with mesothelioma and their carers experience of diet and appetite: a qualitative preliminary insight from the Help Meso Study

L Dismore, L Taylor, A Aujayeb, K Swainston

P15 Surgical resection results in prolonged survival in patients with stage III NSCLC

BM Muehling, F Kanz, J Haeberlin, P Xu, A Babiak, C Babiak

P16 Clinical management and outcomes of granulomatous inflammation following lung resection: a retrospective case series study

S Mohammad, A Ussaid, M Jones, J Bennett, A Nakas, S Rathinam, R Sudhir, P Haldar

P17 Planning thoracic surgery capacity for lung cancer screening in Wales

SR Eccles, D Lentle, J Morgan, C Wright, C Coslett, A Smith

2.15pm-3.45pm
Churchill, Ground floor
SYMPOSIUM

PREVENTING RESPIRATORY INFECTIONS: RISING TO THE CHALLENGE

Chaired by: Dr Catherine Hyams (Bristol) and Professor Wei Shen Lim (Nottingham)

2.15pm Respiratory challenge studies in COVID and beyond
Professor Christopher Chiu (London)

2.45pm Respiratory syncytial virus vaccination
Professor Peter Openshaw CBE (London)

3.15pm Tuberculosis prevention: can we do better than BCG?
Professor Helen McShane (Oxford)

Learning objectives

- *To discuss the role of human challenge studies in the understanding of disease pathogenesis and vaccine development.*
- *To review recent data on vaccination against respiratory syncytial virus and its potential impact on public health.*
- *To review developments towards a new vaccine against tuberculosis.*

2.15pm-3.45pm
Mountbatten, 6th floor
SYMPOSIUM

JOINT BTS/BPRS SYMPOSIUM – CHEST WALL DEFORMITIES: WHO, WHY, WHAT TO DO AND WHEN?

Chaired by: Dr Cara Bossley (London) and Dr Sonal Kansra (Sheffield)

2.15pm Overview of chest wall deformities: definitions, causes and associations
Professor Julian Forton (Cardiff)

2.40pm Conservative management of chest wall deformity
Ashley Johnstone (Glasgow)

3.05pm Pectus and me: patient stories chronicling the challenges of living with pectus
Lynne Evans (Parent and pectus advocate)

3.20pm Surgical interventions and pre-op considerations
Mr Joel Dunning (Middlesbrough)

Learning objectives

- *To learn about the terminology and causes of chest wall deformity.*
- *To identify which children require further investigations and apply available evidence to effectively manage children with chest wall deformity.*
- *To discuss the patient journey including investigation and currently available treatments and the impact on the child and their family.*

2.15pm-3.45pm
Windsor, 5th floor
PRIZE SYMPOSIUM: T1-T6

JOINT BTS/BALR/A+LUK EARLY CAREER INVESTIGATOR SYMPOSIUM

Chaired by: Professor Jonathan Bennett (Leicester)

Judged by: Professor Mona Bafadhel (London), Professor James Chalmers (Dundee) and Professor Karl Staples (Southampton)

2.15pm **T1**

Alterations in vasoconstrictor biomarkers persist up to a year post-COVID-19 and are associated with pulmonary pathology

L Raman, B Ahmetaj-Shala, H Gashaw, M Rickman, A Singanayagam, A Shah, A Reed, P Kelleher, JA Mitchell, PM George

2.30pm **T2**

A novel drug target: IL-36 signalling drives inflammation and poor bacterial clearance in COPD

HLB Owles, JR Baker, P Fenwick, SL Elkin, KC Kasmi, PJ Barnes, LE Donnelly

2.45pm **T3**

Single cell analysis reveals mechanisms of azithromycin and regulation of mucosal immunity in severe asthma

MF Jabeen, W Lason, M Mahdi, P Klenerman, ID Pavord, E Marchi, TSC Hinks

3.00pm **T4**

The respiratory mycobiome is perturbed during viral infection in COPD and drives type 2 immunopathology and exacerbation severity

OR Pitts, DP Conn, T Faiez, P Mallia, MB Trujillo-Torralbo, J Footitt, SL Johnston, PC Cook, A Singanayagam

3.15pm **T5**

Understanding the extracellular immunoproteasome in the acute respiratory distress syndrome

MC McKelvey, T Mawhinney, CM McKee, RC Coll, CM O'Kane, DF McAuley, S Weldon, CC Taggart

3.30pm **T6**

Genome-wide mutagenesis screens identify regulators of cellular iron metabolism and ferroptosis

AW Martinelli, N Wit, JA Nathan

2.15pm-3.45pm
Cambridge, 5th floor
POSTER DISCUSSION: M1-M12

"The long and winding road" - Optimising patient experience of respiratory care

Chaired by: Dr Vincent Mak (London) and Dr Fiona Mosgrove (Aberdeen)

M1 Direct to test: the trend to chest CT scanning requests through primary care

R Nahar, O Bosher, A Makan, K Srinivasan, H Moudgil

M2 Digital technology in respiratory physiotherapy: a double edged sword. Trends in DNA (Did Not Attend) rates from 544 respiratory physiotherapy appointments at a tertiary centre

L Henderson, J Kilduff, J Beard, G Korff, L Grillo

M3 Clinical outcomes of an integrated obstructive lung disease programme in Pakistan

F Khan, M Siddiqui, S Saeed

M4 Central London outreach ILD transplant clinic experience

S Ratnakumar, V Joel Solis, A Webb, J Guinto, D Basire, H Chung, JS Parmar, JC Porter

M5 Is it possible to predict Nintedanib tolerance in patients with progressive fibrotic interstitial lung diseases (PF-ILD)? Experience from a UK Tertiary ILD Centre

J Bradley, C Rowan, S Charles, A Boland, TJT Sutherland, P Beirne

M6 Critically examining the end of life care of people with interstitial lung disease: views of patients, families and healthcare professionals

E Palmer, AM Bourke, S Visram, C Exley, I Forrest

M7 Improving the use of Treatment Escalation Plans in the care of respiratory inpatients in a large tertiary centre

RSA Higginson, K Hamilton

M8 The role of societal stigma in engagement with physical activity for people living with a lung condition

S-R Langston, A Cumella, A Francis

M9 Importance of patient voice in guiding the management of COPD

MK Han, I McMullan, M Warner, C Compton, R Sharma, R Tal-Singer, M Román-Rodríguez

M10 Challenges of patient engagement to a COPD virtual ward, following an admission for an acute exacerbation of COPD

EE Vincent, Z Hawksley, N Gardiner, L Houchen-Wolloff, SJ Singh

M11 A scoping review exploring adoption of digital stress management resources for long-term health conditions – just useful for respiratory conditions?

NJ Roberts, G Gebreheat, F MacLean, F Connolly, C Breen, A Porter-Armstrong

M12 Rotating through respiratory medicine – what can we do to improve efficiency, performance, and confidence?

C Salisbury, H Badawy, A Lal, S Tan

2.15pm-3.50pm
Moore, 4th floor
POSTER DISCUSSION: P18-P30

"Walk this way" – Innovations in pulmonary rehabilitation

Chaired by: Dr Linzy Houchen-Wolloff (Leicester) and Dr Adam Lewis (London)

P18 Barriers and facilitators of physical activity: perceptions of people with COPD, without COPD and healthcare professionals in Saudi Arabia

R Alruwaili, A Albarrati, D Pickering, U Jones, N Gale

P19 Motivations for completing pulmonary rehabilitation – a qualitative analysis

J Harvey, K Ingram, G Edwards, T Jenkins, G Gardener, S Patel, W D-C Man, R Barker

P20 Experiences and attitudes of pulmonary, breathlessness and COVID-19 rehabilitation deliverers about the protected characteristics of service users

H Drover, E Daynes, SJ Singh, MW Orme

P21 Collection and reporting of Equality Act 2010 protected characteristics within studies of pulmonary rehabilitation in the United Kingdom

H Drover, E Daynes, L Gardiner, SJ Singh, MW Orme

P22 Unmet need and barriers in provision of pulmonary rehabilitation for people with COPD: findings from a large UK survey

A Francis, A Cumella

P23 Videoconference pulmonary rehabilitation (PR) and change in knowledge in people with chronic obstructive pulmonary disease (COPD): a propensity-matched analysis

CY Cheung, WS Yam, M Palmer, S Clarke, W Man, CM Nolan

P24 Is home-based pulmonary rehabilitation (PR) associated with improvements in knowledge in people with chronic obstructive pulmonary disease (COPD)? A propensity-matched analysis

WS Yam, CY Cheung, M Palmer, S Clarke, W Man, CM Nolan

P25 A mixed methods evaluation of a 12-week blended digital and face-to-face rehabilitation programme for people with long COVID-19

AJ Simpson, MG Crooks, C Killingback, M Pearson, C Duke, A Fenwick, D Moore, A Williams

P26 Feasibility of a community-based education and physical therapy programme to improve symptoms of long COVID-19

M Armstrong, D Megaritis, M Ball, J Glennie, MJ Hogg, K Haighton, F Hettinga, I Barakou, P Court, S Potthoff, J Unsworth, G Burns, I Vogiatzis

P27 Rehabilitation-induced benefits do not differ between men and women with long COVID-19 syndrome

N Chynkiamis, A Vontetsianos, C Anagnostopoulou, C Lekka, G Kaltsakas, I Vogiatzis, N Koulouris

P28 Incremental and endurance shuttle walk test performance and functional assessment of chronic illness therapy fatigue scale are maintained or improved at 3-months following a 6-week in-person or online COVID rehabilitation programme

AS Hong, L Houchen-Wolloff, KA Alqahtani, E Daynes, E Chaplin, SJ Singh

P29 Exercise-based interventions targeting balance and falls risk in people with COPD: a systematic review with meta-analysis

KJ Loughran, J Emerson, S Suri, E Kaner, T Rapley, D Martin, J McPhee, C Fernandes-James, SL Harrison

P30 Mental Health Interventions in ChroNic Respiratory Disease (MiND project): a pilot trial of specialised psychological care embedded within a general respiratory service

F Cientanni, P Liu, H Galliard, J Fearn, D Dhasmana

2.15pm-4.00pm
Westminster, 4th floor
POSTER DISCUSSION: P31-P44

"Danger! High voltage" – Diagnosis and management of sleep disordered breathing and respiratory failure

Chaired by: Dr Rebecca D'Cruz (London) and Dr Martino Pengo (Milan)

P31 Combining four screening tools for cost effective screening of OSA in train drivers

LO Ogunyemi, SN Nafisa, TS Stacey, MS Sovani

P32 Compliance and patient satisfaction in large group face to face initiation consultations for CPAP

R Hughes, K Grant, C Williams-Allen, L Campbell, L Hesketh, G Phillips, J Billington, S Craig

P33 Comparing CPAP compliance in obese and non-obese patients with obstructive sleep apnoea

L Chilton, S Faruqi, H Hearn

P34 The impact of COPD on the disease course in OSA

NC Ramchander, B Csoma, P Senior, Z Umar, A Bikov

P35 Central sleep apnoea: patient characteristics and therapy data from a large teaching hospital in the UK

C Narvaez, K Kumar, G Siggins, V Ershadi, H Qiam, C Haddinapola, P Sankaran

P36 Experience of a district general hospital physiotherapy led respiratory failure service

S Harding, LE Hodgson

P37 A cross sectional survey of documentation of terminology, of adult service users receiving NIV and CPAP outside of the critical care environment from across the multi-disciplinary team

H White, J Lloyd, N Smirk, V Spillane, J Shingler

P38 Does spacer/adapter device choice affect delivery of a pressurized metered dose inhaler (pMDI) through a humidified circuit to a simulated patient on mechanical ventilation?

M Nagel, C Doyle, R Ali, J Suggett, J Patel

P39 Outcomes after critical care admission in people with a learning disability

E Harrison, PB Messer, HM Tedd, CK Ho, A Carter, T Ross, H Gillott

P40 Characteristics of patients in a home ventilation outreach service. Potential drivers behind health inequality in non-invasive ventilation

L Elliott, A Patel, M Pittman, R Madula, C Wood, T Flemming, T Mathieson, KK Lee

P41 From respiratory failure to respiratory success: remote monitored IVAPS-based home NIV controls hypercapnic respiratory failure, improves survival and offsets inequalities

M Sahibqran, C Levey, M Manthe, A Taylor, G McDowell, E Livingston, C Carlin

P42 Fixed versus variable pressure modes of long-term non-invasive ventilation in patients with chronic hypercapnic COPD

BC Csoma, AB Bentley, ZL Lazar, AB Bikov

P43 Breathing matters: patient and carer experience of high flow oxygen therapy at home for progressive, irreversible respiratory failure

J Rodger, H Tedd, A Armstrong, KLM Hester, L Robinson

P44 Supporting patient preference for location of elective withdrawal from non-invasive ventilation in motor neurone disease

G Cox, E Johnstone, C Davis, D Shrikrishna

2.15pm-4.00pm
Abbey, 4th floor
POSTER DISCUSSION: P45-P58

"The heat is on" – Can we get greener in asthma?

Chaired by: Mrs Grainne d'Ancona (London) and Dr Alex Wilkinson (Stevenage)

P45 Asthma outcomes, inhaled corticosteroid adherence and socioeconomic deprivation in English Clinical Commissioning Group regions

H Hussain, TM McKeever, S Gonem

P46 How and when do patients dispose of old or unwanted inhalers?

A Murphy, W Carroll, M Gotsell, C Potter, J Quint, R Malone

P47 An observational study on the carbon footprint from inhaler use in people with asthma

J Haughney, E McKnight, B Chakrabarti, AJ Lee

P48 Have we taken any steps to reduce the environmental impacts of inhalers? A perspective from a specialist respiratory team in a deprived area of the UK

D Kadar, K Fitzsimmons, E Gossage, S Sibley, D Wat, D Barber, E Rickards, S Hayes

P49 What progress has been made in reducing greenhouse gas emissions from inhalers in England? An analysis of inhaler prescribing data 2018-2023

EA Samuel, A Wilkinson, JN Smith

P50 Cradle-to-grave emission reduction for dry powder inhaler product portfolio

H Hisinger-Mölkänen, M Inget, S Lähelmä, N Paronen

P51 Switching inhaler treatment from pMDI to DPI in real-world; reduction of carbon footprint

C Janson, V Vartiainen, H Hisinger-Mölkänen, L Lehtimäki

P52 Effectiveness of a national respiratory toolkit to drive the green agenda in inhaler prescribing in Wales

SM Barry, G Moore, C Davies, L Wallis

P53 Patient group education sessions: an effective way of making asthma treatment greener?

C Yiu, M Savage, A Piwko, J Yick, C Kennedy

P54 Trends in inhaler use and associated carbon footprint: a sales data-based study in Europe

V Vartiainen, C Janson, H Hisinger-Mölkänen, L Lehtimäki, A Wilkinson

P55 A training tool on inspiratory manoeuvre success in pMDIs and DPIs: the INSPIRE study

FJ Álvarez Gutiérrez, K Baynova, JL Izquierdo Alonso, AL Valero Santiago, M Blanco Aparicio

P56 Clinical accuracy and risk of harm in asthma related content on TikTok

J Murray, E McNally, B Kent

P57 Addressing complex non-adherence among patients with severe asthma using a dedicated adherence clinic

M Almutairi, H Hussein, L White, S Gilbey, J Marriott, A Mansur

P58 Cardio-respiratory outcomes in COPD patients following exposure to particulate matter on the London Underground: preliminary results

AE Kent, A Powell, M Hedges, D Green, R Sinharay, F Kelly

3.15pm-4.15pm,
Whittle & Fleming and Britten, 3rd floor

COFFEE/TEA BREAK

4.15pm-4.45pm
Churchill, Ground floor

AWARD PRESENTATIONS

Presentation of the BTS Medal, BTS Meritorious Service Award, BTS President's Award, BTS/BALR/A+LUK Early Career Investigator Awards, BTS/A+LUK/BALR Lecture Awards, BTS Medical Student Awards and the BTS/NIHR Awards.

4.45pm-5.30pm
Churchill, Ground floor

BTS PRESIDENT'S ADDRESS

"#Respisbest"

BTS President: Professor Jonathan Bennett (Leicester)

Introduced by: Professor Onn Min Kon (London)

5.45pm-6.15pm
Churchill, Ground floor

BTS ANNUAL GENERAL MEETING

British Thoracic Society members only

8.00am-9.00am
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

8.45am-4.00pm
Whittle & Fleming, 3rd floor
POSTER VIEWING

Authors present: 10.00am – 11.00am

P59-P69
"Sweet child of mine" – Innovations in paediatric lung disease
Discussion of abstracts will take place from 2.15pm to 3.40pm in the Rutherford, 4th floor

P70-P81
"I still haven't found what I'm looking for" – Cancer diagnosis: imaging and bronchoscopy
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Westminster, 4th floor

P82-P93
"When the going gets tough" – Difficult infection and NTM
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Moore, 4th floor

P94-P106
"Take my breath away" – Novel diagnostics in respiratory disease
Discussion of abstracts will take place from 2.15pm to 3.50pm in the Abbey, 4th floor

P107-P118
"It's not easy being green" – Suppurative lung diseases
Discussion of abstracts will take place from 4.15pm to 5.45pm in the Abbey, 4th floor

P119-P131
"The way you make me feel" – Beyond the basics in asthma
Discussion of abstracts will take place from 4.15pm to 5.50pm in the Westminster, 4th floor

P132-P144
"Just like a pill" – TB treatment challenges and outcomes
Discussion of abstracts will take place from 4.15pm to 5.50pm in the Moore, 4th floor

P145-P151
"Drop the pressure" – Investigating and treating pulmonary vascular disease
Discussion of abstracts will take place from 4.15pm to 5.15pm in the Rutherford, 4th floor

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8.45am-4.00pm
Cambridge, 5th floor
MODERATED POSTER VIEWING
M13-M26
"Against all odds" – Fight for the future of asthma
Discussion of abstracts will take place from 2.15pm to 4.00pm in the Cambridge, 5th floor

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8.00am-8.30am
Albert, 2nd floor
BTS JOURNAL CLUB
ASTHMA

Dr Hitasha Rupani (Southampton)

Learning objectives

- *To review recent publications in the field of asthma and discuss their potential impact on clinical practice.*

So that delegates may review the papers in advance of the session, references to the papers to be discussed are available on the BTS website and Winter Meeting App.

8.45am-9.45am
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Sleep Apnoea

8.45am-9.50am
Moore, 4th floor
SPOKEN SESSION: S48-S51
"Don't stop believing" – Tumour biology: implications for treatment

Chaired by: Dr Frank McCaughan (Cambridge) and Dr Alexandra Teagle (Edinburgh)

8.50am **S48**

Molecular characterisation of lung adenocarcinoma histological patterns

A Nastase, SAG Willis-Owen, C Domingo-Sabugo, E Starren, M Olanipekun, AG Nicholson, MF Moffatt, WOCM Cookson

9.05am **S49**

Hepatocyte growth factor and epidermal growth factor signalling crosstalk is involved in tunnelling nanotube formation in A549 human lung adenocarcinoma cells

S Banerjee, G Awanis, R Johnson, S Bidula, D Warren, A Sobolewski

9.20am **S50**

Expression of IL-22 in tissue of early stage non-small cell lung cancer (NSCLC) patients with or without chronic obstructive pulmonary disease (COPD)

V Petta, I Vamvakaris, T Milas, E Theodorakis, M Tsatsis, D Bisirtzoglou, I Michailidou, N Koulouris, S Loukides, P Bakakos

9.35am **S51**

Multi-site target capture sequencing confirms intra-tumour heterogeneity of pleural mesothelioma

A Nastase, A Mandal, YZ Zhang, J Ish-Horowicz, S Wilkinson, LL Lazdunski, AG Nicholson, D Morris-Rosendahl, MF Moffatt, WOCM Cookson

8.45am-10.05am
Abbey, 4th floor
SPOKEN SESSION: S52-S56

"Running up that hill" – Rehabilitation interventions in chronic respiratory diseases

Chaired by: Dr Annemarie Lee (Melbourne) and Dr Louise Sewell (Coventry)

8.50am **S52**

Dietary nitrate supplementation to enhance exercise capacity in pulmonary hypertension: EDEN-OX2 a double-blind, placebo-controlled, randomised crossover study

AS Alsulayyim, AM Alasmari, L Price, C McCabe, SM Alghamdi, KJ Philip, SC Buttery, MJ Pavitt, WA Banya, MI Polkey, MJ Rickman, JA Mitchell, NS Hopkinson

9.05am **S53**

Co-design of a walking football intervention for people with chronic breathlessness

C Bradford, K Loughran, S Suri, N Robertson, D Martin, S Harrison

9.20am **S54**

Alternative pulmonary rehabilitation (PR) for people with interstitial lung disease (ILD): developing the model using experience-based co-design

LJ Brighton, N Spain, J Gonzalez-Nieto, K Ingram, CM Nolan

9.35am **S55**

The impact of a 3-month behavioural tele-coaching intervention on physical activity and quality of life at 12 months following lung transplantation

E Hume, H Muse, K Wallace, M Wilkinson, K Heslop-Marshall, A Nair, S Clark, I Vogiatzis

9.50am **S56**

A feasibility Randomised Control Trial (RCT) of OPEP verses Active Cycle of Breathing Technique (ACBT) in people with Chronic Obstructive Pulmonary Disease (COPD)

CG Bridges, L Graham-Wollard, H Morris, J Annandale, KE Lewis

8.45am-10.05am
Rutherford, 4th floor
SPOKEN SESSION: S57-S61

"Working 9 to 5" – Occupation risk to the lung

Chaired by: Dr Vicky Moore (Coventry) and Professor Joanna Szram (London)

8.50am **S57**

20 years of asbestosis – trends from the SWORD scheme

RE Wiggans, R Pereira, L Byrne, IYK Iskandar, Z Iheozor-Ejiofor, M Carder, M Van Tongeren, J Hoyle

9.05am **S58**

The exposure-response relationship between respirable crystalline silica and chronic silicosis: a systematic review and meta-analysis

J Gan, J Feary, P Howlett

9.20am **S59**

Silicosis, tuberculosis and silica exposure among artisanal and small-scale miners: a systematic review and modelling paper

PJ Howlett, H Mousa, B Said, A Mbuya, OM Kon, SG Mpagam, J Feary

9.35am **S60**

Impact of Tyre and Road Wear Particles (TRWPs) on human rhinovirus infection in human airway epithelial cells

KM Nathan, L Daly, K Ito

9.50am **S61**

Occupational exposure to particulate matter and staff sickness absence on the London Underground

J Mak, J Feary, AFS Amaral, E Marczylo, DC Green

8.45am-10.15am
Churchill, Ground floor
SYMPOSIUM

SCIENTIFIC YEAR IN REVIEW: RESPIRATORY INFECTIONS

Chaired by: Professor Alison Condliffe (Sheffield) and Dr Jamilah Meghji (London)

8.45am Acute respiratory infection

Professor Tom Wilkinson (Southampton)

9.15am Non-tuberculous mycobacterial infection and bronchiectasis

Professor Charles Daley (Denver)

9.45am Fungal respiratory infections

Professor Elaine Bignell (Exeter)

Learning objectives

- *To review this year's key publications in the field of acute respiratory infections including pneumonia, COVID-19 and acute exacerbations of respiratory disease.*
- *To review this year's key publications in the field of non-tuberculous mycobacterial infections and bronchiectasis.*
- *To review this year's key publications in the field of fungal respiratory infections.*

8.45am-10.15am
Mountbatten, 6th floor
SYMPOSIUM

CUTTING EDGE DIAGNOSTICS IN MALIGNANT PLEURAL DISEASE

Chaired by: Dr Duneesha De Fonseka (Sheffield) and Dr Rachel Mercer (Portsmouth)

8.45am The BTS 2023 MPE guidelines: what they tell us and what is still unknown

Professor Nick Maskell (Bristol)

9.15am Biomarkers in the diagnosis of MPE and mesothelioma: are we ready to leave biopsies behind?

Dr Selina Tsim (Glasgow)

9.45am Optimal diagnostic pathway for suspected MPE: where is the evidence?

Dr Dinesh Addala (Oxford)

Learning objectives

- *This symposium will open with an oversight of the BTS 2023 Malignant Pleural Effusion Guidelines. The session will outline the current evidence base and highlight areas of uncertainty.*
- *An insight of use of breath and blood biomarkers in diagnosis of pleural malignancy.*
- *An exploration of use of earlier biopsy and stratification of patients to a more aggressive diagnostic and treatment journey.*

8.45am-10.15am
Windsor, 5th floor
SYMPOSIUM

THE CRITICAL CARE JOURNEY OF RESPIRATORY FAILURE: ACUTE MANAGEMENT TO WEANING

Chaired by: Ms Stephanie Mansell (London) and Dr Dhruv Parekh (Birmingham)

8.45am Personalised management of ARDS in the COVID era

Professor Charlotte Summers (Cambridge)

9.15am The right ventricle: the forgotten ventricle?

Dr Segun Olusanya (London)

9.45am Liberation from mechanical ventilation: the WEANSAFE trial

Professor John Laffey (Galway)

Learning objectives

- *Learning about clinical trials in COVID-19 and how the science from these can inform future trials of the management of ARDS.*

- *Understanding how to assess the function of the right ventricle and appreciation of the importance of RV dysfunction and pulmonary hypertension in outcomes from critical care.*
- *Understanding the burden of, management and spectrum of approaches to weaning from ventilation in critical care units worldwide.*

8.45am-10.20am
St James, 4th floor
SPOKEN SESSION: S62-S67

"It's complicated" – Answering the unanswered in asthma biologics

Chaired by: Dr Shamsa Naveed (Leicester) and Professor Dominick Shaw (Nottingham)

8.50am **S62**

Watching and waiting: outcomes among patients with severe asthma demonstrating partial response to monoclonal antibody therapy over 2 years

G Cordha, F Fyles, R Burton, A Nuttall, H Joplin, H Burhan

9.05am **S63**

Long-term effectiveness of anti-IL4R therapy following suboptimal response to anti-IL5/5R therapy in severe eosinophilic asthma

J Gates, M Fernandes, A Hearn, L Green, L Thomson, C Roxas, J Lam, G d'Ancona, AM Nanzer, J Dhariwal, DJ Jackson

9.20am **S64**

Targeted parasite screening in a large, at-risk, pre-biologic severe eosinophilic asthma population

I Berrar-Torre, R Stead, K Simpson, E Lawless, I Statescu, E Campbell, S Mamo, D Armstrong-James, B Cushen, PH Patel

9.35am **S65**

Tezepelumab reduced OCS use in OCS-dependent patients with severe asthma: phase 3b WAYFINDER study interim results

DJ Jackson, N Lugogo, M Gurnell, LG Heaney, S Korn, G Brusselle, P Chanez, J-P Llanos, N Martin, N Keeling, K Salapa, B Cook

9.50am **S66**

Long-term effectiveness of Benralizumab and remission of EGPA: two year results from Guy's EGPA cohort

A-C Maynard-Paquette, AM Nanzer, V Alam, L Green, L Thomson, M Fernandes, C Roxas, J Lam, G d'Ancona, J Dhariwal, DJ Jackson

10.05am **S67**

Biomarkers and clinical outcomes after cessation of tezepelumab after 2 years of treatment (DESTINATION)

CE Brightling, D Jackson, A Kotalik, NA Molfino, S Caveney, G Colice, N Martin, E Israel, ID Pavord, ME Wechsler, C Porsbjerg

8.45am-10.20am
Westminster, 4th floor
SPOKEN SESSION: S68-S73

"It's not unusual" – Rare and interstitial lung disease biology

Chaired by: Dr Shaney Barratt (Bristol) and Dr Amanda Tatler (Nottingham)

8.50am **S68**

Caffeine has differential effects on expression of TGFβ isoforms and promotes epithelial wound healing through a TGFβ-dependent pathway

AL Tatler, AT Goodwin, C Joseph, ER Cash, R Calthorpe, Z Ghandi, A Sajid, L Middlemass, M Ho, P Laryea

9.05am **S69**

Targeting the response of LAM cells to extracellular matrix could provide new therapies for lymphangioleiomyomatosis

D Clements, R Babaei-Jadidi, S Miller, SR Johnson

9.20am **S70**

Mesenchymal cell senescence influences ATII cell viability in LAM

R Babaei Jadidi, Y Wu, D Clements, R Chambers, M Platé, Y Xu, S Johnson

9.35am **S71**

Deciphering the role of γδ T cells in hypersensitivity pneumonitis

E Tanskanen, T Shimamura, T Yamana, Y Miyazaki

9.50am **S72**

Specific thoracic CT pattern of perihilar conglomeration and consolidation is associated with development of lung fibrosis in pulmonary sarcoidosis

S Zulfikar, P Weeratunga, A Crawshaw, A Papadopoulous, T Nicholson, R Hoyles, P Saunders, E Fraser, L Wing, R Benamore, L Ho

10.05am **S73**

Single cell RNA sequencing of PBMCs reveals differences between fast and slow resolving post-COVID interstitial lung disease

P Mehta, K Jansen, M Plate, H Selway, A Alhendi, E Denneny, K Worlock, M Yoshida, G Ercoli, E Ramos-Sevillano, K Kolluri, T Hillman, M Heightman, J Brown, S Janes, M Nikolic, A Nair, J Jacob, J Betts, D Budd, J Porter, R Chambers

10.00am-11.00am
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

10.45am-12.05pm
Westminster, 4th floor
SPOKEN SESSION: S74-S78
"You know I'm no good" – Innovative approaches to smoking cessation

Chaired by: Ms Yvonne MacNicol (Stirling) and Dr Aravind Ponnuswamy (Liverpool)

10.50am **S74**

An innovative digital approach to support NHS staff to stop smoking across an integrated care system

K Sivabalah, D Crane, J Coyne, M Hancock, S Neville, A Crossfield, M Evison

11.05am **S75**

Quantification of smoking-related airway remodelling in COPD using a novel fast-response capnometer

RH Lim, L Wiffen, H Broomfield, D Neville, L Talker, C Dogan, AB Selim, J Carter, ST Weiss, G Lambert, M Chauhan, H Ashdown, G Hayward, T Brown, V Elango, A Chauhan, AX Patel

11.20am **S76**

The SUMMIT study: four-week quit rates amongst individuals referred to Stop Smoking Services following attendance at a Lung Health Check

A Bhamani, E Katsampouris, F Bojang, JL Dickson, C Horst, S Tisi, H Hall, P Verghese, A Creamer, R Prendecki, CR Khaw, J McCabe, K Gyertson, AM Hacker, L Farrelly, A Hackshaw, SL Quaife, SM Janes

11.35am **S77**

Development of a web-based smoking cessation tool to facilitate accurate nicotine replacement therapy (NRT) prescription and onward referral to community stop smoking services

M Lipscomb, M Laughton, J Datta, A Somes, E Akpan, A Clive

11.50am **S78**

Tobacco dependency in maternity: a novel service providing earlier in-hospital care for pregnant smokers

K Roy, G Failla, H Dent, W Robinson, A Putzolu

10.45am-12.30pm
Churchill, Ground floor
SYMPOSIUM
PLENARY SCIENTIFIC SYMPOSIUM

Chaired by: Professor James Chalmers (Dundee) and Professor Elizabeth Sapey (Birmingham)

10.45am Immune mechanisms of chronic airways infection

Professor Timothy Hinks (Oxford)

11.11am Mucociliary clearance in bronchiectasis: upbeat for the future?

Professor Amelia Shoemark (Dundee)

11.37am Asthma in the UK: insights from Big Data

Dr Chloe Bloom (London)

12.03pm Translational pleural disease – pleural infection and beyond
Professor Najib Rahman (Oxford)

Learning objectives

- *To discuss the speaker's research into mucosal immunity in chronic airways disease.*
- *To discuss the role of motile cilia in the pathogenesis of bronchiectasis and related disease.*
- *To discuss how big data can provide insights into asthma.*
- *To discuss new insights into risk stratification and management of pleural disease.*

10.45am-11.45am
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Global Lung Health

10.45am-11.45am
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Critical Care, Respiratory Failure and Mechanical Ventilation

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10.45am-11.45am
Victoria, 2nd floor
OPEN MEETING
BTS/ARTP Joint Strategy Board

12.00pm-2.00pm
Pickwick, 1st floor and Whittle & Fleming, 3rd floor
LUNCH (Not included in the delegate fee. Card payments only)

12.45pm-2.00pm
Abbey, 4th floor
OPEN MEETING
National Respiratory Audit Programme

Chaired by: Professor Jennifer Quint (London) and Professor Tom Wilkinson (Southampton)

12.45pm Introduction to NRAP
Professor Tom Wilkinson (Southampton)

12.50pm Your data – what's available and how can you use it
Professor Jennifer Quint (London)

1.05pm Using NRAP data for healthcare improvement
Dr Katherine Hickman (Bradford)

1.20pm Case study – using NRAP data to achieve improved patient care
Dr James Dodd (Bristol) and Dr Wanda Kozlowska (Cambridge)

Learning objectives

- *To provide services with increased knowledge and understanding of the National Respiratory Audit Programme.*
- *For services to have improved awareness of NRAP data and the potential for future use, aligning their healthcare with national recommendations.*
- *To provide an insight into how a service has utilised their NRAP data to assist with healthcare improvement, improving outcomes for patients.*

1.00pm-1.45pm
Churchill, Ground floor
THE BTS CLINICAL LECTURE
POPULATION HEALTH AND PRECISION MEDICINE IN RESPIRATORY DISEASE – CAN WE ACHIEVE BOTH?

Guest lecturer: Professor Helen Reddel (Sydney)

Introduced by: Professor Onn Min Kon (London)

2.00pm-3.00pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Pleural Disease

2.00pm-3.00pm
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Pharmacist

2.15pm-3.40pm
Rutherford, 4th floor
POSTER DISCUSSION: P59-P69

"Sweet child of mine" – Innovations in paediatric lung disease

Chaired by: Dr Iram Haq (Newcastle upon Tyne) and Dr Anirban Maitra (Manchester)

P59 E-cigarette addiction in adolescents – How do we get them to stop?
E Watt, J Gardner-Medwin, A Bush, RJ Langley

P60 Perceptions and use of e-cigarettes amongst adolescents in a tertiary respiratory service
RL Harvey, SN Woodhull, SMN Brown

P61 Improving the detection and management of pulmonary exacerbations in children with primary ciliary dyskinesia by designing and implementing a written self- management plan
L Baynton, SB Carr, L Wainwright

P62 High Flow (HF) therapy at home – 7 years of experience from a tertiary paediatric respiratory service
C Harris, G Bishop, C Allen, L Astall, M Sullivan, V Mitchinson, I Haq, S Moss, C O'Brien, M McKean, M Thomas, M Brodlie

P63 Multicentre prospective cohort study of remote lung function testing in children: validation and comparison of supervised and unsupervised spirometry
NJ Barker, J Kirkby, EA Robson, OJ Price, PD Burns, E Fettes, LS Stokes, HE Elphick, J Sails

P64 Using a remote monitoring platform to support spirometry coaching in a cystic fibrosis paediatric population
R Borton, L Lowndes, B Cuyvers, W Kozlowska

P65 Respiratory care burden in children with aspiration
CTC Edwards, J Unwin, A Jannat, E Franklin

P66 The utility of sleep studies and treatment options in children with Prader-Willi syndrome in the growth hormone era
R Lennon, E Buchan, P Burns, R Langley, G Shaikh

P67 Current practices for prescribing nebulised hypertonic saline in patients with neuromuscular diseases or cerebral palsy
N Galaz-Souza, HL Tan, M Hurley, A Bush

P68 Inequality in implementation of good clinical practice asthma activities among children in the UK
Z Khalaf, C Bloom, S Saglani

P69 A retrospective study exploring nutritional status of children with bronchiectasis and primary ciliary dyskinesia
A Lyles, C Yverneau, K Unger, SA Unger

2.15pm-3.45pm
Churchill, Ground
SYMPOSIUM

WHEN WE WERE YOUNG: THE INFLUENCE OF COPD

Chaired by: Dr James Dodd (Bristol) and Professor Wisia Wedzicha (London)

2.15pm Inequalities and health policy in COPD
Professor Mike Morgan (Leicester)

2.45pm Early origins of COPD lung
Professor Shyamali Dharmage (Melbourne)

3.15pm Sub-typing of COPD: The Lancet Commission
Professor Daiana Stolz (Freiburg)

Learning objectives

- *To review health inequalities in COPD from the UK and learn about the policy changes we have to impact on this.*
- *To learn about the effects of the early life course and impact on lung function trajectories in COPD.*
- *Review the recent Towards an Elimination of COPD Global Lancet Commission, focussing on the sub-type classification and what this may mean for clinical practice.*

2.15pm-3.45pm
Mountbatten, 6th floor
SYMPOSIUM

HOT TOPICS IN SLEEP

Chaired by: Dr Tim Quinnell (Cambridge) and Dr Sophie West (Newcastle upon Tyne)

2.15pm The ANDANTE collaboration: worldwide individual data meta-analysis of the effect of sleep apnoea treatment on blood pressure

Dr Martino Pengo (Milan)

2.45pm Positional therapy for obstructive sleep apnoea: results of the POSA study

Dr Julia Kelly (London)

3.15pm Co-morbid insomnia and obstructive sleep apnoea (COMISA): something to lose sleep over?

Dr Hugh Selsick (London)

Learning objectives

- *To be apprised of the findings of the international individual patient data meta-analysis on the effects of OSA treatment on blood pressure.*
- *To learn about the results of a multicentre UK RCT of an emerging non-CPAP approach for the treatment of positional obstructive sleep apnoea.*
- *To receive an update on the latest evidence regarding and clinical approach to co-existent insomnia and OSA.*

2.15pm-3.45pm
Windsor, 5th floor
SYMPOSIUM

BTS AUDIT AND QUALITY IMPROVEMENT

Chaired by: Dr Andrew Creamer (Swindon) and Dr Mark Juniper (Swindon)

2.15pm 2023 overview of BTS QI and Audit Programme

Dr Mark Juniper (Swindon)

2.20pm BTS National Respiratory Support Audit 2023

Dr Michael Davies (Cambridge)

2.40pm Analysis of National Reporting and Learning System patient safety data – pneumonia and NIV

Dr Andrew Creamer (Swindon) and Dr Andrew Molyneux (Nottinghamshire)

3.00pm NCEPOD study on the care of patients presenting to hospital with community acquired pneumonia

Dr Mark Juniper (Swindon)

3.20pm BTS QI programme for tobacco dependency treatment

Dr Robyn Fletcher (Nottingham)

Learning objectives

In this symposium participants will learn about:

- *BTS National Respiratory Support Audit and what the results mean for services.*
- *Trends identified from patient safety incident data in pneumonia and NIV.*
- *Improving hospital care for patients with community acquired pneumonia.*
- *Local quality improvement in tobacco dependency treatment.*

2.15pm-3.45pm
Westminster, 4th floor
POSTER DISCUSSION: P70-P81

"I still haven't found what I'm looking for" – Cancer diagnosis: imaging and bronchoscopy

Chaired by: Dr Jennifer Dickson (London) and Dr Malcolm Lawson (Chelmsford)

P70 Evaluation of patient experience of a self-referral chest Xray service piloted in areas of Greater Manchester

S Taylor, D Brickhill, L Brown, L Dunn, M Evison, L Galligan-Dawson, S Grundy, E Harris, S Lyon, A Smith, N Rehan

P71 The utility of the Herder score for guiding diagnostic investigations of nodules in lung cancer screening

L Chan, EC Bartlett, S Sivandan, A Tana, K Wechalekar, S Padley, CA Ridge, B Rawal, SR Desai, J Addis, JL Garner, PL Shah, A Devaraj

P72 The role of the historical clinical and imaging data in Targeted Lung Health Check screening review meetings

G Dixon, N Rash, E Buckley, A Edey, V Masani, A Bibby

P73 What is the impact of reviewing additional information and previous imaging on lung cancer screening outcomes?

SB Naidu, T Patrick, A Bhamani, A Nair, S Patel, R Thakrar, N Navani, S Janes

P74 Evaluation of short-term follow-up CT for the management of consolidation in lung cancer screening

EC Bartlett, L Chan, SR Desai, J Garner, SV Kemp, S Padley, B Rawal, CA Ridge, J Addis, A Devaraj

P75 A radiomics predictive vector for differentiating new primary lung cancer vs lung metastasis in patients presenting with prior radically treated cancer

HS Kalsi, S Hindocha, B Hunter, K Linton-Reid, S Doran, T O'Kane, E Aboagye, RW Lee

P76 Comparison of Endobronchial Ultrasound (EBUS) Fine Needle Aspiration (FNA) and Fine Needle Biopsy (FNB) for cancer diagnosis: a single centre prospective study

A Yousuf, A Stockbridge, C Richards, C Vella, R Sudhir, R Panchal

P77 EBUS TBNA for drug sensitivity testing in lung cancer – how much is enough?

CN McKerr, H Wong, CL Marchand, VD Masani

P78 A ROSE by any other name would smell as sweet: evaluation of biomedical scientist led rapid on-site evaluation in an UK teaching hospital EBUS service

J Vidak, AM O Mahony, CLK Ross, G Srilal, R Sinharay

P79 Enhancing efficiency and accessibility in endobronchial ultrasound-guided transbronchial needle aspiration(EBUS-TBNA): trained biomedical scientists deliver accurate rapid on site evaluation (ROSE) comparable to cytopathologists

R Sehajpal, W Tang, R Mogal, ABT Barlow, A Maddox

P80 Comparing the effects of local anaesthetic via transcricoid injection vs direct visualisation on cough, choking and patient comfort during flexible bronchoscopy – an observational study

J Shaw, H Petty, M Malik, T Bongers

P81 Single centre experience of physician led combined rigid and flexible bronchoscopy in benign and malignant airway management

M Aboushehata, S Iftikhar, Q Abdullah, S Ghosh, M Haris

2.15pm-3.45pm
Moore, 4th floor
POSTER DISCUSSION: P82-P93

"When the going gets tough" – Difficult infection and non-tuberculous mycobacteria

Chaired by: Professor Charles Daley (Denver) and Dr Heinke Kunst (London)

P82 Post-operative infections are associated with the development of airway complications and increased mortality in lung transplant recipients

N Mahdi, I Nadeem, SA Ul Munamm, N Nassehzadehtabriz, B Konjari, N Berman, J Parmar

P83 Short term outcomes of bilateral lung transplant recipients with post-transplant Pseudomonas Aeruginosa (PsA) – a tertiary centre experience

KW Fung, C Patterson, J Parmar

P84 Disease and immunosuppressive factors associated with PCP in the non-HIV immunocompromised population

CS Pearce, A Mehmood, A Morozow, B Kathiresan

P85 Contemporary underlying causes of immunocompromise in severe PCP: a 10 year tertiary-centre experience

M Cokljat, AJ Keeley, AJ Chadwick

P86 Adverse events after anticoagulation in COVID-19 Positive inpatients: a triple cycle audit against NICE Guidance NG191

C Sechante, A Vassila, S Shaikh, M San, H Launders, J Swabe, B Marshall, A Freeman

P87 Lung opacity score of COVID-19 patients and its association with chest CT scan findings and functional capacity 9 to 18 months after discharge

SJM Abrazaldo, JC Nash, E Aniceto, L Raymond, XM Javier, JZ Oliveros

P88 A prospective study of the impact of a fungal multi-disciplinary team meeting on patient management at a tertiary referral centre

N Sultana, T Khan, K Gour, S Sheard, L Martin, A Ghazy, J Peters, R Wilson, R Palanicawandar, M Gilchrist, D Armstrong-James, M Coleman, L Finney

P89 The burden and impact of NTM-LD and perspectives on care, UK data from a European patient survey (ENPADE)

R van der Laan, C Hoenig, R Legtenberg, A Reimann, M Obradovic

P90 Real-world experience with nebulised amikacin liposome inhalation suspension (Arikayce®): report from a tertiary centre

GM Housley, E Bowman, MR Loebinger

P91 A case for specialist non-tuberculous mycobacterium pulmonary disease services: a retrospective study on current management of non-tuberculous mycobacterium pulmonary disease in a regional teaching hospital

S Holland, J Moore, S Drazich-Taylor, P De Souza, R Phillips

P92 Outcomes of non-tuberculous mycobacterial pulmonary disease in an East London cohort

FA Al-Amodi, SS Lim, EW Skyllberg, A Saleh, P Naran, C Chen, J Friel, A Wong, H Kunst

P93 A qualitative interview study to explore the use of adverse event mitigation strategies among adults receiving Amikacin Liposome Inhalation Suspension (ALIS) in real world settings

J Ali, J Wu, M Hassan, J-H Tsai, N Touba, K McCarrier, M Ballard, A Chatterjee

2.15pm-3.50pm
St James, 4th floor
SPOKEN SESSION: S79-S84

"Bad blood" – Biomarkers and mechanisms in long COVID

Chaired by: Professor Peter Openshaw CBE (London) and Dr Yan Hu (Denver)

2.20pm **S79**

An altered peripheral blood transcriptome and immunophenotype post-COVID is associated with initial hospitalisation

C Hughes, M Long, H Keir, YH Giam, T Pembridge, A Gilmour, A Shoemark, D Connell, F Khan, J Chalmers

2.35pm **S80**

Plasma proteomic signatures in patients with residual lung abnormalities following infection with SARS-CoV-2

EK Denneny, S Vernardis, B Selvarajah, R Chapman, R Evans, A Webb, M Mortiga, T Hillman, M Heightman, A Nair, J Jacobs, RC Chambers, JS Brown, M Ralser, JC Porter

2.50pm **S81**

Assessment of endothelial function in long COVID and in patients with residual lung abnormalities after COVID-19

LMD Pearce, A Bakr, S Strickland, L Gustafsson, KL Ng, S Thomas, T Newman, M Plowright, J Watson, Z Gabriel, J Rodgers, M Brook, L Watson, R Vaja, F Gleeson, RG Jenkins, PM George, JM Wild, JA Mitchell, AAR Thompson

3.05pm **S82**

Residual lung abnormality following COVID-19 hospitalisation is characterised by epithelial injury

I Stewart, J Jacob, P Molyneaux, JC Porter, M Pohl, A Stephens, A Maslova, S Young, R Chambers, LV Wain, RG Jenkins, PHOSP-COVID Collaborative Group

3.20pm **S83**

Long-term effects of SARS-CoV-2 on ciliogenesis through altered expression of FOXJ1

IP Stewart, R Rai, O Katsoulis, M Bottier, T Burgoyne, E Cant, M Shuttleworth, M Crichton, A Pinto, C Hogg, A Shah, A Singanayagam, J Chalmers, A Shoemark, DW Connell

3.35pm **S84**

Single-cell landscape of bronchoalveolar cells in inflammatory and fibrotic post-COVID residual lung abnormalities

P Mehta, B Sanz-Magallón Duque de Estrada, E Denneny, K Foster, C Turner, A Meyer, M Milighetti, K Worlock, M Yoshida, J Brown, M Nikolic, A Nair, B Chain, M Noursadeghi, R Chambers, J Porter, G Tomlinson

2.15pm-3.50pm
Abbey, 4th floor
POSTER DISCUSSION: P94-P106

"Take my breath away" – Novel diagnostics in respiratory disease

Chaired by: Dr Martin Allen (Stoke-on-Trent) and Mrs Lizzie Grillo (London)

P94 A comparison of two inhalation methods during a Eucapnic Voluntary Hyperpnoea Challenge

SA Sturridge, JW Dickinson, G Davison, S Meadows

P95 The utility of nasal nitric oxide measurements in patients with rhinitis in a complex breathlessness clinic

R Daly, SJ Fowler, T Pantin, S Ludlow

P96 Use of a novel respiratory resistance sensitivity task to investigate mechanisms of breathlessness in Long COVID

LS Wang, I Awatli, JH Hong, Y Yoon, Z Samara, GF Rafferty, YM Luo, N Nikolova, M Allen, T Nicholson, CJ Jolley

P97 CPET's utility in understanding unexplained exertional dyspnoea in military personnel

H McLay, H Martin, A Johnston, M Thomas

P98 Ventilatory dynamics and clinical status during cardiopulmonary exercise testing in patients with interstitial lung disease

OW Tomlinson, L Markham, RL Wollerton, CA Williams, M Gibbons, CJ Scotton

P99 Efficacy of the British Thoracic Society guidance on pre-flight assessment of patients with restrictive lung disease planning a commercial flight

IJ Cliff, N Mustfa, H Stone

P100 Examining the relationship between exhaled aerosol and carbon dioxide across human activities

BP Moseley, J Archer, CM Orton, HE Symons, NA Watson, KEJ Philip, JH Hull, D Costello, JD Calder, PL Shah, BR Bzdek, JP Reid

P101 Neural respiratory drive among COPD patients with mild or moderate airflow limitation in primary care: reproducibility, reliability and association with other biomarkers

TH Harries, R D'Cruz, G Gilworth, CJ Corrigan, PB Murphy, N Hart, M Thomas, H Ashdown, L Daines, PT White

P102 Symmetric Projection Attractor Reconstruction (SPAR): whole-waveform analysis of abdominal respiratory movement provides a new biomarker of obstructive sleep apnoea

M Serna-Pascual, M Volovaya, S Higgins, J Steier, G Rafferty, C Jolley, P Aston, M Nandi

P103 Provoking inducible laryngeal obstruction – triggers and co-morbidities

SF Ludlow, W Sarodia, SJ Fowler

P104 Medication use in inducible laryngeal obstruction pre and post speech and language therapy

SF Ludlow, SJ Fowler, S Percy, R Daly

P105 Airway stents: development of a physiotherapy management guideline

N Flynn, N Venchard, R Thakrar

P106 To Huff or Not to Huff: could forced expiratory manoeuvres be impeding airway clearance in large airway collapse?

J Forrester, C Pickover, C Paramasivan, J Herre

2.15pm-4.00pm
Cambridge, 5th floor
POSTER DISCUSSION: M13-M26

"Against all odds" – Fight for the future of asthma

Chaired by: Dr Alexandra Nanzer-Kelly (London) and Dr Philip Short (Dundee)

M13 Accurate diagnosis of asthma using either single or longitudinal breath records captured on a novel fast response capnometer

H Broomfield, L Talker, D Neville, L Wiffen, AB Selim, J Carter, RH Lim, G Lambert, C Dogan, M Chauhan, H Ashdown, G Hayward, T Brown, AX Patel, A Chauhan

M14 Screening tools for work-related asthma and their diagnostic accuracy: a systematic review

N Kongsupon, GI Walters, CC Huntley, RE Jordan, P Adab

M15 Quantification of clinical deterioration of asthma based on threshold for SABA use in two studies of the Digihaler System

F Hoyte, G Mosnaim, G Safioti, S Bosnic-Anticevich, R Brown, K Sagalovich, M Wechsler

M16 Recognizing asthma risk scenarios: individualized inhaler usage and inhalation parameter profiles from an electronic inhaler with integrated sensors

ML Levy, F Hoyte, G Mosnaim, M Wechsler, G Safioti, N Magnus, K Sagalovich, S Bosnic-Anticevich, J Kocks

M17 Patient engagement with adherence technology: learnings from the 'Financial INcentives to improve Asthma' (FINA) study

J Hine, L Fleming, G Judah, A Bush, A Desimoni, C Griffiths

M18 Assessing ICS responsiveness in severe asthma using BDP/formoterol NEXThaler™ dose-counting

H Aung, CE Boddy, E Hampson, M Bell, K Balasundaram, AC Murphy, S Naveed, P Bradding

M19 Management of uncontrolled asthma in pregnancy: challenges and concerns

R Burton, F Fyles, S Willoughby, A Nuttall, A Abraham, L Devlin, L Pilling, J Willis, H Burhan, L Chishimba, G Jones, S Zaidi

M20 Preserved antibody responses to COVID-vaccines and lower odds of developing COVID in people with severe asthma

H Rupani, D Edwards, R Chaudhuri, S Smith, A Hearn, DJ Jackson, M Edwards, S Johnston, H Moyses, RJ Kurukulaaratchy, HM Haitchi, R Djukanovic

M21 On-treatment clinical remission with tezepelumab in patients with severe, uncontrolled asthma in the phase 3 DESTINATION study

ME Wechsler, G Brusselle, JC Virchow, LG Heaney, G Hunter, S Ponnarambil, N Martin, J-P Llanos, C Porsbjerg, CE Brightling

M22 Change in FeNO with Dupilumab and Tezepelumab in severe eosinophilic asthma

J Gates, A Hearn, AC Maynard-Paquette, L Green, L Thomson, M Fernandes, C Roxas, J Lam, G d'Ancona, J Dhariwal, AM Nanzer, DJ Jackson

M23 Efficacy of tezepelumab in patients with severe, uncontrolled asthma by prior omalizumab use: a post hoc analysis of the phase 3 NAVIGATOR study

A Menzies-Gow, G Colice, CS Ambrose, N Martin, J-P Llanos, A Hellqvist, B Cook, M Caminati

M24 3-year real world outcomes with benralizumab for severe eosinophilic asthma

H Palmer, C Whitehurst, K Hince, S Khurana, G Tavernier, L Elsey

M25 Reductions in healthcare resource utilisation (HCRU) over 2 years of benralizumab treatment in patients with severe eosinophilic asthma; analysis from the BPAP study

DJ Jackson, H Burhan, PE Pfeffer, IJ Clifton, S Faruqi, AM Nanzer, J Dhariwal, T Morris, C Lupton, M Watt, H Rupani

M26 The proportion of patients achieving low biomarker levels with tezepelumab treatment in the phase 3 NAVIGATOR study

D Jackson, ID Pavord, C Virchow, JR Parnes, A Gamil, G Hunter, S Ponnarambil, N Martin, ME Wechsler

3.30pm-4.30pm,
Whittle & Fleming and Britten, 3rd floor

COFFEE/TEA BREAK

4.15pm-5.15pm
Victoria, 2nd floor

BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Lung Cancer and Mesothelioma

4.15pm-5.30pm
Windsor, 5th floor

SYMPOSIUM

'LEVELLING UP' – RESPIRATORY HEALTH INEQUALITY AND HOW WE CAN ADDRESS IT

Chaired by: Dr Sarah Elkin (London) and Dr Stephen Holmes (Shepton Mallet)

4.15pm The impact of health inequality on patients and communities

Sarah Woolnough (A+LUK)

4.33pm What data tells us about inequality in lung disease

Professor Jennifer Quint (London)

4.51pm Building on the Long-Term Plan: the future for respiratory care and policy

Dr Jonathan Fuld (NHSE)

5.10pm Questions

4.15pm-5.35pm
St James, 4th floor
SPOKEN SESSION: S85-S89

"Total eclipse of the heart" – COPD and cardiovascular disease

Chaired by: Dr Lydia Finney (London) and Dr Chris Gale (Leeds)

4.20pm **S85**

Acute coronary syndrome (ACS) after exacerbation of chronic obstructive pulmonary disease (COPD) compared to other causes of acute lower respiratory tract disease in a prospective cohort study of hospitalised adults

C Morgan, R Challen, E Begier, J Southern, L Danon, G Qian, G Nava, J King, S McGuinness, NA Maskell, J Oliver, BG Gessner, A Finn, C Hyams, JW Dodd

4.35pm **S86**

Factors associated with non-fatal atrial fibrillation or flutter within the first 30 days post-exacerbation of COPD: a nested case-control study

EL Graul, C Nordon, K Rhodes, J Marshall, S Menon, C Kallis, A Ioannides, HR Whittaker, NS Peters, JK Quint

4.50pm **S87**

Prevalence, persistence and outcomes of left ventricular (LV) and right ventricular (RV) dysfunction in patients admitted with exacerbation of chronic obstruction pulmonary disease (ECOPD)

JCT Kibbler, R Webb-Mitchell, E Pakpahan, DP Ripley, SC Bourke, J Steer

5.05pm **S88**

Can coronary artery calcium score calculated from CT thorax be used to predict the presence and severity of coronary artery disease in COPD?

M MacLeod, K Knott, A Braddy-Green, R Lopez, A Devaraj, DO Haskard, LJ Finney, RY Khamis, ED Nicol, JA Wedzicha

5.20pm **S89**

Prevalence of microspirometry-defined chronic obstructive pulmonary disease in two European cohorts of patients with significant smoking history hospitalised for acute myocardial infarction

WAE Parker, J Sundh, J Oldgren, KV Konstantinidis, J Lindback, C Janson, P Andell, A Bjorkenheim, N Elamin, H McMellon, B Moyle, M Patel, J El Khoury, R Surujbally, RF Storey, S James

4.15pm-5.45pm
Churchill, Ground floor
SYMPOSIUM

INTO THIN AIR: INNOVATIONS IN PNEUMOTHORAX

Chaired by: Professor Stefan Marciniak (Cambridge) and Professor Eleanor Mishra (Norwich)

4.15pm The shifting landscape of pneumothorax: developments in epidemiology and aetiology

Dr Robert Hallifax (Oxford)

4.45pm Managing persistent air leak: challenging the paradigms

Dr Steven Walker (Bristol)

5.15pm Surgical state-of-the-art: which patients, when and what operation?

Mr Edward Caruana (Leicester)

Learning objectives

- *An examination of novel concepts in the pathogenesis of spontaneous pneumothorax.*

• *An exploration of our current understandings of air leak in pneumothorax and how this impacts management.*

• *To set out the current surgical approaches for patients with pneumothorax.*

4.15pm-5.45pm
Mountbatten, 6th floor
SYMPOSIUM

JOINT BTS/BPRS SYMPOSIUM – PULMONARY MANIFESTATIONS OF SYSTEMIC DISEASES

Chaired by: Dr Ross Langley (Glasgow) and Dr Clare Sander (Cambridge)

4.15pm	Primary ciliary dyskinesia as part of a ciliopathy spectrum
	Dr Claire Jackson (Southampton)
4.45pm	Respiratory disease in primary immunodeficiency
	Professor Siobhan Burns (London)
5.15pm	Systemic vasculitides
	Professor David Jayne (Cambridge)

Learning objectives

• *To explore the scientific basis of a range of systemic disorders leading to pulmonary complications.*

• *To provide a state-of-the-art review of our current understanding of the genetic and molecular basis of rare disorders and their importance in diagnosis.*

• *To raise awareness of the importance of thinking outside the lungs in patients with respiratory symptoms.*

4.15pm-5.45pm
Abbey, 4th floor
POSTER DISCUSSION: P107-P118

"It's not easy being green" – Suppurative lung diseases

Chaired by: Professor Scott Bell (Brisbane) and Dr Emma Johnson (Dundee)

P107 Real-world impact of ELX/TEZ/IVA on quality of life of children with CF aged 6-11 years and primary caregivers in the UK: MAGNIFY, a prospective, observational, noninterventional study

LP Thia, R Thursfield, T Lee, J Legg, A Maitra, DS Urquhart, C McKinnon, M Lu, J Liu, M Jennings, G Vega-Hernandez

P108 Shortening assessment of Lung Clearance Index (LCI): can we avoid needing to repeat the test three times?

DY Boorman, C MacNaughton, A Maitra, A Jones, F Gilchrist, A Horsley

P109 When is Burkholderia cepacia complex truly eradicated in adults with cystic fibrosis? A 20-year follow up study

DH Tewkesbury, L Pollard, H Green, A Horsley, D Kenna, AM Jones

P110 Metformin in patients with cystic fibrosis-related diabetes (CFRD): outcomes from a single UK centre

A Salih, I Islam, H Wills, M Hassan, J McDermott, K Boldero, A Adler, U Hill

P111 Dipeptidyl peptidase-1 inhibition in bronchiectasis with eosinophilic endotype in the WILLOW trial

JD Chalmers, ML Metersky, A Teper, C Fernandez, S Fucile, M Lauterio, R van der Laan, A Maes, MR Loebinger

P112 Efficacy and safety of Dipeptidyl Peptidase-1 (DPP-1) inhibition in long-term macrolide users with bronchiectasis: a post-hoc analysis of the WILLOW trial

CS Haworth, PJ McShane, C Fernandez, S Fucile, M Lauterio, A Maes, A Teper, JD Chalmers

P113 Bronchiectasis service – What do patients really think and want?

T Betts, L Speight, L Torres, T Lines, J Duckers

P114 Nebulised Meropenem for prevention of bronchiectasis exacerbation

I Nadeem, T Ingle, M Ur Rasool, N Mahdi, SA Ul Munamm, B Rabiei, R Vijayabarathy, D Grady, S Pai, D Grogono

P115 Nebulised gentamicin in bronchiectasis; treatment continuation in a large cohort

K Brooks, R Sobala, S Shrestha, P McCallion, J Davison, P Close, K Hester, A De Soyza

P116 Bronchiectasis and infection control practices: a survey of pulmonary rehabilitation (PR) services in London

FA Burgess, SSC Kon, J Manners, J Kilduff, CM Nolan

P117 Evaluating the treatment impact a specialist inpatient CF physiotherapy service can provide to a non-CF bronchiectasis cohort

C Fordyce, L Wadsworth, J Mitchell, M Wood, RJ Bright-Thomas, AM Jones

P118 Paediatric surveillance self-sampling model in NCFB and PCD – a year on: what have we learnt?

R Prenter, K Unger, J Hyson, SA Unger

4.15pm-5.45pm
Albert, 2nd floor
SYMPOSIUM

TREATABLE TRAITS IN CHRONIC COUGH: THE NEW BTS CLINICAL STATEMENT ON CHRONIC COUGH IN ADULTS

Chaired by: Professor Lorcan McGarvey (Belfast) and Ms Jemma Haines OBE (Manchester)

4.15pm Changing our approach to chronic cough

Dr Sean Parker (Northumbria)

4.45pm Treatable traits in chronic cough

Professor Surinder Birring (London)

5.15pm Cough hypersensitivity and antitussive treatments

Professor Jacky Smith (Manchester)

4.15pm-5.50pm
Westminster, 4th floor
POSTER DISCUSSION: P119-P131

"The way you make me feel" – Beyond the basics in asthma

Chaired by: Dr Tom Brown (Portsmouth) and Dr Andrew Chadwick (Oxford)

P119 Mortality in patients with severe asthma and severe uncontrolled asthma in the UK: a retrospective cohort study

R Zhang, S Khan, J Soto, S Menon

P120 Performance of the NICE, GINA and ERS Asthma Diagnostic Guidelines in Adults

AJ Simpson, S Drake, R Wang, L Healy, H Wardman, M Bennett, CS Murray, SJ Fowler, A Simpson

P121 Upper and lower airway dysfunction in elite athletes

L Cuthbertson, SEG Turner, J Ish-Horowicz, A Jackson, C Ranson, M Loosemore, P Kelleher, MF Moffatt, A Shah, WOC Cookson, JH Hull

P122 Sustained weight loss and improved asthma outcomes at one year from a randomised controlled trial of a weight management programme for difficult-to-treat asthma and obesity

V Sharma, HC Ricketts, L McCombie, N Brosnahan, L Crawford, L Slaughter, A Goodfellow, F Steffensen, R Chaudhuri, MEJ Lean, DC Cowan

P123 Asthma control in severe asthma and occupational exposures to inhalable asthmagens

GI Walters, C Reilly, N Le Moual, CC Huntley, J Marsh, A Bahron, H Hussein, MT Krishna, AH Mansur

P124 Stability of fractional exhaled nitric oxide levels as a biomarker in patients with uncontrolled asthma

WW Busse, ID Pavord, ME Wechsler, IJ Davila, A Altincatal, M Hardin, X Soler, H Sacks, JA Jacob-Nara, Y Deniz, PJ Rowe

P125 Longitudinal study of the prevalence and the impact of obesity on clinical outcomes in patients referred to severe asthma centre

AH Mansur, B Almoosawi, J Hazlehurst, S Bellary, L White, J Sullivan, J Marsh, A Bahron, A Pillai

P126 A qualitative study of perceived work ability in severe asthma patients: decision making about employment

P Mackiewicz, H Hussein, AH Mansur, GI Walters

P127 Initial responses to Tezepelumab in a complex severe asthma population

I Berrar-Torre, R Stead, E Lawless, I Statescu, E Campbell, S Mamo, V Brennan, PH Patel

P128 Healthcare professional-led de-escalation of background therapies for severe asthma among monoclonal super-responders

F Fyles, R Burton, A Nuttall, H Joplin, H Burhan

P129 UK severe asthma patient outcomes in the real-world versus Italy and the USA: REALITI-A at 2 years

J Weir, B Egan, L Heaney, D Menzies, P Pfeffer, P Howarth, R Chaudhuri

P130 Clinical effectiveness over 2 years of benralizumab treatment in patients with severe eosinophilic asthma and concomitant nasal polyposis; analysis from the BPAP study

DJ Jackson, H Burhan, PE Pfeffer, IJ Clifton, S Faruqi, AM Nanzer, J Dhariwal, T Morris, C Lupton, M Watt, H Rupani

P131 Patients with severe eosinophilic asthma achieved remission over 2 years with benralizumab: Integrated analysis of the >1000-patient, multinational, real-world XALOC-1 study

G Pelaia, DJ Jackson, P Nair, B Emmanuel, TN Tran, A Menzies-Gow, M Watt, S Kayaniyil, S Boarino, J Nuevo, M Pardal, A Shavit, VH Shih, D Cohen, C Loureiro, A Padilla-Galo

4.15pm-5.50pm
Moore, 4th floor
POSTER DISCUSSION: P132-P144

"Just like a pill" – TB treatment challenges and outcomes

Chaired by: Dr Obianuju Ozoh (Lagos) and Dr Felicity Perrin (London)

P132 – WITHDRAWN

P133 Impact of the COVID-19 pandemic on tuberculosis rapid access service provision, diagnosis and treatment outcomes

N Grolmusova, N Karim, A Gilmour-Caunt, K Balasundaram, H Choudry, SA Geelani, F Ghani, R Islam, J Leach, MR Khan, K Nazim, MR Sidhu, G Woltmann, P Haldar

P134 Ocular tuberculosis in the UK since introduction of the British Thoracic Society Clinical Statement

T Gorsuch

P135 Ocular response to anti-TB therapy: what can we expect?

JOS Cheng, L Reeve, E Cooley, E Damato, G Russell

P136 Treatment outcomes of spinal tuberculosis patients

A Sharma, E Scullion, F Al-Amodi, P Naran, E Skyllberg, V White, M Ward, S Foley, H Kunst

P137 Drug-induced liver injury in tuberculosis treatment: a retrospective review from a District General Hospital

TS Braby, A Kido, A Marau, A Jayaratnam

P138 An evaluation of current methods of monitoring vision for tuberculosis (TB) patients during ethambutol treatment in England, 2021

KN Stevens

P139 Adverse effects of drugs used in the treatment of multi-drug resistant tuberculosis

P Naran, A Sharma, E Scullion, C Chen, S Tiberi, V White, H Kunst, E Skyllberg

P140 What we have learnt: an audit of an in-house Video-Observed Therapy (VOT) service for active tuberculosis (TB) patients

R Jagdish, K Westley, V Taylor, J Townsend, A Dunleavy

P141 Quinolone-containing treatment-shortening regimens for tuberculosis: what are the implications for the NHS?

E Ferran, E Alexander, J Brown, A Gibertoni-Cruz, MCI Lipman, EE Robinson

P142 Rifampicin therapeutic drug monitoring – An individualised dosing approach in tuberculosis

A Chavda, M Gilchrist, L Martin, M Park, M Coleman, A Hoxha, OM Kon

P143 Difficulties in diagnosing tuberculosis during the COVID-19 pandemic – observational report from a tertiary care hospital in Mumbai (India)

V Nanda, G Nair, A Uppe, N Sarangdhar, S Patel

P144 Does use of a diagnostic certainty score at TB cohort review improve culture confirmation of active tuberculosis?

G McNally, D Solomon, S Morris-Jones, S Capocci, M Brown, S Lozewicz, J Potter, J Dekoningh, J White, D Creer, R Moores, M Lipman, J Brown

4.15pm-5.15pm
Rutherford, 4th floor
POSTER DISCUSSION: P145-P151

"Drop the pressure" – Investigating and treating pulmonary vascular disease

Chaired by: Dr Rachel Davies (London) and Dr Mark Toshner (Cambridge)

P145 Investigating the prevalence of pulmonary hypertension amongst individuals with heart failure: a systematic review and meta-analysis

MK Khan, R Suribhatla, J Spencer, N Daniel, C Kartsonaki

P146 Survival of IPAH patients with and without comorbidity

SA Reddy, GJ Polwarth, S Graf, NW Morrell, EMD De Bie, K Bunclark, J Cannon, KK Sheares, D Taboada, MR Toshner, J Pepke-Zaba

P147 Hypoxia and/or ANCA IgG induce cytoskeletal changes in neutrophils that may promote lung endothelial injury in ANCA-associated vasculitis

N Pisacano, A Dhutia, SM Rothery, SP McAdoo, J Guck, CD Pusey, AS Cowburn, M Prendecki, KM Lodge

P148 Readily available clinical features can help identify patients with intermediate-high risk pulmonary emboli who may benefit from thrombolysis

N Abuhalaweh, H Rupani, M Brown

P149 Implementation of a PE Response Team (PERT): a single centre experience

T Joseph, L Yazbeck, R Davies, F Lo Giudice, M Makinon, R Thomas, L Howard, G Haji

P150 Venous thromboembolism risk on the virtual ward

T Thavajothy, H Dadah, J Martinovic, R Whelan, D Ward, E Balachandran, S Harvey-Porter, V Smith

P151 Neutrophil lymphocyte ratio to predict in-patient mortality of pulmonary embolism during the SARS-CoV-2 pandemic

R Connon, M Shiel, S McNeill, C Ferguson, P Minnis

5.45pm-7.00pm
Britten, 3rd floor

BTS PRESIDENT'S RECEPTION

All registered participants are warmly invited to attend this social occasion

8.00am-9.00am
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

8.45am-2.00pm
Whittle & Fleming, 3rd floor
POSTER VIEWING

Authors present: 10.00am – 11.00am

P152-P162
"Fever!" – COVID-19 and pneumonia
Discussion of abstracts will take place from 1.30pm to 2.55pm in the Westminster, 4th floor

P163-P174
"Two way traffic" – Challenging the status quo in asthma
Discussion of abstracts will take place from 1.30pm to 3.00pm in the St James, 4th floor

P175-P187
"You ain't seen nothing yet" – Imaging across COPD, nodules and lung cancer screening
Discussion of abstracts will take place from 1.30pm to 3.05pm in the Moore, 4th floor

P188-P200
"Getting better" – Interstitial lung disease: from genes to therapy
Discussion of abstracts will take place from 1.30pm to 3.05pm in the Abbey, 4th floor

P201-P211
"Simply the best" – Exacerbations, senescence and quality of life in COPD
Discussion of abstracts will take place from 3.15pm to 4.40pm in the St James, 4th floor

P212-P225
"The show must go on" – What more do we know about cough?
Discussion of abstracts will take place from 3.15pm to 5.00pm in the Westminster, 4th floor

P226-P239
"Call me maybe" – Virtual management of respiratory disease
Discussion of abstracts will take place from 3.15pm to 5.00pm in the Moore, 4th floor

8.45am-4.30pm
Cambridge, 5th floor
MODERATED POSTER VIEWING

M27-M35
"My way" – Innovative pathways in asthma management
Discussion of abstracts will take place from 3.15pm to 4.25pm in the Cambridge, 5th floor

8.00am-8.30am
Albert, 2nd floor
JOURNAL CLUB
TRANSPLANTATION

Dr Anna Reed (London)

Learning objectives

- *To discuss recent publications and clinical research in the field of lung transplantation.*

So that delegates may review the papers in advance of the session, references to the papers to be discussed are available on the BTS website and Winter Meeting App.

8.30am-10.00am
Churchill, Ground floor
SYMPOSIUM
NEW FRONTIERS IN LUNG CANCER DIAGNOSIS AND MANAGEMENT

Chaired by: Dr Liz Fuller (Newcastle upon Tyne) and Dr Fraser Millar (Edinburgh)

8.30am	The air we breathe: lung cancer due to air pollution
	Professor Charles Swanton (London)
9.00am	Hunting cancer in the blood: liquid biopsies
	Professor Caroline Dive CBE (Manchester)
9.30am	Future horizons: radiotherapy for lung cancer
	Dr Kevin Franks (Leeds)

Learning objectives

- *To understand the associations of increasing 2.5um PM (PM2.5) concentrations with cancer risk, particularly in never smokers.*
- *To understand the role of cancer biomarkers in the blood in diagnosis, personalised treatments and predicting recurrence.*
- *To understand the many advances in radiotherapy technology in patients with lung cancer, including the role of proton beam therapy, which means that more patients can be offered radical treatment.*

8.30am-10.00am
Mountbatten, 6th floor
SYMPOSIUM

"I'M NOT OLD, I'VE JUST BEEN YOUNG FOR A VERY LONG TIME"

Chaired by: Professor Nick Simmonds (London) and Dr Joanna Whitehouse (Birmingham)

8.30am	The future of cystic fibrosis care Professor Scott Bell (Brisbane)
9.00am	Ageing and cystic fibrosis Dr Peter Barry (Manchester)
9.30am	GI symptoms, CFTR and malignancy risk in cystic fibrosis Professor Daniel Peckham (Leeds)

Learning objectives

- *To describe the changing population, life expectancy and models of future care for CF.*
- *To describe the challenges in caring for an ageing CF population with reference to complex comorbidities.*
- *To describe ongoing GI challenges and malignancy risk in CF.*

8.30am-10.00am
Windsor, 5th floor
SYMPOSIUM

REHABILITATION IN RESPIRATORY DISEASE: WHERE NEXT?

Chaired by: Professor Samantha Harrison (Middlesbrough) and Professor Ioannis Vogiatzis (Newcastle upon Tyne)

8.30am	Pulmonary rehabilitation in diseases other than COPD Dr Annemarie Lee (Melbourne)
9.00am	The role of PR in identifying lung volume reduction candidates Dr Sara Buttery (London)
9.30am	The COVID recovery journey and the rehabilitation boat Dr Enya Daynes (Leicester)

Learning objectives

- *To determine the role of PR in treating people with chronic lung diseases other than COPD.*
- *To understand the potential role of PR in identifying candidates for lung volume reduction therapy.*
- *To describe the role of exercise-based rehabilitation in the treatment of individuals with post COVID symptoms.*

8.30am-10.05am
St James, 4th floor
SPOKEN SESSION: S90-S95

"Light my fire" – A deeper dive into inflamed airways

Chaired by: Professor Rekha Chaudhuri (Glasgow) and Dr Freda Yang (London)

8.35am **S90**

Efficacy of the ReferID+ digital tool in uncontrolled asthma in primary care (OASIS): a randomised controlled trial

H Dhruve, AM Nanzer, DJ Jackson

8.50am **S91**

The effects of inhaled corticosteroids on healthy airways

P Bradding, E Marchi, M Richardson, L Chachi, FA Symon, R Clifford, CD Austin, S Siddiqui, JS Mar, JR Arron, D Choy, TSC Hinks

9.05am **S92**

Proteomic and transcriptomic analysis of residual steroid-responsive inflammation in mepolizumab treated patients

I Howell, F Yang, J Cane, E Marchi, J Busby, A Azim, JP McDowell, SE Diver, C Borg, V Brown, LG Heaney, P Howarth, ID Pavord, CE Brightling, R Chaudhuri, TSC Hinks

9.20am **S93***

Circadian patterns in immune cell trafficking in chronic allergic airways disease

J Cain, JE Gibbs, HJ Durrington

9.35am **S94**

Computed cardiopulmonography: an innovative assessment of lung function before and after starting biologic therapy for Th-2 high asthma

A Alamoudi, L Petralia, N Smith, H Xu, C Fullerton, G Richmond, D Sandhu, N Talbot, G Ritchie, I Pavord, P Robbins, N Petousi

9.50am **S95**

The effect of small airways disease (SAD) on non-physiological parameters in asthma: findings from the Assessment of Small Airways Involvement in Asthma [ATLANTIS] study

D Singh, M Choudhury-Iqbal, S Niazi-Ali, A Browne, M Ochel, S Siddiqui

***S93 – BTS Medical Student Award Winner**

8.30am-10.05am
Westminster, 4th floor
SPOKEN SESSION: S96-S101

"Scar tissue" – Pathogenesis of lung fibrosis

Chaired by: Dr Jennifer Dickens (Cambridge) and Dr Harvinder Virk (Leicester)

8.35am **S96**

Fibroblast Gαq/11 signalling controls lung epithelial cell-driven repair via modulation of extracellular matrix properties

AT Goodwin, AL Tatler

8.50am **S97**

Heritable risk in pulmonary fibrosis: study of disease penetrance amongst carriers of damaging rare variants

A Duckworth, J Prague, A Wood, K Lunnon, M Lindsay, AM Russell, M Gibbons, J Tyrrell, C Scotton

9.05am **S98**

Genome-wide association studies of pulmonary and non-pulmonary fibrosis

RJ Allen, E Joof, GM Massen, OC Leavy, G Parcesepe, I Stewart, GP Aithal, CJ Scotton, DP Auer, S Francis, RG Jenkins, JK Quint, LV Wain

9.20am **S99**

The effects of Human Epididymis Protein 4 (HE4) on inflammation-driven lung fibrosis

KN Potel, F McGovern, R Cabuhal, N Chaudhuri, BC Schock

9.35am **S100**

MAIT cells contribute to protection against bleomycin-induced lung tissue damage by promoting monocyte differentiation into type 1 conventional dendritic cells

X Zhang, S Li, W Lason, SB Morgan, P Klenerman, TSC Hinks

9.50am **S101**

Identification and validation of novel therapeutic targets in IPF using human tissue models

RA Burgoyne, BS Barksby, S Murphy, L Sabater, LS Patterson, J Majo, AJ Fisher, LA Borthwick

8.30am-10.05am
Moore, 4th floor
SPOKEN SESSION: S102-S107

"Insomnia" – Screening, management and complications of sleep disordered breathing

Chaired by: Dr Michael Davies (Cambridge) and Dr Shelley Srivastava (London)

8.35am **S102**

Cardiac arrhythmogenesis in sleep apnoea (CAOS): a prospective multi-centre study

S Iyer, S Craig, M Austin, L Mattock , J Earley, A Manuel

8.50am **S103**

Dysanapsis in adult obstructive sleep apnoea patients and its association with asthma

M Ur Rasool, H Qaim, S Hand

9.05am **S104**

Clinical outcomes, impact on surgical interventions and complication rates in OSA patients following preoperative screening from a dedicated pre assessment clinic

R Leggatt, G Shaw, P Roberts, AP Witton, N Moll, A Dwarakanath

9.20am **S105**

The incidence of residual excessive daytime sleepiness in obstructive sleep apnoea syndrome treated with continuous positive airways pressure: the Liverpool SleepHealth study

B Chakrabarti, RM Angus, L Dowie, M Osborne, P England, E McKnight, SE Craig

9.35am **S106**

Determinants of hypercapnia in patients with obstructive sleep apnoea, with and without COPD

P Senior, P Matos, A Bikov

9.50am **S107**

Obesity hypoventilation syndrome: hidden in plain sight

DM McKeegan, S Balasubramanian, H Ashraf, E Brohan

8.30am-10.05am
Abbey, 4th floor
SPOKEN SESSION: S108-S113

"Mirrorball" – The many reflections of respiratory viral infection

Chaired by: Dr Andrea Collins (Liverpool) and Professor Karl Staples (Southampton)

8.35am **S108**

Biological predictors of severity in respiratory viral infection (RVI): preliminary data from UNIVERSAL, a multicentre prospective observational study

T Morelli, M Purcell, A Kong, B Welham, C Roberts, A Allen, N Scott, K Thorne, P Lee, A Cazaly, V Goss, J Nuttall, N Greening, S Marciniak, M Crooks, C Daneshvar, J Myerson, P Rodrigues, T Clark, A Freeman, TM Wilkinson

8.50am **S109**

A seropositive SARS-CoV-2 controlled human infection model demonstrating potent protective immunity and identification of immune correlates of protection

S Jackson, JL Marshall, A Mawer, R Lopez Ramon, SA Harris, I Satti, E Hughes, H Preston-Jones, I Cabrera Puig, S Longet, T Tipton, S Laidlaw, R Powell Doherty, H Morrison, R Mitchell, A Ateere, E Stylianou, MS Wu, TPW Fredsgaard-Jones, R Tanner, G Rapeport, M Carroll, A Catchpole, C Chiu, H McShane

9.05am **S110**

Neutrophil extracellular traps drive severity of virus-induced exacerbations in COPD

O Katsoulis, M Toussaint, P Mallia, J Footit, T Kebadze, A Gilmour, M Long, SL Johnston, JD Chalmers, A Singanayagam

9.20am **S111**

Increased airway leptin drives impaired anti-viral immunity in obesity

M Jackson, M Almond, HA Farne, O Katsoulis, O Pitts, E Reigs, P Mallia, OM Kon, MR Edwards, WS Barclay, SL Johnston, A Singanayagam

9.35am **S112**

Infection experienced lung stromal cells provide early immune protection that is independent of the adaptive immune response

JC Worrell, GE Finney, KE Hargrave, C Hansell, J Singh-Nijjar, F Morton, J Cole, MKL MacLeod

9.50am **S113**

Cellular senescence ameliorates human rhinovirus clearance

A Yang, L Daly, Y Yamamoto, J Baker, K Ito

9.00am-10.00am
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Pulmonary Embolism and other Pulmonary Vascular Diseases

9.00am-10.00am
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Bronchiectasis

9.00am-10.15am
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Asthma

10.00am-11.00am
Whittle & Fleming and Britten, 3rd floor

COFFEE/TEA BREAK

10.30am-12.00pm
Churchill, Ground floor
SYMPOSIUM

UNDER PRESSURE: UNDERSTANDING COPD EXACERBATIONS

Chaired by: Professor Mona Bafadhel (London) and Dr Aran Singanayagam (London)

10.30am	What are they?
	Professor Alvar Agustí (Barcelona)
11.00am	What causes them?
	Professor Wisia Wedzicha (London)
11.30am	How do we prevent them?
	Professor Dave Singh (Manchester)

Learning objectives

- *To learn about the impact of exacerbations and how the exacerbation is defined, covering aspects of the ROME proposal.*
- *To learn about causes of exacerbations, specifically about the pathogen-host response.*
- *To review methods of treatment to reduce exacerbation burden.*

10.30am-12.00pm
Mountbatten, 6th floor
SYMPOSIUM

EARLY DETECTION OF INTERSTITIAL LUNG DISEASES: ADDRESSING AN UNMET NEED

Chaired by: Dr Amanda Goodwin (Nottingham) and Professor Bibek Gooptu (Leicester)

10.30am	Lung cancer screening and detection of ILDs
	Dr Conal Hayton (Manchester)
11.00am	Automated computerised tomography predicting mortality in interstitial lung disease
	Dr Joseph Jacob (London)
11.30am	The incidence of lung cancer in ILD: do we need a screening protocol?
	Dr Elisabetta Renzoni (London)

Learning objectives

- *To appreciate how lung cancer screening programmes present a unique opportunity for early detection and management of ILDs.*
- *To recognise the role of novel imaging techniques in the prognostication of ILDs.*
- *To appreciate how these imaging techniques could be utilised in routine clinical practise. Guidance on lung cancer screening in IPF/ILD as limited data on how best and how frequently to offer cross sectional imaging in ILD as does have implications on management and prognosis.*

10.30am-12.05pm
St James, 4th floor
SPOKEN SESSION: S114-S119

"The winner takes it all" – Therapy in asthma

Chaired by: Professor Liam Heaney (Belfast) and Ms Ola Howell (Oxford)

10.35am **S114**

Optimising the management of asthma using FeNO to direct the use of inhaled steroids: the OPTIMAN study. A cluster randomised study

REK Russell, JL Simpson, D Fleming-Brown, B Langford-Wiley, H Jeffers, I Pavord, M Bafadhel

10.50am **S115**

Efficacy of high-dose triple therapy on asthma exacerbations in asthmatics with persistent airflow limitation and high blood eosinophil count: a post-hoc analysis of the TRIGGER study

M Kots, A Papi, L Fabbri, G Canonica, MvD Deijl, A Vele, E Topole, G Georges

11.05am **S116**

Treatment with extra fine formulation single-inhaler triple therapy improves disease control and adherence in patients with asthma – a 3-month interim analysis from the TriMaximize UK study

J Richards, N Rangwani, R Russell

11.20am **S117**

Clinical remission in patients with severe eosinophilic asthma: an analysis of SIROCCO and CALIMA trial data

A Menzies-Gow, FL Hoyte, DB Price, S Swisher, D Cohen, A Shavit

11.35am **S118**

Dupilumab efficacy is not affected by prior asthma exacerbation status in LIBERTY ASTHMA TRAVERSE open-label extension study

A Papi, M Castro, WW Busse, D Langton, S Korn, C Xia, X Soler, N Pandit-Abid, R Amr, JA Jacob-Nara, PJ Rowe, Y Deniz

11.50am **S119**

Effect of Tezepelumab in patients with severe, uncontrolled asthma by age of onset, allergic status, and eosinophilic phenotype

SK Mathur, JL Hill, CS Ambrose, N Martin, J-P Llanos, N Martin, G Colice

10.30am-12.05pm
Westminster, 4th floor
SPOKEN SESSION: S120 – S125

"The great pretender" – Hot topics in TB

Chaired by: Dr Rishi Gupta (London) and Dr Michaela Reichman (Southampton)

10.35am **S120**

Diagnostic accuracy of TB PCR in EBUS-TBNA samples, TRiBE a multicentre prospective UK study

M Park, G Satta, J Nanan, B Tomas-Cordero, M Coleman, L Martin, O Hatem, K Manalan, A Datta, A Whittington, P Kalia, M Loebinger, H Burgess, L Castle, H Kunst, R Breen, A Dunleavy, M Munavvar, P Naran, M Lipman, T Gorsuch, P Haldar, OM Kon

10.50am **S121**

Real-world diagnostic utility of Xpert MTB/RIF Ultra in pulmonary and extrapulmonary samples in TB hotspot of low TB incidence, high resource setting

JW Kim, H Patel, R Halliwell, R Verma, RC Free, A Gilmour-Caunt, G Woltmann, N Perera, P Haldar

11.05am **S122**

PET-CT identifies early inflammatory changes of metabolically active Mycobacterium tuberculosis infection in household TB contacts with a clinical phenotype of latent infection: a descriptive case series

JW Kim, J Lee, I Novsarka, G Woltmann, R Verma, M Sharifpour, A Kamil, P Haldar

11.20am **S123**

Mycobacterium tuberculosis (M.tb) and bacterial co-infection in BAL samples in a multi-centre UK cohort

O Hatem, M Park, G Satta, J Nanan, B Tomas-Cordero, M Coleman, L Martin, K Manalan, A Datta, A Whittington, M Loebinger, H Burgess, L Castle, H Kunst, R Breen, A Dunleavy, M Munavvar, T Gorsuch, P Haldar, OM Kon

11.35am **S124**

Causes, timings and clinical features of tuberculosis-associated deaths in a low-incidence country

J Barrett, B Hack, A Benjamin, M Muzyamba, S Cox, C Campbell, S Tiberi, A Whittington, O Kon

11.50am **S125**

Isoniazid resistant tuberculosis (Hr-TB): a problem well stated is a problem half solved!

KN Malu, AR Lamb

10.30am-12.05pm
Moore, 4th floor
SPOKEN SESSION: S126-S131

"Ebony and ivory" – Where real world and lab data meet

Chaired by: Professor Jennifer Quint (London) and Dr Jay Laver (Southampton)

10.35am **S126**

Surveillance of pneumococcal serotypes in adults hospitalised with acute lower respiratory tract infection following the COVID-19 pandemic in Bristol, UK

C Hyams, M Lahuerta, C Theilacker, J King, D Adgebite, S McGuinness, C Grimes, J Campling, J Southern, M Pride, E Begier, N Maskell, J Oliver, L Jodar, B Gessner, L Danon, A Finn

10.50am **S127**

Is Streptococcus pneumoniae serotype 3 (SPN3) a newly found cause of pharyngitis?

K Liatsikos, P Ambrose, D Dilys, A Bettam, J Brunning, E Carter, J Court, D Elsafadi, M Farrar, F Fyles, H Fleet, P Gonzalez, J Gonzalez-Sanchez, P Hazenberg, A Howard, A Hyder-Wright, L Kerruish, TK Nyazika, S Latham, E Mitsi, V Price, RE Robinson, C Solorzano, B Urban, SB Gordon, AM Collins, DM Ferreira, E Begier, I Kanevsky, J Cattuse, M Lahuerta, K Pan, C Theilacker, BD Gessner

11.05am **S128**

Prevalence of RSV among Acute Lower Respiratory Tract Disease (aLRTD) hospitalisations and projected seasonal RSV-related aLRTD hospitalisation incidence among adults in Bristol UK – 2022-2023

D Adegbite, E Begier, J King, J Southern, S McGuinness, R Hubler, J Oliver, A Vyse, N Aliabadi, B Gessner, A Finn, C Hyams

11.20am **S129**

An impact of age on respiratory syncytial virus infection in air-liquid-interface culture bronchial epithelium

L Daly, K Ito

11.35am **S130**

The incidence and impact of viral respiratory infection in hospitalised adults in winter 2022-2023: a single centre retrospective study

M Shorthose, D Hettle, P Muir, S Taylor, J Smith, P Creber

11.50am **S131**

Too big to fail: how do lung progenitors repair the lung after influenza virus infection?

PA Shearer, C Pirillo, E Roberts, L Yrlid, G Perona-Wright

10.30am-12.05pm
Abbey, 4th floor
SPOKEN SESSION: S132-S137

"Every breath you take" – New findings from the physiology lab

Chaired by: Dr Gillian Doe (Leicester) and Professor James Hull (London)

10.35am **S132**

'Race-neutral' and 'Global'? Impact of reference standards on interpretation of spirometry among socio-economically deprived, southern African adolescents and adults

CJ Calderwood, D Banze, C Nhamuave, ET Marambire, L Larsson, T Minja, A Mfinanga, N Heinrich, K Kranzer, O Ivanova, A Rachow, C Khosa

10.50am **S133**

Quality of primary care spirometry according to ATS/ERS 2019 standards and inter-expert agreement on their application

AP Sunjaya, G Edwards, J Harvey, K Sylvester, J Purvis, M Rutter, J Shakespeare, V Moore, E El-Emir, G Doe, K Van Orshoven, S Patel, M de Vos, B Cuyvers, P Desbordes, R Evans, M Morgan, R Russell, I Jarrold, N Spain, N Hopkinson, S Taylor, S Kon, D Scott, AT Prevost, M Topalovic, W Man

11.05am **S134**

Eupnoos: advancing early diagnosis of respiratory diseases with smartphone-based audio phenotyping

L Welch, M Shaban, C Sheppard, A Gratiot, D Kodak, S Siddiqui

11.20am **S135***

Lung function outcomes in military personnel who sustained combat-related traumatic injury; the ADVANCE study

J Praveen, SJ Schofield, AN Bennett, AMJ Bull, NT Fear, CJ Boos, J Feary

11.35am **S136**

Feasibility and safety of continuous bronchoscopy during exercise to assess dynamic large airway collapse

Z Williams, CM Orton, JL Garner, L Chan, PL Shah, MI Polkey, T Semple, JH Hull

11.50am **S137**

Expression of Extracellular Matrix (ECM) proteins in vastus lateralis muscle fibres is different between COPD and healthy participants in response to exercise training

E Kritikaki, G Terzis, I Vogiatzis, DCM Simoes

***S135 – BTS Medical Student Award Highly Commended**

10.30am-11.30am
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Acute and Complex Pulmonary Infections

10.30am-11.30am
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Pulmonary Rehabilitation

10.30am-11.30am
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Nurse

10.45am-11.50am
Windsor, 5th floor
SPOKEN SESSION: S138-S141

"Bridge over troubled waters" – Managing the exudative effusion

Chaired by: Dr Eihab Bedawi (Sheffield) and Dr Steven Walker (Bristol)

10.50am **S138**

Malignant pleural effusions: evaluating the psychosocial impact of indwelling pleural catheters on patients (MY-IPC) – an interim analysis

J Zhang, J Liang, O Kadwani, L Agoramoorthy, S Montalvo, G Radcliffe, P Sivakumar

11.05am **S139**

Experience of using a novel digital drainage system via an Indwelling Pleural Catheter (IPC): a case series

A Yousuf, F Hinchcliffe, S Johnstone, S Mohammad, R Sudhir, R Panchal

11.20am **S140**

An observational study of patients treated with early or conventionally timed fibrinolytic therapy for pleural infection

R Reddy, HS Virk, M Naeem, G Tsaknis

11.35am **S141**

Does talc offer an increased pleurodesis rate when given at day case thoracoscopy in combination with an indwelling pleural catheter?

DT Beith, EK Mishra

12.00pm-2.00pm
Pickwick, 1st floor and Whittle & Fleming, 3rd floor
LUNCH (Not included in the delegate fee. Card payments only)

12.30pm-1.15pm
Churchill, Ground floor
THE MORRISTON DAVIES LECTURE

SMARTER TRIALS FOR BETTER HEALTH

Guest lecturer: Professor Sir Martin Landray (Oxford)

Introduced by: Dr Simon Hart (Hull)

Friday 24 November 2023

1.30pm-2.30pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Tobacco Dependency

1.30pm-2.30pm
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Cystic Fibrosis

1.30pm-2.55pm
Westminster, 4th floor
POSTER DISCUSSION: P152-P162

"Fever!" – COVID-19 and pneumonia

Chaired by: Dr David Arnold (Bristol) and Dr Biswajit Chakrabarti (Liverpool)

P152 The association of ABO and Rhesus blood group with severe outcomes from non-SARS-CoV-2 respiratory infection: a prospective observational cohort study 2020-2022

A Hathaway, G Qian, J King, S McGuiness, N Maskell, J Oliver, A Finn, L Danon, R Challen, A Toye, C Hyams

P153 Adult respiratory illness attendances to emergency departments: the pinnacle of winter pressures

HF Wright, H Graham, JA Campling, A Vyse, C Reynard, A de Melo, G Ellsbury, E Begier, M Slack

P154 FifeCAP2019: a detailed review of diagnostic testing and antibiotic therapy in patients with severe community acquired pneumonia: a cohort review of 200 consecutive hospital admissions

A Alothman, D Dhasmana

P155 Assessing continued benefits of 4C scores for mortality among patients with COVID-19 pneumonitis admitted to a Teaching District General Hospital

D Cox, K Koshy, N Moudgil, A Makan, E Crawford, H Moudgil, K Srinivasan

P156 An audit of emergency and respiratory physician concordance to the Australian Therapeutic Guideline recommendations for the management of community acquired pneumonia before and during the COVID-19 pandemic

RS Bajwa, A Burke, S Rossouw, S Taylor

P157 Acute respiratory infection testing: a novel pathway to characterise exacerbations of chronic lung disease and address antimicrobial stewardship

K Roy, R Gill, N Yusuf, S Farooqi, Y Abdi

P158 Characteristics and outcomes of patients with COVID-19 presumed to be treated with Sotrovimab in NHS hospitals in England

B Levick, S Boult, DC Gibbons, M Drysdale, M Singh, HJ Birch

P159 Comparative effectiveness of Sotrovimab versus no treatment in initially non-hospitalised high-risk patients with COVID-19 in North West London during Omicron predominance: a retrospective cohort study using the discover dataset

M Drysdale, ER Galimov, MJ Yarwood, B Levick, DC Gibbons, JD Watkins, S Young, BF Pierce, W Kerr, HJ Birch, T Kamalati, SJ Brett

P160 Interim results of a prospective cohort study to monitor the emergence of resistance in immunocompromised non-hospitalised patients with COVID-19 who were treated with Sotrovimab in Great Britain: LUNAR study

J Breuer, M Drysdale, J Walker, JH Han, M Gorczycka, A Aylott, MK Van Dyke, HJ Birch, E McKie, DM Lowe

P161 Antiviral effects of a novel nanoemulsion formulation of Nirmatrelvir for a nasal delivery on coronavirus infection in human nasal epithelium

HCJ Ombredane, JR Baker, J Shur, G Rapeport, K Ito

P162 Epidemiological risk factors for developing long COVID: a rapid review with meta-analysis

A Schuster Bruce, E Vasileiou

1.30pm-3.00pm
Churchill, Ground floor
SYMPOSIUM

PULMONARY EMBOLIC DISEASE: CURRENT CONTROVERSIES AND COMPLICATIONS

Chaired by: Dr Colin Church (Glasgow) and Dr Judith Hurdman (Sheffield)

1.30pm	Catheter-directed therapy is the future for patients with intermediate-high/high risk PE – Pro Professor Andrew Sharp (Cardiff)
1.55pm	Catheter-directed therapy is the future for patients with intermediate-high/high risk PE – Con Professor Luke Howard (London)
2.30pm	The evolution of investigation and management in chronic thromboembolic pulmonary hypertension: balloons, drugs and knives Dr Joanna Pepke-Zaba (Cambridge)

Learning objectives

Pulmonary embolism is increasing in incidence and is one of the commonly faced emergencies for all respiratory physicians.

- *To explore the role of catheter directed therapy in the management of pulmonary embolism. What is its role currently? This is a debate to explore if there is a definitive strategy and subgroup of patients who can benefit from this therapy. This will be put in the context of evidence for systemic thrombolysis.*
- *To outline advances in the investigation of chronic thromboembolic pulmonary hypertension and appraise recent evidence for interventional treatment approaches.*

1.30pm-3.00pm
Mountbatten, 6th floor
BTS STAG SYMPOSIUM

IMMUNOMETABOLISM FOR RESPIRATORY PHYSICIANS AND SCIENTISTS

Chaired by: Dr Frances Grudzinska (Birmingham) and Dr Anthony Martinelli (Cambridge)

1.30pm	Hypoxia, neutrophils and inflammation Professor Sarah Walmsley (Edinburgh)
2.00pm	Iron metabolism and chronic lung disease Dr Suzanne Cloonan (Dublin)
2.30pm	Novel therapeutics in respiratory infection: targeting immunometabolism Dr Alba Llibre Serradell (Birmingham)

Learning objectives

- *Provide an overview of what immunometabolism is and its relevance to respiratory medicine.*
- *Describe how metabolism influences host:pathogen interactions in the context of respiratory disease.*
- *Review how metabolism could be therapeutically tractable.*

1.30pm-3.00pm
Windsor, 5th floor
SYMPOSIUM

HOW CAN WE ADDRESS INEQUALITIES IN NURSING CARE?

Chaired by: Professor Ann-Louise Caress (Huddersfield) and Miss Padmavathi Parthasarathy (Leicester)

1.30pm	Health inequalities in end-of-life care Ms Emma Rickards (Liverpool)
2.00pm	Exploring potential opportunities and challenges of REMOte CARE for COPD Dr Ratna Sohanpal (London)
2.30pm	Optimising breathlessness triggered services for older people Professor Janelle Yorke (Manchester)

Learning objectives

- *To be familiar with the preventable health differences in the population of COPD patients receiving end of life care.*
- *To explore the advantages and disadvantages of remote consultations for patients with COPD.*
- *To understand the role and effectiveness of breathlessness services for older people.*

1.30pm-3.00pm
St James, 4th floor
POSTER DISCUSSION: P163-P174

"Two way traffic" – Challenging the status quo in asthma

Chaired by: Dr Thomas Pantin (Manchester) and Dr Paul Pfeffer (London)

P163	Inhaled and oral corticosteroid treatment highlights differential effects in blood and airway compartments in type-2 high asthma

J Melhorn, C Pelaia, G Hynes, M Mahdi, R Shrimanker, C Borg, E Gamlen, L Bermejo-Sanchez, J Seymour, S Couillard, ID Pavord, TSC Hinks

P164 The influence of age on the diagnostic performance of type-2 biomarkers in suspected asthma

S Ketklao, R Wang, L Healy, S Drake, L Lowe, AS Simpson, CS Murray, SJ Fowler

P165 How best to measure asthma attacks? A methodological systematic review

I Howell, A Howell, S Ramakrishnan, M Bafadhel, I Pavord

P166 External validation of the minimal clinically important difference of fractional exhaled nitric oxide using the Asthma Control Questionnaire: a secondary analysis of two RCTs in mild or moderate asthma

J Noble, O Bean, R Beasley, M Weatherall

P167 Endothelial dysfunction and arterial stiffness in people with asthma: a systematic review of the evidence and meta-analysis

M Marquette, D Sethi, PC Calder, PJ Curtis, AM Wilson

P168 Association between metformin and asthma exacerbations: a self-controlled case series

BH Lee, E Wong, T Tan, C Bloom

P169 Oxysterols in asthma: a novel pilot study

J Creaser-Thomas, Y Wang, WJ Griffiths, J Hopkin, GA Davies

P170 Tapering courses of oral corticosteroids after hospital admission due to asthma exacerbation

M Ray, H Yaqub, A Murphy, RJ Russell

P171 Evaluation of a biomarker-led rapid access review clinic to support steroid stewardship in patients with asthma

J Lam, C Roxas, M Fernandes, L Thomson, L Green, A Hearn, J Gates, G d'Ancona, J Dhariwal, DJ Jackson, AM Nanzer

P172 Assessing the clinical effectiveness of a secondary care Asthma Hot Clinic following hospital attendance with acute asthma exacerbation

C Roxas, N Dul, L Thomson, J Lam, M Fernandes, L Green, AP Hearn, J Gates, G d'Ancona, AM Nanzer, DJ Jackson, J Dhariwal

P173 Maintenance steroids are usually not required in asthma and can be weaned

ER Graham, C Eames, W Soe, L Fox, C Whitfield, S Kerley, E Rayala-Montaniel, P Cook, N Zarif, R Kurukulaaratchy, HM Haitchi, P Dennison, H Rupani

P174 The utilisation of Nominal Group Technique to gain consensus on the key components of non-pharmacological interventions used to treat adults with inducible laryngeal obstruction

A Lukose, JA Smith, J Haines

1.30pm-3.05pm
Moore, 4th floor
POSTER DISCUSSION: P175-P187

"You ain't seen nothing yet" – Imaging across COPD, nodules and lung cancer screening

Chaired by: Dr Michael Crooks (Hull) and Dr Irem Patel (London)

P175 – WITHDRAWN

P176 Bronchodilator response discordance in patients with asthma and/or COPD assessed by 129Xe-MRI and spirometry

LJ Smith, H Marshall, A Biancardi, GJ Collier, HF Chan, D Capener, J Bray, D Jakymelen, L Saunders, J Astley, BA Tahir, R Munro, O Rodgers, J Ball, PJC Hughes, S Rajaram, AJ Swift, NJ Stewart, G Norquay, ML Brook, L Armstrong, L Hardaker, R Hughes, JM Wild

P177 129Xe MRI phenotyping and longitudinal change in patients with asthma and/or COPD and normal pulmonary function tests

H Marshall, LJ Smith, A Biancardi, GJ Collier, HF Chan, D Capener, J Bray, D Jakymelen, L Saunders, J Astley, BA Tahir, R Munro, O Rodgers, J Ball, PJC Hughes, S Rajaram, AJ Swift, NJ Stewart, G Norquay, ML Brook, L Armstrong, L Hardaker, R Hughes, JM Wild

P178 T2*-weighted oxygen-enhanced pulmonary MRI in COPD and linkage to respiratory physiology

AF Elbehairy, JH Naish, H Baghertash, CA Miller, J Vestbo, A Horsley

P179 Aortic valve calcium scores in lung cancer screening: a local targeted lung health check programme experience

A Iyer, K Leslie, R Riordan, C Daneshvar

P180 Local early experience of Interstitial lung abnormalities in a targeted lung health check programme

C Masey, A Iyer, K Leslie, R Riordan, C Daneshvar

P181 Predictive biomarkers of benign pulmonary nodules in a high-risk population in a lung cancer screening programme

C Gotera, J Alfayate, E Cabezas, A El Hachem Debek, F Troncoso, L Nuñez, M Rodríguez, J Pinillos, MJ Rodriguez Nieto

P182 Targeted Lung Health Checks: incidental extrapulmonary tumours

L McManus, J Howells, A Turner, L Flanagan, T Newton, F Zaman

P183 The clinical characteristics of patients with moderate or severe emphysema identified by the Targeted Lung Health Check Screening programme

CHR Francis, JI Hall, K Ryanna, CM Batista

P184 Emphysema identified during lung cancer screening – an opportunity to intervene or just another incidental finding?

TJC Ward, L Cole, S Rai, MC Steiner, G Tsaknis

P185 A pilot of case-finding for COPD with community spirometry within a Targeted Lung Health Check (TLHC) programme

E James-Morley, I Patel, K Ryanna, DP Walder

P186 Innovation project with big data for lung cancer screening in COPD/emphysema population

C Gotera, J Alfayate, T Gómez del Pulgar, R Armenta, A Cruz Benita, P Marin, C Aguado, M Rodríguez Salmones, G Peces-Barba, MJ Rodríguez Nieto

P187 Targeting lung health in Coventry: does lung function corroborate with CT evidence of emphysema?

VC Moore, AM Choudhury, A Jaiteh, J Shakespeare

1.30pm-3.05pm
Abbey, 4th floor
POSTER DISCUSSION: P188-P200

"Getting better" – Interstitial lung disease: from genes to therapy

Chaired by: Dr Richard Hewitt (London) and Dr Pilar Rivera-Ortega (Manchester)

P188 Genetic risk of pulmonary fibrosis across different ancestry groups

R Nabunje, E Joof, GM Massen, OC Leavy, G Parcesepe, I Stewart, G Aithal, C Scotton, D Auer, S Francis, RG Jenkins, J Quint, LV Wain, RJ Allen

P189 Genetic differences between sexes in idiopathic pulmonary fibrosis: a genome-wide SNP-by-sex interaction analysis

OC Leavy, AF Goemans, A Stockwell, RJ Allen, B Guillen-Guio, A Adegunsoye, HL Booth, CleanUP-IPF Investigators of the Pulmonary Trials Cooperative, P Cullinan, WA Fahy, TE Fingerlin, IP Hall, SP Hart, MR Hill, N Hirani, RB Hubbard, N Kaminski, S Ma, F Martinez, RJ McAnulty, M McCarthy, AB Millar, M Molina-Molina, V Navaratnam, M Neighbors, E Oballa, H Parfrey, C Reynolds, G Saini, I Sayers, XR Sheng, ME Strek, MD Tobin, MKB Whyte, Y Zhang, DA Schwartz, TM Maher, PL Molyneaux, JM Oldham, C Flores, BL Yaspan, I Noth, RG Jenkins, LV Wain

P190 Integrating genomics into routine interstitial lung disease management: early experience of NHS genomic testing

C Bewsey, G Dixon, M Dabbas, A Duckworth, CJ Scotton, SL Barratt, M Gibbons

P191 Exploring the association between Human Leukocyte Antigen (HLA) genetics and idiopathic pulmonary fibrosis

B Guillen-Guio, ML Paynton, RJ Allen, DPW Chin, L Donoghue, A Stockwell, OC Leavy, T Hernandez-Beeftink, C Reynolds, P Cullinan, F Martinez, CleanUP-IPF Investigators of the Pulmonary Trials Cooperative, HL Booth, WA Fahy, IP Hall, SP Hart, MR Hill, N Hirani, RB Hubbard, RJ McAnulty, AB Millar, V Navaratnam, E Oballa, H Parfrey, G Saini, I Sayers, MD Tobin, MKB Whyte, A Adegunsoye, N Kaminski, SF Ma, ME Strek, Y Zhang, TE Fingerlin, M Molina-Molina, M Neighbors, XR Sheng, JM Oldham, TM Maher, DA Schwartz, PL Molyneaux, C Flores, I Noth, BL Yaspan, RG Jenkins, LV Wain, EJ Hollox

P192 Assessing causal relationships between type 2 diabetes and idiopathic pulmonary fibrosis

S Moss, I Stewart, C Minelli, OC Leavy, RJ Allen, LV Wain, RG Jenkins

P193 Diabetes and progression in pulmonary fibrosis

M Shiel, M Basil, L Graham, E Murtagh, P Minnis

P194 Occupational and para-occupational asbestos exposure: a cause of pleuroparenchymal fibroelastosis (PPFE)?

PS Burge, CC Huntley, M Djearaman, J Reynolds, AS Robertson, GI Walters

P195 Lung texture analysis in pulmonary fibrosis and emphysema

B Flanagan, C McCool, L Graham, V Steele, E Gibson, R Kelly, E Murtagh, P Minnis

P196 Deep-learning CT imaging algorithm to detect UIP pattern in patients with SSc-ILD: association with severity and survival

CJW Stock, Y Nan, Y Fang, M Kokosi, V Kouranos, PM George, F Chua, GR Jenkins, S Desai, CP Denton, AU Wells, SLF Walsh

P197 Impact of reading time on reliability of radiological assessment to identify progressive pulmonary fibrosis

C Cutinha, S Desai, P George, V Kouranos, F Felder, S Walsh, A Wells, A Devaraj

P198 A comparative analysis of the composite physiological index in patients with interstitial lung disease(s)

S Wallbanks, G Walters, S Burge, C Huntley

P199 Importance of preserved FVC in PFILD patients: insights from a retrospective analysis at a single specialist centre

J Johnston, J Callum, K Newman, H Montgomery, P Rivera-Ortega

P200 Real world tolerability study of Metformin when given alongside Nintedanib: insights from a PFILD retrospective analysis at a single specialist centre

K Newman, J Johnston, J Callum, T Garfoot, H Montgomery, H Morris, K Zakis, J Swale, A Barker, M Greaves, S Stanel, C Avram, J Blaikley, C Hayton, C Leonard, P Rivera-Ortega

3.00pm-3.30pm
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

3.15pm-4.25pm
Cambridge, 5th floor
POSTER DISCUSSION: M27-M35

"My way" – Innovative pathways in asthma management

Chaired by: Mrs Caroline Owen (Cambridge) and Dr Jane Watson (London)

M27 Diagnosis to treatment: a UK cost-of-illness study of the asthma care pathway and its impact on health, environment and society

M Orlovic, A Madoni, M Hanslot, H Bray, V Bar-Katz, N Woolley

M28 Severe asthma, biological therapy, and homecare: a review of national practice

LJ Holmes, S Clayton

M29 Improving access to biologic treatments for patients with severe asthma: delivering a 12 month Accelerated Access Collaborative project

AJ Cooper, H Minshall, E Idris

M30 Accelerating access to specialist care for asthma patients through innovative pathway transformation

R Clarke, H Burhan, H Joplin, R Arvanitis, J Bliss

M31 Bridging the gap: empowering communities through advanced pharmacist-led specialist asthma clinics in primary care

A Howell, H McGuigan, A Chadwick

M32 Asthma Bus – One stop assessment for patients presenting to hospital with acute asthma symptoms

J Watson, J Evans, A Simpson, P Crisp, Y Matimba, N Purchase, S Ruickbie

M33 The impact of a newly developed self-directed online learning module to support healthcare professional to manage non-adherence to inhaled corticosteroids in asthma

M Savage, IP Bates, G d'Ancona

M34 Is a spoke occupational asthma screening service useful?

ED Parkes, VC Moore

M35 The design and development of culturally specific resources for asthma patients

LM Jones, M Bartholomew, H Smith, MA Snowden

3.15pm-4.35pm
Windsor, 5th floor
SPOKEN SESSION: S142 – S146

"Welcome to the jungle" – Diving into the airway mycobiome

Chaired by: Dr Caroline Baxter (Manchester) and Dr Matthew Steward (Exeter)

3.20pm **S142**

Low fungal diversity with Candida, Cladosporium and Papiliotrema-dominance in eosinophilic lung diseases: a cross-sectional bronchoscopic study

C McBrien, L Cuthbertson, C Churchward, A Menzies-Gow, M Moffatt, W Cookson

3.35pm **S143**

A single centre retrospective analysis of the real-world effectiveness of monoclonal antibody therapy in allergic bronchopulmonary aspergillosis

C Carter, I Berrar Torre, S Blackburn, Z Shang, P Patel, A Shah

3.50pm **S144**

Failure to repair: an in vitro model of Aspergillus fumigatus infection in airway epithelial injury

HEC Gifford, J Silva, G Vere, D Lim, C Scotton, PC Cook

4.05pm **S145**

The fungal burden in nontuberculous mycobacterial pulmonary disease

K Kumar, A Nastase, L Cuthbertson, HC Ellis, MR Loebinger, MF Moffatt, WOC Cookson

4.20pm **S146**

Aspergillus in bronchiectasis: data from the EMBARC registry

J Pollock, D Alferes De Lima, E Polverino, P Regis-Burgel, C Haworth, K Dimakou, M Loebinger, R Menendez, A Torres, T Welte, F Blasi, F Ringshausen, A De Soyza, M Vendrell, JS Elborn, S Aliberti, P Goeminne, A Shoemark, JD Chalmers

3.15pm-4.40pm
St James, 4th floor
POSTER DISCUSSION: P201-P211

"Simply the best" – Exacerbations, senescence and quality of life in COPD

Chaired by: Professor Mona Bafadhel (London) and Professor John Hurst (London)

P201 Differences in hospital admissions for eosinophilic and non-eosinophilic acute exacerbations of COPD (AECOPD) during the COVID-19 pandemic

H Aung, H McAuley, K Porter, M Richardson, C Brightling, N Greening

P202 Clinical characteristics of rhinovirus triggered COPD exacerbations

LJ Finney, D Wiseman, J Mah, F Kamal, A Ritchie, M Macleod, J Allinson, JA Wedzicha

P203 Post-pandemic seasonal dynamics in the frequency of hospitalised exacerbations and triggers in chronic obstructive airway disease (COPD) population

H Aung, A Aung, H McAuley, O Elneima, C Flynn, T Thornton, H Evans, C Brightling, N Greening

P204 Using the DECAF score to risk stratify and analyse the inpatient journey of patients with acute exacerbation of chronic obstructive pulmonary disease

C Masey, A Mehmood, P Hughes

P205 Effect of metformin on reducing the risk of COPD exacerbations: a UK nested case-control study

PL Tse, C Valencia-Hernandez, H Farne, C Bloom

P206 Identification of novel senolytic candidates for the treatment of chronic respiratory diseases with accelerating aging

P Gomes, A Rimbert, S Hassibi, J Baker, K Ito

P207 Senolytic effects of Telaglenastat, a glutaminase inhibitor, on senescent airway epithelial cells

S Hassibi, J Baker, L Daly, Y Yamamoto, R Kyle, K Ito

P208 Extracellular vesicles from COPD small airway fibroblasts spread senescence to healthy fibroblasts

J Davey, PS Fenwick, PJ Barnes, JV Devulder, LE Donnelly

P209 Adherence and quality of life in COPD is improved by a fixed triple therapy: the TriOptimize study

L Warner, T Amodu, R Russell, D Wat

P210 Is there a relationship between medicines adherence to inhaled treatment, inhaler device and awareness of sustainability issues in people with COPD?

M Savage, A Piwko, A Ferdous, G d'Ancona

P211 COPD patients' perspectives on their care

S Hayes, K Smyth, M Coleiro

3.15pm-4.45pm
Churchill, Ground floor
SYMPOSIUM

LUNG CANCER SCREENING: TREATING SMOKERS, FINDING RESPIRATORY DISEASE

Chaired by: *Dr Zaheer Mangera (London) and Dr Emma O'Dowd (Nottingham)*

3.15pm Optimising Targeted Lung Health Checks in tackling tobacco dependency in the UK

Mr Nathan Davies (Nottingham)

3.45pm The Yorkshire Enhanced Stop Smoking Study (YESS): personalised smoking cessation interventions during lung cancer screening

Professor Rachael Murray (Nottingham)

4.15pm Lung health checks: it's not just about lung cancer

Professor Matthew Callister (Leeds)

Learning objectives

- *Understand how lung health checks/lung cancer screening programmes can be optimised to treat tobacco dependency.*
- *Recognise how a personalised approach to tobacco dependency can improve quit rates in the screening setting.*
- *To learn about the added value of lung cancer screening/lung health check programmes covering the potential for COPD and ILD detection.*

3.15pm-4.45pm
Mountbatten, 6th floor
SYMPOSIUM

HIGHLIGHTS AND UPDATES FROM THORAX

Chaired by: Professor Mark Griffiths (Editor-in-Chief, Thorax) and Dr Sheetu Singh (Jaipur)

3.15pm Introduction

Dr Sheetu Singh (Jaipur)

3.20pm Getting papers published

Professor Wisia Wedzicha (London)

3.45pm Research integrity and ethics in publishing

Dr Helen Macdonald (UK Research Editor, *BMJ*)

4.10pm Innovations in education in *Thorax*

Dr Christopher Turnbull (Oxford)

4.35pm Opportunities for editorial apprenticeship at *Thorax*

Professor Mark Griffiths (Editor-in-Chief, *Thorax*)

3.15pm-5.00pm
Westminster, 4th floor
POSTER DISCUSSION: P212-P225

"The show must go on" – What more do we know about cough?

Chaired by: Dr Nazia Chaudhuri (Manchester) and Dr Jenny King (Manchester)

P212 Cough hypersensitivity features in interstitial lung disease

B Hirons, K Rhatigan, L Wright, H Kesavan, PSP Cho, SS Birring, K Myall

P213 Patients with IPF demonstrate hyper-responsiveness and hypersensitivity to a range of tussive agents in a different pattern to R/UCC patients

J King, J Wingfield-Digby, B Al-Sheklly, S Galgani, K Holt, R Dockry, P Marsden, JA Smith

P214 Central nervous system resting-state fMRI in refractory/unexplained chronic cough

J Wingfield Digby, R Dockry, J King, S McKie, L Parkes, K Pattinson, S Sen, S Galgani, K Holt, P Turner, P Czyzyk, J Mitchell, P Marsden, JA Smith

P215 RFC1 disorder; a genetic, neuropathic cause of chronic cough

B Hirons, K Rhatigan, R Curro, B Rugginini, J Shaw, H Abubakar-Waziri, H Kesavan, RDM Hadden, C Jolley, J Hull, PSP Cho, A Cortese, SS Birring

P216 Whole blood and plasma ATP levels in refractory/unexplained chronic cough

J Wingfield Digby, S Issop, J King, M Wortley, R Dockry, S Sen, K Holt, M Belvisi, S Bonvini, S Galgani, B Massey, S Stephan, P Marsden, JA Smith

P217 Night-time cough frequency: relationship with awake cough frequency

K Rhatigan, B Hirons, H Kesavan, RD Turner, K Myall, J Hull, CJ Jolley, SS Birring, PSP Cho

P218 Bronchial thermoplasty improves cough hypersensitivity and cough in patients with severe asthma

Y Kanemitsu, H Nishiyama, J Hara, K Fukumitsu, N Takeda, R Kurokawa, K Ito, T Tajiri, S Fukuda, T Uemura, H Ohkubo, K Maeno, Y Ito, T Oguri, M Takemura, A Niimi

P219 Targeting the IL-5 pathway improves cough hypersensitivity in patients with severe uncontrolled asthma

K Ito, Y Kanemitsu, T Suzuki, Y Mori, K Fukumitsu, S Fukuda, T Uemura, T Tajiri, Y Ito, T Oguri, M Takemura, A Niimi

P220 Thoracic Societies member's view of chronic cough

AH Morice

P221 The burden of persistent cough in idiopathic pulmonary fibrosis (IPF) and other interstitial lung diseases (ILDs): a systematic evidence synthesis

R Green, M Baldwin, N Pooley, MPMH Rutten-van Mölken, N Patel, MS Wijsenbeek

P222 The impact of cough and dyspnoea on anxiety and depression in idiopathic pulmonary fibrosis

R Islam, Z Wu, DJF Smith, TM Maher, JA Smith, PL Molyneaux

P223 Ethnic disparities in disease severity among newly diagnosed fibrotic interstitial lung disease patients – UK specialist centre perspective

M Iftikhar, H Huma, M Iqbal, B Boatin, G Ahmad, C Odo, A Khan, F Woodhead, F Khan

P224 Nintedanib in combination with immunosuppressant drug prescribing is safe and well tolerated in a large cohort of patients with progressive fibrotic interstitial lung disease

M Naqvi, A Lawrence, K Myall, A West

P225 Airway disease in pulmonary sarcoidosis

C McCool, B Flanagan, L Graham, K Kerr, P Minnis

3.15pm-5.00pm
Moore, 4th floor
POSTER DISCUSSION: P226-P239

"Call me maybe" – Virtual management of respiratory disease

Chaired by: Dr James Dodd (Bristol) and Dr Sarah Sibley (Liverpool)

P226 Management of community acquired pneumonia in a virtual ward setting

E Bishop, JL Martinovic, R Whelan, D Ward, V Smith

P227 Community acquired pneumonia and readmissions from the virtual ward

DS Barber, F Frost, D Wat, V Barry, S Hayes, E Rickards, S Sibley

P228 Virtual ward (VW) in respiratory medicine – Flash in the pan or game changer?

SN Ampikaipakan, C Beard, K Cooper, R Cary, M Waters, MC Pasteur

P229 Should home oxygen assessment be part of the respiratory virtual ward?

D Wat, S Sibley, N Glover, O Hampson

P230 Predicators of COPD exacerbation readmissions from the virtual ward

DS Barber, F Frost, D Wat, V Barry, S Hayes, E Rickards, S Sibley

P231 Management of asthma on the virtual ward

R Whelan, D Ward, J Martinovic, V Smith

P232 A comparison of visually measured respiratory rate and continuous monitoring with an electronic device in a tertiary centre: a retrospective cohort study

LP Piggott

P233 Virtual physiotherapy for breathing pattern disorder in asthma: not all that glitters is gold

J Kilduff, K Chedgey, K Bazin, L Grillo, G Korff, D Watchorn

P234 The feasibility of a digital self-management programme (BreathTec) to reduce anxiety, depression, and breathlessness in patients with chronic respiratory diseases: a retrospective analysis

M Armstrong, G Burns, K Heslop-Marshall

P235 A point prevalence study of COPD therapy in 13361 patients using the myCOPD app: examining real-time capture of disease control measures

S Bourne, J El-Khoury, A Veldman, T Wilkinson

P236 Adherence to home telemonitoring for COPD with digital coaching

E Raywood, M Robshaw, J Annandale, M Harries, L Walton, LM Jones, C Hurlin, V Hunt, K Lewis

P237 Technophobia is not the most significant patient-reported barrier to accepting a digital adherence package: an analysis of the MAGNIFY trial

AP Dickens, DMG Halpin, V Carter, D Skinner, K Beeh, J Chalmers, A Clark, N Hannan, A Kaplan, K Kostikas, H Pinnock, N Roche, O Usmani, JFM van Boven, P Mastoridis, K Mezzi, F Igwe, S Davis, D Price

P238 Longitudinal observation of patient engagement in an interstitial lung disease (ILD) home monitoring programme

M Naqvi, S Lines, R Borton, W Adams, J Dallas, J Mandizha, M Hunt, C Edwards, M Gibbons, AM Russell, A West

P239 Delivering virtual respiratory teaching at a national scale for non-specialist trainees

N Kapoor, S Williams, C Harlow, R D'Cruz, J Gates, P Ratnakumar, A Sivananthan

SPEAKERS' BIOGRAPHICAL DETAILS

Dr Dinesh Addala is an NIHR Doctoral Research Fellow and Respiratory Registrar at Oxford University Hospitals. His publications and specialist research interests include malignant pleural effusion, pleural infection and thoracic ultrasound. His doctoral research, based at the Oxford Respiratory Trials Unit, focuses on trials assessing early diagnosis and treatment in malignant pleural effusion using contrast ultrasound, direct to biopsy strategies and early IPC insertion (STREAMLINE).
Dr Addala is a member of the ERS Taskforce for Ultrasound Guided Respiratory Intervention and faculty for the ERS thoracic ultrasound and pleural postgraduate courses.

Professor Alvar Agustí, MD, PhD, FRCP, FERS, is Professor of Medicine at the University of Barcelona and Senior Consultant at Hospital Clinic, also in Barcelona (Spain). His main research interest relates to clinical and translational research in chronic airway diseases. He has published more than 500 papers in peer-reviewed journals (h-index 105) and has over 40 contributions to books. Over the past few years, he has led several important conceptual changes in the field of COPD, including that of treatable traits and the trajectome.
Professor Agustí is regularly invited to speak at international conferences and symposia. He is a member of several professional societies, including the American Thoracic Society (where he has been Associate Editor of the *American Journal of Respiratory and Critical Care Medicine*), and the European Respiratory Society (in which he has been a member of its Executive Committee). He has a seat at the Royal Academy of Medicine of the Balearic Islands and also of Catalunya, he is an Honorary Fellow of the Royal College of Physicians of Edinburgh (FRCP), a Fellow of the European Respiratory Society (FERS), Honorary member of ERS, and current Chair of the Board of Directors of GOLD (www.goldcopd.org).

Professor Mona Bafadhel is the Chair of Respiratory Medicine at King's College London (KCL) and works in the School of Immunology and Microbial Sciences, within the Faculty of Life Sciences and Medicine. Mona is the Director of the King's Centre for Lung Health and the Professor of Asthma + Lung UK. She is a Clinical Academic Researcher and Honorary Consultant Respiratory Physician working at Guy's and St Thomas' NHS Foundation Trust.
Mona has both clinical and research interests in COPD and particularly the investigation of the mechanisms underlying exacerbations of COPD. She was the first to identify the utility of the peripheral blood eosinophil count in COPD and COPD exacerbations. This work has directly influenced international guidance and is now routinely used in the management of patients with COPD.

Dr Peter Barry is a Consultant Respiratory Physician at Manchester University NHS Foundation Trust. He has a clinical and research interest in adult cystic fibrosis and in particular the clinical application and outcomes of CFTR modulator therapies. He completed clinical training in the Republic of Ireland before moving to Manchester in 2012. Peter has served as national and global lead on multi-centre clinical trials in cystic fibrosis. He serves on the committee of the UK CF Medical Association and has been a past leader of the pulmonology assembly of the European Cystic Fibrosis Society's scientific committee.

Dr Kylie Belchamber is a Research Fellow at the Institute of Inflammation and Ageing, University of Birmingham. She holds a fellowship from the Alpha-1 Foundation aimed to understand monocyte and macrophage function in Alpha-antitrypsin deficiency. Her research focuses on innate immune cell function in age-related respiratory diseases including COPD, COVID-19 and pneumonia, as well as the mechanisms behind healthy ageing and frailty. Kylie is Secretary of the British Association for Lung Research.

Professor Scott Bell is the Chief Executive of the Translational Research Institute and a Senior Physician of the Adult Cystic Fibrosis Centre at The Prince Charles Hospital in Brisbane, where he has worked since 1996. He was Director between 1996-2015. As a clinician scientist, he leads the Lung Bacteria Laboratory at the University of Queensland. Scott has >290 peer reviewed publications and has received grant support of >$24 million. His research interests include acquisition and transmission pathways for human infection and his multi-disciplinary research has resulted in significant changes to clinical practice and policy implementation globally. He has been principal investigator on numerous pivotal CFTR modulator trials. Professor Bell was the Editor of the *Journal of Cystic Fibrosis* from 2013 until 2020 and co-led the *Lancet* Commission on the future of CF care, which was published in 2020.

Professor Jon Bennett is Consultant Respiratory Physician at Glenfield Hospital, Leicester, and British Thoracic Society President-elect. He is still committed to improving his respiratory medicine skills after 31

years of trying. He remains blessed to be working with great colleagues at Glenfield Hospital, including his office buddies who tell him they were not born when he started clinical medicine.
A very slow cyclist and Old Wulfrunian, now watching Leicester City FC in the Championship. Never in a million years did Jon think that he would be a committee man, but he is very happy to have been a member of the BTS "committee" #respisbest team for several years.
Clinical interests: delivering the best care possible and supporting teams to do so.

Elaine Bignell is Professor of Medical Mycology and Co-Director (Research) for the MRC Centre for Medical Mycology at the University of Exeter. She studied Biochemistry at the University of East Anglia and completed a PhD in fungal genetics at Imperial College London in 2000. Her independent research career was established via an Imperial College Fast-track to Lecturer Award (2005) and an MRC New Investigator Award (2006). She later relocated to Manchester as a Co-Founder and Director of the Manchester Fungal Infection Group (2013-2020). In 2020 she relocated to the University of Exeter. She is an elected Fellow of the American Academy of Microbiology and President-elect of the British Mycological Society.
Elaine's work addresses the mechanistic basis of lung diseases caused by the major mould pathogen of humans, Aspergillus fumigatus. Major contributions to the field have included work on the role of Aspergillus pH sensing in pathogenicity, transcriptional regulation of host adaptation, and the mechanistic basis of tissue invasion during invasive fungal lung disease. Recently, Elaine has applied a systems level approach to define pathogenicity in Aspergillus fumigatus, and is now developing inhibitors of fungal pH signalling as novel antifungal drugs, and studying secreted fungal proteins as novel vaccine candidates and diagnostic tools.

Surinder Birring is Professor of Respiratory Medicine and Consultant Respiratory Physician at King's College Hospital, London (specialist clinics in ILD, cough and sarcoidosis). His research focuses on the assessment and treatment of cough and the development of disease specific quality of life measures. As a British Lung Foundation Fellow in 2001, he studied the cellular mechanisms of unexplained cough and continued his work as a Senior Fellow in Sydney in 2006. He has published over 260 papers, reviews and book chapters and is author of American, British and European cough clinical guidelines. He chairs the Scientific Committee of the European NEuroCOUGH Registry. Professor Birring has been the chief investigator of numerous multi-centre clinical trials. His team developed the widely used quality of life questionnaires, Leicester Cough Questionnaire, King's Brief Interstitial Lung Disease (KBILD) and King's Sarcoidosis Questionnaires (KSQ). He is also co-developer of the Leicester Cough Monitor.

Dr Chloe Bloom is an NIHR Clinician Scientist and Clinical Senior Lecturer in Respiratory Epidemiology at the National Heart and Lung Institute, Imperial College London, and an Honorary Respiratory Consultant at Imperial College Healthcare NHS Trust. Her research group leverages big clinical datasets to improve respiratory care with a focus on airways disease, particularly adult and childhood asthma. She is currently an Associate Editor for the *European Respiratory Journal* and was an Associate Editor for *Thorax*.

Dr Cara Jayne Bossley, MD (Res), FRCPCH, MBChB, has been a Consultant in Paediatric Respiratory Medicine at King's College since 2013. She offers expertise in specialist clinics in complex asthma, non-invasive ventilation, non-CF bronchiectasis and cystic fibrosis. She initially embarked on a research degree at the Royal Brompton Hospital in 2007, investigating airway inflammation and remodelling in children with severe asthma. She was awarded MD(res) at Imperial College in October 2012. Cara has presented at international conferences and has over 70 scientific publications. She is principal investigator for a number of ongoing research projects at King's College Hospital, and has chaired the London Network Clinical Trials Accelerator Programme meetings.

Janette Burgess is Professor of Extracellular Matrix in Disease Pathogenesis within the Department of Pathology and Medical Biology at University Medical Centre Groningen, The Netherlands. Janette completed her Bachelor of Science (with Honours) at the University of Adelaide, Australia in 1991 and her PhD at the University of New South Wales in haematology in 1998. In 2015 a Rosalind Franklin Fellowship brought her to join the University Medical Centre Groningen, where she is now a tenured Professor.
Janette's research focusses on the role of the extracellular matrix (ECM) in lung pathology. Her team investigate changes in the composition and biomechanical properties of tissue and airway structures of the lungs that occur during disease and whether these changes impact disease development and progression. Using novel (3D) in vitro cell and ex vivo human lung tissue models and advanced microscopy

imaging techniques, the team is unravelling the complex nature of the regulation of the ECM and exploring its potential as a future target for therapeutic intervention.

Siobhan Burns is Professor of Translational Immunology at University College London. She is a clinical academic with an interest in primary immunodeficiency disorders (PID). Originally trained in paediatric immunology, she worked at UCL Institute of Child Health and Great Ormond Street Hospital before moving to the Institute of Immunity and Transplantation and the Adult Clinical Immunology Department at the Royal Free Hospital, London. Professor Burns has a special interest in rare monogenic causes of immunodeficiency. Her research group is focused on understanding the underlying molecular and cellular mechanisms that give rise to PID, with a particular interest in how genetic mutations associated with PID impact the function of immune cells.

Sara Buttery is a Senior Research Physiotherapist at the Royal Brompton Hospital and is currently undertaking a PhD at the NHLI, Imperial College, London. Sara's main research interests are pulmonary rehabilitation and chronic respiratory disease management with a particular focus on advanced COPD care, physical activity and patient experience, with publications in both qualitative and quantitative research methods. Sara's PhD is focussed on improving access and outcomes in lung volume reduction therapies for people with severe emphysema.

Mat Callister is a Consultant Respiratory Physician at Leeds Teaching Hospitals and an Honorary Professor of Respiratory Medicine at the University of Leeds. His research interest is the early diagnosis of lung cancer both through low-dose computed tomography screening and symptomatic presentation. He is co-lead for the Yorkshire Lung Screening Trial and Yorkshire Enhanced Stop Smoking Study, and sits on various committees involved with lung cancer screening implementation.

Mr Edward Caruana is a Consultant Thoracic Surgeon at Glenfield Hospital in Leicester, having studied medicine at the University of Malta, and subsequently undertaken specialty training in Leicester, Nottingham, Cambridge (UK) and Shanghai (China). He has a broad-ranging practice in general thoracic surgery, with particular interest in pleural disease, breathlessness (emphysema and diaphragm dysfunction), and locally-advanced lung cancer. He is the Undergraduate Lead for Thoracic Surgery at the University of Leicester, and Chair of the Pleural Disease Working Group at the European Society of Thoracic Surgeons.

Professor James D Chalmers is Asthma and Lung UK Chair of Respiratory Research at the University of Dundee and an Honorary Consultant Respiratory Physician. His clinical and research interests are in difficult infections, particularly bronchiectasis. His research group works to develop new diagnostics and therapies for bronchiectasis and related conditions through studying inflammation, infection and mucociliary clearance from bench to bedside. He is Chair of the European Bronchiectasis Network and Registry (EMBARC) and is chief investigator of multiple multicentre international clinical trials.
James has chaired multiple international guidelines including the ERS bronchiectasis guidelines, the ERS guidelines on the management of COVID-19 and inhaled corticosteroid use in COPD. He is current Chief Editor of the *European Respiratory Journal*, and Chairs the Science and Research Committee of the British Thoracic Society.

Christopher Chiu is Professor of Infectious Diseases at Imperial College London. He is an infectious diseases physician and immunologist. His research group at Imperial College London focuses on mucosal pathogenesis and protective immunity in human respiratory viral infections, including RSV, influenza and SARS-CoV-2. To better understand why some people suffer life-threatening illness while others have only mild/asymptomatic infection, he has developed unique experimental medicine models using infection and vaccination. This is exemplified by his role during the COVID-19 pandemic as Chief Investigator of the first SARS-CoV-2 human challenge study, which together with his other programmes, aims to accelerate the development of more effective next-generation vaccines against respiratory viral illness.

Dr Colin Church is a Consultant in Pulmonary Vascular and Respiratory Medicine. He trained in Glasgow, Cambridge, Papworth and Sydney. He has completed a PhD in understanding the basic mechanisms of inflammatory signalling in pulmonary vascular remodelling. He has a keen interest in both clinical and basic science research and is a principal investigator on a number of important clinical trials including looking at novel anti-inflammatory strategies to treat pulmonary hypertension. His basic science research focuses on the interplay of inflammation and hypoxia on the pulmonary vascular cells, in particular

the pulmonary artery fibroblast.
Colin is one of three consultants in the Scottish Pulmonary Vascular Unit, which is the national referral centre for the Scottish population. This unit investigates and manages all patients in Scotland with pulmonary hypertension. He is also one of the principal clinicians involved in the management of venous thromboembolic disease in the Queen Elizabeth University Hospital and sits on the Glasgow Thrombosis Committee.

Dr Suzanne Cloonan is an Associate Professor in Respiratory Biochemistry in the School of Medicine at Trinity College Dublin, as well as an Adjunct Assistant Professor of Biochemistry in Medicine at Weill Cornell Medical College. Dr Cloonan received her PhD in Biochemistry in 2010 from Trinity College Dublin Ireland. She carried out her Post-Doctoral training in the lab of Dr Augustine MK Choi in the Division of Pulmonary and Critical Care Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston. In 2014, she became faculty at Weill Cornell Medicine having obtained funding from the National Institute of Health (K99/R00 Award) and the American Lung Association to understand the role of mitochondrial dysfunction and iron metabolism in the development of chronic obstructive pulmonary disease (COPD). After obtaining Science Foundation Ireland Future Research Leaders Award, Dr Cloonan relocated her lab to Trinity College Dublin as an Associate Professor in 2020. Her lab is focused on applying cutting edge techniques and concepts to aid in understanding the molecular mechanisms behind iron metabolism in normal and diseased lung; related to inflammation, alveolar epithelial cell biology, host-pathogen interactions in the lung microenvironment and subsequent systemic implications.
She is currently Chair of Assembly 3.02, Airway Cell Biology and Immunopathology and is a member of the Fellowships and Awards Committee for the European Respiratory Society. She is also a programme committee member for the Allergy, Immunology and Inflammation Assembly of the American Thoracic Society and is an Associate Editor at *Scientific Reports* and *Respiratory Research*.

Alison Condliffe is Professor of Respiratory Medicine at the University of Sheffield. Her research interests include host-pathogen interactions, neutrophil-mediate tissue injury, and the impact of hypoxia on innate immune cell function, with a particular focus on the PI3-kinase signalling pathway. She is an Honorary Consultant in Respiratory Medicine and her clinical interests include respiratory infections, the respiratory complications of immune deficiency, and non-CF bronchiectasis. She is the Sheffield Director of the 4Wrd North Wellcome Clinical PhD Academy, and Deputy Chair of the MRC Infection and Immunity Board.

Dr Andrew Creamer is a Respiratory Registrar in the South West currently working at Great Western Hospital in Swindon. He is a member of the British Thoracic Society Quality Improvement Committee and has recently completed a PhD in lung cancer screening with University College London.

Kristin J Cummings, MD, MPH, is Chief of the Occupational Health Branch in the California Department of Public Health (CDPH). Prior to joining CDPH, Dr Cummings served as Epidemic Intelligence Service Officer, Medical Officer, and Branch Chief in the Respiratory Health Division of the National Institute for Occupational Safety and Health (NIOSH) Centres for Disease Control and Prevention (CDC). She is Board Certified in Internal Medicine and Occupational Medicine and is a member of the Standing Committee on Personal Protective Equipment for Workplace Safety and Health of the National Academies of Sciences, Engineering and Medicine. Her research focuses on inhalational exposures and respiratory health of workers, with a particular emphasis on health disparities.

Charles L Daley, MD, is Chief of the Division of Mycobacterial and Respiratory Infections at National Jewish Health (NJH) and Professor of Medicine at NJH, the University of Colorado, and Icahn School of Medicine at Mount Sinai. He chaired the revision of the multi-society sponsored NTM Treatment Guideline. For his work with MDR-TB he was awarded the World Lung Health Award by the American Thoracic Society. He has served as Associate Editor of the *American Journal of Respiratory and Critical Care Medicine* and the *European Respiratory Journal*. His academic interests include TB global health policy and clinical and translational research related to TB, NTM infections and bronchiectasis.

Dr Michael Davies is a Consultant Physician at Royal Papworth Hospital, Cambridge, with a specialist interest in ventilation and sleep medicine. He is Clinical Lead for the 2023 BTS Respiratory Support Unit Audit, having previously led the NIV Audit. He chaired the BTS group that produced the Quality Standards for Acute NIV in Adults and also the NIV Quality Improvement Toolkit. More recently, he was part of a

SPEAKERS' BIOGRAPHICAL DETAILS

BTS group that produced guidance on the development and implementation of respiratory support units.

Enya Daynes, PhD, is a Clinical Academic Physiotherapist at the University Hospitals of Leicester. She is a Specialist Pulmonary Rehabilitation and Service Lead for COVID Rehabilitation at the University Hospitals of Leicester. Enya completed her PhD on high frequency airway oscillation for patients with COPD in 2020 whilst working closely with the pulmonary rehabilitation team. Enya's research interest focusses on personalised treatment for the management of breathlessness and leading on a large multi-centre COVID rehabilitation study (PHOSP-COVID). Enya holds a number of committee appointments including the BTS Pulmonary Rehabilitation Specialist Advisory Group Chair and the American Thoracic Society Pulmonary Rehabilitation Committee.

Dr Duneesha de Fonseka is a Respiratory Consultant with a specialist interest in pleural disease, working at Sheffield Teaching Hospitals (STH). She is the Clinical Lead for the Pleural Service at STH. She previously undertook a period of research at the University of Bristol under the supervision of Professor Nick Maskell, completing her PhD in asbestos related pleural disease in 2018. She is a member of the BTS Pleural Specialist Advisory Group and was a member of the BTS Pleural Guideline Committee. She has an interest in malignant pleural effusions and mesothelioma, and continues to recruit national clinical trials in these areas.

Dr Charlotte Dean is a Reader in the National Heart and Lung Institute, Imperial College London. Charlotte established her group working on Lung Development and Disease at MRC Harwell. She was subsequently awarded a British Lung Foundation fellowship to continue this work before moving to Imperial College in 2011. Charlotte's current work focuses on identifying and harnessing factors that are required to generate the lungs as potential pro-repair treatments for lung diseases. A particular focus of the lab has been on deciphering how the non-canonical Wnt pathway drives lung repair through mechano-signalling to regulate cytoskeleton re-modelling.

Dr Martin Dedicoat is an Infectious Diseases Consultant in Birmingham. He is the Clinical Lead for the Birmingham and Solihull TB Service and the West Midlands TB Control Board. Dr Dedicoat is also a Clinical Consultant in the National TB Unit and National Mycobacterial Reference Service. He trained in Birmingham, South Africa and Ecuador. His research interests include management of TB drug adverse events and contact tracing.

Professor Shyamali Dharmage is a world-recognised leader in Life Course Epidemiology of Chronic Respiratory Diseases. She developed and leads the Allergy and Lung Health Unit, Centre for Epidemiology and Biostatistics, University of Melbourne, and has been awarded the esteemed title of Redmond Barry Distinguished Professor and four prestigious Fellow titles (Thoracic Society of Australia and New Zealand, European Respiratory Society, College of Community Physicians of Sri Lanka, Dame Kate Campbell). Professor Dharmage is currently the top ranked obstructive lung diseases epidemiologist in Australia and third globally. She is in the top 0.018% among 214,409 all obstructive lung disease researchers worldwide (Expertscape) and she was documented as a top female leader in Australian respiratory research recently (Respirology 2021;26:997). She has more than 500 publications and has been awarded >$75 million in grants.

Professor Dharmage leads an internationally recognised research programme on allergies and lung health and is the custodian and PI of two of the world's key studies in allergies and lung health; including NHMRC funded Melbourne Atopy Cohort Study (MACS) and Tasmanian Longitudinal Health Study (TAHS). Her recognition of research excellence is evidenced by national and international advisory board invitations such as the Lancet Commissioner in COPD. She was also a member of the expert committee that developed the Australian COPD Blueprint and led its prevention chapter.

Professor Caroline Dive, CBE, PhD, FBPhS, FMedSci. After completing her PhD studies in Cambridge, Caroline moved to Aston University's School of Pharmaceutical Sciences in Birmingham where she established her own group studying mechanisms of drug induced tumour cell death, before moving to the University of Manchester to continue this research. Caroline was awarded a Lister Institute of Preventative Medicine Research Fellowship before joining the CRUK Manchester Institute in 2003. Currently, she is Interim Director of the Institute and Director of the CRUK Cancer Biomarker Centre, with research spanning tumour biology, preclinical pharmacology, biomarker discovery, biomarker assay validation and clinical qualification to regulatory standards, bioinformatics, biostatistics and most recently, digital clinical trials.

Dr Sarah Diver is an NIHR Clinical Lecturer in Respiratory Medicine at the University of Leicester and University Hospitals of Leicester NHS Trust. Her current research is focused on understanding the interactions between the airway microbiome and airway immune responses in severe asthma and COPD. She has previously led the experimental medicine mechanistic study of anti-TSLP in asthma and was early career member of the joint European Respiratory Society/American Thoracic Society guideline group for severe asthma.

Dr James W Dodd, MB ChB, PhD, FRCP, is an Associate Professor and Consultant in Respiratory Medicine at the Academic Respiratory Unit, University of Bristol. He leads the Regional Complex Airways Service and an interdisciplinary research programme in airways disease, lung health and multimorbidity. He is PI for an MRC Clinical Academic Research Partnership with Avon Longitudinal Study of Parents and Children and the MRC Integrative Epidemiology Unit and co-leads a programme of translational respiratory research within Bristol NIHR Biomedical Research Centre.

Dr Hannah Durrington is an MRC Clinician Scientist at the University of Manchester and an Honorary Consultant Respiratory Physician at Wythenshawe Hospital, with an interest in asthma. Hannah qualified in Medicine from Cambridge University, before returning to undertake her PhD (Wellcome Clinical Research Training Fellowship). Whilst an NIHR Clinical Lecturer at Manchester University, she secured an Asthma UK Senior Clinical Academic Development Award, followed by the University of Manchester Dean's Clinical Prize, and in 2021 successfully secured an MRC Clinician Scientist Fellowship.
Hannah's research focusses on understanding the circadian clock biology of asthma and how this affects treatment and diagnosis for patients with asthma.

Lynne Evans is a writer and Founder of the life writing business, The Memory Shed (www.thememoryshed.com); parent of two sons with pectus conditions; and co-author of *"Pectus and Me"*, a book detailing the plight of forty-one pectus patients (Pectus treatments | SCTS).
In 2022, Lynne not only discovered that both her sons had pectus conditions, she also learnt that treatment for pectus conditions had been decommissioned by NHS England in 2019. For Lynne as a parent, it felt devastating. Through the UK Pectus Support Facebook group, she invited other patients and families to share their stories of living with pectus in a book called *"Pectus and Me"*. The book was presented at a Pectus Event held at the Royal College of Surgeons in February 2023 and later shared across a multitude of clinical departments. In April 2023, treatment for the most severe pectus cases was recommissioned. A case study in the power of the patients' voice.

Dr Johanna Feary is an Honorary Respiratory Consultant at Royal Brompton Hospital and Senior Clinical Research Fellow at the National Heart and Lung Institute, Imperial College, a combination of roles that allows her to carry out clinical work and research as well as teaching. Her clinical interests include a broad range of occupational lung diseases and asthma. She is Chair of the British Thoracic Society Specialist Advisory Group on Occupational and Environmental Disease and a member of the Group of Occupational Respiratory Disease Specialists (GORDS).

Dr Robyn Fletcher qualified from University College London in 2016. She is currently a Senior Public Health Registrar in the East Midlands with particular interests in disease prevention and health promotion. She undertook a Health Education England Tobacco Dependency Fellowship hosted by the British Thoracic Society, during which time she designed, delivered and evaluated a new national quality improvement programme that supported Acute Trusts to develop high-quality tobacco dependency treatment services for inpatients and improve existing services.

JoAnne L Flynn, PhD, has a Bachelor of Science in Biochemistry, from the University of California at Davis and a PhD from University of California at Berkeley in Microbiology and Immunology. Dr Flynn's first post-doc was with Dr Magdalene So at the Scripps Clinic Research Institute and then a Howard Hughes Research Associate with Dr Barry Bloom at Albert Einstein College of Medicine where she began her studies in tuberculosis. Dr Flynn is a Distinguished Professor and Chair of the Department of Microbiology and Molecular Genetics at the University of Pittsburgh School of Medicine. She served as a Councillor for the American Association of Immunologists (AAI) and as President in 2018. She is a Fellow of the American Academy of Microbiologists and a Distinguished Fellow of AAI. Dr Flynn won the University of Pittsburgh School of Medicine Distinguished Mentor Award in 2018 and Chancellor's Distinguished Research Award in 2019.
Dr Flynn's research in tuberculosis is focused on

immunology, host-pathogen interactions, vaccines, and drugs, and she has developed and used non-human primate models for TB research for more than 20 years. Her research uses cutting-edge tools and technologies to investigate the complexities of Mycobacterium tuberculosis infection, with a particular focus on lung and lymph node granulomas, vaccines and treatments.

Professor Julian Forton is Consultant and Clinical Lead for Paediatric Respiratory Medicine at The Children's Hospital for Wales in Cardiff and National Clinical Lead for Paediatric Respiratory Medicine in Wales. He is co-author of the Oxford Specialist Handbook of Paediatric Respiratory Medicine.
Julian runs the CF-SpIT Research Group, a group of research-active clinicians, allied professionals and scientists who are interested in how best to describe airway infection in children with cystic fibrosis. He is chief investigator for several investigator-led clinical trials (Ronchetti et al. 2018. *Lancet Respiratory Medicine*). His team analyse the spatial microbiology of early compartmentalised infection in young children and work to identify a clinical role for respiratory microbiota analysis in cystic fibrosis.

Dr Kevin Franks is a Thoracic Consultant Clinical Oncologist, Deputy Director for the Leeds NIHR Clinical Research Facility and the Clinical Lead for Oncology Research and Innovation at the Leeds Teaching Hospitals NHS Trust. Following a two-year research fellowship at the Princess Margaret Hospital/ University of Toronto in technical lung cancer radiotherapy, he returned to Leeds and was the Clinical Lead for the team that implemented lung Stereotactic ABlative Radiotherapy (SABR) in Leeds in 2009. He is an Associate Professor at the University of Leeds, and his research interests are in lung cancer, including technical radiotherapy, SABR, cancer informatics, quality of life, patient optimisation and novel agent / SABR+RT combinations.

Jonathan Fuld is Consultant Respiratory Physician based at Cambridge University Hospitals NHS Foundation Trust and the Victor Phillip Dahdaleh Heart and Lung Research Institute, University of Cambridge. He has a clinical and research interest in exercise physiology, chronic obstructive pulmonary disease and access to services for those with chronic lung disease. Since April 2023, he has been appointed Interim National Clinical Director for Respiratory Disease and Chair of the Adult Specialised Respiratory Clinical Reference Group, NHS England. Prior to taking up this appointment, Jonathan was Clinical Director for Infection and Inflammation at Cambridge University Hospitals and East of England lead for the Respiratory Clinical Network.

Dr Liz Fuller is a Consultant Respiratory Physician at Newcastle Hospitals NHS Foundation Trust and an Honorary Senior Lecturer at the University of Newcastle. In addition, she is the Clinical Lead for Targeted Lung Health Checks and Lung Case Screening for the Northern Cancer Alliance. Her research interests are lung cancer screening, early diagnosis and health inequalities of lung cancer. She is a member of the British Thoracic Society Lung Cancer and Mesothelioma Specialist Advisory Group and Lung Cancer Clinical Expert Group.

Cathy Goldstein, MD, MS, is an Associate Professor of Neurology at the University of Michigan Sleep Disorders Centre where she cares for patients with various conditions such as obstructive sleep apnoea, insomnia, restless legs syndrome, and circadian rhythm sleep-wake disorders, as well as participating in the training of future sleep physicians.
Dr Goldstein's scholarly activities include research that uses consumer sleep technology and mathematical modelling of sleep as well as the assessment of sleep patterns in other health states, developing methods to assess sleep and circadian rhythms in the ambulatory, day-to-day setting.
She serves the sleep community with editorial responsibilities for *UpToDate* and the *Journal of Clinical Sleep Medicine* and leadership of the AASM Artificial Intelligence in Sleep Medicine Committee. At her institution, she is the Sleep Department Physician Champion for Virtual Health and enjoys various educational roles that target diverse learners such as the University of Michigan Athletics Department.
Clinical Interests include circadian rhythm sleep disorders and sleep disordered breathing.
Cathy Goldstein, M.D., M.S. | Neurology (https://medicine.umich.edu/dept/neurology/cathy-goldstein-md-ms#websites) | Michigan Medicine | University of Michigan (umich.edu)

Dr Amanda Goodwin is an Academic Clinical Lecturer at the University of Nottingham. She obtained her medicine degree from the University of Liverpool in 2010, then pursued clinical academic training in the East Midlands. She obtained her PhD in 2021 as part of an MRC Clinical Research Training Fellowship and is continuing this work funded by Asthma + Lung UK and The Academy of Medical Sciences. Her laboratory

research focusses on the molecular mechanisms of lung development and repair. She also has an interest in research that will improve the management of interstitial lung disease.

Bibek Gooptu is Consultant in Respiratory Medicine and Professor of Respiratory Biology, based in Leicester. He has 20 years of experience in ILD, including interdisciplinary clinics with rheumatology, vasculitis, and PH services. His research focuses on defining molecular mechanisms of ILD and α_1-antitrypsin deficiency. He has contributed to studies of MDT working in ILD, and as PI in interventional studies. Professor Gooptu is Director of the University of Leicester's interdisciplinary Centre for Fibrosis Research, and leads the East Midlands ILD Research Alliance (EMIRA) – a network maximising ILD research collaborations and impact across Leicester and Nottingham.

Mark Griffiths is a Consultant Physician at St Barts Hospital, London. He carries out research into injury and repair of lung and muscle associated with critical illness at Imperial College and Queen Mary University of London.

Frances Grudzinska is a Respiratory Specialist Trainee in the West Midlands. Frances is completing a PhD at the University of Birmingham examining factors influencing outcomes for patients with community acquired pneumonia. Her research centres around improving outcomes for people with pneumonia, with work spanning from innate immune cell function to prediction of adverse outcomes in CAP.

Jemma Haines OBE is a speech and language therapist who has pioneered the role of her profession within UK respiratory care. Her specialist expertise includes managing inducible laryngeal obstruction (ILO) and chronic cough. Jemma is the Royal College of Speech and Language Therapists (RCSLT) National Respiratory Advisor and an elected member of the BTS Cough Specialist Advisory Group. She has co-authored several national professional respiratory guidelines and has many peer-reviewed publications relating to her work.
In recognition of her leadership within the field of upper airway disorders, Jemma was made a Member of the Order of the British Empire in the 2021 Queen's birthday honours list and a Fellow of the RCSLT. Currently, her NIHR BRC research fellowship is investigating standardised evaluation and treatment for ILO.

Rob Hallifax is a Respiratory Consultant and Clinical Lecturer at the University of Oxford. He was an NIHR Lecturer and previously an MRC Clinical Training Fellow for his DPhil in Pneumothorax. Dr Hallifax was the trial coordinator for RAMPP (Randomised Ambulatory Management of Primary Pneumothorax) (*Lancet*, 2020), and has also published in *JAMA, ERJ* and *Thorax*. He was a member of the recent BTS Pleural Guideline Committee.

Samantha Harrison is a Professor in Respiratory Rehabilitation at Teesside University. She completed an MSc in Physiotherapy in 2009 and began working at Glenfield Hospital, Leicester in the Pulmonary Rehabilitation Department where her time was split between research and the clinical service. She was awarded her PhD in 2014 from the School of Psychology, University of Leicester, which comprised a mixed-methods study focused on understanding illness perceptions following an acute exacerbation of COPD. In 2013 Samantha moved to Toronto, Canada to complete her international post-doctoral training. In September 2015 she returned to the UK and joined Teesside University where she was awarded her Professorship in 2021. Samantha currently holds an NIHR Advanced Fellowship.

Dr Conal Hayton is a Consultant Respiratory Physician with a specialist interest in interstitial lung disease (ILD) at Manchester University NHS Foundation Trust. He is a Pickering Research Fellow and an Honorary Senior Lecturer at the University of Manchester. Dr Hayton trained in the North West and was awarded a PhD in ILD from the University of Manchester in 2022. His research interests are breath biomarkers in ILD and interstitial lung abnormalities (ILAs).

Professor Timothy Hinks is a Wellcome Career Development Fellow at the University of Oxford, where his group researches the immunology of airways diseases. After training at Cambridge and Oxford, and predoctoral research into TB immunology, he undertook a Wellcome funded PhD in Southampton with Ratko Djukanovic on T cell responses in asthma, with subsequent postdoctoral research in Melbourne studying pulmonary MAIT cells. In 2017 he established his group at Oxford focusing on the role of microbes and macrolides in asthma, functions of MAIT cells and the genetics, transcriptomics and epigenetics of asthma using bronchoscopies and single cell technologies. As an Honorary Consultant and Associate Professor, he

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co-leads the Severe Asthma Service at the John Radcliffe Hospital.

Steve Holmes is a GP with an interest in respiratory care. He is a member of the BTS Council and PCRS Executive, works as a Regional and ICB Clinical Respiratory Lead, as well as having more then 30 years on going clinical experience as a general practitioner in Somerset. He has more than 200 publications to his name and remains enthusiastic that good clinicians can make a difference.

Professor Luke Howard, MA, DPhil, FRCP, is a Consultant Pulmonologist and Director of the National Pulmonary Hypertension Service at Hammersmith Hospital, London and a Professor of Practice in Cardiopulmonary Medicine at the National Heart and Lung Institute, Imperial College London.
He gained his undergraduate degree at the University of Oxford and followed this with a doctorate in altitude physiology. He then undertook his clinical training as a William Harvey Scholar at the University of Cambridge.
Professor Howard's main areas of interest are pulmonary hypertension, pulmonary embolism and exercise. He has a major interest in exercise physiology, setting up the diagnostic exercise service at Hammersmith Hospital in 2007, providing specialist advice to GB rowing as well as to individual professional and amateur athletes.

Dr Yan Hu earned her PhD in developmental biology at the University of Virginia in 2016. In 2017, she joined Dr Melanie Königshoff's lab at the University of Colorado, focusing on distal lung epithelial progenitor function in chronic obstructive pulmonary disease (COPD), supported by an NIH F32 postdoctoral fellowship. In 2020, she joined Dr Christopher Evans' team in CU to explore functional heterogeneity of airway club cells in health and COPD. Recently, she received a highly competitive NIH K99 career development award to advance her independent research on mechanisms regulating progenitor functions of airway club cells in lung diseases.

Dr Judith Hurdman is a Consultant Respiratory Physician with an interest in pulmonary vascular diseases at Sheffield Teaching Hospitals.

Dr Catherine Hyams completed the UCL MBPhD programme in 2011, examining the interaction of pneumococcal capsule with complement-dependent immunity. Her Academic Clinical Fellowship at the University of Bristol established the AvonCAP surveillance study. As a Clinical Research Fellow, she now leads this research project, providing key analyses on COVID-19 vaccine effectiveness, disease severity and incidence. Her ongoing work looks to ascertain total and vaccine-preventable community-acquired acute respiratory disease incidence (including RSV, pneumococcus, influenza and SARS-CoV-2) and evaluate the impact of current and future vaccines against respiratory infection. Dr Hyams is a member of the UK COVID-19 Vaccine Effectiveness and Expert Panel Working Groups, as well as trainee member of the BTS Pulmonary Infection Specialist Advisory Group.

Dr Maisha Jabeen is a Specialist Registrar in Respiratory Medicine and MRC Oxford Doctoral Training Fellow at the Respiratory Medicine Unit, NDM Experimental Medicine, University of Oxford. Her current doctoral work focuses on the airway microbiome and mucosal immune responses in distinct severe asthma phenotypes using a range of next generation sequencing technologies. She is interested in host-pathogen interactions and mucosal T cells in airways diseases.

Dr Claire L Jackson, BSc, MSc, PhD, is a Senior Research Fellow and Primary Ciliary Dyskinesia (PCD) Lead Scientist. With expertise in PCD diagnostics, cilia imaging and advanced nasal epithelial cell modelling since 2007, she has developed a bio-resource of rare airway samples, and tested the effects of drug therapies and bacterial and respiratory viral infections on airway integrity on ciliary function.
During the COVID-19 pandemic, Claire was instrumental in the discovery of novel short ACE2 isoform in airway epithelia (*Nature Genetics* 2021). She is the diagnostic work package lead for the international 'BEAT-PCD Clinical Research Collaboration' network and supports the PCD Support UK patient charity. She was shortlisted for the University of Southampton Vice Chancellor's Inspiring Leadership Individual Award in 2022.
Claire Jackson (nihr.ac.uk) University of Southampton Profile

David Jackson is Professor of Respiratory Medicine at King's College London and Head of the Regional Severe Asthma and Eosinophilic Lung Disease Service at Guy's and St Thomas' Hospitals in London. He has published widely in the field of type 2 immunity, asthma and eosinophil associated diseases, and is the chief investigator on several phase 3 and 4 clinical trials in asthma. Professor Jackson is on the BTS Asthma

Specialist Advisory Group and the Steering Committee of the International Severe Asthma Registry (ISAR), and holds multiple editorial positions including as Associate Editor at the journals *Thorax* and *Allergy*, and is Reviews Editor at *Chest*. Professor Jackson edited the ERS Monograph on Eosinophilic Lung Diseases and was director of the ERS Course on Eosinophilic Lung Diseases.

Joseph Jacob qualified in Medicine from Imperial College before completing an MD(Res) at the National Heart and Lung Institute where he was awarded the prize for the best thesis of 2017. In 2018, Dr Jacob was awarded a five-year Wellcome Trust Clinical Research Career Development Fellowship. His current research, based at the Centre for Medical Image Computing at University College London, studies the use of computer-analysis of CT imaging in various lung diseases. Dr Jacob has co-authored over 100 papers, won national and international awards for his work, and was the 2021 Royal College of Radiologists Roentgen Professor.

David Jayne, MD, FMedSci, is Professor of Clinical Autoimmunity at the University of Cambridge, UK, and Director of the Vasculitis and Lupus Service at Addenbrooke's Hospital, Cambridge. He trained at the Universities of Cambridge and London, and in nephrology at Harvard Medical School, Boston, USA. He was a Research Fellow at Imperial College London and the University of Cambridge and was appointed Senior Lecturer in Nephrology at St George's Hospital, London in 1995.
Professor Jayne is a co-founder and the current President of the European Vasculitis Society and his research focus has been ANCA vasculitis and lupus nephritis, having led a sequence of International randomised controlled trials over the last 25 years. His research group conducts first into disease trials of newer immunosuppressives and biologics in vasculitis and lupus. He has published over 500 peer reviewed papers and has contributed to numerous guideline statements. His work with industry has contributed to the approval of avacopan for ANCA associated vasculitis and voclosporin for lupus nephritis.
The clinical service in Cambridge cares for over 2000 patients with complex multi-system autoimmunity and receives tertiary referrals from throughout the UK and beyond. In 2021 he was awarded the ERA-EDTA prize for outstanding contributions to nephrology.

Ashley Johnstone graduated from Glasgow Caledonian University in 2002, working initially in NHS Lanarkshire before taking on the role as a Highly Specialist Paediatric Physiotherapist in NHS Greater Glasgow and Clyde in 2007. Since 2017, her role has been as an Advanced Respiratory Physiotherapy Practitioner and Lead Physiotherapist for the Scottish National Chest Wall Service, and more recently Physiotherapy Head of Service at the Royal Hospital for Children in Glasgow. Ashley has a particular interest in the mechanics of breathing and the conservative management of anterior chest wall deformity and is a part time PhD student at Glasgow Caledonian University looking into the impact of anterior chest wall deformity in children and young people.

Mark Juniper is a Consultant Respiratory Physician in Swindon. He currently Chairs the BTS Quality Improvement Committee. He is Clinical Co-ordinator at the National Confidential Enquiry into Patient Outcome and Death (NCEPOD) and has recently led a review of the care provided to patients admitted to hospital with community acquired pneumonia, which will be presented at the Winter Meeting. He is also Medical Director at the Health Innovation Network (HIN) in the West of England. He Chairs the National Respiratory Working Group, which aims to identify innovations appropriate to roll out in national programmes supported by the HIN.

Dr Sonal Kansra is a Consultant in Paediatric Respiratory Medicine at Sheffield Children's Hospital. He has a special interest in aerodigestive disorders, asthma and quality improvement in healthcare. He is the Lead for Children and Young Person's Asthma in South Yorkshire ICB and the Secretary of the British Paediatric Respiratory Society (BPRS).

Dr Julia Kelly, PhD, BPhysio, is a Specialist Physiotherapist in Sleep and Ventilation at the Royal Brompton Hospital, London and an Honorary Lecturer at the National Heart and Lung Institute, Imperial College London. Her PhD was investigating auto-titrating non-invasive ventilation in hypercapnic respiratory failure. Julia has recently led on several UK trials on the diagnosis and treatment of obstructive sleep apnoea; most recently as principal investigator on the UK-wide Positional Sleep Apnoea (POSA) Trial, funded by NIHR and supported by the Sleep Apnoea Trust Association.

John Laffey is Professor of Anaesthesia and Critical Care Medicine at the University of Galway, Ireland. He is Director of the Lung Biology Group at University of Galway, Director of Clinical Research at University of

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Galway and the Saolta University Hospital Group, Chair of the Irish Critical Care Trials Group, and Section Chair of the Translational Biology Section at ESICM. His research is focused on ARDS and sepsis, particularly the mechanisms underlying lung and systemic organ injury. He has a longstanding interest in the investigation of the mechanisms of action and therapeutic potential of cell therapies for critical illnesses. Other interests include the epidemiology of ARDS and weaning from mechanical ventilation. He has extensive experience of early phase and later phase clinical trials.

Sir Martin Landray is Professor of Medicine and Epidemiology at the University of Oxford, and Chief Executive of Protas, a not-for-profit company focused on the design and delivery of highly efficient randomised trials of treatments for common health conditions. He has over 20 years' experience of leading trials of treatments for cardiovascular and kidney disease. Since March 2020, he has co-led the RECOVERY trial, enrolling over 48,000 patients with COVID-19 and publishing definitive results for 13 treatments which have changed clinical practice worldwide. He leads the Good Clinical Trials Collaborative (www.goodtrials.org) that is developing and promoting the implementation of better guidelines and regulations for randomised trials. He was a lead contributor to the G7 Clinical Trials Charter and the 100 Days Mission for Pandemic Preparedness. In June 2021, he was knighted for services to public health and science.

Dr Ross Langley is a Paediatric Respiratory and Sleep Consultant, NRS Career Research Fellow and Honorary Clinical Senior Lecturer based at the Royal Hospital for Children in Glasgow. His main clinical interests are paediatric sleep disorders, technology dependent children and chronic suppurative lung disease. Research interests include the lung microbiome in health and disease, effects of vaping in adolescents, novel technologies in sleep diagnostics and viral / bacterial respiratory infections in children.

Dr Annemarie Lee is an Associate Professor in Physiotherapy at Monash University, Melbourne, who completed her international postdoctoral training at West Park Healthcare Centre, Toronto, Canada. Her research interests are physiotherapy for bronchiectasis, including pulmonary rehabilitation, airway clearance therapy and the impact of comorbidities and the role of adjuncts to pulmonary rehabilitation to maximise outcomes. She is the co-developer of two web-based resources for healthcare professionals: Bronchiectasis Toolbox and Strong Lungs. She has previously coordinated pulmonary rehabilitation programmes at Alfred Health and continues to work clinically delivering home-based pulmonary rehabilitation.

Professor Wei Shen Lim is Consultant Respiratory Physician at Nottingham University Hospitals NHS Trust and Honorary Professor of Medicine, University of Nottingham. He is Chair of COVID-19 Immunisation on the Joint Committee of Vaccination and Immunisation (JCVI), UK. His research activities are in the field of acute respiratory infections, including pneumonia, pneumococcal infections and influenza. He was Chief Investigator of the hibernated ASAP Trial of Dexamethasone in Pandemic Influenza (2012 – 2022), and co-led the evaluation of Dexamethasone for COVID-19 in the RECOVERY Trial.

Dr Alba Llibre Serradell grew up in Barcelona, where she did her BA in Biotechnology and Biochemistry. She then moved to the UK to undertake an MSc in virology at Imperial College London and then pursued a PhD in human immunology at the University of Oxford, where she investigated germinal centre responses. She continued studying host immune responses in the context of infectious diseases at the Institut Pasteur in Paris, where she focused on understanding functional immune responses to Mycobacterium tuberculosis. She joined the University of Birmingham (UoB) in March 2020, funded by a Marie Skłodowska-Curie Fellowship, to investigate host immune and metabolic responses in the context of tuberculosis. She was appointed Assistant Professor at UoB in April 2023.

Clare Lloyd is Professor of Respiratory Immunology, interim Head of National Heart and Lung Institute, and Vice Dean for Institutional Affairs in the Faculty of Medicine at Imperial College, London. She trained in immunology at Kings College London and undertook postdoctoral research at Guy's Hospital, London and Harvard Medical School, Boston. She worked in a biotech company in Cambridge, USA, investigating the functions of type 2 molecules in different disease models. Clare's research examines how the immune system senses the inhaled environment, determining how different stimuli influence development of pulmonary inflammation and tissue remodelling across the life course, using in vivo and cell models, tissue imaging, cell biology and transcriptomics.

Dr Julie Lloyd is a Consultant Clinical Scientist with over 35 years' experience in respiratory physiology and sleep; her specialist interests include home oxygen assessment; sleep disordered breathing and non-invasive ventilation. She is the current Honorary Chair of the Association for Respiratory Technology and Physiology (ARTP), the professional body that represents respiratory and sleep scientists in the UK. She was previously the Chair of Education for ARTP and Chair of Group 9.1, which represents respiratory scientists and technologists within the European Respiratory Society (ERS).
She is an active member of the ERS Spirometry Task Force, which has been responsible for the development of the European Spirometry Driving Licence (ESDL), a pan-European competency certificate in performance of spirometry. She was a member of the European Lung Foundation Professional Advisory Committee, which supports patients across Europe.
Julie enjoys teaching and training at all levels and has delivered training for trainee physiologists, nurses, physiotherapists and medical staff for over 20 years. She regularly presents basic and advanced physiology to a variety of audiences in the UK, Europe and Nepal.

Dr Matt Loxham is a Biotechnology and Biological Sciences Research Council (BBSRC) David Phillips Fellow in Air Pollution Toxicology in the Faculty of Medicine, University of Southampton. He leads a multidisciplinary research group whose focus is on the differential toxicological effects of particulate matter air pollution according to particle source and composition. Having originally studied particulate matter from underground railways, his current work focuses on particulate emissions from shipping-related sources, and non-exhaust emissions from road vehicles. He is especially interested in particulate-associated metals, cellular homeostatic responses to these metals, and implications for lung disease, with a focus on fibrotic lung disease. Aside from this focus on in vitro toxicology, his projects and collaborations also incorporate geochemical analysis of particulate matter, source apportionment, novel methods for monitoring the urban spread of particulates, characterisation of low-cost particulate matter sensors, and epidemiology-based studies.

Dr Zaheer Mangera is Chair of the British Thoracic Society Specialist Advisory Group for Tobacco Dependency and the BTS Tobacco Dependency Project Steering Group. Zaheer has also previously led the BTS National Smoking Cessation Audit. He works as the Lung Cancer Lead at North Middlesex University Hospital with an interest in EBUS / bronchoscopy, as well as asthma. He is Undergraduate Lead at UCL Medical School for the final year.

Stephanie Mansell is a Consultant Physiotherapist at the Royal Free London NHS Foundation Trust and an NIHR Doctoral Research Fellow. Stephanie has a range of clinical experience and expertise, and her main clinical focus is the acute and long term management of patients with ventilatory failure and sleep disordered breathing.
Stephanie is passionate about the education of health care professionals and has a particular interest in simulation based education. She currently sits on the BTS Critical Care, Respiratory Failure and Mechanical Ventilation Specialist Advisory Group. Stephanie is an NHS England Clinical Entrepreneur and has a passion for technology and digital innovation to improve patient care and experience as well as staff experience. She was awarded the award for sustainability through digital from DigitalHealth.London in 2017 for her work on remote monitoring of home NIV patients and the CAHPO award for AHP digital practice in 2021 for the app ONCALLbuddy.

Stefan Marciniak is Professor of Respiratory Science at the University of Cambridge and an Honorary Consultant Respiratory Physician at Addenbrooke's and Royal Papworth Hospitals. His laboratory in the Cambridge Institute for Medical Research focuses on the role of stress signalling in lung disease. His clinical research focuses on pleural medicine, especially the genetics of pneumothorax. He co-directs the NHS Rare Disease Collaborative Network (RDCN) in Familial Pneumothorax, chairing its bimonthly national MDT.

Anthony Martinelli is a Specialist Registrar in Respiratory Medicine with clinical interests including COPD, invasive fungal disease, and lung cancer. He is based in Cambridge and serves as a representative on the BTS Science and Research Committee and the RCP London Trainees Committee. He recently completed a Wellcome Clinical PhD Fellowship in Professor James Nathan's group, with his research focusing on using genome-wide mutagenesis screens to uncover novel regulators of cellular iron metabolism. In the future, he hopes to develop a career as an academic physician, combining his scientific and clinical interests.

Nick Maskell is Professor of Respiratory Medicine at the University of Bristol and Honorary Consultant, North Bristol NHS Trust, Bristol, England. He

undertook his DM thesis on pleural diseases in Oxford prior to taking up a consultant post at North Bristol NHS Trust in 2003. He was awarded a national Walport Senior Lecturer Award in 2005 and joined the University of Bristol. His research interests include clinical trials in pleural infection, pneumothorax, pleural malignancy and patient safety during pleural procedures. He leads the Academic Respiratory Unit (ARU) at the University of Bristol and the Respiratory Theme of the Bristol BRC. He is an NIHR senior investigator and currently the Chief Investigator for a number of NIHR multi-centre randomised controlled trials. His current H-index is 64 with over 250 peer reviewed publications and 18800 citations. He is part of the faculty of the newly developed ERS Thoracic Ultrasound Certified Training Programme. He co-chaired the 2018 BTS Mesothelioma Guidelines and the 2019 ERS Malignant Pleural Effusion Taskforce Statement. He is also co-Chair of the 2023 BTS Pleural Disease Guidelines and 2023 ERS Pneumothorax Guidelines. Nick is also the Chair of the Board of Trustees for the charity Mesothelioma UK.

Professor Lorcan McGarvey, MD, FRCP, is Professor of Respiratory Medicine in the Wellcome-Wolfson Institute of Experimental Medicine at Queen's University of Belfast (QUB) and Consultant Respiratory Physician at the Belfast City Hospital. He graduated with Honours in Medicine from QUB in 1990 and trained in respiratory medicine in Belfast and Sydney, Australia. His research has focused on clinical and scientific aspects of airways disease and in particular chronic cough, asthma and COPD. He is an Expert member on the ERS Cough Task Force, serves on the ACCP Cough Guidelines Expert Committee and is co-author of the BTS Clinical Statement on Chronic Cough in Adults. He established and currently leads the ERS NEuroCOUGH Clinical Research Consortium. Professor McGarvey has published extensively on airways disease (> 200 peer reviewed publications). He is a Fellow of the Royal College of Physicians and in 2011 was elected to the Association of Physicians of Great Britain and Ireland.

Helen McShane is currently Professor of Vaccinology at the University of Oxford, Director of the NIHR Oxford Biomedical Research Centre, Deputy Head, Medical Sciences Division and an Honorary Consultant in Infectious Diseases.
Since 2001, Helen has lead a TB vaccine research group at the University of Oxford. She led the development of MVA85A, the first new TB vaccine candidate to enter efficacy testing. She collaborates with several research groups across Africa in TB vaccine clinical trials. For the last 10 years, Helen has been developing a controlled human infection model using BCG as a surrogate mycobacterial challenge agent. These studies initially delivered BCG intradermally, and more recently have delivered BCG by aerosol direct to the respiratory mucosa.
Most recently, Helen is leading a programme to establish a controlled human infection model with SARS-CoV-2, which will allow the evaluation of protective immunity.

Dr Jamilah Meghji is a Respiratory Consultant at Imperial College Healthcare NHS Trust and Clinical Senior Lecturer at Imperial College London. She has a clinical interest in TB and respiratory infection. Her research is based in sub-Saharan Africa and uses qualitative and quantitative methods to explore the burden, impact and management of TB-associated chronic lung diseases.

Dr Rachel Mercer is a Respiratory Consultant at Queen Alexandra Hospital, Portsmouth. She specialises in lung cancer and pleural diseases and completed her research in malignant pleural disease at the Oxford Respiratory Trials Unit. She obtained a PhD at the University of Portsmouth for this work. Dr Mercer was also on the BTS Pleural Disease Guideline Group for the 2023 guidelines.

Dr Fraser Millar is a Respiratory Registrar and Academic Clinical Lecturer at the University of Edinburgh. Dr Millar completed his early training in London before moving to Edinburgh to continue his research and clinical speciality training. He has a clinical and research interest in early-stage lung cancer, interventional pulmonology and novel early detection approaches.

Dr Kerry Millington is a Research Uptake Manager at the Liverpool School of Tropical Medicine (LSTM). She has worked in academia for nearly 20 years, starting at the University of Oxford and then Imperial College London. At LSTM, Dr Millington has worked on the K4D and HEART programmes, supporting the use of learning and evidence to improve the impact of development policy and programmes. She currently works to maximise research impact through the LIGHT research programme funded with UK aid, which aims to generate new evidence to inform gender-responsive policies and practice which improve men's access to quality TB care to ultimately improve health, socio-economic outcomes, equity, and

contribute to global efforts in ending TB. She co-Chair's the UK Academics and Professionals to End TB (UKAPTB) Network.

Eleanor Mishra is Pleural Lead and Respiratory Consultant at Norfolk and Norwich University Hospitals Foundation Trust and Associate Professor at the University of East Anglia. She is Chief Investigator for the REPEAT study, an NIHR RfPB cohort study to develop and validate a clinical score to predict rate of re-accumulation of malignant pleural effusions following therapeutic aspiration. Other research interests include indwelling pleural catheter infection and patient reported outcome measures in pleural disease.

Andrew Molyneux is Consultant Respiratory Physician, Sherwood Forest Hospitals. He trained and did his PhD in Health Services Research in Nottingham and the East Midlands. He has been a Consultant for 20 years with interests in sleep/NIV and COPD/asthma, and is Clinical Lead for the Sleep and NIV Service at his Trust in North Nottinghamshire. Andy has an interest in QI and patient safety, particularly in the delivery of Acute NIV (see link), with an award-winning Acute NIV prescription that stems particularly from his involvement in NCEPOD Inspiring Change. Nationally, he has worked with NICE, chairing the COPD and Melanoma Guideline Committees, and currently Co-Chairs the BTS/SIGN/NICE Asthma Committee.

Professor Mike Morgan has retired as a Consultant Respiratory Physician at the Department of Respiratory Medicine, Allergy and Thoracic Surgery at the University Hospitals of Leicester NHS Trust at Glenfield Hospital and Honorary Professor at the University of Leicester. He was formally the National Clinical Director for Respiratory Services in England. He is also a past President and Chairman of the British Thoracic Society. He has been a Trustee of the British Lung Foundation and a founding editor of *Chronic Respiratory Disease*. His career interests have included the assessment and management of respiratory disability particularly in COPD. He has published widely and was an author of the earlier BTS and ERS/ATS statements on pulmonary rehabilitation.

Dr Jeremiah Chakaya Muhwa is a world-renowned expert in tuberculosis from Kenya. He has worked as a TB and Lung Disease Researcher at the Centre for Respiratory Diseases Research at KEMRI and later served as the TB Programme Manager for Kenya's Ministry of Health between 2003 and 2006. At the international level, Professor Chakaya has held several positions including: Vice Chair of the Stop TB Partnership Coordinating Board, Chair of the Strategic and Technical Advisory Group for TB of the World Health Organization (WHO), Chair of the Global Fund's Technical Review Panel (TRP), and President of the International Union Against Tuberculosis and Lung Disease (the Union). Professor Chakaya is a founding member of the Respiratory Society of Kenya (ReSoK), serves on the Executive Committee of the Pan African Thoracic Society, and holds an honorary teaching position at the School of Medicine, Kenyatta University in Nairobi, Kenya.

Rachael Murray is a Professor of Population Health at the University of Nottingham and specialises in tobacco control research in multiple health settings. She is currently the PI on a trial investigating the addition of a personalised smoking cessation intervention to a lung cancer screening programme (the Yorkshire Enhanced Stop Smoking Study, YESS; delivered as part of the Yorkshire Lung Screening Trial, YLST) and CoI on a number of other research projects focussed around lung cancer screening, particularly delivering smoking cessation and lifestyle interventions within screening and lung cancer treatment. In addition, Rachael is a member of the Royal College of Physicians Tobacco Advisory Group.

Professor Parameswaran Nair, MD, PhD, FRCP, FRCPC, is the Frederick E Hargreave Teva Innovation Chair in Airway Diseases and Professor of Medicine in the Division of Respirology at McMaster University in Hamilton, Ontario, Canada, providing tertiary care to patients with severe asthma and other complex airway and eosinophilic lung diseases. He directs a patient-centred translational research programme at the Firestone Institute of St Joseph's Healthcare, focussed on charactering bronchitis using sputum biomarkers, and targeted therapy with biologics and small molecule antagonists. His laboratory has contributed to over 300 peer-reviewed publications in high impact general medical, allergy, and respiratory journals (h-index 70), and has been recognized by a Canada Research Chair and Fellowships of the Canadian Academy of Health Sciences and the European Respiratory Society.

Dr Sean Parker trained in Oxford and Newcastle. He has worked as a consultant for Northumbria Healthcare since 2008, and alongside general respiratory practice, has developed a cough service with a particular emphasis on providing patients access to non-pharmacological treatments and clinical trials of

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novel antitussives. He is the current Chair of the BTS Cough Specialist Advisory Group, a co-chair for NEuroCOUGH and co-chaired the BTS Clinical Statement on Chronic Cough in Adults.

Dawn C Newcomb, PhD, is an Associate Professor in the Department of Medicine and in the Department of Pathology, Immunology, and Microbiology, at Vanderbilt University in Nashville, Tennessee, USA. Dr Newcomb's research focuses on the immunologic mechanisms associated with airway inflammation and asthma and how sex hormones influence these pathways. Asthma is not a uniform disease, with many different phenotypes of asthma, and a higher prevalence of asthma (and severe asthma) in women. Her goal is to provide mechanistic insight on why women have increased asthma compared to men and potentially determine new therapeutic targets for women with asthma.

Marko Nikolic is an MRC Clinician Scientist Fellow at UCL Respiratory and Honorary Consultant in Respiratory Medicine, interested in developmental and stem cell biology in the context of lung regeneration, while also contributing to the Human Cell Atlas as a member of the HCA Lung Biological Network. He has recently also gained extensive experience in single cell biology including in COVID-19. He did his PhD and Clinical Lectureship with Emma Rawlins at the Gurdon Institute in Cambridge, before setting up his independent group at UCL in 2018 as a UKRI Innovation Rutherford Fellow linked to the UK Regenerative Medicine Platform. His current MRC Clinician Scientist fellowship aims to delineate late foetal lung and immune maturation.

Dr Emma O'Dowd is a Consultant Respiratory Physician at Nottingham University Hospitals NHS Trust. She was awarded a PhD in lung cancer epidemiology in 2017 and her research interests are lung cancer screening, early diagnosis and epidemiology. She is Chair of the British Thoracic Society Lung Cancer and Mesothelioma Specialist Advisory Group and a member of the UK Lung Cancer Clinical Expert Group.

Dr Segun Olusanya is a newly appointed Intensive Care Consultant at St Bartholomew's Hospital, London, with special interests in extracorporeal membrane oxygenation (ECMO), clinician wellbeing, point of care ultrasound, equality/diversity/inclusion, and online education. His real claim to fame is running a wedding cake and confectionery business with his wife, Fehintola; he primarily functions as Chief Taster, and occasional Dish Washer.

Professor Peter John Morland Openshaw, FMedSci, CBE, is a Respiratory Physician and Immunologist at Imperial College London. He has worked on antiviral immunity since 1985, specialising in RSV disease pathogenesis and prevention. He was the first clinician to be elected President of the British Society for Immunology (2013-18). He has extensively advised the government on pandemic preparedness and response (UK SAGE, 2009-12; Chair/Vice-Chair of NERVTAG, 2015-2022); he led a national research consortium (MOSAIC) on swine flu, and co-led ISARIC-4C on COVID-19. He has served on many grant committees and Advisory Boards and was made a Commander of the British Empire for services to Medicine and Immunology in the 2022 New Year's Honours.

Obianuju Ozoh is an Associate Professor of Medicine at the College of Medicine of the University of Lagos and the Head of the Respiratory Unit at the Lagos University Teaching Hospital, Lagos, Nigeria. She is the Vice President of the Pan African Thoracic Society (PATS) and a Co-Director of the PATS MECOR programme.
Professor Ozoh's research interests are focused on improving outcomes for non-communicable respiratory diseases by improving access to care, reducing exposure to risk factors and through many advocacy activities.

Dr Dhruv Parekh is Associate Professor of Critical Care and Respiratory Medicine at the University of Birmingham and Consultant in Critical Care and Respiratory Medicine at Queen Elizabeth Hospital, Birmingham, UK.
As Programme Director of the Birmingham NIHR/Wellcome Clinical Research Facility and Lead of the cross-cutting Acute Care Research Collaborative within the Birmingham Health Partnership, Dhruv oversees a breadth of academic and industry led research. His own programme of research, from discovery science to clinical trials and data modelling, is based principally around improving the care and outcomes of acute and critically ill patients, in particular developing novel therapies in ARDS, lung fibrosis, respiratory failure, perioperative inflammation and sepsis.
Dhruv leads programmes of work in understanding the inequity in and access to research studies and is now with his leadership roles passionate about reducing health disparities by ensuring a cohesive cross-sector approach, so that every patient regardless of background, location, diversity, language or disability, has equal access to innovation.

Miss Padmavathi Parthasarathy, MSc Advanced Clinical Practice, PG Diploma in Critical Care, PG Diploma in Respiratory Medicine, BSc Nursing. Padmavathi is an Advanced Clinical Practitioner in Respiratory Medicine currently working at the University Hospital Leicester. She is Co-chair of the BTS Nurse Specialist Advisory Group, Vice Chair of the Respiratory ACP Network, a member of the BTS Standards of Care Committee, and BTS Education and Training Committee, and a member of the Respiratory ACP Curriculum Development Committee (HEE/RCP). Padmavathi has completed her BSc Nursing in India and worked in various roles both overseas and in the UK. She has worked as a clinical instructor, staff nurse, ward sister, and nurse practitioner in critical care outreach and out of hours service, before moving into her current role as Respiratory Advanced Clinical Practitioner.

Daniel Peckham is Professor of Respiratory Medicine and Deputy Director of the Leeds Institute of Medical Research at the University of Leeds. After completing his doctoral thesis on "Airway Epithelial Sodium Potassium ATPase Activity and Cystic Fibrosis" at the University of Nottingham, he worked as a Senior Registrar in Oxford before moving to Leeds. He is Clinical Lead for Adult Cystic Fibrosis, Bronchiectasis and the North of England Primary Ciliary Dyskinesia Services.
He pioneered the design and implementation of chronic disease electronic patient records and established a strong base for clinical and basic research in cystic fibrosis. Active research programmes focus on inflammation, CFTR modulators, gut dysbiosis, cancer, drug allergy, big data, and clinical trials.

Dr Martino Pengo, MD, PhD, graduated in medicine at the University of Padua where he completed his training in internal medicine. During his residency, he started conducting clinical research studies in the field of cardiovascular prevention and arterial hypertension. He then moved to the UK for a fellowship at Guy's and St Thomas' Hospital NHS Foundation Trust, King's College London, where he managed to expand his research and clinical interests to the interactions between sleep/sleep disorders and cardiovascular disease. He successfully completed the Expert Somnologist examination issued by the European Society of Sleep Research. In 2016 he completed his International PhD programme on "Arterial hypertension and vascular biology". He moved back to Italy as he was appointed Consultant Physician and Senior Researcher in the Department of Cardiovascular, Neural and Metabolic Sciences, IRCCS Istituto Auxologico Italiano (Milano). In 2022 he was appointed Assistant Professor at the University of Milano-Bicocca.

Joanna Pepke-Zaba, PhD, FRCP, is Consultant Respiratory Physician at Royal Papworth Hospital, Cambridge UK, and Director of the Pulmonary Vascular Diseases Unit, 2003-2019. She was instrumental in the organisation of pulmonary hypertension (PH) services in the UK, specifically the National Chronic Thromboembolic Pulmonary Hypertension Programme. She is affiliated with the University of Cambridge and her research is concentrating on the translational programmes in the field of PH with focus on CTEPH and PAH. She has trained generations of research fellows, serves on various scientific, educational, international boards and societies, and is section editor of *JHLT*. She has published over 200 papers, h index 61.

Dr Jessica Potter is a Consultant in Respiratory Medicine and Lead of the TB Service at North Middlesex University Hospital, London. She is an Honorary Senior Clinical Lecturer at UCL, member of the UCL-TB Steering Committee, Advocacy Lead at TBnet and co-Chair of the network, UK Academics and Professionals to End TB. Jess spear-headed the website www.tbdrugmonographs.co.uk – a globally used resource to aid the prescription and monitoring of drugs used in all forms of TB. She is a qualitative researcher interested in inequalities and how these shape people's experiences of healthcare.

A/Prof Cecilia Prêle is Associate Professor, Pathology, at Murdoch University and Head of the Tissue Repair and Fibrosis Group at the Institute for Respiratory Health, University of Western Australia. She is an experienced cell and molecular biologist and completed her PhD at University College London in 2001. A/Prof Prêle's research focus is on understanding the cellular and molecular pathways driving the pathogenesis of lung fibrosis. Specifically, her current research investigates the role of B cells and autoimmunity in idiopathic pulmonary fibrosis and the potential use of immunotherapy approaches for the future treatment of chronic lung disease. Her research has expanded to include the investigation of other fibrotic conditions. A/Prof Prêle's current work is funded by the Australian National Health and Medical Research Council.

Tim Quinnell has worked at Royal Papworth Hospital, Cambridge since 2004 and now leads one of

the UK's largest sleep and ventilation centres. He specialises in respiratory and non-respiratory sleep disorders, domiciliary non-invasive ventilation and weaning from invasive ventilation. His MD was on genetic and electrophysiological aspects of narcolepsy. He was Chief Investigator for the NIHR Trial of Mandibular Advancement Devices in OSA and now leads an NIHR trial of combination therapy in OSA. He is current Chair of the BTS Sleep Apnoea Specialist Advisory Group. Dr Quinnell is actively engaged in providing and developing multidisciplinary sleep medicine education.

Najib M Rahman, BM BCh, MA (oxon), MSc, DPhil, FERS, is Professor of Respiratory Medicine, Director, Oxford Respiratory Trials Unit, University of Oxford, Consultant Pleural Physician, Oxford Centre for Respiratory Medicine, Churchill Hospital, Oxford, Deputy National CRN Lead for Respiratory Disease, NIHR CRN and NIHR Senior Investigator.
Professor Rahman Directs the Oxford Respiratory Trials Unit and clinically is a pleural specialist and Consultant Respiratory Physician. Having qualified in Oxford he underwent the medical SHO rotation at Queen's Medical Centre, Nottingham, and re-joined Oxford as a Specialist Registrar in 2003. He undertook a DPhil and MSc in this period and was appointed Director of the Oxford Respiratory Trials Unit and Consultant Lead for Pleural Disease in Oxford in 2011. He was appointed as Professor of Respiratory Medicine in 2018, and is currently running randomised and observational studies in pleural infection, pneumothorax and malignant pleural effusion. He is trained in thoracoscopy, thoracic ultrasound and clinical trials methodology, and has published over 300 papers with citations of >6000. He is co-Chair of the BTS Pleural Guidelines 2023, Chair of the BTS Pleural Intervention Committee 2023, Chair of multiple ERS guidelines on pleural disease and an NIHR Senior Investigator.

Professor Helen Reddel, MBBS, PhD, FRACP, is a Research Leader at the Woolcock Institute of Medical Research, Macquarie University, Director of the Australian Centre for Airways Disease Monitoring (ACAM), and a Respiratory Physician at Royal Prince Alfred Hospital in Sydney, Australia. As Chair of the Global Initiative for Asthma (GINA) Science Committee, Professor Reddel has led major evidence-based changes in clinical recommendations for asthma management, with a strong focus on making guidelines not only evidence-based, but also patient-centred and practical. Professor Reddel's current research includes population monitoring of asthma and COPD, clinical studies investigating diagnosis and management of airways disease, and qualitative research about patient perspectives in mild and severe asthma.

Dr Peter Reid is a Consultant in Respiratory Medicine. He trained in Belfast, London and Edinburgh and was appointed to the Western General Hospital in 2000. He has an interest in occupational lung disease and is a member of GORDS.

Elisabetta Renzoni is an ILD specialist at the Royal Brompton Hospital, and Honorary Senior Lecturer, Imperial College, working in the largest ILD referral centre in the UK. Key research interests include prognostic and outcome biomarkers in lung fibrosis across ILD entities, as well as research into supportive care for patients with ILD. Dr Renzoni has led a UK multi-centre randomised controlled clinical trial to study the effects of supplemental oxygen on quality of life in fibrotic lung diseases, which led to a change in the American Thoracic Society (ATS) clinical practice guidelines for ambulatory oxygen in patients with ILD. She has led on a number of additional clinical studies, and has published >190 peer reviewed articles, editorials, reviews and chapters, with a current h index of 60. She has contributed to several national and international ILD guidelines, including ATS/JRS/ALAT guideline group for the diagnosis of hypersensitivity pneumonitis, ATS guideline group for the clinical practice guidelines on use of supplemental oxygen in chronic respiratory diseases, and the ERS task force for genetic testing in familial pulmonary fibrosis. She is currently contributing to the ERS/EULAR guidelines for diagnosis and management of connective tissue disease-ILD, and to the BSR updated guidelines on the management of systemic sclerosis associated ILD. She is an Associate Editor for *Respirology*.

Emma Rickards is a Consultant Respiratory Nurse who works for Liverpool Heart and Chest Hospital NHS Foundation Trust and Knowsley Community Respiratory Service and she is passionate about reducing health inequalities in respiratory care.
Emma qualified as a nurse with a Bsc (Hons) in Nursing Studies then soon after completed her MSc in Professional Practice with a pathway of difficult asthma. As a keen researcher/practitioner, Emma is a PhD student studying end of life care for patients with COPD in ED and as part of her studies has undertaken her Mphil. For this, Emma has received the Florence Nightingale Research Scholarship 2017/2018 and again 2018/2019. Emma is also currently undertaking her MBA.

Emma is the Vice Chair of the Respiratory Disease Sub Committee and Respiratory Nurse Acute Care Lead for the Association of Respiratory Nurses (ARNS).

Dr Katy Roach is a Lecturer in Respiratory and Precision Medicine at the University of Leicester. Her research focuses on the pathophysiology of idiopathic pulmonary fibrosis, understanding the mechanisms of TGFb1-mediated tissue remodelling and investigating ex vivo tissue models of human fibrosis. In addition, Dr Roach's group has a keen interest in ion channels and enzymes as novel therapeutic targets in fibrotic disease. Dr Roach sits on the British Association for Lung Research committee.

Hitasha Rupani is a Consultant Respiratory Physician at the University Hospital Southampton NHS Foundation Trust and leads the Southampton Severe Asthma Centre. She chairs the British Thoracic Society Specialist Advisory Group for Asthma and is a member of the Specialised Respiratory Clinical Reference Group. She is an associate editor for *ERJ Open Research*. She has a PhD from the University of Southampton and continues to actively engage in asthma research.

Clare Sander is a Consultant Respiratory Physician at Addenbrooke's Hospital and an Associate Clinical Lecturer at Cambridge University. She is the Respiratory Training Programme Director for the East of England.
Her main clinical interests include complex lung infections, particularly in those with primary and secondary immunodeficiency. She also manages patients with tuberculosis and non-tuberculous mycobacteria. She has a longstanding interest in respiratory disease associated with haematological conditions including malignancy.
She has contributed to the ERS/EBMT/CIBMTR consensus guidelines on treatment of pulmonary chronic graft versus host disease and to the NTM UK Network standards. She has recently established a transition clinic for patients with complex neuro-disability with respiratory care needs and chairs the Community Acquired Pneumonia Group for the East of England Respiratory Network.

Elizabeth Sapey is an Academic Respiratory and Acute Medicine Physician at the University of Birmingham and University Hospitals Birmingham NHS Foundation Trust. She is the Chair of the British Association for Lung Research and the Director of the Institute of Inflammation and Ageing at the University of Birmingham.
Liz's research interests have focused on translational insights into acute and chronic inflammatory lung diseases in older adults. More recently, this has expanded to improve the representativeness of translational datasets. As Director of PIONEER, the HDR-UK Hub in Acute Care, Liz runs a programme to collect, link and use routine health data to understand disease, its presentation and potential treatments.

Hugh Selsick studied physiology and medicine at the University of the Witwatersrand, Johannesburg, before specialising in adult and addictions psychiatry in London. He established the Insomnia and Behavioural Sleep Medicine Clinic at University College London Hospitals and is the lead clinician there. He founded and chairs the Sleep Special Interest Group in the Royal College of Psychiatrists and is past President of the Sleep Medicine Section at the Royal Society of Medicine. His special interest is the relationship between sleep disorders and psychiatric disorders. He is co-author of *Oxford Case Histories in Sleep Medicine* (2015) and editor of *Sleep Disorders in Psychiatric Patients: A Practical Guide* (2018).

Dr Joanna Shakespeare is a Consultant Clinical Scientist in Sleep and Ventilation at University Hospitals Coventry and Warwickshire, having worked as a Respiratory Physiologist/Scientist for 28 years. She spent 16 years as the Clinical Service Lead for the Respiratory and Sleep Sciences Department leading it to UKAS (IQIPS) accreditation in 2016.
Joanna is currently the Vice Chair of the Association for Respiratory Technology and Physiology (ARTP), having previously worked for six years as the Chair of the ARTP Education Committee. She was the Lead Editor for the NSHCS Scientific Training Programme (STP) curriculum review for Respiratory and Sleep which completed in 2021. Her specialist interests include cardiopulmonary exercise testing and non-invasive ventilation in both the acute and domiciliary settings.

Professor Andrew Sharp qualified from Edinburgh Medical School in 1998. He was appointed as a Consultant Cardiologist in 2011, currently working at the University Hospital of Wales in Cardiff, where he is also an Honorary Professor of Cardiology with Cardiff University.
He conducted his early training at the Royal Infirmary of Edinburgh, before moving to London for his senior clinical training, completing the Milan-Imperial Interventional Cardiology Fellowship Programme, having spent a year in San Raffaele and Columbus

SPEAKERS' BIOGRAPHICAL DETAILS

Hospitals, Milan, Italy, under the tutelage of Professor Antonio Colombo.
Professor Sharp was awarded an MD postgraduate research degree from the University of Edinburgh for his work on the hypertensive heart and his current research interests include device-based and pharmacological treatments for hypertension, catheter-directed treatments for pulmonary embolism, intracoronary imaging, coronary physiology and percutaneous valve replacement therapies.
He is a member of the Steering Committees for the HI PEITHO RCT of catheter-directed treatments for pulmonary embolism and the STRIKE PE study of thrombectomy for pulmonary embolism.
He can be found occasionally on Twitter @drandrewsharp

Professor Amelia Shoemark is Asthma and Lung UK / GSK Chair of Respiratory Research at the University of Dundee and a Clinical Scientist at the Royal Brompton Hospital. Her translational research programme focuses on mucociliary clearance and inflammation in chronic lung disease. Professor Shoemark has a specialist interest in bronchiectasis and primary ciliary dyskinesia and is the Genetics Work Package Lead for the ERS CRC EMBARC and Chair of BEAT-PCD.

Professor Nick Simmonds is Associate Director of the Adult Cystic Fibrosis Centre at Royal Brompton Hospital, London, and Professor of Practice (Respiratory Medicine) at Imperial College London, United Kingdom. His main research interests include difficult CF diagnosis and the investigation of novel CF therapies. He has been a lead investigator on numerous global multicentre trials and is on the Executive Committee of the European Cystic Fibrosis Society (ECFS) Clinical Trials Network. He has extensive experience of novel diagnostic techniques and is the Vice Co-ordinator of the ECFS Diagnostic Network. He is also on the Registry Research Committee of the UK CF Registry, a role which promotes the use of registries to better understand outcomes in CF.

Dr Aran Singanayagam is an MRC Clinician Scientist Group Leader within the Centre for Bacterial Resistance Biology at Imperial College London and Honorary Consultant in Respiratory Medicine at Royal Brompton and Harefield Hospitals. He qualified from the University of Edinburgh Medical School in 2005.
Aran's research programme employs a combination of in vitro and in vivo disease models to understand how pulmonary host-defence is dysregulated in the context of inflammatory airway diseases. He has published extensively in this area (h-index 47) and sits on the Editorial Boards of the *American Journal of Respiratory and Critical Care Medicine* and *European Respiratory Journal*.

Dave Singh is Professor of Clinical Pharmacology and Respiratory Medicine at the University of Manchester, UK. He graduated from Cambridge University. His research interest is the development of new drugs for asthma and COPD. He is the Medicines Evaluation Unit Medical Director, acting as principal investigator in over 400 clinical trials. He is a member of the GOLD Science Committee, and previously Chair of the ERS Airway Pharmacology Group. He is an Associate Editor of the European Respiratory Journal and European Respiratory Review. He is a Fellow of the ERS and British Pharmacology Society. He has over 450 publications.

Dr Laurie Smith is the Lead Research Respiratory Physiologist for the POLARIS Lung Imaging Group at the University of Sheffield. He has spent the majority of his career assessing lung function in paediatrics and in cystic fibrosis. He completed his PhD on lung imaging using hyperpolarised gas MRI and multiple breath washout in cystic fibrosis. His current research interests focus on better understanding lung function in children and adults with obstructive lung disease using functional lung MRI and lung function testing.

Dr Ratna Sohanpal is a Health Services Researcher based in the Centre for Primary Care, Wolfson Institute of Population Health, Queen Mary University of London. Her research interests include complex interventions, long-term condition management and improving diverse stakeholder participation in research and in evidenced based services. Her current NIHR funded studies involve using qualitative methods and mixed methods in topics relating to remote care delivery, assistive technology, and inclusivity research. The aim of these studies is to improve services and outcomes for people with chronic obstructive pulmonary disease and to increase opportunities for people from marginalised communities to take part in research.

Dr Arietta Spinou is a Cardiorespiratory Physiotherapy Lecturer and Researcher at King's College London, United Kingdom. She holds a PhD in Respiratory Medicine, King's College London, and an MSc in Cardiorespiratory Physiotherapy, UCL. She also has over 13 years of clinical experience in Greece, Finland and the UK.
Dr Spinou is a member of the British Thoracic Society (BTS) Pulmonary Infection Specialist Advisory Group

and was a chair of the European Respiratory Society (ERS) Statement Panel for Airway Clearance in Bronchiectasis (2023). Her research interests include bronchiectasis, quality of life, cough physiology and outcomes, and airway clearance techniques.

Karl Staples is Professor of Respiratory Immunology at the University of Southampton Faculty of Medicine and an NIHR Southampton BRC Academic Career Development Lead. His research focuses on host-pathogen interactions in chronic inflammatory airways diseases, such as asthma and chronic obstructive pulmonary disease (COPD), and the contribution of these interactions to exacerbations of these respiratory conditions. To study these interactions he has developed novel ex vivo models of bacterial and viral infection using human lung cells and tissue. He is the Chair of the British Association for Lung Research and an Associate Editor of the *BMJ Open Respiratory Research*.

Professor Daiana Stolz graduated from the Federal University of Rio Grande do Sul, Brazil, in 1997 and completed her clinical training in internal and pulmonary medicine in Germany, Switzerland, and the USA. She received a Master's degree in Quantitative Methods and Public Health from Harvard School of Public Health, Boston, MA, USA, in 2008 and was appointed Professor of Respiratory Medicine by the University of Basel, Switzerland, in 2016. She has been a leading physician at the University Hospital Basel since 2009 and the Chief of Respiratory Medicine at the University Hospital Freiburg, Germany since 2021. She is a Fellow of the American College of Chest Physicians and a Fellow of the European Respiratory Society. Professor Stolz leads a translational research group on inflammatory airway diseases at the University Hospitals Freiburg and Basel and has authored more than 290 publications in peer-reviewed journals, including several studies on pulmonary and systemic biomarkers for the characterisation of patients with COPD. She is a member of the Editorial Board of the *European Respiratory Journal*, is the GOLD representative for Switzerland and is the past Education Council Chair of the European Respiratory Society.

Professor Charlotte Summers graduated in both Biomedical Sciences and Medicine from the University of Southampton, and later undertook a PhD at the University of Cambridge, investigating the role of inflammation on the pulmonary transit kinetics of human neutrophils, alongside specialist clinical training in Respiratory (East of England) and Intensive Care Medicine (London). She was subsequently appointed as the UK's first NIHR Clinical Lecturer in Intensive Care Medicine and was awarded a Fulbright All-disciplines Scholar Award and a Wellcome Trust Fellowship for Postdoctoral Clinician Scientists. Charlotte joined the University of Cambridge School of Clinical Medicine in 2015 from the University of California, San Francisco.
Charlotte's aim is to improve clinical outcomes from acute hypoxaemic respiratory failure (AHRF), which is most commonly caused by pneumonia and acute respiratory distress syndrome. Understanding the mechanisms underlying the development of aberrant lung, will allow them to develop and test therapies to prevent and treat the causes of AHRF. The group works across the translational pathway, from understanding mechanisms in human cell systems, to experimental medicine studies in humans, to testing therapies in large multicentre clinical trials. They also collaborate with several research networks to contribute to global understanding of diseases such as influenza and COVID-19 (e.g., ISARIC, GenoMICC).

Professor Charles Swanton, MBPhD, FRCP, FMedSci, FAACR, FRS, completed his MBPhD training in 1999 at the Imperial Cancer Research Fund Laboratories, and Cancer Research UK clinician scientist/medical oncology training in 2008. He is a Senior Group Leader of the Cancer Evolution and Genome Instability Laboratory at the Francis Crick Institute and combines his research with clinical duties at UCLH, as a Thoracic Oncologist, focussed on how tumours evolve over space and time. His research branched evolutionary histories of solid tumours, processes that drive cancer cell-to-cell variation in the form of new cancer mutations or chromosomal instabilities, and the impact of such cancer diversity on effective immune surveillance and clinical outcome. Charles is chief investigator of TRACERx, a lung cancer evolutionary study and the national PEACE autopsy programme.
Charles was made Fellow of the Royal College of Physicians in April 2011, appointed Fellow of the Academy of Medical Sciences in 2015, awarded the Napier Professorship in Cancer by the Royal Society in 2016, appointed Cancer Research UK's Chief Clinician in 2017, elected Fellow of the Royal Society in 2018, and Fellow of the Academy of the American Association for Cancer Research in 2020. He is an editorial board member of *Cell, Plos Medicine, Cancer Discovery* and *Annals of Oncology* and an advisory board member for *Nature Reviews Clinical Oncology* and *Cancer Cell*.
In 2016 he co-founded Achilles Therapeutics, a UCL/CRUK/Francis Crick Institute spin-out company,

assessing the efficacy of T cells targeting clonal neoantigens.
Charles has been awarded several prizes including the Stand up to Cancer Translational Cancer Research Prize (2015), GlaxoSmithKline Biochemical Society Prize (2016), San Salvatore prize for Cancer Research (2017) and the Ellison-Cliffe Medal, Royal Society of Medicine (2017), recipient of the Gordon Hamilton Fairley Medal (2018), Massachusetts General Hospital, Jonathan Kraft Prize for Excellence in Cancer Research (May 2018), the ESMO Award for Translational Cancer Research (2019), Addario Lung Cancer Foundation Award and Lectureship, International Lung Cancer Congress (July 2020), the Weizmann Institute Sergio Lombroso Award in Cancer Research (2021), International Society of Liquid Biopsy (ISLB) Research Award (2021), the Memorial Sloan Kettering Paul Marks Prize for Cancer Research (2021), UCLH Celebrating Excellence Award for Contribution to World Class Research (2022), Inductee to OncLive's Giants of Cancer Care awards programme (2023), and Springer Nature CDD Award (2023).

Amanda Tatler is an Associate Professor and Principal Research Fellow within the NIHR Nottingham Respiratory Biomedical Research Centre, University of Nottingham, having previously trained at the University of California San Francisco and Harvard Medical School. Her research aims to understand tissue remodelling processes in respiratory diseases including asthma, pulmonary fibrosis, COPD and viral infections, in particular how matrix proteins and matrix crosslinking contribute to disease progression. She has a keen interest in ex vivo tissue models of disease and her current work aims to develop a "breathing" lung slice model.
Amanda is Treasurer of the British Association for Lung Research, and sits on the editorial boards of both the *International Journal of Biochemistry and Cell Biology* and *Pharmacology and Therapeutics*.

Owen Tomlinson, PhD, is a Lecturer in Medical Science at the University of Exeter Medical School, whose area of research is in exercise testing in chronic lung disease, focusing on mechanisms of exercise intolerance in these patient groups. He is the Meetings Secretary of the British Association for Lung Research and sits on the European Cystic Fibrosis Society Exercise Working Group.

Selina Tsim is a Consultant Respiratory Physician at the Queen Elizabeth University Hospital in Glasgow, and NHS Research Scotland Career Research Fellow and an Honorary Clinical Senior Lecturer at the University of Glasgow. She is the Clinical Lead of the National Mesothelioma Network for the West of Scotland and co-Chairs the National Mesothelioma MDT. Dr Tsim was awarded a PhD by the University of Glasgow in 2018 for her work on imaging and blood biomarkers in pleural malignancy. Her current research interests include the pleural microbiome in malignancy and the role of exercise therapy in mesothelioma.

Ioannis Vogiatzis, is Professor of Rehabilitation Sciences at Northumbria University. He has worked in the areas of pulmonary rehabilitation (PR) and cardiopulmonary exercise testing for over 25 years. He is currently the ERS Head of Assembly 1 (Respiratory, Clinical Care and Physiology). He has contributed to several joint ERS/ATS statements on PR, skeletal muscle dysfunction, cardiopulmonary exercise testing, respiratory muscle function assessment and physical inactivity in patients with COPD. Ioannis has co-chaired an ATS/ERS joint policy statement for enhancing implementation, use and delivery of pulmonary rehabilitation globally. He was a member of the Development Group for COPD for the WHO Rehabilitation Programme. He is currently a NICE expert advisory panel member for managing the long-term effects of COVID-19. His research focuses on exercise intolerance in chronic lung disorders and on the benefits of interval exercise training in COPD.

Dr Steve Walker is an NIHR Academic Clinical Lecturer in Respiratory Medicine with the University of Bristol. His research interest is the management of spontaneous pneumothorax. He was a guideline member for the recently published BTS Pleural Disease Guideline 2023 and junior chair for the forthcoming ERS Spontaneous Pneumothorax Guideline.
Dr Steven Walker | Bristol Medical School: Translational Health Sciences | University of Bristol

Sarah Walmsley is a Professor of Respiratory Medicine, University of Edinburgh, Honorary Consultant Physician, NHS Lothian and Co-Director of the Edinburgh Clinical Academic Training Scheme. She undertook her medical training at the University of Edinburgh graduating in 1997, and an MRC training fellowship at the University of Cambridge with award of her PhD in 2004. Sarah's specialist training in respiratory medicine was in Sheffield, where she also held a Wellcome Intermediate Fellowship, prior to her move to Edinburgh as a Wellcome Senior Clinical Fellow. During

this time, she had two periods of maternity leave. Sarah is currently based in the Centre for Inflammation Research in the Institute for Regeneration and Repair in Edinburgh. Her work is focused on understanding how local oxygen and nutrient availability in the inflamed environment can reprogramme neutrophil behaviour in both acute and chronic inflammatory lung disease states.

Wisia Wedzicha is Professor of Respiratory Medicine, Head of the Respiratory Division at the National Heart and Lung Institute, Imperial College and Honorary Consultant at Royal Brompton and Harefield Hospitals. She qualified from Somerville College, Oxford University and St Bartholomew's Hospital Medical College. She was elected as Fellow of the Academy of Medical Sciences (FMedSci) and is a fellow both of the American Thoracic Society (ATSF) and European Respiratory Society (FERS). She received the Helmholtz International Fellow Award in 2014. Professor Wedzicha has a major interest in the causes, mechanisms, impact and prevention of chronic obstructive pulmonary disease (COPD) exacerbations, and in the role of bacterial and viral infection in COPD exacerbations. She directs an active research group specialising in COPD exacerbations, and has published extensively on this topic. She also directs the British Lung Foundation Early COPD Cohort.
Professor Wedzicha was Editor-in-Chief of *Thorax* from 2002 to 2010 and until March 2022 the Editor in Chief for the *American Journal of Respiratory and Critical Care Medicine*. She was the *Lancet* Ombudsman till 2014, Publications Director for the European Respiratory Society (ERS) and has also previously been ERS Guidelines Director. She is a member of the GOLD Scientific Committee.

Sophie West is a Respiratory Consultant in Newcastle upon Tyne and Lead of the Regional Sleep Service. Her clinical and research interests are in best treatments for obstructive sleep apnoea and its associated conditions. She was a committee member for the NICE NG202 Obstructive Sleep Apnoea-Hypopnoea Syndrome and Obesity Hypoventilation Syndrome Guideline, and now sits on the NICE Diagnostics Advisory Committee reviewing automated home testing devices for diagnosing obstructive sleep apnoea/hypopnoea syndrome.

Dr Joanna Whitehouse was appointed to the West Midlands Adult Cystic Fibrosis Centre in 2004 (University Hospitals Birmingham) and has been Centre Director since 2011. She leads the CF Obstetric Service and pharmaceutical trials for CF and non-CF bronchiectasis. Jo also leads non-CF bronchiectasis, developing services for this group, in particular respiratory patients with primary immunodeficiency and primary ciliary dyskinesia. She has spent three years as a member of the BTS Specialist Advisory Group for CF and has been a member of the CF Trust Strategic Implementation Board from 2016 – 2022.

Dr Ruth Wiggans is a Respiratory Consultant with an interest in occupational and environmental lung diseases and an Honorary Lecturer at the University of Manchester. She is a member of the Group of Occupational Respiratory Disease Specialists and the BTS Occupational and Environmental Lung Disease Specialist Advisory Group. Her PhD research examined risk factors for occupational asthma in allergen-exposed workers. Current research projects explore the intersection between work and health including the COVID-19 PROTECT study and THOR database.

Professor Janelle Yorke is Executive Chief Nurse at The Christie Hospital and Chair in Cancer Nursing with the University of Manchester. She leads the Christie Patient Centred Research Group (CPCR) and the Clinical Academic Pathway (CCAP) supporting combined clinical and academic research pathways for nurses and allied health professionals. She is Chair of the NIHR Pre-doctoral Clinical-Academic Fellowship Programme and an NIHR Senior Investigator.
Professor Yorke has expertise in the development and utilisation of Patient Reported Outcome – and Experience – Measures (PROMS/PREMS). Being internationally recognised as an expert in PROM work, her work includes symptom specific and quality of life measures that have been translated into more than 50 languages. She is Chair of the Christie ePROM Implementation Group, leading the implementation of electronic PROMs into routine clinical care.
In addition, Professor Yorke's research programme applies all aspects of the Medical Research Council's framework for the development and evaluation of complex interventions. Her research team undertakes systematic reviews, mixed methods, pilot/feasibility RCT's and phase III pragmatic trials. Some current research includes: i) phase III RCT to evaluate the effectiveness of the 'Respiratory Distress Symptom Intervention' for the management of the breathlessness-cough-fatigue symptom cluster in lung cancer; and ii) feasibility RCT of surgery versus radiotherapy in addition to systemic anti-cancer therapy in resectable Stage III-N2 lung cancer with QOL as the primary outcome and assessment of caregiver burden.

EXHIBITORS' INFORMATION

Action for Pulmonary Fibrosis **Stand D**

We are Action for Pulmonary Fibrosis, a patient-led charity working to stop pulmonary fibrosis (PF). Our growing community of patients, families, carers, researchers and healthcare professionals is striving to ensure everyone affected by PF has a better future.

What we do

- Directly fund research to develop new treatments and stop PF.
- Support people who are living with or affected by PF.
- Raise awareness of PF and improve access to the highest quality care through campaigning and education.
- Fundraise to fuel our mission.

Email: info@actionpf.org
Website: https://www.actionpf.org/

Aerogen **Stand number 36**

Globally renowned Aerogen vibrating mesh technology has been in use for over 25 years, in more than 75 countries worldwide, and is associated with over 200 research papers and publications.[1] Aerogen is the partner of choice for the world's leading ventilator companies for aerosol drug delivery, and can be used at every stage of patient care, from the emergency department to the ICU.[1] 1. Aerogen Data on File

Email: info@aerogen.com
Website: https://www.aerogen.com/

Ambu **Stand number 24**

INNOVATIONS THAT MAKE A DIFFERENCE

Since 1937, Ambu has been rethinking medical solutions to save lives and improve patient care. Today, millions of patients and healthcare professionals worldwide depend on the efficiency, safety and performance of our single-use endoscopy, anaesthesia, and patient monitoring solutions.

Our early innovations include the world's first self-inflating resuscitator, the Ambu® Bag™. Then 12 years ago we launched our landmark aScope™, the first flexible single-use bronchoscope that raised the bar with new possibilities. And now with the new aScope 5 Broncho, Ambu takes single-use bronchoscopy to even greater heights.

Today, we continue to collaborate with leading medical experts to deliver innovations that make a real difference.

Ambu – Forever Forward

Email: uksales@ambu.com
Website: https://ambu.co.uk/endoscopy/pulmonology

APR Medtech **Stand number 15**

APR Medtech is a specialist independent medical technology company established in 2014. We identify innovative technologies from around the globe and seek to integrate them into the UK healthcare system. This year at the BTS Winter Meeting we will be exhibiting the Passio™ Pump Drainage System. Passio™ is the world's first digital handheld pump designed to provide reliable low-level suction for the home management of recurrent pleural effusion.

Email: hello@aprmedtech.com
Website: https://aprmedtech.com

Association for Respiratory Technology & Physiology (ARTP) **Stand H**

The Association for Respiratory Technology & Physiology (ARTP) are the professional society focused on physiological measurement and interpretation within the field of respiratory medicine for the UK. We work alongside partner organisations and societies to produce position papers, national guidelines and standards for good practice. Our primary focus is the performance of respiratory / sleep physiological measurement, and the delivery of lung function and sleep services.

The ARTP links with BTS and other organisations around the world to deliver global standards in respiratory healthcare involving respiratory technology and physiology (such as Assembly 9 of the European Respiratory Society).

Email: admin@artp.org.uk
Website: https://artp.org.uk/

Association of Chartered Physiotherapists in Respiratory Care (ACPRC) **Stand G**

The Association of Chartered Physiotherapists in Respiratory Care promotes health and best practice in respiratory physiotherapy for the benefit of all. With over 1800 members the ACPRC is the largest national body of physiotherapists interested in all aspects of respiratory care. Connecting with our members is at the heart of our organisation, and in addition to our ACPRC Conference, which is taking place in April 2025, we also engage with members via:

- Regular short courses

- Monthly e-Newsletters with latest updates for our members
- A dedicated ACPRC Facebook page www.facebook.com/TheACPRC
- Monthly twitter chats via our ACPRC twitter account - twitter.com/TheACPRC
- A website which is packed with resources for members www.acprc.org.uk
- Support with publishing your research
- Education grants

Furthermore, we support the development of National Guidelines related to cardio-respiratory care and aim to publish two journals a year, which is delivered electronically to every one of our 1800+ members.

Email: secretary@acprc.org.uk
Website: https://acprc.org.uk/

Association of Respiratory Nurses (ARNS) **Stand J**

The Association of Respiratory Nurses (ARNS) was established in 1997 as a nursing forum to champion the specialty respiratory nursing community, promote excellence in practice, and influence respiratory health policy. ARNS also works to influence the direction of respiratory nursing care.

Email: info@arns.co.uk
Website: https://arns.co.uk

Asthma + Lung UK **Stand F**

Asthma + Lung UK is the only charity in the UK fighting for everyone with a lung condition, aiming for a world where everyone can breathe with healthy lungs. We fund cutting-edge research and provide advice and support via our dedicated Helpline and WhatsApp service for the 12 million people who will get a lung condition during their lifetime. We provide in person and virtual support groups for beneficiaries and also campaign for clean air and for better NHS diagnosis and treatment. For further information visit asthmaandlung.org.uk.

Email: nwatt@asthmaandlung.org.uk
Website: https://asthmaandlung.org.uk

AstraZeneca **Stand number 2**

AstraZeneca is a global, science-led biopharmaceutical company that focuses on the discovery, development, and commercialisation of prescription medicines in Oncology, Rare Diseases, and BioPharmaceuticals, including Cardiovascular, Renal & Metabolism, and Respiratory & Immunology. AstraZeneca operates in over 100 countries and its medicines are used by millions of patients worldwide.

With a proud 100-year heritage in advancing UK science, today AstraZeneca is the UK's leading biopharmaceutical company. AstraZeneca is based in six different locations across the UK, with its global headquarters in Cambridge. In the UK, around 8,600 employees work in research and development, manufacturing, supply, sales, and marketing. We supply around 35 different medicines to the NHS.

For more information, please visit www.astrazeneca.co.uk and follow us on Twitter @AstraZenecaUK.

Email: Medical.InformationUK@astrazeneca.com
Website: https://astrazeneca.co.uk/

BD **Stand number 7**

BD is one of the largest global medical technology companies in the world and is advancing the world of health by improving medical discovery, diagnostics and the delivery of care. The company develops innovative technology, services and solutions that help advance both clinical therapy for patients and clinical process for health care providers. BD has 77,000 employees and a presence in virtually every country around the world to address some of the most challenging global health issues. BD helps customers enhance outcomes, lower costs, increase efficiencies, improve safety and expand access to health care.

Email: daniel.sime@bd.com
Website: https://www.bd.com/en-ca/offerings/capabilities/interventional-specialties/peritoneal-and-pleural-drainage/about-the-pleurx-drainage-system/pleurx-drainage-system

British Association for Lung Research (BALR) **Stand I**

The British Association for Lung Research (BALR) provides a focus for exchange of ideas between all manner of respiratory researchers, basic scientists and clinicians alike, to ferment collaboration and to further fundamental pulmonary research. Active for over twenty years, the main aim of the society is to promote respiratory research throughout the UK. We also support early career researchers in the field. The BALR is a registered charity (SC010151).

Email: admin@balr.co.uk
Website: https://balr.co.uk

EXHIBITORS' INFORMATION

British Thoracic Society **Stand A**

British Thoracic Society (BTS) is the largest, most authoritative, and inclusive respiratory professional society in the UK, working to achieve better lung health for all. We have over 4,400 members, including respiratory doctors, nurses, physiotherapists, physiologists, pharmacists, scientists, and other professionals with a respiratory interest. We aim to raise awareness of the impact of lung disease and champion the respiratory workforce.

BTS strongly believes in working collaboratively to influence policy and services to help reduce the health and economic burden of lung disease. We have comprehensive education and clinical workstreams with the goal of developing and promoting evidence-based care. We publish guidelines, quality standards, clinical statements, and run national audits. Our members all have a drive to improve patient outcomes, and supporting our members to improve the health of respiratory patients is central to all that we do.

Email: bts@brit-thoracic.org.uk
Website: https://brit-thoracic.org.uk

Broncus / Uptake Medical **Stand number 23**

The Archimedes® Navigation System integrates CT and fused fluoroscopy to provide 3D, real-time Guided Transbronchial Needle Aspiration (TBNA) and Bronchoscopic Trans-Parenchymal Nodule Access (BTPNA). The system combines nodule, vessel and airway mapping technology to ensure a safe and efficient Guided TBNA or BTPNA procedure. Archimedes is the only navigation system that provides multiple bronchoscopic techniques to access a nodule regardless of size, location or the presence of a bronchus sign.

The InterVapor® System is designed to deliver targeted Bronchoscopic Thermal Vapor Ablation (BTVA®) to ablate the most diseased lung segments and results in a reduction in emphysematous tissue and volume.

Email: sales@broncus.com
Website: https://broncus.com

Chiesi **Stand number 4**

Based in Parma, Italy, Chiesi Farmaceutici is an international research-focused biopharmaceuticals group with over 85 years' experience in the pharmaceutical sector operating in 30 countries, employing around 6,000 people. Chiesi develops and markets innovative therapeutic solutions in respiratory health, rare diseases, and specialty care. The company's mission is to improve people's quality of life and act responsibly towards both the community and the environment. As a certified B Corp since 2019, Chiesi is part of a global community of businesses that meet high standards of social and environmental impact. Chiesi Limited is headquartered in Manchester employing over 400 people.

Email: Contact.uk@chiesi.com
Website: https://chiesi.uk.com

Creo Medical **Stand number 12**

Creo Medical is improving patient outcomes by delivering pioneering solutions across the world, empowering healthcare professionals through our range of trusted high quality medical devices. Our advanced energy is addressing unmet needs by providing solutions for indications previously requiring a surgical intervention. By partnering with industry leaders, we are providing intelligent solutions today through the technology of tomorrow.

Email: Neil.Bottomley@creomedical.com
Website: https://creomedical.com

CSL Vifor **Stand number 9**

CSL Vifor is a global partner of choice for pharmaceuticals and innovative, leading therapies in iron deficiency, dialysis and nephrology & rare disease. We specialize in strategic global partnering, in-licensing and developing, manufacturing and marketing pharmaceutical products for precision healthcare, aiming to help patients around the world lead better, healthier lives. Headquartered in St. Gallen, Switzerland, CSL Vifor also includes the joint company Vifor Fresenius Medical Care Renal Pharma (with Fresenius Medical Care). The parent company, CSL (ASX:CSL; USOTC:CSLLY), headquartered in Melbourne, Australia, employs 30,000 people and delivers its lifesaving therapies to people in more than 100 countries. For more information about CSL Vifor visit, www.cslvifor.com

Website: https://cslvifor.com

DC Action **Stand R**

Telomere Biology Disorders (TBD), including Dyskeratosis Congenita (DC), are inherited conditions that cause premature ageing of cells and organs due to telomere repair abnormalities. Mutations in a number of telomere maintenance genes have been identified that can lead to lung fibrosis, bone marrow failure, liver cirrhosis and other clinical conditions. TBDs can severely affect children, as well as adults later in life.

DCAction supports people living with Telomere Biology Disorders through:
ADVOCACY
Our advocacy work focuses on research and expert care and treatments.
EDUCATION
We aim to raise awareness of DC amongst medical professionals, patients and the public.
SUPPORT
We provide support and advice for people affected by Dyskeratosis congenita and Telomere Biology Disorders.
DC Action is a UK Registered Charity (Charity Number 1167150)
Email: jane@dcaction.org
Website: https://DCAction.org

Erbe Medical UK Ltd **Stand numbers 10 & 11**
Erbe, a family-owned and operated business, develops, manufactures and markets surgical systems for professional use in various medical disciplines globally. The portfolio includes devices and instruments for electrosurgery, thermofusion, plasmasurgery, cryosurgery and hydrosurgery; combining these technologies, innovative applications become possible, particularly in general surgery, gastroenterology, gynaecology, pulmonology and urology.
Erbe strives to be the market leader in electrosurgery and continues to innovate and improve surgical equipment and applications for over 100 years, since the first electrosurgical unit was developed in Germany in 1923. Erbe works closely with clinicians and specialists and believes that this is the key to developing innovative medical technology that truly makes a difference to patient outcomes.
Email: sales@erbe-uk.com
Website: https://Erbe-Med.com

Fisher & Paykel **Stand number 25**
Fisher & Paykel Healthcare are a leading designer, manufacturer and marketer of products and systems for use in acute and chronic respiratory care, surgery and treatment of obstructive sleep apnoea. Driven by a strong sense of purpose, we're working to improve patient care and outcomes through inspired and world-leading healthcare solutions. The needs of our customers and their patients drive everything we do. We call this commitment Care by Design.
Our medical devices and technologies help clinicians deliver the best possible patient care. They enable patients to transition into less-acute care settings, recover more quickly and avoid more serious conditions.
Email: customerservice@fphcare.co.uk
Website: https://fphcare.com

GSK **Stand number 1**
GSK has been a leader in respiratory for more than 50 years, helping patients with respiratory disease better manage their condition. Working in collaboration with the scientific community, GSK remains at the cutting edge of scientific research into innovative medicines with the aim of helping patients' symptoms and reduce the risk of their disease. For further information for UK HCPs, please visit https://gskpro.com/en-gb/
Website: https://gskpro.com/en-gb/

Guardant Health **Stand number 18**
Guardant Health are dedicated to helping patients at all stages of cancer live longer and healthier lives through the power of blood tests and the data they unlock – from informing better treatment in patients with advanced cancer, to new ways of monitoring recurrence in cancer survivors, and screening to find cancer at its earliest and most treatable stage in the general population.
Email: Clientserviceseurope@guardanthealth.com
Website: https://guardanthealth.co.uk

Insmed **Stand numbers 31 & 32**
Insmed is a global biopharmaceutical company on a mission to transform the lives of patients with serious and rare diseases. We are powered by purpose, a purpose to serve patients and their families with unwavering dedication. A purpose to find solutions where there were none before. A purpose to do what's right, even when it isn't easy. A biotech company that empowers great people to deliver with a profound sense of urgency and compassion, life-altering therapies to small patient populations experiencing big health problems, transforming the lives of patients living with serious and rare diseases.
Email: juliet.henderson@insmed.com
Website: https://insmed.com

Inspire Medical Systems **Stand number 16**
Inspire Medical Systems is a company involved in the treatment of moderate to severe Obstructive Sleep Apnoea with a hypoglossal nerve stimulation device

that sits under the skin. The company was founded in 2007 and almost 50,000 patients have been treated around the world. Patient satisfaction is 94%. This was the world's first fully implantable device approved by the FDA for the treatment of OSA. Robust clinical data proving safety, efficacy and effectiveness is now out to 5 years and usage has commenced in the NHS. It is specifically for patients suffering from OSA who have become intolerant to CPAP.

Tel: +44 (0) 7796 691 880 (Mark Chambers)
Email: markchambers@inspiresleep.com
Website: https://inspiresleep.com/

It's Interventional **Stand number 34**

We are It's Interventional, an SME based in Sheffield. Our aim is to be different in an increasingly undifferentiated world. We select proven, clinically effective medical devices and are proud to be exhibiting the Aspira™ Drainage System, a long-term indwelling catheter. Designed for palliative management of recurrent pleural effusion & malignant ascites, Aspira™ is IPC evolved. Featuring new methods of catheter implant, designed for easier adoption and a cleaner procedure, as well as improved drainage option, Aspira™ is designed to maximise patient comfort and convenience during home care.
Please visit us at stand no: 34 or visit www.itsinterventional.com for more information on Aspira™.

Email: hello@itsinterventional.com
Website: https://itsinterventional.com

LifeArc **Stand number 38**

LifeArc is a self-funded, non-profit medical research organisation. We take science ideas out of the lab and help turn them into medical breakthroughs that can be life-changing for patients. We have been doing this for more than 25 years and our work has resulted in five licensed medicines, including cancer drug Keytruda, and a diagnostic for antibiotic resistance. Our teams are experts in drug and diagnostics discovery, technology transfer, and intellectual property. Our work is in translational science – bridging the gap between academic research and clinical development, providing funding, research and expert knowledge, all with a clear and unwavering commitment to having a positive impact on patient lives.

Email: info@lifearc.org
Website: https://lifearc.org

the limbic **Stand number 41**

the limbic is the leading news and medical education website for respiratory health clinicians in the UK. We believe that evidence-based medicine together with clinical expertise leads to better healthcare and optimal outcomes for patients. Through our news coverage and CPD we aim to support medical specialists by providing local context to the latest information on all aspects of their practice – from the clinical to the political...and the stories behind the people.
Register now for free at www.thelimbic.com

Email: Editor@thelimbic.com
Website: https://thelimbic.com

Medtronic **Stand number 20**

Medtronic develop groundbreaking healthcare technology solutions for the most complex and challenging conditions. Inspiring hope and new possibility in people all over the world.

Email: rs.csukireccc@medtronic.com
Website: https://medtronic.com

Mesothelioma UK **Stand S**

Who are we?

Mesothelioma UK is the national charity for anyone affected by mesothelioma. We exist to support people with mesothelioma to live better and live longer and to prevent mesothelioma happening to future generations. We do this by advocating for better treatment and care, enhancing quality of life, supporting research and amplifying the patient's voice.

How do we support cancer patients?

Mesothelioma UK's team of Clinical Nurse Specialists provide a large range of benefits including specialist expertise, increased access to clinical trials, better management of symptoms, and an overall increase in the quality of life for patients.
We also provide a number of other services. These include a Freephone Support Line, specialist benefits advice, a travel grant to support the cost of accessing clinical trials, a dedicated research centre at Sheffield University, and a comprehensive information service accredited by the Patient Information Forum.

Email: info@mesothelioma.uk.com
Website: https://mesothelioma.uk.com

National Respiratory Audit Programme (NRAP) **Stand B**

The National Respiratory Audit Programme (NRAP) aims to improve the quality of the care, services and clinical outcomes for patients with respiratory disease across England and Wales. It does this by using data submitted to the audit to support and train clinicians, empowering people living with respiratory disease, and their carers, and informing national and local policy. NRAP has a track record of delivery and is critical in assessing progress against the NHS Long Term Plan. To find out more about the NRAP visit our website https://www.rcplondon.ac.uk/projects/national-respiratory-audit-programme-nrap.

Email: NRAPinbox@rcp.ac.uk
Website: https://rcplondon.ac.uk/projects/national-respiratory-audit-programme-nrap

NHS England LeDer Team **Stand C**

The Health Improvement team within NHS England's national Learning Disability and Autism programme aims to improve care, address health inequalities and prevent premature mortality. LeDeR (learning from lives and deaths – people with a learning disability and autistic people) has reviewed the deaths of over 16,000 people with a learning disability and has more recently started reviewing the deaths of autistic people, to better understand the factors contributing to avoidable mortality and identify areas amenable to service improvement. Respiratory conditions are amongst the most common causes of death for people with a learning disability, making this a priority area for improvement activity.

Email: england.lederprogramme@nhs.net
Website: https://leder.nhs.uk/about

NHS Wye Valley Trust **Stand number 37**

Wye Valley Trust (WVT) Respiratory Consultant vacancies

WVT is located on the border with Wales in the shadow of the Black Mountains, we provide acute and community services across Herefordshire and into parts of Powys and run Hereford County Hospital and the community hospitals in Bromyard, Leominster and Ross-on-Wye.

We are a progressive and forward looking trust with ambitious plans to improve quality and integrate patient pathways through close collaborative working with our partners to deliver the quality of care we'd want for our family and friends.

We can offer a great work-life balance and have a fine tradition of working with staff to help them achieve their full potential.

Email: Ingrid.DuRand@wvt.nhs.uk (Clinical Lead, Respiratory)
Website: https://wyevalley.nhs.uk/

Niox Healthcare Ltd **Stand number 8**

NIOX® develops and produces state-of-the-art technology for asthma diagnosis and management. Our aim is to improve the lives of millions of people suffering from asthma by helping physicians assess patients more accurately. Our market-leading device, NIOX VERO®, measures the level of fractional exhaled nitric oxide (FeNO) in the breath, with results proven to help with asthma treatment.

We're celebrating 25 years of NIOX® technology in 2023! As the first to market with a portable analyser to maximise access to FeNO and nNO testing, we're proud to say NIOX VERO® remains the gold standard device, with nearly 50 million tests performed worldwide and counting. NIOX.com MKT-PRM-UK-0029

Email: info@niox.com
Website: https://niox.com

NTM Network UK **Stand Q**

NTM Network UK is a multidisciplinary network of over 400 healthcare professionals and researchers from 170 centres across all four UK nations. Our purpose is to enable research platforms and provide evidence to improve and maintain the quality of care for people affected by both pulmonary and extrapulmonary NTM disease. We are currently developing the first Standards of Care for People Living with NTM Disease in the UK.

Email: admin@ntmnetworkuk.com
Website: https://ntmnetworkuk.com

NTM Patient Care UK **Stand Q**

NTM Patient Care UK was founded by two NTM patients and two specialist NTM physicians in response to the need for improved awareness and understanding of Non-tuberculous Mycobacteria (NTM) infections and treatment, in both the patient population and the multi-disciplinary teams who provide diagnoses, treatment and support to these patients. The charity

aims to provide an access point for information and support for NTM patients and their wider community. NTM Patient Care UK works with the multi-disciplinary healthcare professional (HCP) teams involved in NTM care to ensure continued improvement to the understanding of patient needs.
Email: info@ntmpatientcare.uk
Website: https://ntmpatientcare.uk

Nuvoair **Stand number 29**
NuvoAir is an innovative digital health company that partners with the NHS to help patients with lung conditions to understand and manage their health from home.
Specialist monitoring
Through high-quality remote monitoring using a range of biomarkers, we work with secondary and tertiary NHS care teams to understand and manage complex cardiopulmonary conditions such as COPD, severe asthma, and cystic fibrosis.
Our devices remotely collect biomarkers to empower the best clinical decisions, while being easy to use for patients from the comfort of their homes.
Diagnostic pathways
Our remote assessments, facilitated by respiratory physiologists, increase the capacity of clinical teams to aid accurate diagnosis of conditions such as asthma and COPD.
NuvoAir is your value-based care provider that empowers and engages people. We deliver continuous, proactive, and personalised care at-scale through a virtual care model that integrates the best of multidisciplinary care, connected devices to improve outcomes and reduce costs.
Email: uksales@nuvoair.com
Website: https://nuvoair.com/

Olympus **Stand number 17**
At Olympus, we are committed to Our Purpose of making people's lives healthier, safer and more fulfilling. As a global medical technology company, we partner with healthcare professionals to provide best-in-class solutions and services for early detection, diagnosis and minimally invasive treatment, aiming to improve patient outcomes by elevating the standard of care in targeted disease states.
Olympus offers a variety of products and system solutions for Respiratory Endoscopy, constantly seeking to improve lung cancer outcomes, among other diseases. Olympus is committed to developing new technologies, products, services and solutions that comply with the toughest industry standards.
Email: customer.service@olympus.co.uk
Website: https://www.olympus.co.uk/medical

Orion Pharma **Stand number 14**
Orion Pharma (UK) Ltd is a subsidiary of Orion Corporation, pharmaceutical company based in Finland. We are continuously developing new drugs and treatment methods. The core therapy areas of our pharmaceutical R&D are oncology and pain. UK therapy areas include Respiratory, Women's health and Neurological disorders.
www.orionpharma.co.uk
July 2023/CORP-233(3)
Email: UK.MedicalInformation@orionpharma.com
Website: https://orionpharma.co.uk

PCD Support UK **Stand E**
PCD Support UK is a volunteer-led charity helping those affected by Primary Ciliary Dyskinesia (PCD). We talk about PCD as widely as possible and we champion research to improve its diagnosis, management and treatment. We do this by providing support to people affected by PCD, sharing information about PCD via our website and social media, bringing PCD to the attention of the medical community and the public, and supporting the NHS and other bodies to ensure patients have access to diagnostic services and ongoing care. We also fundraise to support these activities. Visit our website to find out more!
Email: chair@pcdsupport.org.uk
Website: https://pcdsupport.org.uk

Rocket Medical **Stand number 6**
Rocket Medical has partnered the NHS for over 50 years, with our aim to help improve patient's lives. Come and visit us on our stand, where we can demonstrate how we can support your patient's treatment journey for pleural effusion or pneumothorax; including Rocket homecare for supporting patient's care from hospital into the home. For information about any of Rocket Medical's products please contact 0191 419 6949 or homecaresupport@rocketmedical.com or www.rocketmedical.com
Email: customerservices@rocketmedical.com
Website: https://rocketmedical.com

Sanofi **Stand numbers 3, 21 & 22**

We are an innovative global healthcare company, driven by one purpose: we chase the miracles of science to improve people's lives. Our team, across some 100 countries, is dedicated to transforming the practice of medicine by working to turn the impossible into the possible. We provide potentially life-changing treatment options and potentially life-saving vaccine protection to millions of people globally, while putting sustainability and social responsibility at the center of our ambitions.

Email: uk-mr@sanofi.com
Website: https://sanofi.co.uk

Stirling Anglian **Stand number 5**

Based in the UK, Stirling Anglian is committed to medicines optimisation. It has sourced and developed a portfolio of medicines to help the NHS curb waste – across a range of conditions that currently place unnecessary and avoidable pressure on NHS resources. At a time when there is such pressure on the NHS to reduce costs, we believe we offer a real and practical solution.

We work closely with stakeholders across the NHS to identify real-world problems and develop value-based solutions that support the delivery of efficient and cost-effective healthcare.

Website: https://stirlinganglianpharmaceuticals.com

Teva **Stand numbers 30 & 35**

Our medicines are taken by millions of UK patients, and we are proud to be one of the largest suppliers of medicines to the NHS. We supply medicines to treat a wide range of diseases and conditions – from multiple sclerosis, asthma, cancer, migraine and Chronic Obstructive Pulmonary Disease, to pain relief, cholesterol reducers and antibiotics. Our UK headquarters and distribution centre is located in Castleford, West Yorkshire. We also have additional offices and facilities in Harlow, Eastbourne, Runcorn and Larne. Learn more about Teva UK at www.tevauk.com

Email: customer.services@tevauk.com
Website: https://tevauk.com

Tracheo-Oesophageal Fistula Support (TOFS) **Stand P**

Tracheo-Oesophageal Fistula Support (TOFS) is an active support group for those born with oesophageal atresia/tracheo-oesophageal fistula (OA/TOF) and associated conditions. Once considered a paediatric illness, it's now evident that those born with OA/TOF may have respiratory issues throughout life. TOFS wants to engage with respiratory doctors for adults, with the aim of improving care for anyone born with these conditions so that they may live life unlimited. Chronic respiratory issues that OA/TOF patients may face include:

- Chronic cough
- Bronchomalacia
- Tracheomalacia
- Pneumonia
- Bronchiectasis
- Asthma
- Aspiration
- Sleep disruption

TOFS has recently published a management handbook for health professionals. Please visit our stand to find out more.

Website: https://tofs.org.uk

Trudell Medical International **Stand number 33**

Trudell Medical International works with patients, their caregivers and healthcare professionals to help patients all over the world breathe better and live fuller lives. We manufacture and globally market some of the leading brands in respiratory care including the AeroChamber* brand of spacers, Aerobika* OPEP devices, and AEROECLIPSE* BAN* nebulisers. "Breathe Better Live Fuller" is our mission to make patient focused, clinically validated AeroChamber* spacers and Aerobika* airway-clearance devices that are beloved by patients and healthcare providers.

Email: CustomerService@trudellmed.com
Website: https://trudellmed.com/uk/en-GB

Vertex **Stand number 28**

Vertex is a global biotechnology company that invests in scientific innovation to create transformative medicines for people with serious diseases.

Email: vertexmedicalinfo@vrtx.com

Vitalograph **Stand number 42**

Vitalograph is a global leader in respiratory diagnostics. We produce high quality, accurate and reliable, respiratory medical devices & services for primary, secondary healthcare and occupational health. We deliver successful clinical trials for leading pharmaceutical companies, biotechs and research organisations.

Email: info@vitalograph.co.uk
Website: https://vitalograph.com/

BTS/A+LUK/BALR Early Career Investigator Symposium

T1 ALTERATIONS IN VASOCONSTRICTOR BIOMARKERS PERSIST UP TO A YEAR POST-COVID-19 AND ARE ASSOCIATED WITH PULMONARY PATHOLOGY

[1]L Raman, [1]B Ahmetaj-Shala, [1]H Gashaw, [1]M Rickman, [2,3]A Singanayagam, [2,3]A Shah, [2,3]A Reed, [2,3]P Kelleher, [1]JA Mitchell, [2,3]PM George. *[1]National Heart and Lung Institute, Imperial College London, London, UK; [2]Royal Brompton and Harefield Clinical Group, Guy's and St Thomas' NHS Foundation Trust, London, UK; [3]Imperial College London, London, UK*

10.1136/thorax-2023-BTSabstracts.1

Introduction Persistent respiratory disease and endothelial dysfunction are recognised complications of severe COVID-19 infection. Using data from the PROSAIC-19 study, we explored whether alterations in vasoconstrictor biomarkers persist up to a year post-COVID-19 and whether these correlate with inflammatory cytokines or persistent pulmonary pathology.

Methods We studied 4 groups; healthy controls(n=11), acute COVID-19(n=8), 3–6 months post-COVID-19(n=44) and 12 months post-COVID-19(n=27). Plasma endothelin-1, ADMA and L-arginine were measured by commercial ELISAs. Cytokines were measured using Olink proximity extension immunoassays. The extent of interstitial abnormality on CT, lung function and St George's Respiratory questionnaire (SGRQ) scores were obtained for the post-COVID-19 groups. Clinical data were obtained from electronic patient records.

Results Endothelin-1 was significantly higher and the ratio of L-arginine:ADMA was significantly lower in acute COVID-19, 3–6 months and 12 months post-COVID-19 compared with healthy controls. ADMA was elevated at 3–6 months but not 12 months post-COVID-19. A small proportion had pulmonary hypertension, however there was no difference between endothelin-1 or ADMA in those patients ($p>0.05$). ADMA levels negatively correlated with DLco at 3–6 months post-COVID-19 (n=33; r=-0.41, p=0.02). This association was not sustained 12 months post-COVID-19. There was no association between ET-1, ADMA or L-arginine:ADMA and the radiological extent of disease, FVC or SGRQ score.

Troponin-I and d-dimer levels were elevated in acute COVID-19 but normal at 3–6 months post-COVID-19.

TNFα and IP10 were elevated in samples from acute COVID-19 but not 3–6 months post-COVID-19. Endothelin-1 positively correlated with IP10 (r=0.37, p=0.01), TNFα (r=0.32, p=0.01) and IL-8 (r=0.41, p=0.001) but not IFNg (r=0.24, p=0.06), suggesting that its persistent elevation may be related to ongoing type I interferon activation.

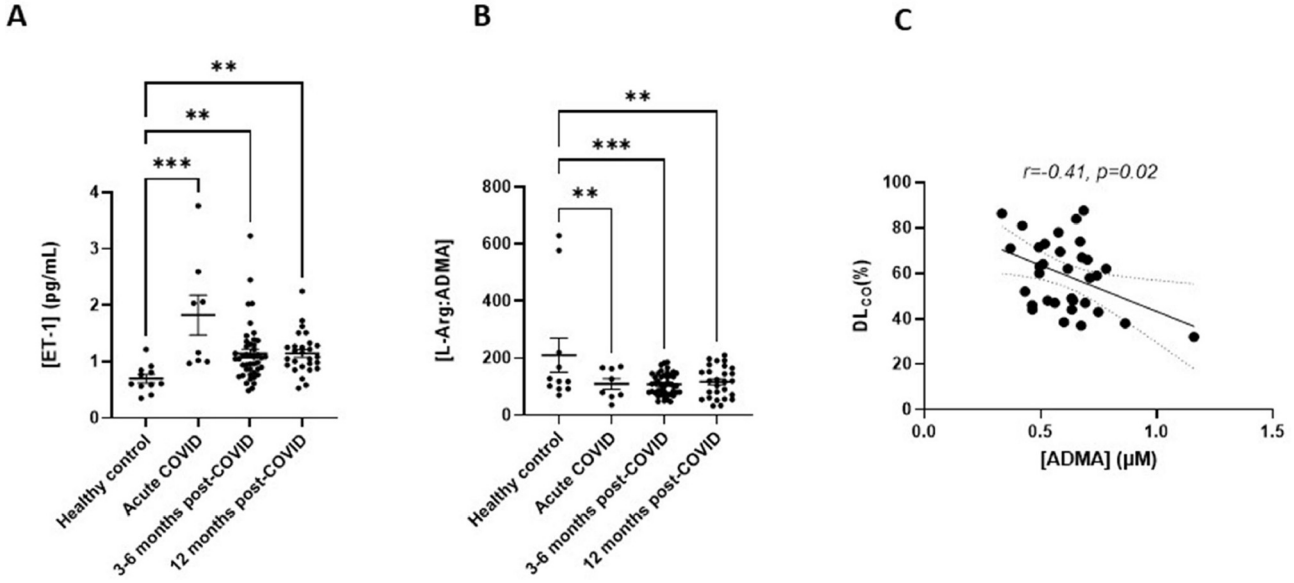
Conclusions This is the first demonstration of altered endothelial function up to 1 year post-COVID-19. The sustained elevation of endothelin-1 and reduction of L-arginine:ADMA may be useful to risk stratify patients for cardiovascular complications post-COVID and may represent therapeutic targets to protect against associated endothelial dysfunction. The inverse relationship between ADMA and DLco suggests shared pathways may drive these processes; patients with a persistent DLco deficit post-COVID-19 may be at risk of other vascular complications and are important to identify.

T2 A NOVEL DRUG TARGET: IL-36 SIGNALLING DRIVES INFLAMMATION AND POOR BACTERIAL CLEARANCE IN COPD

[1]HLB Owles, [1]JR Baker, [1]P Fenwick, [2]SL Elkin, [3]KC Kasmi, [1]PJ Barnes, [1]LE Donnelly. *[1]Imperial College London, London, UK; [2]Imperial College Healthcare NHS Trust, London, UK; [3]Boerhinger Ingelheim, Biberach, Germany*

10.1136/thorax-2023-BTSabstracts.2

The inflammatory cytokine IL-36γ is increased in COPD lungs, whereas its endogenous inhibitor IL-36 receptor antagonist (IL-36RA) is reduced. IL-36 receptor signalling drives neutrophilic inflammation. Macrophages are critical in modulating lung inflammation and clearance of bacteria but the effect of IL-36γ on macrophages is not fully understood.



Abstract T1 Figure 1 Endothelial markers are persistently altered up to 1 year post-COVID-19 and negatively correlate with Dlco (A) Kruskal-Wallis comparing the concentration of endothelin-1 in each patient group (B) One-way ANOVA comparing the ratio of L-arginine to ADMA in each patient group (n=90) *p<0.05, **p<0.0l, ***p<0.001. (C) Pearson correlation between ADMA and DLco (n=33 pairs)

To understand how IL-36γ affected macrophage function, non-smoker(NSm) and COPD monocyte-derived macrophages (MDM) were cultured with 100ng IL-36γ. IL-36γ reduced phagocytosis of H.influenzae by 23% in COPD MDM ($p<0.01$,$n=13$) but there was no effect on NSm MDM. Cytokine concentrations were measured in MDM supernatants by ELISA. IL-36γ did not affect IL-6, CXCL1 or CXCL8 secretion. Small airway fibroblasts (SAF) are a known effector cell of IL-36γ. To assess cross-talk between cell types, SAF supernatants were transferred onto MDM and cytokines measured in MDM supernatants. Untreated SAF did not stimulate MDM, however IL-36γ-treated SAF caused increased IL-6 (NT SAF vs IL36γ SAF: 2.8±0.4 vs 49.6±13.1ng/ml), CXCL1 (3.4 ±1.5 vs 14.1±4.9ng/ml) and CXCL8 (13.9±3.4 vs 53.3 ±11.0ng/ml) secretion from MDM.

Lung macrophages are a major source of IL-36RA. IL36RN expression was measured in monocytes and MDM. COPD monocytes had lower IL36RN expression than NSm (NSm:1.52±0.38 vs COPD:0.32±0.12ng/ml, $p<0.01$, $n=8$), suggesting an innate pre-disposition towards low IL-36RA in COPD. IL36RN expression increased on monocyte differentiation to MDM, with NSm MDM having 5-fold higher IL36RN expression than COPD MDM ($p<0.01$). To investigate the mechanism regulating IL-36RA expression, MDM were incubated with PIK75 (PI3K inhibitor), UO0126 (ERK inhibitor), VX745 (p38 inhibitor), SP600125 (JNK inhibitor) and TPCA1 (NF-κB inhibitor) for 24h and IL36RN measured. Only PIK75 increased IL36RN expression (NT:0.63±0.33, PIK75:1.63 ±0.75, $p<0.05$, $n=11$), indicating that PI3K signalling mediates its reduced expression in COPD.

This study demonstrates that IL-36γ causes a cascade of inflammation and impairs bacterial clearance in COPD. As IL-36γ is secreted in response to viral stimuli, the effects of IL-36γ described above could be important in pathogenesis of COPD exacerbations and secondary bacterial infection. IL36RN is reduced in COPD macrophages, which may be due to PI3K expression which is increased in COPD: Further work is needed to identify how this pathway regulates IL36RN to identify a potential drug target.

T3 SINGLE CELL ANALYSIS REVEALS MECHANISMS OF AZITHROMYCIN AND REGULATION OF MUCOSAL IMMUNITY IN SEVERE ASTHMA

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10.1136/thorax-2023-BTSabstracts.3

Introduction Azithromycin reduces exacerbations in severe asthma,[1] particularly if *Haemophilus influenzae* is present in the airways. Though this suggests antibacterial effects predominate, other antibiotics are not effective, implying other mechanisms including azithromycin's additional antiviral and immunomodulatory functions may be important, whilst antimicrobial resistance is a significant concern. Our metagenomic studies showed airway dominance by specific potentially pathogenic organisms as a common 'treatable trait' in severe asthma.[2] We sought to determine the azithromycin mechanisms of action to enable better targeting azithromycin therapy, or non-antibacterial macrolide compounds in airways disease.

Objective Characterise changes in airway mucosal immunology and microbiology using bronchoscopy before and after therapeutic intervention with azithromycin.

Methods Patients with severe asthma despite optimised inhaled therapy underwent detailed clinical phenotyping and bronchoscopy before and 3 months post-initiation of clinically-indicated azithromycin (250 mg, three times weekly). Endobronchial samples and nasal brushings underwent single

Abstract T3 Table 1 Gene ontology (GO) overrepresentation analysis using differentially expressed genes pre- and post-azithromycin therapy in severe asthma; gene set enrichment analysis (GSEA) performed on all GO pathways between pre- and post-azithromycin therapy. The ten most enriched pathways for upregulated (top) and downregulated genes (bottom) are shown. NES, normalised enrichment score; p, p value; p adj, adjusted p value (Benjamini- Hochberg, FDR 0.05)

	GO Pathway	Gene ranks	NES	p	p adj
Upregulated by AZM	Extracellular matrix component		2.23	1.2 E-9	5.1 E-7
	Extracellular matrix		1.93	1.3 E-9	5.1 E-7
	Proteinaceous extracellular matrix		1.95	1.0 E-8	2.6 E-6
	Tube formation		2.07	3.0 E-7	5.0 E-5
	Heart development		1.73	5.5 E-7	8.4 E-5
	Morphogenesis of embryonic epithelium		2.10	6.2 E-7	9.2 E-5
	Skeletal system development		1.72	1.1 E-6	1.4 E-4
	Stem cell differentiation		1.95	1.7 E-6	2.1 E-4
	Tube development		1.63	3.0 E-6	3.1 E-4
	Organic anion transport		1.69	3.0 E-6	3.1 E-4
Downregulated by AZM	Immune effector process		-1.83	2.5 E-9	8.5 E-7
	Positive regulation of immune response		-1.82	7.2 E-10	3.4 E-7
	Interferon gamma mediated signaling pathway		-2.62	1.9 E-10	1.0 E-7
	Leukocyte activation		-1.94	1.3 E-10	7.7 E-8
	Defense response to other organism		-1.95	1.0 E-10	7.3 E-8
	Inflammatory response		-1.97	4.4 E-11	3.8 E-8
	Protein folding		-2.33	1.0 E-12	1.1 E-9
	Unfolded protein binding		-2.70	6.6 E-13	9.5 E-10
	Cytokine mediated signalling pathway		-2.13	9.3 E-15	2.0 E-11
	Innate immune response		-2.14	2.5 E-16	1.1 E-12
		0 4000 8000 12000 16000			

cell immune-profiling (10X genomics). Bronchoalveolar lavage (BAL) and nasal samples were stored for metagenomic sequencing with Nanopore and immunoassays.

Results Eleven patients (mean age±SD, 51.8±16.8 years; 63% male) with severe asthma and high symptom burden (mean ACQ-5±SD, 2.9±1.1) underwent pre-/post-azithromycin bronchoscopy. *H. influenzae* was isolated in 36% on BAL culture pre-azithromycin. No pathogenic organisms were isolated post-azithromycin therapy. Analyses performed on 55,962 airways cells (n=6) revealed significant downregulation of gene ontology categories related to innate immune defence responses and cytokine mediated signalling pathways, with upregulation of genes encoding extracellular matrix components (p adj$<1x10^{-7}$) post-azithromycin therapy (table 1). This corresponded to reduced expression of CXCL10 and S100A8, with upregulation of CST1 and mast cell CPA3. CD8 T cells underwent the greatest transcriptional reprogramming, downregulating heat shock proteins and pathways implicated in T cell activation and cytokine responses.

Conclusions In addition to known antimicrobial effects, single cell transcriptomics reveals azithromycin suppresses Th1 and neutrophilic airways inflammation, modulates T cell functions and upregulates corticosteroid responsiveness markers (CST1, CPA3). In ongoing work, transcriptomic data from the full study population (n=11) will be analysed and integrated with single cell T cell repertoires, comparing upper and lower airway responses, and integrated with airway metagenomics.

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2. http://dx.doi.org/10.2139/ssrn.4473145

T4 THE RESPIRATORY MYCOBIOME IS PERTURBED DURING VIRAL INFECTION IN COPD AND DRIVES TYPE 2 IMMUNOPATHOLOGY AND EXACERBATION SEVERITY

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10.1136/thorax-2023-BTSabstracts.4

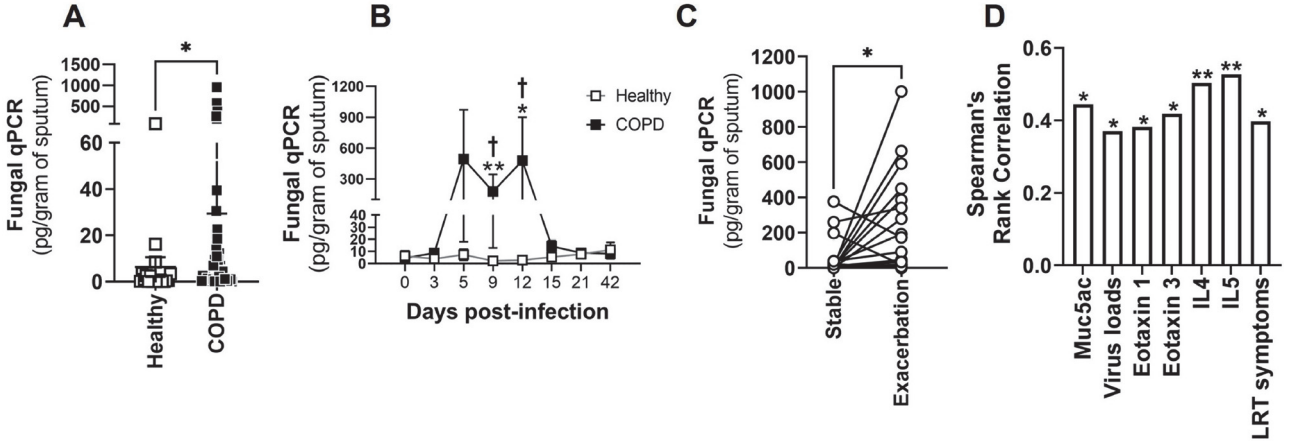
Introduction The existence of resident fungal communities ('mycobiome') within the lungs has only recently been discovered, and their role in health and disease remains unknown. Mycobiota are altered in chronic obstructive pulmonary disease (COPD), but the consequences of these perturbations have not been characterised. Given that fungi can promote type 2 inflammation and mucus hypersecretion, features of COPD that are augmented during exacerbations, we hypothesised that the mycobiome could be a key determinant of exacerbation pathogenesis.

Methods We quantified total sputum fungal burden by qPCR at baseline and during infection in separate cohorts of experimentally induced and naturally occurring viral exacerbations of COPD. Fungal burden was correlated with measures of immunopathology and clinical exacerbation severity. Subsequently, we modelled fungal dysbiosis in mice through administration of low dose *Aspergillus Fumigatus* (a major constituent of the COPD airway mycobiome) prior to infection with rhinovirus A1 to investigate effects upon pulmonary immune responses.

Results Individuals with COPD across the two studies (n=52) had increased sputum fungal burden compared to healthy control subjects (n=19) at stable state (figure 1A). Experimental rhinovirus infection led to increased sputum fungal loads from baseline in COPD subjects but not healthy controls with significant differences between these groups at day 9 and 12 post-infection (figure 1B). Similarly, sputum fungal burden increased during virus-associated naturally occurring exacerbations (figure 1C). During experimental challenge, sputum fungal loads positively correlated with viral loads, type 2 inflammatory responses including eotaxin 1/3, IL-4, IL-5 and Muc5ac (figure 1D) and clinical exacerbation severity (lower respiratory tract symptom scores) (figure 1D).

In mice, administration of low dose *Aspergillus* to model airway fungal dysbiosis enhanced rhinovirus replication at 24 hours post-infection. *Aspergillus* administration also elevated recruitment of lung neutrophils, eosinophils and induction of IL-13 and Muc5ac proteins by rhinovirus (all P<0.05).

Conclusion The airway mycobiome is altered in COPD and further perturbed by respiratory viral infections. Mycobiota may be an important driver of type 2 immunopathology and severity during virus-induced COPD exacerbations. Our



Abstract T4 Figure 1 Viral infection perturbs the airway mycobiome in COPD. (A) sputum fungal burden in individuals with COPD vs healthy subjects across the two studies. (B) sputum fungal burden following experimental rhinovirus A1 challenge in COPD and healthy subjects (* COPD vs healthy, † COPD baseline vs COPD day 9/12). (C) sputum fungal burden during naturally occurring exacerbations. (D) correlation analysis between sputum fungal burden and markers of immunopathology and clinical severity during experimentally-induced exacerbation. LRT: lower respiratory tract

ongoing profiling of fungal community composition within these studies will shed further light on the key mycobiota that may be amenable to future therapeutic targeting.

T5 UNDERSTANDING THE EXTRACELLULAR IMMUNOPROTEASOME IN THE ACUTE RESPIRATORY DISTRESS SYNDROME

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10.1136/thorax-2023-BTSabstracts.5

The constitutive proteasome and its inflammation-driven derivative, the immunoproteasome (IP), perform important intracellular proteolytic functions, including terminal protein degradation and antigen processing. However, the IP is increasingly recognised as being present in the extracellular space during pathology, though its mechanisms of release and functions are unknown. The lungs of patients with acute respiratory distress syndrome (ARDS) are flooded with complex oedema fluid and characterising the pathogenic components within this extracellular environment may help identify therapeutic targets. We hypothesised that extracellular IP is a feature of and plays a role in ARDS.

We show that the levels and activity of IP are elevated in bronchoalveolar lavage fluid from patients with ARDS, the human healthy volunteer LPS model and the murine inhaled LPS model. Furthermore, in a series of *in vitro* experiments, we demonstrate that IP is released constitutively from macrophage-like cells and primary human macrophages. Importantly, this release can be augmented by activation of the NLRP3 and AIM2 inflammasomes. Using both pharmacological and genetic strategies we show that targeting the inflammasome pathway abrogates IP release from macrophages, confirming the importance of this pathway in IP release. We next sought to identify extracellular substrates of IP, the cleavage of which might contribute to the inflamed environment of the lung in ARDS. We report that IP is able to cleave several anti-inflammatory proteins that are present in the ARDS lung, including antiproteases and the phospholipid-binding protein Annexin A1.

In conclusion, extracellular IP is a feature in human ARDS and models of ARDS. We have identified a potential mechanism of release of IP, which is closely linked to inflammasome activation, and postulate that extracellular IP may play a pro-inflammatory role in the acutely inflamed lung.

T6 GENOME-WIDE MUTAGENESIS SCREENS IDENTIFY REGULATORS OF CELLULAR IRON METABOLISM AND FERROPTOSIS

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10.1136/thorax-2023-BTSabstracts.6

Introduction and Objectives Regulation of iron metabolism is essential for lung health, with mutations in the gene encoding iron regulatory protein 2 (IRP2, which helps maintain cellular iron homeostasis), being associated with the development of COPD. Increased IRP2 protein levels are found in the lungs of patients with COPD and increased iron in BAL fluid from these patients is associated with exacerbation risk. Ferroptosis (iron-dependent cell death), can be induced by cigarette smoke and may promote COPD pathogenesis. Dysregulated iron metabolism is also found in non-small cell lung cancer and pulmonary fibrosis. Better understanding how cells regulate iron levels therefore represents a promising avenue for lung research.

Methods A549 lung adenocarcinoma and HeLa cells were modified by CRISPR/Cas9 to add a fluorescent tag to IRP2, creating dynamic and responsive iron-reporter cell lines. These were used in genome-wide forward genetic screens to identify genes that regulate cellular iron homeostasis.

Results 122 unique genes were classed as significant hits (FDR <0.25), of which 64 can be mapped to known iron-regulatory pathways, including transferrin-dependent iron uptake, iron-sulfur cluster synthesis and ferritin breakdown. SETD2, a histone methyltransferase which can be mutated in lung adenocarcinoma and mesothelioma, was identified as a novel top hit in A549 cells, providing the first example of a chromatin modifier as a mediator of iron levels. SETD2 depletion leads increased levels of the cargo receptor NCOA4 (responsible for ferritin breakdown), intracellular iron depletion and activation of the IRP2 response to promote iron uptake. As a regulator of alternative splicing, SETD2 loss is further associated with the differential expression of NCOA4 isoforms. Finally, certain SETD2 mutant cancer cell lines are more resistant to ferroptosis, whilst knockdown of SETD2 promotes resistance in wild type lines.

Conclusions We establish a robust reporting system for intracellular iron levels in patient-derived lung cancer cell lines, definitively map the cellular pathways of iron metabolism, identify novel regulators of iron homeostasis, and determine their impact on the induction of ferroptosis. SETD2 loss of function mutations, which are common in cancer, may promote resistance to ferroptosis, with potentially important implications for future therapies targeting this cell death pathway.

'The drugs do work!' – New treatments in cough

S1 A PHASE 3B TRIAL OF GEFAPIXANT, A P2X3-RECEPTOR ANTAGONIST, IN WOMEN WITH CHRONIC COUGH AND STRESS URINARY INCONTINENCE

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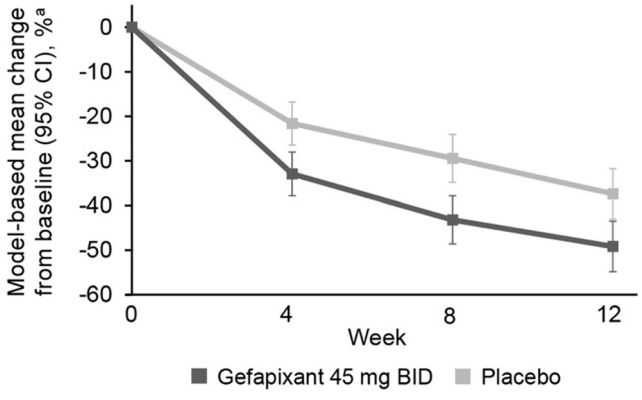
10.1136/thorax-2023-BTSabstracts.7

Introduction and Objectives The majority of women with chronic cough experience cough-induced stress urinary incontinence (cSUI), or involuntary loss of urine on coughing[1]; however, this complication of cough is underappreciated. This multicenter, randomized, placebo-controlled phase 3b trial (NCT04193176) investigated gefapixant in women with refractory or unexplained chronic cough (RCC/UCC) and cSUI.

Methods Adult women with RCC/UCC for ≥12 months and pure/predominant SUI for ≥3 months were enrolled. Additional inclusion criteria were ≥40-mm cough severity visual analog scale score (100-mm scale) at screening and placebo run-in, ≥2 cSUI episodes/day before placebo run-in and randomization, and positive cough stress test for SUI at screening. After screening and a 2-week, single-blind, placebo run-in, participants were randomized to gefapixant 45 mg twice daily (BID) or placebo for 12 weeks. Change in frequency of self-reported cSUI episodes from baseline to Week 12 (measured as a 7-day daily average using the Incontinence Diary) was the primary endpoint. An exploratory endpoint was change in Cough Severity Diary (CSD) scores from baseline to Week 12. Safety and tolerability were also evaluated.

Results Of 375 women, 190 and 185 were randomized to gefapixant 45 mg BID or placebo, respectively. Mean age (~56–57 years), cough duration (~5.1–5.2 years), SUI duration (~3.6–4.5 years), and number of daily cSUI episodes (~4.7 episodes/day) were similar between groups at baseline. At Week 12, treatment with gefapixant 45 mg BID resulted in greater model-based mean (95% confidence interval [CI]) reductions in daily cSUI episodes (52.76% [47.09, 58.44]) compared with placebo (41.09% [35.45, 46.74]; figure 1), with an estimated treatment difference (95% CI) of −11.67% (−19.67, −3.67; P=0.004). Mean weekly CSD scores at Week 12 were also reduced compared with placebo, with an estimated treatment difference (95% CI) of −0.44 (−0.85, −0.03). Adverse events were reported in 69.7% and 37.4% of women in the gefapixant and placebo groups, respectively, with no serious treatment-related adverse events.



Abstract S1 Figure 1 Mean weekly change in cSUI episodes. BID, twice daily; cSUI, cough-induced stress urinary incontinence. [a]Based on the longitudinal analysis of covariance model consisting of the percent change from baseline in mean weekly overall incontinence episodes at each postbaseline visit as a response

Conclusions After 12 weeks of treatment, gefapixant was superior to placebo in reducing mean daily cSUI episodes and improving cough severity in women with RCC/UCC and cSUI, with a safety profile similar to previous studies.

REFERENCE

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Please refer to page A282 for declarations of interest related to this abstract.

S2 PACIFY COUGH: A RANDOMISED, DOUBLE-BLIND, PLACEBO-CONTROLLED, TWO-WAY CROSSOVER TRIAL OF MST FOR THE TREATMENT OF COUGH IN IDIOPATHIC PULMONARY FIBROSIS

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10.1136/thorax-2023-BTSabstracts.8

Introduction Idiopathic pulmonary fibrosis (IPF) is a progressive fibrotic lung disease. The majority of patients with IPF report cough which is associated with significant negative physical, social and psychological consequences. At present there are no approved treatments for IPF-related cough. We evaluated the effect of low dose controlled-release morphine sulfate (MST) as an antitussive therapy in individuals with IPF.

Design PulmonAry Fibrosis (PAciFy) Cough was a randomised, double-blind, placebo-controlled, two-way crossover trial of MST in subjects with IPF. Patients were randomised (1:1) to either placebo twice daily or MST 5 mg twice daily for 14 days. Patients then underwent crossover after a 7-day washout period. The primary endpoint was percent change in objective awake cough frequency at day 14 of treatment. The primary endpoint was percent change in objective awake cough frequency at day 14 of treatment in the intention-to-treat population. Secondary endpoints included change from baseline in patient reported outcomes (cough VAS, Leicester Cough Questionnaire [LCQ], Dyspnoea 12, Living with IPF [L-IPF] questionnaires). This study was registered at ClinicalTrials.gov, NCT04429516.

Results Among the 44 patients who were randomized (mean age 71 years; 70% men), 43 completed the morphine arm and 41 completed the placebo arm. In the ITT analysis, MST reduced awake cough frequency by 39.4% compared to placebo (95% CI, -54.4 to -19.4; P < 0.001). The proportion of responders was greater in the MST arm (25/43) compared to placebo (odds ratio 2.48, [95% CI 1.01 to 5.9]). Furthermore, MST treatment led to improvements in cough VAS (-16.1mm, P < 0.001), LCQ (1.8 points, P < 0.001), L-IPF impacts (-5.2, P = 0.033) and L-IPF cough domain (-10.8, P < 0.001). The main side effects reported were nausea (14%) and constipation (21%). One serious adverse event (death) occurred during the placebo arm, the cause of which was not related to trial drug.

Conclusion MST is an effective antitussive in patients with IPF. Given the established safety profile of morphine in IPF these findings are rapidly translatable into clinical practice.

S3 GEFAPIXANT EFFICACY AND SAFETY IN PARTICIPANTS WITH HISTORY OF REFRACTORY OR UNEXPLAINED CHRONIC COUGH FOR ≥1 VS <1 YEAR

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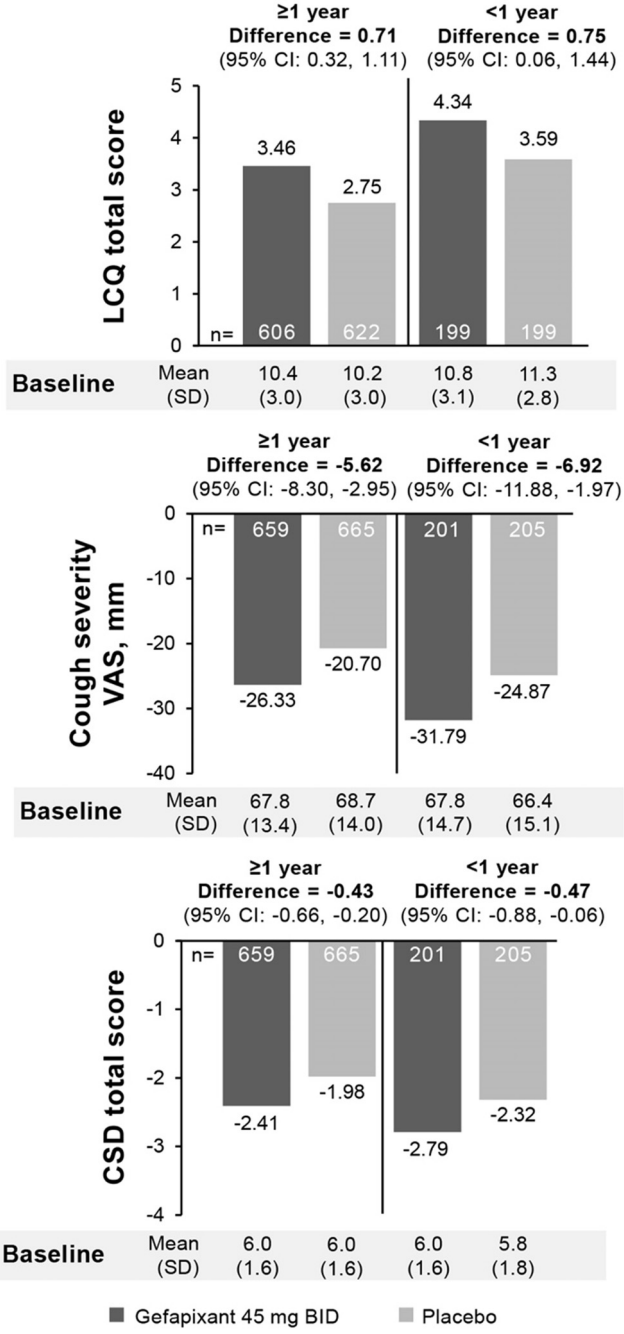
10.1136/thorax-2023-BTSabstracts.9

Introduction and Objectives The efficacy, safety, and tolerability of gefapixant were previously studied in two phase 3 trials of individuals with refractory or unexplained chronic cough (RCC/UCC) for ≥1 year and in a phase 3b trial of individuals with cough history >8 weeks and RCC/UCC for <1 year. This analysis compared baseline characteristics and efficacy and safety profiles of gefapixant 45 mg twice daily (BID) after 12 weeks of treatment in these trial populations to assess how these variables compare in individuals with RCC/UCC for ≥1 vs <1 year.

Methods Participants with RCC/UCC for ≥1 year in the phase 3 trials (NCT03449134 [COUGH-1], NCT03449147 [COUGH-2]; pooled) and with RCC/UCC for <1 year in the phase 3b trial (NCT04193202) who received gefapixant 45 mg BID or placebo were analyzed. Change from baseline in patient-reported outcomes, including Leicester Cough Questionnaire (primary endpoint for <1-year trial), cough severity visual analog scale, and Cough Severity Diary, were evaluated at Week 12. Safety was also evaluated at Week 12.

Results Demographics and baseline cough characteristics were similar across trials (≥1 year: gefapixant 45 mg BID, n=682; placebo, n=678; <1 year: gefapixant 45 mg BID, n=206; placebo, n=209), with the exception of cough duration (mean [standard deviation]: 11 [9] years vs 7 [3] months; median [range]: 8 [2–65] years vs 8 [1–12] months). Compared with placebo, the efficacy of gefapixant 45 mg BID in improving patient-reported outcomes was similar, regardless of RCC/UCC duration (figure 1). Adverse event (AE) incidences for gefapixant 45 mg BID were 80% (≥1 year) and 64% (<1 year); taste-related AEs occurred in 64% (≥1 year) and 54% (<1 year) of participants, and >95% of AEs were mild or moderate in both data sets.



Abstract S3 Figure 1 Model-based change from baseline[a] in patient-reported outcomes at Week 12 for gefapixant 45 mg BID vs placebo across trials of participants with RCC/UCC duration ≥1 year or <1 year. BID, twice daily; CSD, cough severity Diary; LCQ, Leicester Cough Questionnaire; RCC, refractory chronic cough; UCC, unexplained chronic cough; VAS, visual analog scale. [a]Based on longitudinal analysis of covariance consisting of change from baseline, with treatment, visit interaction of treatment by visit, sex, and baseline score included as covariates

Conclusions Results from this analysis suggest a similar and favorable response to gefapixant 45 mg BID regardless of RCC/UCC duration.

Please refer to page A282 for declarations of interest related to this abstract.

S4 THE IMPACT OF INHALED TUSSIVE AGENTS ON THE URGE TO COUGH IN REFRACTORY/UNEXPLAINED CHRONIC COUGH PATIENTS

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10.1136/thorax-2023-BTSabstracts.10

Background Patients with refractory or unexplained chronic cough (R/UCC) frequently describe unpleasant throat sensations including tickle and irritation associated with urge-to-cough.[1] The increase in UTC sensation impacts negatively on their quality of life.[1]

We aimed to compare experimentally evoked airway sensations to a range of inhaled irritants in healthy volunteers (HVs) with those with R/UCC.

Methods Gender matched R/UCC patients and HVs underwent 4 cough challenges including doubling doses of capsaicin and citric acid, reducing osmolarities of pH buffered hypotonic saline and placebo (0.9% saline) in a randomised, single blinded order, 2–7 days apart. On the first inhalation of each dose patients were asked to record a VAS score for UTC, tickle, irritation and taste. LME modelling was used to compare these scores in relation to cough frequency and irritant concentration throughout each challenge.

Results 20 R/UCC and 21 HVs were recruited. R/UCC patients were well established (median cough duration 13.5 years) with median (IQR) age 71 (56–76), were light ex or never smokers and had been off all anti tussive therapy for at least 1 month prior to the study. Baseline LCQ was 13.4 (10–16.2) and VAS cough severity was 49mm (27–76). R/UCC patients reported higher baseline UTC sensations than HVs ($p<0.001$) which continued in a dose dependant manner in each challenge and correlated strongly with the amount of coughing across capsaicin and citric acid challenge ($p<0.001$) (figure 1). This was also true of the novel pH buffered hypotonic saline challenge which evoked UTC sensations and coughing in R/UCC patients but not in HVs. This difference was seen at the threshold osmolality of 150 mOsm/kg ($p<0.001$). Placebo challenge did not evoke higher than baseline sensations in either group ($p=0.492$).

Conclusions R/UCC patients demonstrate higher baseline UTC sensations than HVs which correlate in a dose response manner to dose of inhaled tussive agents and correlates with amount of coughing in both groups. R/UCC patients demonstrated allotusia to hypotonic saline which also triggered UTC, tickle and irritation sensations in correlation with coughing in this group, an effect which was not seen in HVs.

REFERENCE

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S5 EARLY COUGH SEVERITY CHANGES OVER THE FIRST 4 WEEKS OF TREATMENT WITH GEFAPIXANT IN TWO PHASE 3 STUDIES

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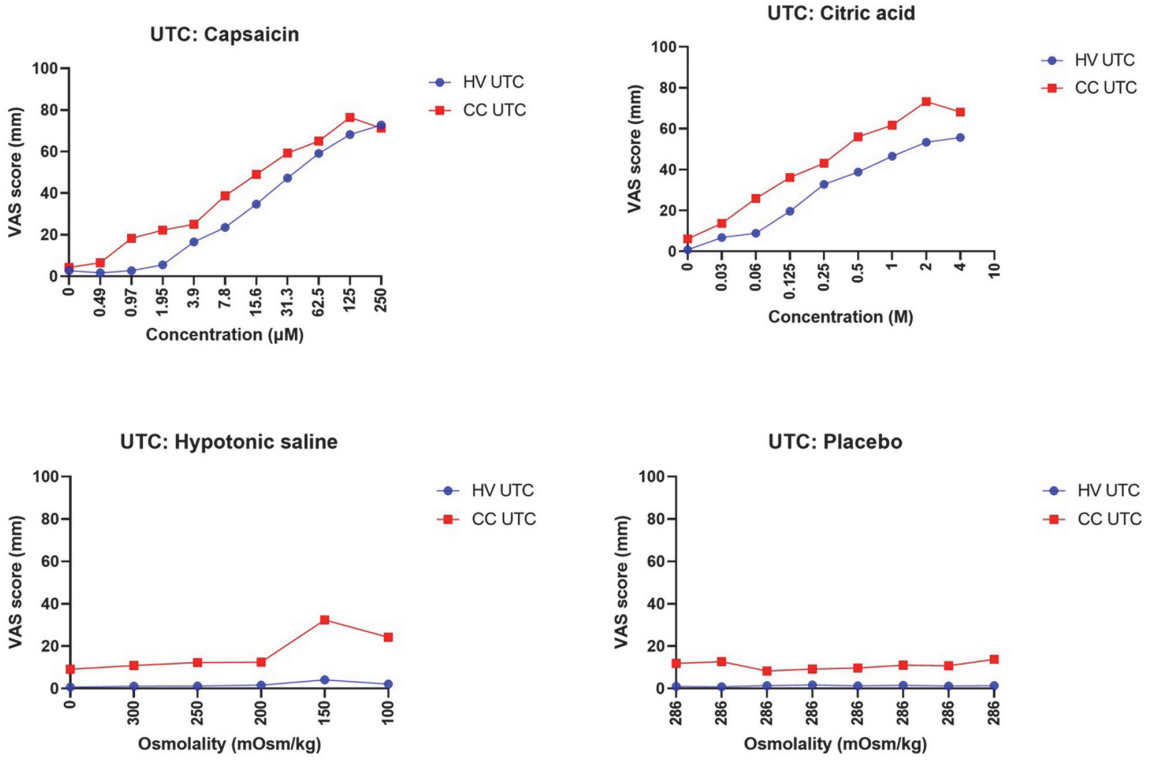
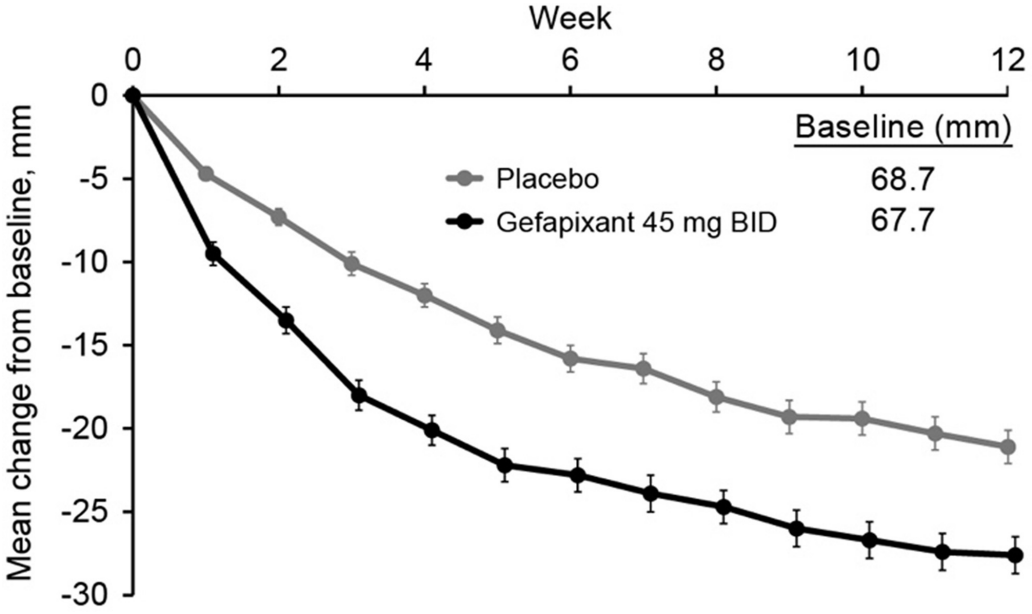


Abstract S4 Figure 1 Comparison of VAS sensation scores for urge-to-cough across all 4 challenges. VAS= visual analogue scale score (0–100mm scale). HV= healthy volunteers, CC= RCC/UCC patients. UTC= urge to cough



Abstract S5 Figure 1 Mean (standard error) change from baseline in cough severity VAS score during Weeks 1–12 in COUGH-1/COUGH-2 (pooled data). Baseline VAS values reflect mean score across all participants with baseline VAS date in each group. BID, twice daily; VAS, visual analog scale

Introduction and Objectives Treatment with the P2X3-receptor antagonist gefapixant has previously demonstrated improvement in patient-reported cough severity visual analog scale (VAS) scores through 52 weeks relative to placebo in two phase 3 studies (COUGH-1 and COUGH-2). However, changes in cough severity VAS scores at time points earlier than 4 weeks have not previously been characterized. This analysis assessed changes in cough severity VAS scores over the first 4 weeks of treatment with gefapixant 45 mg twice daily (BID) or placebo in the phase 3 clinical trials COUGH-1 (NCT03449134) and COUGH-2 (NCT03449147).
Methods Eligible adults had refractory or unexplained chronic cough, cough duration ≥1 year, and cough severity VAS ≥40 mm (100-mm scale). This post hoc analysis used pooled data from participants who received gefapixant 45 mg BID or placebo to assess changes from baseline in weekly mean cough severity VAS scores. Cough severity VAS scores were collected daily from Weeks 1 through 12, and this analysis focuses on the first 4 weeks of treatment.
Results A total of 682 and 678 participants were randomized to treatment with gefapixant 45 mg BID or placebo, respectively. With gefapixant 45 mg BID, most (73%) of the reduction in mean (standard error [SE]) cough severity VAS scores was evident by Week 4 (−20.1 mm [0.9]) compared with Week 12 (−27.6 mm [1.1]; figure 1). When examining changes from baseline in cough severity VAS scores for gefapixant 45 mg BID, the weekly differences from placebo increased until Week 4 (Week 1, −4.8 mm; Week 2, −6.2 mm; Week 3, −7.9 mm; Week 4, −8.1 mm); these differences were generally sustained from Weeks 5 through 12 (range, −6.5 to −8.0 mm).
Conclusions This analysis suggests that the majority of improvements in cough severity VAS scores through 12 weeks of treatment with gefapixant 45 mg BID are observed within the first 4 weeks.

Please refer to page A282 for declarations of interest related to this abstract.

'Survivor' – Prognostic indicators in interstitial lung disease

S6 SOCIAL PREDICTORS OF MORTALITY IN IDIOPATHIC PULMONARY FIBROSIS

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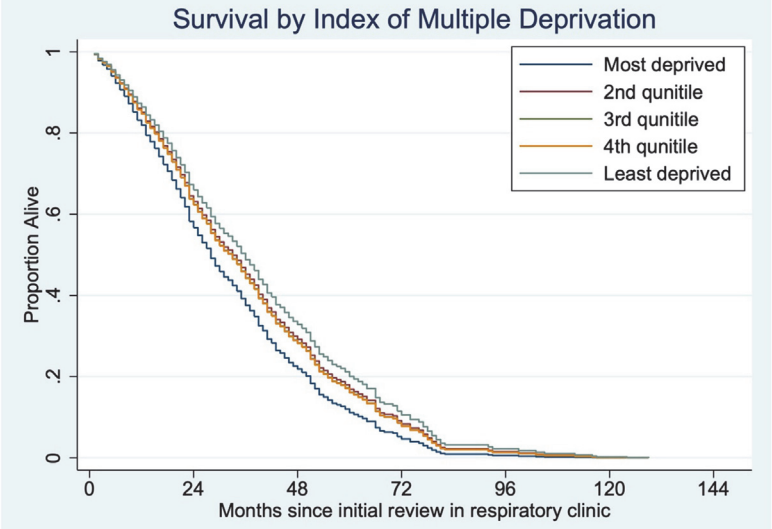
10.1136/thorax-2023-BTSabstracts.12

Introduction Idiopathic pulmonary fibrosis (IPF) is a progressive condition associated with a variable prognosis. The relationship between socioeconomic status (SES) or distance travelled to respiratory clinics and prognosis is poorly understood in IPF. The effect of SES on outcomes in IPF has not been determined conclusively in universal healthcare settings. The aim of our study was to determine whether SES, travelling distance and delay to referral affects survival in IPF.
Methods In this retrospective cohort study, we used data collected in the British Thoracic Society (BTS) Interstitial Lung Diseases Registry, between 2013 and 2021. This large dataset of patients diagnosed with IPF at expert centres in the UK allowed robust survival analyses adjusting for confounding variables. The SES of patients was determined using the Index of Multiple Deprivation 2019. Patients were categorised into 5 groups based on UK population level quintiles of deprivation. Survival was assessed using Cox proportional hazards models.
Results A total of 2359 patients diagnosed with IPF in England were included in the analysis. Most of the cohort were male (79.5%) and the mean age 74 years (standard deviation 8). Participants in the most deprived quintile reported symptoms for a longer duration at presentation to the respiratory clinic (41% reporting symptoms for more than 2 years), had a higher Gender Age Physiology (GAP) index and were more likely to use supplemental oxygen (47%) and antifibrotic therapies (93%) compared to those in the least deprived



Abstract S6 Figure 1 Kaplan-Meir plot demonstrating the effect of socioeconomic status (determined by the Index of Multiple Deprivation 2019) on survival from first review in a respiratory clinic

quintile (35%, 12%, 78% respectively ($p<0.05$)). The most deprived patients had worse overall survival (figure 1) even after adjusting for smoking status, GAP index, distance travelled to clinic and delay to referral (HR = 1.39 [1.11 to 1.73]; p = 0.004). Patients travelling furthest to a respiratory clinic also had worse overall survival in an unadjusted analysis.

Discussion The most deprived patients with IPF have more severe disease at presentation and worse outcomes. Increased travel distance to respiratory clinics was also associated with poor outcomes. This demonstrates inequalities in access to healthcare even in a universal health care system and requires consideration in delivering effective and equitable care to patients with IPF.

S7 PREDICTING OUTCOMES FROM ACUTE EXACERBATIONS OF INTERSTITIAL LUNG DISEASE: A MULTICENTRE OBSERVATIONAL STUDY

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10.1136/thorax-2023-BTSabstracts.13

Introduction Acute exacerbations of interstitial lung disease (AE-ILD) often lead to hospitalisation but have limited evidence-based treatment options. Patient-specific outcomes from AE-ILD are difficult to predict, making decisions regarding prioritisation for specialist palliative care input challenging. The PCR (PaO_2/FiO_2 ratio, C-reactive protein (CRP), and CT chest pattern) score has been shown to predict mortality risk

Abstract S7 Table 1 Patient and participating hospital characteristics

Patient characteristics	
Total number	443
Number with repeated admissions during study period	98 (22.1%)
Median age (years) (n, IQR)	77 (67–83)
Male (n,%)	254 (57.3%)
Ethnicity (n,%)	
White British	331 (74.7%)
Indian or British Indian	35 (7.9%)
Other	77 (17.4%)
ILD diagnosis (n,%)	
Hypersensitivity pneumonitis	46 (10.4%)
Connective tissue disease-related ILD (CTD-ILD)	27 (6.1%)
Idiopathic pulmonary fibrosis (IPF)	132 (29.8%)
Non-specific interstitial pneumonia (NSIP)	40 (9.0%)
Progressive fibrotic ILD, unspecified	31 (7.0%)
Rheumatoid arthritis-associated ILD (RA-ILD)	26 (5.9%)
Not previously diagnosed, but evidence of established ILD	40 (9.0%)
Sarcoidosis	17 (3.8%)
Post-COVID ILD	13 (2.9%)
Other	71 (16.0%)
Treatment characteristics	
Total number of admissions	602
Admissions where antibiotics given	499 (82.9%)
Admissions where steroids given	403 (66.9%)
Admissions where diuretics given	227 (37.7%)
Hospital characteristics	
Total number	6
Index admissions recorded (range)	10–149
Antifibrotic prescribing site (n,%)	2 (33.3%)
Local guideline for management of AE-ILD	1 (specific to AE-IPF) (16.7%)
Specialist palliative care service availability	
Usual office hours	6 (100%)
Weekday evenings	1 (16.7%)
Weekday nights	1 (16.7%)
Weekend days	4 (66.7%)
Weekend nights	1 (16.7%)

in AE-idiopathic pulmonary fibrosis (AE-IPF),[1] however this has not been assessed in AEs of non-IPF ILDs.

Aims Describe a real-world patient population with AE-ILD and establish the relationship between PCR score and mortality.

Methods Clinical records of ILD patients admitted to six NHS trusts over one year were reviewed. Patients with a deterioration in respiratory symptoms not explained by heart failure or pulmonary embolism were included. Demographic, treatment, investigation, and mortality data were collected. Participating hospitals provided information on local services.

The PCR score, where one point is gained for each of CRP >55 mg/l, PaO2/FiO2 ratio <250, and diffuse ground glass changes on CT chest, was calculated.

Results 443 patients with 602 admissions were included. IPF was the commonest ILD (29.8%), and other ILD diagnoses were represented (table 1). Antibiotics and steroids were prescribed in 82.9% and 66.9% of admissions, respectively. Just one participating hospital had a protocol for the management of AE-ILD, which was specific to AE-IPF.

Mortality after AE-ILD was high, with 14% in-hospital, 21.7% 30-day, 39.8% 6-month, and 53.9% 12-month mortality. Higher PCR scores were associated with increased in-hospital (p=0.03), 30-day (p=0.01), and 6-month mortality (p=0.003), with a trend towards increased 12-month mortality (p=0.07) (88 index admissions, p for trend).

No specialist palliative care input was recorded in 29.3% of admissions with in-hospital mortality, and 49.2% of admissions where death occurred within 30 days. This could be explained by hetereogeneity in specialist palliative care availability, particularly out-of-hours (table 1).

Conclusions AE-ILDs are associated with significant mortality, limited standardised treatment and heterogeneous palliative care provision. Higher PCR scores were associated with increased mortality in AE-ILD and may have utility when prioritising patients for palliative care input and advanced care planning.

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S8 THE BURDEN OF COMORBIDITY IN IDIOPATHIC PULMONARY FIBROSIS VERSUS CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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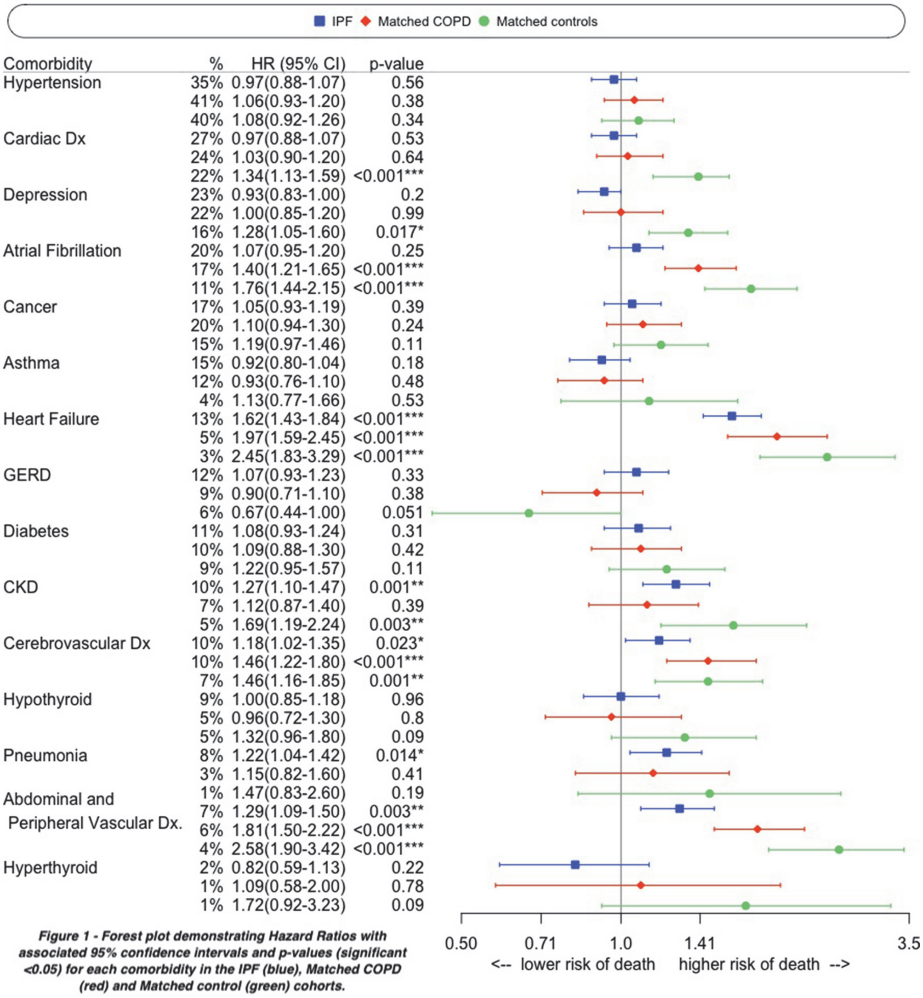

Figure 1 - Forest plot demonstrating Hazard Ratios with associated 95% confidence intervals and p-values (significant <0.05) for each comorbidity in the IPF (blue), Matched COPD (red) and Matched control (green) cohorts.

Abstract S8 Figure 1

Aim To delineate comorbidities occurring in patients prior to their diagnosis of idiopathic pulmonary fibrosis (IPF). Comorbidity prevalence was compared to age, gender and smoking matched chronic obstructive pulmonary disease (COPD) patients prior to COPD diagnosis and similarly matched controls without COPD or IPF. The impact of comorbidities on survival was then examined in the three study groups: IPF and COPD patients and control subjects.

Methods We studied pseudonymised patient-level, electronic health care records from the Clinical Practice Research Datalink (CPRD) GOLD database 2019. The study protocol was approved by the CPRD Independent Scientific Advisory Committee, ISAC protocol number: 18_291. IPF patients were 1:1 matched with COPD patients and control patients without a diagnosis of IPF or COPD. Data are given as means with standard deviations, or numbers of patients with percentages where appropriate. Multivariable Cox regression analyses were adjusted for patient age, gender and smoking status.

Results 3055 IPF, COPD and matched controls were identified. The mean age was 71.5 years, subjects were predominantly male (66%) with 83% of the population smokers. Comorbidities were generally more frequent in IPF patients compared to both COPD patients and patients in the matched control group, except for hypertension. 38% of IPF patients had 3 or more comorbidities before IPF diagnosis versus COPD patients (32%) and matched controls (20%). Comorbidities were also seen to develop at a younger age in IPF patients compared to COPD patients and matched controls.

Heart failure (Hazard Ratio (HR)=1.62; p<0.001), chronic kidney disease (HR=1.27; p=0.001), cerebrovascular disease (HR=1.18; p=0.02), pneumonia (HR=1.22; p=0.01) and abdominal and peripheral vascular disease (HR=1.29; 0.003), all diagnosed prior to IPF diagnosis, independently predicted mortality (figure 1).

Conclusion Our study highlights the excess burden of comorbidity in patients with IPF compared to COPD and matched controls. Importantly, IPF subjects show an excess of comorbidities up to 20 years before IPF diagnosis suggesting the presence of additional disease pathways beyond those related to cigarette smoke exposure and ageing.

Please refer to page A282 for declarations of interest related to this abstract.

S9 NATIONAL UK EXPERIENCE OF THE TREATMENT OF PROGRESSIVE FIBROSING INTERSTITIAL LUNG DISEASE WITH NINTEDANIB

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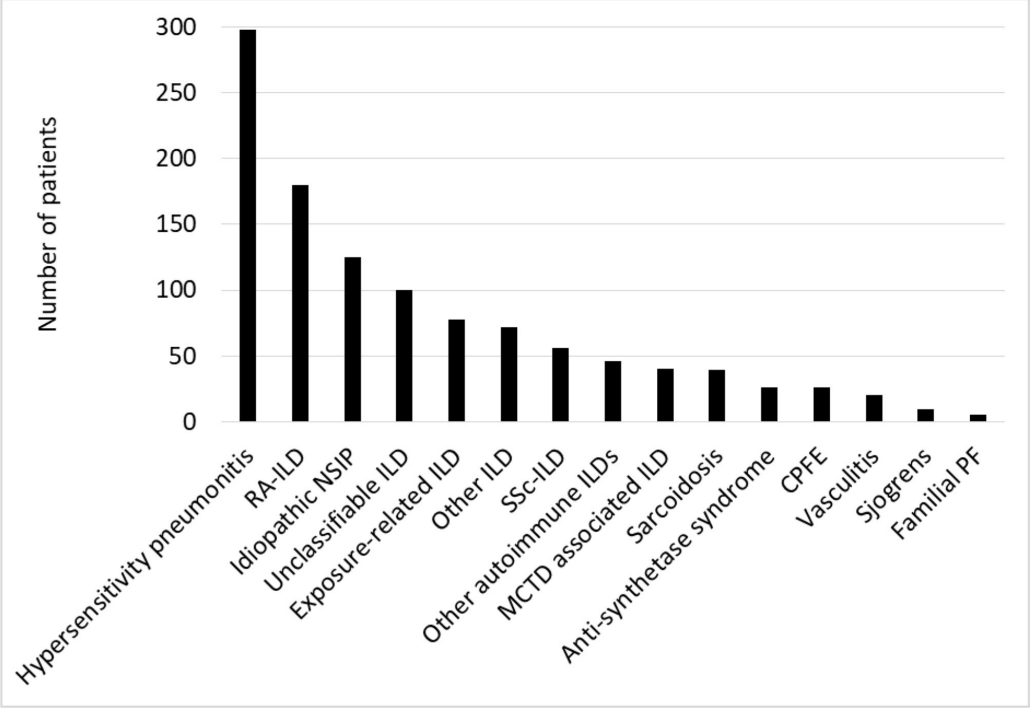
10.1136/thorax-2023-BTSabstracts.15

Background Nintedanib was approved in the UK for use in progressive fibrosing interstitial lung disease (PF-ILD) in November 2021. The UK prescribing criteria were informed by the PF-ILD diagnostic criteria established by the INBUILD study.[1] To date, there has been no national evaluation of the use of nintedanib for PF-ILD.



Abstract S9 Figure 1 Primary diagnosis of 1120 patients with an ILD-MDT decision to commence nintedanib between 17th November 2021 and 30th September 2022. CPFE = Combined pulmonary fibrosis and emphysema syndrome, ILD = Interstitial lung disease, MCTD-ILD = Mixed connective tissue disease-ILD, NSIP =Non-specific interstitial pneumonia, PF = Pulmonary fibrosis, RA-ILD = Rheumatoid arthritis – ILD, SSc-ILD = Systemic sclerosis-ILD. The predominant diagnoses included in 'Other ILD' were pleuroparenchymal fibroelastosis (PPFE) 19/1120 (1.7%), other connective tissue disease-ILD 11/1120 (1.0%), fibrotic organising pneumonia 7/1120 (0.6%), interstitial pneumonia with autoimmune features 6/1120 (0.5%), asbestosis 5/1120 (0.4%), desquamative interstitial pneumonia 4/1120 (0.4%), post-Covid ILD 3/1120 (0.3%) and sarcoidosis 2/1120 (0.2%)

Methods Specialist ILD centres in the UK were invited to take part in an electronic service evaluation questionnaire in September 2022. The questionnaire collated site summary data regarding underlying diagnosis, pulmonary function tests, diagnostic criteria, radiological appearance, concurrent immunosuppressive therapy and drug tolerability. Individual patient data were categorised by local sites prior to submission. Local clinical audit department approval was obtained.

Results Twenty-four UK centres responded to the invitation. 1120 patients had an MDT decision to commence nintedanib between 17/11/21 and 30/9/22 for PF-ILD. Figure 1 demonstrates the primary ILD diagnoses. Concomitant oral corticosteroids were prescribed in 609/1120(54.4%), 355/1120 (31.7%) were receiving mycophenolate mofetil and 340/1120 (30.3%) were receiving another immunosuppressive/modulatory therapy.

The most common criteria by which PF-ILD was diagnosed was progressive symptoms combined with disease progression on HRCT (418/1120,37.3%). The median percentage predicted forced vital capacity category was ≥60 to <70% and median percentage predicted transfer capacity category was <40%.

By 30/9/2022, 928/1120 had commenced nintedanib, the remaining patients were awaiting initiation. At the time of questionnaire completion 175/928(18.8%) patients had discontinued nintedanib. Discontinuation reasons included death (63/175,36.0%), drug tolerability (83/175,47.4%) and deranged liver function tests (16/175,9.1%).

Our service evaluation has demonstrated the UK real-world use of nintedanib for PF-ILD. Our study highlighted an increased proportion of patients diagnosed with PF-ILD on the basis of disease progression on HRCT and progressive symptoms compared to the seminal INBUILD study.[1] This may reflect limited availability of pulmonary function testing during the COVID-19 pandemic.

This study highlights a significant overall discontinuation rate for nintedanib. Whilst prognostication in fibrosing ILD is difficult, individual circumstances must be considered to ensure the beneficial effect on lung function preservation remains greater than the adverse effect burden.

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S10 THE PROGNOSTIC IMPLICATIONS OF ACUTELY DETERIORATING INTERSTITIAL LUNG DISEASE IN PATIENTS WITH IDIOPATHIC INFLAMMATORY MYOSITIS

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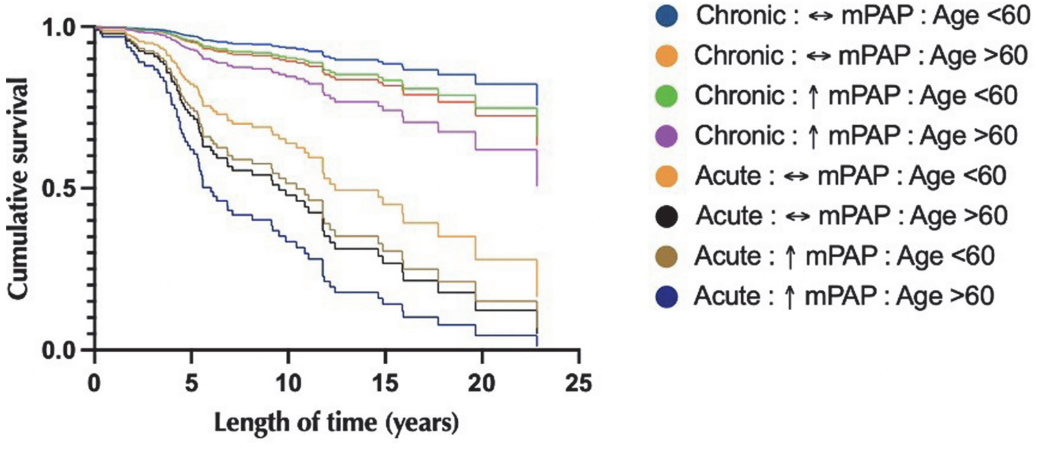
10.1136/thorax-2023-BTSabstracts.16

Introduction Idiopathic inflammatory myopathy-associated interstitial lung disease (IIM-ILD) can develop insidiously or manifest acutely, either as a fulminant initial presentation or unexpected deterioration of pre-existing ILD. In this study, we sought to characterise the disease course and prognostic determinants of acutely deteriorating IIM-ILD.

Methods The Royal Brompton Hospital Immunology database was retrospectively interrogated for results of myositis-specific (MSA) and myositis-associated antibodies (MAA) from Jan 2015-Dec 2022. Patients with at least one acute IIM-ILD episode were identified using the SAS Clinical Data platform accessing Graphnet EPR and critical care systems. IIM were classified according to contemporaneous EULAR/ACR guidance and patients with <1 year follow-up were excluded. Time-to-death modelling was performed by Cox proportional hazards regression for acute and chronic (insidious) IIM-ILD and receiver operating curves generated to assess covariate prediction of mortality.

Results 344 patients (median age 61.2, IQR 50.8–69.6; 63.4% female and 63.1% White Caucasian) with acute and chronic IIM-ILD were followed up for a median of 4.5 years (IQR 2.4–8.7 years) and 5.5 years (IQR 3.7–8.4) respectively. MSA including Jo-1 antibody were present in 42.4% and 36.7% while MAA were detected in 78.0% and 80.5% of the acute and chronic subgroups respectively. ILD presentation preceded myositis in 57.8% of cases. Overall, a third (118/344; 34%) of patients were hospitalised for acute IIM-ILD, with a fifth requiring intensive care. 20.4% (68/344) of all patients died during follow-up. MDA5 serology was positive in five patients including two survivors of acute IIM-ILD. Unadjusted hazard ratios (HR) for death were highest for acute ILD deterioration, age >60 and elevated pulmonary arterial pressure. Multivariate regression confirmed that they independently predicted



Abstract S10 Figure 1 Estimated survival by covariate stratification

mortality; the highest adjusted HR (6.64, 95% CI:3.7–11.9; P<0.001) was attributed to acute IIM-ILD. The discriminatory index (AUC) for the integrated model was 0.84. Covariate stratification revealed tiered subgrouping with significant survival differences (figure 1).

Conclusions In identifying clinical variables that predict a poorer outcome in IIM, acute ILD development but not anti-Jo-1 serology was strongly associated with an increased likelihood of death. Detailed profiling including predictive stratification may allow high-risk patients with IIM-ILD to be triaged for earlier and more intensive intervention.

'Don't want to miss a thing' – Novel diagnostics in malignant effusion and pleural infection

S11 SERIAL SAMPLING FOR NOVEL BIOMARKER EVALUATION IN MALIGNANT PLEURAL EFFUSION: THE PREDICTIVE POTENTIAL OF PLEURAL FLUID SUPAR

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10.1136/thorax-2023-BTSabstracts.17

Introduction and Objectives Soluble urokinase plasminogen activator receptor (suPAR) is a novel inflammatory biomarker with predictive potential for invasive management in loculated parapneumonic effusions.[1] We sought to explore whether pleural fluid (PF) suPAR may predict loculation and pleurodesis outcomes in malignant pleural effusion (MPE) using serial samples from IPC Plus trial[2] participants.

Methods Quantitative suPAR testing using a commercially available ELISA kit (ViroGates suPARnostic AutoFlex ELISA) was performed on PF samples collected over 70 days. Demographic, clinical data and day 35 pleurodesis outcomes were obtained from the trial database.

Results 146 samples from 46 patients (17 female) across 7 timepoints were analysed. suPAR increased after talc administration (median baseline suPAR 28.5ng/mL (IQR 26.5–59) vs 56ng/mL (IQR 43.5–82) day 14 post talc; p=0.005; n=12). Change in suPAR from baseline to day 14 differed with talc and placebo (p=<0.001). Day 14 suPAR was higher in pleurodesis success vs failure (median 62ng/mL (IQR 40.5–82); n=4 vs 29ng/mL (IQR 16–56); n=17). Median baseline suPAR was not predictive of loculation over 70 days (loculation group 28.5ng/mL (IQR 16–42); n=14 vs non-loculators 29ng/mL (IQR 19–80); n=27).

Conclusion To our knowledge, this is the first study to utilise serial PF samples collected via an IPC for novel biomarker evaluation in MPE at different timepoints. We demonstrate that PF suPAR rises in response to talc, confirming suPAR as a surrogate marker of pleural space inflammation in MPE. PF suPAR measured 14 days post talc may be predictive of pleurodesis outcome. Baseline suPAR was not predictive of PF loculation. Further prospective evaluation is needed in a larger cohort.

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Please refer to page A282 for declarations of interest related to this abstract.

S12 16S RRNA SEQUENCING TO IDENTIFY CAUSATIVE ORGANISMS IN PLEURAL INFECTIONS

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10.1136/thorax-2023-BTSabstracts.18

Introduction Pleural infections are associated with high morbidity and mortality, and considerable healthcare resource use. Despite the use of BACTEC blood culture bottles, the microbiological yield is poor, often mandating broad-spectrum antibiotics, which contributes to antimicrobial resistance. Moreover, the TORPIDS study recently showed that microbiology in pleural infection predicts clinical outcomes which can rationalise more aggressive management in these patients.[1]

Objectives The aim of this study was to assess the additional microbiological yield and clinical utility provided by the use of the two supplementary tests currently recommended by the UK Standards of Microbiology Investigations (SMI); 16s rRNA PCR and targeted PCR, in confirmed pleural infection samples compared to standard culture methods.[2]

Methods Our centre has been routinely sending culture-negative pleural fluid samples for molecular analysis since 2016. This was a single centre retrospective observational study primarily assessing the appropriateness of testing, additive pathogen identification, clinical utility in providing diagnoses and enablement of antimicrobial-de-escalation.

Results Analysis is ongoing and final results will be available for the conference. 99 pleural fluid samples from 98 patients have been identified as having been referred from microbiological culture and sensitivity. 81/99 (81.8%) met diagnostic criteria for pleural infection and were included in this preliminary analysis. The overall yield from standard was 43/81 (53.1%). Of the remaining 38 culture-negative samples referred for molecular analysis, 15/38 (39.5%) giving an absolute yield increase of 15/81 (18.5%) with 16S PCR. The rate of 'actionable' microbiology i.e prompting a change in antibiotic strategy, was 7/15.

Conclusion This data demonstrates that appropriately used molecular analysis in pleural infection is feasible and reduce false negative microbiological diagnoses. It provides significant additive value to the microbiologic yield and may be of use in guiding focused antibiotic therapy and thus reducing the use of broad-spectrum agents.

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S13 ROLE OF FROZEN SECTION DURING MEDICAL THORACOSCOPY FOR DECISION MAKING IN A COUNTRY WITH DECREASING TB BURDEN

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10.1136/thorax-2023-BTSabstracts.19

Rationale On-site pathologic diagnosis of pleural disease during medical thoracoscopy (MT) is expected to be useful in diagnosis of pleural effusion with unknown etiology. There were only few studies investigating utility of a frozen section examination during MT. This study aimed to demonstrate the diagnostic performance of frozen section examination during MT in diagnosis of pleural malignancy or pleural TB.
Methods Medical records of patients who underwent medical thoracoscopy with frozen section examination between October 2017 and April 2023 in Incheon Saint Mary's Hospital, the Catholic University of Korea were retrospectively reviewed. Final diagnosis of pleural diseases was classified into pleural malignancy, pleural TB and other benign pleuritis. Results of frozen section were classified into malignancy, atypical cells, chronic granulomatous inflammation, and other benign inflammation. Diagnostic performance of frozen section examination was investigated with each reference standard – the results of pleural tissue examination or final composite diagnosis of pleural disease.
Results A total of 444 patients were included. Number of patients with pleural malignancy, pleural TB and other benign pleuritis was 217, 59, 167, respectively. One patient was diagnosed ad pleural malignancy and pleural TB, concurrently. Among patients with pleural malignancy, non-small cell lung cancer – adenocarcinoma accounted for 66.5%. Among patients who showed atypical cells in frozen section, 44.4% were finally diagnosed as pleural malignancy. The frozen section result 'malignant' showed 84.3% (95% CI: 78.8–88.9) of sensitivity on diagnosis of pleural malignancy, and 83.5% (77.7–88.3) of negative predictive value (NPV). The frozen section results of 'malignancy or atypical cells' showed 96.8% (93.5–98.7) of sensitivity with 79.5% (72.7–85.3) of specificity. The frozen section result 'chronic granulomatous inflammation showed 93.2% (83.5–98.1) of sensitivity on diagnosis of pleural TB, and 98.1% (95.1–99.5) of NPV (table 6).
Conclusions Frozen section examination during MT showed good sensitivity in diagnosis of pleural malignancy or pleural TB. With this diagnostic modality, diagnostic delay could be shortened and patients could be provided with adequate treatment such as pleurodesis or anti-TB medications, quickly.

S14 A SURGE OF PAEDIATRIC THORACIC EMPYEMA: IDENTIFYING TRENDS AND LESSONS FROM THE UK INVASIVE GROUP A STREPTOCOCCUS (IGAS) OUTBREAK DURING 2022–2023

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10.1136/thorax-2023-BTSabstracts.20

Introduction We present a retrospective review as a specialist-paediatric centre, managing empyema over an 8-year period, including an unexpected surge during the 2022–23 UK invasive Group A Streptococcus (iGAS) outbreak.
Methods Case notes for children requiring thoracic empyema intervention (January 2014 – January 2023) were reviewed. Data was correlated against microbiology/histological reports and categorised into three eras in reference to the Covid-19 pandemic: post-pandemic (2022-current), pandemic (2020–2021) and pre-pandemic (2015–2020).
Results 86 patients were identified. Median age in the post-pandemic, pandemic and pre-pandemic eras were 4.4, 6.2 and 9.9 years respectively ($p<0.0001$, ANOVA). 61/84 patients had sterile cultures (73%). 16S PCR assays identified bacterial DNA in 90.7% (39/43) of cases. The most common microorganisms identified were Streptococcus pyogenes (n=23, 43.4%) and Streptococcus pneumoniae (n=16, 30.2%) with viral co-infection more frequently seen with these two species; as compared with all other species (12/39, 30.8%, 3/37, 8.1%).

Most concerning was the finding of viral co-infection in 45% (5/11) of cases with necrotising disease compared with 24% (10/42) without ($p = 0.2$, chi-sq.). 48% (11/23) of patients required surgery (VATS/thoracotomy/decortication/resection) in the post-pandemic compared with 19% (11/57) pre-pandemic ($p=0.0097$, chi-sq.). Median length of stay has also increased from 8 days pre-pandemic to 11 days post-pandemic ($p=0.0532$, Mann-Whitney U),

To date no mortalities from bacterial empyema were reported at our centre though there were deaths from iGAS without empyema.
Conclusion Our findings highlight 16S PCR as a diagnostic tool in empyema management as culture is frequently sterile. Association of viral co-infection on outcomes was substantial, correlating with higher necrosis rates, surgical intervention and prolonged hospital-stay. This suggests immunological naiveté amongst young-children after Covid-19 may be a crucial factor in the severity of follow-on bacterial superinfection. We advise attention to viral outbreak reports in the upcoming winter-flu-season, which could signal another empyema outbreak. With good collaboration and prompt treatment, good outcomes should be expected.

S15 SENSITIVITY OF SURGICAL PLEURAL BIOPSIES FOLLOWING A PREVIOUS NEGATIVE PLEURAL BIOPSY

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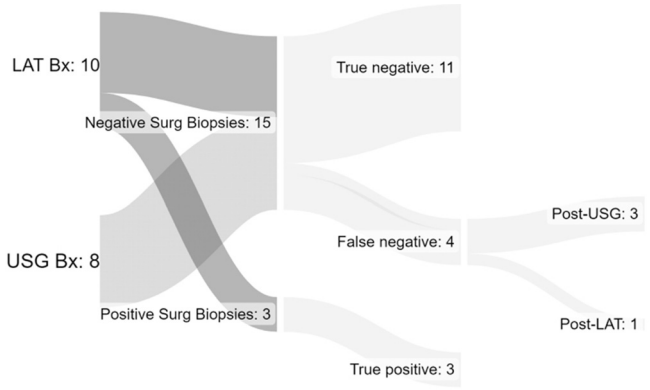
10.1136/thorax-2023-BTSabstracts.21

Introduction and Objectives Ultrasound-Guided (USG) and Local-Anaesthetic Thoracoscopy (LAT) Pleural Biopsies are performed to investigate pleural disease. Though often sufficient to make a diagnosis, biopsies can be indeterminate or negative, despite a clinical picture favouring malignancy. Such patients may be referred for surgical biopsies. The aim of this study was to determine the sensitivity of surgical biopsies following previous negative USG or LAT biopsies.
Methods We conducted a retrospective review of patients who underwent an USG or LAT biopsies at a tertiary centre between January 2017 and June 2023. Features and outcomes of those referred to surgery were recorded, including follow-up duration, initial histology, reason for referral and eventual diagnosis.
Results Eighty-five patients underwent USG biopsies and 115 had a LAT. Following MDT discussion, 18 were referred to surgery (8 USG biopsy, 10 LAT). Initial histology in these



Abstract S15 Figure 1 Outcomes of 18 surgical referrals following Ultrasound-Guided Pleural Biopsies (USG Bx) and Local-Anaesthetic Thoracoscopy Pleural Biopsies (LAT Bx)

were: 4 inadequate samples, 2 atypical cells, 10 benign fibrosis and 2 other benign findings. The surgical procedures undertaken included 15 video-assisted thoracoscopies, one robotic and two open biopsies. Mean post-surgical follow-up was 35.5 weeks.

Of the 18 patients who underwent surgical biopsies, there were three true-positives (all mesothelioma), four false-negatives (diagnosed with mesothelioma during follow up; 3 following USG biopsy, 1 following LAT) and 11 true-negatives (benign pleuritis). The sensitivity of a surgical biopsy for mesothelioma following a negative USG Bx or LAT was 42.9% (figure 1). The sensitivity of USG or LAT biopsies, for a malignant or non-malignant diagnosis, was 91% for either investigation.

All 4 with inadequate samples and both with atypical cells at initial biopsy were diagnosed with mesothelioma (3 at surgery, 3 during follow up). None of three patients with anterior mediastinal pleural thickening were diagnosed with a malignancy.

Discussion Surgical biopsies in a general cohort are highly sensitive (>0.9). Our findings suggest they are significantly less sensitive in those who with prior negative USG or LAT biopsy. However, sensitivity was good in the subgroup of patients with inadequate samples or atypical cells at initial histology. Further studies are required to devise the optimum pathway for investigating possible mesothelioma following negative USG or LAT biopsies.

'Shake it off' – Recovery from COVID-19

S16 RECOVERY, BURDEN OF SYMPTOMS AND HEALTH RELATED QUALITY OF LIFE (HRQOL) AT 1-YEAR POST COVID-19 HOSPITALISATION IN PATIENTS WITH PRE-EXISTING AIRWAYS DISEASES: RESULTS FROM A PROSPECTIVE UK COHORT STUDY (PHOSP-COVID)

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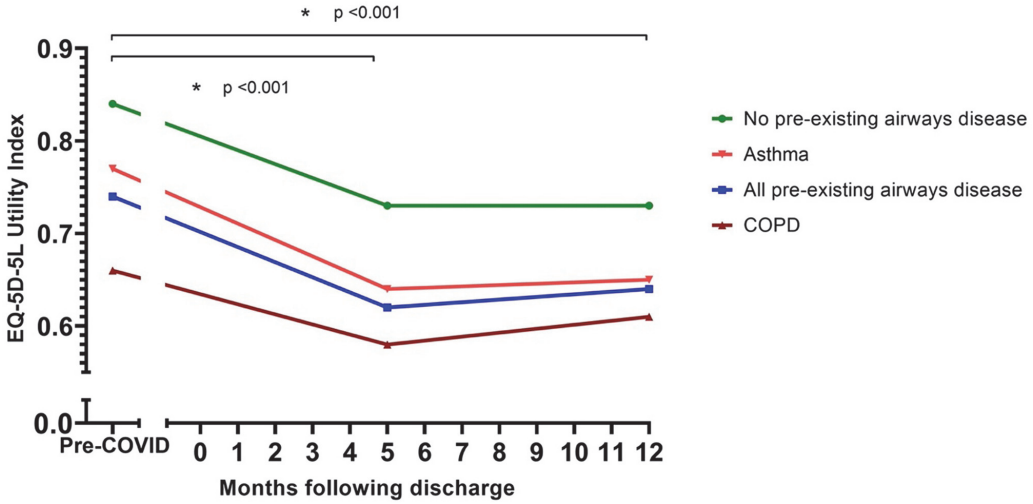
10.1136/thorax-2023-BTSabstracts.22

Background The medium and long-term impacts of COVID-19 in patients with pre-existing airways diseases are unknown.

Aim To assess recovery, burden of symptoms and HRQoL in COVID-19 survivors with pre-existing airways diseases up to 1-year post-hospitalisation.

Methods PHOSP-COVID is a large prospective multi-centre UK study of hospitalised COVID-19 survivors who attended 2 research visits at 5-months & 1-year post-discharge. Recovery assessed by answering 'Do you feel fully recovered from COVID-19?'. Burden of symptoms assessed using validated questionnaires (GAD-7 for anxiety and PHQ-9 for depression) and a study specific Patient Symptoms Questionnaire (PSQ) with a numeric scale of 0–10 to evaluate burden of breathlessness, cough and fatigue. HRQoL assessed by EQ-5D-5L Utility



Abstract S16 Figure 1 Change in HRQOL (EQ-5D-5L Utility Index) from pre-COVID to five months and one- year visits by presence or absence of pre-existing airway diseases. * p values calculated using student t-test

Index (UI). Pre-COVID estimates completed for EQ-5D-5L (UI) and PSQ assessments.

Results Overall, 479/2100 (22.8%) had pre-existing airways diseases (346 asthma, 122 COPD and 21 bronchiectasis). At 1 year, 20.4% of the airways group reported full recovery vs 33.2% in the non-airways group (p<0.001). Likeliness of reporting full recovery was similar between patients with COPD and asthma. The airways group were more likely to have features of: anxiety (29.1% vs 22.0% p=0.002), depression (31.2% vs 24.7%, p=0.006), breathlessness (mean PSQ scale 3.7 (SD 2.7) vs 2.4 (SD 2.5), p<0.001), cough (mean PSQ scale 2.1 (SD 2.5) vs 1.3 (SD 2.1), p<0.001) and fatigue (mean PSQ scale 4.3 (SD 3.0) vs 3.3 (SD 2.9), p<0.001). The pre-COVID estimate of EQ-5D-5L (UI) in the airways group was lower than non-airways group, 0.74 (SD 0.27) vs 0.84 (SD 0.21) p<0.001 respectively, however the delta change difference was similar between the two groups at 1-year, -0.09 (SD 0.24) vs -0.11 (SD 0.22) p=0.351. Patients with COPD had lowest baseline HRQoL and the highest baseline burden of breathlessness, cough and fatigue but minimal delta change at 1-year compared to the asthma and non-airways groups.

Conclusion Significant burden of symptoms observed in COVID-19 survivors with pre-existing airways diseases at 1-year post discharge. Only 1/5 of patients with pre-existing airways diseases felt fully recovered at 1-year and despite reduced baseline HRQoL, the magnitude of decline was similar to the non-airways group.

S17 GREATER ADIPOSITY IS ASSOCIATED WITH NON-RECOVERY AT ONE YEAR FOLLOWING HOSPITALISATION FOR COVID-19: RESULTS FROM A PROSPECTIVE UK COHORT STUDY (PHOSP-COVID)

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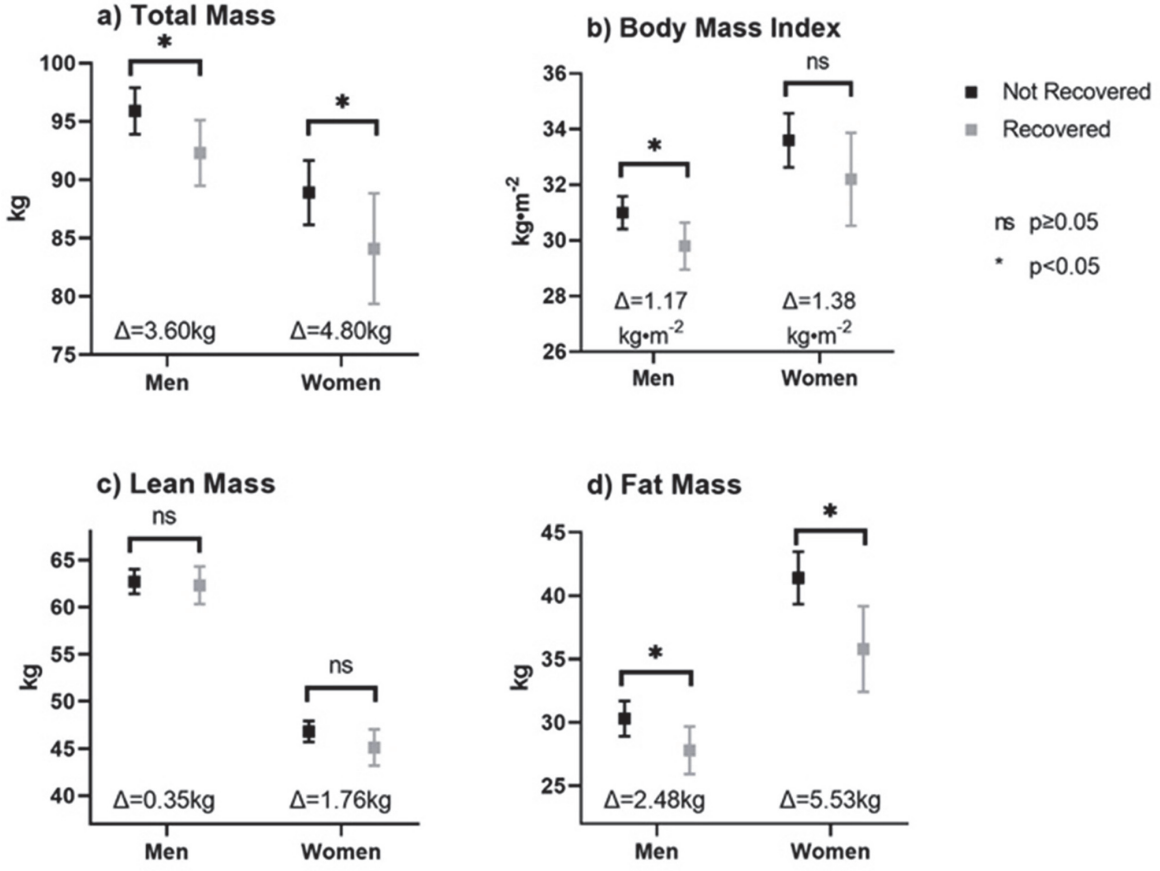
10.1136/thorax-2023-BTSabstracts.23

Background Previous reports have described obesity as a major risk factor for non-recovery following hospitalisation for COVID-19.

Aims and Objectives To assess body composition differences between individuals who have either recovered or not following hospitalisation with COVID-19.

Methods Adult survivors of hospitalisation for COVID-19 across 35 UK sites were recruited. Body composition was assessed using either BIA or DXA at median 5 months after discharge from hospital with whole body lean and fat mass values combined from modalities. Participants were grouped according to their response to the question 'Do you feel fully recovered from your COVID-19 illness?' at 12 months.



Abstract S17 Figure 1 panels a) – d) showing mean and 95% C.I. values for body composition measured at five months after discharge among men and women grouped by those reporting being recovered or not at one year followup

Results 1264 participants were included with 343 undergoing DXA and 921 undergoing BIA. Mean age was 57.7 (SD 12.7) years, mean BMI was 31.8 (SD 6.98) and 39.4% were female. Total body mass and fat mass was significantly greater among participants reporting being not recovered compared to those who reported being recovered (figure 1a and d), similarly body mass index was significantly higher among men who reported being not recovered (figure b). No differences were seen in lean mass between recovery groups in both sexes.

Conclusions Analysis of detailed body composition highlights adiposity as a predictor for non-recovery following hospitalisation for COVID-19 with no difference in lean mass seen. While further work is required to understand potential mechanistic explanations, this finding highlights the potential role for interventions targeting adiposity among individuals suffering persistent post-COVID-19 non-recovery including Long-COVID.

S18 LONG-TERM SYMPTOM PROFILES AFTER COVID-19 VS OTHER ACUTE RESPIRATORY INFECTIONS: A POPULATION-BASED OBSERVATIONAL STUDY

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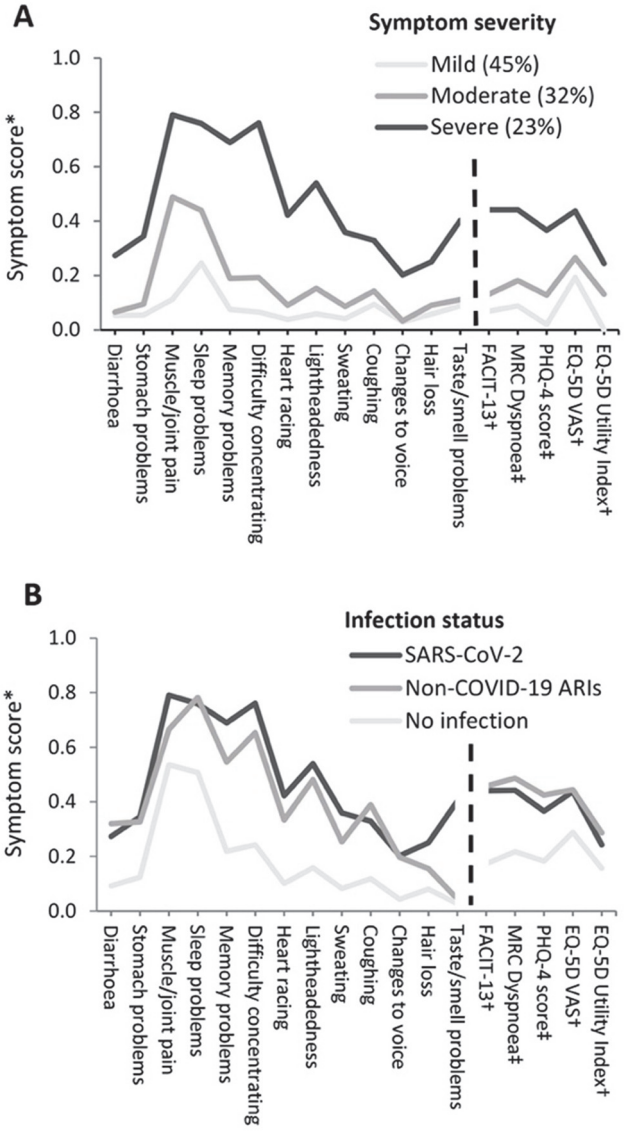
10.1136/thorax-2023-BTSabstracts.24

Introduction and Objectives Long COVID is a well recognised, if heterogeneous, entity. Acute respiratory infections (ARIs) due to other pathogens may cause long-term symptoms, but few studies compare post-acute sequelae between SARS-CoV-2 and other ARIs. We aimed to compare symptom profiles between people with previous SARS-CoV-2 infection, people with previous non-COVID-19 ARIs, and contemporaneous controls, and to identify clusters of long-term symptoms.

Methods COVIDENCE UK is a prospective, population-based UK study of ARIs in adults. We analysed data on 16 potential long COVID symptoms and health-related quality of life (HRQoL), reported in January, 2021, by participants unvaccinated against SARS-CoV-2. Symptoms analysed were coughing, sleep problems, memory problems, difficulty concentrating, muscle or joint pain, problems with sense of taste/smell, diarrhoea, stomach problems, changes to voice, hair loss, unusual racing of the heart, lightheadedness or dizziness, unusual sweating, breathlessness, anxiety or depression, and fatigue. We classified participants as having previous SARS-CoV-2 infection or previous non-COVID-19 ARI ($\geq$4 weeks prior) or no reported ARIs. We compared symptoms by infection status using logistic and fractional regression, and identified symptom clusters using latent class analysis (LCA).

Findings We included 10,203 participants (1343 [13.2%] with SARS-CoV-2 infection, 472 [4.6%] with non-COVID-19 ARI). When compared with no infection, both SARS-CoV-2 and non-COVID-19 ARIs were associated with increased prevalence or severity of most symptoms and decreased HRQoL. When comparing infection types, participants with SARS-CoV-2 infection had higher odds of taste/smell problems (odds ratio 8.06, 95% CI 4.52–14.35) and hair loss (2.10, 1.39–3.19) than participants with non-COVID-19 ARIs. Separate LCA models identified three symptom severity groups for each infection type. For SARS-CoV-2, the most severe group was characterised by an increase in overall symptom burden, with the greatest differences in memory problems, difficulty concentrating, and lightheadedness or dizziness. When comparing the most severe groups by infection status, SARS-CoV-2



Abstract S18 Figure 1 Symptom profiles among all participant with previous SARS-CoV-2 Infection (A) and among participants with the most severe symptoms, by infection status (B). Figure shows the conditional probability (left of the dashed line) or mean severity (right of the dashed line) for all symptoms considered, adjusted for age and sex. Parallel lines between the classes indicate a fairly even increase in the probability or severity of the symptoms considered; disproportionate changes in symptom probability or severity is shown by deviations from the parallel. (A) Includes all participants with previous SARS C0V-2 infection. (B) Symptom profiles for participants with the most severe symptoms from the three separate latent class analyses are overlaid. MRC =Medical Research Council. VAS=visual analogue scale. PHQ=Patient Health Questionnaire. *Symptom score represents conditional probability for binary variables and mean severity for ordinal and continuous variables. †Continuous variables have been reversed to aid with interpretation, so that higher values indicate worse severity or health state. ‡Ordinal variable

infection presented with a higher probability of memory problems, difficulty concentrating, hair loss, and taste/smell problems than non-COVID-19 ARI.

Conclusions Both SARS-CoV-2 and non-COVID-19 ARIs are associated with a wide range of long-term symptoms. Research on post-acute sequelae of ARIs should extend from SARS-CoV-2 to include other pathogens.

Please refer to page A282 for declarations of interest related to this abstract.

S19 GAS EXCHANGE IMAGING USING DISSOLVED-PHASE 129XE MRI IN POST COVID COHORTS

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10.1136/thorax-2023-BTSabstracts.25

Introduction Hyperpolarised ^{129}Xe MRI allows quantitative and regionally sensitive measurement of gas exchange. The objective of this work is to characterise longitudinal lung function abnormalities using hyperpolarised ^{129}Xe MRI in patients hospitalised due to COVID-19.

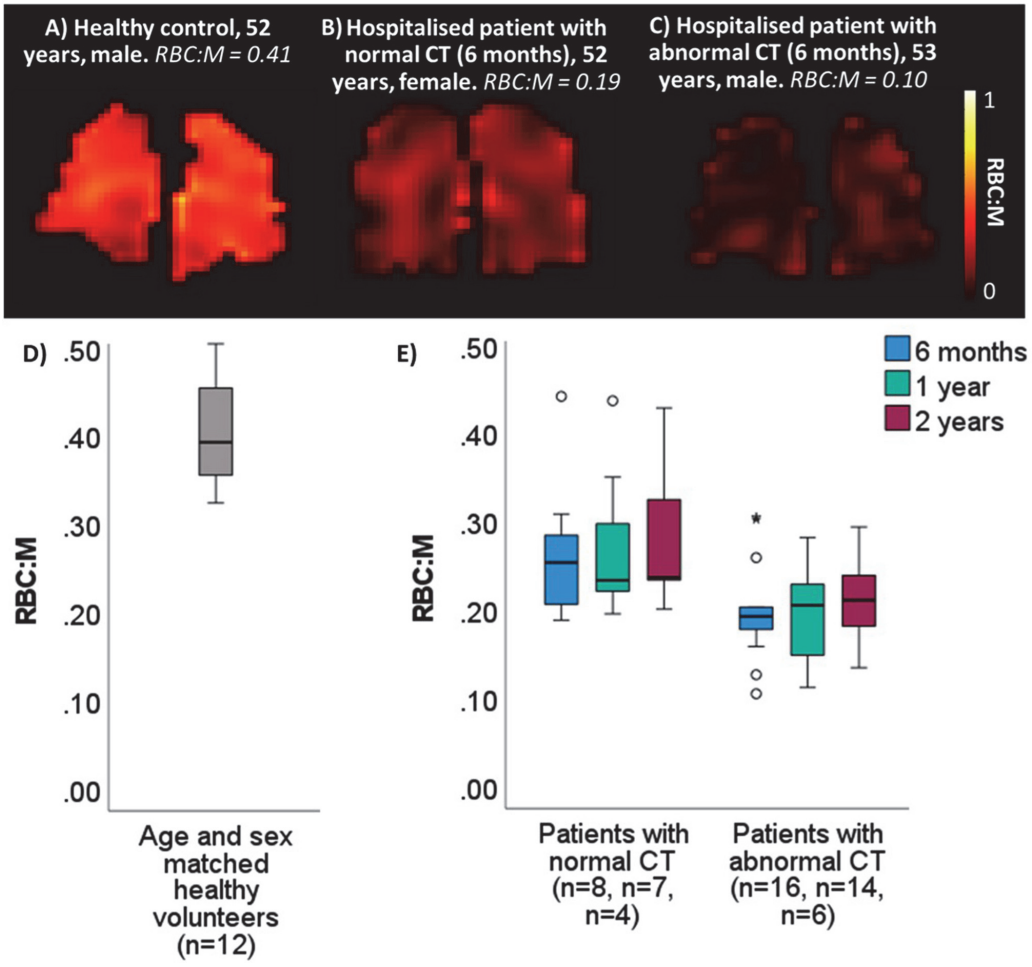
Methods A comprehensive ^{1}H and ^{129}Xe 1.5T MRI protocol has been implemented in two longitudinal studies of patients hospitalised due to COVID-19, up to 2 years after hospitalisation: i) with normal or near-normal CT[1] ii) with abnormal CT consistent with signs of interstitial lung damage at 12 weeks post-hospitalisation as part of the XMAS study[2].

Matching MRI protocols were performed in both studies including dissolved phase xenon imaging, from which the fraction of xenon dissolved in the pulmonary red blood cells compared to the xenon dissolved in the pulmonary membrane is calculated (RBC:M) as a measure of xenon gas transfer. PFTs were also performed. Longitudinal and group comparisons were assessed using non parametric tests.

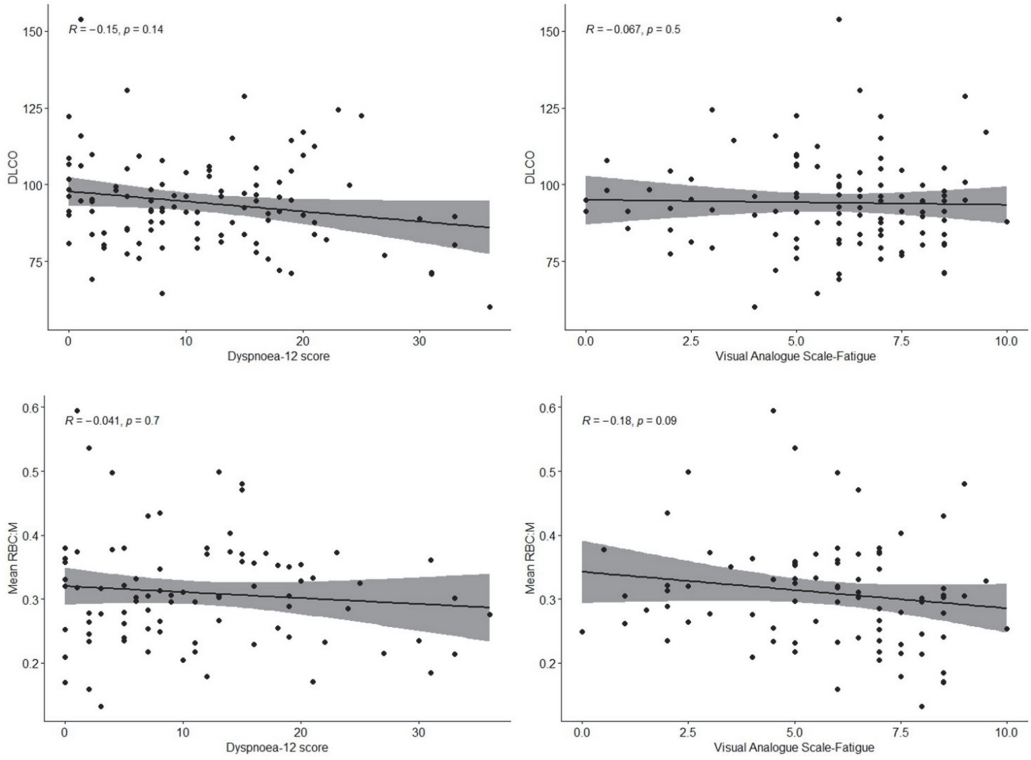
Results 8 patients with normal CT (6 months, n=7; 1 year, n=8; 2 years: n=5) and 25 patients with abnormal CT were recruited (6 months, n= 16; 1 year, n=14; 2 year, n=6).

Patients with normal CT showed abnormal xenon gas transfer (RBC:M) with no longitudinal change between 6 months and 1 year. TLCO Z-score was normal in 7/7 patients at 6 months, 7/8 patients at 1 year and 3/3 patients with data available at 2 years.

Patients with abnormal CT had significantly greater xenon gas transfer impairment at 1 year (6 months: p=0.056, 1 year: p=0.032) and lower TLCO Z-score predicted than patients, with normal TLCO Z-score in 4/16, 3/16, and 1/6 patients with data available at 6 months, 1 year and 2 years respectively.



Abstract S19 Figure 1



Abstract S20 Figure 1 No significant relationship between patient-reported symptoms (Dyspnoea-12 and Visual Analogue Scale-Fatigue) and objective lung function measures (DLCO and mean RBC:M).

Conclusions Xenon gas transfer can detect ongoing abnormalities in patients hospitalised due to COVID-19 up to two years after hospitalisation, including in patients with normal CT and PFTs.

Please refer to page A283 for declarations of interest related to this abstract.

S20 LONG-COVID: A MULTI-FACETED SYNDROME EXPLORED IN THE EXPLAIN STUDY (HYPERPOLARISED XENON MAGNETIC RESONANCE PULMONARY IMAGING IN PATIENTS WITH LONG-COVID)

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10.1136/thorax-2023-BTSabstracts.26

Background Never hospitalised Long-COVID(NHLC) patients are significantly affected by debilitating symptoms. EXPLAIN is a prospective, multi-centre, observational cohort study investigating breathlessness in these patients, comparing multi-parametric imaging (including hyperpolarised dissolved ^{129}Xe MRI (HPX-MRI)), Lung Function Tests(LFT), simple exercise tests, dyspnoea scores, blood markers of coagulopathy and endotheliopathy, structured light plethysmography-assisted breathing pattern assessment and questionnaire outcome measures in dyspnoeic (DLC,200 participants), non-dyspnoeic (NDLC,50) NHLC patients and asymptomatic post-COVID controls (C,50). Here, we explore the relationships of symptom-related questionnaire outcomes with DLCO and HPX-MRI metrics in NHLC patients.

Methods Adult NHLC patients were recruited from post-COVID clinics and COVID-19 recovered asymptomatic controls from the general population. Participants with significant smoking history or cardiorespiratory diseases were excluded. Low-dose CT and LFT were performed alongside the measurement of xenon gas transfer (via the global mean imaging ratio RBC:M) using HPX-MRI.

Results 189 participants have been recruited to date (DLC=113/200, NDLC=33/50, C=43/50). In this study, questionnaires were completed only by the patient cohorts (103 completed to date).

In the DLC and NDLC groups, the median time from infection was 466(305–745.8) and 301(219–584) days, Dyspnoea-12 score 13(7.75–19) and 2.5(0–5.25) and visual analogue scale-fatigue(VASF) score 6(4.5–7.125) and 7(5–7.625) respectively. The mean age was 45.8±12.5 and 48±11.3 years, BMI 28±5.8 and 28.4±6.7 kg/m,^{2} DLCO predicted 93.9±16% and 93.7±12.1% and mean RBC:M 0.325±0.086 and 0.305±0.089 in the DLC and NDLC groups respectively. In this interim analysis, CT score data was available in 77 patients, of which 76 had normal or near-normal CT findings (i.e. CT score<5) and 1 with a score of 11.

No significant correlation was found between DLCO and Dyspnoea-12(n=103,r=-0.15,p=0.14) or VASF(n=103,r=-0.067,p=0.5) scores; or between mean RBC:M and Dyspnoea-12(n=87,r=-0.041,p=0.7) or VASF(n=87,r=-0.18,p=0.09) scores using Spearman's rank correlation test (figure 1).

Conclusions Symptomatology in NHLC persists beyond a year of infection in those with unremarkable CT findings

and does not necessarily correlate with objective measures of lung function, which indicates the multi-faceted nature of the syndrome. Further quantitative and qualitative analysis of HPX-MRI data and its correlations with perfusion MRI, markers of coagulopathy and endotheliopathy, and breathing pattern assessment in our EXPLAIN cohort may provide insight into the different mechanisms driving symptoms in NHLC.

S21 SMALL AIRWAYS FUNCTION IN PATIENTS WITH LONG COVID-19 SYNDROME FOLLOWING HOSPITALISATION

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10.1136/thorax-2023-BTSabstracts.27

Background Reticulation, ground glass opacities and post-infection bronchiectasis are present three months following recovery in patients recovering from COVID-19 infection and are associated with the severity of acute disease, while scarce data exist on small airways impairment.

Aims To assess small airways function in previously hospitalised patients with long COVID-19 syndrome.

Methods 33 patients (mean±SD, 53±11 years) were recruited from June 2021 to August 2022, 149±90 days following hospital discharge. Pulmonary function tests, including spirometry, static lung volumes using the multiple breath nitrogen washout technique, and lung diffusion capacity for carbon monoxide were performed. Small airway function was evaluated by measuring closing volume using the single breath nitrogen washout technique (SBN2W).

Results BMI was 28.1±5.4% predicted, Forced Expiratory Volume at the 1st second (FEV_1) was 100±19% predicted, Total Lung Capacity (TLC) was 94±27% predicted and diffusion capacity for carbon monoxide (DLco) was 78±23% predicted. None of the patients exhibited an obstructive pattern in spirometry. Forced mid-Expiratory Flow ($FEF_{25–75}$) was 95±33% pred., Closing Capacity (CC) was 115±28% pred. and Functional Residual Capacity-Closing Capacity (FRC-CC) was 0.4 ±0.5 litres. Eight patients (24%) presented tidal airway closure, assessed via FRC-CC (-0.140±0.090 litres). Three patients (9.1%) presented with ventilation inhomogeneity assessed by increased slope of phase III (>120% predicted). FEF25–75 was abnormal in 3 (9.1%), whilst CC was abnormal in 14 patients (42%).

Conclusions Patients with long COVID-19 syndrome, developed following hospitalisation, present with small airways dysfunction and tidal airway closure.

'The beat goes on' – Novel data in mucociliary disorders

S22 LONGITUDINAL CHANGES IN CHEST CT IMAGING IN CHILDREN WITH PRIMARY CILIARY DYSKINESIA

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Introduction Primary Ciliary Dyskinesia (PCD) is a rare genetic disease, affecting ~400 children in England. Ciliary structural defects cause abnormal function, impairing mucociliary clearance. Mucus build-up and infection cause lung disease, including bronchiectasis. Little is known about disease progression in PCD. CT imaging identifies structural lung damage and alongside lung function could be used to measure disease severity. This study compared CT changes over time to identify disease progression in children with PCD linked to spirometry, infection, and ciliary defect.

Methods 278 children with confirmed PCD diagnosis were screened. Inclusion criteria were referrals between 2013–2022 and having two sequential lung CT scans according to an internal hospital guideline, ensuring children were scanned at similar ages. CTs were analysed using the Brody score. Demographic, anthropometric, ciliary defect, lung function, infection and treatment data were collected for patients using hospital records.

Results 61 children (30 male) had two CTs, mean age at first, 9.1 years, and second, 14.8 years. There was no significant change over time in total CT lung scores, median (IQR) 16 (6–26) and 14 (7.9–24.7), or lung function, mean $ppFEV_1$72.9% and 73.4%, ppFVC 81.1% and 83.1%. Dependent lobes scored higher, as expected. The sub-category score for bronchiectasis did increase over time, however 3 of the other sub-categories improved (mucus plugging, peribronchial thickening, parenchymal changes). CT score and lung function showed significant negative correlation at both CT time points ($r^2=0.25$, $p<0.0001$ at second). Increased CT scores were associated with increased chronic infections, at second CT. CT changes, anthropometrics and lung function did not differ significantly between ciliary defects.

Conclusion This large, longitudinal CT study in PCD showed no changes in total CT score or lung function in children aged 5 and over, contrasting with sparse and inconclusive evidence in the literature. This was a single-centre study, using a CT score derived from cystic fibrosis, which may have introduced bias and scoring limitations resulting in participants showing less progressed disease. Our findings suggest CT is a useful modality, alongside spirometry, to monitor disease progression. However, larger multicentre longitudinal studies, using a PCD-specific score, are required to validate this claim.

S23 ANTIMICROBIAL MANAGEMENT GUIDELINES FOR CHILDREN WITH PRIMARY CILIARY DYSKINESIA- A DELPHI CONSENSUS

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Introduction Primary ciliary dyskinesia (PCD) is a rare genetic disorder resulting in progressive lung disease due to recurrent respiratory infections. A recent international consensus statement regarding infection prevention and control in PCD[1] gave some framework for management of infection, but did not give specific suggestions regarding antimicrobial agents of choice, length of treatment or surveillance post treatment. The clinical leads of the NHS-England commissioned paediatric PCD service (PCD leads) agreed to prioritise this and develop best practice guidelines for antimicrobial management in paediatric PCD.

Methods Consensus guidelines were developed by a multi-stage process

1. Development of a framework of antimicrobial management based on current practice and available evidence.
2. Critical appraisal of the framework by the PCD leads and an expert pharmacist resulting in preliminary statements
3. A two-stage modified Delphi survey of the PCD leads followed by a review by an expert microbiologist to generate the final statements.

Statements were rejected if they failed to achieve 75% consensus or if they were independently rejected by either the pharmacist or microbiologist.

Results Twenty-seven statements under the following headings were examined and put forward to the Delphi process.

Abstract S23 Table 1 Managing first isolation of *Pseudomonas aeruginosa* (*PA*)

1. Typing (100%) *We suggest that clonal type of PA is determined by variable number of tandem repeats (VNTR typing) when PA is isolated for the first time, in discussion with microbiology team*
2. Treatment – drug and duration of therapy (100%) • *If child is well and there are no contra-indications: Ciprofloxacin p.o. 3–4 weeks plus nebulised Colistimethate sodium for 4 weeks is recommended. Until specific studies are done in PCD, we recommend using dosages as specified in the British National Formulary for children (BNFc).* • *If unwell and/or contra-indication to above: Consider i.v. antipseudomonal antibiotics, ideally a combination of two different classes. Suggested duration – 10 days to 14 days. In addition, prescribe nebulised Colistimethate sodium for 4 weeks as above.*
3. Monitoring following treatment (88%) • *Monitor for the regrowth of PA using surveillance sputum samples (2-3 sputum samples over a period of 2-4 weeks) done at least 2-4 weeks after completion of treatment.* • *In sputum non-producers, given the lower sensitivity of cough swabs, consider more frequent sampling or longer period of surveillance. Consider the use of induced sputum for monitoring regrowth.*
• Respiratory microbiological samples for surveillance
• Managing first isolation of *Pseudomonas aeruginosa* (PA)
• Management of regrowth and chronic isolation of PA
• Management of *Staphylococcus aureus*
• Management of *Moraxella catarrhalis* and *Haemophilus influenzae*
• Management of *Streptococcus pneumoniae*
• Antibiotic prophylaxis
• Management of a chest exacerbation while awaiting a positive culture report

Full consensus was achieved in 16 statements and partial (75–99%) consensus in 8. Two statements regarding 'Management of *Streptococcus pneumoniae*' were rejected based on expert microbiological review. The consensus statements regarding first isolation of *Pseudomonas aeruginosa* is shown in table 1 as an example.

Conclusions A standardised approach to antimicrobial respiratory management in children with PCD was developed which is likely to reduce variations in practice and improve their outcomes. A Delphi method was used successfully, and consensus statements were developed based on best practice. Scientific evidence is lacking and further research needs to be done.

REFERENCE

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S24 PROTEOMICS REVEALS DISTINCT DRIVERS OF CYSTIC FIBROSIS LUNG FUNCTION AND QUALITY OF LIFE OUTCOMES: POST-HOC ANALYSIS OF THE AZTEC-CF STUDY

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Introduction Lung function and quality of life are key outcomes in most interventional clinical trials conducted in people living with cystic fibrosis. However, the precise pathophysiological mechanisms leading to treatment related improvements in these outcomes are incompletely understood. In this post-hoc analysis of the Aztreonam Lysine for Treatment of Exacerbations of CF (AZTEC-CF) study we investigated proteomic changes in response to treatment and how these changes related to the clinical trial outcomes.

Methods Paired sputum samples collected pre and post 14 days of antibiotics for the treatment of an acute pulmonary exacerbation were included. After homogenisation and digestion, samples were analysed by nanoLC-MS/MS. Identification and quantification was performed in ThermoProteomeDiscover v2.5 and ProgenesisQIP v4.2 respectively. DESeq2 was used to calculate log-fold change for individual proteins and relationships between protein change and changes in lung function (% predicted FEV1) and quality of life (Respiratory Domain CFQ-R) were evaluated.

Results Paired samples from 13 patients, (samples n=26) were included for analysis. In this group, after 14 days treatment, average lung function improvement was +11.6% absolute improvement in% predicted FEV1, improvement in Respiratory Domain CFQ-R score was +11.1 points. For lung function, 20 of the top 30 (66%) differential proteins were bacterial derived. 22 proteins were significantly correlated with changes in lung function, 4 of which were

bacterial. For quality of life, 0 of the top 30 (0%) differential proteins were bacterial, 78 proteins were significantly correlated with changes in quality of life, all host-derived and completely distinct from those associated with lung function. Bacterial proteins were therefore significantly less likely to be associated with quality of life than lung function (Chi2 8.5, p=0.003).

Conclusion These results suggest changes in two key CF clinical trial outcomes (lung function and quality of life) may be underpinned by different pathophysiological mechanisms. Understanding these divergent mechanisms is vital to underpin optimal clinical trial design in CF in the modulator era.

S25 BENEFITS OF LUMACAFTOR/IVACAFTOR (LUM/IVA) INITIATION IN CHILDREN WITH CF AGED 2 THROUGH 5 YEARS: INTERIM RESULTS FROM AN ONGOING REGISTRY-BASED STUDY

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Objectives LUM/IVA has been shown to be safe and effective in people with CF, including children. This registry-based study evaluated long-term efficacy and safety of LUM/IVA in children aged 2 through 5 years at treatment initiation.

Methods LUM/IVA cohorts included children with CF homozygous for *F508del* (*F*/*F*) in the European CF Society Patient Registry who initiated LUM/IVA therapy between 15 January 2019 (approval) and 31 December 2020. Longitudinal trends in key outcomes were compared to 3 modulator-naïve cohorts: matched concurrent cohort of children heterozygous for *F508del* and minimal function mutation (*F*/MF) from same countries (AT,LU,DK,FR,IE,NL,SE,SI,CH,UK,DE) as LUM/IVA cohort (*F*/MF comparator [COMP]); matched concurrent cohort of *F*/*F* children from countries (HR,IT,CZ,LT, NO,PL) without commercial access to LUM/IVA as of 2020 (*F*/*F* COMP); and a historical cohort of *F*/*F* children from the same countries as LUM/IVA cohort.

Results LUM/IVA cohort matched to *F*/MF COMP included 681 children and LUM/IVA cohort matched to *F*/*F* COMP included 183 children. As of 31 December 2021, >90% remained on treatment (mean exposure 23 months). LUM/IVA cohorts had increases in BMI percentiles relative to *F*/MF COMP and *F*/*F* COMP (mean difference in absolute change from baseline 8.4 [95% CI: 5.5, 11.3] and 11.8 [95% CI: 5.9, 17.7], respectively) as well as to historical cohort, and reductions in pulmonary exacerbations (table 1) and hospitalizations relative to baseline, and relative to the *F*/*F* COMP in 2021.

Interim results from this study support the benefits of LUM/IVA initiation in children with CF aged 2 through 5 years.

Please refer to page A283 for declarations of interest related to this abstract.

S26 CLINICAL, MICROBIAL AND INFLAMMATORY CHARACTERISATION OF EOSINOPHILIC BRONCHIECTASIS

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Introduction Eosinophilic bronchiectasis is a recently described clinical entity defined by eosinophilic inflammation in the absence of asthma and/or allergic bronchopulmonary aspergillosis. This study aimed to characterise eosinophilic bronchiectasis, using two bronchiectasis patient cohorts, to determine whether eosinophilia represents a treatable trait in bronchiectasis and whether eosinophilia predicts response to inhaled corticosteroids (ICS).

Methods We utilised data collected via the EMBARC registry, a prospective observational bronchiectasis cohort. CT-confirmed bronchiectasis patients without asthma, COPD and/or ABPA were included. A blood eosinophil count (BEC) ≥400cells/μL indicated eosinophilic disease, while a BEC

Abstract S25 Table 1

Annual risk of pulmonary exacerbation leading to hospitalization	Matched to *F*/MF COMP			Matched to *F*/*F* COMP		
Year	LUM/IVA Cohort (n = 681) Risk,%	*F*/MF Concurrent COMP Cohort (n = 681) Risk,%	Relative Risk (95% CI)	LUM/IVA Cohort (n = 183) Risk,%	*F*/*F* Concurrent COMP Cohort (n = 183) Risk,%	Relative Risk (95% CI)
Baseline (2018)	18.7	14.9	1.26 (0.99, 1.59)	22.0	21.5	1.02 (0.69, 1.51)
Enrollment (2019)[1]	17.3	13.3	1.30 (1.01, 1.67)	16.9	19.3	0.88 (0.56, 1.36)
Enrollment (2020)[1,2]	14.3	9.9	1.44 (1.07, 1.93)	13.1	13.7	0.96 (0.56, 1.62)
2021[2]	9.2	10.3	0.89 (0.64, 1.25)	6.0	21.4	0.28 (0.14, 0.54)

[1]Treatment effect is not expected to be notable during enrollment years; [2]Outcome patterns in 2020 and 2021 are potentially affected by the COVID-19 pandemic.

<400cells/μL indicated non-eosinophilic disease. Exacerbations during annual follow-up were analysed using negative binomial modelling. In a nested mechanistic cohort, CT-confirmed bronchiectasis patients without asthma and/or ABPA were studied. Patients were selected based on a BEC ≥300cells/μL, indicating eosinophilic disease, or a BEC ≤150cells/μL, indicating non-eosinophilic disease. Participants underwent age- and sex-matching prior to analysis. Microbial differences were analysed by 16s rRNA sequencing and/or multiplex PCR for respiratory pathogens. Sputum cytokines were measured by MSD multiplex cytokine panel or ELISA.

Results We included 4269 bronchiectasis patients with BEC data. 302 patients were eosinophilic (6.8%). Eosinophilic disease was more common in males (42.1% vs 30.2%, p<0.001) and was associated with reduced FEV1 (77.1% vs 83.0%, p=0.002). In the mechanistic subcohort (n=102), 49 patients were eosinophilic (48.0%) and 53 were non-eosinophilic (52.0%). Here, eosinophilic disease was associated with PCR positive sputum for *P. aeruginosa* (p=0.033). No difference in clinical status, including FEV1 (p=0.19), bronchiectasis severity index (p=0.79) or exacerbations (p=0.96), was observed between eosinophilic and non-eosinophilic disease. Sputum inflammatory profiles also showed no marked difference. ICS use was significantly increased in eosinophilic disease in both cohorts (EMBARC 42.4% vs 32.3%, p<0.001; subcohort 57.1%-vs-30.2%,-p=0.006). In EMBARC, eosinophilic ICS users had reduced exacerbations (RR0.70 95% CI0.59–0.84, p<0.001) and hospitalisations (RR0.56 95% CI0.35–0.90, p=0.016) during follow-up, while eosinophilia associated with increased exacerbations in ICS non-users (RR1.17 95%CI1.00–1.38, p=0.053).

Conclusions Eosinophilic bronchiectasis is an observable clinical phenotype associated with male sex, airway *P. aeruginosa* infection and a higher clinical use of ICS. Inflammatory profiles within this group are complex and heterogeneous. ICS modifies disease outcomes in those with eosinophilia.

Please refer to page A283 for declarations of interest related to this abstract.

S27 THE RELATIONSHIP BETWEEN NEUTROPHILIC INFLAMMATION AND THE AIRWAY MICROBIOME USING NOVEL FULL LENGTH 16S RRNA SEQUENCING IN BRONCHIECTASIS

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Introduction The relationship between neutrophilic inflammation and microbiome dysbiosis, two central features of bronchiectasis pathophysiology, is not fully understood. We used novel full length 16s rRNA sequencing, which provides detailed characterisation of bacterial communities at species level, to investigate the relationship between microbiome composition and markers of neutrophilic inflammation in bronchiectasis airways.

Methods The neutrophil serine protease Proteinase-3 (PR3) and the neutrophil granule protein Olfactomedin-4 (OLFM4), were measured by ELISA in sputum supernatant from patients enrolled in the pan-European, multicentre EMBARC-BRIDGE study. Results were linked to sputum levels of neutrophil elastase (NE), a known bronchiectasis severity marker, and to relative abundance of taxa at species level in sputum measured by full length 16s rRNA sequencing.

Results 143 patients were included. Mean age was 65 yrs (± 16) and 48% were female. Sputum PR3 and OLFM4 were strongly correlated (r_s=0.73, p<0.001). Both were moderately correlated with NE (r_s=0.54 and r_s=0.4 respectively, p<0001). Median PR3 and OLFM4 were significantly higher in patients with *Pseudomonas aeruginosa* infection (p=0.002 and p<0.001), mucus plugging on chest computed tomography (p=0.006 and p=0.045) and hospitalisation for severe exacerbation (p=0.07 and p=0.05). Patients were grouped into high and low biomarker levels based around the median concentration. Table 1 shows bacterial species with highest relative abundance in samples grouped by high and low PR3, OLFM4 and NE. Linear discriminant analysis Effect Size (LEfSe) showed that the proteobacteria *Haemophilus influenzae* and *P. aeruginosa* were the most differentially abundant species defining patients with high PR3, OLFM4 and NE. In patients with low sputum PR3 and OLFM4, *Rothia mucilaginosa* was the most differentially abundant species; whereas unclassified *Streptococcus* differentiated those with low NE. Alpha diversity, measured using the Shannon index, was lower among patients with high PR3 (p<0.001), OLFM4 (p<0.001) and NE (p=0.034). Beta diversity analysed by PERMANOVA revealed distinct clusters defined by high and low PR3, OLFM4 and NE levels.

High sputum PR3, OLFM4 and NE levels are associated with microbiome dysbiosis, characterised by predominance of proteobacteria and reduced alpha diversity. PR3 and OLFM4 were more strongly associated with dysbiosis than NE and warrant further investigation as biomarkers in bronchiectasis.

Abstract S27 Table 1 Relative abundance (%) of Haemophilus influenzae, Pseudomonas aeruginosa, Rothia mucilaginosa and unclassified Streptococcus in bronchiectasis patients with high (above the median concentration) and low (below the median concentration) sputum proteinase-3 (PR3), olfactomedin-4 (OLFM4) and neutrophil elastase (NE).

	PR3		OLFM4		NE	
Median sputum concentration (ng/ml)	425.6		640.24		747.5	
Bacterial Species	**PR3 high**	**PR3 low**	**OLFM4 high**	**OLFM4 low**	**NE high**	**NE low**
Haemophilus influenzae	27.91%	3.58%	27.23%	3.47%	18.55%	15.48%
Pseudomonas aeruginosa	9.04%	0.29%	8.92%	0.09%	8.54%	2.02%
Rothia mucilaginosa	3.90%	8.73%	3.88%	8.95%	5.59%	6.51%
Unclassified *Streptococcus*	11.04%	15.21%	12.73%	13.17%	8.37%	16.97%

'How to save a life' – T2 inflammatory profiles in COPD

S28 NON-INVASIVE NASAL SAMPLING USING NASOSORPTION MAY IDENTIFY COPD INFLAMMATORY PROFILES AND HAVE A ROLE AS A DIAGNOSTIC TOOL IN EXACERBATIONS

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COPD is a heterogenous disease and there is ongoing need to identify biomarkers for treatable endotypes. Nasosorption is a non-invasive and safe way of sampling the respiratory tract to obtain undiluted endothelial lining fluid. This study investigates whether nasosorption can be used to characterise COPD.

Nasosorption was performed on 23 non-smokers and 32 COPD patients and MSD (Mesoscale Discovery) used to measure an array of cytokines. IL-4 (NSm:3.06±1.49ng/ml, COPD:0.07±0.03ng/ml), IL-5 (NSm:8.2±2.51ng/ml, COPD:2.03±0.66ng/ml), IL-6 (NSm:20.00±2.73ng/ml, COPD:12.89±2.73ng/ml), CXCL-8 (NSm:4729.2±703.7ng/ml, COPD:2378.3±404.6ng/ml) and IFNγ (NSm:108.37 ±46.81ng/ml, COPD: 12.93±11.17ng/ml) were significantly lower in COPD than non-smokers. Eotaxin was higher in COPD (NSm:2.90±0.57ng/ml, COPD:6.53±1.12ng/ml). The COPD cohort was further analysed to look at commonly identified clinical phenotypes. Nasal eotaxin was raised in the high blood eosinophil cohort (>300cells/100µl) compared to low eosinophil cohort (7.93±2.66ng/ml vs 2.91±1.14ng/ml, $p<0.05$), but other TH2 cytokines such as IL-4, IL-5, IL-13 did not differ. 16% of COPD patients had co-existing bronchiectasis. These patients had significantly higher nasal IL-7 (109.7±6.0ng/ml vs 56.9±7.9ng/ml, $p<0.05$), CXCL10 (4446.0±1540.0ng/ml vs 949.5±237.7ng/ml, $p<0.01$), CXCL11 (6.41±5.32ng/ml vs 0.30±0.9ng/ml, $p<0.01$) and CCL17 (56.1±6.8ng/ml vs 32.3±4.1ng/ml, $p<0.05$). Comparing frequent (≥2 exacerbations/year) against infrequent exacerbators (<2/year) there were non-significant trends of increased IL-6 (15.7±4.1ng/ml vs 7.68±2.81ng/ml) and reduced IL-13 (8.8±3.1ng/ml vs 17.9±3.9ng/ml) and IL-33 (63.8±23.2ng/ml vs 144.1±63.1ng/ml) in frequent exacerbators.

16 COPD patients were sampled at exacerbation and >4 weeks after recovery. IFNγ was higher during exacerbation than on recovery (729.6±591.2ng/ml vs 2.2±1.3ng/ml, $p<0.05$), with a trend towards higher levels in viral vs non-viral exacerbations. Other markers known to be associated with viral infections such as IFNα, CXCL10 and TSLP were non-significantly increased in viral vs non-viral exacerbations. There was also a trend towards eotaxin levels being raised during exacerbation, with higher levels in non-bacterial rather than bacterial exacerbations (Non-bact:4.02±2.57ng/ml, Bact: 3.46±1.48ng/ml, $p<0.05$).

We show that nasosorption may identify differences in inflammatory profiles in COPD. As a non-invasive test, its potential for qualifying exacerbations in a less stable patient is particularly relevant. A larger study is needed to cohort COPD phenotypes based on nasal inflammation and assess its use as a diagnostic test during exacerbations.

S29 ASSOCIATION BETWEEN STABLE STATE BLOOD EOSINOPHILS COUNTS (BEC), BASOPHILS AND EOSINOPHIL/BASOPHIL RATIO (EBR) WITH COPD EXACERBATIONS

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Introduction COPD is a heterogenous condition with multiple endotypes including eosinophilic airway inflammation. Blood eosinophils have been identified as a treatable trait in COPD. There is increasing interest in the role of basophils and eosinophil/basophil ratio (EBR) in COPD.[1]

Aims The blood eosinophils in COPD (BECCOPD) study is assessing whether the highest of ≥3 BEC within 24 months is a suitable surrogate for stable state BEC. We assessed the association of stable state, BEC, basophils and EBR with exacerbation frequency in BECCOPD participants 12 months before and after recruitment.

Methods Eligible patients, stable at baseline, were recruited to the BECCOPD study from both primary and secondary care. Stable state full blood count was collected at first study visit.

Moderate and severe exacerbation frequency were collected from primary and secondary care health records. Participants were split into a low and high exacerbation frequency group.

Mean BEC, basophils and EBR were compared between groups using a two tailed t-test.

Results 188 participants were included in the prospective analysis, 192 in the retrospective analysis. Mean (SD) age70 (8), Mean (SD) FEV1% predicted 55 (22), 51% female, median eMRCD 3 (3–4). The mean and SD values are shown in table 1.

Conclusion Increased BEC was seen in the higher exacerbation group consistent with other larger observational studies. A

Abstract S29 Table 1 Comparison of mean BEC, basophils and EBR in BECCOPD participants split into low and high exacerbation frequency groups during 12 month periods before and after study recruitment

	12-month prospective period			12-months retrospective period		
	0 -1 moderate exacerbations	≥2 moderate exacerbations or 1 severe exacerbation	p-value	0 -1 moderate exacerbations	≥2 moderate exacerbations or 1 severe exacerbation	p-value
Subjects (n)	89	99		85	107	
BEC	0.19 (0.13)	0.24 (0.15)	0.04	0.20 (0.13)	0.23 (0.15)	0.1
Basophil	0.06 (0.03)	0.06 (0.03)	0.70	0.07 (0.03)	0.06 (0.03)	0.006
EBR	3.41 (2.48)	4.52 (3.81)	0.02	3.0 (1.92)	4.73 (3.91)	0.0001

raised peripheral EBR was significantly associated with more exacerbations in both analyses driven by primarily higher BEC as well as low basophils.

Acknowledgements The BECCOPD study is funded by GSK via the supported studies program.

REFERENCE

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S30 TEMPORAL STABILITY OF BLOOD EOSINOPHIL ENDOTYPE IN COPD

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Introduction Blood eosinophil counts (BEC) are used to direct ICS therapy in COPD. BEC are variable and can move across treatment thresholds over time. Multiple factors can influence the stability of BEC. Identification and assessment of potential surrogate markers for stable state BEC over time would be helpful.

Aims The blood eosinophils in COPD (BECCOPD) study is assessing whether the highest of ≥3 BEC within 24 months is a suitable surrogate for stable state BEC. We compared the stability of the highest and second highest BEC over 10 years.

Methods Patients with spirometry confirmed COPD, stable at baseline, were recruited from primary and secondary care. BEC over the first and last 3 years within the previous 10 years were captured and converted to 1 decimal place for reporting consistency. Only patients with 3 or more BEC within both time periods were included. The highest and second highest BEC between both time frames were compared using a paired t-test.

Results 145/235 (62%) of participants were included in this analysis. Mean age 71 (7), mean FEV1% predicted 57 (22), 58% female, median eMRCD 4 (3–4).

When comparing the highest BEC between the two groups, 101/145 (69.66%) were in the same GOLD guideline threshold, 20/145 (13.79%) moved into a lower threshold and 24/145 (16.55%) into a higher threshold.

The mean and SD values are shown in table 1.

The intraclass correlation coefficient between the two groups for highest BEC was 0.555 and 0.670 for the second highest BEC indicating moderate reliability for both.

Conclusion Blood eosinophil endotype varied over a ten-year period. The ICC for both measures of BEC showed a moderate correlation but was better when comparing the second highest BEC. This shows promise as a surrogate marker of eosinophil endotype.

Acknowledgements The BECCOPD study is funded by GSK via the supported studies program.

Abstract S30 Table 1 Comparison of mean highest and second highest BEC in BECCOPD participants in the first and last 3 year time periods.

	First 3 years	Last 3 years	p-value
Highest BEC	0.3 (0.3)	0.3 (0.2)	0.04
Second highest BEC	0.3 (0.2)	0.2 (0.2)	0.08

S31 EFFICACY OF DUPILUMAB IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH TYPE 2 INFLAMMATION BY BASELINE BLOOD EOSINOPHIL COUNT

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10.1136/thorax-2023-BTSabstracts.37

Rationale Chronic obstructive pulmonary disease (COPD) is characterized by progressive lung function decline and worsening symptoms, accelerated by recurrent exacerbations. Type 2 (T2) inflammation may play a significant role in a subset of patients with COPD. Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for interleukin (IL)-4 and IL-13, key and central drivers of T2 inflammation.

Methods BOREAS (NCT03930732) was a 52-week, phase 3, placebo-controlled trial of the efficacy and safety of subcutaneous add-on dupilumab 300 mg q2w vs placebo in COPD patients with moderate-to-severe airflow limitation with T2 inflammation (blood eosinophils ≥300 cells/μL at screening) on triple therapy with inhaled corticosteroids (ICS), long-acting β2-agonists (LABA), and long-acting muscarinic antagonists (LAMA) (or LABA/LAMA if ICS was contraindicated). Primary endpoint: annualized rate of moderate or severe exacerbations (AECOPD). Secondary/other endpoints: change from baseline in pre-bronchodilator FEV_1 at Weeks 12/52; change from baseline in St. George's Respiratory Questionnaire (SGRQ) total score and E-RS: COPD RS-Total Score at Week 52; SGRQ responders with ≥4-point improvement from baseline at Week 52; blood eosinophil levels over time; and safety.

Results 939 participants were randomized to placebo (N=471) or dupilumab (N=468). Treatment groups were balanced at baseline. Dupilumab met all multiplicity-adjusted endpoints. Dupilumab demonstrated a 30% reduction in the annualized rate of AECOPD (p=0.0005). In the entire study population, dupilumab vs placebo significantly increased pre-BD FEV_1 at Week 12 (least squares mean (LSM) difference vs placebo: 83 mL, p<0.0001); through Week 52 (83 mL, p=0.0003). Dupilumab demonstrated greater improvement from baseline in pre-BD FEV_1 at Week 52 in the subgroup of patients with baseline blood eosinophils ≥300 cells/μL (table 1). Median change from baseline in blood eosinophils was â€ '30.00 cells/μL in both groups at Week 52. Safety was similar in the dupilumab and placebo groups. TEAEs were balanced between placebo and dupilumab groups. No clinically symptomatic eosinophilia was observed.

Conclusions Dupilumab is the first biologic to significantly improve exacerbations, lung function, health-related quality-of-life, and symptoms in COPD patients with T2 inflammation.

Abstract S31 Table 1 Change from baseline in pre-bronchodilator FEV_1 (L) at Week 52, in patients with blood eosinophils < or ≥ 300 cells/μL at baseline

	Placebo (N=471)	Dupilumab 300 mg q2w (N=468)
Baseline eosinophils count		
<300 cells/μL		
Baseline		
Number	186	179
Mean (SD)	1.30 (0.46)	1.28 (0.47)
Median	1.21	1.19
Q1 ; Q3	0.97 ; 1.55	0.94 ; 1.58
Min ; Max	0.5 ; 2.8	0.4 ; 3.4
Week 52		
Number	166	161
Mean (SD)	1.36 (0.52)	1.43 (0.61)
Median	1.27	1.32
Q1 ; Q3	0.95 ; 1.61	1.02 ; 1.79
Min ; Max	0.5 ; 3.2	0.4 ; 3.5
Change from baseline		
Number	166	161
Mean (SD)	0.03 (0.31)	0.12 (0.45)
Median	-0.02	0.01
Q1 ; Q3	-0.13 ; 0.16	-0.09 ; 0.20
Min ; Max	-0.7 ; 1.8	-0.5 ; 2.7
Number of participants in the model	185	179
LS Mean (SE)[a]	0.043 (0.033)	0.108 (0.033)
LS Mean Diff, 95% CI[a]		0.065 (-0.012 to 0.143)
≥300 cells/μL		
Baseline		
Number	285	288
Mean (SD)	1.33 (0.47)	1.29 (0.44)
Median	1.22	1.23
Q1 ; Q3	1.00 ; 1.60	0.94 ; 1.57
Min ; Max	0.5 ; 3.4	0.4 ; 2.7
Week 52		
Number	254	265
Mean (SD)	1.41 (0.53)	1.45 (0.55)
Median	1.34	1.37
Q1 ; Q3	1.04 ; 1.69	1.02 ; 1.85
Min ; Max	0.5 ; 3.6	0.5 ; 3.2
Change from baseline		
Number	254	265
Mean (SD)	0.07 (0.32)	0.16 (0.35)
Median	0.02	0.08
Q1 ; Q3	-0.13 ; 0.19	-0.05 ; 0.27
Min ; Max	-0.6 ; 1.3	-0.6 ; 2.0
Number of participants in the model	284	287
LS Mean (SE)[a]	0.085 (0.023)	0.181 (0.022)
LS Mean Diff, 95% CI[a]		0.096 (0.042 to 0.150)
Overall p-value for interaction[b]		0.4662

MMRM: Mixed-effect Model with Repeated Measures; ICS: Inhaled Corticosteroid; FEV1: Forced Expiratory Volume in one second

[a] Derived from MMRM model with the change from baseline in FEV1 values up to Week 52 as response variables, and factors for treatment group, age, sex, height, region (pooled country), ICS dose at baseline, smoking status at screening, visit, treatment-by-visit interaction, baseline pre-bronchodilator FEV1, and FEV1 baseline-by-visit interaction (except where subgroup of interest)

[b] Derived from MMRM model with the change from baseline in pre-bronchodilator FEV1 up to Week 52 as response variables, and treatment group, age, sex, height, region (pooled country), ICS dose, smoking status at screening, visit, treatment-by-visit interaction, baseline pre-bronchodilator FEV1, and FEV1 baseline-by-visit interaction, subgroup (if different than the aforementioned covariates), subgroup-by-treatment interaction and subgroup-by-treatment-by-visit interaction as covariates.

The dupilumab safety profile was consistent with other dupilumab indications.

Please refer to page A283 for declarations of interest related to this abstract.

'Revolution' – Updates from UK cancer screening

S32 IMPLEMENTING LUNG CANCER SCREENING IN THE UK: BASELINE RESULTS FROM THE NHS ENGLAND NATIONAL 'TARGETED LUNG HEALTH CHECK' PROGRAMME

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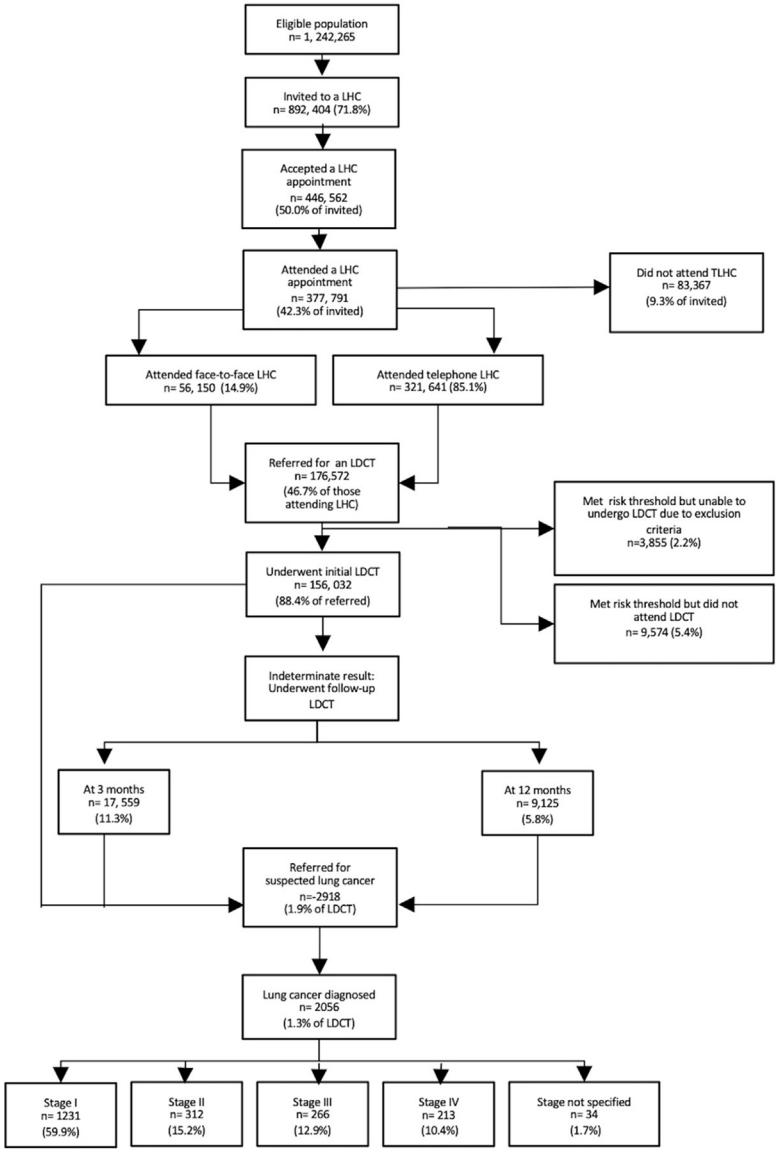
10.1136/thorax-2023-BTSabstracts.38

Background Lung cancer screening (LCS) with low-dose CT (LDCT) reduces lung cancer mortality. National implementation is now recommended in England, with government support announced. Following successful UK pilot studies between 2016–2019, NHS England (NHSE) launched the Targeted Lung Health Check (TLHC) programme. This abstract summarises lung cancer detection data from the combined NHSE TLHCs.

Methods In 2019, face-to-face or telephone lung health checks (LHCs) commenced for ever-smokers aged 55–74 in underserved populations with high lung cancer mortality. Current smokers are offered Very Brief Advice and cessation referral. Those at higher risk of lung cancer (PLCOm2012 ≥1.51% or LLPv2 ≥2.5%) are offered LDCT reported by quality-assured thoracic radiologists with lung MDT expertise using adapted British Thoracic Society nodule guidelines. The TLHC programme includes several phases of deployment, now incorporating 43 live sites. Site level data are presented for all phase



Abstract S32 Figure 1 Consort diagram showing key programme metrics. (LHC= lung health check; LDCT= low dose computed tomography thorax)

1 (original), phase 2 (onboarded) sites, and phase 3 (expansion) sites.

Results By March 2023, 892,404 people had been invited for a LHC across all TLHC 'live' sites. 377,791 attended a LHC (uptake rate 42.1%) of whom 176,572 were identified as high risk and offered LDCT screening. After DNAs/exclusions, 156,032 (88.4% of referred) participants underwent LDCT screening (LHC to CT conversion rate 41.3%).

2,056 participants have been diagnosed with lung cancer, equating to a prevalence of 1.3%. 75.1% were diagnosed at an early-stage (I-II). Further cancer diagnoses are expected from nodule surveillance. As a proportion of baseline LDCT, surveillance scans had been performed at 3mo (11.3%), and 12mo (5.8%) respectively. In parallel, rapid registration data for lung cancer showed greatest improvement in stage of diagnosis in the most deprived quintile.

Conclusions Through the work of a multi-disciplinary team, the NHSE TLHC programme, working across multiple project sites has successfully delivered LCS to high-risk participants across England. This has resulted in increased early stage diagnosis, especially for people experiencing higher deprivation. The programme continues to expand in a phased manner, and will play a key role informing full national LCS roll-out by 2030.

S33 PERFORMANCE OF VOLUME AND DIAMETER THRESHOLDS IN PREDICTING AND EXCLUDING MALIGNANCY IN SCREEN-DETECTED SOLID NODULES IN THE SUMMIT STUDY

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10.1136/thorax-2023-BTSabstracts.39

Background Indeterminate solid nodules are common in lung cancer screening and distinguishing malignant from benign nodules remains challenging. There is discrepancy between guidelines on whether diameter or volumetry should be used to assess size. The aim of this preliminary analysis was to report the performance of size thresholds in excluding nodules from further surveillance ('rule out') and identifying higher risk nodules requiring definitive assessment ('rule in') at baseline low-dose computerised tomography (LDCT).

Methods The SUMMIT study aims to assess the implementation of LDCT for lung cancer screening in a high-risk population and to validate a multi-cancer early detection blood test (NCT03934866).

LDCTs were reported by thoracic radiologists using CADe software (Veolity, MeVIS) with semi-automated volumetry. Nodule management was based on British Thoracic Society guidelines with solid non-calcified nodules $<80mm^3$ volume/ <5mm long-axis diameter not requiring further surveillance and those $\geq 300mmm^3/\geq 8mm$ with Brock risk ≥10% referred for definitive assessment.

Participants underwent LDCT at baseline and year 2, with randomisation to scan/no scan at year 1. Cancer outcomes were determined following referral to multi-disciplinary teams and from national registries, with cancers linked to individual screen-detected nodules. This study analyses outcomes from participants who had baseline LDCT prior to 01/04/2020.

Results 11,355 participants were included. Median follow-up was 3.45 years (IQR 3.22–3.62, minimum 3.04). 13,547 solid non-calcified nodules were identified in 5,924 participants, of which 203 were proven malignant. Malignancy risk increased with nodule volume (OR 1.001/$10mm^3$ increase, p<0.0001) and diameter (OR 1.255/1mm increase, p<0.0001).

2,220 more participants (3733 vs 1513, equivalent to 19.6% of the total cohort) were encompassed by the $<80mm^3$ volume threshold compared to the <5mm diameter threshold (table 1) with no significant difference in the negative predictive value (NPV) (99.54% vs 99.60%, p=0.9417).

Conclusion Our findings support BTS nodule guidelines with both diameter and volume-based rule-out thresholds achieving high NPV. A volumetric approach encompassed 19.6% more of the total screening cohort than a diameter approach, significantly and safely reducing the number of participants that required further surveillance scans. Future analysis of the SUMMIT cohort will further explore nodule metrics in predicting malignancy at baseline and subsequent LDCTs.

Please refer to page A283 for declarations of interest related to this abstract.

Abstract S33 Table 1 Performance of 'rule out' and 'rule in' size thresholds for the management of solid non-calcified nodules at baseline lung screening CT. Data is presented at a per-participant level, with participants represented by the largest solid nodule identified at baseline scan. Volumetric analysis excludes nodules where reliable segmentation could not be achieved. Diameter is the single longest axis. P value calculated by chi-squared test

	Diameter of largest solid nodule	Volume of largest solid nodule	p
"Rule out" threshold	**<5mm**	**$<80mm^3$**	
Cancers below threshold at baseline CT/ All ppts with largest nodule below threshold	7/1,513 **(0.46%)**	15/3,733 **(0.40%)**	-
Cancers below threshold at baseline CT/ All ppts with malignant solid nodule reported at baseline CT	7/203 **(3.4%)**	15/172 **(9.2%)**	0.0690
Benign nodule below threshold at baseline CT/ All ppts with benign solid nodule reported at baseline CT	1506/5722 **(26.3%)**	3718/5623 **(66.1%)**	<0.0001
Negative predictive value	**99.54%** (99.04-99.81)	**99.60%** (99.34-99.77)	0.9417
"Rule in" size threshold	**≥8mm**	**$\geq 300mmm^3$**	
Cancers above threshold at baseline CT/ All ppts with largest nodule above threshold	168/1,799	118/441	-
Cancers above threshold at baseline CT/ All ppts with malignant solid nodule reported at baseline CT	168/203 **(80.6%)**	118/172 **(68.6%)**	0.0020
Benign nodules above threshold at baseline CT / All ppts with benign solid nodule reported at baseline CT	1631/5722 **(28.5%)**	323/5625 **(5.7%)**	<0.0001
Positive predictive value	**9.34%** (8.03-10.79)	**26.76%** (22.68-31.15)	<0.0001
"Rule in" size threshold and Brock risk model ≥10%	**≥8mm and Brock ≥10%**	**$\geq 300mmm^3$ and Brock ≥10%**	
Cancer above threshold at baseline CT / All ppts with largest nodule above threshold	142/479	110/304	-
Positive predictive value	**29.65%** (25.59-33.96)	**36.18%** (30.78-41.86)	0.0672

S34 TARGETED LUNG HEALTH CHECK – NODULES: PRIOR IMAGING

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10.1136/thorax-2023-BTSabstracts.40

Objectives Targeted lung health checks (TLHC) with low dose computed tomography (LDCT) have been shown to identify an increased proportion of lung cancers at an earlier stage in the UK. The reporting of index LDCT without access to prior imaging affects many programs due to reporting capacity and the need for outsourcing. We assessed the impact of historical imaging on reported nodules through our local TLHC.
Methods All patients with TLHC index LDCT scan between 5/8/22 and 11/5/23 were included. Historical imaging within the Trust was identified via CRIS codes and if present was reviewed at the Specialist Review Meeting (SRM).
Results Of 4,422 index LDCT scans performed, nodules were reported in 674(15.2%). Of these 125(20%) patients had prior CT scans with a median interval time of 3.9[1.6–6.8] years. Nodules were present in 75(60%) of the prior CT images. In 67/75(89%) cases the nodules had improved or were stable.

In 7/75(11%) patients the nodules had increased in size. A progressive peri-cystic lesion was noted in one case (unmeasurable), four cases showed nodules <5mm, and two cases were >5mm. All were unreported. The median growth in diameter was 3[2.25–4.5]mm. A direct referral to the 2WW pathway was made in one patient.

The prior CT scans were dedicated thoracic imaging in 45 cases, while other CT imaging included CT coronary angiograms, CT colons and CT thorax-abdomen-pelvis. We found only 24/67(32%) of nodules were reported on the prior imaging. In those with dedicated prior thoracic imaging 19/45 (42%) were reported while in non-dedicated thoracic CT scans only 4/29(14%) were reported ($p<0.01$).
Conclusions Our data shows that 1 in 5 patients with reported nodules at index LDCT had relevant prior imaging. Of these the reported nodules were present in nearly two thirds. Most were stable and this avoided an additional 134 surveillance LDCT scans. This indicates that reporters of index LDCT should routinely have access to prior CT imaging.

S35 REAL-WORLD IMPACT OF TARGETED LUNG HEALTH CHECK (TLHC) PROGRAMME ON DOWNSTREAM ACTIVITIES IN THE SECONDARY CARE AND BEYOND: A PILOT SITE EXPERIENCE

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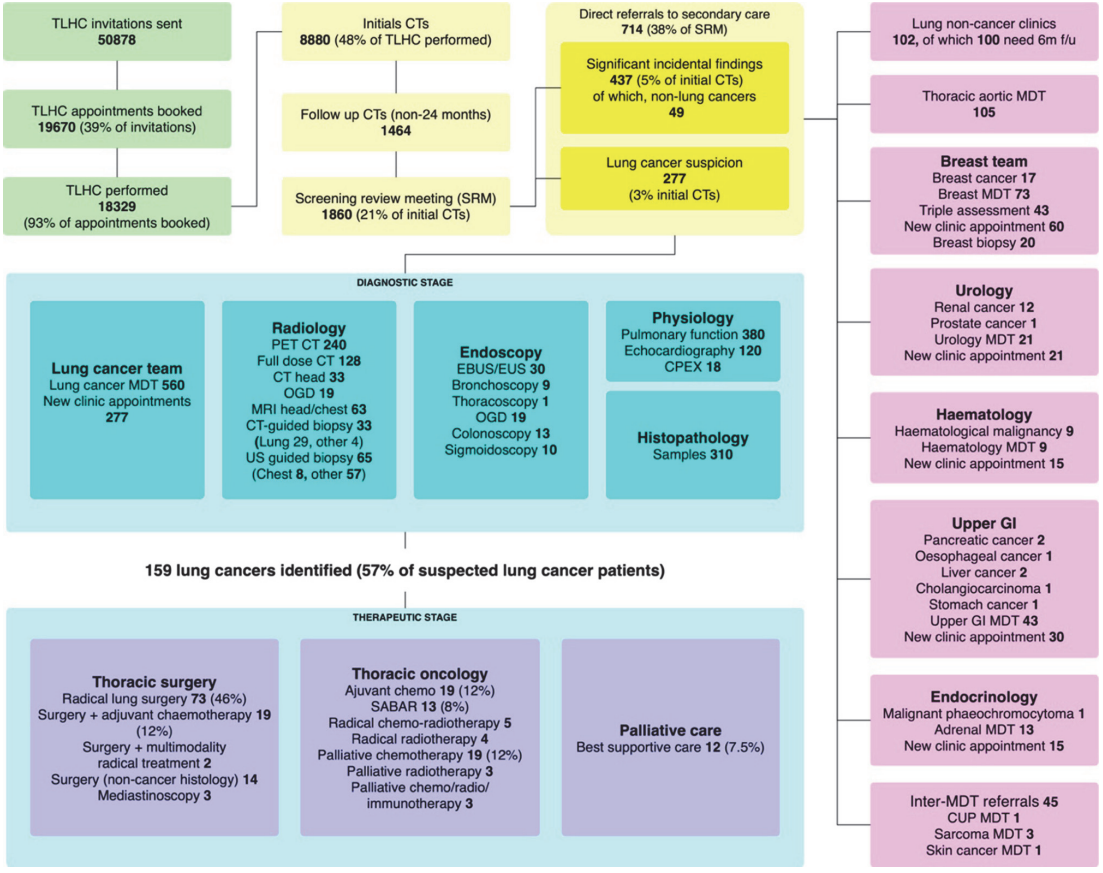
10.1136/thorax-2023-BTSabstracts.41

Introduction The national targeted lung health check (TLHC) screening programme is imminently due to be launched across the UK, following successful detection of early lung cancer in



Abstract S35 Figure 1

the pilot sites. Although TLHC proved life-saving, its impact on resources and specialist services is unknown. Here, we report real-life impact on diagnostic and therapeutic services at our phase 1 pilot site.

Methods A comprehensive prospective patient-level dataset capturing information discussed during the screening review meeting (SRM) was maintained. Intra- and inter-service interactions were recorded through the Infoflex information system, lung multi-disciplinary team (MDT) minutes, ICE electronic result system and Synapse imaging system. Our analysis excluded the initial CT workload, and focused solely on onward referrals from the SRM. Indirect referrals from primary care due to concerned GPs and patients were not included.

Results From April 2021 to April 2023, 159 lung and 49 other cancers were detected. 120 (76%) were diagnosed at stage I or II; 117 (74%) received curative cancer treatment. We observed a paradigm shift in early lung cancer staging, rising from 23% in 2018/19 to 43% in 2021/22.

Out of 8,880 initial CT scans and 1,860 cases discussed at the SRM, 714 (8% of initial CT scans) were referred to secondary care, leading to 590 new appointments, 490 discussions at various cancer MDTs, 105 discussions at the thoracic aortic MDT and > 50 discussions at the ILD MDT. 195 biopsies and cytological analyses (98 radiological, 63 endoscopies, 1 bone marrow, 1 thorocoscopy, 20 breast and 12 renal) were processed by the local histopathology department and 115 (post-surgery histology and 2 EUS) were processed by the tertiary-centre pathology unit. Further details on the impact on services are outlined in the diagram.

Conclusions The shift from late- to early-stage cancer detection resulted in an increase in PET-driven workup for early-stage cases, accompanied by a perceived reduction in the workload for late-stage cases. Incidental pathologies also imposed a significant onward workload. Careful capacity planning is needed to consider both direct and indirect referral pathways involving multiple disciplines. A further detailed economic analysis is needed to inform the true cost of the programme.

S36 OUTCOMES AFTER CURATIVE TREATMENT FOR PATIENTS DIAGNOSED WITH CLINICAL STAGE I LUNG CANCER IN THE YORKSHIRE LUNG SCREENING TRIAL

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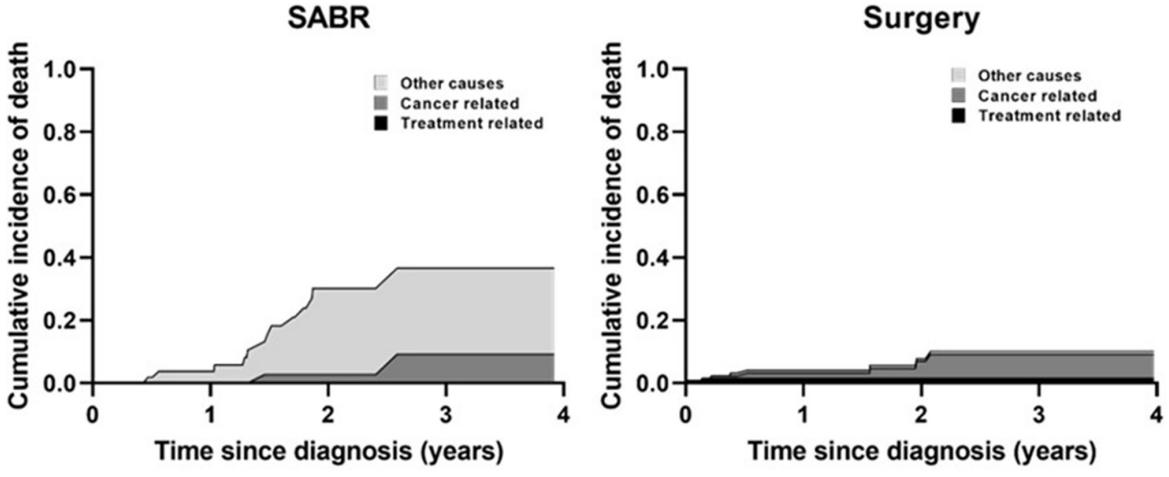
10.1136/thorax-2023-BTSabstracts.42

Introduction Lung cancer screening is currently being rolled-out across England following recommendation by the UK National Screening Committee in September 2022 and Ministerial approval in June 2023. The US Preventive Services Task Force recommendations for lung cancer screening specify that this should only be offered to people able and willing to have curative lung cancer surgery, whereas the NHS England Targeted Lung Health Check (TLHC) Standard Protocol recommends excluding people only if curative treatment would be contra-indicated.

Methods Clinical data for patients diagnosed with clinical stage I lung cancer in the Yorkshire Lung Screening Trial were reviewed. Parameters were compared between those having surgical resection versus Stereotactic Ablative Radiotherapy (SABR), and within the surgical group between those undergoing lobectomy versus sub-lobar resection (anatomical segmentectomy or wedge resection). Deaths following treatment were reviewed, and electronic records were used to determine whether deaths were due to treatment, lung cancer recurrence or non-cancer causes.

Results Of 197 patients diagnosed with clinical stage I lung cancer from 2019 to 2022, 59 were treated with SABR and 132 with lung resection (55 lobectomy, 62 segmentectomy, 15 wedge resection). FEV_1, DLco, and ISWT were lower for SABR compared to surgery cases ($p<0.0001$), but there were no differences in these parameters comparing lobectomy and sub-lobar resection. Of 116 surgical patients with adequate nodal staging, 13 (11.2%) were upstaged (9 following lobectomy, 4 following sub-lobar resection, $p=0.07$). There were 5 benign resections (3.8% of all surgical cases). With follow-up



Abstract S36 Figure 1 Cumulative incidence of death for participants diagnosed with clinical Stage 1 lung cancer following low-dose CT screening

from diagnosis to 01/01/2023 and a median time at risk of 18.9 months, 13 SABR and 8 resection patients died (p=0.005). Most deaths in the SABR group were from non-cancer causes (85%) (see figure 1).

Conclusions There were no differences in fitness tests between those patients undergoing lobectomy compared to sub-lobar resection. Patients treated with SABR were less fit than those having surgery and had worse overall survival due to non-cancer causes of death. Patients with limited life-expectancy due to co-morbidities may not benefit from participation in lung cancer screening but identifying such patients in the current TLHC pathway is challenging.

Please refer to page A283 for declarations of interest related to this abstract.

'Right here, right now' – Bench to bedside in pulmonary vascular disease

S37 MUTATIONS IN GCN2 CAUSE PULMONARY VASCULAR DISEASE VIA DYSFUNCTIONAL INFLAMMATORY PATHWAYS

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10.1136/thorax-2023-BTSabstracts.43

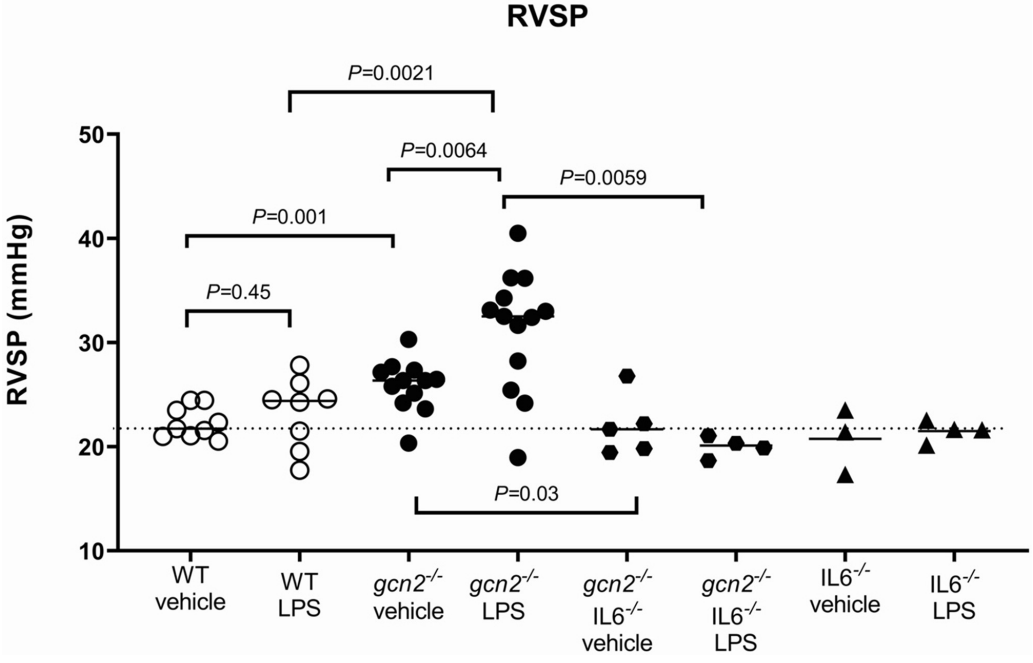
Introduction Mutations in eukaryotic translation initiation factor 2 alpha kinase 4 (EIF2AK4, or General Control Nonderepressible 2 [GCN2]) cause deadly forms of pulmonary hypertension such as pulmonary veno-occlusive disease (PVOD). GCN2 is a serine/threonine protein kinase, one of a family of 4 kinases that phosphorylate the α-subunit of the translation initiation factor eIF2, which activates a common adaptive pathway known as the Integrated Stress Response.

Methods We phenotyped the *gcn2*$^{-/-}$ mouse at baseline and created 2 independent mouse models of PVOD- the first using an inflammatory driver (lipopolysaccharide) on a background of genetic *gcn2* loss, and the second using mitomycin-c (which has an idiosyncratic side-effect of causing PVOD in patients).

Results GCN2 deficiency causes a mild pulmonary hypertensive phenotype, with a right ventricular systolic pressure (RVSP) of 28.1(±3.4)mmHg in *gcn2*$^{-/-}$ mice versus 24.7(±3.7) mmHg in the wild-type at baseline. Exposure to acute LPS creates a higher level of IL-6 and KC in *gcn2*$^{-/-}$ mice. Chronic administration of LPS exaggerates the RVSP response in *gcn2*$^{-/-}$ mice (32.6±4.3mmHg) but not in the wild-type. Genetic ablation of IL-6 ameliorated the development of pulmonary hypertension, with the *gcn2*$^{-/-}$*IL6*$^{-/-}$ mouse having a mean RVSP of 20.4 (±0.6)mmHg despite chronic exposure to LPS.

Administration of mitomycin-c raises the RVSP from 19.23 (±4.3)mmHg to 26.6(±3.8)mmHg in wild-type mice but not in the *IL6*$^{-/-}$ mouse. Single-cell RNA sequencing of wild-type and *gcn2*-deficient mouse lungs has allowed us to identify the specific cell-types responsible for the inflammatory phenotype. Serum samples from patients with GCN2-mutation-positive PVOD confirm increased IL-6 levels compared to healthy volunteers. Proteomics studies have shown that there is a heightened inflammatory response in GCN2-mutation-positive PVOD compared to healthy volunteers and that aspects of this response may differ from other kinds of mutation-driven pulmonary vascular disease.

Discussion and conclusions Mutations in GCN2 cause a hyperinflammatory phenotype and a baseline pulmonary hypertensive phenotype which is worsened by persistent inflammation. Genetic deletion of IL-6 ameliorates the pulmonary vascular disease in 2 independent mouse models of disease. We propose that IL-6 is a central pathway for the pathogenesis of heritable pulmonary veno-occlusive disease and anti-IL6 therapies may be clinically useful in treating PVOD patients.



Abstract S37 Figure 1

S38 INCIDENCE AND PHENOTYPIC PREDICTORS OF ARRHYTHMIAS IN IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

[1]SA Reddy, [2]JT Middleton, [3]SL Nethercott, [1]GJ Polwarth, [1]J Pepke-Zaba, [1]CA Martin, [2]AMK Rothman, [1]MR Toshner. *[1]Royal Papworth Hospital, Cambridge, UK; [2]Sheffield Teaching Hospitals, Sheffield, UK; [3]Addenbrookes Hospital, Cambridge, UK*

10.1136/thorax-2023-BTSabstracts.44

Introduction Arrhythmias are common in patients with idiopathic pulmonary arterial hypertension (IPAH) and thought to predict poor outcome. Previous studies have relied on short-term electrocardiographic surveillance to determine arrhythmia incidence, and prospective systematic analysis of arrhythmias in a large cohort of IPAH patients using implantable cardiac monitors (ICMs) is lacking.

Aims Establish the rate of arrhythmias in a prospective cohort of IPAH patients using ICMs.

Determine factors that predict arrhythmia occurrence in IPAH.

Elucidate whether arrhythmia incidence is related to adverse outcomes.

Methods ICMs were implanted into 80 IPAH patients across two UK Pulmonary Hypertension centres to detect cardiac arrhythmias. The rate and type of arrhythmias in IPAH patients was compared to 72 age- and sex-matched patients without IPAH who had ICMs implanted for clinical indications. Arrhythmia and clinical worsening events (defined as death, transplant or hospitalisation due to PAH worsening) were prospectively recorded over the follow-up period, and demographic and clinical characteristics associated with arrhythmia incidence were identified.

Comparisons of data were performed using analysis of variance, $\chi 2$ or Kruskal-Wallis calculations as appropriate. The Cox proportional-hazards multivariate model was used to resolve risk factors independently associated with significant arrhythmia occurrence. A two-tailed probability level of <0.05 was considered significant.

Results Over 186 patient-years follow-up, 79 arrhythmia events were noted in 32 (40%) IPAH patients vs 78 events in 29 (41%) comparator patients. Arrhythmia incidence was related to right atrial (RA) enlargement at time of implant, conduction disease at baseline and symptom reporting.

Arrhythmia incidence was associated with clinical worsening (figure 1).

20% of patients had targeted arrhythmia intervention as a direct consequence of ILR studies. Only right atrial size was independently associated with clinically significant arrhythmia on multivariate analysis.

Conclusion Arrhythmias occur frequently in IPAH patients and are associated with worse outcomes. RA enlargement is independently associated with clinically significant arrhythmia incidence. IPAH should be considered a high-risk group for continuous monitoring studies.

S39 LONG TERM OUTCOME IN CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION IN THE MULTIMODALITY TREATMENT ERA: A UK NATIONAL COHORT ANALYSIS

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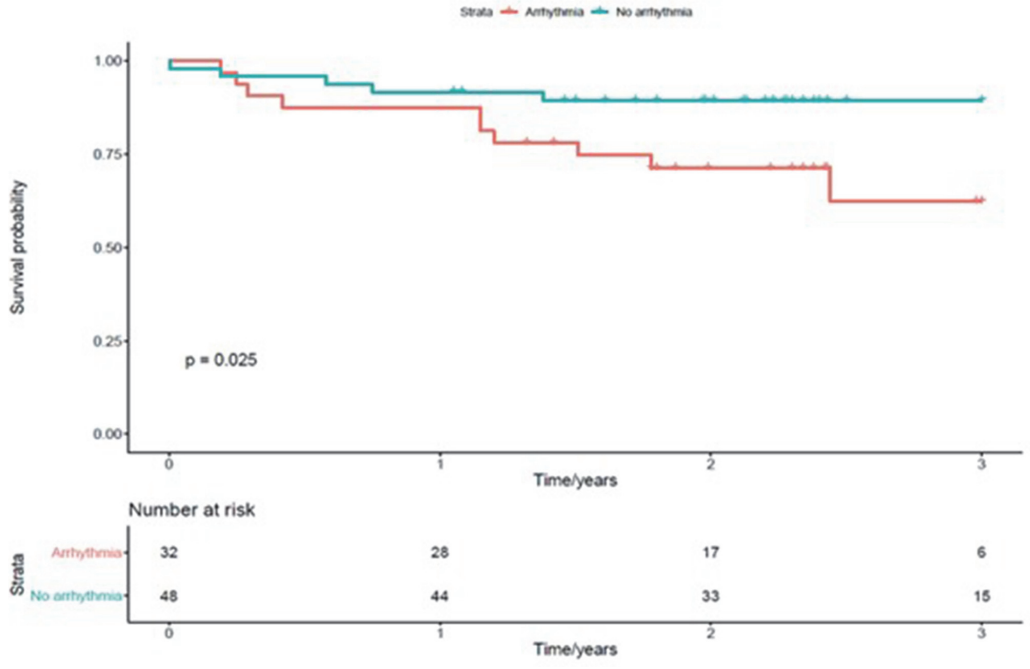
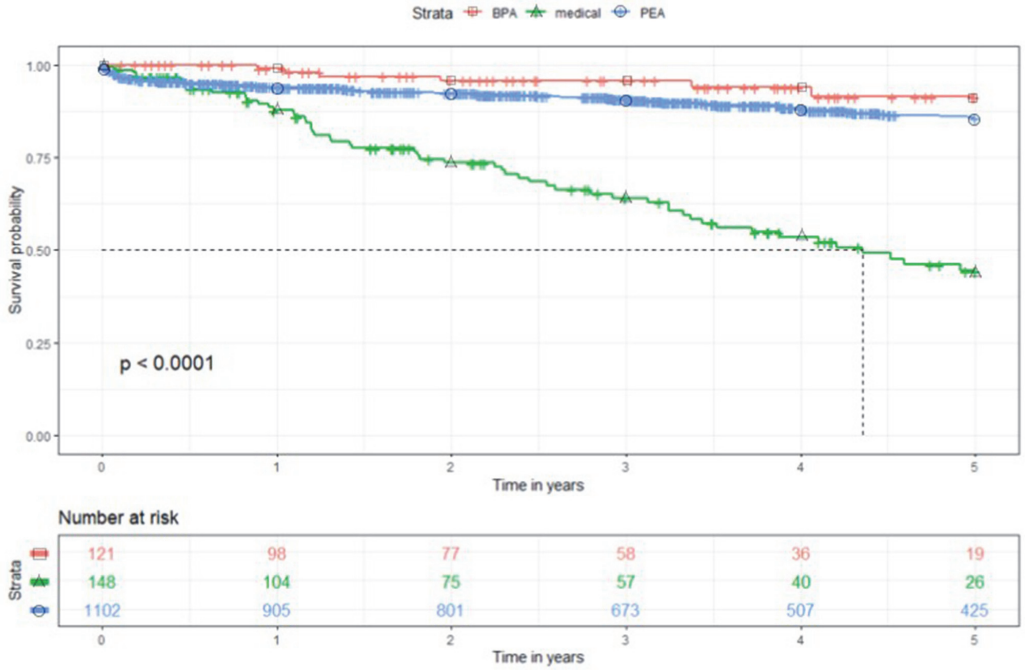
10.1136/thorax-2023-BTSabstracts.45

Introduction and Objectives Chronic thromboembolic pulmonary hypertension (CTEPH) treatment is multimodal and includes medical therapy, pulmonary endarterectomy (PEA) and balloon pulmonary angioplasty (BPA). However, there is limited outcome data since all three treatment modalities have been available. We compared the long-term outcome of PEA,



Abstract S38 Figure 1 Survival to clinical worsening event (death, transplant, pulmonary hypertension-related hospitalisation) as a function of presence or absence of arrhythmia



Abstract S39 Figure 1 Kaplan Meier Curves for all groups (PEA, BPA, and medical cohort)

BPA, and medical therapy in an era since all three modalities have become available.

Methods This is a retrospective review of CTEPH patients managed at the UK National CTEPH Centre between 2015 and 2022. Treatment modality decision was made by the multidisciplinary CTEPH team based on chronic thromboembolic disease distribution and comorbidities. Primary outcome measure was all-cause mortality. Secondary outcome measures were mean pulmonary arterial pressure (mPAP), pulmonary vascular resistance (PVR), 6-minute walk distance (6MWD), NTproBNP, at baseline and follow up after treatment. Long-term survival after treatment was assessed by Kaplan-Meier curves and log-rank analysis. Differences between groups were analysed with Wilcoxon test.

Results 1,394 CTEPH patients were treated with PEA (n=1102), BPA with medical therapy (BPA cohort, n=144) and medical therapy alone (medical cohort, n=148). Median ages were 60 years (PEA), 67 years (BPA) and 74 years (medical) (p<0.001). Survival of PEA, BPA and medical cohorts were 95%, 96% and 64% at 3 years (p<0.001), and 90%, 91% and 44% (p<0.001) at 5 years, respectively. Conditional 3-year PEA survival from first follow-up (excluding early mortality, <90 days), showed no significant difference between PEA and BPA (95 vs 96%, p=0.94). Subgroup analysis in the medical cohort showed poorest survival in technically operable patients with comorbidities, followed by technically operable patients who declined intervention, median survival 3.4 years and 3.9 years respectively. Reductions in mPAP (-17 vs -8mmHg, p<0.001) and PVR (-364 vs -175 dynes.sec.cm^{-5}, p<0.001) were significantly greater following PEA than BPA. PEA and BPA showed similar improvements in 6MWD and NTproBNP.

Conclusions CTEPH patients treated with PEA and BPA have excellent 5-year survival. Selected CTEPH patients managed with medical therapy alone had the poorest survival due to comorbidities and more advanced age. CTEPH is best managed by an experienced multidisciplinary CTEPH team and patients suitable for interventions have the best long-term outcomes.

S40 ERUPT: EVALUATION OF REAL-WORLD USE OF PULMONARY EMBOLISM (PE) THROMBOLYSIS

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10.1136/thorax-2023-BTSabstracts.46

Introduction PE is common and life-threatening. Thrombolysis with 100 mg alteplase is recommended in cardiac arrest and haemodynamic instability,[1] however best management for intermediate-risk PE is unclear. The PEITHO study demonstrated excess bleeding risk with thrombolysis in this setting; a randomised trial of reduced-dose thrombolysis will complete in 4 years.[2]

Trainees identified variability in thrombolysis use and uncertainty about best practice, prompting the selection of ERUPT, the first project delivered by the INSPIRE trainee respiratory research national network. This multicentre, retrospective observational study of patients treated with thrombolysis for PE aimed to describe current UK practice and patient outcomes.

Method Patients aged ≥18, treated with alteplase for acute PE during 1 year from 1st September 2021 were identified via pharmacy records. Patient and PE characteristics, treatment and outcomes were extracted.PE and thrombolysis incidence were estimated from local coding searches. The primary focus was complication rates; frequency of thrombolysis in non-high-risk PE and frequency of half-dose thrombolysis was also captured.

Results 25 sites in England and Northern Ireland contributed 170 cases. Comorbidity rates were generally low, although

10% had active malignancy. Coding searches suggested thrombolysis was used in 1.5% of PE cases, and 24.1% of cases with right heart dysfunction.

59% of thrombolysis occurred in high-risk PE, 39% occurred in intermediate-risk and 1% in low-risk. A reduced alteplase dose was used in 40% of high-risk and 12% of intermediate-risk cases.

Table 1A displays complication rates. Complications were recorded in 52.5% of high-risk and 23.9% of intermediate-risk cases. High-risk cases treated with reduced-dose thrombolysis had significant complications in 62.2% of cases (vs 46.0% treated with full-dose, p=0.148; Fisher's exact test).

Strikingly, almost half of PE thrombolysis involved practice outwith recommendations, although outcomes were not significantly worse. To complement future randomised trials, a registry of hospitalised PE cases would provide data to help clinicians navigate the thrombolysis decisions with their patients.

Abstract S40 Table 1

Table 1A: Outcomes for prespecified subgroups

High-risk (n=101)	Bleeding	Minor	15.83% (14)
		Moderate-Severe	9.9% (10)
	Outcome	ICH	6.9% (7)
		Death	42.2% (43)
		Unknown	3.0% (3)
		No complications	47.5% (48)
Intermediate-risk (n=67)	Bleeding	Minor	29.9% (20)
		Moderate -Severe	7.5% (5)
	Outcome	ICH	0% (0)
		Death	6.0% (4)
		Unknown	14.9% (10)
		No complications	76.1% (51)
Reduced-dose thrombolysis* (n=46)	Bleeding	Minor	13.0% (6)
		Moderate -Severe	6.5% (3)
	Outcome	ICH	0% (0)
		Death	47.8% (22)
		Unknown	6.52% (3)
		No complications	41.3% (19)
Highly comorbid† (n=21)	Bleeding	Minor	9.5% (2)
		Moderate -Severe	0% (0)
	Outcome	ICH	0% (0)
		Death	33.3% (7)
		Unknown	9.5% (2)
		No complications	42.9% (9)

Table 1B: Complication rates in high-risk cases by thrombolysis dose‡

	No complications	Major complications§	P value (Fisher's exact test)
Full-dose alteplase (n=63)	54.0% (34)	46.0% (29)	0.148
Reduced-dose alteplase (n=37)	37.8% (14)	62.2% (23)	

*40 high-risk, 6 intermediate-risk; †Age-adjusted Charlson comorbidity index $\geq$ 6; ‡1 case had unknown alteplase dose; §Any of moderate-severe bleeding, ICH, palliation, death by 4 weeks

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Please refer to page A283 for declarations of interest related to this abstract.

S41 A RETROSPECTIVE REVIEW OF THE CAUSES AND CIRCUMSTANCES OF DEATH OF PATIENTS WITH PAH AND CTEPH

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10.1136/thorax-2023-BTSabstracts.47

Objectives We provide the first European analysis of the cause and circumstances of death in patients with Pulmonary Arterial Hypertension (PAH) and Chronic Thromboembolic Pulmonary Hypertension (CTEPH)

Methods All deaths in the Pulmonary Vascular Disease Unit (PVDU) have had a cause of death analysis that included review of death certificates where available, review by the Morbidity & Mortality (M&M) clinician lead and additional review in the multidisciplinary M&M meeting. Deaths were deemed either directly related to pulmonary hypertension (PH), contributed to by PH or unrelated to PH following review by two PH Physicians. Deaths due to right ventricular failure were characterised as directly related to PH.

Results Mean age of death was 66.2 years in PAH and 69.4 years in CTEPH patients. Survival time increased from 43.5 months to 70.1 months (p = 0.016) in PAH patients diagnosed between 2010 – 2015 (n=62) vs. 2016 – 2021(n=91) and from 43.7 months to 69.5 months (p = 0.019) in CTEPH. 10% of patients (n=27) died in a PH centre, 44% (n=116) in their local hospital and 21% (n=55) in their own home or hospice. Location of death was unknown for 24% (n=64). Overall PH directly or indirectly contributed to death in (n =181) 69% of cases (PAH 70% and CTEPH 68%). PH was a contributor to death for patients diagnosed in 2010 – 2015 (68%) vs. 2016 – 2021 (67%). The commonest causes of non-PH related death were pneumonia (33%), neoplasia (22%) and ischaemic heart disease (18%).

Conclusions Although survival has improved in CTEPH and PAH with advancements in PAH therapy and CTEPH management, right ventricular failure continues to be a significant contributor to death.

'The kids aren't alright' – Does this child have asthma, or something else?

S42 DIAGNOSING ASTHMA IN CHILDREN – HOW CAN IT BE IMPROVED?

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10.1136/thorax-2023-BTSabstracts.48

Introduction National Institute for Health and Care Excellence (NICE) guideline (NG80) aims to aid asthma diagnosis in children and suggests sequential lung function testing. We compared diagnostic outcomes using NG80 to that of an 'expert panel' of respiratory consultants within the Rapid Access Diagnostics for Asthma (RADicA) study.

Method The RADicA study recruited children aged 5–16 years with symptoms suggestive of asthma. Clinical history, physical examination, and lung function [fractional exhaled nitric oxide (FeNO), spirometry, bronchodilator reversibility, peak expiratory flow variability, methacholine challenge] were assessed before and after inhaled corticosteroid treatment. The 'expert panel' reviewed results from all visits and assigned diagnostic categories of 'asthma', 'not asthma', 'possible asthma', or 'insufficient evidence'.

The NG80 algorithm was used to categorise participants into the same categories using results from the first study visit. If a child was unable to perform a test they were classed as insufficient evidence and stopped from progressing through the NG80 algorithm at that point. This process was then repeated allowing children a second attempt at spirometry and FeNO from study visit 2. Children in whom a diagnosis of 'asthma' was not confirmed, were reassessed with their methacholine challenge results. A positive challenge (PD20 < 0.2 mg) was used to confirm 'asthma'; negative challenge resulted in no change in category and if no challenge was performed classed as 'Insufficient evidence'.

Results 127 children [mean age (SD) 9 (3) yrs] were enrolled into the study and completed visit 1; 112 children attended visit 2. Diagnostic categories are shown for each method in the table 1 below.

Expert panel gave 56% of children a diagnosis of 'asthma' and 20% 'not asthma'. Allowing children, a second attempt at spirometry and FeNO increased the number with confirmed 'asthma' and reduced those classed as insufficient evidence, compared with one attempt. A methacholine challenge in those without a confirmed asthma diagnosis following NG80 recommended testing, significantly increased the number of children with a diagnosis of asthma.

Conclusion Repeating simple tests in primary care may improve diagnosis and reduce the number requiring further referral. Methacholine challenge further improved the number with confirmed 'asthma'.

Please refer to page A283 for declarations of interest related to this abstract.

Abstract S42 Table 1 Shows the number of children categorised as asthma, not asthma, possible asthma or insufficient evidence by expert panel, NG80 and its modified versions

	Expert Panel	NG80 first attempt	NG80 allowing 2 attempts at FeNO and Spirometry	NG80 with Methacholine challenge
Asthma	71 (56%)	20 (16%)	24 (19%)	56 (44%)
Not asthma	25 (20%)	38 (30%)	42 (33%)	28 (22%)
Possible asthma	4 (3%)	16 (12%)	21 (17%)	3 (2%)
Insufficient evidence	27 (21%)	53 (42%)	40 (31%)	40 (31%)

S43 STABILITY OF BLOOD EOSINOPHIL COUNT AND FRACTIONAL EXHALED NITRIC OXIDE OVER TIME IN PRESCHOOL CHILDREN WITH WHEEZE

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10.1136/thorax-2023-BTSabstracts.49

Introduction A biomarker-based approach to preschool (age 1–5 years) wheeze might be beneficial.[1] Blood eosinophil count (BEC) and fractional exhaled nitric oxide (FeNO) are potential biomarkers of inhaled corticosteroid (ICS) response, but stability in this population is unknown. We hypothesised that BEC and FeNO are stable in the short term in pre-school children with documented wheeze.

Methods This was a prospective, year-long, observational study. We compared finger prick for BEC measurement, offline FeNO measurement and skin prick testing (house dust mite, grass and tree pollen, cat, and dog hair) at baseline and on optional repeat occasion. Statistical methods: Intraclass correlation coefficient (ICC) test, chi-square test of independence. ICS treatment change (initiation, dose change, termination), ≥1 wheeze attack between tests, and atopic status (non-atopic, mono-sensitised, poly-sensitised) assessed as factors affecting stability.

Results 97 participants [median age: 35 months (IQR: 23–48 months, male=60). 47 completed the second testing 3–4 months later; BEC and FeNO were measured in 47 and 10 participants respectively. There was no difference between those who did and did not undergo a second test in age, atopic status, FeNO or BEC; a slightly higher proportion of males were re-tested, p=0.04. BEC measurements had poor repeatability (ICC=0.07, $p>0.05$,within-subject SD=269 cells/μl); FeNO measurements showed moderate repeatability (ICC=0.54,$p<0.05$, within-subject SD=3.2 ppb). Whatever BEC normal cut-off was examined (≥150, ≥200, ≥300, ≥400 and ≥500 cells/μl) switch in category (normal, abnormal) was equally likely ($p>0.05$), but stability was observed for both FeNO thresholds (≥5 and ≥ 10 ppb) ($p<0.05$). ICS treatment change, ≥1 wheeze attack between measurements or atopy had no association with change in either biomarker ($p>0.05$). BEC were not stable regardless of atopic status [mono-sensitised (n=11), polysensitised (n=12), non-atopics (n=24)] ($p>0.05$). Stability was not affected by ICS treatment change (n=12; n=8 initiation, n=2 each ICS stopped or increased dose), ≥1 wheeze attack between measurements (n=15) or atopy.

Conclusion BEC but not FeNO were unstable over three to four months. Single BEC measurements may be an insufficient guide to preschool wheeze treatment. Due to the small sample size, FeNO results should be considered with caution.

REFERENCE

1. *J Allergy Clin Immunol*. 2016;**138**:1608–18

S44 DEVELOPING A QUALITY OF LIFE OUTCOME MEASURE FOR PAEDIATRIC SEVERE ASTHMA: A QUALITATIVE STUDY

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10.1136/thorax-2023-BTSabstracts.50

Introduction We previously conducted a systematic review of outcome measures for severe asthma and found that existing quality of life (QoL) tools fail to fully capture the deficits experienced by paediatric patients. While the Severe Asthma Questionnaire (SAQ) has been developed for adults, its suitability for children and adolescents remained unexplored. Our aim was to assess the appropriateness of the SAQ for paediatric use and develop a prototype Paediatric SAQ (PSAQ).

Methods We conducted qualitative interviews with children, adolescents, parents, and Healthcare Professionals (HCPs) caring for severe asthma patients. Participants' perspectives on the relevance, comprehensibility, and comprehensiveness of the SAQ for the paediatric population were sought. The interviews were analysed thematically, and the findings informed development of a prototype PSAQ.

Results A total of 26 patients and parents of children with severe asthma aged 7–17 years were interviewed. The majority were female and had experience with biologics. The 20 HCPs interviewed had ≥10 years' experience practicing at a severe asthma centre. Participants represented 11 countries. The majority of SAQ items were deemed relevant with suggestions to remove adult-related examples and edits to improve comprehensibility. For instance, a parent commented their adolescent 'may not be able to do housework if she's feeling that she's not having a good day', and the adolescent echoed that if they 'had a big flare-up of my asthma, I'm not going to be cleaning', and suggested using the term 'chores'. However, examples such as 'home maintenance' and 'gardening' were considered irrelevant, a sentiment shared by HCPs who noted the limited familiarity of patients with such adult-related activities. Participants recommended enhancing the PSAQ's comprehensiveness by addressing environmental triggers, pets, and treatment burden. Several patients mentioned they 'want a pet but can't because of my asthma' while others expressed 'I think it's been one of the issues throughout my life with asthma um making sure to take the medication'.

Conclusions We have developed the prototype PSAQ for assessing QoL impairments specific to paediatric severe asthma. Further research will validate the PSAQ, which will be valuable for patient monitoring in clinic and evaluating treatment effectiveness in clinical trials.

Please refer to page A283 for declarations of interest related to this abstract.

S45 FORCED OSCILLOMETRY TECHNIQUE IN CHILDREN WITH PRESCHOOL WHEEZE: FEASIBILITY AND RELATIONSHIP TO CLINICAL PARAMETERS

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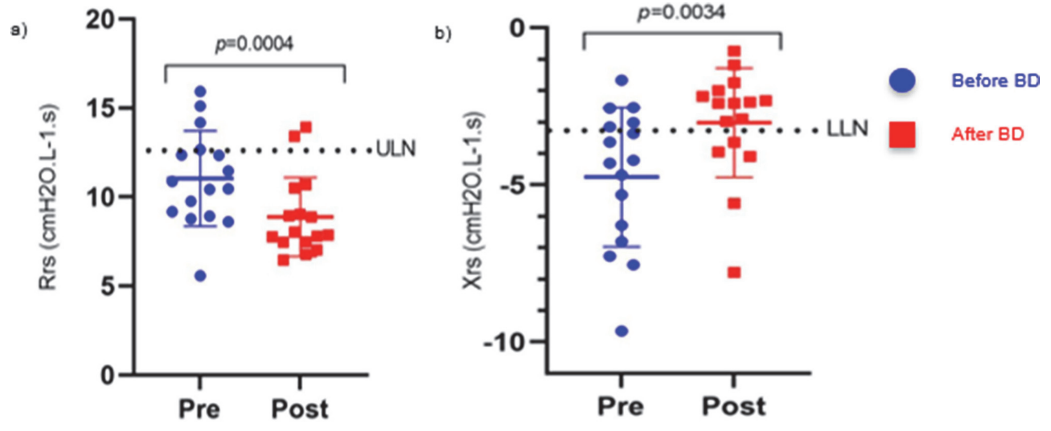
10.1136/thorax-2023-BTSabstracts.51

Background Preschool wheeze affects about one in three children aged under 5 years in the UK and may be associated with sensitization to aeroallergens. Little is known about the effect of preschool wheeze and atopy on airway mechanics. Forced oscillometry technique (FOT) is a non-invasive, effort-independent lung function technique, which measures airway mechanics expressed as respiratory impedance and is composed of resistance (Rrs) and reactance (Xrs). We sought to; 1) assess the feasibility of FOT in children with preschool wheeze, 2) establish baseline and bronchodilator reversibility (BDR) for FOT measurement in preschool wheezers and relate results to symptom control, quality of life and atopic status.

Methods A prospective, cross-sectional study was undertaken in 35 children aged 1–5 years old with doctor-diagnosed recurrent preschool wheeze attending a paediatric respiratory clinic. A pseudorandom FOT device was used to examine Rrs and Xrs at a frequency of 8 Hz and then repeated after bronchodilator administration. Symptoms and quality of life were assessed using the Test for Respiratory and Asthma Control in Kids (TRACK) and Paediatric Asthma Caregiver Quality of Life Questionnaire (PACQLQ) to correlate symptoms with FOT baseline measurements.

Results 12/35 children had aeroallergen sensitisation. 18/35 (51%) children successfully completed FOT measurement, median age= 4 (3–5). (63%) of those who completed the test



Abstract S45 Figure 1 Bronchodilator response identified by forced oscillometry technique. Shown: a) respiratory resistance before and after bronchodilator, b) respiratory reactance before and after bronchodilator

were ≥ 4 years. Atopic and non-atopic preschool wheezers had raised Rrs and impaired Xrs, with atopic wheezers having significantly worse Rrs, $p = 0.04$. Acceptable BDR studies were achieved in 16/35 of the children tested. Significant BDR was seen in Rrs and Xrs in atopic and non-atopic children, figure 1. However, the levels of bronchodilator responsiveness were similar in atopic and non-atopic wheezers. There was no correlation between baseline FOT measurements and TRACK or PACQLQ scores.

Discussion FOT was only feasible in clinical settings in children with preschool wheeze ≥4 years of age. Rrs is raised and Xrs is impaired in children with preschool wheeze and these parameters improve in response to bronchodilator. Further studies are needed to relate FOT in atopic and non-atopic wheezers to other objective measures i.e., bronchial samples to better understand the differences between groups.

Please refer to page A284 for declarations of interest related to this abstract.

S46 THE UTILITY OF CARDIOPULMONARY EXERCISE TESTING IN THE DIAGNOSIS OF EXERCISE INDUCED LARYNGEAL OBSTRUCTION IN CHILDREN AND ADOLESCENTS

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10.1136/thorax-2023-BTSabstracts.52

Introduction & Objectives The prevalence of exercise induced laryngeal obstruction (EILO) is thought to be around 5–7% in the general adolescent population and can often be misdiagnosed as asthma.[1] Continuous laryngoscopy during exercise (CLE) is the gold standard to confirm a diagnosis of EILO. However, EILO has limited availability in UK paediatric hospitals. Our aim was to evaluate the prevalence of confirmed EILO using CLE in a group of patients referred with exercise induced dyspnoea and to assess the ability of cardiopulmonary exercise testing (CPET) to diagnose these patients without the need for a CLE.

Methods Retrospective data were analysed from patients who had undergone CPET and CLE for suspected EILO. Evidence of stridor or dysfunctional breathing on the CPET was used to test the sensitivity and specificity of CPET to diagnose EILO. CPET was performed on a cycle ergometer with an incremental ramp protocol. CLE was also performed on the cycle ergometer with an ENT specialist citing and stabilising a nasal endoscope for the duration of the test. A shorter ramped supramaximal protocol was used for this.

Results Twenty-three patients had a CPET and CLE between 2015–2023. Mean age: 12.6 years, 95% CI[11.5, 13.8]. A summary of CLE tests is shown (figure 1). Twenty were performed successfully and twelve had confirmed EILO. CPET had a sensitivity = 75.0%, 95% CI[42.8, 94.5%] and specificity = 90.9%, 95% CI[58.7, 99.8]

Conclusions This study indicates that CPET has a low sensitivity and high specificity for EILO. Therefore, a normal CPET should not exclude a diagnosis of EILO, and a CLE should be performed. Evidence of dysfunctional breathing and/or stridor on CPET is highly specific for EILO in children and adolescents referred with exercise induced dyspnoea. We have also shown that CLE can be successfully performed in the majority patient's aged between 7 and 18 years.

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S47 DO HIGH TIDAL VOLUMES AT PEAK EXERCISE CAUSE EXERCISE INDUCED LARYNGEAL OBSTRUCTION (EILO)?

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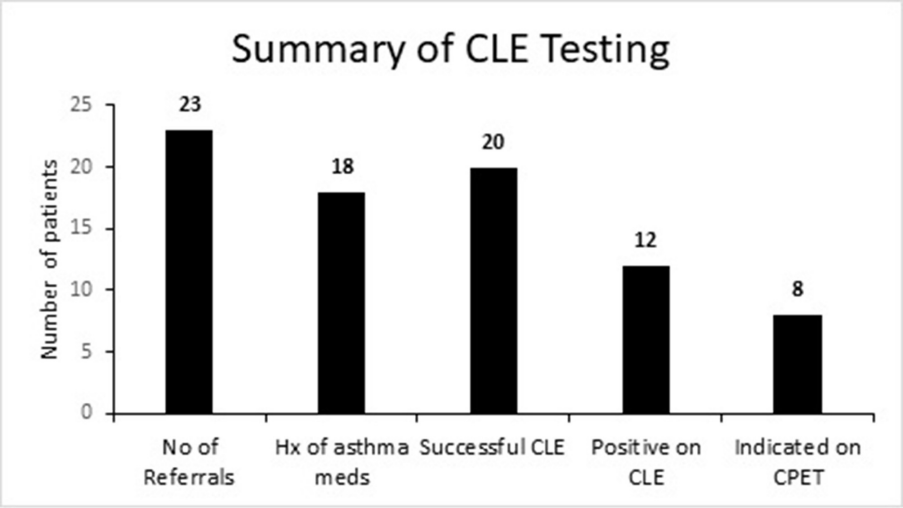
Exercise-induced laryngeal obstruction (EILO) is a common cause of exertional dyspnoea in young people. We have previously shown that subjects with EILO have a breathing pattern disorder (BPD).[1 2]

Aims To determine if large tidal volumes beyond physiological capacity at peak exercise cause EILO symptoms.



Abstract S46 Figure 1

Method We retrospectively analysed cardiopulmonary exercise test (CPET) data in children with exercise induced dyspnoea and identified two cohorts of 20 patients each (A) EILO with BPD and (B) BPD only. EILO: stridor or feeling of throat constriction during CPET. BPD: evidence of hyperventilation (increased breathing frequency (BF) or large tidal volumes (VT)), stunted increase in tidal volume or an erratic breathing pattern in response to exercise on the CPET plots. To further characterise the two groups, the Empey Index (ratio of FEV_1 (ml): PEFR (l/min)) was compared pre- and post-exercise between and within groups.

Results Demographic data were similar between groups (table 1). There was no difference in tidal volumes at peak exercise between the EILO and BPD groups on unadjusted T-tests (table 1) and univariate and multivariate logistic regression analysis (p=0.14). There was no difference in the Empey index between the two groups at either time point. There was no relationship between the post-exercise and baseline Empey index in either group.

Abstract S47 Table 1 Demographics, Spirometry and CPET data

	Difference Between Medians	P-value	P-value Summary
Age	0	0.9685	ns
Height (m)	0.008	0.9947	ns
Weight (kg)	4.9	0.2084	ns
Peak VO2/kg (ml/min/kg)	3.8	0.2677	ns
VE Peak (L/min)	-4.18	0.9097	ns
VT at Peak (L)	0.3435	0.0773	ns
FEV1 (L) Pre-exercise (EILO vs BPD)	-0.065	0.9307	ns
FEV1 (L) Post-exercise (EILO vs BPD)	-0.05	0.9502	ns
PEF (L) Pre-exercise (EILO vs BPD)	-0.445	0.2236	ns
PEF (L) Post-exercise (EILO vs BPD)	0.13	0.6819	ns
FEV1 (L) Pre- vs post-exercise (EILO)	-0.025	0.8778	ns
FEV1 (L) Pre- vs post-exercise (BPD)	0.155	0.6063	ns
PEF (L) Pre- vs post-exercise (EILO)	-0.01	0.9387	ns
PEF (L) Pre- vs post-exercise (BPD)	0.73	0.2271	ns
Empey Index (Pre)	0.3146	0.3307	ns
Empey Index (Post)	0.1146	0.9285	ns
Empey Index (Pre vs Post EILO)	-0.2456	0.4612	ns
Empey Index (Pre vs Post BPD)	-0.4456	0.1415	ns

Conclusions We found no difference in tidal volumes at peak exercise and the Empey index between EILO and BPD groups. Further work is needed to establish why some subjects with augmented tidal volumes at peak exercise have symptoms of EILO while others (BPD group) do not.

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'Don't stop believing' – Tumour biology: implications for treatment

S48 MOLECULAR CHARACTERISATION OF LUNG ADENOCARCINOMA HISTOLOGICAL PATTERNS

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Background Lung adenocarcinomas (LUADs) usually show one predominant morphological pattern (either lepidic, papillary, acinar, cribriform, micropapillary or solid) that predicts patient's survival. In addition, LUADs may be classified according to their predominant subtype (either mucinous, non-mucinous or mixed). Genomic differences that may influence patterns have been minimally studied. Our aim was to identify genetic alterations with pathogenic relevance related to LUAD morphology.

Methods We genomically profiled 89 LUAD tumour samples (13 lepidic, 13 papillary, 37 acinar, 7 cribriform, 7 micropapillary and 12 solid, sub-typed as 48 non-mucinous, 20 mucinous and 19 mixed) by Affymetrix microarrays, single nucleotide polymorphism genotyping and whole-exome or targeted capture sequencing.

Results *TP53* mutations were the most frequent abnormalities overall (41%) but were notably absent in cribriform tumours, where *CDKN2A* alterations were most frequent. *EGFR* mutations were more common in never-smokers, were mutually exclusive to *KRAS* in all subjects and not detected in solid, papillary or cribriform patterns. *KRAS* mutations in the acinar subtype were the only predictor for patient survival.

The solid tumours (mostly of the non-mucinous subtype [83.3%]) had a high tumour mutation burden (TMB). Solid tumours also exhibited high levels of expression for *VEGFA* and *CD274* (PD-L1) transcripts level and the highest CD8 T-cell abundance, shown by CIBERSORT analysis, suggesting potential response to checkpoint inhibitors for this pattern.

Network analysis discovered 92 modules of co-expressed genes in LUAD tumours. The greatest number of co-expression modules were found in solid and lepidic patterns (11 and 10 networks respectively). These associations were almost entirely opposing in directionality, indicating strongly contrasting mechanisms underlying these two histotypes. The largest co-expression module ME1 (*chromosome organization*, containing 1,007 genes, with *TPX2* as hub gene) showed the strongest associations: Cor 0.53, P $8.92\text{x}10^{-08}$ [% solid]/-0.52, P $1.38\text{x}10^{-07}$ [% lepidic]). The ME1 module was also linked to with γδ T cells (strength: 1.00, direction: 0.95).

Conclusions Our study has highlighted existence of genomic heterogeneity in LUAD patterns. Assessing key molecular changes in combination with standard histology in LUAD might have direct impact in classifying responders to targeted therapies, in particular solid pattern patients to immune checkpoint inhibitors.

S49 HEPATOCYTE GROWTH FACTOR AND EPIDERMAL GROWTH FACTOR SIGNALLING CROSSTALK IS INVOLVED IN TUNNELING NANOTUBE FORMATION IN A549 HUMAN LUNG ADENOCARCINOMA CELLS

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Non-small cell lung cancer(NSCLC) accounts for 85% of all lung cancer cases and is often associated with mutations in hepatocyte growth factor(HGF) and epidermal growth factor (EGF) expression. Tunneling nanotubes(TNTs) are thin cytoplasmic connections shown to be involved in long-distance intercellular communication and have an important role in cancer progression. We investigated the role of EGF/HGF signalling pathway crosstalk in TNT formation, in addition to defining key characteristics of TNTs in A549 cells. For TNT quantification, A549 cells were cultured and treated with 100ng/mL EGF/HGF/EGF+HGF for 24h and analysis of phase-light images was undertaken using ImageJ. Pharmacological inhibition of MEK,PI3K,c-Met,EGFR,Rac1,Cdc42, and the Arp2/3 complex and siRNA-mediated knockdown of Paxillin was performed to assess signalling pathways. EGF, HGF and EGF+HGF induced TNTs in 42%,39% and 46% of cells respectively. EGF+HGF yielded effects consistent with individual EGF and HGF treatments, indicating convergence of EGF/HGF signalling pathways at receptor level. We also found the Ras/MAPK/MEK, PI3K/Akt and the Arp2/3 complex pathways regulated EGF/HGF-induced TNTs. While singular inhibition of MEK or PI3K diminished HGF or EGF-induced TNTs, this was not sufficient to inhibit EGF +HGF-induced TNTs, and simultaneous MEK+PI3K inhibition was required for TNT suppression to basal levels. This suggests the MAPK/MEK and PI3K/Akt pathways, traditionally thought to be independent, may be participating in compensatory signalling to overcome pathway inhibition. Furthermore, knockdown of Paxillin inhibited EGF+HGF-induced TNTs, marking it as an important scaffolding protein in TNT formation. The structure of observed TNTs was examined by scanning electron microscopy, wherein TNTs demonstrated non-adherence to the substrate and presence of vesicles, which was confirmed later by trafficking of DiO lipid vesicles and mitochondria between cells via TNTs. Finally, immunofluorescent labelling of EGF+HGF-induced TNTs showed localisation of the novel proteins EGFR, c-Met and β1-integrin, in addition to expressing the classical TNT markers F-actin and α-tubulin. The findings of this study serve a wider implication in understanding the mechanisms of NSCLC progression and chemoresistance via TNTs in the tumour microenvironment. Future work will explore the functional consequences of mitochondria/organelle transfer via TNTs, and eventually stratify NSCLC patient samples for HGF/EGF dual expression to determine the contribution of TNTs to treatment resistance.

S50 EXPRESSION OF IL-22 IN TISSUE OF EARLY STAGE NON-SMALL CELL LUNG CANCER (NSCLC) PATIENTS WITH OR WITHOUT CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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10.1136/thorax-2023-BTSabstracts.56

Introduction COPD is an independent risk factor for lung carcinoma and lung cancer more likely to occur in smokers with airflow obstruction than those with normal lung function.[1] IL-22 is produced by innate lymphoid cells and mediates its cellular effects via a heterodimer receptor complex composed of two different subunits (IL-22 receptor subunit 1 (IL-22R1) and IL-10R2). IL-22 signaling regulates pro-survival, cell migration, mitogenic and anti-apoptotic effects, leading to enhancement of tumor growth and metastasis. IL-22 is overexpressed in lung cancer tissues, malignant pleural effusions, and serum of NSCLC patients.[2]

Aim We attempted to determine lung tissue IL-22 levels in patients with early-stage NSCLC with and without COPD.

Method The expression of IL-22 was studied with immunohistochemistry.

Results 85 patients were recruited 12 of which with coexistent COPD confirmed by spirometry. Expression of IL-22 (%) in lung cancer tissue was significantly higher in men (n=64) compared to women (n=21), (p=0,005). A negative correlation between% percentage levels of IL-22 tissue expression and BMI was found (p=0,017). The% expression of IL-22 was marginally not different between lung cancer patients with COPD vs. lung cancer patients without COPD. (49,06% vs 43,53%, p=0,059). No significant difference was detected in immunohistochemical staining of IL-22 in lung cancer tissues according to age, gender and BMI. On the other hand, immunohistochemical expression of tissue IL-22 was higher in lung adenocarcinoma, with 62,9% of cytoplasmic expression vs. 2,9% in the other histological subtypes (p=0,039). Furthermore, cytoplasmic expression of IL-22 was significantly higher in current smokers vs ex-smokers (69,7% vs 18,2%, p=0,019).

Conclusions IL-22 expression in lung cancer tissue of early-stage NSCLC was significantly higher in men, lung adenocarcinoma, current smokers and showed a trend to be higher in NSCLC patients with concomitant COPD compared to NSCLC without COPD. Our findings indicate that IL-22 may represent a promising therapeutic target for NSCLC.

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S51 MULTI-SITE TARGET CAPTURE SEQUENCING CONFIRMS INTRA-TUMOUR HETEROGENEITY OF PLEURAL MESOTHELIOMA

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10.1136/thorax-2023-BTSabstracts.57

Background Pleural mesothelioma is a rare, aggressive cancer. It is characterised by intra-tumour genomic heterogeneity (ITH) that has a direct impact on a patient's clinical outcome including selection and response to therapy.

Methods To gain insight into spatial ITH, we have conducted target gene sequencing of 26 tumour samples and matched blood samples from four mesothelioma patients. For each patient tumour samples were taken from multiple affected regions including lateral, diaphragmatic, and mediastinal sites. Histology and immunohistochemistry were conducted on all samples.

Results We observed quite marked genetic heterogeneity across tumours for three patients. In the remaining patient *NF2* mutations was detected in all tumour samples with high variant allele frequencies (≥50% in three samples and >30% in the other three) pointing to an early clonal origin.

Immunohistochemistry showed focal or total loss of protein BAP1 in all patients but mutations or single copy number aberrations (sCNA) were only seen in two patients. Aberrations of *SETD2*, on chromosome 3, were detected in single samples from two patients.

Mutations in the SWI/SNF chromatin remodelling member *ARID1A*, and its homolog *ARID1B*, were also identified heterogeneously in three patients: *ARID1B* was present in 4/6 samples in one patient and in 1/7 samples for a second patient, *ARID1A* in 1/7 samples in a third patient.

ARID1A mutated tumours may be targeted *in vitro* with EZH2 inhibitors thus it may be considered as a potential therapeutic target for a subset of pleural mesothelioma patients.

Mutations in *MET*, *TSC1* and *SF3B1* were detected in single samples from two patients. sCNA of the cytobands containing *SUFU* (Hedgehog pathway) on chromosome 10q24.32 was detected in two samples from one patient, and *RBFOX1* on chromosome 16p13.13 was detected in two different samples from the same patient. *RBFOX1* is within a chromosomal region that has been implicated in autoimmunity.

Conclusions Spatial profiling of pleural mesothelioma revealed marked inter and intra- patient heterogeneity, with only one patient showing an apparent founder mutation in *NF2*. Although alterations affecting Hippo, Hedgehog or SWI/SNF pathways may define subsets of responders to therapies, it is possible that underlying heterogeneity will result in poor response.

'Running up that hill' – Rehabilitation interventions in chronic respiratory diseases

S52 DIETARY NITRATE SUPPLEMENTATION TO ENHANCE EXERCISE CAPACITY IN PULMONARY HYPERTENSION: EDEN-OX2 A DOUBLE-BLIND, PLACEBO-CONTROLLED, RANDOMISED CROSSOVER STUDY

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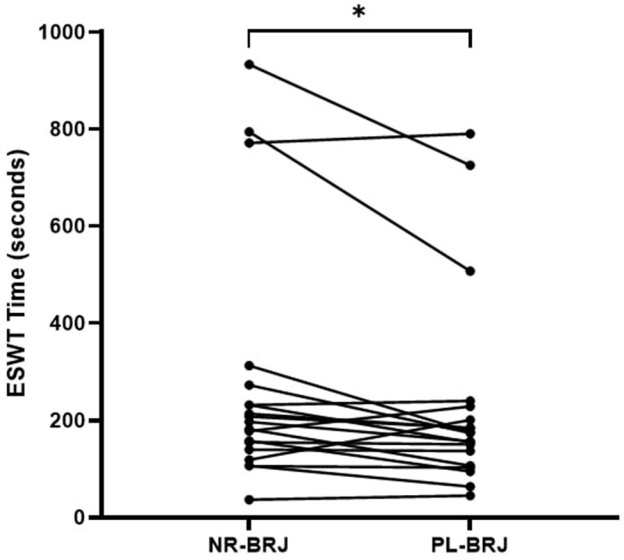
10.1136/thorax-2023-BTSabstracts.58

Rationale Dietary nitrate supplementation improves skeletal muscle oxygen utilisation and vascular endothelial function in people with COPD. We hypothesised that these effects might also improve exercise performance in patients with pulmonary hypertension and hypoxia.



*Data are presented individual ESWT times (seconds) in both dosing conditions. Wilcoxon sign-rank test was used to compare the change in ESWT time between treatment conditions; NR-BRJ 197sec (140, 273) vs. PL-BRJ 174 sec (107, 229), with a median of differences (95% CI) 30 (6.19 -91.07); *p<0.05.*

Abstract S52 Figure 1 Effect of dietary nitrate supplementation on endurance shuttle walk test (ESWT) time (seconds) measured in the NR-BRJ and PL-BRJ dosing condition

Methods We conducted a single-centre, double-blind, placebo-controlled, cross-over study, enrolling adults with pulmonary hypertension who desaturated during exercise. Participants performed an endurance shuttle walk test, using their prescribed oxygen, three hours after consuming either 140 mL of nitrate-rich beetroot juice (BRJ) (12.9 mmol nitrate), or placebo (nitrate-depleted BRJ). Treatment order was allocated (1:1) by computer generated block randomisation.

Measurements The primary outcome was endurance shuttle walk test time. Secondary outcomes included area under the curve to isotime for oxygen saturation and heart rate parameters during the test, as well as blood pressure and endothelial function assessed using flow mediated dilatation (FMD). Plasma nitrate and nitrite levels were also measured.

Main Results 20 participants were recruited, and 19 completed the study. Dietary nitrate supplementation improved exercise endurance time compared to placebo; median (IQR) ESWT times were NR-BRJ 197(140 to 273)s vs. PL-BRJ 174(107 to 229)s, MD(95% CI) 30 (6.19 to 91.07)s p=0.0281, and endothelial function; FMD +1.70 (0.40 to 7.70)% vs -0.30 (-5.07 to 1.87), MD 4.23 (95% CI 1.44 to 8.02) p=0.0108 and lowered mean arterial blood pressure; MD -3.9(-7.4 to -0.4) mmHg p=0.028

Conclusion Acute dietary nitrate supplementation increases exercise endurance and endothelial function in pulmonary hypertension patients who require supplemental oxygen.

Please refer to page A284 for declarations of interest related to this abstract.

S53 CO-DESIGN OF A WALKING FOOTBALL INTERVENTION FOR PEOPLE WITH CHRONIC BREATHLESSNESS

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10.1136/thorax-2023-BTSabstracts.59

Background There is an absence of accessible, social, and sustainable physical activity options for people with chronic breathlessness (CB). Walking football (WF) could be an option due to its inclusivity, cultural-embeddedness, and flexibility for populations who may experience limited confidence and ability.

Objective To co-design a WF intervention for people with CB.

Methods Between March-2022 and February-2023 we undertook a series of co-design activities with members of a Breathe Easy (BE) support group, following the UK Standards for Public Involvement (table 1). A stakeholder meeting introduced the concept of WF, four two-hour WF 'taster-sessions' were delivered by a WF coach, and a one-hour debrief was held after each session.

Results Twenty BE members attended the stakeholder meeting, and 10–12 attended the subsequent taster-sessions and debriefs. The stakeholder meeting identified several concerns: (1) Keeping pace with non-breathlessness participants; (2) Limited balance/turning ability; (3) Requirement of walking aids/oxygen; (4) Accessible parking and low-light driving conditions.

Responding to concerns, WF taster sessions were: (1) Delivered exclusively to people with breathlessness with a 'buddy-system' employed for new players; (2) No-contact 'table-football style' rules and a weighted 'slow-motion' football were utilised on occasion as required; (3) Oxygen was worn on the person and walking aids could not make contact with the ball; (4) Accessible parking was abundant and all sessions concluded by 2pm.

Each WF session included a warm-up, passing/dribbling drills, small-sided matches and fun mini-games drawing from other sports (e.g. tennis, netball). WF was adapted iteratively: rest time (approximately 5-mins for 15-mins of activity); football drills (having a goal to aim at and adding competitive elements to drills was preferred); and setting time aside after each session for refreshment/conversation. During debriefs BE members stated they *'Surprised ourselves'*, and *'On the pitch you forget about breathlessness'*, telling new members *'It's amazing, give it a try, it's a laugh!'*.

Abstract S53 Table 1 Co-design approach mapped onto UK standards for public involvement

UK standard	Activity	Areas for improvement
Inclusive opportunities	Walking football was designed exclusively for people with CB.	The distance from where BE members were based to the sports hall was too far to travel long-term (approx. 20-mins drive/13-miles).
Working together	The research team would occasionally participate in the WF with BE members to provide support, build rapport, and experience the game first-hand. We valued the contributions BE made, applying changes to the WF based on their comments.	Active participation could occasionally increase the pace-of-play, despite the intervention being self-paced.
Support and learning	BE members developed football skills in an enjoyable 'real-life' context, demonstrating balancing abilities (such as standing on one leg) which outside of the intervention they would not have the confidence to attempt. BE received a talk on public involvement in research prior and provided with relevant resources to the project start.	We identified and addressed various risks of WF participation including limited balance/turning ability and the use of oxygen/walking devices. This should be improved upon in any future implementations to further understand and reduce the risk of injury, in-turn increasing confidence for people participating in public involvement activities.
Communication	Time is set aside at the end of all WF sessions to socialise over tea/coffee. This time is utilised between the researchers and BE as an informal debrief of the previous session, and future planning.	It may have been beneficial to develop a more formal communication plan so BE members have a clear waypoint if they would like to discuss any given issue.
Impact	Transparent dissemination of the intervention development process.	To further understand the experience of contributing to a co-design process.
Governance	All information shared with us on a public-involvement basis is kept confidential until we receive explicit permission to share it via publications, reports, and presentations. BE were actively involved in decision making regarding changes to the WF intervention.	Invite BE members to lead sessions alongside WF coach so they have a more active role in development.

Conclusions The co-design process illuminated the difficulties of incorporating people with CB into existing sport-programs for older adults due to limitations imposed by breathlessness, poor balance, and devices. There is a need to promote inclusivity by incorporating devices, facilitating access, and allowing time for socialising.

Please refer to page A284 for declarations of interest related to this abstract.

S54 ALTERNATIVE PULMONARY REHABILITATION (PR) FOR PEOPLE WITH INTERSTITIAL LUNG DISEASE (ILD): DEVELOPING THE MODEL USING EXPERIENCE-BASED CO-DESIGN

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10.1136/thorax-2023-BTSabstracts.60

Background Few studies have investigated alternative PR programmes in people with ILD. The majority of which involved people with idiopathic pulmonary fibrosis and have methodological limitations. None were adapted to address the needs of people with ILD and little is known about their needs and preferences.

Aim To co-design an alternative PR programme for people with ILD.

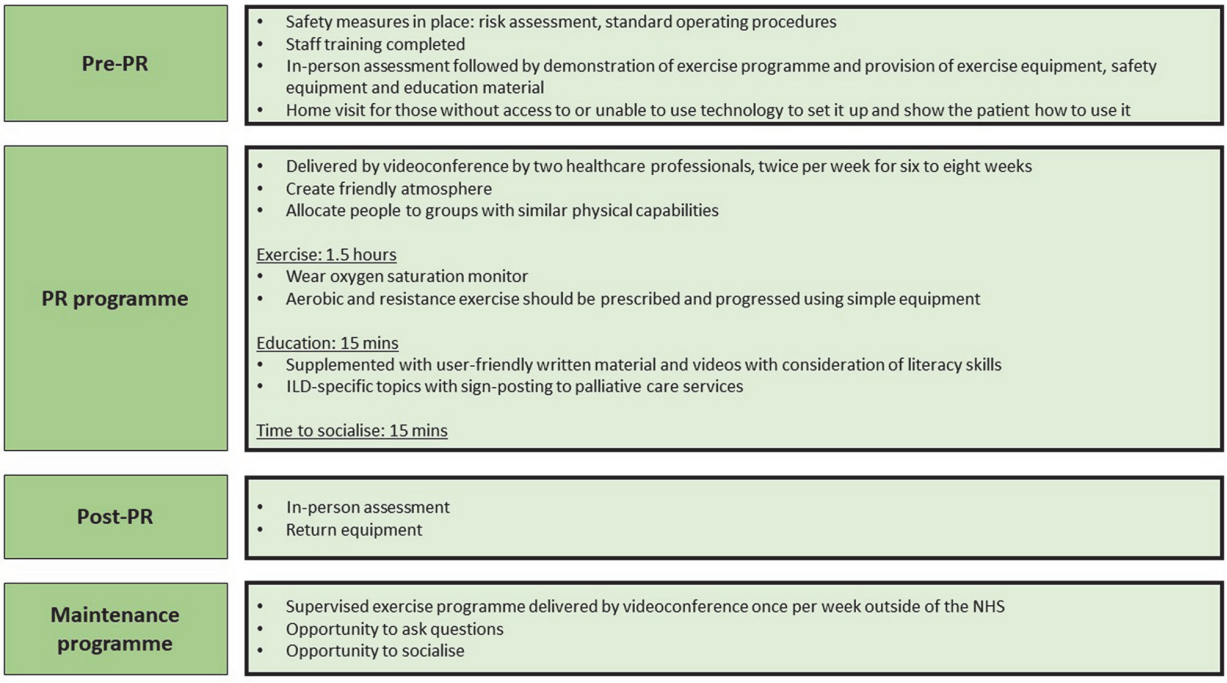
Methods Experience-based co-design comprises interviews, stakeholder workshops and co-design meetings. 1:1 video-recorded interviews with purposively selected people with ILD with experience of PR, their carers/family, and healthcare professionals, were edited into a 20-minute film. The film was shown at three audio-recorded stakeholder feedback events (1: service-users, 2: healthcare professionals, 3: joint) to identify key themes and touchpoints and short-list key programme components. The programme was finalised at two further co-design workshops.

Results Ten people with ILD, four carers/family and seven healthcare professionals completed video-recorded interviews. Participants in the stakeholder feedback events included: service-user group: n=14; healthcare professional group: n=11; joint event: n=21. Three people with ILD and one carer/family participated in the first joint co-design workshop with five healthcare professionals attending the second.

Consensus on the programme was achieved. Three key touchpoints were getting started (e.g. importance of an in-person assessment, concerns about safety and technology), during rehab (e.g. use of minimal equipment, importance of socialising) and after rehab (e.g. opportunities for continued contact). The final co-designed model includes PR supervised and delivered by videoconference, with people grouped according to ability, followed by a video-conference-based maintenance programme. People inexperienced with or unable to access technology should be supported to do the programme. Important components included a programme delivered in line with national quality standards, safety (including oxygen saturation monitoring), exercise delivered using minimal equipment, access to information about end of life care and opportunities to socialise with other people with ILD. The final programme model is outlined in figure 1.

Conclusion An alternative PR programme for people with ILD has been co-designed by patients, their carers/family, and healthcare professionals, emphasising the role of social connection and ongoing support beyond initial supervised sessions.

Please refer to page A284 for declarations of interest related to this abstract.



Abstract S54 Figure 1 Final programme model

S55 THE IMPACT OF A 3-MONTH BEHAVIOURAL TELE-COACHING INTERVENTION ON PHYSICAL ACTIVITY AND QUALITY OF LIFE AT 12 MONTHS FOLLOWING LUNG TRANSPLANTATION

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10.1136/thorax-2023-BTSabstracts.61

Introduction Despite improvements in pulmonary function, physical activity (PA) levels remain significantly lower than the general population, even at 1 year following lung transplantation (LTx). Previously, we have presented on the feasibility and short-term outcomes of a behavioural PA tele-coaching (TC) intervention following LTx. This study aims to investigate the longer-term effects of this intervention on PA levels and health-related quality of life (HRQoL).

Methods LTx recipients were randomised to 3 months of TC or usual care (UC) following hospital discharge. TC consisted of a pedometer and smartphone app, allowing transmission of activity data to a platform that provides feedback, activity goals, education, and contact with the researcher as required. At 3 months, participants retained the pedometer but access to the platform was removed. Outcomes assessed at baseline (hospital discharge), 3- and 12-months post discharge included accelerometer (Actigrah GT3x) PA outcomes (steps/day, movement intensity) and HRQoL (SF-36 questionnaire).

Results 23 LTx recipients were recruited (ILD n=13; COPD n=6; CF n=2; PAH n=2) and randomised (TC: n=12, UC: n=11). At 12 months, 4 patients were lost to follow up (TC: n=2, UC n=2) and 2 patients were deceased (UC: n=2). The TC group demonstrated a significant increase in daily steps from baseline to 12 months (by 2371±3133 steps/day; p=0.014), whereas no change was shown in the UC group (98±2448 steps/day; p=0.926) over 12 months (figure 1A). Similarly, movement intensity significantly increased from baseline to 12 months in the TC group (by 168±193 VMU; p=0.023), but not the UC group (-11±137 VMU; p=0.849) (figure 1B). For SF-36 physical component scores, only the TC group showed a significant and clinically important improvement (by 10±11 points; p=0.016) from baseline to 12 months, compared to no change in the UC group (2±17 points; p=0.757). There were no changes in SF-36 mental component scores in either group.

Conclusion Implementing a behavioural PA TC intervention following hospital discharge from LTx led to sustained improvements in daily PA levels and physical aspects of HRQoL at 12 months. Therefore, behavioural PA TC constitutes a promising intervention to optimise long-term recovery and health outcomes in LTx recipients.

S56 A FEASIBILITY RANDOMISED CONTROL TRIAL (RCT) OF OPEP VERSES ACTIVE CYCLE OF BREATHING TECHNIQUE (ACBT) IN PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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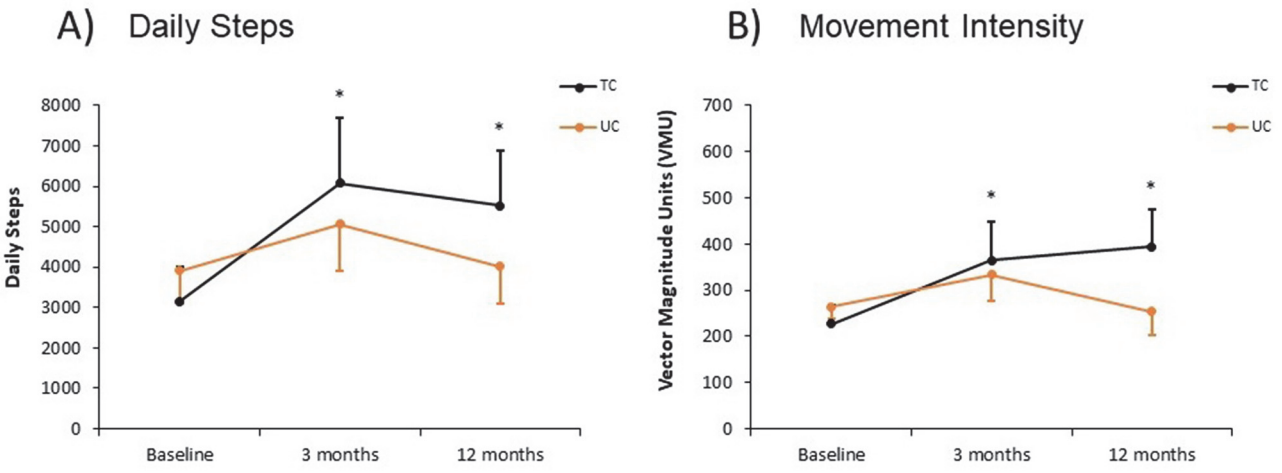
10.1136/thorax-2023-BTSabstracts.62

NICE guideline NG115 for COPD recommend Airways Clearance Techniques (ACTs) for people with excessive sputum but there have been no studies comparing different ACTs.

Aim To compare Oscillatory Positive Expiratory Pressure (OPEP, Aerobika ™) vs Active Cycle of Breathing Technique (ACBT) following exacerbations of COPD.

Method A pilot, feasibility randomised controlled trial (ClinicalTrials.gov Identifier: NCT05548036

Patient With confirmed COPD (GOLD 2023) and chronic bronchitis symptoms, who had not received ACTs previously. They were recruited in hospital or through community COPD nurses during (or within 4 days) of starting a moderate-severe exacerbation. Randomisation via sealed envelope determined whether they received 30–60 minutes of training on OPEP or ACBT by respiratory physiotherapists, face-to-face. All participants received antibiotics, steroids, nebulisers and oxygen in the acute phase according to clinical discretion. All were already prescribed optimal inhaled treatments. Participants



Abstract S55 Figure 1 A) Daily steps and B) Movement intensity in LTx recipients assigned to the tele-coaching (TC) and usual care (UC) groups at the baseline (hospital discharge), 3 and 12 months. Data are mean±SEM.* Denotes significant within-group difference compared to baseline(P<0.05)

Abstract S56 Table 1 Participant characteristics at base line

Variable	OPEP (n=19)	ACBT n=23
Age	66 (10.3) yrs	69.7 (7.3) yrs
Male	37%	48%
Smokers	32%	13%
FEV_1% pp	50%	44%
MRC	3.4 (1.0)	3.5 (0.7)
CAT	31.0 (5.4)	32.6 (4.7)
LCQ-Total	63.8 (25.0)	61.2 (17.6)

were advised to continue twice daily OPEP or ACBT at home for at least 6 months.

Groups were similar at baseline (all p=N.S). See table 1.

Primary Outcome Leicester Cough Questionnaire (LCQ) at 3 months post-intervention (via intention to treat analysis).

Results Mean (SD) Total LCQ at 3 months in the OPEP group was 87.3 (27.3) vs 91.9 (29.2) in the ACBT group, p=0.73, 95% CI -33 to +23.8.

Conclusion Both groups showed statistically significant and clinically important improvement in LCQ, post-exacerbation (MDCID 1.5–2 LCQ) but there is no significant difference in LCQ scores between OPEP (Aerobika ^{TM}) vs ACBT groups at 3 months.

'Working 9 to 5' – Occupation risk to the lung

S57 20 YEARS OF ASBESTOSIS – TRENDS FROM THE SWORD SCHEME

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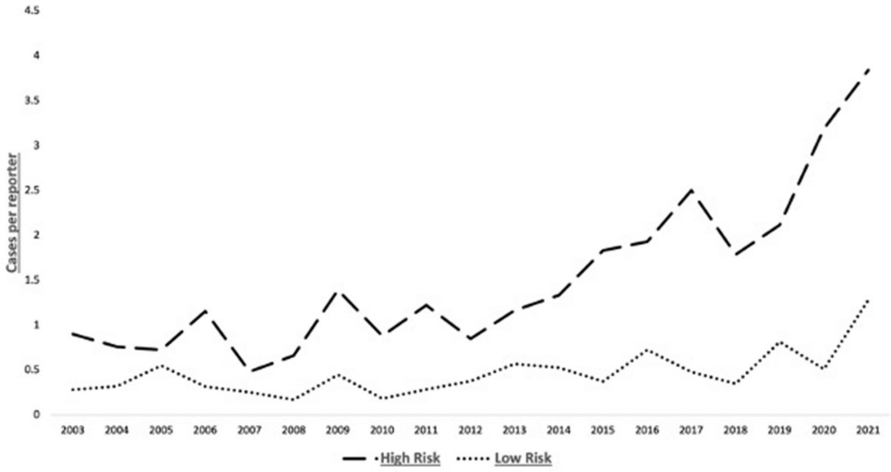
10.1136/thorax-2023-BTSabstracts.63

Background Asbestosis is caused by inhalation of asbestos fibres and is radiologically indistinguishable from other usual interstitial pneumonia (UIP). The UK was a leading importer of asbestos until the 1980s. Health and Safety Executive (HSE) mortality data for asbestosis suggests cases are increasing and risk is highest in construction, but whether incidence has changed similarly in surveillance schemes is unknown. We reviewed trends in asbestosis reported to the Surveillance of Work-related and Occupational Respiratory Disease (SWORD) scheme over the last 20 years.

Methods All cases reported between 2003–2021 and diagnosed as either pneumoconiosis (causative agent asbestos) or coded ICD-10 J61 (asbestosis) or J64 (unspecified – causative agent asbestos), were included. Cases were calculated and adjusted for temporal changes in reporter numbers. Data were stratified by high and low risk, with high risk defined as SOC codes with a significantly elevated PMR for asbestosis using HSE mortality data.

Results In total, 1081 cases of asbestosis were reported between 2003–2021. Cases were 99% male with a mean age of 73. The majority came from construction (48%) and manufacturing (29%): 61% were in SOC2010 group 5 (skilled trades occupations). The most common occupations were carpenters and joiners (12%), metal working production/maintenance fitters (10%), electricians and electrical fitters (9%), elementary construction occupations (9%), and plumbers/heating engineers (7%). On average, cases in high-risk jobs doubled over the period (mean cases per reporter 2003–11 = 0.8 versus 2012–21 = 1.74) whereas increase in low-risk jobs was slower (2003–11 = 0.3 versus 2012–21 = 0.5) (figure 1). Between 2002–11 and 2012–22, cases of asbestosis increased in all but two of the 13 highest-risk SOC codes identified by HSE. No cases were reported in boat/ship repair 2003–2022.

Conclusion Cases of asbestosis reported to SWORD have increased over the last 20 years. Compared to HSE mortality data, numbers reported to SWORD were significantly lower, and there were differences in risk groups observed. Risk of asbestosis is highest in construction and manufacturing industries, in particular carpenters and joiners. Changes in occupational risk are important in understanding asbestosis and a detailed occupational history should be routine for all patients with pulmonary fibrosis.



Abstract S57 Figure 1 Trends in asbestos incidence reported to SWORD by high and low risk group, 2003–2021

S58 THE EXPOSURE-RESPONSE RELATIONSHIP BETWEEN RESPIRABLE CRYSTALLINE SILICA AND CHRONIC SILICOSIS: A SYSTEMATIC REVIEW AND META-ANALYSIS

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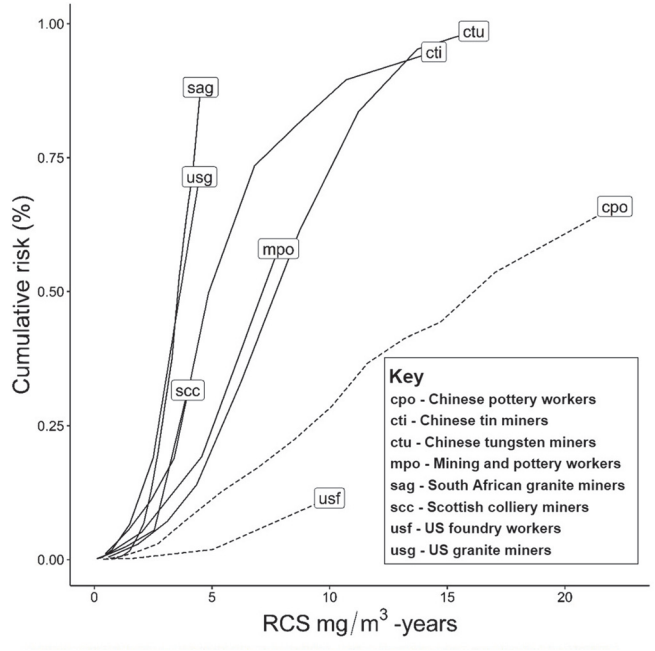
10.1136/thorax-2023-BTSabstracts.64

Background Silicosis presents a significant global disease burden in mining and non-mining populations. Cumulative respirable crystalline silica (RCS) is thought to determine silicosis risk but no quantitative analysis has been performed and the reported literature is conflicting on the nature of this relationship. The UK government has recommended the evidence supporting the reduction in the RCS workplace exposure-limit (WEL) from 0.1 mg/m^3 to 0.05 mg/m^3 is assessed. This review aimed to quantitatively analyse the relationship between cumulative RCS exposure and chronic silicosis risk, and to assess the impact of intensity and industry on this relationship.

Methods We searched Medline, Embase, Web of Science, a previous narrative review and US evidence summary report for eligible studies published before 24/02/23. Inclusion criteria included: silicosis risk stratified by cumulative RCS exposure categories and ≥20-year mean latency between first exposure and latest radiograph assessment. Cumulative risk for dose categories were calculated with a lifetable approach. Study fitted curves were plotted for comparison. Using the lifetables, a dose-response meta-analysis was performed. Risk of bias was assessed with a modified Newcastle-Ottawa Scale.

Results From 782 studies, seven studies were selected and assessed as having a low risk of bias, which contributed nine cohorts (seven mining and two non-mining). Overall, 10,400 silicosis cases were reported among 66,013 workers. The rate of increase in cumulative silicosis risk with increasing cumulative RCS dose appeared greater in mining than non-mining industries (figure 1). A reduction from 2 mg/m^3-years – equivalent to 20 years work at 0.1 mg/m^3 average exposure – to 1 mg/m^3-years resulted in a relative risk of 0.32 (95% CI 0.22–0.47) for miners and 0.76 (95% CI 0.73–0.79) for non-miners, however heterogeneity was high for both groups ($I^2$96.7% and 50.0%, respectively).

Discussion Despite risk of bias from underestimated RCS exposure and high heterogeneity in our meta-analysis, our findings support recommendations to further reduce RCS WELs. Due to higher reported risks for mining cohorts, results additionally support more stringent WELs for mining industries to achieve equitable silicosis risk reduction. Further research investigating the underlying cause for risk disparity, and broadening evidence to encompass other industries is recommended.



Abstract S58 Figure 1 Comparsion of lifetable cumulative silicosis risks by cumulative respirable crystalline silica (RCS) exposure, for mining (solid line) and non-mining (dashed line) cohorts. Cumulative risk for diatomaceous earth miners (Hughes, 1997) could not be extracted

S59 SILICOSIS, TUBERCULOSIS AND SILICA EXPOSURE AMONG ARTISANAL AND SMALL-SCALE MINERS: A SYSTEMATIC REVIEW AND MODELLING PAPER

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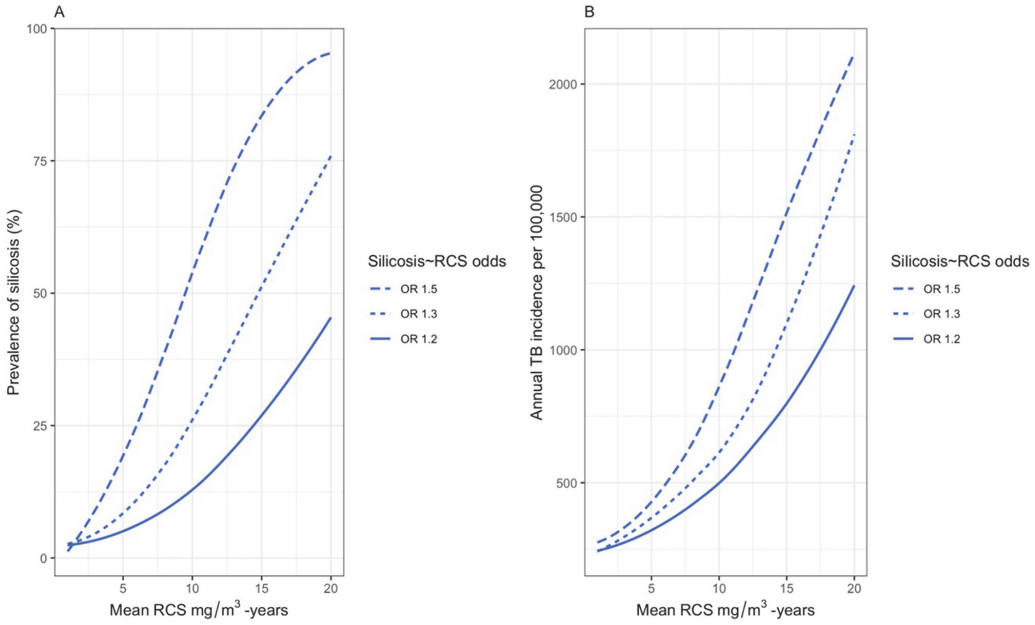
10.1136/thorax-2023-BTSabstracts.65

Background An estimated 44 million artisanal and small-scale miners (ASM), largely based in developing economies, face significant occupational respiratory diseases risks. We aimed to review studies describing silicosis and tuberculosis (TB) prevalence and respirable crystalline silica (RCS) exposures among ASM and use previous evidence to model the relationship between silica exposure and silicosis and TB outcomes.

Methods We searched PubMed, Web of Science, Scopus and Embase for studies published before the 24th March 2023. Our primary outcomes were silicosis or TB among ASM. Secondary outcomes were respirable dust or silica measurements, spirometry values and respiratory symptom prevalence. A systematic review and meta-analysis were performed and risk of bias assessed using the Joanna Briggs Prevalence Critical Appraisal Tool. Logistic and Poisson regression models with predefined parameters were used to estimate silicosis prevalence and TB incidence at increasing distributions of cumulative silica exposure.

Results We identified 18 eligible studies that included 29,562 miners from 13 distinct populations in 10 countries. Silicosis prevalence ranged from 11 to 37%, despite four of five studies reporting an average median duration of mining of <6 years. Tuberculosis prevalence was high; microbiologically confirmed disease ranged from 1.8 to 12% in six studies and clinical disease 3.0 to 17% in four studies. Meta-analysis results demonstrated very high heterogeneity (I^2 Silicosis 97% and microbiological TB 98%). Average RCS intensity was very high (range 0.19–89.5 mg/m^3) in five studies. Respiratory symptoms across three studies were common while spirometry findings in three studies were mixed. Our modelling demonstrated greater reductions in silicosis prevalence and TB incidence at high RCS exposure distributions, which were robust across multiple scenarios (figure 1). These models may be viewed interactively at: https://phowlett.shinyapps.io/sil_tb_app/. Study quality was mixed; recurrent issues included selection and measurement bias.



Abstract S59 Figure 1 Modelled estimates of number of silicosis cases and annual tuberculosis (TB) cases at cumulative RCS distributions of increasing mean values. In plot A, the silicosis prevalence (%) by distributions of increasing mean cumulative RCS (mg/m^3-year) is estimated at three different strengths of association between RCS exposure and silicosis OR 1.2, 1.3 and 1.5. In plot B, annual TB cases are estimated at the same three different strengths of association between mean cumulative RCS (mg/m^3-year) and silicosis

Discussion Despite limitations of included studies, the prevalence of silicosis and TB appears high which is likely due to RCS exposures between 4–1790 times above the US permissible exposure limit. Our modelling demonstrated the greatest respiratory health benefits of reducing RCS are in those with the highest exposures. Effective low-cost interventions are available and should be studied and implemented.

S60 IMPACT OF TYRE AND ROAD WEAR PARTICLES (TRWPS) ON HUMAN RHINOVIRUS INFECTION IN HUMAN AIRWAY EPITHELIAL CELLS

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10.1136/thorax-2023-BTSabstracts.66

Background Air pollution by car emission is known to cause detrimental respiratory effects, especially on vulnerable populations, such as children and individuals with underlying chronic respiratory diseases, including asthma and chronic obstructive pulmonary disease (COPD). An increasing number of electric vehicles on the road has been reported to result in high levels of tyre and road wear particles (TRWPs) being released due to their heavy weight. Despite this, little research has explored the effect of TRWPs on respiratory systems. In this study, we investigated effects of TRWPs on cell damage and human rhinovirus infection, which is a major cause of exacerbation of asthma and COPD, in human bronchial epithelial cells.

Methods Immortalised human bronchial epithelial cells, HBEC3-KT, were treated with N-cyclohexyl-1,3-benzothiazole-2-amine (NCBA), N-(1,3-dimethylbutyl)-N'-phenyl-p-phenylenediamine (6-PPD), 1,3-diphenylguanidine (DPG), 2,4-morpholinyl-benzothiazole (24MoBT), 1,3-butadiene, 2-methylbutadiene (2-MB), DL-limonene, and styrene/butadiene copolymer, and cell toxicity was determined using resazurin assay. Cells were also exposed to selected TRWP concentrations prior to human rhinovirus (HRV16) infection, and viral load was assessed using a 50% tissue culture infectious dose ($TCID_{50}$) assay.

Results NCBA and 6-PPD (100μg/ml) significantly decreased cell viability (6.87% of control (p=0.0412, N=3) and 5.94% (p=0.0054, N=3) viable cells respectively) although other chemicals showed no or little impact on cell viability up to 100μg/ml. In addition, NCBA and 1,3-butadiene (both, 0.1μg/ml) generated 2.2 and 4.3 fold higher viral load compared to their respective controls, respectively. In addition, 2-methylbutadiene (2-MB) (10μg/ml) was found to delay HRV16 clearance as viral load remained higher than control on Day 5.

Conclusion Some TRWPs were found to cause cell damage or increased rhinovirus infection in HBEC3-KT cells. These findings provide us with an important insight as to how TRWPs affect our respiratory health, and what solutions may be implemented in the future to reduce TRWP emissions from vehicles and help abate the health impacts of TRWPs to improve public health. The observations in this study indicate that future investigation and study is highly warranted.

S61 OCCUPATIONAL EXPOSURE TO PARTICULATE MATTER AND STAFF SICKNESS ABSENCE ON THE LONDON UNDERGROUND

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10.1136/thorax-2023-BTSabstracts.67

The London Underground (LU) employs over 19,000 staff, some of which are exposed to elevated concentrations of particulate matter (PM) due to emissions within the network. Little is known about the health effects of this PM, which can reach concentrations 15 times higher than outdoor PM and is different in both chemical and physical composition. The aim of this study was to quantify the occupational exposure of LU staff to PM and investigate whether these elevated exposures were associated with increased cardiorespiratory sickness absence.

A job exposure matrix was developed to quantify the exposure of LU staff to $PM_{2.5}$ based on their activity during the working day by undertaking personal and static measurement campaigns across the LU network. The 29,744 staff were grouped into distinct exposure groups, which were linked to sickness absence records (2014–2019). The association between exposure and sickness absence was evaluated using zero-inflated mixed effect negative binomial models.

Staff $PM_{2.5}$ exposure varied by job grade and tasks undertaken. Drivers had the highest exposure over a work shift (median: 130 $\mu g/m^3$), but levels varied significantly by the line on which they worked and the duration of time the train spent underground.

All non-office-based staff had significantly higher rates of all-cause and respiratory infection sickness absence. When looking at drivers only, five out of eight lines had significantly increased rates of all-cause sickness absences, however no dose response relationship was seen. Only drivers on the Central line had significantly higher rates of sickness absences from respiratory infections (incidence rate ratio (IRR): 1.24, 95% CI 1.10, 1.39). Chronic respiratory and cardiovascular sickness absences were not associated with occupational $PM_{2.5}$ exposure.

While staff with higher occupational exposure to subway PM reported higher rates of sickness absence in some cases, there was no conclusive evidence to suggest that LU PM is the sole contributing factor to sickness absence. This is the largest study to quantify $PM_{2.5}$ exposure and the associated health effects within a London occupational cohort to-date and may have wider implications for the LU workforce that can contribute to a safer working environment for staff.

Please refer to page A284 for declarations of interest related to this abstract.

'It's complicated' – Answering the unanswered in asthma biologics

S62 WATCHING AND WAITING: OUTCOMES AMONG PATIENTS WITH SEVERE ASTHMA DEMONSTRATING PARTIAL RESPONSE TO MONOCLONAL ANTIBODY THERAPY OVER 2 YEARS

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10.1136/thorax-2023-BTSabstracts.68

Introduction Super-response (SR), defined as a cessation of oral corticosteroid (OCS) therapy and elimination of exacerbation, is a key treatment goal among patients with severe asthma (SA) on monoclonal antibody (mAb) therapy. Key predictors of SR remain elusive, and delayed SR (post 12-months' therapy) has not been well described. We explore long-term outcomes among patients with SA demonstrating partial response (PR) – $\geq$ 50% and <100% reduction in maintenance OCS and/or courses of OCS – to mAb therapy at 12 months.

Methods Retrospective analysis of patients with physician-confirmed SA commenced on mAb therapy from January 2019 – May 2021 who demonstrated PR at 12 months. We assessed baseline characteristics, clinical outcomes at 12 and 24 months, and treatment decisions. A subgroup analysis compared those who maintained PR at 24 months with those who went on to develop SR.

Result 194 patients were started on mAb therapy, of whom 72.7% (n=141; Benralizumab = 86, Mepolizumab = 31, Omalizumab = 19, Dupilumab = 5) demonstrated PR at 12 months. Among this group, clinical outcomes, including OCS use, annualised exacerbation rate (AER), Asthma Control Questionnaire (ACQ-6) and mini Asthma Quality of Life Questionnaire (mAQLQ) were not significantly different between 12 and 24 months' therapy.

Within this cohort, 121 (85.8%) maintained PR at 24 months' therapy, with 20 (14.2%) developing SR. There were no significant differences in baseline demographics or baseline clinical outcomes between the two groups. At 12 months' therapy, those who went on to develop SR had a significantly improved AER and ACQ-6 compared to those who did not.

At their 24 month review, 60% (n=116) continued on the mAb, 1% (n=2) switched to a new mAb, and 12% (n=23) discontinued treatment.

Conclusion Patients who demonstrate partial response to mAb treatment at 12 months may go on to develop super-response by 24 months. Patients who did develop super-response at 24 months had significantly improved AER and ACQ-6 at 12 months compared to those who didn't, suggesting these may be key criteria to decide whether to continue or switch mAb treatment in patients with partial response.

S63 LONG-TERM EFFECTIVENESS OF ANTI-IL4R THERAPY FOLLOWING SUBOPTIMAL RESPONSE TO ANTI-IL5/5R THERAPY IN SEVERE EOSINOPHILIC ASTHMA

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10.1136/thorax-2023-BTSabstracts.69

Introduction Dupilumab is an anti-IL4R monoclonal antibody (mAb) with proven efficacy in severe eosinophilic asthma (SEA). A suboptimal response to the eosinophil-targeting anti-IL5/5R mAbs mepolizumab and benralizumab is seen in ~20% of patients with SEA. We have previously reported that a significantly improved response in this cohort is seen following 6 months of treatment with dupilumab. It is unknown whether this response is maintained in the long-term.

Methods We performed a retrospective analysis of the clinical effectiveness of dupilumab at 1 year and 2 years of treatment in patients with SEA who had not responded adequately to anti-IL5/5R biologics. Change in the exacerbation rate (AER), maintenance oral corticosteroid dose (mOCS), lung function (FEV1) and change in symptom scores (ACQ6 and mAQLQ) were recorded.

Abstract S63 Table 1

Parameter	Baseline	12 months	24 months	P value
mOCS dose median (IQR), n=19	10 (5–25)	0 (0–5)	0 (0–3)	<0.0001
AER mean (SD)	3.22 (1.28)	0.34 (0.75)	0.77 (1.16)	<0.0001
ACQ6 score mean (SD)	3.04 (1.26)	1.61 (1.36)	1.70 (1.47)	<0.0001
mAQLQ score mean (SD)	3.57 (1.43)	5.20 (1.30)	5.73 (1.13)	<0.0001
FEV1 (L) mean (SD)	2.08 (0.8)	2.48 (0.8)	2.29 (0.94)	0.03

Results Thirty-two patients (mean age 41, 69% female, 72% atopic) were included in the analysis, of whom 23/32 (72%) had switched directly from benralizumab with the remainder switching from mepolizumab. 13/32 (40.6%) had co-morbid nasal polyposis and 5/32 (15.6%) had atopic dermatitis. Two patients discontinued Dupilumab in the 2nd year – 1 due to multiple missed appointments and doses and 1 due to pregnancy at the patient's choice.

The mean (SD) AER fell from 3.22(1.28) at dupilumab initiation to 0.34 at 1 year and 0.77 at 2 years. The median (IQR) mOCS dose in those on daily prednisolone (n=19) fell from 10(5–25) mg to 0 (0–5) mg at 1 year and remained 0 (0–3) mg at 2 years. 52% were exacerbation-free and off all mOCS for asthma at 2 years. Asthma control, quality of life and FEV1 also significantly improved (table 1).

Conclusion A minority of individuals with SEA have a suboptimal response to eosinophil-targeted therapy with an anti-IL5/5R mAb. We report significant clinical improvements following initiation with dupilumab that is maintained for 2 years. This suggests an important role for IL-4/-13 in these patients and reflects a specific sub-phenotype of T2-high asthma in which the eosinophil appears unlikely to play a key role in the disease pathogenesis.

S64 TARGETED PARASITE SCREENING IN A LARGE, AT-RISK, PRE-BIOLOGIC SEVERE EOSINOPHILIC ASTHMA POPULATION

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10.1136/thorax-2023-BTSabstracts.70

Introduction It is estimated that between 5–10% of asthma patients have severe disease. Eosinophilic asthma represents the majority of severe asthma cases, and many of these patients require commencement of anti-eosinophilic biologics. Eosinophils are believed to play a pivotal role in the host defence against parasite infections and thus prescribers of anti-IL5/5R biologics are cautioned against their use in patients with known or untreated helminth infections. There remains global ambiguity surrounding if, when and how, patients should be screened. To ensure appropriate identification of patients at risk, a comprehensive screening protocol based on patient travel history and exposure was introduced at our institution in collaboration with Infectious disease colleagues.

Methods A retrospective review of all protocol directed parasite screens performed from January 2019 up to January 2023 in adult severe asthma patients who met NICE criteria for commencement of an anti-IL5/5R biologic, was completed. Based on each patient's exposure and travel history, targeted stool smear testing and/or serum enzyme-linked immunosorbent assays (ELISA) were used to detect parasitic antibodies.

Results A total of 479 patients were screened for parasite infection. 26 patients (5.4%) had a positive result and of these, 16 (61.5%) were for Schistosoma and 10 (38.5%) for Strongyloides. Table 1 stratifies the characteristics of these patients. No patient had a positive stool smear, or positive result for Toxocara or Filaria antibodies. All positive antibody results were discussed within a join respiratory and infectious

Abstract S64 Table 1

Positive Parasite Screen patient characteristics

		Positive Strongyloides (n = 10)	Positive Schistosomiasis (n = 16)	Total (n = 26)
Sex	Male	3 (30%)	7 (43.7%)	**10 (38.5%)**
	Female	7 (70%)	9 (56.3%)	**16 (61.5%)**
Age (years)	Mean	60.5	54.3	**56.7**
	Median (range)	71.5 (38-82)	43 (32-68)	**68 (32-82)**
Serum eosinophils at the time of parasite screening (10^9/L)	Mean	0.49	0.45	**0.47**
	Median (range)	0.4 (0.0 -0.8)	0.75 (0.0-1.2)	**0.75 (0.0 -1.2)**
Peak Serum Eosinophil count (10^9/L)	Mean	1.02	0.77	**0.87**
	Median (range)	1.77 (0.4-3.15)	1.1 (0.3 – 1.3)	**2.0 (0.3-3.15)**
Patients taking daily Oral Corticosteroid (OCS)	Number of patients	n= 4	n= 8	**n= 12**
	Mean (mg)	12	11.2	**11.5**
	Median (range)	11.5 (5 - 20)	10 (5-30)	**10 (5-30)**

disease MDT, with appropriate treatment administered prior to the first dose of anti-il5/5R biologic.

Conclusions Within a targeted screening population of at-risk, severe eosinophilic asthma patients, just under 1 in 20 patients had a positive parasite screen. To date, this is the largest reported cohort of severe asthmatics to have undergone pre-anti-IL5/5R screening in the literature, which serves to help inform global clinical practice and risk assessments.

S65 TEZEPELUMAB REDUCED OCS USE IN OCS-DEPENDENT PATIENTS WITH SEVERE ASTHMA: PHASE 3B WAYFINDER STUDY INTERIM RESULTS

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10.1136/thorax-2023-BTSabstracts.71

Introduction and Objectives The efficacy of tezepelumab in patients with severe asthma, including oral corticosteroid (OCS)-dependent patients, was established in the PATHWAY (NCT02054130) and NAVIGATOR (NCT03347279) studies. WAYFINDER (NCT05274815) is an ongoing, open-label, single-arm, OCS-sparing study that aims to enrol 300 patients with severe, OCS-dependent asthma. This interim analysis observed the ability of tezepelumab to reduce the prescribed OCS dose without loss of asthma control in patients who received treatment for ≥8 weeks and had ≥1 opportunity to reduce their OCS dose (n=84).

Methods Patients (18–80 years old) taking high-dose inhaled corticosteroids plus a long-acting β_2-agonist for ≥6 months and OCS (prednisone/prednisolone 5–40 mg/day or equivalent) for ≥3 months before study entry are receiving tezepelumab 210 mg SC every 4 weeks for up to 52 weeks.

Results The mean (SD) maintenance OCS dose at baseline was 10.9 (7.6) mg/day. A maintenance OCS dose of ≤5 mg/day was observed in 29 of 32 patients (90.6%) who reached week 20 in the study (figure 1). Mean (SD) follow-up was 125 (41) days. Tezepelumab was well tolerated.

Conclusions This early-trend analysis of WAYFINDER suggests that patients treated with tezepelumab achieve protocol-driven reductions in maintenance OCS dose while maintaining asthma control.

Please refer to page A284 for declarations of interest related to this abstract.

S66 LONG-TERM EFFECTIVENESS OF BENRALIZUMAB AND REMISSION OF EGPA: TWO YEAR RESULTS FROM GUY'S EGPA COHORT

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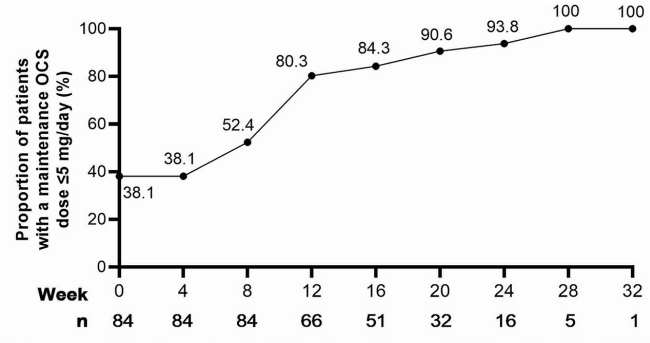
10.1136/thorax-2023-BTSabstracts.72

Background Eosinophilic granulomatosis with polyangiitis (EGPA), is a rare multi-system vasculitis which has shown to be responsive to the anti-IL5 biologic mepolizumab in the phase 3 MIRRA trial. The anti-IL5R biologic benralizumab leads to more complete depletion of tissue eosinophilia making it of considerable interest in EGPA, however, the phase 3 MANDARA study is ongoing. As most patients with EGPA additionally have steroid-dependent severe eosinophilic asthma, there has been the opportunity to use benralizumab via the asthma indication and assess its long-term effectiveness in the real-world.

Method All patients within Guy's EGPA Cohort who had completed a minimum of 1 year of benralizumab were identified. Baseline characteristics and clinical response criteria were collected from electronic patient records for up to two years of treatment. Clinical remission was defined as Birmingham Vasculitis Activity Score (BVAS) of 0 and oral corticosteroid (OCS) dose of ≤4 mg/day. ''Super responders'' were defined as patients in clinical remission without any asthma exacerbations or extrapulmonary relapses over the preceding 12 months.



Week	Number of patients at each week	Patients with a maintenance OCS dose ≤5 mg/day, n (%)
4	84	32 (38.1)
8	84	44 (52.4)
12	66	53 (80.3)
16	51	43 (84.3)
20	32	29 (90.6)
24	16	15 (93.8)
28	5	5 (100)
32	1	1 (100)

Data are presented as the number of patients with a maintenance OCS dose ≤5 mg/day divided by the number of patients who reached the timepoint.
OCS, oral corticosteroid.

Abstract S65 Figure 1 The proportion of patients receiving a maintenance OCS dose ≤5 mg/day increased with time on the protocol

Results 70 EGPA patients who had completed one year of treatment and 53 had completed two years with benralizumab were included. 27% were ANCA positive and 77% had a BVAS>0 at baseline. The mean (SD) baseline OCS dose was 13.1 (10.5) mg/day. Following initiation of benralizumab, 82% of patients achieved a reduction of ≥50% in OCS dose and 54% were weaned off completely. At two years 67% were no longer requiring OCS for EGPA. Clinical remission was observed in 67% of patients at one year and in 68% of patients at two years. A relapse-free 'super-response' was observed in 46% at 1 year and 34% at 2 years. The mean (SD) time to relapse was 11 (8) months.

Conclusion In a large cohort of patients with EGPA, benralizumab offered significant steroid-sparing potential and the achievement of clinical remission in approximately two-thirds of patients. Importantly the effects were maintained at two years.

S67 BIOMARKERS AND CLINICAL OUTCOMES AFTER CESSATION OF TEZEPELUMAB AFTER 2 YEARS OF TREATMENT (DESTINATION)

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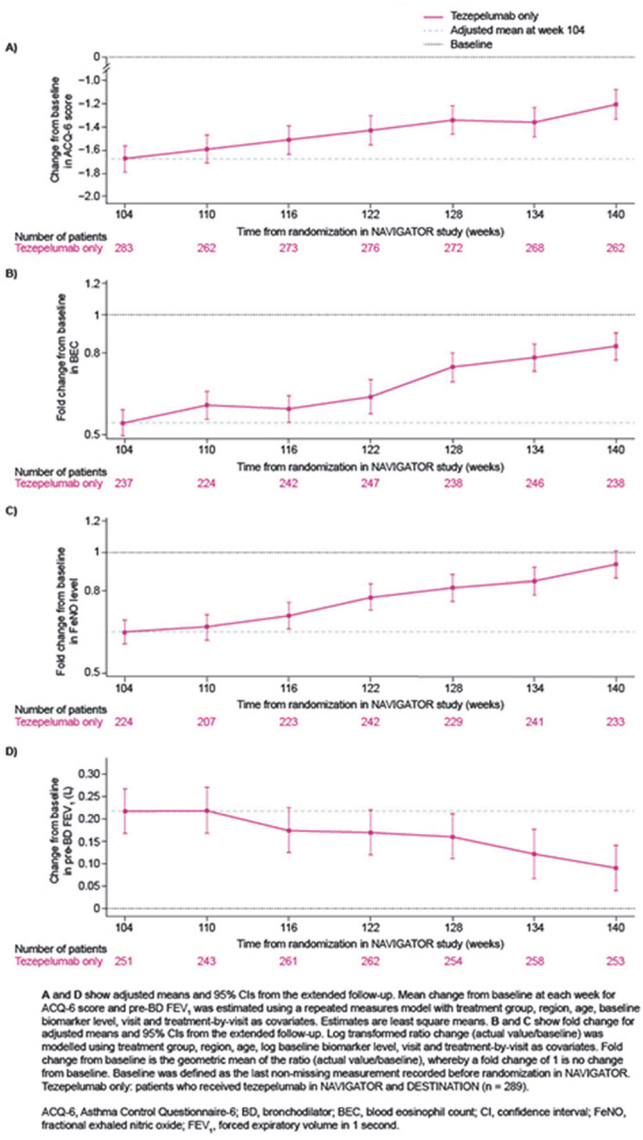
10.1136/thorax-2023-BTSabstracts.73

Introduction and Objectives In the phase 3 DESTINATION (NCT03706079) study, long-term tezepelumab treatment resulted in reduced exacerbations, and improvements in lung function and symptom control, and reduced inflammatory biomarkers in patients with severe, uncontrolled asthma. To explore the effects of tezepelumab cessation after 2 years of treatment (210 mg every 4 weeks).

Methods DESTINATION was a multicentre, randomized, placebo-controlled, double-blind, extension study of patients (12–80 years old) who completed NAVIGATOR (NCT03347279) or SOURCE (NCT03406078). After tezepelumab cessation at week 104, patients who initially enrolled in NAVIGATOR could enter a 36-week off-treatment extended follow-up. Change over time in Asthma Control Questionnaire (ACQ)-6 score, blood eosinophils count (BEC), fractional exhaled nitric oxide (FeNO) levels and pre-bronchodilator (BD) FEV_1 was assessed.

Results Overall, 569 patients entered the extended follow-up. From week 110, ACQ-6 score increased, and BEC and FeNO levels gradually increased in parallel with pre-BD FEV_1 reductions. All measures continued to worsen over the extended follow-up, but did not return to baseline 36 weeks post treatment cessation (figure 1)

Conclusion Biomarker suppression and improved clinical outcomes in patients gradually waned after cessation of tezepelumab, although, on average, none returned to baseline during the extended follow-up.



A and D show adjusted means and 95% CIs from the extended follow-up. Mean change from baseline at each week for ACQ-6 score and pre-BD FEV_1 was estimated using a repeated measures model with treatment group, region, age, baseline biomarker level, visit and treatment-by-visit as covariates. Estimates are least square means. B and C show fold change for adjusted means and 95% CIs from the extended follow-up. Log transformed ratio change (actual value/baseline) was modelled using treatment group, region, age, log baseline biomarker level, visit and treatment-by-visit as covariates. Fold change from baseline is the geometric mean of the ratio (actual value/baseline), whereby a fold change of 1 is no change from baseline. Baseline was defined as the last non-missing measurement recorded before randomization in NAVIGATOR. Tezepelumab only: patients who received tezepelumab in NAVIGATOR and DESTINATION (n = 289).

ACQ-6, Asthma Control Questionnaire-6; BD, bronchodilator; BEC, blood eosinophil count; CI, confidence interval; FeNO, fractional exhaled nitric oxide; FEV_1, forced expiratory volume in 1 second.

Abstract S67 Figure 1 Change over time from baseline during the extended follow-up of DESTINATION(weeks 104–140) in (A) ACQ-6 score, (B) BEC, (C) FeNO levels and (D) pre-BD FEV

Please refer to page A284 for declarations of interest related to this abstract.

'It's not unusual' – Rare and interstitial lung disease biology

S68 CAFFEINE HAS DIFFERENTIAL EFFECTS ON EXPRESSION OF TGFβ ISOFORMS AND PROMOTES EPITHELIAL WOUND HEALING THROUGH A TGFβ-DEPENDENT PATHWAY

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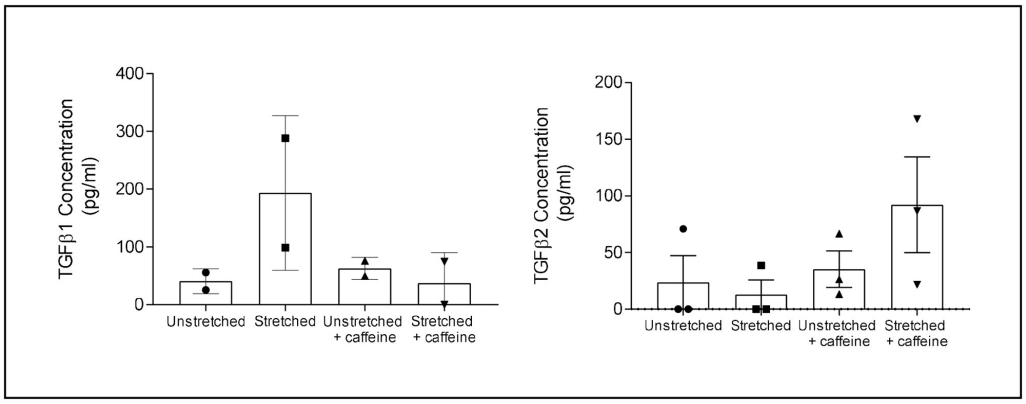
10.1136/thorax-2023-BTSabstracts.74



Abstract S68 Figure 1 Effect of caffeine on stretch induced TGFβ1 and TGFβ2 release measurement by ELISA

Introduction and Objectives Bronchopulmonary dysplasia (BPD) affects 45% of infants born at ≤29wks, when prematurity interrupts lung development causing simplified alveoli, interstitial fibrosis plus airway and vasculature remodelling. Mechanical ventilation of the neonate is an important risk factor for the development of BPD. TGFβ signalling is implicated in normal lung development and BPD pathogenesis yet specific functions of individual TGFβ isoforms is unclear. Clinically, caffeine is used to treat BPD, yet the mechanism of action is unknown. We hypothesize that caffeine functions to shift the balance of TGFβ isoforms from TGFβ1 to TGFβ2, to promote conditions of healing.

Methods Mechanical ventilation was modelled using the Flexcell 5000T system to impose 15% CMS, 1Hz on immortalised human bronchial epithelial cells (iHBECs) for varying amounts of time. TGFβ1, TGFβ2 and TGFβ3 levels were measured by ELISA, western blotting and qRT-PCR. Scratch wound assays were used to investigate the effect of caffeine and TGFβ2 on iHBEC repair over 24 and 48 hours.

Results CMS increased TGFβ1 and decreased TGFβ2 expression, whereas TGFβ3 was below the ELISA sensitivity. Caffeine had no effect on baseline *TGFB1* or *TGFB3* but increased *TGFB2* mRNA time-dependently (maximal at 24 hours, 5.63±2.88). Caffeine reversed the effect of CMS-induced changes in TGFβ1 and TGFβ2 measured by western blotting: CMS induced TGFβ1 (1.55 fold change±0.07) which was reduced by caffeine (0.98 fold change±0.23) and reduced TGFβ2 (0.77 fold change±0.16) which was reversed by caffeine (0.90 fold change±0.12), with similar effects seen when measured by ELISA. Caffeine enhanced epithelial wound closure after 48 hours (62.5±2.45% wound closure vs 20 ±2.6%), as did exogenous TGFβ2 stimulation (51.4±10.2% vs 20±9.1%), and caffeine-induced wound closure was abrogated by SB431542, an inhibitor of TGFβ receptors (10.7 ±2.4% vs 27±3.3%).

Conclusion Mechanical ventilation in neonates is thought to contribute to BPD pathogenesis. Our data shows that CMS has differential effects on TGFβ isoforms, which can be reversed by caffeine, leading to increased TGFβ2. We have also shown that caffeine promotes epithelial wound healing via TGFβ signalling. These findings shed light on the mechanism of action of caffeine in prevention and treatment of BPD.

Please refer to page A285 for declarations of interest related to this abstract.

S69 TARGETING THE RESPONSE OF LAM CELLS TO EXTRACELLULAR MATRIX COULD PROVIDE NEW THERAPIES FOR LYMPHANGIOLEIOMYOMATOSIS

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10.1136/thorax-2023-BTSabstracts.75

Introduction and Objectives Lymphangioleiomyomatosis (LAM) is a rare, female-specific cystic lung disease in which destruction of the lung parenchyma is driven by lesions containing $TSC2^{-/-}$ LAM cells and recruited stromal LAM associated fibroblasts (LAFs). LAM patients can be treated with rapamycin to stabilise lung function, but some patients continue to decline, and additional therapies are needed for these patients. We hypothesised that extracellular matrix (ECM) deposited by LAFs within lesions could affect LAM cell behaviour and promote disease progression; previously we showed that decellularised LAF-deposited ECM could stimulate $TSC2^{-/-}$ LAM-derived cell proliferation *in vitro*. We aimed to investigate the transcriptional response of LAM cells to ECM, to identify druggable, ECM-driven, pro-proliferative pathways.

Methods RNA sequencing was used to identify genes that were differentially expressed in $TSC2^{-/-}$ LAM-derived cells grown on decellularised LAF-deposited matrix relative to cells grown on standard tissue culture plastic. We detected 458 genes with elevated expression on matrix, 155 genes with decreased expression. We mined these data for components of pro-proliferative pathways which were elevated on matrix, insensitive to rapamycin inhibition and targeted by drugs currently under clinical development, for rapid translation to the clinic.

Results We identified several promising candidates including:

1. All three components (*CDK7, CCNH, MNAT1)* of the CDK activating kinase (CAK) complex, responsible for the activating phosphorylation of CDK1, CDK2, CDK4 and CDK6 and promoting cell cycle progression.
2. *GAS6*, the ligand for the AXL receptor tyrosine kinase, which has demonstrated pro-proliferative and anti-apoptotic activity in multiple cancer cell models.
3. Urokinase (*PLAU*) and its receptor uPAR (*PLAUR*): UPAR interacts directly with integrins and vitronectin, to initiate signalling cascades involved in cell proliferation and survival.

Inhibitors of these molecules (Samuraciclib/CDK7, Dubermatinib/AXL, IPR-803/UPAR) proved effective against $TSC2^{-/-}$ LAM-derived cells, significantly reducing proliferation *in vitro*.
Conclusion LAF-derived ECM enhances $TSC2^{-/-}$ cell proliferation *in vitro* and may contribute to disease progression by providing a pro-proliferative microenvironment for LAM cells *in vivo*. A number of pro-proliferative molecules are upregulated when $TSC2^{-/-}$ LAM-derived cells are grow on decellularised ECM *in vitro*, and targeting these pathways may provide novel therapies for LAM patients with reduced response to rapamycin.

Please refer to page A285 for declarations of interest related to this abstract.

S70 MESENCHYMAL CELL SENESCENCE INFLUENCES ATII CELL VIABILITY IN LAM

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10.1136/thorax-2023-BTSabstracts.76

Background Lymphangioleiomyomatosis (LAM) is a progressive, incurable multisystem disease-causing respiratory failure, lymphatic abnormalities, and renal tumours. LAM is rare as a sporadic disease but is common in women with the autosomal genetic disease tuberous sclerosis complex. LAM cells have biallelic inactivation of TSC2 which codes for tuberin, a component of a multiprotein complex inhibiting the kinase mTOR. We hypothesis, due to mTOR dysregulated cells in LAM nodules become senescent, generate senescence associated secretory proteins and lipids which in turn induce senescence in adjacent cells including alveolar type II cell impairing alveolar repair mechanisms to promote parenchymal lung destruction.
Methods Using laser microdissection, we examined the transcription profile of LAM nodules compare to rest of lung and control lungs. The result from transcription validated in dual label immunohistochemistry, primary cell co-cultures and coculture of human drives ATII organoids with Primary LAM model cells.
Results Cyclin Dependent Kinase Inhibitor 1A (p21) and Cyclin Dependent Kinase Inhibitor 2A (p16) proteins were increased in LAM lung. p21 and p16 co-localised with SPC (ATII cells). In Murine model of LAM homograft, senescence associated beta-galactosidase activity increased with time and significantly higher than control animals. scRNAseq of human LAM lungs showed alterations in ATII cell regulation of cell death, apoptotic pathways, senescence and Wnt signalling. A Stat 3 / p53 dependent pathway governing apoptosis and alterations in lipolysis and ATI/II differentiation were present. In vitro LAM cell / LAF / human organoids ATII co-cultures showed that senescence associated genes are upregulated in an mTOR dependent manner. Interrogation of scRNA seq data from nodules and epithelial areas validates these findings and is associated with lung function and disease duration in humans.
Conclusions mTOR dysregulated LAM cells induce fibroblast and epithelial senescence and reduce ATII cell viability to impair the repair response to lung injury.

Please refer to page A285 for declarations of interest related to this abstract.

S71 DECIPHERING THE ROLE OF γδ T CELLS IN HYPERSENSITIVITY PNEUMONITIS

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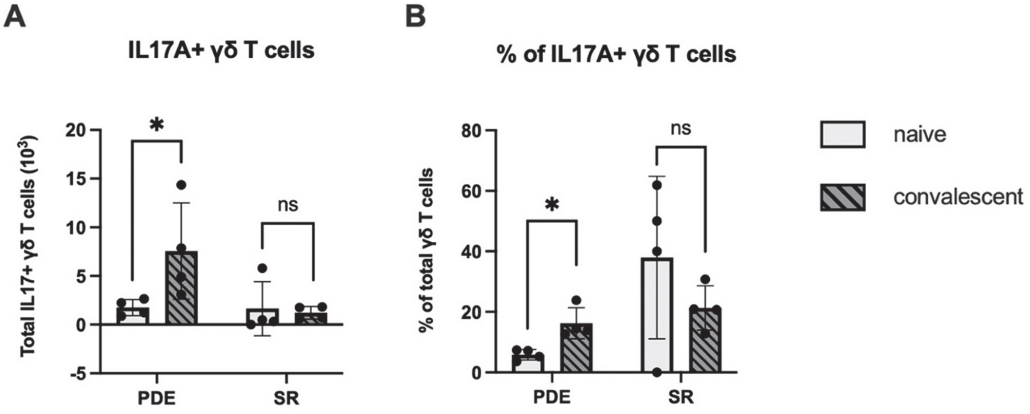
10.1136/thorax-2023-BTSabstracts.77

Introduction and Objectives Hypersensitivity pneumonitis (HP) is a form of interstitial lung disease, characterized by persistent lymphocytosis and granuloma formation in the lungs, but its pathophysiology is poorly understood. Pigeon Dropping Extract (PDE) is a common antigen causing bird-related HP. IL17A-producing γδ T cells have been shown to mediate an immune response against PDE, and to be more abundant upon secondary exposure to the antigen.[1] The aim of this study was to determine whether this memory-like response against PDE is antigen-specific.
Methods C57BL6/J mice (n=16) underwent a sensitization protocol to create convalescent mice, where they were administered 8 μg of PDE on days 1,3,5,8,10,12 and 15. Control group of naïve mice (n=17) were given saline on the corresponding days. Following a 2-week recovery period, all mice were exposed either to PDE, or another antigen (*Saccharopolyspora rectivirgula*, SR) causing HP. The numbers of tissue-



Abstract S71 Figure 1 Total number (A) and (B) of IL17A+ γδ T cell in the lungs of mice exposed to either PDE or SR. Analysed by fluorescence-activated cell sorting .Data is shown as mean ± SD. Mann-Whitney U test was carried out with p=0.05(*), n=16

resident, circulating, and IL17A+ γδ T cells were quantified using flow cytometry. Immune cells in bronchoalveolar lavage fluid were immunostained and counted with light microscope. Immune cell infiltration was observed in H&E-stained formalin-fixed paraffin-embedded lung sections.

Results The numbers of tissue-resident and IL17A+ γδ T cells following PDE-exposure were higher in convalescent mice compared to control. SR caused non-significant increase in tissue-resident γδ T cells. Total cell count and density in bronchoalveolar lavage were significantly higher and there was more immune cell infiltration in H&E-stained lung sections in convalescent mice that were exposed to PDE than SR.

Conclusions It was demonstrated that the memory-response was specific to PDE and mediated by tissue-resident and IL17A-producing γδ T cells. However, there was cross-reactivity to SR. Potential causes included the capability of γδ T cells to detect non-MHC-bound molecules. Future studies should examine reactions to other antigens with similar immune profiles, γδ T cell-depletion and other tissue-residence markers. Better understanding pathophysiology of HP would allow for identification of diagnostic biomarkers and potential novel therapeutics.

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S72 SPECIFIC THORACIC CT PATTERN OF PERIHILAR CONGLOMERATION AND CONSOLIDATION IS ASSOCIATED WITH DEVELOPMENT OF LUNG FIBROSIS IN PULMONARY SARCOIDOSIS

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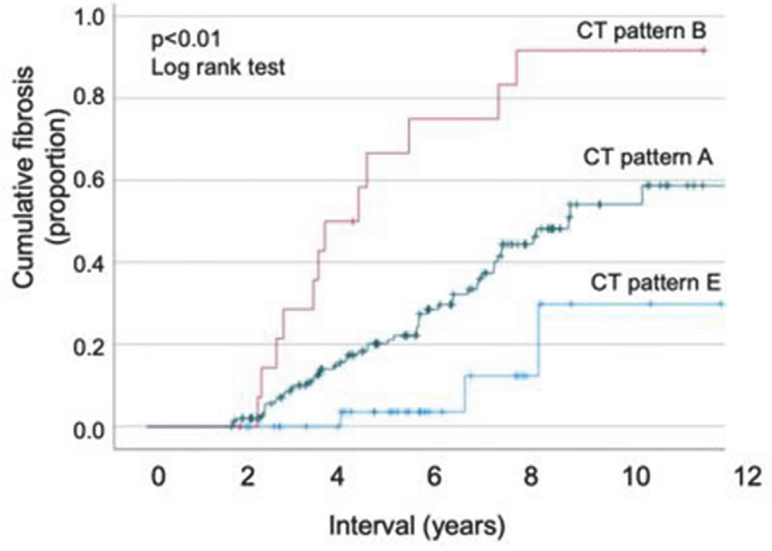
10.1136/thorax-2023-BTSabstracts.78

Background Approximately 20% of patients with pulmonary sarcoidosis develop fibrosis. There is currently no predictor of fibrosis.

Aims We questioned if a specific radiological feature were associated with development of fibrosis in pulmonary sarcoidosis.

Methods In a retrospective study, n=376 sarcoidosis patients (BTS Statement 2020 diagnostic criteria) from the Oxford Sarcoidosis Clinic were included. Their first and last thoracic CTs were classified into: A. Active disease (defined as presence of nodularity, ground glass opacities, interlobular septal thickening, and/or consolidation but not perihilar) without fibrosis, B. Active disease with perihilar consolidation/conglomeration without fibrosis, C. Active disease with fibrosis, D. Fibrosis without active disease, E. hilar and/or mediastinal lymphadenopathy only. Those with fibrosis on their first CT were excluded (n=127). Of the remaining, those with CT intervals between 2 and 12 years were selected for final analyses (n=201). 67 of these patients developed fibrosis on the second CT. Starting FVC [mean (S.D.)] was 99(20)% predicted, TLCO 81(17)%; 91% were non-smoker. A multivariable Cox regression model was constructed to examine the association of age, gender, first CT pattern (A, B and E) and treatment (Prednisolone or any immunosuppressants – yes/no during CT interval), with development of fibrosis on second CT (which accommodates the variable follow up period). Kaplan-Meier survival analysis with log rank test of significance was also performed for time to fibrosis for the three CT patterns.

Results For the final cohort (n=201), median age was 52y, CT pattern A (n=151); B (n=15) and E (n=35). Median interval (S.D.) between the two CTs were 4.7(2.3)y and 5.7 (2.7)years for the fibrotic and the non-fibrotic groups respectively. From the multivariable Cox regression model, presence of active disease with peri-hilar conglomeration/consolidation (CT pattern B) was the strongest independent predictor for fibrosis ($p < 0.001$, HR – 20.45, 95% CI : 5.37 – 77.85). Active disease (pattern A) was also associated with development of fibrosis but with a lower HR (p=0.01, HR-4.70, 95% CI – 1.43–15.28). Kaplan-Meier analysis supports these findings (logrank test, $p < 0.01$) (figure 1).



Abstract S72 Figure 1 KM plot for cumulative proportion of patients with fibrosis over the years

Conclusion Presence of perihilar consolidation or conglomeration on CT is a strong predictor of fibrosis in patients with pulmonary sarcoidosis.

Please refer to page A285 for declarations of interest related to this abstract

S73 SINGLE CELL RNA SEQUENCING OF PBMCS REVEALS DIFFERENCES BETWEEN FAST AND SLOW RESOLVING POST-COVID INTERSTITIAL LUNG DISEASE

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10.1136/thorax-2023-BTSabstracts.79

Background The majority of respiratory symptoms and radiological abnormalities post-COVID-19 improve. However, residual radiological changes are observed in approximately 10% of symptomatic patients at 12 months post-hospitalization. The aim of this study was to further our understanding of the immunopathomechanisms associated with persistence and resolution of post-COVID interstitial lung disease (ILD), in order to facilitate early therapeutic intervention to accelerate recovery and minimize potentially irreversible lung damage.

Methods Patients with post-COVID ILD (n=8) and post-COVID recovered controls (n=8) were selected from the UCL Respiratory post-COVID-19 biobank of blood samples from unvaccinated individuals during the first wave of the pandemic. The samples were sourced ethically and used in accord with the terms of the informed consent under an IRB/EC approved protocol. All patients had a history of confirmed COVID-19, were hospitalized and had required supplemental oxygen during the acute phase of infection. Patients with fast (n=3) and slow (n=5) resolution of interstitial lung abnormalities, were selected by evaluating trajectories of quantitative, visually-scored serial chest CT scans over a 52-week follow-up. Using combined single-cell RNA-seq and cellular indexing of transcriptomes and epitopes sequencing (CITE-seq), of peripheral blood mononuclear cells sampled at 16 weeks post-acute infection, we compared the transcriptomic and cell surface proteomic profiles.

Results and Conclusions We generated a dataset of 97,711 cells and identified 27 cell types (figure 1). The immune profile did not differ between the post-COVID ILD (fast and slow combined) group compared with recovered patients. Within the post-COVID ILD cohort, we observed that fast resolvers had a lower abundance of CD16+ monocytes and natural killer (NKT) cells, compared to slow resolvers. Moreover, there were transcriptomic differences between fast and slow resolvers, with a total of 462 differentially expressed genes predominantly in B memory (n=155), CD14+ (n=142) and CD16+ (n=96) monocytes. In conclusion reduced circulating CD16+ monocytes and NKT cells at 16 weeks post-acute COVID-19 are associated with faster resolution of post-COVID residual lung abnormalities at 52 weeks and warrant further investigation.

'You know I'm no good' – Innovative approaches to smoking cessation

S74 AN INNOVATIVE DIGITAL APPROACH TO SUPPORT NHS STAFF TO STOP SMOKING ACROSS AN INTEGRATED CARE SYSTEM

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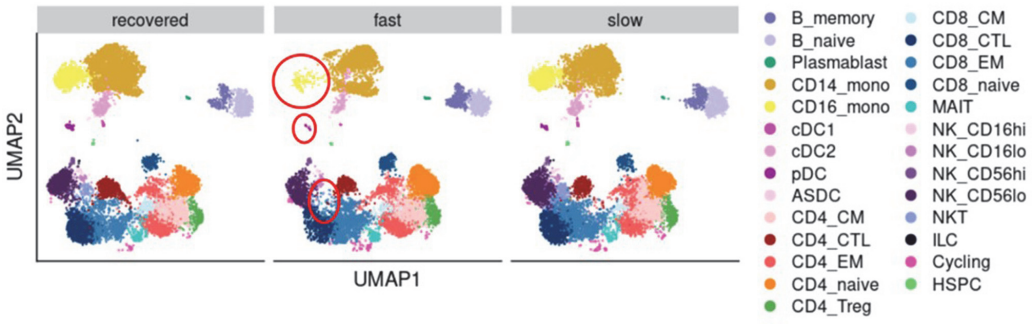
10.1136/thorax-2023-BTSabstracts.80

Introduction Greater Manchester Integrated Care Partnership, funded by NHS England, have implemented a new tobacco dependency treatment offer for Greater Manchester-based NHS employees. This digital approach provides participants with 6-months' free access to the Smoke Free app, which includes 24/7 access to behavioural support from trained advisors, and 12-weeks of nicotine replacement therapy (NRT) and/or a refillable vaping device (through home delivery). To investigate clinical effectiveness of this programme, a deep-dive study was commissioned to recruit 300 participants.

Methods 300 NHS staff (all job roles were eligible – clerical, domestic, service, etc) participating in this treatment programme were recruited in two cohorts: 1) 150 participants at the pilot site (Manchester University NHS Foundation Trust) from February to May 2022, 2) 150 participants from across all other eligible NHS Trusts in Greater Manchester from September to February 2023. The two-cohort approach enabled us to implement the lessons learned in cohort 1 to achieve even better abstinence rates in cohort 2. The primary outcome



Abstract S73 Figure 1 Uniform manifold approximation and projection (UMAP) visualization of annotated peripheral blood mononuclear cells (PBMCs)

Abstract S74 Table 1 Summary of primary and secondary outcomes in cohort 1, cohort 2 and entire study population

Outcome	Cohort 1% (n)	Cohort 2% (n)	Total% (n)
CO-verified 12w Abstinence			
Did Not Smoke	34% (51)	40% (60)	37% (111)
Smoked	9% (13)	5% (7)	7% (20)
No Reading	20% (30)	36% (54)	28% (84)
Lost to Follow-Up	37% (56)	19% (29)	28% (85)
12w Continuous Abstinence			
Did not Smoke	31% (47)	47% (70)	39% (117)
Smoked	31% (46)	34% (51)	32% (97)
Lost to Follow Up	38% (57)	19% (29)	29% (86)
12w 7d Point Prevalence			
Did not Smoke	44% (66)	59%(89)	52% (155)
Smoked	18% (27)	21%(32)	20% (59)
Lost to Follow Up	38% (57)	19% (29)	28% (86)
4w Continuous Abstinence			
Did Not Smoke	42% (63)	57% (85)	49% (148)
Smoked	30% (45)	30% (45)	30% (90)
Lost to Follow Up	28% (42)	13% (20)	21% (62)

was CO verified smoking abstinence at 12 weeks (CO devices delivered to participants' home). Secondary outcomes included self-reported continuous abstinence at 4 and 12 weeks and 7-day point prevalence abstinence at 12 weeks.

Results Across the entire cohort (n=300), the CO-verified 12-week abstinence rate was 37%. Secondary outcomes were 49% self-reported continuous abstinence at 4 weeks and 39% self-reported continuous abstinence at 12 weeks (table 1). In terms of treatment options, 10% of all participants used NRT, 44% vaped, and 35% used a combination of NRT and vaping to help them stop smoking. The average number of advisor interactions via the app was 50 per participant. Higher quit rates were achieved when NRT/Vaping were used compared to the app alone. Feedback from cohort 1 highlighted the need for education on different treatments. This was implemented in cohort 2, leading to increased abstinence rates compared to cohort 1 (CO verified 12-week abstinence 34% cohort 1 versus 40% cohort 2).

Conclusion The results of this deep-dive study into a regional NHS staff tobacco dependency treatment offer provides assurance of clinical effectiveness across this large-scale programme of work.

S75 QUANTIFICATION OF SMOKING-RELATED AIRWAY REMODELLING IN COPD USING A NOVEL FAST-RESPONSE CAPNOMETER

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10.1136/thorax-2023-BTSabstracts.81

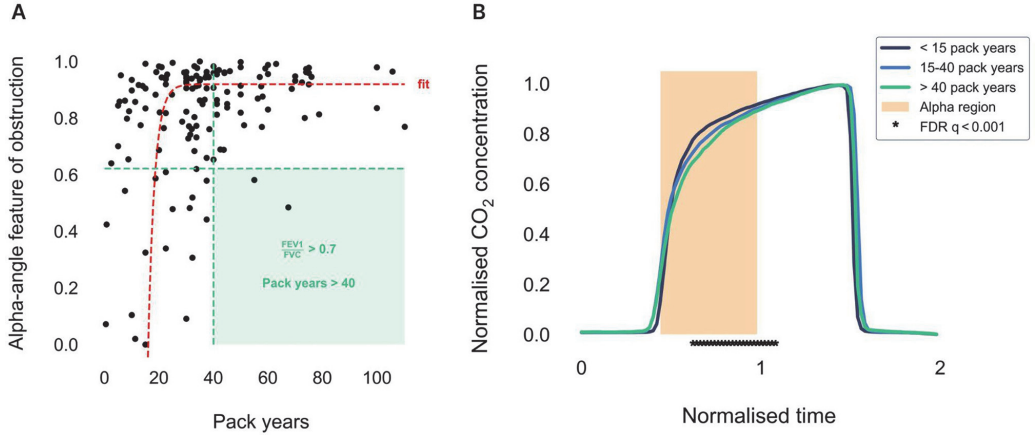
Introduction Airway remodelling due to cumulative tobacco smoking and its association with airflow limitation severity in COPD is difficult to characterise using non-specific methods such as spirometry.

Objective To evaluate the relationship between smoking history and features of small to medium-sized airway obstruction in participants with COPD with fast-response capnometry using TidalSense's N-Tidal™ device.

Methods 305 COPD GOLD stage 3/4 participants were included from three longitudinal observational studies conducted in the UK: COPD Breathing Record Study (CBRS); CBRS 2; and the Cardiorespiratory Diagnostic Study (CARES). Tobacco smoking data was collected at baseline; capnography data was collected twice daily for up to 6 weeks. CO2 features from the expiratory upstroke and plateau phases known to correlate with the degree of airways obstruction in COPD were compared to participants' smoking histories.

Results Higher smoking pack-years was associated with greater curvature in the alpha-angle region, which may relate to structural airway remodelling of smaller airways. The alpha-angle feature of obstruction demonstrated a positive non-linear correlation with pack years, indicating that a greater degree of airways obstruction is associated with increased cumulative exposure to smoking.

Alpha-angle features showed a significantly altered CO2 waveform geometry beyond 40 pack years, suggesting this



Abstract S75 Figure 1 (A) regression plot of CO2 alpha-angle feature vs. pack years. (B) Average CO2 waveforms across subjects with <15 pack years, 15–40 pack years and >40 pack years smoking history

level of smoking history may represent a threshold beyond which demonstrable airway remodelling is highly likely. Of participants with over 40 pack years, 96% had an FEV1/FVC <0.7, further supporting this hypothesis.

Conclusion CO2 waveform features of airway obstruction demonstrate a dose-response relationship with cumulative smoking history. N-Tidal may be able to directly probe airway remodelling as a result of smoking, potentially enabling early identification of physiological changes undetectable by spirometry.

Please refer to page A285 for declarations of interest related to this abstract.

S76 THE SUMMIT STUDY: FOUR-WEEK QUIT RATES AMONGST INDIVIDUALS REFERRED TO STOP SMOKING SERVICES FOLLOWING ATTENDANCE AT A LUNG HEALTH CHECK

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10.1136/thorax-2023-BTSabstracts.82

Introduction Lung Cancer Screening (LCS) reduces lung cancer related mortality, and LCS participation provides a valuable opportunity to offer smoking cessation interventions to a population experiencing long-term tobacco dependence. Here, we examine the impact of an 'opt-out' smoking cessation referral strategy on Stop Smoking Service (SSS) attendance and four-week quit rates in a LCS context.

Methods The SUMMIT Study (NCT03934866) is a prospective observational cohort study which aims to assess the implementation of Low-Dose Computed Tomography screening for lung cancer in a high-risk population and validate a multi-cancer early detection blood test.

LCS eligibility was assessed at a baseline Lung Health Check (LHC) where all individuals currently smoking tobacco were given Very Brief Advice on smoking cessation. For those resident in boroughs where community SSS were available and accepted secondary care referrals, an 'opt-out' referral to a SSS was made on their behalf unless they declined consent.

Individuals referred to SSS following attendance at a LHC between 8 April 2019 and 31 January 2020 were included in the analysis. Referral outcome data was obtained from SSS individually.

Results Outcomes were available for 742 referrals across five SSS. 47.3% (n=351/742) of individuals accepted an appointment with the service when contacted. 16.7% (n=124/742) declined the service and 34.2% (n=254/742) could not be contacted after being referred (table 1).

65.5% (n=230/351) of those accepting an appointment set a quit date. Amongst these individuals, the four-week quit rate was 57.4% (n=132/230). 40.0% (n=92/230) did not quit and 2.6% (n=6/230) were lost to follow-up. The overall four-week quit rate amongst all individuals referred was 17.8% (n=132/742).

Discussion Long-term abstinence rates amongst untreated smokers are reportedly 3–5% after a quit attempt (Hughes et al., 2004). In our cohort, two-thirds of individuals accepting a SSS appointment following attendance at a LHC seriously attempted to quit by setting a quit date and the four-week quit rate amongst those doing so was 57.4%. While it remains to be seen how this translates into long-term abstinence, our data suggests that opt-out policies which proactively refer individuals who smoke tobacco to SSS following interaction with a LCS programme may be beneficial.

Abstract S76 Table 1 Breakdown of referrals made to smoking cessation services with available outcome data

	Total (n)	Total (% of referrals received)
Total number of referrals with available outcome data	742	-
Number of individuals contacted who accepted an appointment	351	47.3
Number of individuals contacted who declined the service	124	16.7
Unable to contact following receipt of referral	254	34.2
Other (e.g., insufficient details on referral, out of area)	13	1.8

Please refer to page A285 for declarations of interest related to this abstract.

S77 DEVELOPMENT OF A WEB-BASED SMOKING CESSATION TOOL TO FACILITATE ACCURATE NICOTINE REPLACEMENT THERAPY (NRT) PRESCRIPTION AND ONWARD REFERRAL TO COMMUNITY STOP SMOKING SERVICES

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10.1136/thorax-2023-BTSabstracts.83

Background The NHS long term plan commits to offering all inpatients who smoke access to tobacco treatment services. Previous BTS audits at our trust, highlighted shortfalls in offering nicotine replacement therapy (NRT) and low rates of follow-up with community stop smoking services (CSSS). Poor recall of NRT prescription guidelines and how to refer to our three local CSSS (depending on patients' postcodes) were identified as barriers.

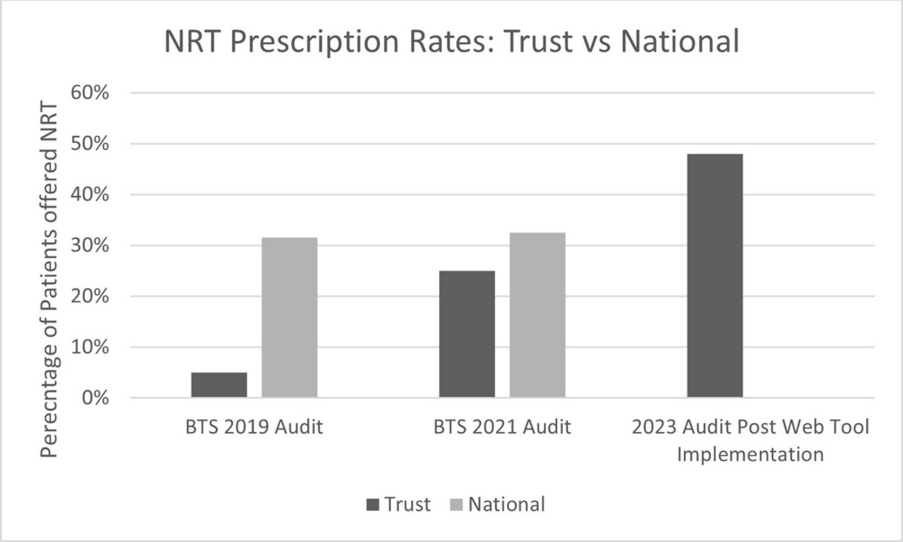
Methodology We developed a web-based, interactive smoking cessation tool, which supports clinicians to prescribe the most appropriate nicotine patch and 'as-required' NRT (according to the patient's history and preferences and local guidelines). The tool also forwards the user to the correct CSSS referral website according to the patient's postcode.

We promoted the tool using educational posters (with QR code to the tool) and teaching sessions across medicine and surgery.

The impact was measured using questionnaires to assess clinician confidence, re-auditing NRT prescription rates and evaluating referral numbers to CSSS.

Results Our smoking cessation tool and education events increased the proportion of clinicians who felt confident to deliver very brief advice (25% pre-teaching to 79% post-teaching), prescribe NRT (25% to 73%) and refer patients to CSSS (25% to 97%)(n=33).

After the tool was introduced, we audited 121 patient notes across four departments, identifying 21 smokers. Smoking status was documented in 91(75%). NRT prescription rates increased from 25% in the 2021 BTS audit to 48% in



Abstract S77 Figure 1

2023, surpassing the 2021 national average of 32.5% (see figure 1).

CSSS referral data showed a 44% increase in referrals (16 referrals in May 2022 versus 23 in May 2023).

Conclusion Our novel, web-based smoking cessation tool led to meaningful increases in prescriber confidence, NRT prescription rates and CSSS referrals. We anticipate that further promotion within the hospital and across the ICB, as well as including a QR link to the regional NRT guidelines will expand its use to more clinicians, TTD advisors, AHPs and GPs, thereby promoting better smoking cessation practices within our region.

In the future, we hope to convert the web-based platform to an App to improve accessibility and expand its use to include other UK regions.

S78 TOBACCO DEPENDENCY IN MATERNITY: A NOVEL SERVICE PROVIDING EARLIER IN-HOSPITAL CARE FOR PREGNANT SMOKERS

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10.1136/thorax-2023-BTSabstracts.84

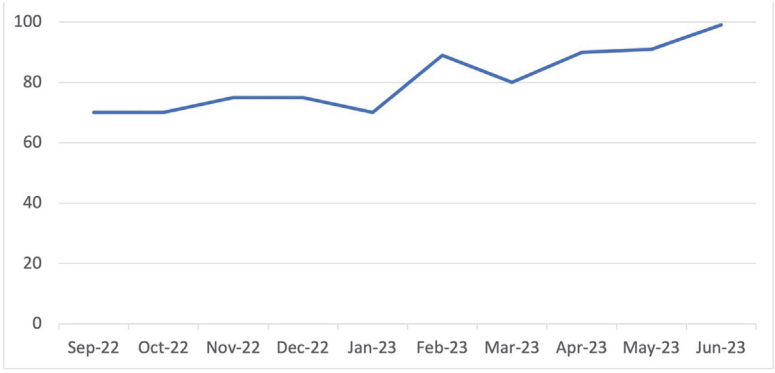
Background Saving Babies Lives care bundles and the NHS Long-Term Plan prioritise identifying pregnant smokers (PS) at first outpatient engagement to ensure that every PS identified is referred to a specialist maternity tobacco dependency advisor (mTDA) within 24 hours of first contact.

A maternity smoking cessation pathway, embedded within the adult service, was launched at a busy London teaching hospital in January 2023, developed to facilitate smoking cessation as rapidly as possible in the first trimester. Previously PS were referred directly to local community-based stop-smoking service (LSSS). Now, they receive in-house care in hospital at first booking appointment.

We hypothesised earlier identification and access to referral systems within the trust for PS leads to quicker interventions with pharmacological and behavioural therapy. mTDA support from start of journey results in increased quit rates and access of the service to a more diverse population in an area with one of the highest UK levels of deprivation and health inequality.

Objectives To investigate whether implementing a streamlined referral process for early in-house management of PS improved:

1. Identification within maternity booking, referral to mTDA and then subsequent LSSS engagement



Abstract S78 Figure 1 Pregnant smokers (%) referred to specialist maternityTDA

2. Pharmacotherapy prescriptions and PS adherence
3. 4-week quit rates

Methods A virtual clinic created in March 2023 enabled midwives to refer PS more efficiently to mTDA. Following an effective communication campaign, all staff involved in patient care, were encouraged to refer into the new system, implemented and trialled from April 2023. Referral numbers for September 2022 to March 2023 were compared to the post service period.

Results 178 patients, who all underwent carbon monoxide monitoring, were seen mid-Jan to mid-June 2023 within the new service model.

The number referred to mTDA increased significantly when compared to before the new service establishment (figure 1).

4-week quit rates doubled from 15%, March to 33%, May 2023.

Conclusion This novel approach of hospital-based mTDA support in early pregnancy demonstrated improvement in quit rates and adherence to national targets, empowering staff with confidence to identify and support PS. We hope to replicate this model for other smokers in an out-patient setting.

'Bad blood' – Biomarkers and mechanisms in long COVID

S79 AN ALTERED PERIPHERAL BLOOD TRANSCRIPTOME AND IMMUNOPHENOTYPE POST-COVID IS ASSOCIATED WITH INITIAL HOSPITALISATION

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10.1136/thorax-2023-BTSabstracts.85

Introduction Post-COVID syndrome is a multiorgan disease characterised by persistent symptoms 12 weeks or more following SARS-CoV2 infection. However, the pathophysiology remains unknown and is likely multifactorial due to the heterogeneity of clinical manifestations. The present study aimed to understand the changes and contribution of the systemic immune response in patients with post-COVID syndrome.

Methods Observational study of hospitalised and non-hospitalised participants 3–16 months post-COVID at a single centre (Dundee, UK). Stabilised peripheral blood was processed for mRNAseq. In a participant subset, immunophenotyping of peripheral blood immune cells was carried out using mass cytometry and Maxpar Direct Immune Profiling kit comprising 35 cell-surface markers. Cytobank platform was used for manual gating for mass cytometry data and dimensionality reduction was carried out using the tSNE-CUDA algorithm.

Results 92 post-COVID participants were included (age 56 ±12.5 years (mean±SD), 46.7% male). Differences in immunophenotype were identified between those initially hospitalised (n=11) or not (n=7); significantly higher proportions of transitional monocytes (Mann-Whitney, p=0.0441), total CD8 αβ cells (p=0.0114) including effector memory (p=0.0185) and terminal effector (p=0.0083) subpopulations, as well as CD4 terminal effector cells (Unpaired T-test, p=0.0330) were found in those hospitalised. Notably, the hospitalised group had significantly more males (Fishers exact test, p=0.0294) and were older (Unpaired T-test, p=0.0005). 28 significantly differentially expressed genes (adjusted pvalue<0.05; Wald test with Benjamini-Hochberg correction) were identified between those initially hospitalised (n=49) or not (n=30). Genes relating to neutrophil activity including neutrophil elastase, MPO, azurocidin-1, defensin alpha 3 (DEFA3) and DEFA4 were upregulated in those who were hospitalised, in addition to lactotransferrin, BPI and CEACAM8, expressed in both neutrophils and monocytes. Those who were hospitalised were more likely to experience dyspnoea/fatigue beyond 12 weeks following acute infection (Fishers exact test, p=0.0021). Further, those with ongoing dyspnoea/fatigue (n=13) had increased neutrophils and a significant increase in T-regulatory cells (Unpaired T-test, p=0.0059), compared to those without (n=7).

Conclusion Post-COVID, an increase in T-cell subsets and neutrophil-associated genes is associated with a more severe initial infection leading to hospitalisation. Neutrophil and T-regulatory cells are further associated with ongoing symptoms post-COVID, suggesting a role for these cell types in post-COVID syndrome.

S80 PLASMA PROTEOMIC SIGNATURES IN PATIENTS WITH RESIDUAL LUNG ABNORMALITIES FOLLOWING INFECTION WITH SARS-COV-2

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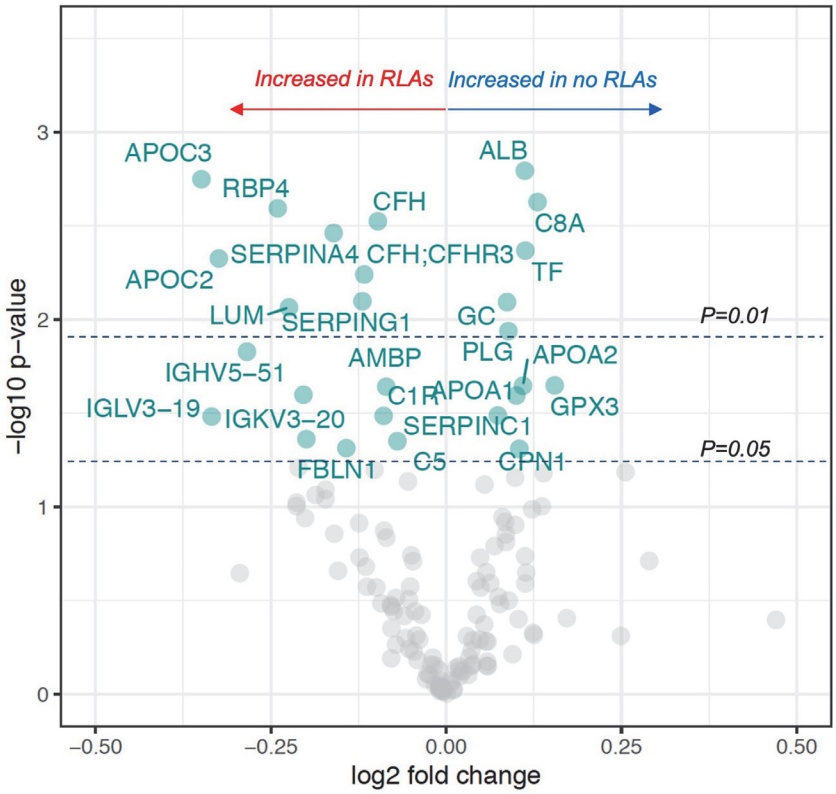
10.1136/thorax-2023-BTSabstracts.86

Introduction Residual lung abnormalities (RLAs) following acute infection with SARS-CoV-2 are defined as visually scored abnormalities greater than 10% on computed tomography (CT) and are present in 7–11% of hospitalised patients.[1] Understanding immunopathogenic mechanisms driving RLAs is important as they may be progressive and may provide insights into other lung diseases.

Methods Blood samples were collected from 138 patients attending the UCLH post-Covid Service between May and September 2020. Ultra-high throughput liquid chromatography-mass spectrometry (LC-MS) proteomics was used to identify and quantify peptides. Plasma samples (5ul) were processed and analysed in a data-independent acquisition mode and raw data were processed with DIA-NN software, with statistical analysis performed in R.[2]

Results Median time from symptom onset to sampling date was 16 (IQR 12–19) weeks.â€‹ 56% were male and median age was 51 (IQR 41–64) years. Median WHO score was 4 (IQR 2–6). 78 (57%) required hospital admission and median ISARIC-4C mortality score was 7 (IQR 5–9). At 3 months post-acute infection 72 patients (52%) had RLAs; the majority (76.4%) were hospitalised and had more severe disease. Unsupervised hierarchical clustering identified 24 differentially expressed proteins. Apolipoprotein C-III, apolipoprotein C-II, retinol binding protein 4, lumican, kallistatin, complement factor H and serpin G1 were increased ($p<0.01$) in patients with RLAs (figure 1). These proteins correspond to multiple biological processes including lipid metabolism, vitamin transport, extracellular matrix organisation, vascular repair/endothelial function, and inhibition of complement activation.

Conclusion We have identified significantly raised proteins in patient with RLAs at >3 months post COVID-19, which have all been shown to be protective during acute SARS-CoV-2



Abstract S80 Figure 1

infection and may be implicated in lung repair. Further work will establish whether these signatures of organ recovery and wound healing are reproducible with the aim to confirm and validate these findings in other patient cohorts.

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S81 ASSESSMENT OF ENDOTHELIAL FUNCTION IN LONG-COVID AND IN PATIENTS WITH RESIDUAL LUNG ABNORMALITIES AFTER COVID-19

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10.1136/thorax-2023-BTSabstracts.87

Background Long-COVID is characterised by a heterogenous range of symptoms which persist for more than 12 weeks. Post-COVID breathlessness may occur in the context of normal lung imaging or residual lung abnormalities (RLA); the latter occurring more frequently in patients hospitalised due to SARS-CoV-2 infection. Previous studies have suggested that a proportion of symptomatic post-COVID patients have endothelial dysfunction and we investigated whether this is evident in non-hospitalised Long-COVID and in patients with post-COVID RLA.

Aims To identify differences in endothelial function in post-COVID cohorts stratified by severity of SARS-CoV-2 infection and to assess changes in these parameters over time.

Methods In this observational cohort study, 4 groups of participants provided informed consent: non-hospitalised SARS-CoV-2 infection and fully recovered (NHR, n=22), non-hospitalised Long-COVID with no RLA (NHLC, n=36), previously hospitalised due to SARS-CoV-2 infection and fully recovered (HR, n=9), and previously hospitalised with post-COVID RLA (HLC, n=19). The previously hospitalised groups were assessed at 26 and 52 weeks after infection. The non-hospitalised participants attended for a single visit. EndoPAT® (Itamar medical) was used to assess endothelial function (reactive hyperaemia index (RHI) and augmentation index (AI)).

Results No significant differences in RHI or AI were observed between non-hospitalised groups (NHR and NHLC). Analysis of data collected 26 ±4 weeks after infection demonstrated that endothelial dysfunction (RHI <1.67) was more frequent in the HLC group (10/15) compared to the NHR group (1/17, OR 32.00, 95% CI 3.25–315.31, p=0.0003). Mean RHI was significantly lower in the HLC group (1.63 ±0.72) compared to the NHR group (2.31 ±0.54, p=0.018) but was not significantly different from the HR group (2.15 ±0.79). HLC and NHR groups differed significantly in mean age (37 vs. 62, p<0.001), BMI (26.1 ±3.6 vs. 31.3 ±4.9) and sex (76% female vs. 7%). Mixed-effects analysis found no significant change in RHI or AI between 26 and 52 weeks in the previously hospitalised patients.

Conclusions Patients with residual lung abnormalities after COVID infection had evidence of endothelial dysfunction

when compared to non-hospitalised, fully recovered participants, but significant differences in demographics potentially confound this finding.

S82 RESIDUAL LUNG ABNORMALITY FOLLOWING COVID-19 HOSPITALISATION IS CHARACTERISED BY EPITHELIAL INJURY

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10.1136/thorax-2023-BTSabstracts.88

Background Persistent breathlessness is commonly reported following recovery of acute COVID-19 infection. Our previous study identified residual lung abnormalities (RLA) on CT, and suggested up to 11% of COVID-19 hospitalisations were at high risk of RLA.[1] Whether RLA represents persistent epithelial damage or inflammation is unknown.

Methods Plasma was sampled from the PHOSP-COVID cohort at five months post-hospitalisation. Epithelial injury biomarkers Krebs von den Lungen-6 (KL6), matrix metalloproteinase 7 (MMP7), surfactant protein-D (SPD) and surfactant protein-A (SPA) were assayed for hypothesis testing. An O-link Explore inflammatory panel of 384 biomarkers was included in exploratory analysis. Confirmed RLA was defined as ≥10% combined involvement of ground glass opacity and reticulation on follow-up CT. High RLA risk in those without a CT was defined by percent predicted DL_{CO} <80% and/or abnormal chest X-ray.[1]

Results A total of 868 people with biomarker profiles were included, 111 people with CT scores (85 confirmed RLA, 77%), 757 people with no CT (81 high risk, 11%). KL6 and MMP7 were significantly higher in people with confirmed RLA than those without, SPD and SPA did not reach significance (table 1). Epithelial injury biomarkers correlated with reticulation (KL6 r_s=0.36, p<0.001; MMP7 r_s=0.40, p<0.001; SPD r_s=0.29, p=0.002; SPA r_s=0.22, p=0.029), but only KL6 and MMP7 correlated with ground glass opacities. All epithelial injury biomarkers were significantly elevated in people at high risk of RLA compared to low risk (table 1). No O-link Explore inflammatory biomarkers were reproducibly higher in both confirmed RLA and high risk participants after correction for multiple testing.

Conclusion All epithelial injury biomarker levels increased with greater reticulation on follow-up CT and were elevated in those at high risk of RLA, whilst KL6 and MMP7 were significantly elevated in people with CT-confirmed RLA. Limited inflammatory biomarkers were elevated in either confirmed RLA or high risk, and none at reproducibly significant levels. Findings suggest RLA is characterised by persistent epithelial injury after acute COVID-19 infection.

REFERENCE

1. Stewart I, *et al*. (2022) Residual lung abnormalities following COVID-19 hospitalization: interim analysis of the UKILD Post-COVID study. AMERICAN JOURNAL OF RESPIRATORY AND CRITICAL CARE MEDICINE DOI:10.1164/rccm.202203-0564OC

S83 LONG-TERM EFFECTS OF SARS-COV-2 ON CILIOGENESIS THROUGH ALTERED EXPRESSION OF FOXJ1

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10.1136/thorax-2023-BTSabstracts.89

Introduction Cilia are critically important in the mucociliary clearance of the airways. This study explores the long-term effects of SARS-CoV-2 on cilial function and regeneration.

Aim We aimed to investigate respiratory epithelial recovery and cilial function in individuals 3–12 months post SARS-CoV-2 infection.

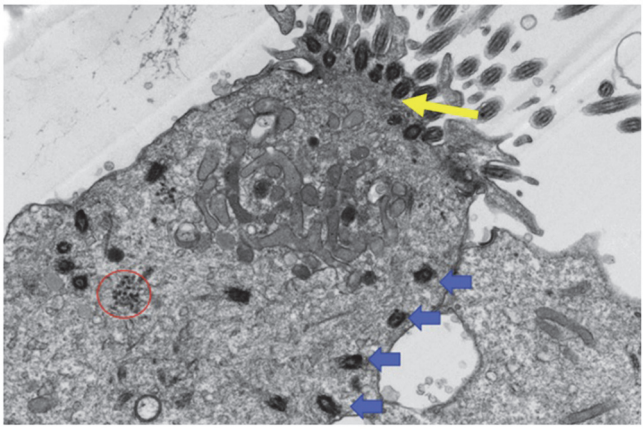
Methods We studied 3 cohorts of patients: the first cohort (FOLLOW n=41) underwent nasal epithelial cell sampling 3–12 months after the first waves of SARS-CoV-2 infection in both hospitalised and community settings; the second cohort, (ULTRON n=10), 3–12 months post-Omicron variant infection in vaccinated individuals; the third cohort (PROSAIC n=46) had RNA extracted from nasal brushings 6–12 months after recovery from severe infection with pre-Omicron variants of SARS-CoV-2. In the first two cohorts, cilial function was assessed using high-speed-video-microscopy, with ultrastructural analysis assessed by Transmission Electron Microscopy. Expression of the ciliogenesis gene, *FOXJ1*, was measured by qRT-PCR in the third cohort.

Results In the initial FOLLOW cohort, there was significant loss of ciliation compared to controls. 90% of individuals had ultrastructural defects marked by mislocalised basal bodies and

Abstract S82 Table 1 Epithelial biomarker concentration according to residual lung abnormality

	RLA<10%	RLA ≥10%	*p*	RLA low risk	RLA high risk	*p*
KL6 (IU/mL)	269.04	380.33	*0.0020*	364.60	407.72	*0.0367*
	(170.34 – 377.58)	(281.40 – 608.06)		(260.36 – 526.44)	(295.53 – 641.50)	
MMP7 (ng/mL)	10.27	16.38	*0.0001*	12.55	17.76	*<0.0001*
	(8.21 – 13.20)	(10.78 – 22.56)		(9.54 – 17.42)	(10.93 – 25.02)	
SPD (ng/mL)	44.10	53.99	*0.2802*	45.36	69.36	*0.0003*
	(33.27 – 62.89)	(32.70 – 70.98)		(29.76 – 73.88)	(39.42 – 99.72)	
SPA (ng/mL)	31.27	33.90	*0.3528*	29.51	34.71	*0.0022*
	(22.16 – 39.70)	(24.99 – 41.09)		(21.22 – 39.16)	(26.35 – 45.75)	

Median concentrations presented with interquartile range. P-values calculated with Wilcoxon rank sum test. RLA: residual lung abnormality. Confirmed RLA threshold scored as overall involvement on CT scans, risk defined by clinical risk factors of DLco <80% predicted and/or abnormal chest X-ray.



Abstract S83 Figure 1 Electron Micrograph- Basal Body Mislocalisation Post- COVID.
This TEM image shows cell gathered from the inferior turbinate (nasal brushing). Basal bodies (blue arrows) that were mislocalised post COVID, as should be seen on the apical membrane, (yellow arrow). Correct apical docking is essential for ciliogenesis and function. Red circle highlights evidence of ciliogenesis subunits forming prior to docking

intracytoplasmic cilia up to 12 months post infection. There was no correlation with any ongoing nasal symptoms or symptoms of long COVID. In contrast, ciliogenesis was normal in the Omicron infected, vaccinated cohort, and no mislocalised basal bodies or intracytoplasmic cilia were seen. Defects in cilia function were present in both cohorts compared to pre-pandemic controls: reduced cilia beat frequency (FOLLOW $p<0.01$), reduced amplitude per second in both: (FOLLOW $p<0.01$, ULTRON $p<0.01$).

This ciliogenesis defect led us to explore *FOXJ1* expression post-COVID: qRT-PCR showed a significant reduction of *FOXJ1* mRNA levels 6 months ($p<0.001$) and 12 months ($p=0.002$) following pre-Omicron variant infections compared with healthy volunteers; however, there was a significant improvement between 6-months and 12-months.

Conclusion Cilia loss and defective ciliogenesis linked to reduced *FOXJ1* expression persisted for a year following infection with early SARS-CoV-2 variants. No such defects were seen in vaccinated individuals infected with the Omicron variant despite some functional ciliary defects. This work illuminates novel long-term effects of viral infection on human epithelial function through altered expression of a key cilial regulator gene.

S84 SINGLE-CELL LANDSCAPE OF BRONCHOALVEOLAR CELLS IN INFLAMMATORY AND FIBROTIC POST-COVID RESIDUAL LUNG ABNORMALITIES

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10.1136/thorax-2023-BTSabstracts.90

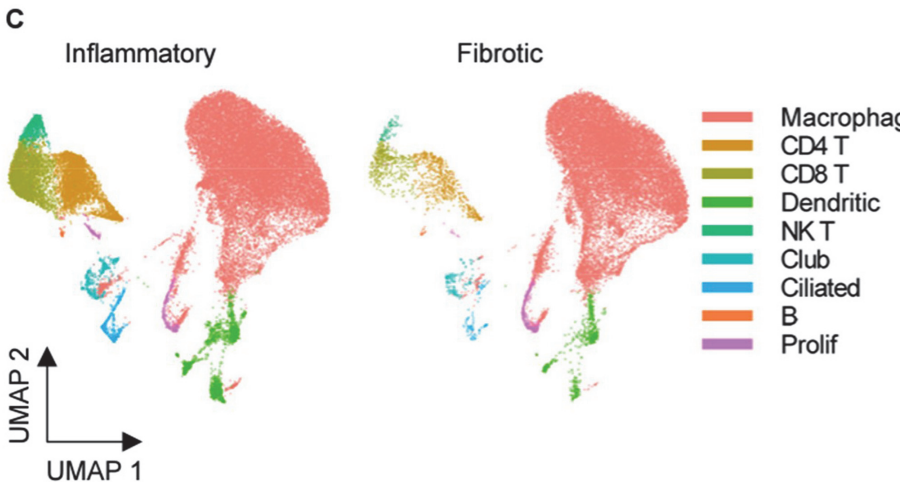
Background Approximately 10% of patients hospitalised with COVID-19 have residual lung abnormalities (RLAs) at 12 months. In clinical practice, CT scan appearances are often used to guide management. Whether such radiological changes reliably reflect immunopathomechanisms, and can therefore inform the treatment approach, is unclear and an important clinical question.

Methods We compared the single cell transcriptomic and T cell receptor (TCR) profiles of bronchoalveolar lavage cells from patients with Post-COVID RLAs with either predominantly inflammatory or fibrotic radiological appearances.

Results We generated a dataset of 55, 776 cells. CD4 central memory T cells (TCM) and CD8 effector memory T cells (TEM) were significantly increased in the inflammatory subphenotype. Both patient groups were transcriptionally similar and exhibited clonal expansion and high TCR clustering, without enrichment for SARS-CoV-2 reactive sequences.

Conclusions We describe the first comparison of purported radiological subphenotypes in patients with Post-COVID RLAs, which may actually represent different manifestations of the same disease. Antigen-specific immune responses to unidentified T cell targets, imply a breach of immune tolerance in the lung and a potential role for T-cell directed therapies in these patients, agonistic of radiological appearance.

Please refer to page A285 for declarations of interest related to this abstract.



Abstract S84 Figure 1 Uniform manifold approximation and projection (UMAP) visualization comparison of inflammatory and fibrotic subphenotypes in patients with Post-COVID residual lung abnormalities (RLAs)

'Total eclipse of the heart' – COPD and cardiovascular disease

S85 ACUTE CORONARY SYNDROME (ACS) AFTER EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) COMPARED TO OTHER CAUSES OF ACUTE LOWER RESPIRATORY TRACT DISEASE IN A PROSPECTIVE COHORT STUDY OF HOSPITALISED ADULTS

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10.1136/thorax-2023-BTSabstracts.91

Introduction and Objectives The interaction between hospitalisation for acute lower respiratory tract infection (LRTI), COPD status, and subsequent ACS is infrequently reported. Proposed mechanisms that promote ACS risk in the COPD population include shared risk factors and pro-inflammatory overspill, which may be heightened in hospitalised, exacerbating patients. We assessed a cohort of persons hospitalised for non-SARS-CoV-2 LRTI to determine if COPD status is an independent risk factors for subsequent ACS.

Methods We conducted a prospective observational cohort study of adults ages ≥18y admitted with community acquired respiratory infection in Bristol, UK, between 27thJuly 2020 and 28th November 2022. Pre-existing COPD was confirmed using documented past medical history; only persons with SARS-CoV-2 negative infection on admission were included. Outcomes included physician diagnosed ACS (NSTEMI,

Abstract S85 Table 1 Logistic regression for the association between covariates and a clinical diagnosis of ACS. Column 1: Unadjusted univariate model. Column 2: Adjusted for shared cardiac risk factors. Column 3: Adjusted for LRTI severity and cardiac comorbidities.

		Unadjusted		Adjusted model 1		Adjusted model 2	
Characteristic	**Group**	**OR**	**P-value**	**OR**	**P-value**	**OR**	**P-value**
COPD LRTI Status	LRTI without COPD	ref	0.032	ref	0.237	—	—
	COPD Exacerbation	1.22 [1.02–1.45]		1.13 [0.92–1.37]		—	
aLTRD presentation	NP-LRTI	ref	<0.001	—	—	ref	<0.001
	Pneumonia	1.59 [1.33–1.89]		—		1.38 [1.15–1.64]	
Age Adjusted CURB	0–1 (Mild)	ref	<0.001	—	—	ref	0.026
Category	2 (Moderate)	1.71 [1.27–2.30]		—		1.41 [1.04–1.91]	
	3–5 (Severe)	2.94 [1.30–6.65]		—		2.16 [0.95–4.93]	
Age In Decades		1.22 [1.16–1.28]	<0.001	1.20 [1.13–1.26]	<0.001	1.16 [1.10–1.22]	<0.001
Gender	Male	ref	0.415	—	—	—	—
	Female	0.93 [0.80–1.10]		—		—	
CCI Category Ex COPD	none (0)	ref	<0.001	—	—	—	—
	mild (1–2)	2.35 [1.54–3.59]		—		—	
	moderate (3–4)	2.92 [1.98–4.32]		—		—	
	severe (5+)	4.20 [2.87–6.14]		—		—	
IMD (decile)		1.00 [0.97–1.03]	0.919	0.98 [0.95–1.01]	0.181	—	—
Smoker	Non-smoker	ref	0.011	ref	0.173	—	—
	Current	0.91 [0.68–1.21]		0.98 [0.71–1.34]		—	
	Ex-smoker	1.19 [0.99–1.43]		1.01 [0.82–1.23]		—	
	Unknown	1.48 [1.12–1.95]		1.36 [1.02–1.80]		—	
Hypertension	yes	1.36 [1.09–1.69]	0.008	1.00 [0.80–1.26]	0.986	—	—
AF	yes	1.07 [0.86–1.33]	0.541	—	—	—	—
CVA/TIA	yes	1.18 [0.92–1.53]	0.202	—	—	—	—
IHD	yes	1.98 [1.62–2.43]	<0.001	1.67 [1.35–2.06]	<0.001	1.68 [1.37–2.07]	<0.001
CCF	yes	1.44 [1.15–1.79]	0.002	1.05 [0.83–1.33]	0.672	1.11 [0.88–1.40]	0.383
Diabetes Type	None	ref	0.296	ref	0.854	—	—
	Type 1	1.13 [0.55–2.33]		1.22 [0.59–2.54]		—	
	Type 2	1.18 [0.96–1.44]		1.03 [0.83–1.26]		—	
Periph Vasc Dx	yes	1.33 [0.88–2.02]	0.195	—	—	—	—
CKD	None	ref	0.243	—	—	—	—
	Mild (CKD 1–3)	1.18 [0.97–1.44]		—		—	
	Moderate or Severe CKD (CKD 4+)	0.99 [0.63–1.54]		—		—	
CRP Level	Unknown	0.67 [0.24–1.84]	0.062	—	—	—	—
	<10	ref		—		—	
	10–50	1.24 [0.98–1.57]		—		—	
	>50	1.30 [1.04–1.62]		—		—	
White Cell Count Level	Unknown	0.26 [0.04–1.90]	<0.001	—	—	0.31 [0.04–2.29]	0.001
	≤10	ref		—		ref	
	>10	1.41 [1.19–1.67]		—		1.32 [1.11–1.57]	

STEMI and acute LBBB) occurring within 30-days of admission. Logistic regression models were adjusted for shared cardiovascular risk factors and LRTI severity.

Results The COPD population were more frequently current smokers, and a higher proportion had a history of ischaemic heart disease and type-2 diabetes. ACS occurred in 7.55% (190/2516) of patients with COPD, and 6.29% (438/6961) LRTI inpatients without COPD. Across both groups ACS incidence within 30-days of hospitalisation was 93.0 events/1000 inpatient days. On unadjusted analysis, COPD was associated with an increased risk of subsequent ACS (OR=1.22, 95% CI:1.02–1.45). In an adjusted model for shared risk factors for ACS (age, smoking status, index of multiple deprivation, co-morbid hypertension and ischaemic heart disease), COPD was no longer an independent risk factor for ACS (OR=1.13, 95%CI:0.92–1.37). By contrast, markers of LRTI severity were associated with high risk of ACS (pneumonia on admission OR=1.38, 95%CI:1.15–1.64).

Conclusions We do not find evidence to support the hypothesis that COPD exacerbation is an independent risk factor for ACS in a hospitalised cohort within 30-days of hospitalisation, when compared to a control of hospitalised LRTI. The association between ACS events and LRTI severity supports the hypothesis that pro-inflammatory pathways are associated with risk of ACS. Our results highlight the importance of increased vigilance within 30-days of admission in those admitted to hospital with LRTI and secondary prevention in this patient group.

Please refer to page A285 for declarations of interest related to this abstract.

S86 FACTORS ASSOCIATED WITH NON-FATAL ATRIAL FIBRILLATION OR FLUTTER WITHIN THE FIRST 30 DAYS POST-EXACERBATION OF COPD: A NESTED CASE-CONTROL STUDY

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Background Few observational studies have explored the relationship between exacerbations of COPD and atrial fibrillation (AF) or flutter, specifically developing AF/flutter in the first 30 days following a COPD exacerbation.

Methods We conducted a nested case-control study drawn from a generalisable, primary care-derived COPD cohort from the Exacerbations of COPD and their OutcomeS on Cardio-Vascular diseases (EXACOS-CV) study. EXACOS-CV used data from the Clinical Practice Research Datalink (CPRD) Aurum primary care linked with hospital admissions and mortality data. Cases were people hospitalised with AF/flutter within the first 30 days post-exacerbation. Controls without AF/flutter within 30 days of an exacerbation were matched 3:1 by GP practice to a case. We used conditional logistic regression and adjusted for age, sex, deprivation, smoking, co-morbidities and medications (table 1).

Results We included 841 cases and 2,523 controls. Older age and male sex were associated with AF/flutter, as was having had a severe COPD exacerbation in the 30 days prior (aOR=6.10, 95%CI 4.73–7.86). We found strong association for prior arrhythmia (aOR=3.63, 95%CI 2.63–5.02), and

Abstract S86 Table 1 Factors associated with hospitalisations for atrial fibrillation or flutter within the first 30 days post exacerbation of COPD

Baseline Covariate (N (%) unless specified)	Total (N=3,364)	Controls (N=2,523)	Cases (Non-fatal AF/flutter) (N=841)	Fully Adjusted Model aOR (95% CI) *
Age				
40–69	1,235 (36.7)	1,097 (43.5)	138 (16.4)	1.00 (ref)
70–74	578 (17.2)	458 (18.2)	120 (14.3)	1.18 (0.83–1.67)
75–79	659 (19.6)	463 (18.4)	196 (23.3)	1.85 (1.32–2.60)
80+	892 (26.5)	505 (20.0)	387 (46.0)	3.14 (2.29–4.32)
Male sex	1,722 (51.2)	1,226 (48.6)	496 (59.0)	1.45 (1.15–1.83)
Smoking status				
Ex-smoker	2,073 (61.6)	1,502 (59.5)	571 (67.9)	1.00 (ref)
Current smoker	1,291 (38.4)	1,021 (40.5)	270 (32.1)	1.11 (0.87–1.42)
Index of Multiple Deprivation quintile				
Least Deprived	483 (14.4)	354 (14.0)	129 (15.3)	1.00 (ref)
2	588 (17.5)	418 (16.6)	170 (20.2)	1.52 (1.01–2.29)
3	603 (17.9)	448 (17.8)	155 (18.4)	1.09 (0.70–1.68)
4	746 (22.2)	593 (23.5)	153 (18.2)	0.82 (0.52–1.28)
Most Deprived	944 (28.1)	710 (28.1)	234 (27.8)	1.15 (0.72–1.86)
Comorbidities				
Type II Diabetes	697 (20.7)	474 (18.8)	223 (26.5)	1.00 (0.75–1.33)
Depression and depressive symptoms	2,511 (74.6)	1,844 (73.1)	667 (79.3)	1.11 (0.83–1.50)
Anxiety	840 (25.0)	655 (26.0)	185 (22.0)	0.99 (0.75–1.31)
Hypertension	1,908 (56.7)	1,339 (53.2)	569 (67.7)	1.03 (0.78–1.36)
COPD prognosis				
exacerbation severity at start of follow-up				
Moderate	2,515 (74.8)	2,081 (82.5)	434 (51.6)	1.00 (ref)
Severe	849 (25.3)	442 (17.5)	407 (48.4)	6.10 (4.73–7.86)
exacerbation frequency in the 1-year window preceding 1-year-to-start of cohort follow-up				
Infrequent exacerbator (≤1)	2,675 (79.5)	2,006 (79.5)	669 (80.0)	1.00 (ref)
Frequent exacerbator (≥2)	689 (20.5)	517 (20.5)	17 (20.5)	0.81 (0.60–1.09)
Prior prevalent CVD				
Acute Coronary Syndrome	363 (10.8)	216 (8.6)	147 (17.5)	0.86 (0.60–1.24)
Arrhythmias	664 (19.7)	239 (9.5)	425 (50.5)	3.63 (2.63–5.02)
Heart Failure	138 (4.1)	65 (2.6)	73 (8.7)	1.13 (0.68–1.88)
Pulmonary Arterial Hypertension	45 (1.3)	14 (0.6)	31 (3.7)	2.98 (1.25–7.09)
Ischaemic Stroke	253 (7.52)	152 (6.0)	101 (12.0)	0.84 (0.56–1.26)
COPD Medications				
Long-acting, inhaled therapies				
No long-acting therapies	406 (12.1)	302 (12.0)	104 (12.4)	1.00 (ref)
ICS mono therapy	157 (4.7)	127 (5.03)	30 (3.6)	0.73 (0.38–1.39)
LABA/LAMA mono or dual therapy	405 (12.0)	317 (12.6)	88 (10.5)	1.01 (0.63–1.62)
LAMA/ICS or LABA/ICS dual therapy	784 (23.3)	605 (24.0)	179 (21.3)	1.02 (0.68–1.53)
ICS/LABA+LABA triple therapy	1612 (47.9)	1,172 (46.5)	440 (52.3)	1.19 (0.82–1.74)
Short-acting, inhaled therapies				
No short-acting therapies	2,800 (83.2)	2,095 (83.0)	705 (83.8)	1.00 (ref)

SABA/SAMA mono or dual therapy	564 (16.8)	428 (17.0)	136 (16.2)	1.19 (0.86–1.65)
CVD medications				
Positive inotropes (Digoxin)	229 (6.8)	45 (1.78)	184 (21.9)	2.39 (1.48–3.86)
Diuretics	1,398 (41.6)	875 (34.7)	523 (62.2)	1.39 (1.07–1.79)
Anti-arrhythmic drugs	91 (2.7)	28 (1.1)	63 (7.5)	2.42 (1.26–4.64)
Beta blockers	737 (21.9)	395 (15.7)	342 (40.7)	1.58 (1.19–2.09)
Hypertension and HF drugs	1,643 (48.8)	1,121 (44.4)	522 (62.1)	0.86 (0.66–1.13)
Nitrates, CCBs, other antianginals	1,422 (42.3)	987 (39.1)	435 (51.7)	1.04 (0.81–1.33)
Anticoagulants	476 (14.2)	153 (6.1)	323 (38.4)	3.84 (2.63–5.62)
Antiplatelets	1,242 (36.9)	840 (33.3)	402 (47.8)	1.41 (1.08–1.86)
Statins	1,770 (52.6)	1,239 (49.1)	531 (63.1)	0.97 (0.74–1.27)

CVD=cardiovascular disease, CCB = calcium channel blocker, ICS = inhaled corticosteroid, LABA = long-acting beta agonist, LAMA = long-acting muscarinic antagonist, SABA = short-acting beta agonist, SAMA = short-acting muscarinic antagonist. n(%) described for the COPD and CV prescription categories may be mutually exclusive, as they can be taken in combination elsewhere in the table (e.g., patient prescribed a long-acting inhaler, short-acting inhaler, oral therapy, and a cardiovascular medication)

* Model adjusted for age and sex, socioeconomic status (Index of Multiple Deprivation), smoking status, Type II Diabetes, Depression and depressive symptoms, exacerbation severity, exacerbation frequency and prior CVD (hypertension, ACS, arrhythmia, HF, PAH, ischaemic stroke), short-acting and long-acting COPD inhaled therapies, and major classes of CVD medications prescribed in the past 12 months according to the British National Formulary.

pulmonary arterial hypertension (aOR=2.98, 95%CI 1.25–7.09). No associations were found for prior acute coronary syndrome or ischaemic stroke. Prior prescriptions for positive inotropes, diuretics, anti-arrhythmic drugs, beta-blockers, anti-coagulants, and anti-platelets, were also associated with AF/flutter with the strongest associations observed for anticoagulants (aOR=3.84, 95%CI 2.63–5.62), positive inotropes (aOR=2.39, 95%CI 1.48–3.86) and anti-arrhythmic drugs (aOR=2.42, 95%CI 1.26–4.64). No associations with short-acting or long-acting inhaled therapies for COPD were found (table 1).

Conclusions Awareness of factors associated with developing AF/flutter after a COPD exacerbation are necessary for prompt diagnosis and treatment, or even prevention of AF/flutter at this time. Prevention of severe exacerbations is key to reducing AF/flutter events.

Please refer to page A285 for declarations of interest related to this abstract.

S87 PREVALENCE, PERSISTENCE AND OUTCOMES OF LEFT VENTRICULAR (LV) AND RIGHT VENTRICULAR (RV) DYSFUNCTION IN PATIENTS ADMITTED WITH EXACERBATION OF CHRONIC OBSTRUCTION PULMONARY DISEASE (ECOPD)

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10.1136/thorax-2023-BTSabstracts.93

Introduction LV and RV dysfunction are common in patients with ECOPD, yet little is known about rates of resolution and associations with post-exacerbation outcomes.

Methods Echocardiography was performed on patients hospitalised with ECOPD, and repeated at stability after 90 days. LV and RV function were measured, with data reviewed by a second, blinded clinician. 365-day outcomes were recorded, including days alive outside hospital ($DAOH_{365}$).

Results 55 patients were assessed. 3 died and 9 withdrew before 90 days; 43 had follow-up echocardiography.

The tables show rates of (new) diagnosis, resolution and outcomes, according to different diagnostic classifications.

Ventricular dysfunction was a new finding in a substantial majority of cases. Severe LV dysfunction was significantly associated with increased mortality; there was a trend towards fewer $DAOH_{365}$ with worse LV function. In most patients, echocardiographic abnormalities resolved at 90 days.

Right ventricular dysfunction during ECOPD was not associated with worse 1-year outcomes.

Discussion Echocardiography at the time of ECOPD is worthwhile: ventricular dysfunction is highly prevalent and usually unknown. Severe LV dysfunction portended a dichotomous outcome: early death, or universal resolution in treated survivors. Those with the adverse outcome had markedly worse

Abstract S87 Table 1

A: Rates of ventricular dysfunction and 90-day outcomes

Finding	Present	New finding	Resolved at 90 days*	90-day mortality	p value, Fisher†
LVEF < 40%	6/55 (11%)	4/6 (67%)	3/3 (100%)	2/6 (33%)	0.029
LVEF < 50%	13/55 (24%)	10/13 (77%)	5/9 (56%)	2/13 (15%)	0.136
RV dysfunction‡	15/55 (27%)	13/15 (87%)	8/12 (67%)	2/15 (13%)	0.177

LVEF = left ventricular ejection fraction * If survived to review without withdrawing
† vs. those without finding ‡ Global impression by sonographer

B: 365- day Outcomes

Definition	365-day mortality	p value, Fisher	Time to re-admission or death*	p value, log-rank	$DAOH_{365}$*	p value, MWU
LVEF < 40%	4/6 (67%)	0.031	94 (264)	0.448	213 (347)	0.092
LVEF > 40%	10/49 (20%)		122 (333)		356 (30)	
LVEF < 50%	4/13 (31%)	0.719	239 (347)	0.456	361 (153)	0.749
LVEF > 50%	10/42 (24%)		114 (331)		353 (52)	
RV dysfunction	5/15 (33%)	0.493	250 (268)	0.062	364 (83)	0.215
No RV dysfunction	9/40 (23%)		98 (241)		350 (59)	

MWU = Mann-Whitney U Test * Median (IQR)

breathlessness and frailty scores, and many more recent admissions.

The absence of a negative prognostic effect for RV dysfunction contrasts with previous echocardiography studies.[1] [SJ (N1] This is probably because our study was conducted mid-exacerbation: for survivors after 90 days, RV dysfunction *was* significantly associated with subsequent mortality (50% vs 11%, p=0.048). This suggests clinicians should be cautious about using inpatient echocardiography to diagnose cor pulmonale.

The distributions of $DAOH_{365}$ were heavily left-skewed, limiting straightforward methods to identify population differences. Nevertheless, $DAOH_{365}$ may be a more expedient outcome measure in this population than time to readmission/death, given the insensitivity of the latter to repeated events, which occurred in over half this cohort.

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S88 CAN CORONARY ARTERY CALCIUM SCORE CALCULATED FROM CT THORAX BE USED TO PREDICT THE PRESENCE AND SEVERITY OF CORONARY ARTERY DISEASE IN COPD?

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10.1136/thorax-2023-BTSabstracts.94

Background Coronary artery disease (CAD) is often asymptomatic in patients with chronic obstructive pulmonary disease (COPD) and traditional screening methods may not be as useful in detecting it. A coronary artery calcium score (CACS) can be calculated on CT thorax and predicts future cardiovascular events in COPD.[1] The extent to which this predicts subclinical atheroma has not been determined. Thoracic CT is commonly performed in clinical practice and could be a good screening test for CAD, allowing early intervention to improve outcomes.

We aimed to determine the utility of CACS, derived from CT thorax, in detecting significant CAD in patients with COPD.

Methods 37 patients with COPD underwent pre- and post-contrast ECG-gated CT coronary angiogram (CTCA) and non-gated CT thorax without contrast. CACS was measured on both pre-contrast scans, categorised by severity (mild, moderate, severe, extensive) and used to calculate CACS percentile, accounting for age, sex and ethnicity. Correlation between CACS measured from each scan was evaluated. Receiver operator curves (ROC) were used to determine the sensitivity of CT thorax for detecting significant atheroma on CTCA.

Results CAD was present in 86% (n=32) of CTCAs, with obstructive disease (>50% stenosis of any vessel) in 38% (n=14). There was excellent correlation between CT thorax and CTCA in terms of CACS (R=0.98, p<0.001, Spearman's rank correlation) and percentile (R=0.98, p<0.001). When categorised by severity, there was 81% (30/37) concordance between the two methods, with thoracic CT detecting a higher CACS in most cases of disagreement (86%(6/7)).

ROC analysis showed that CACS on CT thorax was effective at detecting CAD on CTCA (area under the curve for CAD 0.98 (95%CI 0.94–1.00) and obstructive CAD, 0.92 (0.83–1.00)). In this small dataset, a CACS of 232 on thoracic CT had a sensitivity of 100% and specificity of 83% for detecting obstructive CAD.

Conclusion CT thorax can provide an accurate CACS which is highly predictive for CAD in COPD. Larger studies are needed to determine its utility as a screening tool in clinical practice.

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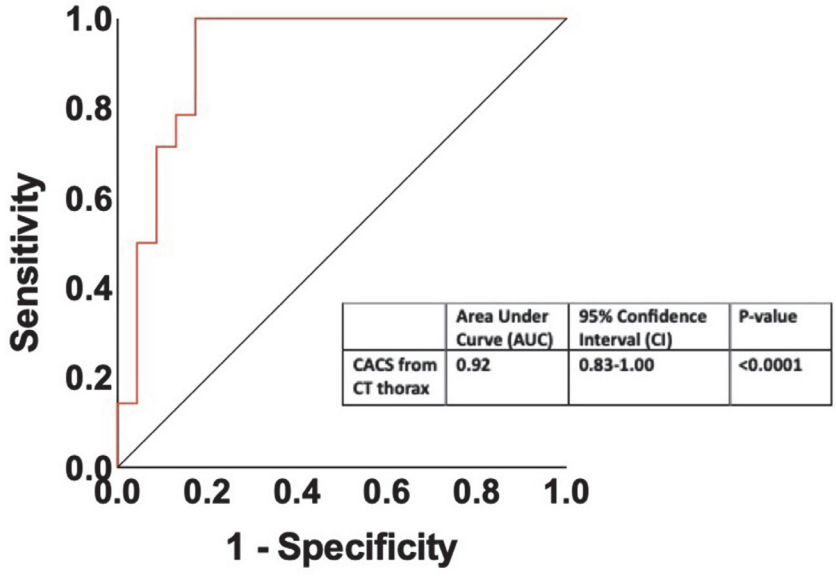

Abstract S88 Figure 1 Receiver operator curve for CACS calculated from CT thorax in predicting obstructive coronary artery disease (>50% stenosis of any vessel) in COPD

S89 PREVALENCE OF MICROSPIROMETRY-DEFINED CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN TWO EUROPEAN COHORTS OF PATIENTS WITH SIGNIFICANT SMOKING HISTORY HOSPITALISED FOR ACUTE MYOCARDIAL INFARCTION

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10.1136/thorax-2023-BTSabstracts.95

Introduction Smoking is a major risk factor for both chronic obstructive pulmonary disease (COPD) and myocardial infarction (MI). Systemic inflammation also contributes to both diseases and has been suggested as a potential target for intervention. Prevalence of COPD in those with a significant smoking history hospitalised for MI has not been well-characterised. We sought to obtain an accurate estimate of COPD burden in this group and characterise the population.

Methods Two consecutive cohorts of patients hospitalised for MI with a smoking history of ≥10 pack-years were recruited in Sweden and the United Kingdom (UK). Baseline characteristics were recorded, including treatment with inhaled corticosteroids (ICS) and eosinophil count in blood. Microspirometry was performed using the Vitalograph COPD-6 device and symptom burden assessed using the COPD Assessment Test (CAT). The primary outcome was the prevalence of a preliminary diagnosis of clinically-significant COPD, here defined as a ratio of forced expiratory volume in 1 and 6 seconds (FEV_1/FEV_6) <0.7 and with FEV_1 <80% of predicted value.

Results In the UK cohort, 216 participants with MI (26% female, median age 60 (IQR 53–67) years, smoking history 32 (23–45) pack-years) were recruited. The proportion with any COPD was 36%. Clinically-significant COPD was found in 30 participants (13.9%, 95% CI 9.5–19.2). Of these, 43% had a prior COPD diagnosis, 20% had an eosinophil count ≥300 cells/mm^3, mean CAT score was 14.4 ± 9.3), 80% had high symptom burden (CAT score >10) and 23% were receiving ICS. The Swedish cohort included 302 participants with MI (24% female, median age 68 (IQR 61–76) years, 26 (15–38) pack years), and clinically-significant COPD was found in 52 (17.2%; 12.9–21.5). In these 52 participants, 17% had a prior COPD diagnosis, 20% had an eosinophil count ≥300 cells/mm^3, mean CAT score was 12.9 ± 7.2, 63% had CAT score ≥10 and 15% had treatment with ICS.

Conclusions The prevalence of preliminary diagnosis of clinically-significant COPD in patients with a ≥10 pack-year smoking history hospitalised for MI is similar between two European cohorts and under-recognised. Further work is warranted to determine whether identification and treatment of COPD improves clinical outcomes following MI.

Please refer to page A285 for declarations of interest related to this abstract.

'Light my fire' – A deeper dive into inflamed airways

S90 EFFICACY OF THE REFERID+ DIGITAL TOOL IN UNCONTROLLED ASTHMA IN PRIMARY CARE (OASIS): A RANDOMISED CONTROLLED TRIAL

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10.1136/thorax-2023-BTSabstracts.96

Introduction Despite longstanding recommendations from numerous national and international asthma guidelines on the recognition, optimisation and referral of patients with uncontrolled asthma to specialist care, several reports highlight that the majority of these patients continue to be managed in primary care. A digital tool guiding a primary-care based health care professional (HCP) through an asthma review, with the ability to identify key driving factors underpinning poor control and suggesting onward referral where indicated, has the potential to transform the quality of asthma care in the community, reducing asthma-related morbidity and unscheduled healthcare costs.

Methods Adults with a diagnosis of asthma and a history of [3]1 asthma exacerbation requiring oral corticosteroids (OCS) in the previous year were randomly assigned 1:1 to receive a remote asthma review using a digital tool ('ReferID+') by a respiratory pharmacist, or continue receiving usual care in the primary care setting. The primary outcome was the rate of exacerbations at 1 year follow-up. Secondary outcomes included asthma control (ACQ6), quality of life (mAQLQ) and adherence to inhaled corticosteroids (ICS).

Results 202 adults under primary care for their asthma (mean age 53±14.5, 72% female) were randomised 1:1 to receive a review using ReferID+ (n=101) or ongoing standard of care (n=101). At follow up, there was a statistically significant decrease in exacerbation rate in the intervention arm (1.87 [±1.47] to 0.79[±1.21], p<0.001) but not in the usual care arm (1.67[±1.46] to 1.46[±1.67], p=0.17). The mean ACQ6 improved by 0.61 (1.83[1.35] to 1.22[1.03], p<0.001) exceeding the MCID of 0.5 in the intervention arm, but only by 0.25 (2.09[1.23] to 1.84[1.22], p=0.04) in the usual care arm. Significant improvements in mAQLQ (p<0.001) and ICS adherence (p<0.01) were only seen in the intervention arm. Overall, 29/101 (28.7%) patients were identified as having features consistent with severe asthma and were referred to specialist care.

Conclusion An asthma review by a respiratory pharmacist in primary care using the ReferID+ tool led to improved clinical outcomes for adults with a history of severe asthma exacerbations and additionally identified patients with suspected severe asthma who required referral to secondary care.

S91 THE EFFECTS OF INHALED CORTICOSTEROIDS ON HEALTHY AIRWAYS

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10.1136/thorax-2023-BTSabstracts.97

Background The effects of inhaled corticosteroids (ICS) on healthy airways are poorly described. Delineating their effects on gene expression in health, without the confounding changes generated by changes in disease-related genes, will enable more precise analysis of data in severe asthma.

Methods We performed a randomised open-label bronchoscopy study of high dose ICS therapy in 30 healthy adult volunteers randomised 2:1 to i) fluticasone propionate Accuhaler 500 mcg bd or ii) no treatment, for 4 weeks. Laboratory staff were blinded to allocation. Biopsies and brushings were analysed by immunohistochemistry, bulk RNA sequencing, DNA methylation area and metagenomics.

Results Blood eosinophil numbers increased after 4 weeks in the observation group compared to people using ICS. This was not related to atopic status. Blood neutrophils, FeNO or FEV1 did not differ between groups. There was a small significant between-group difference in change in lamina propria eosinophils but not for other immunological markers. ICS treatment caused upregulation of 72 genes in brushings, and 53 in biopsies, and down regulation of 82 genes in brushings and 416 genes in biopsies. The most upregulated genes were predominantly those involved in steroid metabolism, cellular proliferation, cellular metabolism and cytoskeletal changes. By contrast the most downregulated genes in both brushings and biopsies were key mediators of type 2 inflammation (FCER1A, CPA3, IL33, CLEC10A, SERPINB10 and CCR5) or of T cell mediated adaptive immunity (TARP, TRBC1, TRBC2, PTPN22, TRAC, CD2, CD8A, HLA-DQB2, CD96, PTPN7). All other top 20 common downregulated genes were involved with innate or adaptive immunity, including Hobit, RANTES, Langerin and GFI1. Genest enrichment showed differential upregulation of 26 genes previously reported as induced by fluticasone in asthma. We observed minimal differences in the microbiome or DNA methylation.

Conclusions We defined genes altered diectly by corticosteroid therapy without confounding by disease. These were predominantly downregulated genes. Strikingly even in health the most downregulated genes were canonical markers of type 2 inflammation. This implies that homeostasis in health involves tonic type 2 signalling in the airway mucosa, which is very sensitive to corticosteroids.

Please refer to page A285 for declarations of interest related to this abstract.

S92 PROTEOMIC AND TRANSCRIPTOMIC ANALYSIS OF RESIDUAL STEROID-RESPONSIVE INFLAMMATION IN MEPOLIZUMAB TREATED PATIENTS

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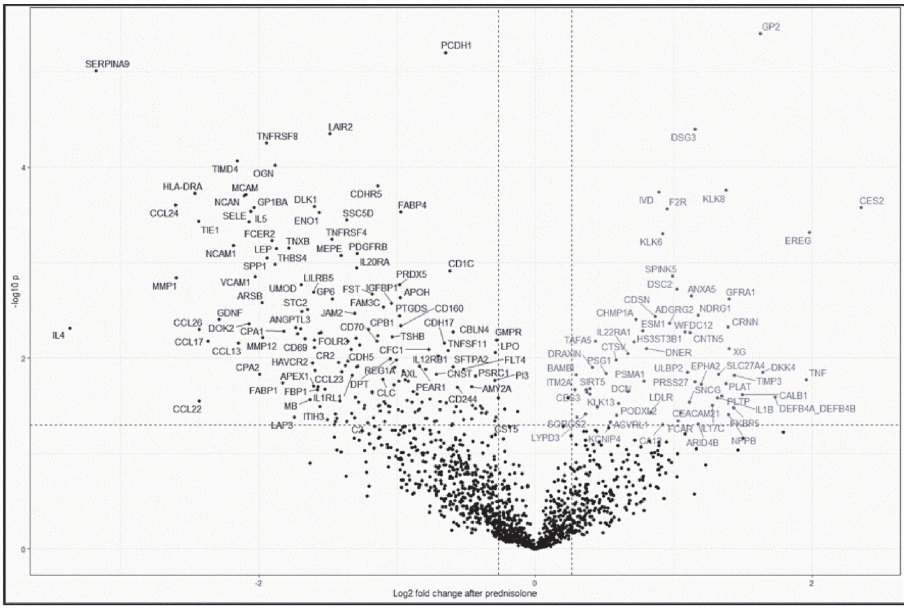
10.1136/thorax-2023-BTSabstracts.98

Background Mepolizumab is an anti-interleukin-5 monoclonal antibody for severe eosinophilic asthma (SEA). The additional



Abstract S92 Figure 1 A proteomic volcano plot showing downregulated proteins (left) and upregulated proteins (right) in the sputum after prednisolone in people treated with mepolizumab

effects of prednisolone to mepolizumab, on molecular mechanisms in the airways and blood are poorly understood.
Aim Determine the transcriptomic and proteomic effects of prednisolone versus placebo on the airways and blood in patients with SEA treated with mepolizumab.
Methods MAPLE was a randomized, double-blind, placebo-controlled crossover trial of prednisolone at stable state in adults with SEA after mepolizumab (Yang F, JACI Pract 2022;10:2925–34.e12). Prednisolone had a minor effect on FEV_1 but not on symptoms. Sputum and blood samples were taken before and after high dose prednisolone and placebo in patients treated with mepolizumab. These underwent O-link expression analysis of 1536 proteins. A paired comparison of normalised protein expression for 1536 proteins in sputum and serum were compared in a linear mixed effects model, with Benjamini-Hochberg correction for multiple testing.

Nasal scrape samples were taken for transcriptomic analysis after prednisolone and placebo in patients treated with mepolizumab. RNA was extracted (Qiagen) and good quality samples sequenced (Illumina Novaseq). We identified differentially expressed genes with paired t-tests with Benjamini-Hochberg correction for multiple testing.
Results 21 participants had paired serum, and 14 had paired sputum, before and after both prednisolone and placebo. Prednisolone significantly downregulated 173 and 229 proteins and upregulated 63 and 140 proteins in sputum and serum respectively. Downregulated proteins in sputum included IL-4, IL-5, IL-13, chemokines, and signatures of mast cells, prostaglandin synthesis, and alternatively activated macrophages. Upregulated proteins included FKBP5, typical of steroid treatment.

6 people had paired nasal epithelial samples comparing prednisolone to placebo. 28 genes were down-regulated by prednisolone included leukocyte chemotaxis, mast cell tryptase and the 15-lipoxygenase pathway.
Conclusions Prednisolone in addition to mepolizumab suppresses type-2 pathways unaffected by IL-5 inhibition in the sputum and blood proteome, and nasal transcriptome. These findings support the notion that the type-2 airway epithelium remains active in mepolizumab-treated patients. The relationship of these additional effects to longer term clinical outcome is unknown.

Please refer to page A286 for declarations of interest related to this abstract.

S93 CIRCADIAN PATTERNS IN IMMUNE CELL TRAFFICKING IN CHRONIC ALLERGIC AIRWAYS DISEASE

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10.1136/thorax-2023-BTSabstracts.99

Background Asthma is a chronic inflammatory disease, commonly featuring an eosinophilic allergic-type signature. Patients with asthma experience diurnal variation in symptoms, with notable worsening in lung function around 04:00, coinciding with peak sputum eosinophilia. A better understanding of the rhythmic inflammatory pathways underpinning asthma may identify novel therapeutic targets.
Experimental Design Female C57BL/6 mice were exposed intranasally to House Dust Mite (HDM) or Phosphate Buffered Saline (PBS) 3x per week for 5 weeks. Tissues were harvested at 6hr intervals over a 72hr period. Immune cell populations in lung, bronchoalveolar lavage fluid (BALF), spleen, and blood were characterised (flow cytometry) and BALF and serum cytokines quantified (bioplex). qPCR and Immunohistochemistry assessed expression of tight junction components found in the airway epithelium. T-helper 2 cells we further analysed to show varying expression of the immune modulatory transcription factor E4BP4 in BALF, lung tissue, and peripheral blood.
Results Immune cell populations in HDM-exposed mice showed time-of-day variations. Eosinophils and Th2 cells peaked at 07:00 in BALF and reached a nadir at 19:00. Similarly, serum IL-5 peaked at 07:00. Blood eosinophils however displayed a consistent daily peak at 13:00 (figure 1), in both HDM and PBS exposed mice. Diurnal variation in the expression of tight junction genes zo-1 and ocln was lost in HDM-exposed mice indicating airways may be leakier, especially at 07:00. T-helper 2 cells, exhibit a reversed pattern of expression of the E4BP4 protein in the lung tissue compared to in the blood and BALF, perhaps driving the cells towards a more proinflammatory phenotype.
Perspectives Our murine model of chronic allergic inflammation demonstrates time of day variation in the cellular milieu of the lung. During the rest phase (when asthma symptoms are typically worse) levels of the eosinophil chemoattractant IL5, lung eosinophils and barrier permeability are heightened. Ongoing work will address mechanisms facilitating rhythmic eosinophil accumulation and clock gene function in T-helper 2 cells when present in the inflamed lung.

Please refer to page A286 for declarations of interest related to this abstract.

S94 COMPUTED CARDIOPULMONOGRAPHY: AN INNOVATIVE ASSESSMENT OF LUNG FUNCTION BEFORE AND AFTER STARTING BIOLOGIC THERAPY FOR TH-2 HIGH ASTHMA

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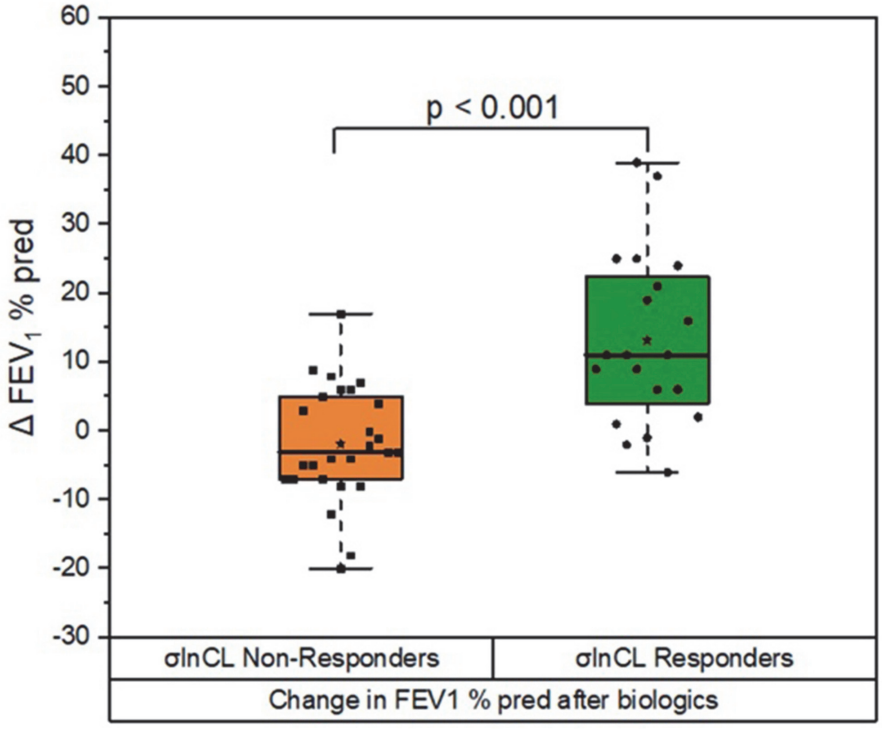
10.1136/thorax-2023-BTSabstracts.100

Aim Anti IL5/anti-IL5R biologics are highly effective in asthma by targeting eosinophilic inflammation and reducing exacerbations, but their effects on lung function are less clear. The aim of the study was to explore whether a novel lung function index, σlnCL, provided by a new technique, computed cardiopulmonography (CCP), is modified following treatment with these biologic therapies in patients with severe type-2 high asthma. σlnCL measures inhomogeneity (unevenness) in lung tissue inflation/deflation and is a sensitive index of small-airways disease.
Methods This was an observational study at a tertiary asthma clinic. Fifty-four patients with type- 2 high asthma were evaluated at baseline and following their 4th biologic injection with an anti-IL5 or anti-IL5R agent 3 or 4 months later, respectively. Assessments included CCP (as described in [1]) and standard spirometry, both pre- and post-bronchodilation with salbutamol, and measurements of blood eosinophil count (BEC), FeNO and ACQ5.



Abstract S94 Figure 1 'σlnCL Responders', i.e. patients who exhibited a decrease in σlnCL (standard deviation for the natural logarithm of standardized lung compliance) following their fourth biologic injection (B) also experienced a significant improvement in FEV1%pred (forced expiratory volume in one second as a percentage of predicted) compared to 'σlnCL Non- Responders', i.e. those who did not show the changes in σlnCL, (A)

Results Biologic therapy significantly improved both FEV1% pred and σlnCL ($p<0.01$ and $p<0.005$, respectively), as did bronchodilation ($p<0.001$ for both), regardless of the specific biologic used (linear mixed-effects modelling). When considering BEC, FeNO, and ACQ5 as predictors in the models, BEC and ACQ5 significantly influenced FEV1%pred (F-ratio 22.7 and 22.6, respectively, both $p<0.001$). However, only BEC strongly affected σlnCL values (F-ratio 34.1, $p<0.001$), while ACQ5 had a weaker effect (F-ratio 5.4, $p<0.05$). FeNO did not show statistical significance.

The change in post-bronchodilator σlnCL following biologics followed a bimodal distribution (Akaike information criterion). Patients responding with a fall in σlnCL also had a significant increase in FEV1%pred compared to those without σlnCL changes (t-test, 13.1% vs. -1.6%, $p<0.001$, figure 1).

Conclusions CCP categorized patients into two groups: responders and non-responders to biologics in terms of lung function changes. Although the effectiveness of anti-IL5 therapy may not rely on direct lung function changes, a subgroup of patients experienced early and significant lung function improvement. Additionally, our findings revealed a strong association between σlnCL and systemic eosinophilic inflammation levels (BEC) in type-2 high asthma, both at baseline and after biologic treatment.

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Please refer to page A286 for declarations of interest related to this abstract.

S95 THE EFFECT OF SMALL AIRWAYS DISEASE (SAD) ON NON-PHYSIOLOGICAL PARAMETERS IN ASTHMA: FINDINGS FROM THE ASSESSMENT OF SMALL AIRWAYS INVOLVEMENT IN ASTHMA [ATLANTIS] STUDY

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10.1136/thorax-2023-BTSabstracts.101

Background SAD is associated with poor asthma control and increased exacerbations. Observed across all asthma disease severity, its prevalence increases as you move up the Global Initiative for Asthma (GINA) pathway. Identifying those at most risk of SAD is important for determining treatment options. The ATLANTIS study previously demonstrated lung physiology as a measure of SAD in asthma patients.[1] Here, we present non-physiological parameters, identified in ATLANTIS, which SAD can affect.

Methods The ATLANTIS prospective cohort study (NCT02123667) included 773 asthma participants and 99 control participants aged 18–65 years followed at baseline, 6 and 12 months. Patients were assessed with clinical and physiological tests, blood tests, questionnaires about asthma control, quality of life, and health status. Structural equation modelling (SEM) analysis was performed in the asthmatic cohort to identify causal relationships; factor loading was used to understand the weight of relationships.

Results The SEM identified causal relationships and variables that are affected by SAD/large airways disease (LAD). Causal factors were age and asthma history, which was strongly weighted towards duration of disease and smoking history (duration and pack-years). Non-physiological parameters impacted by SAD/LAD were patient reported outcomes (PROs), healthcare consumption and non-allergic inflammation.

Two SAD populations were identified by the model. Compared with patients with less prevalent SAD (Group 1, n=452), patients with more prevalent SAD (Group 2, n=312) had significantly worse PROs (measured by asthma control test, P<0.001 and asthma control questionnaire score, P<0.001); significantly more unscheduled consultation visits with a medical specialist or GP for asthma (without hospitalisation) (P=0.001) and unscheduled diagnostic tests for asthma (P<0.001); and a significantly higher neutrophil count (P<0.001).

Conclusion The presence of SAD should be considered in all patients with asthma. In the absence of lung-physiological testing, factors associated with an increased likelihood of SAD included a history of prior smoking, asthma duration and blood neutrophil levels – warranting further investigation. SAD, once identified, requires careful clinical assessment of asthma management due to its impact across a range of PROs.

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Please refer to page A286 for declarations of interest related to this abstract.

'Scar tissue'- Pathogenesis of lung fibrosis

S96 FIBROBLAST GαQ/11 SIGNALLING CONTROLS LUNG EPITHELIAL CELL-DRIVEN REPAIR VIA MODULATION OF EXTRACELLULAR MATRIX PROPERTIES

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10.1136/thorax-2023-BTSabstracts.102

Background Normal lung repair involves tightly regulated epithelial-mesenchymal crosstalk and extracellular matrix (ECM) generation, and dysregulation of repair results in conditions such as pulmonary fibrosis and emphysema. Mesenchymal $G_{\alpha q/11}$ knockout causes emphysema with altered ECM composition,[1] however the role of the ECM in driving this phenotype is unknown.

Aim Understand how $G_{\alpha q/11}^{-/-}$ fibroblast-deposited ECM influences epithelial repair processes.

Methods Wild-type (WT) and *Gnaq*$^{-/-}$;*Gna11*$^{-/-}$ ($G_{\alpha q/11}^{-/-}$) murine embryonic fibroblasts (MEFs), and E10 mouse lung epithelial cells were cultured on ECM generated by WT or $G_{\alpha q/11}^{-/-}$ MEFs. Wound healing was assessed using a scratch wound assay (injury) and by seeding cells around 'fences' (non-injury model). Cell viability was quantified using MTT assays. Transforming growth factor-β (TGFβ) signalling was assessed using transformed mink lung reporter cells (TMLC) and *Pai-1* mRNA expression.

ECM was isolated in soluble and insoluble fractions in RIPA and urea buffers, respectively.

Results Epithelial cell injury-related healing was attenuated (13.8% vs 26.3% 8-hour wound healing, p=0.05), and non-injury defect closure was slower (5.6% vs 15.7%, p=0.02) on $G_{\alpha q/11}^{-/-}$ MEF-generated ECM compared with WT ECM. This was not due to cell death, as E10 and MEF viability was similar on both ECM types.

TGFβ signalling was lower when TMLCs were cultured on $G_{\alpha q/11}^{-/-}$-generated ECM compared with WT ECM (0.44 relative TMLC luciferase activity (RLA), p<0.05). While total protein concentrations from $G_{\alpha q/11}^{-/-}$-generated and WT ECM were comparable, these data indicate reduced TGFβ content of ECM deposited by $G_{\alpha q/11}^{-/-}$ MEFs. This was supported by reduced *Pai-1* mRNA expression in epithelial cells cultured on $G_{\alpha q/11}^{-/-}$-generated ECM compared with WT ECM.

WT MEFs released less active TGFβ into the culture media when grown on $G_{\alpha q/11}^{-/-}$ ECM compared with WT ECM (0.53 RLA, p<0.05). Conversely, $G_{\alpha q/11}^{-/-}$ MEFs increased active TGFβ release on WT ECM compared with $G_{\alpha q/11}^{-/-}$ECM (1.8 RLA, p<0.05). Therefore, the ECM may also influence lung repair via mesenchymal TGFβ signalling.

Conclusion Fibroblast $G_{\alpha q/11}$ signalling controls epithelial repair via modulation of ECM properties, a key aspect of which is TGFβ content. Further evaluation of these mechanisms may identify therapeutic methods of manipulating lung repair.

REFERENCE

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Please refer to page A286 for declarations of interest related to this abstract.

S97 HERITABLE RISK IN PULMONARY FIBROSIS: STUDY OF DISEASE PENETRANCE AMONGST CARRIERS OF DAMAGING RARE VARIANTS

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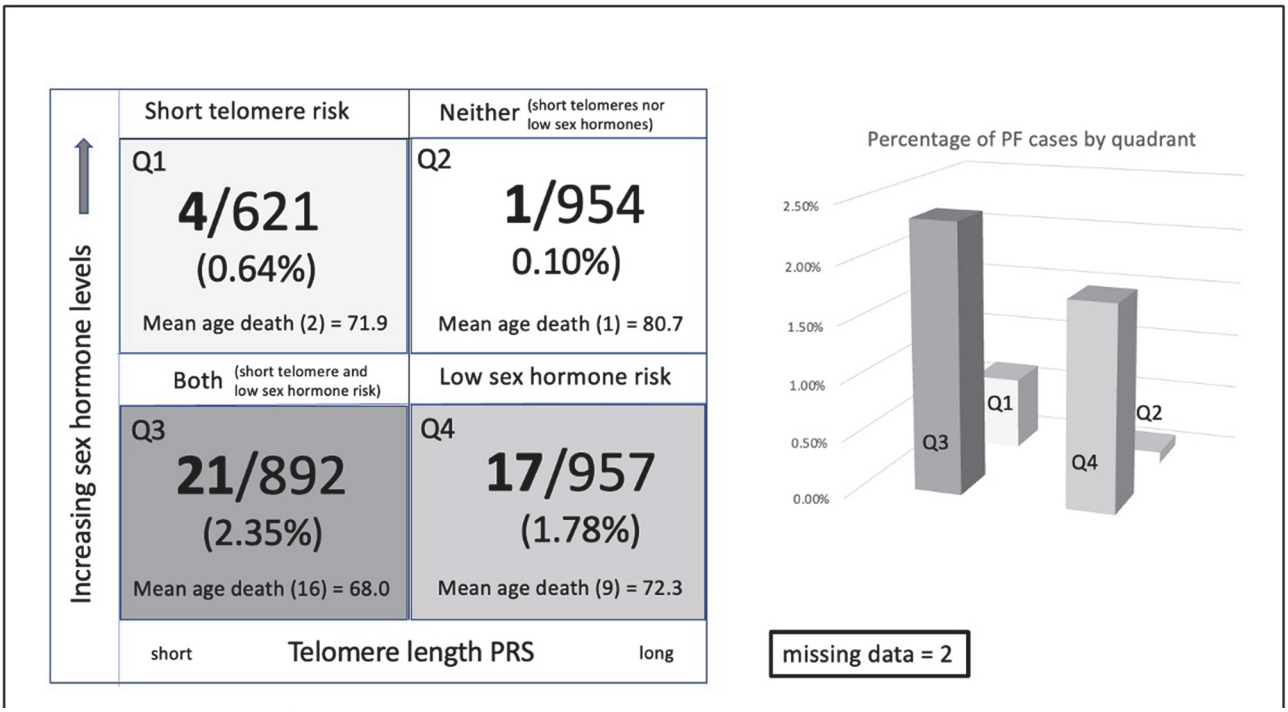
Introduction and Objectives Pulmonary Fibrosis (PF) is a fatal lung disease that accounts for 1% of UK deaths. Based on the literature[1] and local clinical cohort observations, PF is overtly heritable in approximately 20% of cases. Low polygenic risk can counteract causal variant penetrance implied by positive family history across a range of diseases.[2] Interactions between sex hormones, telomere length and pulmonary fibrosis are also reported.[3] We hypothesised that penetrance of 'probably damaging' variants in genes associated with pulmonary fibrosis is moderated by both polygenic risk and sex hormone levels.

Methods We derived 3,424 carriers of 'probably damaging' rare variants from exome sequencing in 8 genes for which carrier status was associated with PF prevalence amongst 82,795 male and 101,682 female UK Biobank participants. We created polygenic risk scores for telomere length in males and females separately. We generated percentage of bioavailable testosterone (bioT%) in males and free androgen index (FAI) in females from biomarkers measured at registration. We used median values to group rare variant carriers into four quadrants of risk. Within each of these quadrants we examined both PF prevalence and PF death within ten years of biomarker measurements.



Abstract S97 Figure 1 Quadrants with differing percentage penetrance of pulmonary fibrosis for carriers of rare probably damaging variants, categorised by above or below median values of polygenic risk score (PRS) for short telomere and sex hormone levels in males and female combined

Results There were 45 PF cases amongst our 3,424 'probably damaging' rare variant carriers. Dichotomising our cohort by median telomere length polygenic risk score split this group by 18:25 for low:high risk (chi^2 P=0.142). Dichotomising by bioT% for males and FAI for females split this group by 5:38 for low:high sex hormone levels (chi^2 P<0.001). Combining these two categories into quadrants showed a marked difference in penetrance of PF for rare variant carriers. Mean age of death with PF also varied considerably by quadrant.

Conclusions Penetrance of 'probably damaging' rare variants in genes associated with PF prevalence appears to be affected by both polygenic risk for short telomeres and blood sex hormone levels. These results carry important implications for PF screening, prognostication and preventive treatment with sex hormones.

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S98 GENOME-WIDE ASSOCIATION STUDIES OF PULMONARY AND NON-PULMONARY FIBROSIS

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Introduction Fibrosis is involved in up to one-third of deaths globally and can affect many organ systems. Individuals with fibrosis in one organ may be more likely to develop fibrosis in another. Genome-wide association studies (GWAS) have shown that genetics plays a key role in fibrotic diseases, including pulmonary fibrosis. Identifying genetic variants associated with a disease increases our understanding and aids in the development of novel treatments. We hypothesised that there could be genetic variants associated with fibrosis across multiple organs.

Objective To identify fibrosis associated genetic variants across different organ systems, and investigate the correlating genetic architecture between respiratory fibrosis and fibrosis in other organs.

Methods We used unrelated individuals of European ancestry in UK Biobank. Fibrotic diseases, as defined by a published consensus list, were combined across 13 organs or systems (Respiratory, Liver, Bile, Cardiomyopathy, Intestinal-Pancreatic, Integumentary, Skeletal, Systemic, Reproductive, Urinary, Blood-vessel, Atherosclerosis and Diabetes). Individuals with at least one fibrotic condition recorded in their hospital or mortality records were defined as cases (all others defined as controls). We then performed a GWAS to test the association between each genetic variant across the genome with each organ fibrosis separately. We selected genetic variants that reached genome-wide significance ($p<5x10^{-8}$) as associated with respiratory fibrosis. We calculated genome-wide genetic correlation between fibrotic diseases using LD score regression.

Results There were 2,600 cases and 415,455 controls included in our respiratory fibrosis GWAS. We identified three genetic signals associated with respiratory fibrosis. These included signals located near the *MUC5B* and *TERT* genes that have been previously reported as associated with idiopathic pulmonary fibrosis and a potential novel genetic association near *SYNPO2* (rs6844137, OR=1.18, $p=4.89x10^{-8}$). None of these variants reached genome-wide significance in the GWAS of fibrosis in other organs. However, there was

genetic correlation observed between respiratory fibrosis and fibrosis in other organs. Of the 12 organs investigated, six had a genetic correlation ($r^2>0.4$) with respiratory fibrosis, with skeletal ($r^2=0.79$) and urinary ($r^2=0.63$) fibrosis showing the strongest correlations.

Conclusion These results suggest there may be biological mechanisms involved in developing respiratory fibrosis that are shared with fibrotic diseases in other organs.

Please refer to page A286 for declarations of interest related to this abstract.

S99 THE EFFECTS OF HUMAN EPIDIDYMIS PROTEIN 4 (HE4) ON INFLAMMATION-DRIVEN LUNG FIBROSIS

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10.1136/thorax-2023-BTSabstracts.105

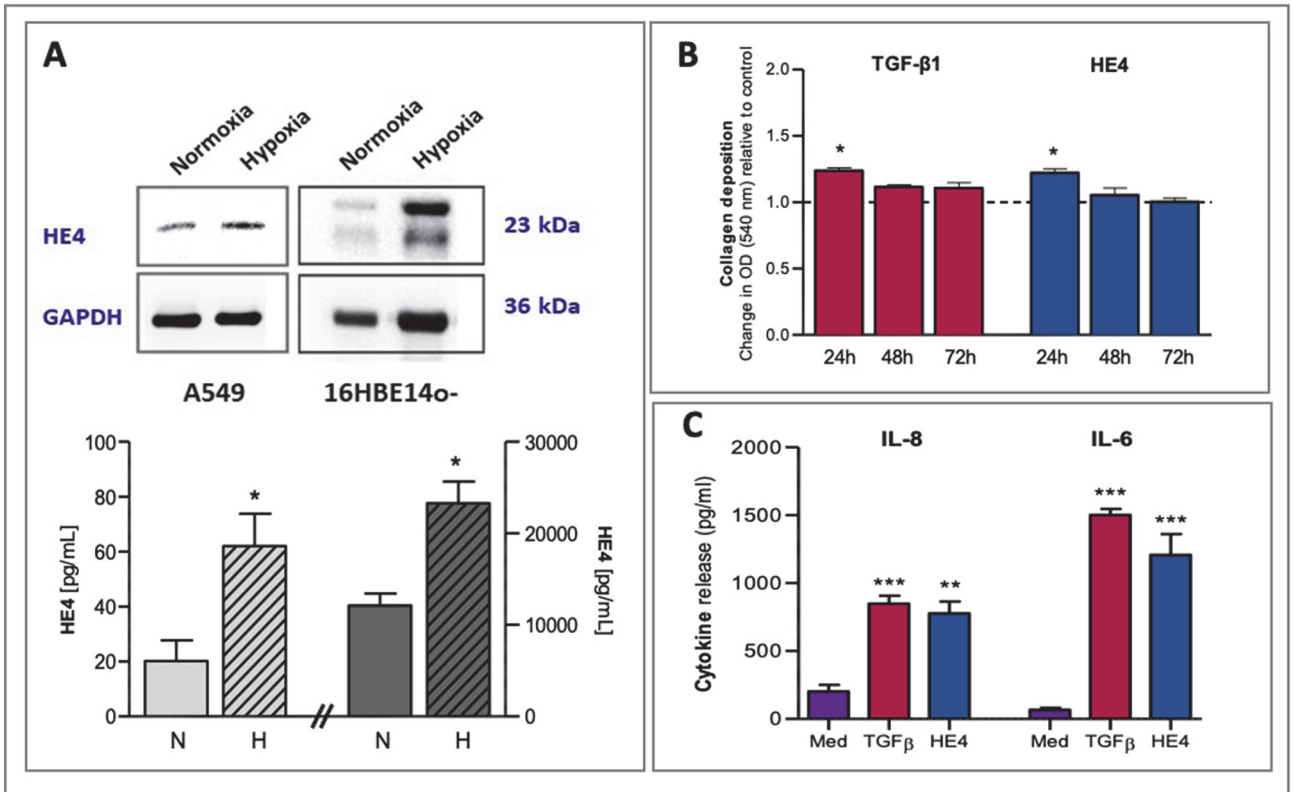
Background Human Epididymis Protein 4 (HE4), a biomarker in ovarian cancer, has been found to be associated with fibrotic lung diseases. However, the effects of HE4 on lung fibrosis and inflammation remain unclear. The inflammation regulator A20 and its transcriptional suppressor DREAM have also been found to be dysregulated in lung diseases, including connective tissue disease-related interstitial lung disease.

Aims We aim to elucidate the effect of HE4 on inflammation-driven lung fibrosis and investigate its potential effect on the A20/DREAM-pathway.

Methods HE4 induction by hypoxia (6h 1% O_2, 18h 21% O_2) was assessed using ELISA and confirmed with Western Blot in bronchial epithelial (16HBE14o-), endothelial (HUVEC), and alveolar (A549) cell lines. The fibrogenic and inflammation-modulating effects of recombinant human HE4 (rHE4) (7.5 nM, 24h) on pulmonary fibroblasts (CCD-Lu11) was compared to those of TGF-beta1 (10 ng/mL, 24h). Type 1 collagen (COL1A1), alpha-SMA, vimentin, S100A4, IL1-beta, IL-6, IL-8 and TNF-alpha expression was assessed at mRNA level using qRT-PCR. Collagen deposition was further investigated using Sirius RED staining and inflammatory marker secretion was confirmed with ELISA. The effects of rHE4 on DREAM and A20 transcription were assessed by qRT-PCR and A20 expression was confirmed by Western Blot.

Results Human bronchial epithelial cells showed significantly higher HE4 levels at baseline compared to endothelial and alveolar cells. Exposure to hypoxia induced HE4 secretion in 16HBE14o-, HUVEC and A549 cells. rHE4 significantly increased mRNA levels of COL1A1 and vimentin, but not alpha-SMA in pulmonary fibroblasts. Similar to TGF-beta1 exposure, collagen deposition was significantly increased at 24h following rHE4 exposure. Expression and secretion of inflammatory mediators (IL-6, IL-8) were significantly induced in rHE4-exposed lung fibroblasts. TGF-beta1 increased A20 mRNA expression, but in response to rHE4 A20 remained at control levels and A20 protein levels were markedly decreased following rHE4 exposure. DREAM mRNA was significantly increased in response to TGF-beta1 and rHE4.

Conclusion HE4 is induced by hypoxia and secreted by respiratory cells to exert a fibrogenic and inflammation-modulating



Abstract S99 Figure 1 Pro-fibrotic and pro-inflammatory effects of HE4. (A) HE4 is induced in pulmonary cells by hypoxia (H:6h 1% O_2, 18h 21% O_2) compared to normoxia (N). (B) Exposure of CCD-Lu11 pulmonary fibroblasts to rHE4 (7.5 nM) increases collagen deposition and (C) expression of pro-inflammatory cytokines. All data n=3, mean±SEM, One-Way ANOVA , ***p<0.001, **p<0.01, *p<0.05 vs Control/24h

effect on fibroblasts, possibly through DREAM-dependent suppression of A20. HE4 and its downstream targets could therefore prove promising therapeutic targets in fibrotic lung diseases.

S100 MAIT CELLS CONTRIBUTE TO PROTECTION AGAINST BLEOMYCIN-INDUCED LUNG TISSUE DAMAGE BY PROMOTING MONOCYTE DIFFERENTIATION INTO TYPE 1 CONVENTIONAL DENDRITIC CELLS

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10.1136/thorax-2023-BTSabstracts.106

Introduction Mucosal-associated invariant T (MAIT) cells are the most abundant unconventional T cells in the lung. We and others have recently described a potential role in promoting tissue repair. It is unknown what role MAIT cells play during sterile tissue damage, or the functional consequences of their tissue repair capabilities in the lung.

Methods We assessed MAIT cell activation and function using a bleomycin-induced murine lung injury model. We used flow cytometry, spectral analysis (Cytek Aurora), histology, qPCR, immunoassays, bulk and single cell RNA sequencing and adoptive transfer in wild-type and MAIT cell-deficient $Mr1^{-/-}$ mice.

Results *In vivo* bleomycin challenge caused recruitment and potent activation of pulmonary MAIT cells and induced their tissue repair program. $Mr1^{-/-}$ mice exhibited more severe weight loss and a more robust immune response following bleomycin challenge compared with their wild-type counterparts. MAIT-cell dependent early accumulation of pulmonary $CD103^{+}$ type 1 dendritic cell (cDC1) was impaired in $Mr1^{-/-}$ mice, and MAIT cells were required for the early differentiation of $CCR2^{+}$ $Ly6C^{hi}$ monocytes into cDC1. The early weight loss of $Mr1^{-/-}$ mice was rescued by adoptive transfer of bone marrow-derived dendritic cells (BMDCs) but this effect was lost when DNGR-1 was blocked in the mice. scSeq data revealed MAIT cells drive marked baseline differences in macrophage, monocyte and neutrophil expression of Pbx1, a major physiological and selective transcriptional mediator of apoptotic-cell-induced macrophage IL10 gene expression.

Conclusion Overall, our data suggested that MAIT cells played a protective role against bleomycin-induced lung tissue damage by promoting monocyte differentiation into cDC1, which limited tissue damage via the DNGR-1 signal. These findings establish a novel mechanism by which MAIT cells function to reduce damage during sterile tissue injury and provide insight into the potential use of MAIT cells in pulmonary tissue repair. Furthermore they imply a homeostatic role for MAIT cells in promoting an anti-inflammatory which markedly alters the lungs response to subsequent tissue injury.

Please refer to page A286 for declarations of interest related to this abstract.

S101 IDENTIFICATION AND VALIDATION OF NOVEL THERAPEUTIC TARGETS IN IPF USING HUMAN TISSUE MODELS

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10.1136/thorax-2023-BTSabstracts.107

Background Idiopathic pulmonary fibrosis (IPF) is a devastating condition leading to respiratory failure and >3000 deaths/year in the UK. Therapeutic approaches are limited and there is an urgent need to better understand mechanisms driving pulmonary fibrosis to support development of new anti-fibrotics. There is spatial and temporal heterogeneity of pathological changes within IPF tissue, which may correlate to changes in pathophysiological mediators of disease and clinical progression. Here, we utilise an intrapatient approach for target identification and validation by comparing histologically distinct regions of tissue from within the same IPF lung.

Methods Macroscopically 'normal', 'intermediate' and end-stage 'fibrotic' tissue was sampled under pathology guidance from the upper left lobe of explant IPF lungs (n=8) collected from patients undergoing lung transplantation. Histological assessment of the regions confirmed distinct pathology before samples were subject to unbiased proteomics assessment alongside aged-matched non-diseased unused donor (UD) lungs (n=10). Ingenuity Pathway Analysis (IPA) was performed to identify novel upstream regulators of fibrosis, from which inhibitory compounds targeting these regulators were selected and anti-fibrotic efficacy was assessed in IPF-derived precision cut slices (PCS).

Results Principal component analysis showed IPF samples clustered based on region of tissue and became less similar to UD controls in correlation with disease severity. We identified markers/pathways significantly modulated in the intermediate region compared to other regions of the IPF lung. The intermediate region is the site of active tissue remodelling and therefore the region that needs to be targeted therapeutically to limit disease progression. Validation of PCS from these distinct regions showed that only intermediate-derived PCS increased collagen-1α1 secretion spontaneously throughout culture, suggesting enhanced disease progression in these PCS. A total of n=18 candidate compounds targeting upregulated markers/pathways modulated in the IPF intermediate region were assessed, of which n=10 exhibited robust anti-fibrotic effects in IPF-derived PCS.

Conclusion We have identified distinct patterns of protein expression that are modulated in line with changes in disease severity. Interrogation of protein heterogeneity identified novel targets that have been validated in the PCS system *via* inhibitors, confirming involvement in disease pathogenesis.

Please refer to page A286 for declarations of interest related to this abstract.

'Insomnia' – Screening, management and complications of sleep disordered breathing

S102 CARDIAC ARRHYTHMOGENESIS IN SLEEP APNOEA (CAOS): A PROSPECTIVE MULTI-CENTRE STUDY

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10.1136/thorax-2023-BTSabstracts.108

Background Sleep disordered breathing (SDB) is associated with an increased risk of cardiac arrhythmias. There is compelling evidence showing a bi-directional relationship between atrial fibrillation (AF) and obstructive sleep apnoea (OSA). The reasons for this are not fully understood but some hypotheses offered include hypoxia or arousals causing autonomic dysfunction, exaggerated negative intra-thoracic pressures affecting the atrial wall and bradycardia-tachycardia phenomenon following a hypoxic event. We sought to identify a cohort of patients with SDB who may be at higher risk of arrhythmogenesis.

Aims 1. To investigate the prevalence of cardiac arrhythmias in a cohort of suspected OSA patients

2. To examine the possible mechanisms of arrhythmogenesis and identify high risk patients

Methodology This was a multi-centre prospective observational study across two large tertiary sleep centres in UK. The study was funded by the BMS/Pfizer alliance and cardiac monitoring equipment was provided by iRHYTHM ZIO®. Ethical approval for the study was provided by HRA and HCRW (REC ref 21/LO/0582).

Recruited patients were monitored for 14 days and underwent 3 overnight limited polysomnograms (LPSG) on days 1, 6 & 11, baseline blood tests including a capillary blood gas and resting 12-lead ECG. They wore a ZIO monitor and Actiwatch Spectrum (Philips) continuously from days 1 to 14 and kept a sleep diary.

Abstract S102 Table 1

Demographics	Value
Male/Female (p-value)	65/39 (0.01)
Age (std)	55 (8.7)
Ethnicity (White Caucasian/Mixed Ethnic group/Asian or Asian British)	98/1/2
Height in m (std)	1.73 (0.11)
Weight in Kg (std)	103 (21.8)
Comorbidities	
Diabetes (%)	17 (16.5)
Hypertension	36 (34.2)
Iscaaemic Heart Disease (%)	2 (1.9)
Epilepsy (%)	2 (1.9)
High Cholesterol (%)	20 (19.2)
SDB Parameters	
Epworth Sleepiness Score (std)	11.6 (5.1)
Baseline Oxygen Saturation% (std)	96.5 (1.5)
Systolic Blood Pressure (std)	136 (17.3)
Diastolic Blood Pressure	82 (10.7)

Results A total of 104 patients participated in the study between Nov 2021 &amp Feb 2022. The table 1 below summarises their characteristics.

The vast majority (93%) of patients had evidence of at least mild OSA. There was a high prevalence of cardiac arrythmias (defined as at least 4 beats of non-sinus tachycardia of above 100bpm) with 78 patients (80%) demonstrating at least one arrhythmia (AF 3%, VT 26%, SVT 76%).

On initial analyses, there is a correlation between number of hypopnoeic events arrhythmias as well as between oxygen desaturation index (ODI) and number of SVT events. This is currently being explored in greater detail.

In addition, patients with cardiac arrhythmias have a greater degree of nocturnal hypoxia as defined by time spent at SaO2<90%.

Further regression analyses and cluster analyses is being done.

Conclusions Initial results suggest that both severity of SDB and hypoxia may play a role in arrhythmogenesis.

S103 DYSANAPSIS IN ADULT OBSTRUCTIVE SLEEP APNOEA PATIENTS AND ITS ASSOCIATION WITH ASTHMA

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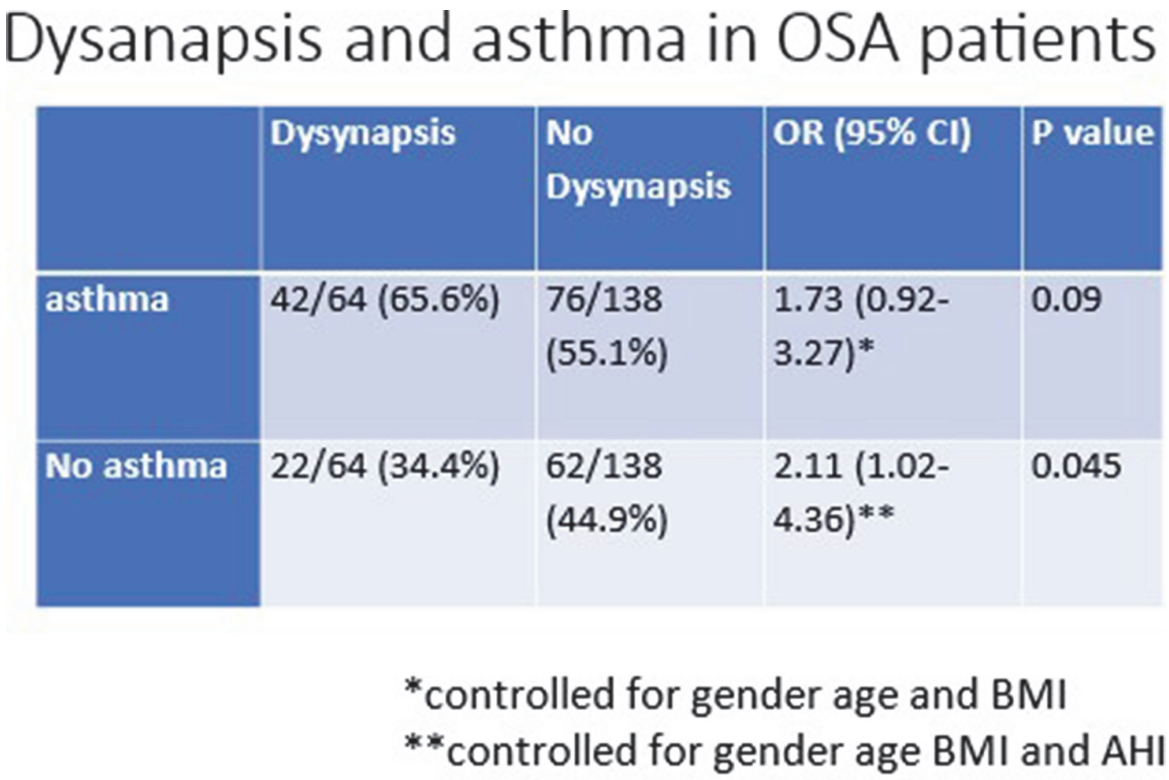
10.1136/thorax-2023-BTSabstracts.109

Introduction and Objective Dysanapsis is the incongruent growth of lung parenchyma and the slower growth of the airways. It is associated with asthma in overweight children. Little is understood regarding dysanapsis in disease and health in adults. A bidirectional relationship exists between asthma and obstructive sleep apnoea (OSA) in adults, each disorder adversely affects the other. We sought to determine the relationship of dysanapsis in OSA patients with and without asthma.

Methods Ethical approval was obtained for a retrospective review of electronic patient records, of subjects followed up in sleep clinic for obstructive sleep apnoea between 1stJanuary 2020 and 31st January 2021. As only 16% of OSA clinic patients had both asthma and OSA, we included the first 150 with asthma and OSA then a further 150 with OSA who did not have asthma. Dysanapsis was defined as FEV1/FVC <80% and FEV1 > 80% predicted.

Results Of the total OSA patients with and without asthma, 32 and 66 were excluded respectively because of the co-existence of other lung conditions e.g., emphysema, interstitial lung disease, lung surgery or diaphragm dysfunction. Of the remaining 202 subjects, 118 had both OSA and asthma of which 72(61%) were male and 84 had OSA only of which 64 (76%) were male. Obesity (BMI > 30 kg/m^2) was present in 102/118 (86%) and 72/84 (86%) respectively. Dysanapsis was present in 64 (32%) of which 47(73.4%) were male and 17 (26.6%) were female, OR 1.5 (0.79–2.9 p=not significant). Of the 64 dysanaptic subjects, 42(65.6%) had asthma, OR after controlling for gender, age, and BMI was 1.73(95% CI 0.92–3.27), p= 0.09. Pre-treatment AHI was available for 184 subjects, mean AHI was 28.3/hour in asthma and 38.6/hour in



Abstract S103 Figure 1

non-asthma (p= <0.001). When controlled for AHI, OR was 2.11(95% CI 1.02–4.36), p-value 0.045.

Conclusion Dysanapsis is more common in males with OSA although this was non-significant. There was a significant association of dysanapsis and asthma but only when controlled for AHI. These results suggest that there may be a relationship between asthma and dysanapsis in adults with OSA. The significance of AHI remained unclear. This requires further research.

S104 CLINICAL OUTCOMES, IMPACT ON SURGICAL INTERVENTIONS AND COMPLICATION RATES IN OSA PATIENTS FOLLOWING PREOPERATIVE SCREENING FROM A DEDICATED PRE ASSESSMENT CLINIC

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10.1136/thorax-2023-BTSabstracts.110

Introduction Unidentified OSA can lead to unexpected perioperative complications, unplanned postoperative admissions and increased length of hospital stay. The NICE (National Institute of Clinical Excellence) recommends a rapid preoperative assessment for patients undergoing elective surgery. We have evaluated clinical outcomes, impact on surgical interventions and complication rates in patients referred from the pre assessment clinic.

Method Surgical patients in the pre assessment clinics were assessed prior to an elective intervention. All patients with a clinical suspicion of OSA based on a STOP-BANG score of 3 or more were referred for an overnight oximetry. Demographics, clinical outcomes and the impact on the planned surgical procedures were evaluated.

Results 450 patients (Age- 55 ± 14, Males- 69%, ESS- 7 ± 5) with a STOP BANG score of 3 or more underwent an overnight oximetry. The oximetry was completed and reported in 6 ± 4 days (mean ±SD). 32% were normal, 44%-mild, 15%-moderate and 9% had severe OSA respectively. All moderate and severe OSA were recommended for CPAP therapy to facilitate their surgical procedures and for long term cardiometabolic benefits. Diagnosis of moderate/severe OSA had an impact on the surgical decision (P < 0.0001, OR= 3.79, 95% CI= 2.39–6.02). Severity of OSA affected the planned anaesthetic route (P < 0.0001, OR= 3.94, 95% CI= 2.21- 7.05). No significant difference in day case v/s non-day case, need for unplanned admissions to critical care due to better planning pre procedure. CPAP was initiated preoperatively in a third of patients (mean compliance- 3.75 hours/day) and the overall complication rate was 11.6% in the moderate/severe OSA group v/s 9.6% in the normal/mild group.

Conclusion Prevalence of OSA is high in pre surgical patients identified through preoperative screening. A diagnosis of moderate/severe OSA impacts surgical decision and planned anaesthetic route. Prior awareness of the diagnosis may help clinicians to identify the at-risk group. Timely CPAP initiation to facilitate surgery remains a challenge and despite low compliance, CPAP may reduce post operative complications. An MDT approach and a dedicated CPAP pathway post diagnosis may help the clinicians and patients.

S105 THE INCIDENCE OF RESIDUAL EXCESSIVE DAYTIME SLEEPINESS IN OBSTRUCTIVE SLEEP APNOEA SYNDROME TREATED WITH CONTINUOUS POSITIVE AIRWAYS PRESSURE: THE LIVERPOOL SLEEPHEALTH STUDY

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10.1136/thorax-2023-BTSabstracts.111

Introduction Whilst the presence of residual excessive daytime sleepiness (EDS) is well described following initiation of Continuous Positive Airways Pressure (CPAP) in Obstructive Sleep Apnoea Syndrome, little is known regarding the incidence of residual EDS within a UK population sample.

Methodology A Clinical Decision Support System (SleepHealth Solutions Ltd) was used to assess CPAP compliance in patients from the Liverpool Sleep Service following CPAP initiation. The CDSS intelligently directs the operator ensuring that those patients with residual EDS are identified. Residual EDS was defined as the presence of all the following criteria: Duration of CPAP therapy≥6 months, ESS>10 on CPAP, AHI<5 on CPAP and CPAP compliance ≥4 hours a night for ≥75% of nights.

Results 3407 patients in total underwent CPAP compliance reviews and 24% (n=822) had CPAP usage documented and deemed sufficiently compliant i.e. CPAP usage ≥4 hours a night for ≥75% of nights (Median daily CPAP usage 6.47 hours (SD 1.31)). Of these CPAP compliant patients, 574 (69.82%) appeared to be well controlled on CPAP (i.e. AHI<5) and residual EDS was observed in 17.4% (n=100; see table 1; median daily CPAP usage 6.54 (SD 1.35) hours, mean CPAP leak 17.19 (SD 19.67) litres/minute) of those well controlled. CPAP usage was ≥6 hours nightly in 84% (n=688) and of these, 70.06% (n=482) appeared to be well controlled on CPAP (i.e. AHI<5). Residual EDS was noted in 11.3% (n=78; median daily usage 7.07 (SD 1.07) hours, mean CPAP leak 17 (SD 19) l/min) of those well controlled using CPAP≥6 hours nightly. The incidence of residual EDS was significantly higher in those using CPAP ≥4 hours nightly compared to ≥6 hours nightly (Chi Squared Test; p=0.002) and in females at both 4-hour and 6-hour usage thresholds (Chi Squared test; p=0.003 and p<0.001 respectively).

Conclusion In this UK study, residual EDS was observed in 17% of subjects using CPAP ≥4 hours nightly falling to 11% in those using CPAP ≥6 hours nightly and also appeared to be more common in females. The incorporation of technology as reported here may assist Sleep services in the identification, characterisation and subsequent management of residual EDS.

Please refer to page A286 for declarations of interest related to this abstract.

S106 DETERMINANTS OF HYPERCAPNIA IN PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA, WITH AND WITHOUT COPD

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10.1136/thorax-2023-BTSabstracts.112

Introduction and Objectives Assessment of chronic hypercapnia in certain groups of patients with obstructive sleep apnoea (OSA) is recommended as these patients may benefit from non-invasive ventilation rather than continuous positive airway pressure. Although nocturnal oximetry may be indicative in whom to suspect hypoventilation syndrome, no clear cut off has been identified.

Methods As part of a quality improvement project, we analysed clinical data, sleep study results and earlobe blood gas values in 105 patients with confirmed OSA (55±15 years, 66 males, BMI 41±8 kg/m2, AHI 56±31/h) who attended our early morning blood gas clinic, following a sleep study suggestive of underlying sleep-related hypoventilation.

Results Patients were divided into COPD (n=26) and non-COPD (n=79) groups. Six patients with COPD met the diagnostic criteria for hypoventilation (pCO2>6kPa), but none of them had higher pCO2 than 7kPa. In this group, pCO2 was related to HCO3 values (p<0.01, r=0.76) and the percentage of time spent with saturation below 90% (T90, p=0.04, r=0.42). There was no correlation with age, gender, AHI, ODI, the use of sedative medications or early morning pO2 (all p>0.05).

In the non-COPD group, 29 patients had a pCO2>6 kPa, including 5 patients with pCO2≥7kPa. In these patients, pCO2 was related to age (p=0.02, r=-0.27), T90 (p<0.01, r=0.44), pO2 (p<0.01, r=-0.38) and HCO3 (p<0.01, r=0.77). No correlation was found with any other factor, including the use of sedative medications.

In both patient groups T90>40% was sensitive to detect pCO2 >6kPa (100% and 89%; COPD and obesity groups, respectively) and pCO2>7kPa (100%).

Conclusion We suggest performing blood gases if the sleep test shows T90%>40% in patients with obstructive sleep apnoea and clinical suspicion for hypoventilation syndrome. We believe this approach could safely reduce the referral to treatment time by reducing use of pre-treatment blood gas analysis.

Abstract S105 Table 1 Comparison of residually sleepy v non-residually sleepy patients in those compliant and well controlled with CPAP therapy

	Age	ESS	Gender
Total number CPAP compliant with usage ≥ 4 hours nightly for ≥75% nights and well controlled on CPAP N=574	54 (13)	5 (5)	209 Female (36%)
Total number CPAP compliant with usage ≥ 4 hours nightly for ≥75% nights **with residual EDS** N=100	55 (13)	15 (3)	48 Female (48%)
Total number CPAP Compliant with usage ≥ 6 hours nightly for ≥75% nights and well controlled on CPAP N=482	54 (13)	5 (5)	175 Female (36%)
Total number CPAP Compliant with usage ≥ 6 hours nightly for ≥75% nights **with residual EDS** N=78	54 (13)	15 (3)	39 Female (50%)

S107 OBESITY HYPOVENTILATION SYNDROME: HIDDEN IN PLAIN SIGHT

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10.1136/thorax-2023-BTSabstracts.113

Obesity Hypoventilation Syndrome (OHS) describes the association between obesity and chronic daytime alveolar hypoventilation and is defined as body mass index (BMI) $\geq$30 kg·m^{-2}, daytime hypercapnia and sleep disordered breathing, in the absence of any other potential cause for hypoventilation. Prevalence of OHS is estimated to be up to 20% in obese patients.[1, 2] It is likely that most OHS patients remain undiagnosed.

OHS is typically diagnosed during an episode of acute-on-chronic hypercapnic respiratory failure, or, less frequently, when symptoms lead to respiratory or sleep consultation in stable conditions. OHS patients respond very well to treatment with non-invasive ventilation (NIV) which results in improvements in clinical symptoms, quality of life, gas exchange, and sleep disordered breathing.

Given that the diagnosis is most frequently made during an acute exacerbation it was hypothesised that there are frequent missed opportunities to make the diagnosis earlier in the course of the illness.

All patients diagnosed with OHS from January 2020 to December 2022 were reviewed. 57% of patients had had an unactioned abnormal blood gas prior to their diagnosis of OHS. 98% had at least one hospital admission prior to diagnosis with an average length of stay of 30 days. 86% attended at least one outpatient clinic prior to diagnosis with 50% attending a lymphoedema clinic. Following initiation of NIV, number of bed days dropped from 221 days per year to 40 days per year, a reduction of 82%, and average length of stay reduced from 30 days pre-NIV to 4 days post-NIV.

Treatment of OHS with NIV leads to a reduction in bed days and subsequent morbidity. We have demonstrated multiple interfaces with healthcare professionals where there was a missed opportunity to make a diagnosis of OHS, initiate treatment and reduce the risk of further hospitalisation.

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'Mirrorball' – The many reflections of respiratory viral infection

S108 BIOLOGICAL PREDICTORS OF SEVERITY IN RESPIRATORY VIRAL INFECTION (RVI): PRELIMINARY DATA FROM UNIVERSAL, A MULTICENTRE PROSPECTIVE OBSERVATIONAL STUDY

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Abstract S108 Table 1 Selected patient characteristics of adults hospitalised with respiratory viral infection organised by virus group

	All Viruses (excluding co-infection, (n=313, 100%)	SARS-CoV-2 (n=98, 31.3%)	Influenza (n=68 21.7% inc. influenza A (IAV) n=65, 20.8%, influenza B (IBV) n=3, 1.0%)	Rhino/ enterovirus (RhV/EV, n=60, 19.2%)	Respiratory syncytial virus (RSV, n=49, 15.7%)	Other Viruses (n=38, 12.1%) inc. metapneumovirus (hMPV) n=13,4.2%, common coronavirus (HCoV) n=11,3.5%, parainfluenza virus (PIV) n=11,3.5%, adenovirus (AdV) n=3, 1.0%)	p value
Male Sex (%)	51.5%	58.1%	43.3%	50.0%	51.1%	51.4%	p=0.516 *Fisher's Exact Test
Median Age (IQR25–75)	68 (57–76)	72 (63–79)	64 (49–74)	64 (50–74)	68 (60–76)	70 (58–77)	p<0.001 *Kruskal-Wallis Test
Median Charlson Comorbidity Score, CCS (IQR25–75)	5 (4–13)	10 (4–16)	4 (4–8)	4 (4–12)	4 (4–12)	7 (4–17)	p<0.001 *Kruskal-Wallis Test
COPD (%)	35.5%	31.6%	33.8%	36.7%	36.7%	44.7%	p=0.695 *Fisher's Exact Test
Asthma (%)	36.4%	30.6%	41.2%	41.7%	38.8%	31.6%	p=0.508 *Fisher's Exact test
Supplementary Oxygen requirement on Admission (%)	62.9%	62.2%	63.2%	66.7%	67.4%	52.6%	p=0.651 *Fisher's Exact test

Introduction and Objectives SARS-CoV-2 has reemphasised the importance of respiratory virus infections (RVIs). UNIVERSAL aims to characterise the impact of a broad range of RVIs. We hypothesise that analysis of a prospective cohort of hospitalised adults with RVI will allow determination of clinical and biological profiles associated with virus type and disease severity.

Methods Excluding co-infection, we recruited 313 hospitalised, symptomatic adults, with PCR evidence of RVI. Clinical characteristics were collected prospectively. We compared admission total/differential white cell count (WCC), CRP and supplementary O_2-requirement.

Multiple logistic regression (MLR) was utilised to calculate the OR and 95%CI associated with oxygen requirement for all viruses. Adjustments included: Age>65, smoking status, Charlson co-morbidity score (CCS), COPD, asthma, hypertension, diabetes, obesity, congestive heart failure, pneumococcal/covid/influenza-vaccination status, white cell differentials and CRP.

Results Table-1 displays patient characteristics by virus group. Overall, 62.9% of participants required supplemental-O_2 on admission.

There was no significant difference in admission-O_2 requirement between virus groups (p=0.651). Lymphocyte count $<1.0*10^9$/L(p=0.018) and CRP>55 mg/L(p<0.001) were associated with admission-O_2 requirement

SARS-CoV-2 positive patients (median age-72) were significantly older than Rhino/enterovirus (RhV/EV) (median age-64, p=0.006), and influenza positive patients (median age-64, p=0.001).Furthermore, SARS-CoV-2 patients (median CCS-10) were significantly more comorbid than the RhV/EV (median CCS-4, p=0.043) and influenza patients(median CCS-4, p=0.001).

For all viruses, median WCC was $10.3*10^9$/L. WCC differential median values included: neutrophils ($8.0*10^9$/L), lymphocyte count ($1.0*10^9$/L), eosinophil count ($0.0*10^9$/L) Median CRP was 55 mg/L and there was no significant CRP difference between the viruses(p=0.389).

SARS-CoV-2 WCC (median-$8.8*10^9$/L) was significantly lower when compared to RhV/EV (median-$11.7*10^9$/L, p=0.003) and influenza (median-$8.9*10^9$/L, p=0.041).Neutrophils were significantly lower in SARS-CoV-2 (median-7.2) than in RhV/EV(median-$8.9*10^9$/L, p=0.030).Additionally, lymphocytes were significantly lower in SARS-CoV-2(median-$0.9*10^9$/L) compared to RhV/EV(median-1.3 p=0.002).

Eosinophil count in RhV/EV (median-0.1 IQR:0.0–0.3) was significantly higher than in influenza (median-$0.0*10^9$/L, p<0.001) and SARS-CoV-2(median-$0.0*10^9$/L p=0.043).

MLR revealed lymphocytes $<1.0*10^9$/L (OR 1.838 CI:1.05–3.26) and CRP >55 mg/L (OR-2.58 CI:1.45–4.67) were independent risk factors for admission supplemental-O_2 requirement.

Conclusion Common RVIs including RhV cause considerable morbidity. Lymphopenia and CRP>55 mg/L were associated with more severe disease in adults admitted with RVI. More precise characterisation of biomarkers associated with severity is an essential prerequisite to novel therapeutics development.

Please refer to page A286 for declarations of interest related to this abstract.

S109 A SEROPOSITIVE SARS-COV-2 CONTROLLED HUMAN INFECTION MODEL DEMONSTRATING POTENT PROTECTIVE IMMUNITY AND IDENTIFICATION OF IMMUNE CORRELATES OF PROTECTION

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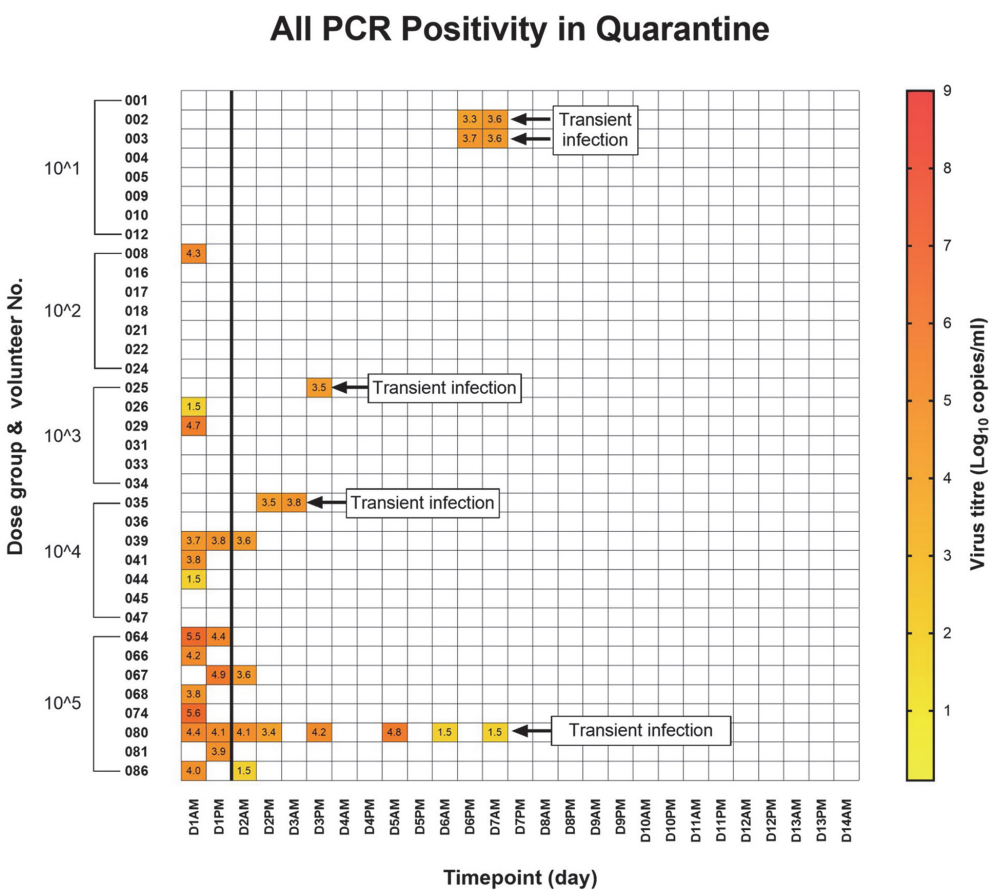
Introduction Controlled human infection models (CHIMs) involve the deliberate exposure of individuals to a pathogen in a controlled environment. Respiratory organism CHIMs have been utilised to further understanding on the kinetics of infection or host-pathogen immunobiology plus enabling expedited testing of vaccines and therapeutics. A SARS-CoV-2 CHIM has been undertaken in seronegative volunteers utilising a dose of $10TCID_{50}$ pre-Alpha virus strain. Sustained infection was seen in 53% (18/34) volunteers with infectious virus persisting for on average 10 days.[1] Development of a seropositive model is necessary to allow full assessment of immune correlates of protection (CoP) and enable use for vaccine and therapeutic development given the increasing global seroprevalence to SARS-CoV-2.

Methods 36 healthy, SARS-CoV-2 seropositive, 18–30-year-old volunteers were inoculated intranasally with increasing doses of pre-Alpha SARS-CoV-2 virus (same as used in the seronegative CHIM) in a sequential fashion up to a dose of 10^5 $TCID_{50}$. Volunteers were quarantined for at least 14 days after inoculation and until 12-hourly oropharyngeal/nasal swabs were negative for viable virus. The primary objective being identification of a safe, well-tolerated dose that induced infection in 50% of volunteers.

Results Only five of 36 (13.9%) volunteers developed infection despite dose escalation up to 10^5TCID_{50}. Infection kinetics differed compared to the seronegative CHIM, with volunteers demonstrating transient episodes of PCR positivity only (median duration 12 hours). Comparison of pre-inoculation samples identified significantly lower baseline mucosal and systemic SARS-CoV-2 specific antibody titres and lower peripheral IFN-γ responses against a CD8+ T cell SARS-CoV-2 peptide pool in infected volunteers.

Conclusions Our inability to reproduce the sustained infection kinetic seen in the seronegative CHIM despite a significant dose escalation using the same viral strain demonstrates the potent protective immunity induced by homologous vaccination and homologous/heterologous prior SARS CoV-2 infection. Our model has identified credible CoP against infection with work ongoing to interrogate post exposure immunity. Model development to induce sufficient infection rates for product evaluation and further validation of our identified CoP is required.



Abstract S109 Figure 1 Positive PCR during quarantine. Demonstrates all swabs taken during the quarantine period. Coloured squares denote detection of SARS-CoV-2 by qPCR with viral titre values presented. The 5 volunteers considered to demonstrate Transient infection (TI) are labelled. All other SARS CoV-2 positive swabs were considered to represent residual inoculum following inoculation, with initial viral detection occurring on Day 1 (denoted by thick black line) and subsequent rapid decline in viral titres

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Please refer to page A287 for declarations of interest related to this abstract.

S110 NEUTROPHIL EXTRACELLULAR TRAPS DRIVE SEVERITY OF VIRUS-INDUCED EXACERBATIONS IN COPD

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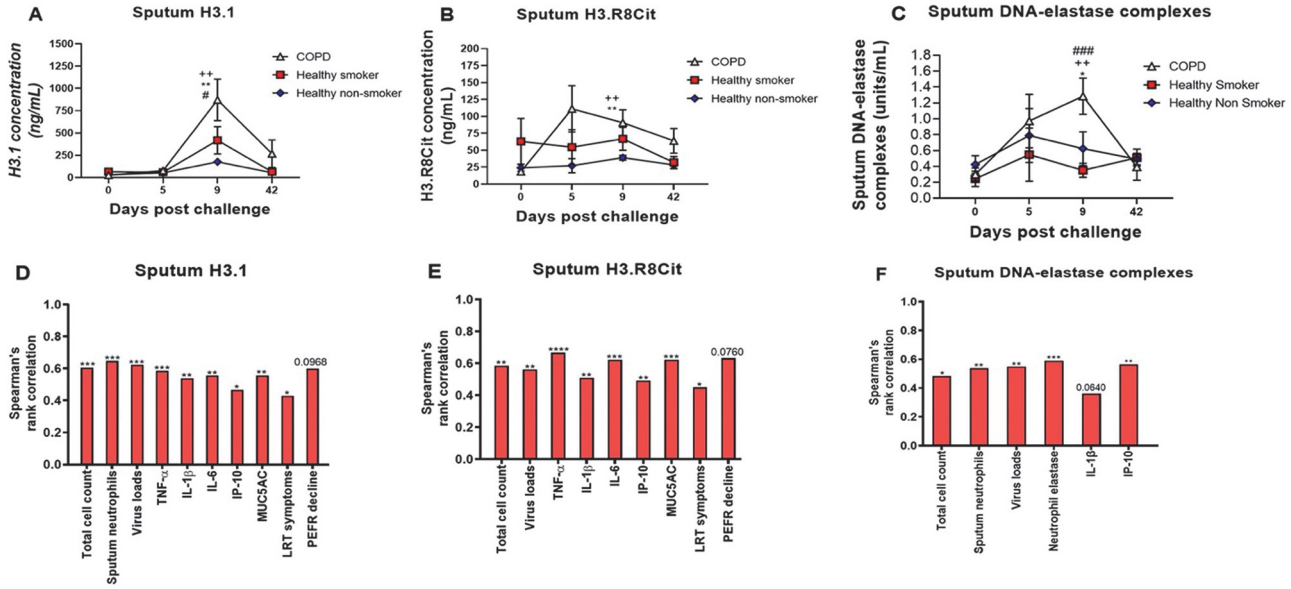
Introduction Neutrophils are recognised to be an immunological driver in chronic obstructive pulmonary disease (COPD) and can release neutrophil extracellular traps (NETs), which may have protective and detrimental roles. We hypothesised that NET formation drives immunopathology and severity during viral exacerbations of COPD.

Methods Nine COPD patients, 10 healthy smokers and 11 healthy non-smokers were experimentally challenged with rhinovirus (RV)-A16. Markers of NET formation including nucleosome components histone (H)3.1, H3 citrullinated at arginine 8 (H3R8Cit), and DNA-elastase complexes were quantified in sputum, before and during infection over a period of 42 days. In subsequent studies, C57BL/6 mice were treated with intranasal elastase to recapitulate features of COPD, followed by intraperitoneal administration of a NET inhibitor (NETi) GW311616A prior to infection with RV-A1. Inflammatory cytokines and lung function were measured at 24 and 96 hours post-infection.

Results H3.1 was induced by rhinovirus infection in COPD and, to a lesser extent, in healthy smokers on day 9 post-infection (figure 1A). H3R8Cit and DNA-elastase complexes were only induced in COPD at day 9 post-infection (figure 1B&C). Concentrations of H3.1 and H3R8Cit correlated positively with sputum virus loads, cellular responses (sputum neutrophils) and virus-induced pro-inflammatory responses including TNF-α, IL-6, CXCL10/IP-10, IL-1β and MUC5AC (figure 1D&E). Both markers also correlated positively with clinical exacerbation severity (lower respiratory tract symptoms), with non-significant trends towards positive correlation with decline in peak expiratory flow rate (PEFR) during exacerbation. Concentration of DNA-elastase complexes correlated positively with sputum virus loads, cellular responses, neutrophil elastase and the proinflammatory cytokines IL-1β and CXCL10/IP-10 (figure 1F).



Abstract S110 Figure 1 NET formation is increased during COPD exacerbations and correlates with immunopathology and clinical severity. Sputum concentrations of **(A)** H3.1, **(B)** H3.R8Cit and **(C)** DNA-elastase complexes in COPD, healthy smoker and healthy non-smoker subjects following rhinovirus challenge (+COPD baseline vs. COPD day 9, *COPD vs. Healthy non-smoker, # COPD vs. Healthy smoker). Spearman's rank correlation analysis of sputum **(D)** H3.1,(E) H3.R8Cit and **(F)** DNA-elastase complexes with markers of inflammation and clinical exacerbation severity. LRT :Lower respiratory tract

In the animal model of elastase-induced COPD, administration of NETi prior to viral infection reduced concentrations of H3R8Cit at day one post-infection ($p<0.05$). NETi treatment also attenuated RV-induction of pro-inflammatory responses (IL-6 ($P<0.01$), TNF-α, IP-10 and RANTES concentrations, $P<0.05$), MUC5AC ($P=0.11$) and improved lung function measured by whole body plethysmography ($P<0.001$), indicating that NETs are a mechanistic driver of immunopathology during exacerbations.

Conclusion NETs drive immunopathology and severity during viral exacerbations of COPD. Targeting of NETs in COPD exacerbations could represent a future effective intervention to improve clinical outcomes.

S111 INCREASED AIRWAY LEPTIN DRIVES IMPAIRED ANTI-VIRAL IMMUNITY IN OBESITY

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10.1136/thorax-2023-BTSabstracts.117

Introduction The mechanisms driving the association between obesity and susceptibility to adverse clinical outcome from influenza infections, as highlighted during the 2009 H1N1 pandemic, are poorly understood. We hypothesized that dysregulated type I interferon would be a major mechanistic driver of obesity-related severity.

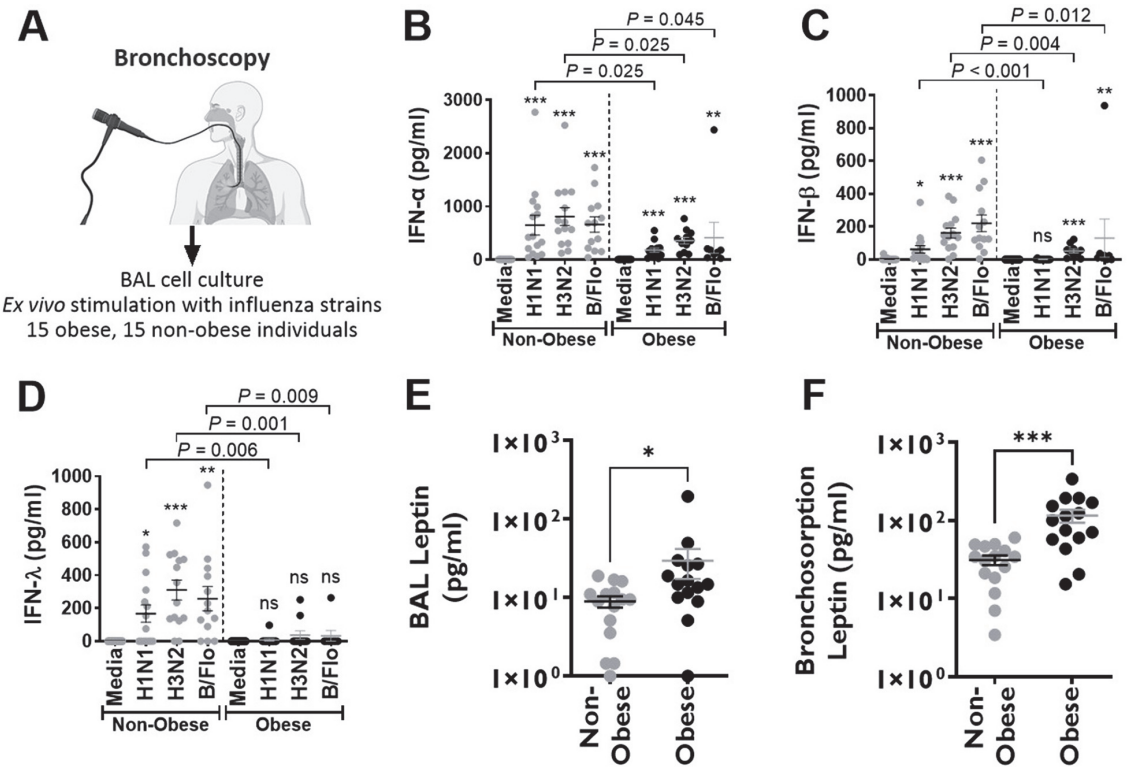
Methods 15 obese and 15 non-obese individuals were recruited to our study. Bronchial epithelial cells (BECs), bronchoalveolar lavage (BAL) cells and peripheral blood dendritic cells (pDCs) collected from these subjects were stimulated *ex vivo* with clinically relevant influenza viruses: A/Eng/195 (pandemic H1N1/09), A/Eng/691/10 (seasonal H3N2) and B/Florida (influenza B) followed by measurement of the anti-viral immune response at 8 and 24 hours post-infection. *In vivo* airway adipokine concentrations were profiled using multiplex ELISA. In subsequent studies, we administered exogenous leptin protein into the airways of BALB/c mice to model the obese pulmonary microenvironment and assess the effects imparted upon infection with influenza X31 (H3N2).

Results *Ex vivo* stimulation of BAL cells from obese individuals demonstrated impaired induction of interferons-α, -β and -λ compared to cells from non-obese controls when stimulated with each of the three influenza strains (figure 1A-D). Similar impairment was not observed in BECs or pDCs.

Concentrations of the adipokine leptin were augmented in BAL and bronchosorption from obese versus non-obese individuals (figure 1E&F) and correlated negatively with the magnitude of *ex vivo* BAL cell anti-viral response with greater leptin concentrations being significantly associated with weaker induction of IFNβ; seen most strongly for B/Florida ($r=-0.67$, $P=0.0008$).

Exogenous pulmonary administration of leptin in mice directly impaired anti-viral type I IFN responses *in vivo*, reducing early induction of *Ifn*β, *Pkr* and *Oas* lung mRNA expression by influenza X31 ($P<0.05$) and subsequently leading to a later augmentation of neutrophilic inflammation ($P<0.05$) and pro-inflammatory cytokine (IL-6 and IL-1β) responses ($P<0.01$).

Conclusion Obese individuals have deficient pulmonary anti-viral type I and III IFN immune responses to influenza infection in BAL cells. Mechanistically, this occurs through increased airway leptin concentrations imparting suppressive effects upon anti-viral immune pathways. Leptin manipulation or IFN administration may provide novel strategies for conferring protection from severe viral infections in these susceptible individuals.



Abstract S111 Figure 1 In obesity, antiviral immune responses are impaired and airway metabolic milieu is altered. (A) Bronchoalveolar lavage (BAL) cells from 15 obese and 15 non-obese control subjects were infected ex *vivo* with H1N1/09 (H1N1),seasonal H3N2 and B/Florida (B/Flo) influenza strains.(B) IFN-α, (C) IFN-β and (D) IFN-λ antiviral immune proteins at 24 hour post-infection .Quantification of leptin in obese vs non-obese subjects in (E) bronchosorption and (F) BAL. *p<0.05;**p<0.01;***p<0.001; ns=non-significant

S112 INFECTION EXPERIENCED LUNG STROMAL CELLS PROVIDE EARLY IMMUNE PROTECTION THAT IS INDEPENDENT OF THE ADAPTIVE IMMUNE RESPONSE

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Introduction and Objectives Influenza A virus (IAV) infections contribute significantly to global mortality. Stromal cells may be permanently altered by inflammatory responses, a process known as trained immunity. We hypothesize that viral infection induces trained immunity in lung stromal cells, enhancing their protective responses to future lung injury via interactions with local immune cells.

Methods C57BL/6 mice were infected intranasally with IAV (WSN) and after 30 days re-challenged with IAV (X31). Mice were sacrificed at day 0, 2, 30 and 32 post-infection/re-infection. The transcriptional profiles and locations of infection experienced stromal cells were identified by RNAscope, viral nucleoprotein (IAV-NP) was detected by immunofluorescence and flow cytometry. An in vitro co-culture assay measured T cell re-activation by naïve or IAV infected stromal cells. To assess the consequences of T cell depletion on viral load following IAV re-challenge, anti-CD4/CD8 blockade was performed during the memory phase of infection.

Results IAV infection led to formation of dense clusters of T and B cells. RNAscope revealed high expression of SpiB and Cxcl0 in lung epithelial cells and fibroblasts, specifically at sites near immune cell clusters. SpiB regulates genes involved in antigen processing/presentation, while Cxcl10 facilitates T cell communication, suggesting collaboration between these cell types could facilitate early viral control. However, depletion of CD4 and CD8 T cells prior to a re-challenge infection did not alter enhanced viral control in IAV-memory animals. To investigate whether IAV-memory stromal cells display enhanced intrinsic viral control, we infected stromal cells from naïve and IAV-memory mice with IAV in vitro. Less IAV-Nucleoprotein was found in stromal cells taken from memory than naïve animals, this was independent of type I interferon. Interestingly, the NP+epithelial cells in cultures of IAV-memory stromal cells expressed higher levels of MHCII than NP +epithelial cells from naïve animals. Both populations could present IAV antigens to CD4 and CD8 T cells, although infected IAV-memory stromal cells to a lesser extent than infected naïve-stromal cells, perhaps due to lower levels of antigen.

Conclusions IAV-experienced lung stromal cells can play dual roles in anti-viral control, early cell intrinsic control and a rapid ability to communicate with local T cells.

S113 CELLULAR SENESCENCE AMELIORATES HUMAN RHINOVIRUS CLEARANCE

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10.1136/thorax-2023-BTSabstracts.119

Background Accumulation of senescent cells is one of the key hallmarks of ageing, and its senescence-associated secretory phenotype (SASP) has been shown to cause chronic inflammation, which contributes to age-related diseases. Aged populations are more vulnerable to respiratory viral infections and are likely to develop more severe complications after infections, especially the aged individuals with underlying disease such as chronic obstructive pulmonary disease (COPD). However, aging (cellular senescence) effects on respiratory viral infections was not demonstrated in the *in vitro* system.
Aim To investigate the role of cellular senescence on human rhinovirus (HRV) infections.
Method Cellular senescence was induced in human foetal lung fibroblast cells MRC-5 cells by a treatment of Nutlin 3A, a p53 stabilizer, and in human air-liquid interface (ALI) cultured induced pluripotent stem cells (iPSCs)-derived bronchial epithelium (HiLung Inc.) by a treatment of etoposide (2μM) for 2 days. Both cell types demonstrated elevated p21, a marker of cellular senescence. The cells were inoculated with HRV16, and viral load and CXCL8 in supernatants were determined by a 50% tissue culture infectious dose ($TCID_{50}$) assay and ELISA, respectively.
Results A peak viral load of HRV16 on Day 2 post inoculation was not different between senescent or normal MRC5 cells, but the viral load at later time point (Day 4 post inoculation) was higher in senescent MRC5 cells, suggesting delayed virus clearance compared with non-senescent MRC-5 cells. When the senescent cells were treated with a senolytic combination cocktail, Dasatinib + Quercetin, virus clearance delayed in senescent cells was restored. In addition, viral replication was more rapid in etoposide treated senescent ALI iPSCs bronchial epithelium compared to non-senescent cells, and higher levels of pro-inflammatory cytokine CXCL8 release were also observed in senescent iPSC bronchial epithelium.
Conclusion This study demonstrates that senescent status affects HRV replication or elimination, supporting the age-dependent susceptibility to HRV infections. Selective elimination of senescent cells by a senolytic agent will be a promising option for preventing severe complications of infections from occurring in the elderly.

'The winner takes it all' – Therapy in asthma

S114 OPTIMISING THE MANAGEMENT OF ASTHMA USING FENO TO DIRECT THE USE OF INHALED STEROIDS: THE OPTIMAN STUDY. A CLUSTER RANDOMISED STUDY

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10.1136/thorax-2023-BTSabstracts.120

Asthma is common impacting over 5 million in UK. Inhaled corticosteroids (ICS) are universally recommended for disease control, not all respond or have asthma. FeNO is a test of corticosteroid responsive inflammation and could guide ICS use.

Question: Is using FeNO in primary care practicable and effective in asthma management?
Design Multi-centre study with cluster randomisation. Subjects recruited from Thames Valley GP practices. Subjects: new asthma and poorly controlled asthmatics. Day 0: full assessment symptoms, medication, history and FeNO. Trial visits: day 30 and 60 for assessment and correction of inhaler technique and adherence. FeNO driven treatment algorithm was followed vs standard care. Final visit d360. Goal: maintain FeNO <25 ppb. Primary outcome: ACT score. Data for the first 71 participants from 251 total.
Results Poorly controlled cohort: Fifty-five adults completed trial using FeNO guidance. 76% non-smoking, mean age 56 years, with mild to moderate airflow obstruction. 87% were using ICS and 58% reported good asthma control at baseline (ACT>19). Baseline and D360 data shown in table 1.

A FeNO of <25ppb was achieved and maintained in 54%, compared baseline, p<0.001. There was a modest increase in ICS dose from 400 mg to 800 mg daily, no change in exacerbation rate (p=0.823). ACT score improved from median 20 (16,23) at baseline, to 21 (19,24), p=0.020 at 12 months. FeNO levels were lower at study end, median 24ppb vs 28ppb at baseline (p=0.085)

New Asthma Cohort: 16 enrolled, 11 completed, 63% female, mean age 40yrs. At study end ACT and MRC scores were improved, mean ICS dose: 400 mgc Bec. FeNO was unchanged.
Conclusion This initial analysis demonstrates that asthmatics in primary care improve control when FeNO guides ICS dose adjustments This was both practicable and acceptable in the primary care setting. However, continued clinical support is required for continued improvement.

S115 EFFICACY OF HIGH-DOSE TRIPLE THERAPY ON ASTHMA EXACERBATIONS IN ASTHMATICS WITH PERSISTENT AIRFLOW LIMITATION AND HIGH BLOOD EOSINOPHIL COUNT: A POST-HOC ANALYSIS OF THE TRIGGER STUDY

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10.1136/thorax-2023-BTSabstracts.121

Background High-dose triple therapy with ICS/LABA/LAMA is recommended for adults with uncontrolled asthma in GINA Steps 4–5 and is often administered concomitant with or prior to initiation of biologic treatment. Previously, we reported in a post-hoc analysis of two large randomized clinical trials (TRIMARAN & TRIGGER) that patients with asthma uncontrolled on ICS/LABA and exhibiting persistent airflow limitation (PAL) may particularly benefit from the addition of LAMA (Singh D et al. Eur Respir J 2020). Here we explore the efficacy of high-dose ICS triple therapy in patients not controlled by high-dose ICS/LABA exhibiting both PAL and high blood eosinophil count, a phenotype that is considered for a step-up to biologic therapy.
Methods Using the dataset from the TRIGGER study, we conducted a post-hoc analysis in subjects with asthma uncontrolled by high dose ICS/LABA exhibiting PAL (post-salbutamol FEV1≤80% and FEV1/FVC≤0.7) and a blood

eosinophils count higher than 150 cell 10^9/L at screening, to evaluate the annualized rate of moderate to severe exacerbation following a 52 week treatment with high-dose extrafine beclometasone dipropionate/formoterol fumarate/glycopyrronium (BDP/FF/GB 800mcg/24mcg/50mcg total daily dose pMDI) or high dose extrafine beclometasone dipropionate/formoterol fumarate (BDP/FF 800mcg/24mcg total daily dose pMDI).

Results The TRIGGER study population included 1142 patients on BDP/FF/GB or BDP/FF out of which 511 (44.7%) met the criteria of PAL and high blood eosinophil count. After 52 weeks of therapy, the reduction in the rate of 'severe' and 'moderate and severe' asthma exacerbations with BDP/FF/GB vs BDP/FF was 35.8% (rate ratio = 0.642; 95% CI: 0.445–0.926; p=0.018) and 28.3% (rate ratio = 0.717; 95% CI: 0.573–0.898; p=0.004), respectively.

Conclusion Treatment with high-dose extrafine BDP/FF/GB is effective in patients with asthma uncontrolled on high-dose ICS/LABA who exhibit PAL and high blood eosinophils count. Exploring triple therapy before initiation of biologic treatment is an option that merits further investigation.

Please refer to page A287 for declarations of interest related to this abstract.

S116 TREATMENT WITH EXTRAFINE FORMULATION SINGLE-INHALER TRIPLE THERAPY IMPROVES DISEASE CONTROL AND ADHERENCE IN PATIENTS WITH ASTHMA – A 3-MONTH INTERIM ANALYSIS FROM THE TRIMAXIMIZE UK STUDY

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Background Beclometasone/Formoterol/Glycopyrronium (BDP/FF/G) Trimbow® pMDI single-inhaler triple therapy (SITT) has demonstrated significant clinical benefits in randomised controlled trials,[1] however, real-world evidence in this setting is limited. TriMaximize is an ongoing real-world study of patients with moderate-to-severe asthma treated with BDP/FF/G SITT. Here we present a 3-month interim analysis from the UK study cohort (NCT04902573).

Methods TriMaximize is a multicentre, prospective, non-interventional study investigating patient characteristics, therapy pathways and health-related quality of life (HRQoL) in patients with moderate-to-severe asthma treated with extrafine formulation SITT (BDP/FF/G).

This interim analysis presents the impact of 3-months of treatment with BDP/FF/G on asthma control, HRQoL, and adherence, assessed by the Asthma Control Test (ACT), Mini Asthma Quality of Life Questionnaire (Mini-AQLQ), and Test of Adherence to Inhalers (TAI), respectively.

Results Of 147 patients enrolled across 20 UK centres, 128 are included in the full analysis set. The majority of patients are 18–65 years old (67.2%) and female (68.8%). Prior to study enrolment, 96 (75%) patients were treated with ICS/LABA (fixed or free combination) and 32 (25%) patients with ICS/LABA/LAMA (free combination). The main reasons for therapy switch to BDP/FF/G were poor symptom control under previous therapy (72.7%) and disease progression (19.5%).

Three-month data are available for 71 patients. A total of 88.9% (n=64) patients reported being very satisfied/satisfied with BDP/FF/G and 97.2% (n=69) were very satisfied/satisfied with the handling of the inhaler. Treatment with BDP/FF/G for 3 months improved asthma control, HRQoL and inhaler adherence (table 1), exceeding the minimal clinically important difference of 3 points for ACT and 0.5 points for Mini-AQLQ.

Conclusion This interim analysis demonstrates both treatment satisfaction and a significant improvement in asthma control, HRQoL and inhaler adherence following three months of treatment with BDP/FF/G in patients with uncontrolled asthma in a real-life setting.

REFERENCE

1. Virchow JC, Kuna P, Paggiaro P, Papi A, Singh D, Corre S, Zuccaro F, Vele A, Kots M, Georges G, Petruzzelli S, Canonica GW. Single inhaler extrafine triple

Abstract S116 Table 1 ACT, Mini-AQLQ and TAI scores at baseline and following 3-months treatment with BDP/FF/G SITT in patients previously treated with ICS/LABA (fixed or free combination) or ICS/LABA/LAMA (free combination). Change from baseline was calculated using paired t-test

	ACT total score		Mini-AQLQ total score		TAI score	
	n	mean (SD)	n	mean (SD)	n	mean (SD)
Baseline	99	13.3 (4.9)	82	3.8 (1.2)	84	48.1 (3.2)
3 months	63	17.0 (5.2)	47	4.7 (1.4)	51	49.0 (2.0)
Change from baseline	59	3.9 (5.2) P<0.0001	43	1.0 (1.0) P<0.0001	48	0.9 (2.4) P=0.0125

therapy in uncontrolled asthma (TRIMARAN and TRIGGER): two double-blind, parallel-group, randomised, controlled phase 3 trials. *Lancet*. 2019;**394** (10210):1737–1749.

Please refer to page A287 for declarations of interest related to this abstract.

S117 CLINICAL REMISSION IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA: AN ANALYSIS OF SIROCCO AND CALIMA TRIAL DATA

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Introduction Efficacy and safety of benralizumab were evaluated in patients with severe eosinophilic asthma (SEA) in phase 3 SIROCCO (SIR; NCT01928771) and CALIMA (CAL; NCT01914757) trials. Prior studies have shown clinical remission (CR) is achievable with benralizumab; this post-hoc analysis evaluated baseline characteristics of patients in SIR/CAL who achieved CR or did not achieve CR (non-CR).

Methods Eligible patients for SIR/CAL were aged 12–75 years with ≥2 exacerbations within the previous year despite medium- to high-dose ICS plus additional controllers. CR was defined as zero exacerbations, zero OCS, and an ACQ-6 score <1.5 after 12 months; patients on OCS at baseline were excluded. We compared baseline patient characteristics (SIR/CAL) of CR patients (i.e., met all 3 components) with non-CR patients.

Results Among 1123 patients from SIR/CAL, 39.2% (213/544) on benralizumab achieved CR compared with 26.6% (154/579) on placebo (**table 1**). Baseline median [range] blood eosinophil counts were higher for patients achieving CR (benralizumab, 412 cells/μL [0, 2095 cells/μL]; placebo, 402 cells/μL [10, 3640 cells/μL]) than for non-CR patients (benralizumab, 365 [0, 3100 cells/μL]; placebo, 360 cells/μL [0, 2610 cells/μL]). The percentage of patients achieving CR with a forced expiratory volume in 1 second (FEV_1) ≥65% predicted was higher (benralizumab, 38.7%; placebo, 40.9%) than for non-CR patients (benralizumab, 29.4%; placebo, 33.8%). Of patients with nasal polyps receiving benralizumab, a higher percentage achieved CR (19.7%) than non-CR (11.5%). Lower percentages of CR patients had >2 exacerbations within 12 months of baseline (benralizumab, 28.6%; placebo, 26.0%) than non-CR patients (benralizumab, 34.7%; placebo, 38.8%). Mean [SD] baseline ACQ-6 scores were lower for CR patients (benralizumab, 2.5 [0.86]; placebo, 2.5 [0.87]) than non-CR patients (benralizumab, 3.0 [0.85]; placebo, 2.9 [0.88]).

Conclusions Our analysis shows greater likelihood of CR in patients with higher blood eosinophil counts, better lung function, lower ACQ-6 score, and fewer exacerbations at baseline. CR was more likely to be achieved in patients with a history of nasal polyps who received benralizumab. These data highlight the importance of diagnosing and appropriately treating SEA as early as possible.

Please refer to page A287 for declarations of interest related to this abstract.

Abstract S117 Table 1 Patient demographics and baseline clinical characteristics

	Benralizumab		Placebo	
	Remission (N=213)	Non-remission (N=331)	Remission (N=154)	Non-remission (N=425)
Age, years, mean (SD)	47.6 (13.92)	50.5 (13.75)	47.1 (16.63)	50.1 (13.84)
≥12–<18	10 (4.7)	10 (3.0)	12 (7.8)	14 (3.3)
≥18–<50	93 (43.7)	134 (40.5)	62 (40.3)	169 (39.8)
≥50–<65	90 (42.3)	141 (42.6)	59 (38.3)	185 (43.5)
≥65–75	20 (9.4)	46 (13.9)	21 (13.6)	57 (13.4)
Sex, female, n (%)	121 (56.8)	218 (65.9)	91 (59.1)	277 (65.2)
Local baseline bEOS count cells/μL, median	412.0	365.0	402.0	360.0
(range)	(0, 2095)	(0, 3100)	(10, 3640)	(0, 2610)
Local baseline bEOS ≥300 cells/μL, n (%)	152 (72.0)	208 (63.8)	113 (73.9)	275 (65.3)
Time since asthma diagnosis, years, mean (SD)	18.3 (14.82)	20.0 (15.05)	19.5 (16.22)	19.6 (14.78)
Age at asthma onset, years, mean (SD)	29.9 (18.04)	31.1 (19.25)	28.3 (20.95)	31.1 (18.52)
Total IgE, IU/mL, median (range)	166.3	206.1	185.3	179.7
	(4, 5782)	(2, 12754)	(5, 10029)	(2, 17317)
Phadiatop, positive at baseline, n (%)	N=211	N=323	N=153	N=418
	136 (64.5)	209 (64.7)	98 (64.1)	246 (58.9)
ACQ-6 score, mean (SD)	2.5 (0.86)	3.0 (0.85)	2.5 (0.87)	2.9 (0.88)
History of nasal polyps, n (%)	42 (19.7)	38 (11.5)	22 (14.3)	76 (17.9)
FEV_1% predicted normal n (%)				
<65%	130 (61.3)	233 (70.6)	91 (59.1)	274 (66.2)
≥65%	82 (38.7)	97 (29.4)	63 (40.9)	140 (33.8)
Exacerbations at baseline, n (%)				
2	151 (70.9)	216 (65.3)	114 (74.0)	260 (61.2)
>2	61 (28.6)	115 (34.7)	40 (26.0)	165 (38.8)

ACQ-6, Asthma Control Questionnaire 6-item; bEOS, blood eosinophil; FEV_1, forced expiratory volume, 1 second; IgE, immunoglobulin E; IU, international unit; μL, micro liter; SD, standard deviation.

S118 DUPILUMAB EFFICACY IS NOT AFFECTED BY PRIOR ASTHMA EXACERBATION STATUS IN LIBERTY ASTHMA TRAVERSE OPEN-LABEL EXTENSION STUDY

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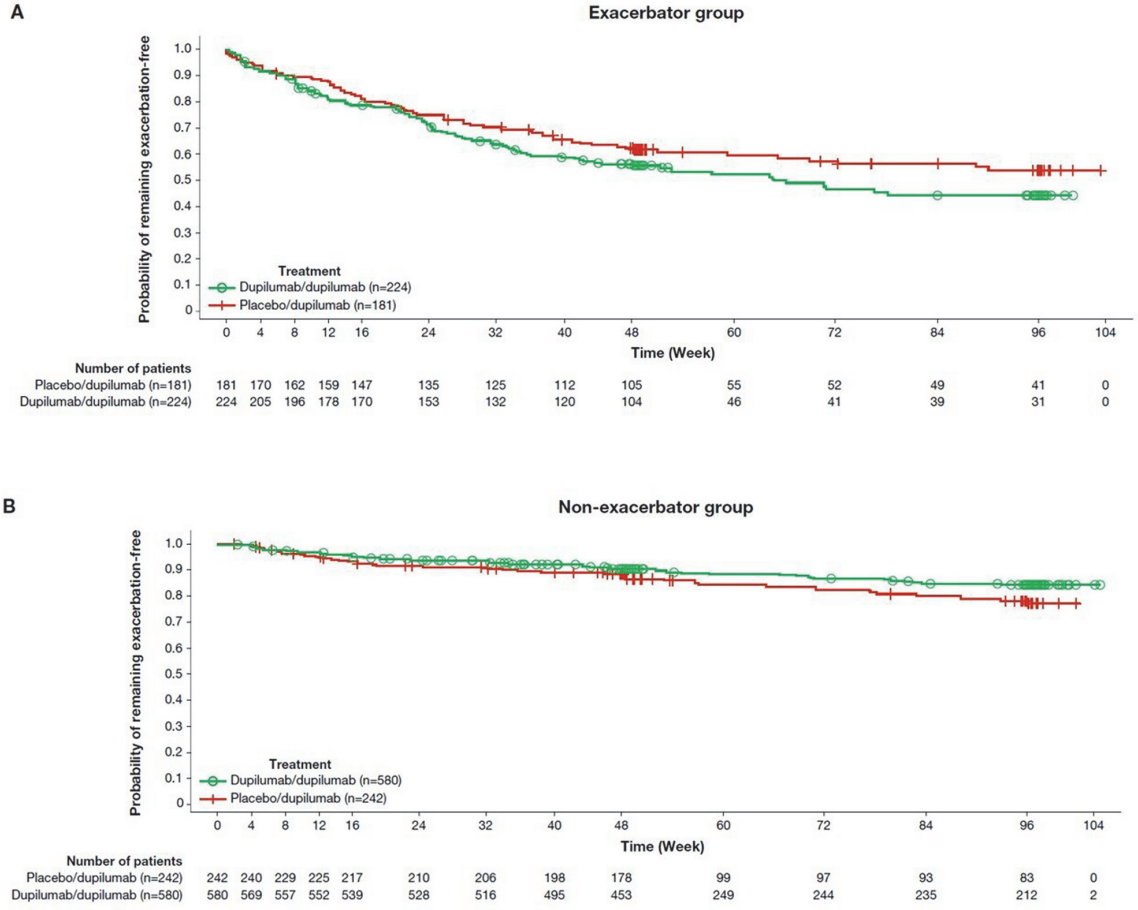
Rationale Asthma exacerbations are associated with lung function decline and risk of future exacerbations. Dupilumab blocks IL-4/-13, key and central drivers of type 2 inflammation. We investigated the relationship between prior exacerbations and lung function in patients with moderate-to-severe type 2 asthma (blood eosinophils ≥150cells/μL or FeNO ≥25ppb at parent study baseline [PSBL] QUEST [NCT02414854]) enrolled in TRAVERSE (NCT02134028).

Methods Dupilumab-treated patients from QUEST continued in TRAVERSE up to 96 weeks (designated dupilumab/dupilumab); placebo-treated patients from QUEST initiated dupilumab in TRAVERSE (designated placebo/dupilumab). Endpoints: annualized severe exacerbation rates (AER), time to first exacerbation, absolute pre-bronchodilator percent-predicted (pp) FEV_1 over time, in QUEST non-exacerbators (0 exacerbations) and exacerbators (≥1 exacerbations).

Results Dupilumab sustained lung function improvements observed in QUEST during TRAVERSE. Mean (SD) $ppFEV_1$ at TRAVERSE Week 0 was 65.0 (17.3) and 73.3 (15.8) in dupilumab/dupilumab, and 60.4 (16.0) and 68.0 (16.0) in placebo/dupilumab, for exacerbators and non-exacerbators, respectively. At week 96, dupilumab further improved $ppFEV_1$ to 67.2 (17.1) and 72.8 (16.2) in dupilumab/dupilumab, and 70.8 (15.2) and 71.4 (17.3) in placebo/dupilumab. In QUEST, dupilumab reduced AER. During TRAVERSE, Dupilumab reduced AER in exacerbators (0.78 and 0.56 in dupilumab/dupilumab and placebo/dupilumab, respectively), and maintained low AER (0.11 and 0.17, respectively) in non-exacerbators. Risk of experiencing a first exacerbation was lower for non-exacerbators than exacerbators, but similar between dupilumab/dupilumab and placebo/dupilumab within both patient groups (figure 1).

Conclusions Dupilumab significantly reduced AER, improved/sustained improvements in lung function in placebo/dupilumab patients, and dupilumab/dupilumab patients, regardless of prior exacerbation status, up to three years.

Please refer to page A287 for declarations of interest related to this abstract.



Abstract S118 Figure 1 Time to first exacerbation during TRAVERSE in (A) exacerbator group and (B) non-exacerbator group
Dupilumab/dupilumab = dupilumab during QUEST and TRAVERSE; exacerbators = 1 severe exacerbation during QUEST; non-exacerbators = no severe exacerbations during QUEST; placebo/dupilumab=placebo during QUEST and dupilumab during TRAVERSE

S119 EFFECT OF TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA BY AGE OF ONSET, ALLERGIC STATUS, AND EOSINOPHILIC PHENOTYPE

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Introduction and Objectives Biologic efficacy for severe asthma varies depending on age of asthma onset and inflammatory phenotype. This *post hoc* analysis assessed the effect of tezepelumab in patients with severe, uncontrolled asthma with childhood-onset and current allergic or non-eosinophilic disease and adult-onset and current eosinophilic or non-allergic disease using pooled data from the phase 2b PATHWAY and phase 3 NAVIGATOR studies.

Methods PATHWAY (NCT02054130) and NAVIGATOR (NCT03347279) were multicentre, randomized, placebo-controlled studies with similar designs. Included patients (12–80 years old) received tezepelumab 210 mg or placebo subcutaneously every 4 weeks for up to 52 weeks. Annualized asthma exacerbation rates (AAERs) over 52 weeks were assessed in patients grouped by age of asthma onset (childhood-onset, <18 years; adult-onset, ≥18 years) in combination with inflammatory phenotype (non-eosinophilic, baseline blood eosinophil count [BEC] <150 cells/μL; eosinophilic, baseline BEC ≥150 cells/μL; or allergy to a perennial aeroallergen [positive/negative serum specific immunoglobulin E test]). Subgroups were not mutually exclusive.

Results Tezepelumab reduced the AAER over 52 weeks versus placebo by 53% (95% CI: 34–67) in patients with childhood-onset, allergic asthma (tezepelumab, n=181; placebo, n=180); 49% (95% CI: 9–72) in patients with childhood-onset, non-eosinophilic asthma (tezepelumab, n=58; placebo, n=57); 67% (95% CI: 57–74) in patients with adult-onset, eosinophilic asthma (tezepelumab, n=330; placebo, n=332); and 54% (95% CI: 37–67) in patients with adult-onset, non-allergic asthma (tezepelumab, n=198; placebo, n=204).

Conclusions Tezepelumab reduced exacerbations versus placebo in a broad population of patients with severe, uncontrolled asthma grouped by age of onset and inflammatory phenotype.

Please refer to page A287 for declarations of interest related to this abstract.

'The great pretender' – Hot topics in TB

S120 DIAGNOSTIC ACCURACY OF TB PCR IN EBUS-TBNA SAMPLES, TRIBE A MULTICENTRE PROSPECTIVE UK STUDY

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10.1136/thorax-2023-BTSabstracts.126

Introduction The utility of TB PCR (Xpert Ultra®) in endobronchial ultrasound guided transbronchial needle aspiration (EBUS-TBNA) samples remains unclear in a low incidence high resource setting.

Aims To analyse the diagnostic accuracy of Xpert Ultra for the detection of MTB in EBUS-TBNA samples in culture positive lymph node TB cases.

Methods This multicentre prospective study across 10 units analysed EBUS-TBNA samples from January 2021 to December 2022. Routine EBUS-TBNA results for TB PCR, microscopy, culture, cytology and rapid onsite evaluation of cytology (ROSE) where available were reviewed alongside their clinical data. Turnaround times (TAT) from sample collection were measured for each test. Trace readings for Xpert Ultra were analysed both as a positive and negative result.

Abstract S120 Table 1 Diagnostic accuracy table for EBUS-TBNA samples

Reference standard: Culture positive mediastinal lymph node TB

EBUS-TBNA	Xpert Ultra (trace as negative)	Xpert Ultra (trace as positive)	Smear	Cytology	ROSE
Positive Tests	27/34	28/34	2/34	21/34	9/14
Sensitivity	0.79	0.82	0.06	0.62	0.64
	(CI 0.75–0.84)	(CI 0.78–0.87)		(CI 0.59–0.65)	(CI 0.57–0.72)
Specificity	0.92	0.91	1.00	0.63	0.74
	(CI 0.91–0.93)	(CI 0.90–0.92)	(CI 0.99–1.00)	(CI 0.62–0.63	(CI 0.73–0.75)
PPV	0.56	0.55	0.67	0.19	0.26
	(CI 0.55–0.58)	(CI 0.54–0.56)	(CI 0.29–1.00)		
NPV	0.97	0.98	0.89	0.92	0.94
	(CI 0.96–0.98)	(CI 0.97–0.98)	(CI 0.88–0.90)	(CI 0.91–0.93)	(CI 0.91–0.96)

*PPV: Positive predictive value, NPV: Negative predictive value, CI: 95% confidence interval

Results A total of 293 EBUS-TBNA samples were analysed from participants with a median age of 51.8 (IQR 37.4–67.5), M:F ratio of 172:121, 4 cases were co-infected with HIV, 67 with diabetes and 27 cases with previous TB.

34/293 (11.6%) were culture positive from the mediastinal lymph nodes. The diagnostic accuracies of routine TB tests are shown in table 1.

There were 2 Xpert Ultra trace readings but both in TB naïve cases with one being culture positive and one culture negative but clinically being treated for TB.

The median TAT for culture positivity was 21.5 days (IQR 15.25–39.75) but ROSE, Xpert Ultra and smear had the same day TAT. TAT for cytology was 4 days (IQR 2–6).

Conclusion Xpert Ultra has a considerably higher diagnostic yield compared to smear microscopy in EBUS-TBNA samples and is associated with a high sensitivity. It has a rapid TAT with the ability to identify rifampicin resistance and with a significant lead time advantage to culture. The data argue for a health-economic analysis to determine its value as a first-line test that replaces smear in people with possible mediastinal nodal TB.

S121 REAL-WORLD DIAGNOSTIC UTILITY OF XPERT MTB/RIF ULTRA IN PULMONARY AND EXTRAPULMONARY SAMPLES IN TB HOTSPOT OF LOW TB INCIDENCE, HIGH RESOURCE SETTING

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10.1136/thorax-2023-BTSabstracts.127

Introduction Use of rapid molecular diagnostics such as Xpert MTB/RIF and Xpert MTB/RIF Ultra (Xpert-Ultra) is endorsed by World Health Organization for rapid diagnosis of TB. Xpert-Ultra has improved sensitivity, but utility in low TB-prevalent settings, where paucibacillary and extrapulmonary disease are more common, remains uncertain. Current UK National Institute for Health and Care Excellence guidance for use of rapid molecular diagnostics remains unclear.

Objectives To examine utility of Xpert-Ultra as a clinical first-line diagnostic tool in pulmonary (PTB) and extrapulmonary

Abstract S121 Table 1

		Mycobacterial culture as reference standard		TB diagnosis as reference standard	
Group (sample n, patient n)	**Diagnostic tests**	**Sensitivity (95% CI)**	**Specificity (95% CI)**	**Sensitivity (95% CI)**	**Specificity (95% CI)**
All data (251, 231)	Xpert Ultra	89.06% (78.75% to 95.49%)	92.51% (87.76% to 95.85%)	84.34% (74.71% to 91.39%)	99.32% (96.29% to 99.98%)
	Microscopy	34.38% (22.95% to 47.30%)	97.86% (94.61% to 99.41%)	26.51% (17.42% to 37.34%)	97.3% (93.22% to 99.26%)
	Culture			75.9% (65.27% to 84.62%)	100% (97.54% to 100.00%)
Sputum (121, 116)	Xpert Ultra	94.44% (81.34% to 99.32)	98.82% (93.62% to 99.97%)	94.44% (81.34% to 99.32%)	98.75% (93.23% to 99.97%)
	Microscopy	50% (32.92% to 67.08%)	97.65% (91.76% to 99.71%)	50.0% (32.92% to 67.08%)	97.5% (91.26% to 99.70%)
	Culture			97.22% (85.47 – 99.93)	100% (95.49% to 100.00%)
Bronchoalveolar lavage (67, 62)	Xpert Ultra	86.67% (59.54% to 98.34%)	92.31% (81.46% to 97.86%)	80.95% (58.09% to 94.55%)	100% (91.40% to 100.00%)
	Microscopy	20% (4.33% to 48.09%)	98.08% (89.74% to 99.95%)	14.29% (3.05% to 36.34%)	97.56% (87.14% to 99.94%)
	Culture			71.43% (47.82% to 88.72%)	100% (91.40% to 100.00%)
Pulmonary samples (188, 178)	Xpert Ultra	92.16% (81.12% to 97.82%)	96.35% (91.69% to 98.80%)	89.47% (78.48% to 96.04%)	99.17% (95.48% to 99.98%)
	Microscopy	41.18% (27.58% to 55.83%)	97.81% (93.73% to 99.55%)	36.84% (24.45% to 50.66%)	97.52% (92.93% to 99.49%)
	Culture			87.72% (76.32% to 94.92%)	100% (97.00% to 100.00%)
Extrapulmonary samples (63, 53)	Xpert Ultra	76.92% (46.19% to 94.96%)	82% (68.56% to 91.42%)	73.08% (52.21% to 88.43%)	100% (87.23% to 100.00%)
	Microscopy	7.69% (0.19% to 36.03%)	98% (89.35% to 99.95%)	3.85% (0.10% to 19.64%)	96.3% (81.03% to 99.91%)
	Culture			50.0% (29.93% to 70.07%)	100% (87.23% to 100.00%)
All TB diagnosis, (n/a, 231)	Culture and Xpert Ultra combined			91.57% (83.39% to 96.54%)	99.32% (96.29% to 99.98%)
PTB (n/a, 178)	Culture and Xpert Ultra combined			94.7% (85.38% to 98.90%)	99.2% (95.48% to 99.98%)
EPTB (n/a, 53)	Culture and Xpert Ultra combined			84.62% (65.13% to 95.64%)	100% (87.23% to 100.00%)

TB (EPTB) and to investigate Xpert-Ultra grade as a biomarker of infectiousness in a low TB burden setting.

Methods Retrospective analysis of all patients with suspected TB that were triple tested with Xpert-Ultra, smear microscopy and mycobacterial culture at the University Hospitals of Leicester NHS Trust between 01/03/2018 and 28/02/2019. Sensitivity and specificity analyses of all three diagnostic markers were performed using TB culture and TB diagnosis at the primary disease site as independent reference standards. We also investigated the association between Xpert-Ultra grade from index PTB respiratory tract samples, and infectiousness defined as the proportion of close contacts with QuantiFERON-TB Gold plus positive latent TB infection (LTBI).

Results 251 samples (188 respiratory samples) were analysed, from 231 patients of whom 86 had TB. 64 samples (63 patients) were *Mycobacterium tuberculosis* (Mtb) culture positive. 26 samples were smear positive, including four with non-tuberculous mycobacteria. 71 were Xpert-Ultra positive. Compared with culture alone, Xpert-Ultra increased microbiological confirmation of TB diagnosis from 50.0% to 73.1% in EPTB, and from 87.7% to 89.5% in PTB (table 1). Combining both Xpert and culture as a composite for microbiological diagnosis yielded overall sensitivity of 84.6% and 94.7% for the diagnosis of EPTB and PTB, respectively. Overall, 28.6% of 224 screened PTB contacts from 49 PTB cases had LTBI. Stratifying by index Xpert-ultra grade (high/low/negative), the proportion of contacts with LTBI was 45.5%, 17.4% and 4.4% respectively.

Conclusions Xpert-Ultra is a highly sensitive and specific TB diagnostic that usefully informs infectiousness of PTB. Our data support using Xpert-Ultra routinely with culture, in the diagnostic assessment of clinically relevant cohorts.

S122 PET-CT IDENTIFIES EARLY INFLAMMATORY CHANGES OF METABOLICALLY ACTIVE MYCOBACTERIUM TUBERCULOSIS INFECTION IN HOUSEHOLD TB CONTACTS WITH A CLINICAL PHENOTYPE OF LATENT INFECTION: A DESCRIPTIVE CASE SERIES

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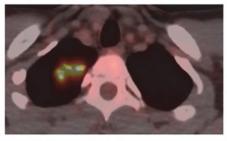
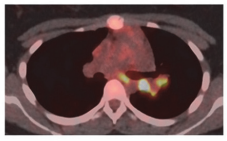
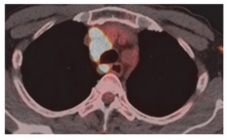
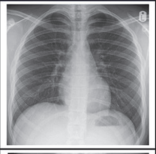
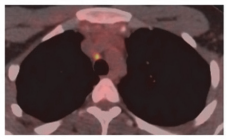
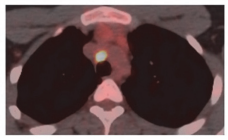
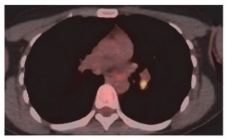
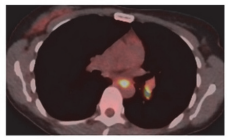
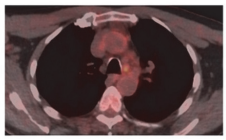
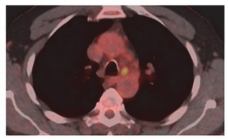
Introduction Tuberculosis infection (TBI) comprises a spectrum of infection states poorly characterised by clinical screening with chest X-ray (CXR) and interferon gamma release assays (IGRA). Here we report utility of PET-CT as a highly sensitive imaging modality to visualise the heterogeneity of TBI.

	Age	Gender	IGRA	CXR at baseline	PET-CT at baseline	TB culture
Case 1	20	M	Positive			Positive culture from bronchoalveolar lavage after 34 days
Case 2	16	F	Positive (conversion)			Positive culture from bronchoalveolar lavage after 25 days
Case 3	64	M	Positive			Positive culture from intrathoracic lymph node aspirate after 29 days
	Age	**Gender**	**IGRA**	**CXR at baseline**	**PET-CT at baseline**	**PET-CT at conversion**
Case 4	18	M	Positive (conversion)			
Case 5	37	F	Positive (conversion)			
Case 6	53	M	Positive (conversion)			

Abstract S122 Figure 1

Objectives A descriptive account of findings after serial PET-CT scans with targeted invasive sampling in six immunocompetent household pulmonary TB contacts (HHCs) with normal CXRs recruited to a larger prospective observational study.
Methods All recruited HHCs underwent routine CXR and IGRA testing (QuantiFERON-TB Gold Plus (QFT)), followed by ^{18}F-FDG PET-CT soon after index notification. Invasive sampling with bronchoalveolar lavage (BAL) and/or endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) was performed if there was significant PET-CT tracer uptake. QFT-negative participants with baseline ^{18}F-FDG-avid lesions had follow-up PET-CT and repeat QFT after 3 months.
Results Three QFT-positive patients with ^{18}F-FDG-avid abnormalities in lung parenchyma and/or intrathoracic lymph nodes that underwent bronchoscopic sampling yielded positive *Mycobacterium tuberculosis* cultures in BAL (N=2) and EBUS-TBNA (N=1). Time to positive culture ranged from 25 days to 34 days (figure 1). Linkage to index cases was confirmed in two out of three patients on whole genome sequencing. Post-treatment PET-CT showed partial or complete resolution of metabolic activity.

Three QFT negative patients that had ^{18}F-FDG-avid intrathoracic lymph nodes at baseline demonstrated QFT conversion after 3 to 6 months. Follow-up PET-CT at the time of QFT conversion showed increasing avidity at baseline sites of tracer uptake (N=2) or appearance of additional ^{18}F-FDG-avid lesions in the mediastinal lymph nodes (N=1) (figure 1).
Conclusions PET-CT identifies intrathoracic inflammation in HHCs with a clinical phenotype of latent TBI that predominates in mediastinal nodes and is evident prior to IGRA conversion. Sampling detects metabolically active, culturable TBI in a subset with PET-CT avidity that may be representative of incipient TB. These observations also support the view that *M.tuberculosis* is transmitted in a metabolically active state. PET-CT offers a tool for characterising the heterogeneity of latent TBI that has utility to support studies of biomarker development and infection pathogenesis.

S123 MYCOBACTERIUM TUBERCULOSIS (M.TB) AND BACTERIAL CO-INFECTION IN BAL SAMPLES IN A MULTI-CENTRE UK COHORT

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Background M.tb and bacterial co-infection can complicate the clinical presentation of tuberculosis (TB) and may require additional antibiotic therapy. Yet there are limited data describing M.tb with bacterial co-infection in BAL samples in immunocompetent individuals within a low TB incidence setting.
Objective To study the prevalence of bacterial co-infections and comorbidities in a UK adult population with confirmed TB (positive culture or positive TB PCR) in BAL samples.
Methods Patients who underwent a BAL (for suspected TB) were studied. Retrospective data were collected between 2018–2019 in one centre and prospective data collected in 2021–2022 across 10 UK centres. Electronic records were reviewed for demographic and clinical details.
Results 58/569 had pulmonary TB treated (48 culture positive, 9 PCR positive-culture negative and 1 PCR trace-culture negative). 8 (14%) individuals had bacterial co-infection (table 1). In the co-infected group, mean age was 44 years (IQR 31.5–52.5) and half were smokers, none were immunosuppressed (i.e DM, HIV, renal, immunosuppressive medications) nor had previous TB exposure. 6/8 co-infected individuals were migrants . Drug resistant TB was found in 1/8 of the co-infected cases. Cavities were noted in 9/58 (15.5%) confirmed TB cases of which 6/9 had bacterial co-infections (6/8 with bacterial co-infections had a cavity).

Abstract S123 Table 1 TB confirmed cases with bacterial co-infection

Case	Case (1)	Case (2)	Case (3)	Case (4)	Case (5) & (6)		Case (7)	Case (8)
Age(years)	28	31	45	57	7	3	32	48
UK born	No	No	No	Yes	No	No	No	Yes
Previous TB exposure	No	No	No	No	No	No	No	No
Risk factors	None	None	Smoker, Shingles	Smoker, Alcohol abuse, COPD	Smoker, IHD	None	Smoker	Asthma
TB PCR	+	+	-	+	+	+	-	+
AFB culture days	14	22	17	20	No	No	48	16
TB drug resistance	Pyrazinamide	No	No	No	No	No	No	No
CT cavitary findings	Yes	Yes	Yes	Yes	Yes	No (pleural effusion)	No (pleural effusion)	Yes
MCS confirmed bacteria	MRSA	Klebsiella pneumonia	Serratia marcescens	Haemophilus influenzae	Haemolytic Streptococcus (Group B) x2		Streptococcus oralis	S.pneumonia
Follow-up CT chest	Improved	Improved	Improved	Improved	Improved	Improved	No	No

In the co-infected group, time to positive AFB culture was 23 vs 20 days in the non-co-infected group.

Conclusion There was a 14% rate of TB bacterial co-infection in our cohort. 66% of confirmed TB cases with cavities had a co-infection. Those with cavitary pulmonary lesions may have a higher risk of bacterial co-infection and this may need to be taken into account at presentation.

S124 CAUSES, TIMINGS AND CLINICAL FEATURES OF TUBERCULOSIS-ASSOCIATED DEATHS IN A LOW-INCIDENCE COUNTRY

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Introduction Low-incidence countries make a small but steady contribution to global TB deaths despite wide availability of rapid diagnostics and effective treatment. Previous studies have often been limited by difficulty identifying which deaths resulted from TB directly, and which were coincident with treatment, but caused by other pathology. Here we describe the causes and timings of deaths occurring during TB treatment or following a diagnosis of TB, and clinical features including severity and complications over a 10-year period (2010–2020) across seven London hospitals.

Methods London TB register (LTBR) and UK Health Security Agency records were used to identify all deaths on TB treatment, or with newly diagnosed tuberculosis where anti-tuberculosis therapy (ATT) was not initiated, or the diagnosis was made post-mortem. Laboratory, radiological and clinical records were used to categorise deaths as a) TB-associated, where TB or ATT-complications were the main cause, or TB contributed but was not primary cause, and b) non-TB

Results From a total of 9334 people notified during this period, 313 deaths were identified (3.4%).

In 71 deaths, TB was not a significant factor. Cancer was the commonest cause (25, 35.0%), frequently haematological or lung. Other important causes were infection, cardiovascular, dementia and cirrhosis. This group had significantly higher Charleson Comorbidity Indices (CCI), and deaths occurred throughout treatment.

Tuberculosis caused 131 deaths (41.9%) and contributed to 102 deaths (32.6%). ATT-associated hepatic or renal failure caused 9 deaths (2.9%). TB-associated deaths occurred earlier in treatment than non-TB deaths: post-mortem diagnoses were more common, and more people received minimal or no treatment.

The most common complications were neurological, pulmonary (haemorrhage, embolus, pneumothorax) and abdominal perforation or obstruction. Complications of bronchoscopy or surgery caused 3 deaths.

Discussion Correctly attributing the cause of deaths, and the contribution to mortality from comorbidities and complications, is key to understanding tuberculosis mortality in low-incidence countries. More than 50% of TB-associated deaths occurred during the first month of treatment indicating the need for close monitoring of high-risk patients during this stage. Reducing the cases diagnosed peri- or post-mortem by encouraging earlier use of TB-diagnostics, or empirical treatment, may also impact mortality.

Abstract S124 Table 1 Characteristics of TB-associated and non-TB deaths

		All deaths[1]		TB-associated deaths		
	All deaths *n = 313*	Non-TB *n = 71*	TB-associated *n = 242*	TB cause *n = 131*	TB-contributed *n = 102*	ATT-associated *n = 9*
Age (mean, SD)	66.4, 16.6	66.0, 14.3	66.5, 17.2	65.8, 19.1	66.6, 15.0	75.6, 9.62
Sex (% male)	65.5	**54.9**	**68.6**	66.4	68.6	77.8
CCI (mean, SD)	5.43, 2.95	**6.59, 3.01**	**5.13, 2.87**	4.36, 2.83	6.08, 2.68	5.67, 2.18
No ATT given, n (%)	39 (12.5)	**3 (4.2)**	**36 (14.9)**	28 (21.4)	8 (7.8)	0
1 to 7 days ATT, n (%)	45 (14.4)	**3 (4.2)**	**42 (17.4)**	29 (22.1)	12 (11.8)	1 (11.1)
Diagnosis made post-mortem, n (%)	29 (9.3)	**0**	**29 (12.0)**	22 (16.8)	7 (6.9)	0
Time from symptoms to ATT start[2] (days)	58 (31, 118)	68 (26, 129)	57.5 (31.8, 117.5)	57.5 (30.3, 137.3)	55 (32.5, 104.5)	
Time from ATT start to death[2] (days)	38 (13, 100)	**95 (33, 198.5)**	**31.0 (9, 76.5)**	20 (7,43.5)	48 (21, 98)	86 (22.5, 145.4)
Time from symptoms to death[2] (days)	121 (69, 216)	**179 (116, 291)**	**101.5 (63, 203.4)**	84 (49, 176)	121.5 (80.5, 215.5)	212 (126.5, 266)
Disseminated disease, n (%)	-	-	-	28 (21.4)	14 (13.7)	2 (22.2)
Extensive pulmonary disease, n (%)	-	-	-	33 (25.2)	23 (22.5)	0
TB complication, n (%)	-	-	-	31 (23.7)	18 (17.6)	0
Hepatic or renal failure from ATT	-	-	-	3	2	9

[1]p-values <.05 in bold [2]median, interquartile range

S125 ISONIAZID RESISTANT TUBERCULOSIS(HR-TB): A PROBLEM WELL STATED IS A PROBLEM HALF SOLVED!

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10.1136/thorax-2023-BTSabstracts.131

Background Isoniazid (INH) is an important first line drug in the management of active and latent TB. Its widespread use and lack of diagnostic testing has resulted in an increase in the prevalence of Hr-TB, either alone or in combination with other drugs. katG and inhA mutations confer high and low level INH resistance respectively.

Methods Patients with Hr-TB were enrolled in a prospective observational cohort at a public tertiary care hospital in India.

Demographic characteristics, clinico-microbiological profile and treatment outcomes were noted (table 1). Samples were analyzed using line probe assays (LPA). Treatment and defined outcomes were as per national program guidelines.

Results 442 patients were included. It was a young cohort with male predominance (n=287,64.9%). 89 (20.1%) subjects had presumptive TB whereas 23 (5.2%) were previously treated for TB. 1.4% of subjects had HIV coinfection and 10.2% were diabetic. Sputum samples were most commonly tested (n=309,69.9%) followed by lymph nodes (n=107,29.2%). (n=63,14.3%) subjects had a negative AFB smear despite a positive LPA. (n=207,69%) patients had katG mutation whereas (n=88, 29.3%) had inhA mutation on I line LPA.

43 (9.7%) patients had additional drug resistance on II line LPA (8.1% with fluoroquinolones(FQ), 0.9% with second line injectables(SLI) and 0.7% with both FQ & SLI). (n=306,69.3%) were declared cured and (n=32 7.3%) died. Outcomes were significantly worse in males (p=0.04) and with additional drug resistance (p=0.03). Age, mutation type, comorbidities did not affect treatment outcomes.

Conclusion Hr-TB is frequently underdiagnosed and mismanaged leading to acquired drug resistance. LPA and universal DST should form an integral part of the TB program.

Abstract S125 Table 1 Demographics, clinico-microbiological profile & treatment outcomes of 442 enrolled Hr-TB patients

			Frequency (N)	Percentage (%)
DEMOGRAPHICS	AGE	<18 years	33	7.5
		18–35 years	**203**	**45.9**
		36–50	95	21.5
		51–65	93	21
		>65	18	4.1
	GENDER	Male	**287**	**64.9**
		Female	155	35.1
	COMORBIDITIES	Diabetes	45	10.2
		HIV	6	1.4
RELEVANT TB HISTORY	PRESUMPTIVE TB		89	20.1
	CONTACT WITH TB PATIENT		42	9.5
	NEW CASE		419	94.8
	PREVIOUSLY TREATED		23	5.2
SAMPLES	PULMONARY	Sputum	**309**	**69.9**
		BAL	20	4.5
	EXTRA-PULMONARY	Lymph node	107	24.2
		Body fluid	3	0.7
		Pus	4	0.9
MICROBIOLOGY	AFB SMEAR RESULTS	Scanty	98	22.2
		1+	**177**	**40**
		2+	75	17
		3+	29	6.6
		Negative	63	14.3
	1st LINE LPA (INH RESISTANCE PATTERN)	High level	**207**	**69**
		Low level	88	29.3
		Both high & low level	5	1.7
	2nd LINE LPA (FQ/SLI RESISTANCE)	Indeterminate	4	0.9
		Invalid	33	7.5
		RR	3	0.7
		RS	36	8.1
		SR	4	0.9
		SS	362	81.9
OUTCOME		Cured	**306**	**69.3**
		Treatment complete	80	18.1
		Regimen change	3	0.7
		Lost to follow up	13	2.9
		Failure	6	1.4
		Died	32	7.3

'Ebony and ivory' – Where real world and lab data meet

S126 SURVEILLANCE OF PNEUMOCOCCAL SEROTYPES IN ADULTS HOSPITALISED WITH ACUTE LOWER RESPIRATORY TRACT INFECTION FOLLOWING THE COVID-19 PANDEMIC IN BRISTOL, UK

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10.1136/thorax-2023-BTSabstracts.132

Background While pneumococcus remains one of the main bacterial causes of adult lower respiratory tract infections (LRTI), there is a paucity of data on the relative contribution of serotypes included in pneumococcal vaccines to community-acquired pneumonia (CAP) and non-pneumonic (NP) LRTI. We determined the burden of vaccine-serotypes to CAP and NP-LRTI following SARS-CoV-2 emergence to inform evidence-based vaccination policy.

Methods We conducted a prospective cohort study at both acute care Bristol hospitals (UK) including all adults hospitalised with acute lower respiratory tract disease (aLRTD) from 08/11/2021–07/11/2022. Patients were identified with: a) radiographically-confirmed CAP (CAP+/RAD+), b) clinically-diagnosed CAP without radiological confirmation (CAP+/RAD-), or c) NP-LRTI. Among participants, pneumococcus was identified by blood culture, BinaxNOW and a serotype-specific urine antigen detection assay (SSUAD). Serotypes were identified from cultured isolates and SSUAD.

Results Of 12,083 aLRTD admissions, 2,445 consented and provided urine: 1,097 CAP+RAD+; 207 CAP+RAD-, 1,141 NP-LRTI. The median age was 71.1y (IQR57.9–80.2), the median Charlson comorbidity index=4 (IQR2–5), 2.7% patients required intensive care, and 4.4% died within 30-days of hospitalisation. Pneumococcus was detected in 280/2445 (11.5%) participants, including 12.1% at-risk (n=182/1501) and high-risk (n=82/678) individuals. We identified pneumococcus in 165/1097 (15.0%) CAP+RAD+, 23/207 (11.1%) CAP+RAD-, and 92/1141 (8.1%) NP-LRTI cases. Among adults ≥65y and 18–64y, 12.9% (198/1534) and 9.0% (82/911), respectively, tested pneumococcus positive. Of the 280 pneumococcal cases, 102 (36.4%) were due to serotypes

Abstract S126 Table 1 Logistic regression for the association between covariates and a clinical diagnosis of ACS. Column 1: Unadjusted univariate model. Column 2: Adjusted for shared cardiac risk factors. Column 3: Adjusted for LRTI severity and cardiac comorbidities

		Unadjusted		Adjusted model 1		Adjusted model 2	
Characteristic	**Group**	**OR**	**P-value**	**OR**	**P-value**	**OR**	**P-value**
COPD LRTI Status	LRTI without COPD	ref	0.032	ref	0.237	—	—
	COPD Exacerbation	1.22 [1.02–1.45]		1.13 [0.92–1.37]		—	
aLTRD presentation	NP-LRTI	ref	<0.001	—	—	ref	<0.001
	Pneumonia	1.59 [1.33–1.89]		—		1.38 [1.15–1.64]	
Age Adjusted CURB	0–1 (Mild)	ref	<0.001	—	—	ref	0.026
Category	2 (Moderate)	1.71 [1.27–2.30]		—		1.41 [1.04–1.91]	
	3–5 (Severe)	2.94 [1.30–6.65]		—		2.16 [0.95–4.93]	
Age In Decades		1.22 [1.16–1.28]	<0.001	1.20 [1.13–1.26]	<0.001	1.16 [1.10–1.22]	<0.001
Gender	Male	ref	0.415	—	—	—	—
	Female	0.93 [0.80–1.10]		—		—	
CCI Category Ex COPD	none (0)	ref	<0.001	—	—	—	—
	mild (1–2)	2.35 [1.54–3.59]		—		—	
	moderate (3–4)	2.92 [1.98–4.32]		—		—	
	severe (5+)	4.20 [2.87–6.14]		—		—	
IMD (decile)		1.00 [0.97–1.03]	0.919	0.98 [0.95–1.01]	0.181	—	—
Smoker	Non-smoker	ref	0.011	ref	0.173	—	—
	Current	0.91 [0.68–1.21]		0.98 [0.71–1.34]		—	
	Ex-smoker	1.19 [0.99–1.43]		1.01 [0.82–1.23]		—	
	Unknown	1.48 [1.12–1.95]		1.36 [1.02–1.80]		—	
Hypertension	yes	1.36 [1.09–1.69]	0.008	1.00 [0.80–1.26]	0.986	—	—
AF	yes	1.07 [0.86–1.33]	0.541	—	—	—	—
CVA/TIA	yes	1.18 [0.92–1.53]	0.202	—	—	—	—
IHD	yes	1.98 [1.62–2.43]	<0.001	1.67 [1.35–2.06]	<0.001	1.68 [1.37–2.07]	<0.001
CCF	yes	1.44 [1.15–1.79]	0.002	1.05 [0.83–1.33]	0.672	1.11 [0.88–1.40]	0.383
Diabetes Type	None	ref	0.296	ref	0.854	—	—
	Type 1	1.13 [0.55–2.33]		1.22 [0.59–2.54]		—	
	Type 2	1.18 [0.96–1.44]		1.03 [0.83–1.26]		—	
Periph Vasc Dx	yes	1.33 [0.88–2.02]	0.195	—	—	—	—
CKD	None	ref	0.243	—	—	—	—
	Mild (CKD 1–3)	1.18 [0.97–1.44]		—		—	
	Moderate or Severe CKD (CKD 4 +)	0.99 [0.63–1.54]		—		—	
CRP Level	Unknown	0.67 [0.24–1.84]	0.062	—	—	—	—
	<10	ref		—		—	
	10–50	1.24 [0.98–1.57]		—		—	
	>50	1.30 [1.04–1.62]		—		—	
White Cell Count Level	Unknown	0.26 [0.04–1.90]	<0.001	—	—	0.31 [0.04–2.29]	0.001
	≤10	ref		—		ref	
	>10	1.41 [1.19–1.67]		—		1.32 [1.11–1.57]	

included in PCV13+6C, 115 (41.7%) in PCV15+6C, and 210 (75.0%) in PCV20+6C/15C and 228 (81.4%) in PPV23 +15C. The most frequently identified serotypes were 8 (n=78; 27.9% of all pneumococcus), 3 (n=24; 8.6%) and 7F (n=25; 8.9%).

Conclusions These first estimates of pneumococcal infection in adults hospitalised with CAP+/RAD- and NP-LRTI indicate that pneumococcus is an important pathogen across all respiratory infection subgroups. Despite 17-years of paediatric PCV use and 20-years of PPV23 use in adults aged ≥65y, vaccine-serotype pneumococcal disease still causes a significant proportion of LRTI adult hospitalizations. To account accurately for the potential impact of adult pneumococcal vaccination, however, not only serotype coverage, but also expected vaccine effectiveness against non-bacteraemic CAP, duration of protection, and expected cross-protection against vaccine-related serotypes should be considered.

S127 IS STREPTOCOCCUS PNEUMONIAE SEROTYPE 3 (SPN3) A NEWLY FOUND CAUSE OF PHARYNGITIS?

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10.1136/thorax-2023-BTSabstracts.133

Introduction Streptococcus pneumoniae (SPN) frequently colonises the nasopharynx. Colonisation is considered an asymptomatic event and a prerequisite for disease.[1] SPN upper airway infection has not been associated previously with pharyngitis, and colonisation with SPN6B, SPN15B, and SPN23F was not

Abstract S127 Table 1 Total number of participants, frequency of AESIs and RRs associated with colonisation per study group, and between SPN3 and SPN6B colonised participants

		Sample size	AESI frequency	AESIs that include sore throat frequency	Day of onset of symptoms post EHPC (median, IQR)	AESI RR (95% CI, p-value) *	AESIs that include sore throat RR (95%CI, p-value) *	AESIs that do not include sore throat RR (95%CI, p-value) *
Study part A (n=373)	SPN3 colonised	212	62%	52%	2 (1–2)	1.66 (1.33–2.1, <0.0001)	1.94 (1.47–2.6, <0.0001)	0.94 (0.52–1.71, 0.86)
	Non-colonised	161	37%	26%	2 (1–4)			
Study part B (n=245)	SPN6B colonised	75	29%	20%	1 (1–3)	1.72 (1.06–2.76, 0.04)	1.62 (0.88–2.91, 0.12)	1.98(0.77–5.06, 0.25)
	Non-colonised	170	17%	12%	2 (1–4)			
					SPN3 colonised v. SPN6B colonised			
AESIs combined: RR associated with SPN3 colonisation v. SPN6B colonisation (95%CI, p-value) *							2.11 (1.50–3.09, <0.0001)	
AESIs that include sore throat symptoms: RR associated with SPN3 colonisation v. SPN6B colonisation (95%CI, p-value) *							2.59 (1.67–4.21, <0.0001)	
AESIs that do not include sore throat symptoms: RR associated with SPN3 colonisation v. SPN6B colonisation (95%CI, p-value) *							1.06 (0.42–2.05, >0.99)	

*Fisher's exact test, crude RR

associated with symptoms when evaluated in an experimental human pneumococcal challenge (EHPC) model.[2]

Methods An EHPC model was established to evaluate the efficacy of the 13-valent pneumococcal conjugate vaccine against SPN3 colonisation (part A) and longer-term efficacy against SPN6B (part B). Illnesses following EHPC that included any of the symptoms below were defined as adverse events of special interest (AESIs). Symptoms were sore throat, headache, earache, fever, and respiratory symptoms. We compared the prevalence of AESIs -with a dedicated analysis of those including sore throat symptoms- in the SPN3 colonised v. non-colonised, SPN6B v. non-colonised, and SPN3 colonised v. SPN6B colonised. We excluded participants who developed symptoms more than 7 days post-EHPC or post-antibiotic treatment.

Results Participants' median age was 22 years (18–50, IQR 20–26), and 63% were female. Of 373 participants exposed to SPN3, 183 developed symptoms within 7 days, with 191 symptomatic episodes and sore throat the most common symptom present. Table 1 shows the number of AESIs per study group and relative risks (RR) associated with SPN3 and SPN6B colonisation.

Conclusion In most cases, SPN3 colonisation appears to be a symptomatic event involving the oropharynx. SPN6B also was associated with an increased RR of symptoms, but the absolute risk was substantially lower than for SPN3. There are certain limitations. Probing for symptoms may have led to increased reporting in all groups, and the study's purpose may have affected the symptomatology. Furthermore, this is an exploratory analysis that cannot prove causality. This newly found association deserves further research to explore implications and the possibility that colonisation with other serotypes may also increase the risk of symptomatic disease.

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Please refer to page A288 for declarations of interest related to this abstract.

S128 PREVALENCE OF RSV AMONG ACUTE LOWER RESPIRATORY TRACT DISEASE (ALRTD) HOSPITALIZATIONS AND PROJECTED SEASONAL RSV-RELATED ALRTD HOSPITALIZATION INCIDENCE AMONG ADULTS IN BRISTOL UK – 2022–2023

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10.1136/thorax-2023-BTSabstracts.134

Introduction Respiratory Syncytial Virus (RSV) infection is increasingly recognized as a significant cause of adult morbidity and mortality. However, virological testing has been infrequent among adults hospitalized with acute lower respiratory tract disease (aLRTD): consequently, the only RSV-related hospitalization incidence estimates available are pre-pandemic time-series modelling studies.

Methods Adults (aged ≥18y) hospitalised in Bristol, UK, were screened for aLRTD and included in a prospective cohort study that systematically records demographics, presenting clinical diagnoses, and standard-of-care virological testing results (primarily combined nasopharyngeal/oropharyngeal swab). We analysed admissions from 01August2022–31March2023 to determine counts of: total aLRTD admissions, patients tested for RSV, and RSV positive cases. We stratified results by patient age and aLRTD subgroups (pneumonia, non-pneumonic lower respiratory tract infection (NP-LRTI), heart failure (HF) and chronic respiratory disease exacerbation (CRDE)). We projected age-stratified seasonal RSV-related aLRTD hospitalisation incidence by applying prevalence in the tested population to total cases and then adjusted for under detection due to single specimen testing (i.e., nasopharyngeal/oropharyngeal swab) versus multiple specimens (i.e., saliva and swab).

Results Among 6893 adult aLRTD admissions identified, 3815 (55.35%) had molecular testing for RSV with little variability by diagnosis: ranging 49.87% (HF) to 60.58% (pneumonia) (table 1). Among tested patients, 229/3815 (6.0%) aLRTD admissions had a positive RSV test: pneumonia (5.4%), NP-LRTI (8.0%), HF (6.1%) and CRDE (6.7%). RSV infection

Abstract S128 Table 1 Standard-of-care RSV testing frequency, results, and projected population-based incidence among acute lower respiratory tract disease hospitalizations in Bristol United Kingdom during Aug 2022-March 2023, overall and by diagnosis and age group

aLRTD subgroups: Final Clinical Diagnosis based on Medical Record Review																	
	Pneumonia			Non-Pneumonic LRTI			Heart Failure Exacerbation			Chronic Respiratory Disease Exacerbation			All aLRTD*				
Age Group	N, Hospital Admissions	%, RSV tested	%, RSV+	N, Hospital Admissions	%, RSV tested	%, RSV+	N, Hospital Admissions	%, RSV tested	%, RSV+	N, Hospital Admissions	%, RSV tested	%, RSV+	N, Hospital Admissions	%, RSV tested	%, RSV+	Projected seasonal incidence per 100,000 if all cases tested**	Projected seasonal incidence if all cases tested with NP/OP swab and saliva**
All adults	3011	60.6%	5.4%	2982	54.1%	8.0%	1189	49.9%	6.1%	3387	58.6%	6.7%	6893	55.3%	6.0%	58	84
18–34	136	69.1%	3.2%	275	47.6%	3.8%	5	40.0%	50.0%	202	52.5%	3.8%	463	53.1%	3.3%	7	9
35–49	240	64.2%	3.2%	298	57.7%	8.7%	36	69.4%	4.0%	311	62.7%	5.1%	620	59.7%	5.4%	18	26
50–64	482	64.7%	5.1%	511	57.5%	7.8%	132	52.3%	13.0%	657	60.7%	5.5%	1160	58.4%	5.9%	45	65
65–74	603	66.0%	4.5%	589	58.7%	7.2%	236	55.5%	2.3%	825	62.1%	6.4%	1402	59.6%	5.1%	97	140
75–84	824	59.0%	7.2%	700	53.9%	9.8%	360	50.8%	6.0%	893	57.3%	8.8%	1755	54.7%	7.6%	290	418
≥85	726	52.2%	5.5%	609	48.1%	8.2%	420	43.6%	6.0%	499	52.1%	6.9%	1493	48.5%	6.2%	483	695
≥65	2153	58.7%	5.9%	1898	53.5%	8.5%	1016	48.9%	5.0%	2217	57.9%	7.5%	4650	54.2%	6.4%	213	307
≥75	1550	55.8%	6.5%	1309	51.2%	9.1%	780	46.9%	6.0%	1392	55.5%	8.2%	3248	51.8%	7.0%	349	503

***44% increase in detection when adding saliva to NP/OP swab based on analysis from this study presented at ReSViNET 2023, Lisbon Portugal (Adding Saliva Specimens Increases RT-PCR Detection of Respiratory Syncytial Virus Among Hospitalized Adults Over Nasopharyngeal/Nasal Swabs Alone).

peaked between Nov-Jan, with a maximum of 12.21% of weekly aLRTD admissions attributed to RSV. Projected seasonal RSV-related total aLRTD hospitalization incidence was highest among older adults: 349/100,000 (≥75 years) before adjustment and 503/100,000 after adjustment for diagnostic testing-based under-ascertainment.

Conclusions Seasonal RSV-related hospitalization incidence in older adults is approximately two times higher than previous annual time-series based estimates and comparable with other prospective studies in high-income countries. RSV disease burden is high among older adults and emphasizes the potential value of RSV vaccination.

Please refer to page A288 for declarations of interest related to this abstract.

S129 AN IMPACT OF AGE ON RESPIRATORY SYNCYTIAL VIRUS INFECTION IN AIR-LIQUID-INTERFACE CULTURE BRONCHIAL EPITHELIUM

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Background Elderly people are known to be vulnerable to virus infection. However, this has not been appropriately tested in *in vitro* studies due to a lack of appropriate virus infection models. The aim of this study was to investigate the impact of age on respiratory syncytial virus (RSV) in pseudostratified air-liquid-interface (ALI) culture bronchial epithelium, which more closely mimic human airway epithelium morphologically and physiologically, than submerged cancer cell line cultures.

Methods RSV A2 was inoculated apically to the bronchial epithelium, and time-profiles of viral load and inflammatory cytokines were analysed in donors with different ages and genders (8 donors).

Results RSV A2 replicated well in ALI-culture bronchial epithelium. The viral peak day and peak viral load were similar between donors at <60 years old (n=4) and >65 years old (n=4) (elderly group), but virus clearance was impaired in the elder group. Furthermore, area under the curve (AUC) analysis, calculated from viral load peak to the end of sample collection (Day 3 to 10 post inoculation), revealed statistically higher live viral load (PFU assay) and viral genome copies (PCR assay) in the elderly group, and a positive correlation between viral load and age was observed. In addition, the AUCs of RANTES and dsDNA (cell damage marker) were statistically higher in the elderly group, also the elderly group showed a trend of higher AUC of CXCL8, CXCL10 and mucin production. The gene expression of p21 (cellular senescence marker) at baseline was also higher in the elderly group, and there was a good positive correlation between basal p21 expression and viral load or RANTES (AUC).

Conclusion Age would be a key factor affecting viral kinetics and biomarkers post virus infection in an ALI-culture model.

Please refer to page A288 for declarations of interest related to this abstract.

S130 THE INCIDENCE AND IMPACT OF VIRAL RESPIRATORY INFECTION IN HOSPITALISED ADULTS IN WINTER 2022–2023: A SINGLE CENTRE RETROSPECTIVE STUDY

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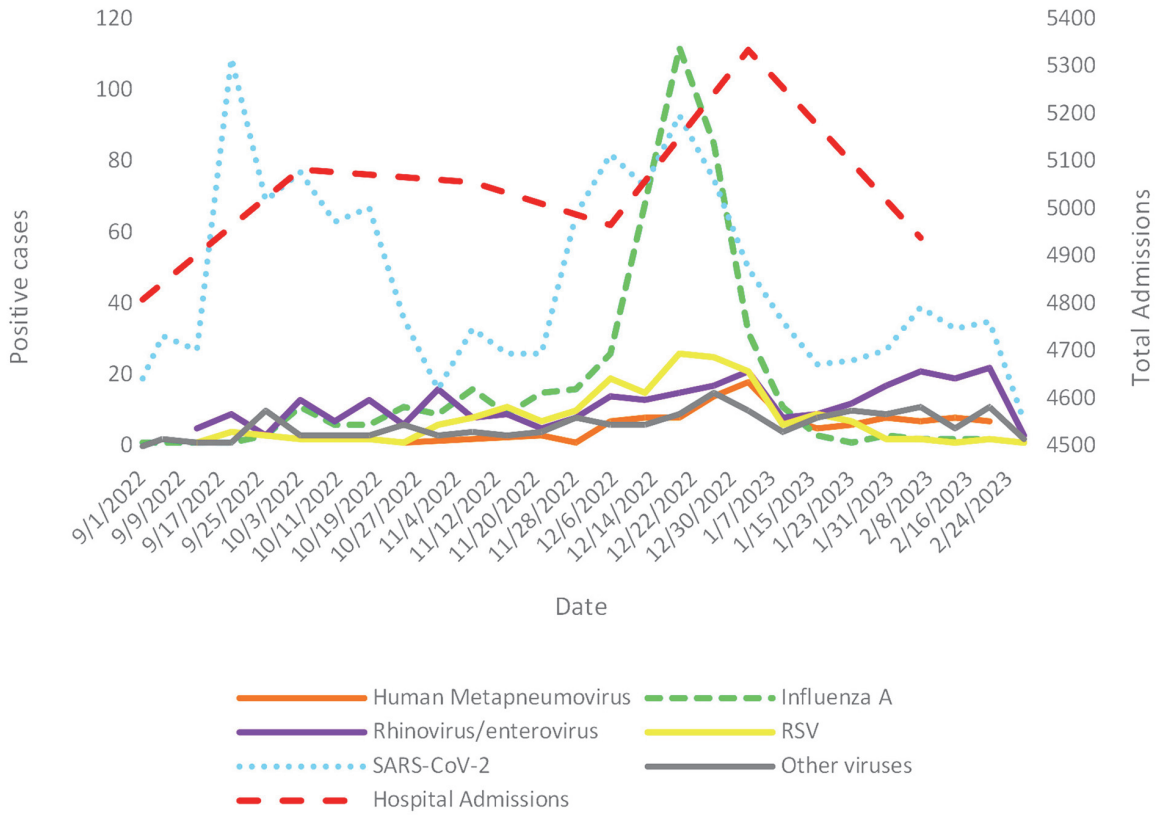
Background Respiratory viruses are the major cause of respiratory tract infections and often present with peaks in cases, which can be linked with higher numbers of inpatient admissions. In the winter of 2022, hospitals were under significant pressure with high rates of both admissions and staff sickness, and perceived increase in number of patients presenting with respiratory viruses. We describe the incidence of respiratory viruses across our hospital inpatients in this study.

Methods All positive respiratory virus swab results for one hospital's inpatient adults (>18yo) across all virological platforms were collected for a six-month period between 1stSeptember 2022 and 28th February 2023. Having removed any duplicate results, we analysed all positive cases, mapping their incidence as well as the incidence of the individual viruses, then comparing these to emergency medical admissions over the same period.

Results There were 2453 positive cases during the six-month study period, with two clear peaks. The first peak occurred in September 2022, and a longer and higher peak between 24thNovember 2022 and 4th January 2023. The first peak was mainly driven by SARS-CoV-2, and the second by a combination of SARS-CoV-2 and Influenza A. During the second peak, there was a corresponding peak of dual infections, driven by 7 dual SARS-CoV-2/Influenza A infections and 7 SARS-CoV-2/Human Metapneumovirus infections. Dual



Abstract S130 Figure 1 Line graph of viral swab positive cases, with total medical emergency admissions superimposed

infections made up 4% of infections in this peak. The months with the highest number of medical admissions did not entirely correlate with the peaks of the positive viral results, with the greatest number of admissions in January.

Discussion Respiratory viruses are a significant burden on hospitals every year. During the winter of 2022–2023, North Bristol Trust had two peaks, driven by SARS-CoV-2, and then Influenza A combined with SARS-CoV-2. The rise in hospital admissions did not completely follow this, which may represent admissions with post-viral illnesses, but more data would need to be collected to investigate this. This data should help hospitals plan for future peaks in respiratory viral infections, highlighting the importance of strong infection control measures, and preparation for the seasonality of viral infections impacting hospital admissions each year.

S131 TOO BIG TO FAIL: HOW DO LUNG PROGENITORS REPAIR THE LUNG AFTER INFLUENZA VIRUS INFECTION?

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Despite anti-viral drugs and vaccines, influenza viruses are still poorly controlled and pose a threat to those who suffer chronic diseases such as COPD and asthma. The most dangerous influenza symptoms are caused by damage to the lung tissue, and repairing this damage is essential for survival. Lung repair is driven by activation of epithelial progenitor cells, but their exact role is not well understood. We infected mice with influenza virus and studied the behaviour of epithelial progenitors and consequent effects on the cellular composition of the recovering lung. We found that the epithelial composition of the lung is changed during the peak and recovery phases of influenza. There is a loss of ciliated and alveolar cells at day 6 post infection, but by day 10 these populations are restored. This recovery correlates with increased activation and proliferation of progenitor cells. Using differential expression and pathway analysis, we found lung basal cells activation and proliferation is fuelled by a switch from lipid metabolism to high energy yield oxidative phosphorylation. Our findings confirm that lung epithelial precursor activation occurs during recovery from influenza, and the reshaping of the lung after infection is fuelled by a change in progenitor metabolism. We suggest a careful balance is struck by lung progenitors after infection: they assist in clearing the infection in the short term, while also preparing to recover the damaged epithelium in the long term.

‘Every breath you take’ – New findings from the physiology lab

S132 ‘RACE-NEUTRAL’ AND ‘GLOBAL’? IMPACT OF REFERENCE STANDARDS ON INTERPRETATION OF SPIROMETRY AMONG SOCIO-ECONOMICALLY DEPRIVED, SOUTHERN AFRICAN ADOLESCENTS AND ADULTS

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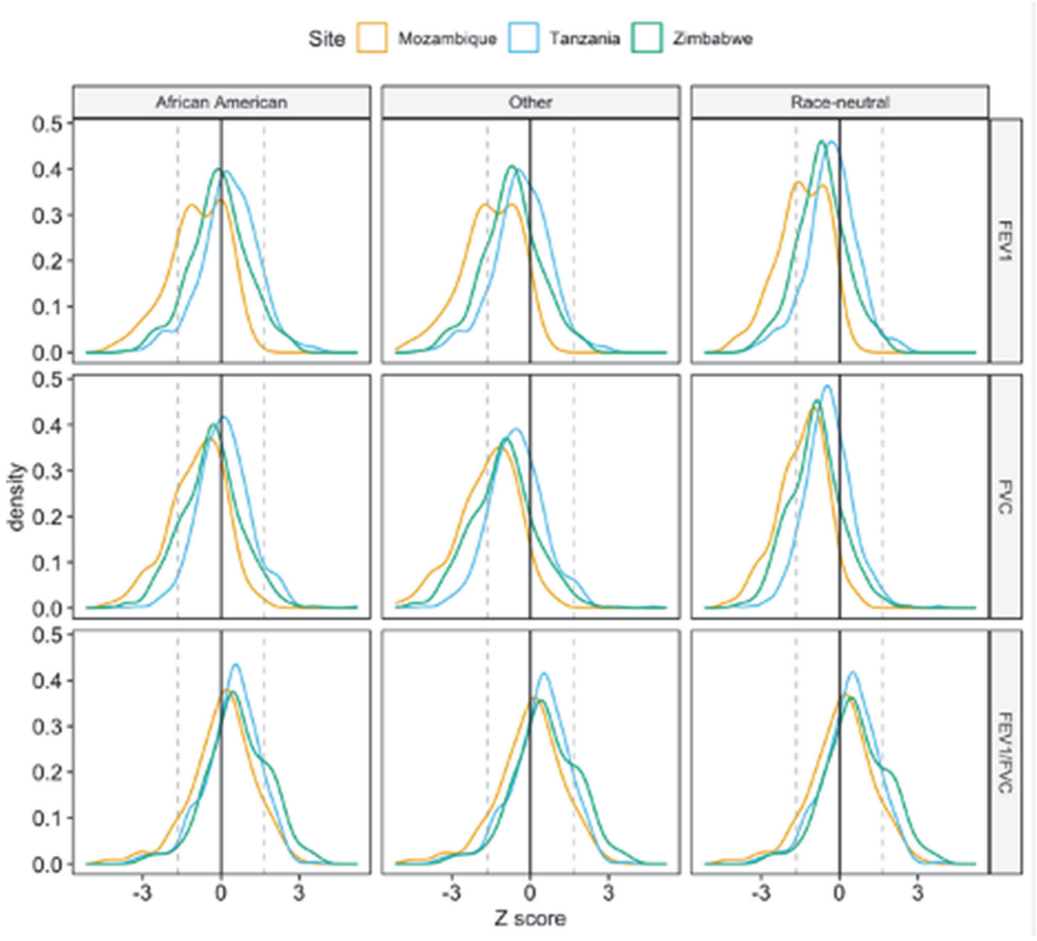
Background There has been recent interest in the impact of race-specific Global Lung Initiative (GLI) reference standards for underdiagnosis of chronic respiratory diseases among people of non-white ethnicities, and a ‘race-neutral’ GLI equation has been proposed, however data from southern Africa were not included in its development. As part of a TB household contact screening study, we performed spirometry on household contacts (age ≥10 years) of people with pulmonary TB in three southern African countries (Mozambique, Tanzania, and Zimbabwe). We sought to describe the prevalence of lung impairment among a healthy, socio-economically deprived African population, and examine the fit of different reference standards for lung function.

Methods Pre- and post- bronchodilation spirometry was performed; participants who were smokers or had a history of previous TB or respiratory disease were excluded. Forced expiratory volume in one second (FEV1), forced vital capacity (FVC), and FEV1/FVC z-scores were calculated using different Global Lung Initiative (GLI) reference equations. Prevalence of obstructive and restrictive impairments were calculated according to American Thoracic Society/European Respiratory Society guidelines and associations between GLI Z scores and age, sex and anthropometric indices examined, across different reference standards.

Results Between April 2021 and March 2023, 1009 HHCs underwent spirometry with 147 in Mozambique, 440 in Tanzania, and 422 in Zimbabwe. Median age of participants was 26 years (IQR 16–40 years), 40% were men, and 15% were living with HIV. Figure 1 shows the distribution of post-bronchodilator z-scores by site and GLI reference standards. The ‘African American’ reference standard fit the data best. Using this standard, 13% participants had impaired post-bronchodilator spirometry (9% restrictive, 3% obstructive pattern, 0.6% mixed).

Conclusion Lung function interpretation, in particular restrictive patterns of spirometry, are sensitive to the reference standard used. Among a healthy, socio-economically deprived



Abstract S132 Figure 1 Density plots show distribution of lung volumes Z-scores across the 3 sites, using 3 different reference standards

southern African population, the GLI 'race neutral' equation did not provide best fit to the data. This may reflect both genetic and social determinants of lung health. There is an urgent need to not only ensure that global standards for lung function interpretation perform well across different ethnic groups, but that they are validated in globally representative data.

Please refer to page A288 for declarations of interest related to this abstract.

S133 QUALITY OF PRIMARY CARE SPIROMETRY ACCORDING TO ATS/ERS 2019 STANDARDS AND INTER-EXPERT AGREEMENT ON THEIR APPLICATION

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10.1136/thorax-2023-BTSabstracts.139

Introduction The American Thoracic Society and European Respiratory Society (ATS/ERS) updated their spirometry technical standards in 2019 with the intention of increasing the accuracy, precision and quality of spirometry. We assessed the technical quality of primary care spirometry according to ATS/ERS 2019 standards and evaluated inter-expert agreement on application of these standards.

Methods Two hundred consecutive spirometry sessions performed by non-physiologist respiratory practitioners using a ndd EasyOne Plus spirometer in primary care -based clinics in Hillingdon Borough (Northwest London), were independently assessed by three expert respiratory physiologists. Each physiologist was part of the Association for Respiratory Technology and Physiology (ARTP) leadership, and each had >10 years of experience leading a lung function department. For each curve, FEV1 and FVC were assessed for acceptability and usability, and then the FEV1 and FVC grades for the overall spirometry session were determined according to the ATS/ERS 2019 standards (A,B,C,D,E,F,U). For this analysis, we classified sessions with grades A or B (at least two acceptable traces within 0.150L) as 'good' quality, and grades C,D,E,F,U as 'suboptimal'.

Results According to ATS/ERS 2019 standards, an average of 54% and 29% of sessions were classified as 'good' quality for FEV1 and FVC respectively, with only 28% of sessions achieving 'good' quality for both FEV1 and FVC. There was moderate agreement between experts on the determination of FEV1 classification (kappa 0.57 [95%CI: 0.48–0.66], 79% agreement), and FVC (kappa 0.52 [95%CI: 0.42–0.62], 81% agreement). For FEV1, full consensus (agreement from all 3 experts) was achieved in 136 (68%) sessions (73 'good'; 63 'suboptimal' quality). For FVC, full consensus was achieved in 142 (71%) sessions (30 'good' and 112 'suboptimal' quality).

Conclusions The technical quality of primary care spirometry is largely suboptimal. Furthermore, amongst expert respiratory physiologists, there is only moderate agreement on FEV1 and FVC quality grading using the ATS/ERS 2019 standards. This suggest subjectivity in how experts apply the standards which is likely to be amplified when applied by less expert primary care practitioners. Tools and strategies are needed to support better quality spirometry and standardise spirometry quality assessment, particularly in primary care where most spirometry is conducted.

Please refer to page A288 for declarations of interest related to this abstract.

S134 EUPNOOS: ADVANCING EARLY DIAGNOSIS OF RESPIRATORY DISEASES WITH SMARTPHONE-BASED AUDIO PHENOTYPING

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10.1136/thorax-2023-BTSabstracts.140

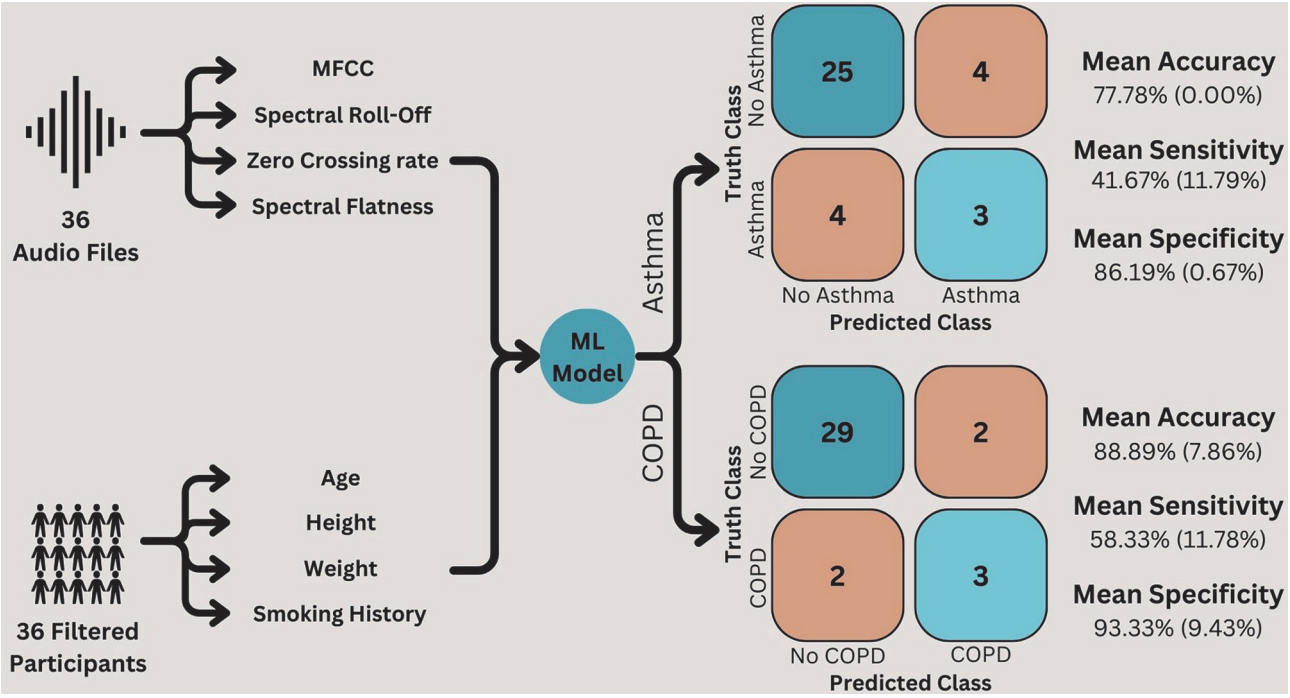
Background Early detection of airway disease is an important public health priority with an urgent need for simple diagnostic tools that are easier to deploy than spirometry. Eupnoos has developed an audio phenotyping platform that is capable of detecting spectral patterns in audio data recorded using the MEMS microphone on a smartphone. The algorithms identify and quantify distinct spectral features within human breath sounds potentially facilitating early diagnosis.

Methods We performed a small-scale research study in conjunction with the University of Southampton (ERGOII 70867) and Care Ashore, with a view to testing the diagnostic accuracy of the Eupnoos technology platform.

The collected dataset consisted of 43 participants who performed three forced expiratory manoeuvres into the MEMS sensor of a mobile phone. The audio files were filtered down to 36 usable files, with one file per participant; for six participants the audio files were unusable and left out during the processing.

The collected data was processed to extract several acoustic spectral features. These features (n=22) were used as inputs into a gradient-boosting classification model with a binary output. Model accuracy was assessed by applying a repeated K-fold cross-validation.

Results The audio phenotyping platform can demonstrate excellent specificity but limited sensitivity in the classification of both asthma and COPD (figure 1). The mean AUC score (SD) is 0.64 (0.056) for asthma and 0.786 (0.169) for COPD. Algorithm development and model accuracy were limited by the small number of disease cases, necessitating further development of the spectral algorithm in incident asthma and COPD populations.



Abstract S134 Figure 1

Conclusion The results demonstrate promising accuracy in using audio phenotyping for diagnosing asthma and COPD. This work serves as an early proof of concept, highlighting the potential of utilising breath sound to phenotype respiratory diseases.

Please refer to page A288 for declarations of interest related to this abstract.

S135 LUNG FUNCTION OUTCOMES IN MILITARY PERSONNEL WHO SUSTAINED COMBAT-RELATED TRAUMATIC INJURY; THE ADVANCE STUDY

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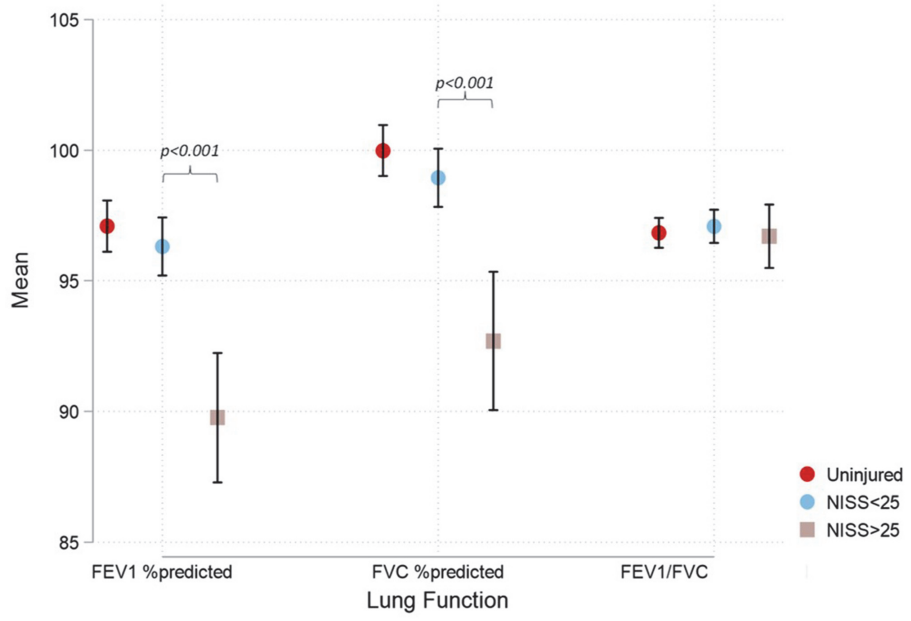
10.1136/thorax-2023-BTSabstracts.141



Abstract S135 Figure 1 Association between CRTI, severity of CRTI and lung function as measured by % predicted Forced Expiratory Volume in one second (FEV1),% predicted Forced Vital Capacity (FVC), and the ratio between FEV1 and FVC (FEV1/FVC). Spirometry was performed without a bronchodilator. Uninjured n=478; injured n=479. Values are the mean ±standard deviation

Introduction During combat operations service personnel who sustain combat related traumatic injury (CRTI) are at risk of both direct and indirect injuries to the lungs, including blast lung injury. In this study we aim to investigate the relationship between lung function and CRTI in servicemen deployed to Afghanistan. We hypothesise that eight years post deployment, those who were injured will have a lower percent (%) predicted forced expiratory volume at 1 second (FEV1) than those who were uninjured.

Methods In the ADVANCE cohort, 579 UK servicemen injured while deployed in Afghanistan (2003–2014) were frequency matched by age, rank, role, regiment, service, and deployment period to 565 uninjured servicemen. Lung function was measured by spirometry. Primary outcome was% predicted FEV1 with forced vital capacity (FVC) and FEV1/FVC as secondary outcomes. The New Injury Severity Score (NISS 2008) was used to stratify injury severity; mild-moderate severity (NISS≤25) and severe injury (NISS>25). Multivariable linear regression was used to adjust for age and rank.

Results Spirometry data were available for 963 participants (84%) (n=479 injured and n= uninjured); 76% of injuries were blast related. Mean age at assessment was 34.6 years (standard deviation (SD) 5.24) at a median of 8 years post deployment.

The% predicted FEV1 was 94.8% (SD 11.8) in the injured group which was significantly lower than the uninjured group (97.1% (SD 11.0), p=0.002). Mean% predicted FEV1 in those with severe injuries was significantly lower in those with severe injuries compared with those with milder injuries: 90.8% (SD 12.9%) vs 96.6% (SD 10.8); p<0.001). Similar results were seen for FVC but there were no significant differences in FEV1/FVC [figure 1]. When adjusted for age and rank at time of injury/deployment, CRTI was still associated with a significant decrease in% predicated FEV1 of 2.2% (95% CI -3.7%, -0.8%).

Conclusion In servicemen deployed to Afghanistan, CRTI was associated with a lower% predicted FEV1 independent of age and rank. While these differences are statistically significant, they are relatively small and of unknown clinical significance. Follow up will focus on longitudinal change and examine any association with type of injury.

Please refer to page A288 for declarations of interest related to this abstract.

S136 FEASIBILITY AND SAFETY OF CONTINUOUS BRONCHOSCOPY DURING EXERCISE TO ASSESS DYNAMIC LARGE AIRWAY COLLAPSE

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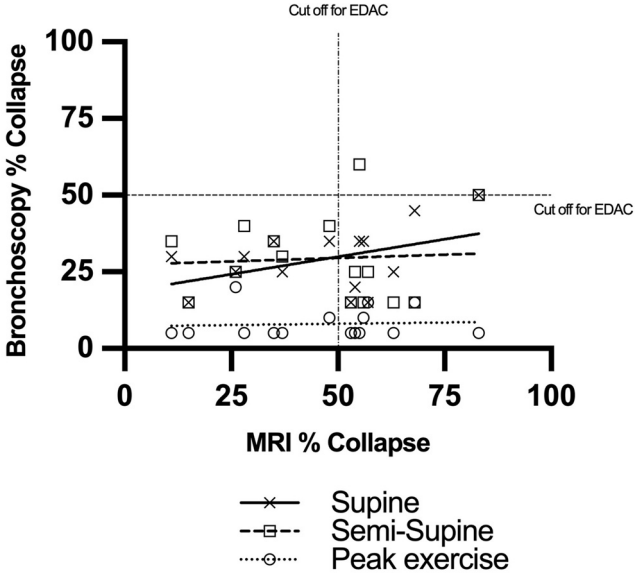
10.1136/thorax-2023-BTSabstracts.142

Introduction Excessive dynamic airway collapse (EDAC) is a recognised cause of exertional dyspnoea. EDAC is diagnosed by evaluating inward movement of the trachea and main bronchi, during a forced expiratory manoeuvre, typically during semi-supine bronchoscopy. This differs from stress placed on large airways during physical activity. We aimed to explore the feasibility of conducting continuous bronchoscopy during exercise (CBE) to evaluate large airway movement and to compare this with findings during forced manoeuvres on bronchoscopy and with magnetic resonance (MRI) imaging.

Method 15 healthy (40% female) individuals were recruited. Demographics, spirometry, blood pressure, and electrocardiogram were assessed. Using topical anaesthesia, the bronchoscope was inserted to the mid-trachea and secured using a specialist head-mount. Video images were captured in supine, semi-supine positions and during an incremental treadmill-based test to voluntary exhaustion. Resting and forced manoeuvres were recorded, timestamped, and qualitatively analysed by two operators. At a subsequent visit, subjects performed dynamic MRI with forced expiratory measures. Tolerability and feasibility were determined using questionnaire assessment and reported adverse events.

Results All participants, median (IQR) age 29 (26–34)years, BMI 24.5 (24.1–26.2)kg/m^2 and FEV_1% predicted 105 (100–112)%, successfully performed CBE. Thirteen (87%) participants exercised to voluntary exhaustion (end-exercise peak heart rate of >90% predicted). Exercise was stopped prematurely in two participants due to elevated blood pressure (>200mm Hg). Two individuals required supplemental oxygen for transient desaturations. Participants (60%) reported discomfort with placement of the bronchoscope, but most (73%) reported no increase in scope associated discomfort during exercise. One participant reported a temporary headache and mild fever following CBE. Bronchsocopic images allowed adequate evaluation of the degree of large airway collapse in all cases with minimal secretions. MRI identified tracheal collapse >50% in eight (53%) individuals. There was a poor relationship between percentage of trachea collapse measured via forced resting manoeuvres (either on MRI or bronchoscopy) and findings during exercise (figure 1).

Conclusion Continuous bronchoscopy can be safely conducted during vigorous exercise and is tolerable in healthy subjects. In this series, there was no evidence of EDAC during exercise despite forced manoeuvres on imaging indicating excessive collapse. Further studies are now required in patient populations.



Abstract S136 Figure 1 Scatter plot of the relationship between percentage collapse measured during MRI and bronchsocopic evaluation

S137 EXPRESSION OF EXTRACELLULAR MATRIX (ECM) PROTEINS IN VASTUS LATERALIS MUSCLE FIBRES IS DIFFERENT BETWEEN COPD AND HEALTHY PARTICIPANTS IN RESPONSE TO EXERCISE TRAINING

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10.1136/thorax-2023-BTSabstracts.143

Background ECM proteins comprise a major component of the muscle connective tissue. In healthy individuals, exercise training upregulates the expression of certain ECM proteins causing muscle fibre hypertrophy. Whether compromised myogenic capacity in response to exercise training in COPD is partly due to diminished expression of myogenic ECM proteins, currently remains unknown.
Methods Using ELISA (R&D Systems) we studied the effect of an 8-week combined endurance and resistance exercise program on the expression of selected ECM proteins in vastus lateralis muscle biopsies from 29 COPD patients (FEV_1: 55 ±12% predicted) and 14 healthy individuals.
Results At protein level, post training changes in collagen type I (âˆ†COL1), collagen type IV (âˆ†COL4) and tenascin-C (âˆ†TNC) expression was significantly greater in COPD patients compared to healthy individuals (figure 1.A, 1B, 1C). Post training changes in the expression of fibronectin (âˆ†FN), osteonectin (âˆ†SPARC) and byglican (âˆ†BGN) expression was significantly lower in COPD (figure 1D, 1E, 1F)
Conclusions Exercise training elicits distinct changes in muscle fibre ECM adaptive response in COPD compared to healthy participants. Greater training-induced expression in collagens (COL1, COL4) in COPD indicates increased structural changes and possible deficient protein turnover. Increased anti-adhesive tenascin-C (TNC) and decreased adhesive fibronectin (FN) protein levels in COPD muscle indicates compromised adhesion of activated myoblasts, which is further supported by reduced myogenic activity of osteonectin (SPARC) and byglican (BGN).

'Bridge over troubled waters' – Managing the exudative effusion

S138 MALIGNANT PLEURAL EFFUSIONS: EVALUATING THE PSYCHOSOCIAL IMPACT OF INDWELLING PLEURAL CATHETERS ON PATIENTS (MY-IPC) – AN INTERIM ANALYSIS

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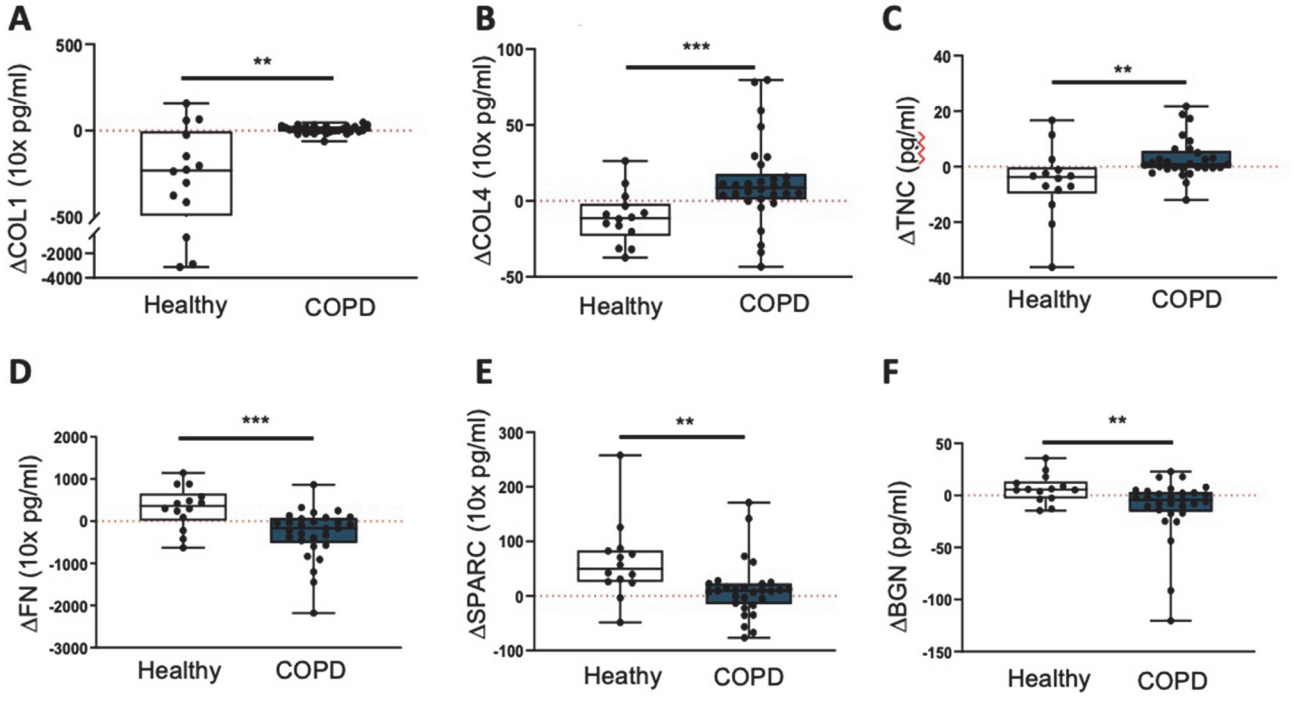
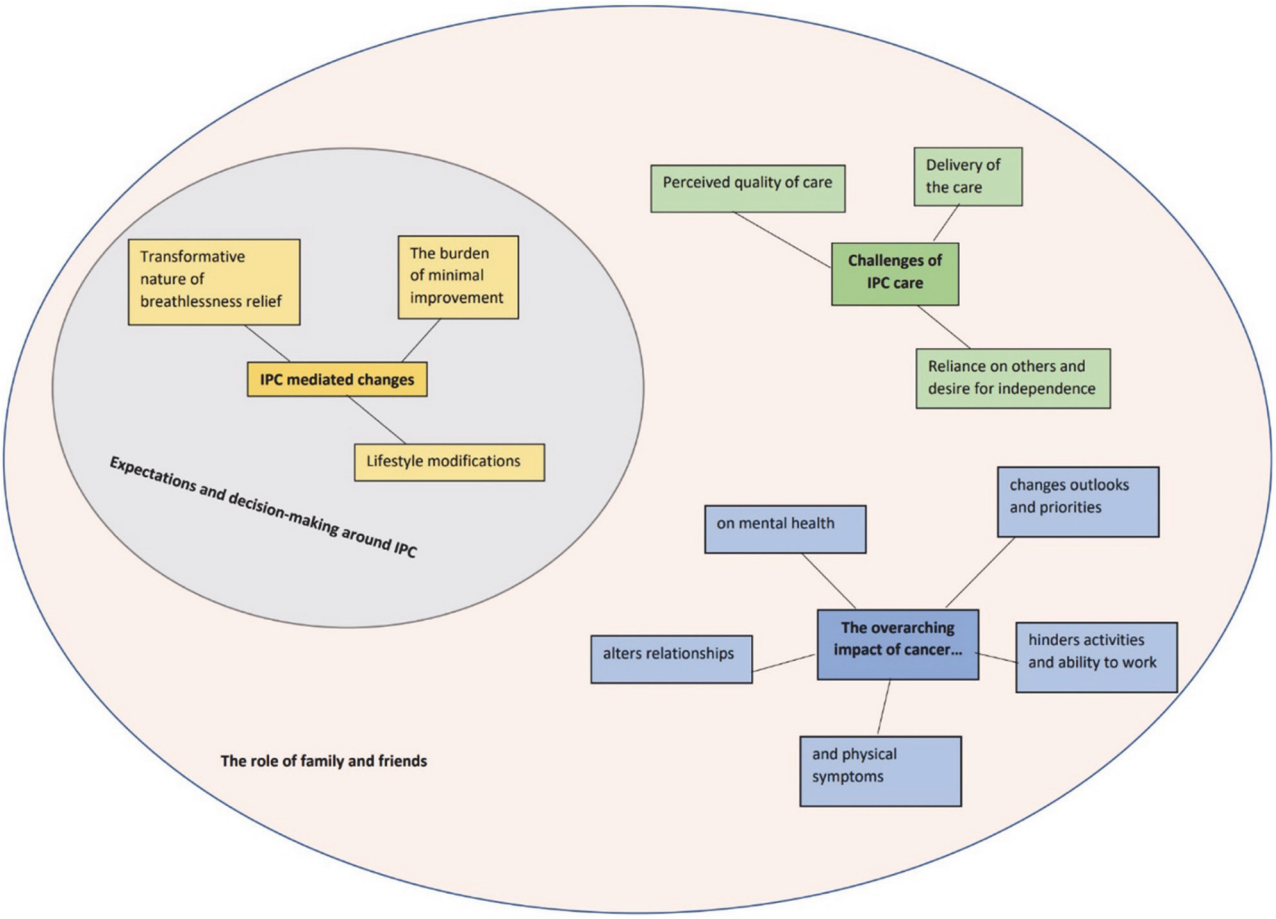
10.1136/thorax-2023-BTSabstracts.144

Background While indwelling pleural catheter (IPC) is widely accepted as a primary treatment option for managing malignant pleural effusions (MPEs), there is limited research on the psychological and social impact of living with an IPC.
Aims To investigate the psychosocial impact of living with an IPC among patients with MPEs.
Methods A qualitative study was performed involving adult patients with MPEs managed with IPCs between May 2022 and May 2023 at a single tertiary pleural centre. Semi-structured interviews were conducted with the participants at two different timepoints: 2 weeks and 6–8 weeks after IPC insertion. The interviews covered seven domains: sleep, work, hobbies and activities, relationships, body image, intimate relations, and overall IPC care. Thematic analysis with an inductive approach was used to analyse the data.



Abstract S137 Figure 1



Abstract S138 Figure 1 Overview of key themes and subthemes yielding influence over the psychosocial impact of living with an IPC on patients with malignant pleural effusions

Results 18 participants were recruited with 13 completing the first interview at 2 weeks and 10 completing the second interview at 6–8 weeks following IPC insertion. Interim data from the first 10 participants completing the first interview is presented (60% female, mean age 69 years, baseline ECOG performance status 1–3, 20% lived alone).

The key psychosocial impacts reported by participants encompassed anxiety, altered relationships, changes in independence and control, engagement in activities, and expectations. Both positive and negative effects were prominent in all areas, which were modulated by three main factors that exerted varying degrees of influence on individuals' psychosocial well-being (figure 1). The extent of influence was further modified by the pre-existing expectations held by patients and their experience of the decision-making process relating to the IPC, as well as existing social support.

Conclusion This study represents the first in-depth exploration of the wide-ranging psychosocial impact experienced by patients with MPEs in the first two weeks of living with an IPC. Findings from the interim analysis highlight the highly variable and complex nature of the experience in the first 2 weeks, where the IPC can both facilitate and hinder patient's psychosocial wellbeing.

Analysis of the 6–8week follow up data will provide a valuable insight into whether these factors vary over time.

S139 EXPERIENCE OF USING A NOVEL DIGITAL DRAINAGE SYSTEM VIA AN INDWELLING PLEURAL CATHETER (IPC): A CASE SERIES

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10.1136/thorax-2023-BTSabstracts.145

Introduction The PASSIO (BEARPAC medical) IPC drainage system employs a hand held digital device which uses lower drainage pressures compared to vacuum bottles.[1] This device allows a choice of four speeds, which correspond to flow rates of 50, 100, 150 and 200 mls/min, respectively. While lower pressure drainage could help patients who experience pain on drainage with a vacuum bottle, there is currently no evidence on patient and clinician experience of using this device in the United Kingdom (UK).

Methods As part of a pilot scheme started in October 2022, eight patients had a PASSIO compatible IPC inserted for management of their recurrent pleural effusion. Patient selection was based on an assessment of a patient and the community nurses ability to manage the device. Patients were followed up until May 2023 and any significant clinical events were recorded. Patients were also asked to record volume drained via the pump and corresponding volume in the bag. Six

Abstract S139 Table 1 Clinical events in patients who had the PASSIO IPC for management of pleural effusion

#	Age	Date of insertion	Diagnosis	Valve failure	Device Failure	IPC blockage	IPC removed
1	73	14/10/2022	Mesothelioma	Yes	No	Yes	No
2	69	01/11/2022	Mesothelioma	Yes	Yes	No	No
3	88	01/12/2022	Indeterminate	No	No	No	Yes
4	59	8/12/2022	Lymphoma	No	No	No	Yes
5	57	16/01/2023	Breast cancer	No	No	No	Yes
6	66	15/02/2023	Breast cancer	No	Yes	Yes	No
7	76	03/03/2023	Gynaecological cancer	No	No	No	No
8	69	29/03/2023	Breast cancer	No	Yes	No	No
Number (%)				2 (25%)	3 (37.5%)	2 (25%)	3 (37.5%)

patients were approached at the conclusion of follow up for feedback.

Results Mean age was 69.6 SD 9.83 years and four patients were female. Seven patients had a malignant pleural effusion. Half of the patients experienced a device related complication (table 1). These complications included IPC blockage (50%) which resolved with a saline flush in both cases, pump failure needing replacement (37.5%) and valve leakage (25%) leading to re-accumulation of the effusion and hospital admission. Drainage volumes on the pump and in the bag were available for 43 drainages. In 18 instances (41.8%), pump under-reported the drainage volume by more than 100 mls. Three of the six patients (50%) approached for feedback on conclusion of follow up liked the drainage system.

Discussion We describe the first experience of using the PASSIO device in the UK. The concept of employing lower pressures with a variable flow rate for effusion drainage warrants further study. However, the frequent problems we encountered may limit use of the PASSIO until rectified.

REFERENCE

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S140 AN OBSERVATIONAL STUDY OF PATIENTS TREATED WITH EARLY OR CONVENTIONALLY TIMED FIBRINOLYTIC THERAPY FOR PLEURAL INFECTION

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10.1136/thorax-2023-BTSabstracts.146

Background MIST2 demonstrated the efficacy of combined fibrinolytics in pleural infection, with reduced rates of surgery and hospital stay versus placebo. Once daily concurrent dosing of recombinant tissue plasminogen activator (t-PA, 10 mg Alteplase) and recombinant human DNase (5 mg) is associated with acceptable outcomes. The optimal timing of fibrinolytic therapy is unknown. Although a single-centre study suggested that administration within 24 hours of chest drainage had better outcomes, how this compares to conventional treatment at failure of drainage is unknown.

Methods Since November 2018 we prospectively identified consecutive patients with pleural infection, presenting with fever and/or raised inflammatory markers and pleural effusion with pleural fluid sample showing pus or pH<7.2, or gram

Abstract S140 Table 1

	Number treated	Mean Age (S.D.)	No. of patients who had surgery within 3 months	No. of deaths within 3 months (%)	Expected mortality based on RAPID score (%)	Mean duration of hospital stay from diagnosis (S.D.)	Mean duration of antibiotics (IV + oral)	Average FVC% at end of 4 months (range)
Group 1 (Late fibrinolytics)	36	62 (15.24)	2 (5.6%)	2 (5.6%)	10.33%	10.92 (13.17)	19.78 days (8.44+11.33)	90.5% (49% -126%)
Group 2 (Early fibrinolytics)	30	59.77 (15.9)	0	2 (6.7%)	11.2%	6.8 (3.92)	17.07 (5.43+11.64)	103% (62%-134%)

stain positive for organisms, or bacterial growth on culture. Patients with iatrogenic pleural infections, pregnant patients and those with life expectancy <3 months were excluded. Those with multiloculated or septated effusions had chest drain insertion and fibrinolytics (once daily for max. 3 days). The outcomes of surgical referral, mortality, length of stay, duration of antibiotic therapy and lung function were assessed retrospectively.

Prior to November 2021 (Group 1), patients who failed initial conventional chest tube drainage were given fibrinolytics (once daily for a maximum of three days). The protocol was changed in November 2021 to early administration (within 24 hours- Group 2). We compared the outcomes between the two groups (table 1).

Results 36 and 30 patients in Groups 1 and 2 respectively met the inclusion criteria (excluded 10 and 6 respectively). 17 in Groups 1 and 23 patients in group 2 received fibrinolytics. Mortality was similar between the groups (5.5% vs 6.67%), and lower than expected based on the RAPID score (10.33% vs 11.2%). The mean hospital stay after diagnosis was 10.92 days in Group 1 vs 6.83 days in group 2. The mean duration of chest tube drainage was 6 days in Group 1 and 3.72 days in Group 2.

Conclusions In these retrospective cohorts, a treatment protocol including early intrapleural fibrinolytics was associated with shorter length of stay than a protocol advocating therapy if chest drainage fails.

S141 DOES TALC OFFER AN INCREASED PLEURODESIS RATE WHEN GIVEN AT DAY CASE THORACOSCOPY IN COMBINATION WITH AN INDWELLING PLEURAL CATHETER?

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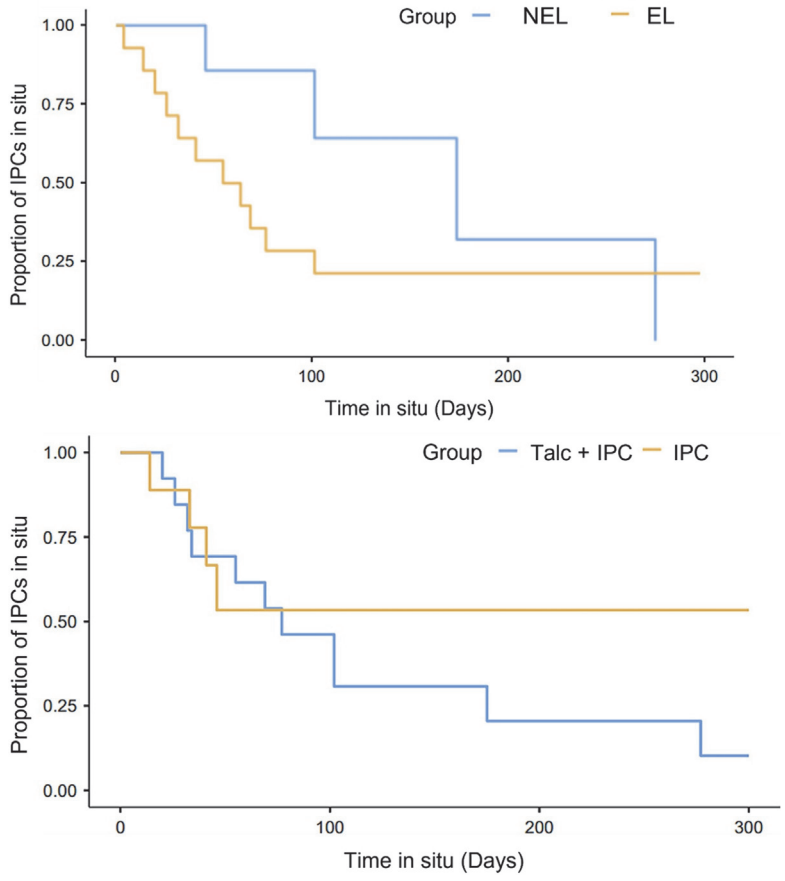
10.1136/thorax-2023-BTSabstracts.147

Background Day-case local anaesthetic thoracoscopy (LAT) decreases length of stay and is safe.[1] However, there is variation in current practice between inserting an indwelling pleural catheter (IPC) alone or IPC insertion with talc poudrage. The decision depends on patient wishes, whether they have a non-expansible lung (NEL), and whether the patient may need to go on to have further invasive procedures such as video-assisted thoracoscopic surgery.[2] Giving talc may increase pleurodesis rates over IPC alone but it painful and prolongs the procedure.

Methods Between 1st June 2020 and 20th April 2023, patients with exudative pleural effusions were identified whom received talc poudrage and IPC or IPC alone via day-case LAT at NNUH. Essential data was retrospectively collected: demographics, intervention at LAT, IPC time in situ, NEL status, and admission length. Pleurodesis was defined as date of IPC removal.



Abstract S141 Figure 1 Kaplan Meier survival curve of 22 patients comparing pleurodesis rates between (A) non-expansile v. expansile lung, and (B) after talc poudrage with IPC insertion and IPC insertion alone

Results Fifty-three patients were referred for LAT with an average age of 73 years. Twenty-two (42%) patients had either talc poudrage and IPC insertion (59%) or IPC alone (41%). Where patients survived until IPC removal (N = 15), overall median time to IPC removal was 60 days. There was no difference in pleurodesis rate between IPC+talc and IPC alone (p=0.45). NEL was found in 26% LAT patients. Patients with NEL had a longer time to pleurodesis than those with expansile lung.
Discussion This small retrospective study surprisingly found no difference in pleurodesis rate between IPC alone and talc poudrage plus IPC. Expandable lung appears to be a better predictor of pleurodesis than use of talc. Limitations are small sample size and retrospective nature and thus further work needed.

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'Welcome to the jungle' – Diving into the airway mycobiome

S142 LOW FUNGAL DIVERSITY WITH CANDIDA, CLADOSPORIUM AND PAPILIOTREMA-DOMINANCE IN EOSINOPHILIC LUNG DISEASES: A CROSS-SECTIONAL BRONCHOSCOPIC STUDY

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10.1136/thorax-2023-BTSabstracts.148

Introduction Eosinophilic Lung Diseases (ELDs), including Chronic Eosinophilic Pneumonia (CEP), Eosinophilic Granulomatosis with Polyangiitis (EGPA) and Allergic Bronchopulmonary Aspergillosis (ABPA) are uncommon conditions linked to asthma. Fungi are implicated in ABPA but the aetiology of other ELDs is unknown. No studies have yet described the fungal communities in CEP or EGPA.
Objectives To determine the fungal biomass and characterise the fungal communities in the upper and lower airways of ELD patients.
Methods Bronchoscopic evaluation of the Eosinophilic Airway Microbiome (BEAM) was a cross-sectional observational study. Subjects undertook questionnaires, blood tests and spirometry. Each provided an oropharyngeal throat-swab (OTS) and endobronchial brushings. Samples underwent DNA extraction, 18S quantitative PCR and massively-parallel next-generation ITS2 sequencing. Data were pre-processed in Quantitative Insights Into Microbial Ecology (QIIME) 2 and analysed in R. Samples were rarefied; Those with <1,000 reads were excluded from downstream analyses.
Results Twenty-one subjects were recruited: 11 ELD patients (7 CEP, 3 EGPA, 1 ABPA) and 10 healthy controls. The mean (SD) age was 50.6 yrs (9.8) in cases and 51 (9.4) in controls. All cases (no controls) were using inhaled corticosteroids (ICS). The blood eosinophil count was $0.39x10^9$/L (0.4) in cases and $0.08x10^9$/L (0.1) in controls. Fungal biomass was significantly higher in OTS than brushes: OTS mean 20,675 18S copies/sample *vs* brushes 4,950 copies/sample (P=0.036). Fungal biomass did not correlate with blood eosinophil count or FEV1. Twelve OTS and 7 brushes had >1,000 reads. Data analysis revealed fungal diversity was low in all samples with each being dominated by a single genus. The most common genera in OTS were *Candida*, *Aureobasidium* and *Cladosporium*, and in brushes *Candida* and *Papiliotrema*. Brushings from all three EGPA subjects were dominated by *Papiliotrema*.
Conclusions Differences were observed between the dominant organisms in healthy controls (usually *Aureobasidium*), and ELDs (*Candida*-dominance of the upper and lower airways, *Cladosporium* [upper airways] and/or *Papiliotrema* [lower airways]). Such differences may be influenced by ICS use. The results of this study suggest mechanistic studies of potential immune-modulatory actions of fungi in ELDs are warranted to determine whether fungal dysbiosis is a trigger for and/or perpetuator of disease.

S143 A SINGLE CENTRE RETROSPECTIVE ANALYSIS OF THE REAL-WORLD EFFECTIVENESS OF MONOCLONAL ANTIBODY THERAPY IN ALLERGIC BRONCHOPULMONARY ASPERGILLOSIS

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10.1136/thorax-2023-BTSabstracts.149

Background Allergic bronchopulmonary aspergillosis (ABPA) is a severe hypersensitivity reaction to *Aspergillus* species colonising the airways of asthmatic patients and may be a cause for deterioration. There is increasing evidence that monoclonal antibody therapy used to treat severe allergic asthma can be beneficial in treating patients with ABPA in steroid or antifungal dependant refractory disease with several phase 3 clinical trials in progress.
Aim To assess the real-world effectiveness of biological therapies targeting atopic inflammation in ABPA.
Methods Retrospective single-centre analysis of patients with ABPA as defined by the ISHAM criteria and use of any monoclonal therapy between 2014–2022. Clinical outcome was assessed at 12 months post commencement including validated symptom questionnaires, exacerbation frequency, corticosteroid use and clinical multidisciplinary team (MDT) consensus. Baseline characteristics were used to determine ABPA phenotype and impact on monoclonal antibody efficacy.
Results 74 patients with ABPA received monoclonal antibody therapy during the study period. Mean age was 56.3 years with 50% female. 32% received anti-immunoglobulin E (anti-IgE) therapy, 65% anti-Interleukin-5 (anti-IL5) therapy and 3% anti-interleukin 4-R alpha (anti IL4-Ra) therapy. Overall n=48 (65%) of patients were deemed by clinical MDT review at 12 months to have had a successful response with $\geq$ 50% reduction in oral corticosteroid (OCS) use. 26 (35%) stopped or changed biologic during the follow-up period due to either side effects (n= 3), failed clinical response (n=21) or other medical co-morbidities that required cessation (n=2). There was a significant reduction in ACQ-6 score, exacerbation frequency and maintenance OCS use following monoclonal antibody initiation as shown in table 1. Multivariate analysis will be further presented to analyse how ABPA endotyping, based

Abstract S143 Table 1

Monoclonal Antibody Therapy	ACQ-6 Pre Therapy	ACQ-6 Post Therapy	P Value (95% CI)	Exacerbation/ 12 months Pre Therapy	Exacerbation Rate/12 months Post Therapy	P Value (95% CI)	Maintenance Prednisolone Use (mg) Pre Therapy	Maintenance Prednisolone Use (mg) Post Therapy	P Value (95% CI)
All Monoclonal Antibodies	3.0 (1.49)	1.69 (1.81)	<0.0001 (-0.81, -1.40)	4.0 (4.0)	1.0 (1.0)	<0.0001 (-1.74, -3.09	5.0 (10.0)	3.0 (5.0)	0.0173 (-0.26, -3.6)
Anti-IgE	2.7 (1.14)	1.0 (2.2)	0.0004 (-0.55, -1.64)	2.0 (3.0)	1.0 (2.0)	*ns*	5.0 (6.25)	3.0 (5.5)	0.0662 (1.12, -5.07)
All Anti-IL5s	3.29 (1.57)	1.83 (1.5)	<0.0001 (-0.69, -1.43)	4.0 (3.0)	1.0 (2.75)	<0.0001 (-2.03, -3.71)	5.0 (10.0)	2.5 (5.0)	0.1641 (0.31, -2.78)
Benralizumab	2.59 (0.96)	1.99 (2.44)	0.1060 (0.28, -1.54)	5.0 (2.0)	2.0 (4.0)	0.0156 (-0.81, -5.18)	0.0 (25.0)	0.0 (25.0)	0.9999 (2.67, -2.13)
Mepolizumab	3.5 (1.89)	1.77 (0.41)	<0.0001 (-0.7, -1.66)	4.0 (3.75)	1.0 (2.5)	<0.0001 (-1.48, -3.13)	5.0 (10.0)	0.0 (5.0)	0.2714 (0.55, -2.90)

Data presented as median (interquartile range) and P vale (95% confidence interval)

on radiology and microbiological fungal burden, affects efficacy of monoclonal antibody therapy.

Conclusion This retrospective study highlights the potential effectiveness of monoclonal antibody therapy in some individuals with ABPA with a significant reduction in exacerbation frequency, symptoms and OCS use following monoclonal antibody therapy highlighting the importance of ongoing phase 3 clinical trials. Given a significant proportion of patients had no clinical response, further research is required to understand how ABPA endotypes can affect monoclonal antibody response.

S144 FAILURE TO REPAIR: AN IN VITRO MODEL OF ASPERGILLUS FUMIGATUS INFECTION IN AIRWAY EPITHELIAL INJURY

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Question: How does the ubiquitous environmental mould, *Aspergillus fumigatus*, impact bronchial epithelial cells (BECs) during injury? This study aimed to assess an in vitro model of host-pathogen interaction with the underlying hypothesis that *A.f.* infection disrupts lung epithelial repair in disease.

Background *A.f.* causes a broad spectrum of life-threatening invasive and allergic respiratory diseases in over 18 million individuals worldwide. The impact of *A.f.* infection during co-morbid acute and chronic respiratory diseases has been identified but the underlying mechanistic basis of this is unclear.

Methodology To mimic lung barrier damage, we employed a scratch assay on CM-DiI labelled 16HBE14o- cell (BEC) monolayers on 0.4μm pore transwells cultured in MEMα containing 10% FBS. Scratch closure in the presence and absence of transgenic GFP+ *A. fumigatus* was measured using timelapse fluorescence microscopy. Epithelial migration velocity was calculated using non-linear regression with the Levenberg-Marquardt algorithm. To determine epithelial uptake of spores, BEC were isolated at different time points of the culture and spore uptake was measured via flow cytometry.

Results While we found wound closure occurred within 12–18 hours (mean maximum closure 97.2%), this was prevented in the presence of live *A.f.* spores (MOI 10:1, mean maximum closure 54.9%). Spore inhibition of wound closure was associated with presence of mycelium growth. Furthermore, addition of spores to BEC cultures 24h prior to scratch wounding dramatically inhibited wound closure (mean maximum closure 3.9%). Despite this, epithelial velocity during wound repair between 3–7 hours post scratch was increased in the presence of spores (MOI 1:1000, 0.28 μm/h; 1:100, 0.47 μm/h; 1:10, 0.58 μm/h). Finally, flow cytometry analysis showed that spores were not internalised by epithelial cells (uptake 0.50–0.66 %), showing that the impact of *A.f.* epithelial cell wound closure and cell velocity was not due to epithelial cell uptake of spores.

Conclusions BEC wound repair accelerates and then fails during *A.f.* infection in a dose-dependent manner. Further research should explore the reproducibility of these preliminary findings and the mechanisms underlying wound repair failure. Potential candidates include *A.f.* secreted factors as mediators of altered BEC cytoskeletal function and epithelial migration.

Please refer to page A288 for declarations of interest related to this abstract.

S145 THE FUNGAL BURDEN IN NONTUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE

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Introduction and Objectives Fungal lung infections may complicate the clinical trajectories of individuals with nontuberculous mycobacterial pulmonary disease (NTM-PD). It remains unclear whether NTM infection or therapies predispose to fungal disease. We hypothesised that there are differences in pulmonary fungal burden in NTM-PD according to NTM species, NTM treatment use and underlying structural lung diseases. We aimed to quantify this longitudinally in people with NTM-PD.

Methods Sputum samples were acquired at baseline, weekly for 4 weeks and monthly up to 3 months from 37 participants who: had NTM-PD requiring treatment; had NTM-PD not requiring treatment; or did not have NTM-PD. Additional samples were collected monthly from those on NTM treatment until 12 months; then 3-monthly until 18 months. Sputum DNA was extracted using hexadecyl-trimethyl-ammonium bromide phenol chloroform. Total fungal burden was quantified using 18S rRNA gene quantitative polymerase chain reaction.

Results There was no difference in pulmonary fungal burden at baseline or 3 months between: individuals with or without NTM-PD; those with *Mycobacterium avium* complex pulmonary disease (MAC-PD) or *Mycobacterium abscessus* pulmonary disease (MAB-PD); those on or off NTM treatment; or those with bronchiectasis, cystic fibrosis or chronic obstructive pulmonary disease. Fungal burden was higher in MAB-PD than MAC-PD ($P<0.05$) following 6 months of NTM treatment; no difference was observed at 12 or 18 months. Among those on NTM treatment, there was no difference in the change in fungal burden that occurred between baseline and 6, 12 or 18 months according to NTM species or underlying lung disease.

Conclusion No difference in pulmonary fungal burden between individuals with or without NTM-PD was found. In NTM-PD, no difference was observed in fungal burden according to underlying lung disease, NTM species (except at 6 months if on NTM treatment) or NTM therapy. NTM treatment was not associated with changes in fungal burden at 6, 12 or 18 months relative to baseline. Fungal burden alone is therefore unlikely to explain the clinical associations between NTM-PD and fungal sequelae. Using internal transcribed spacer 2 sequencing to evaluate the relationship between fungal diversity and NTM species, therapies and outcomes is therefore warranted.

Please refer to page A288 for declarations of interest related to this abstract.

S146 ASPERGILLUS IN BRONCHIECTASIS: DATA FROM THE EMBARC REGISTRY

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Introduction *Aspergillus fumigatus* causes airway disorders including Allergic bronchopulmonary aspergillosis (ABPA), *Aspergillus* sensitisation (AS) and *Aspergillus* bronchitis (AB). The clinical significance of *Aspergillus* lung diseases in bronchiectasis is not well understood, partially due to no universally-accepted diagnostic criteria for ABPA.

Objective Investigate the clinical significance of *Aspergillus* disease in bronchiectasis while comparing existing and modified ABPA diagnostic criteria.

Methods Bronchiectasis patients enrolled into the EMBARC registry from 2015–2022 with serological testing for *Aspergillus* disease (total IgE, *Aspergillus*-specific IgE or *Aspergillus* skin test, *Aspergillus*-specific IgG and blood eosinophil counts) were included. ABPA was defined using Modified-ISHAM criteria (2021) with sensitivity analysis performed using ISHAM-ABPA criteria (2013). Elevated *Aspergillus*-specific IgE/positive *Aspergillus* skin test without ABPA was deemed 'AS'. Those with elevated *Aspergillus*-specific IgG without ABPA acted as surrogate for AB. Patients not meeting these criteria formed the control group. Exacerbations during annual follow-up were analysed using negative binomial modelling and survival analysis was performed using Cox proportional hazards regression with adjustment for relevant confounders.

Results 9953 patients were included. Using Modified-ISHAM criteria (2021), 608 (6.1%) had ABPA, 570 (5.7%) showed AS, 806 (8.1%) had raised *Aspergillus*-specific IgG, 184 (1.8%) had both AS and raised *Aspergillus*-specific IgG and 619 (6.2%) had elevated eosinophil counts without *Aspergillus* disease. 78 ABPA diagnoses were missed using the original ISHAM-ABPA criteria (2013) (31 previously AS, 47 previously AS with raised *Aspergillus*-specific IgG). All patients with *Aspergillus* disease had more severe bronchiectasis and worse lung function at baseline. Long-term follow-up revealed patients with raised *Aspergillus*-specific IgG experience more exacerbations (RR1.19 95%CI 1.05–1.35, p=0.008) and more frequent hospitalisations (RR1.66 95%CI 1.37–1.99, p<0.001), while a trend towards increased mortality was observed in those with ABPA (HR 1.40 95%CI 0.99–1.99, p=0.057). Inhaled corticosteroids modified hospitalisation risk associated with AS (RR0.70 95%CI 0.54–0.90, p=0.006 vs RR0.91 95%CI 0.54–1.52, p=0.71) and raised *Aspergillus*-specific IgG (RR1.32 95%CI 1.04–1.68, p=0.02 vs RR2.26 95% CI 1.68–3.02, p<0.001).

Conclusion *Aspergillus* disease is common in bronchiectasis and associates with worsened disease severity and outcomes which can be modified by ICS. The Modified-ISHAM criteria (2021) captured ABPA diagnoses that would have been missed using existing ISHAM-ABPA criteria (2013).

Please refer to page A288 for declarations of interest related to this abstract.

'Blowing in the wind' – Management of pneumothorax

P1 WHICH CLINICAL FACTORS ARE PREDICTIVE OF OUTCOME IN PRIMARY SPONTANEOUS PNEUMOTHORAX MANAGEMENT?

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10.1136/thorax-2023-BTSabstracts.153

Background Primary Spontaneous Pneumothorax (PSP) refers to collapse of the lung (with air in the chest) in the absence of trauma in patients with no underlying lung disease. This causes pain and breathlessness; often requiring admission to hospital and chest drain insertion (median stay 4–5 days). There is no good evidence to predict which patients will resolve and who will fail treatment (defined as ongoing PSP at Day 4). This study aimed to determine whether clinical factors such as duration and severity of symptoms, and PSP size are associated treatment failure.

Methods This study used prospectively collected data from the 236 patients from RAMPP randomised trial [Hallifax et al, Lancet 2020;396:39–49]. Clinical data were collected from hospital records and daily patient questionnaires.

Results Patients had a median breathlessness score of 40.8/100 and pain score of 31.3/100 at admission. 63/236 (26.7%) failed treatment. On average, symptoms started 1 day before admission. 96/236 patients (40.7%) presented on the day symptoms started: their risk of treatment failure was higher (33.7%) than patients presenting >=1 day after symptoms began (22.8%). Interestingly, a *low* baseline breathlessness or pain score was also associated with greater risk of failure (34.6% and 31.1%, respectively, vs 21.1% and 24.0% for high score). Patients with larger PSP (>=4cm at the hilum on chest x-ray) had longer treatment duration (median 3 vs 1 days if <4cm).

Conclusion Risk of treatment failure was greater in PSP patients presenting on the day symptoms began, and unexpectedly, in those patients with *lower* pain and breathlessness scores. Further work is required to generate a tool to predict treatment failure.

P2 'TO DRAIN OR NOT TO DRAIN? THAT IS THE QUESTION': A UK-WIDE PHYSICIAN SURVEY OF PRACTICE TO UNDERSTAND THE MANAGEMENT OF PNEUMOTHORAX AFTER CT-GUIDED LUNG BIOPSY

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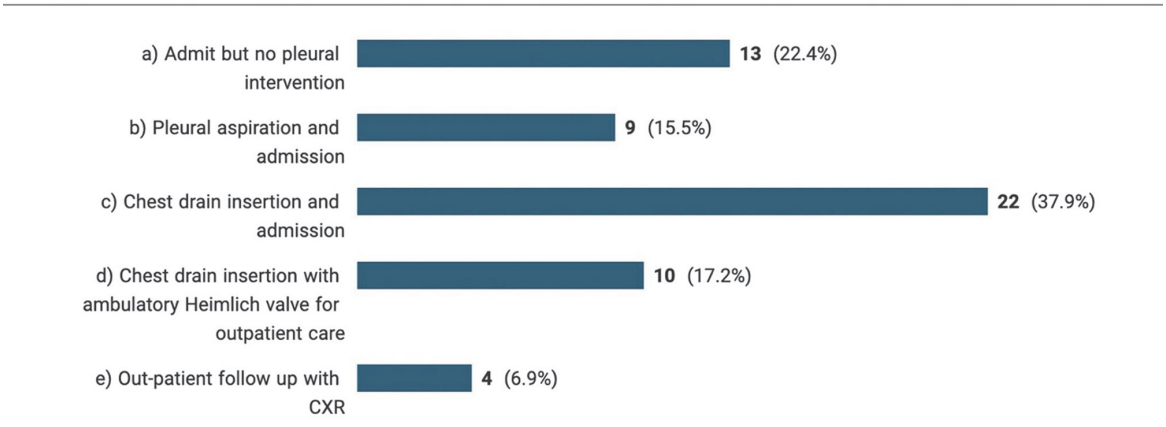
Introduction Percutaneous CT-guided lung biopsy (PCTLB) is the most important diagnostic test for an early-stage lung cancer. Pneumothorax after PCTLB is a common problem with an incidence of 26–60%. About 3–15% of these patients require drainage, commonly with a chest drain insertion to drain the pneumothorax.[1] Despite the magnitude of this problem, there is limited evidence on the management of pneumothorax after PCTLB. Consequently, there is a proposed variability in practice in the UK about the management of pneumothorax after PCTLB which has never been explored before.

Methods We conducted a UK-wide online survey over 3-months to understand the practice of managing pneumothorax after PCTLB. This survey was aimed at the respiratory and radiology physicians as well as the specialist trainee registrars. The survey was advertised through the UK Pleural Society and INSPIRE network for respiratory and via BSTI for radiology physicians. The survey consisted of 10 multiple-choice format questions including 2 case-based scenarios and the completion time was 2 minutes.

Results 58 responses were received: 29/58 (50%) from the respiratory physicians, 20/58 (35%) from the respiratory/radiology trainees and 9/58 (15%) from the radiologists. The management approach towards the clinical case showed significant variability with an overall trend of favouring interventional options, mainly chest drain insertion and inpatient admission (figure 1). Among the factors affecting treatment decisions, chest pain and breathlessness in patients with pneumothorax after PCTLB were more important for the treating physicians compared to drop in oxygen saturations by >2% from baseline. 51/58 (88%) respondents used 12Fr chest drain for pneumothorax drainage. The use of thoracic suction was less common and only used by 12/58 (21%) respondents.



Abstract P2 Figure 1

There was no widespread use of treatments like biopsy plugs to prevent pneumothorax development in high-risk patients.
Conclusion This survey highlights that there is a significant variability in practice in managing pneumothorax after PCTLB and the overall trend favours interventional management. We need robust research to understand the optimal management of pneumothorax after PCTLB to help develop clinical consensus and to avoid unnecessary interventions.

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P3 SURVEY OF PLEURAL PROCEDURES PERFORMED BY GENERAL MEDICAL REGISTRARS

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10.1136/thorax-2023-BTSabstracts.155

Introduction Pleural procedures form a core component of the general internal medicine curriculum. Out-of-hours (OOH), as defined by the 5pm-9am time period, provision for these procedures is usually facilitated by the on-call medical registrar. We explored how confident medical registrars are in performing pleural procedures.
Methods We investigated the number of OOH pleural procedures being performed by medical registrars and their perceived confidence with the procedures. We used a retrospective anonymised questionnaire sent by email to medical registrars in the South West England deanery.
Results We received 62 responses. 19 (31%) were ST3–4 grade registrars 43 (69%) were ST5–7. There were 12 respiratory registrars and 50 non-respiratory registrars. Specialties included acute medicine, cardiology, elderly care, endocrinology, gastroenterology, palliative care, renal and rheumatology.

14 (23%) registrars had performed at least 1 OOH **pleural aspiration** with an average of 0.35 procedures performed per respondent per year (SD 0.81).

3 (21%) people felt those procedures could have waited to be done in hours, 2 (14%) were unsure. 5 respiratory registrars had done an OOH pleural aspiration and 3 felt this could not have waited to be done in hours.

26 (42%) registrars had performed at least 1 OOH **chest drain** with an average of 0.78 per respondent per year (SD 1.43). 6 (23%) reported they felt the procedures could have waited to be done in hours, 3 (11%) were unsure. Out of 12 respiratory registrars, 10 had performed an OOH chest drain and 8 (80%) felt these could not have waited to be done in hours.

22 (44%) non-respiratory trainees reported feeling not at all confident with their ability to perform pleural aspirations and chest drains. All respiratory registrars felt very confident with both pleural aspirations and drains.
Discussion Medical registrars are frequently performing pleural procedures and yet a substantial proportion of non-respiratory registrars do not feel confident in doing so. This raises questions regarding the role of the medical registrar in providing OOH emergency pleural procedures and its place in the curriculum. More support or a dedicated OOH pleural service may be required to ensure patient safety.

P4 PNEUMOTHORAX TRENDS 2010–2020: A SINGLE CENTRE RETROSPECTIVE STUDY

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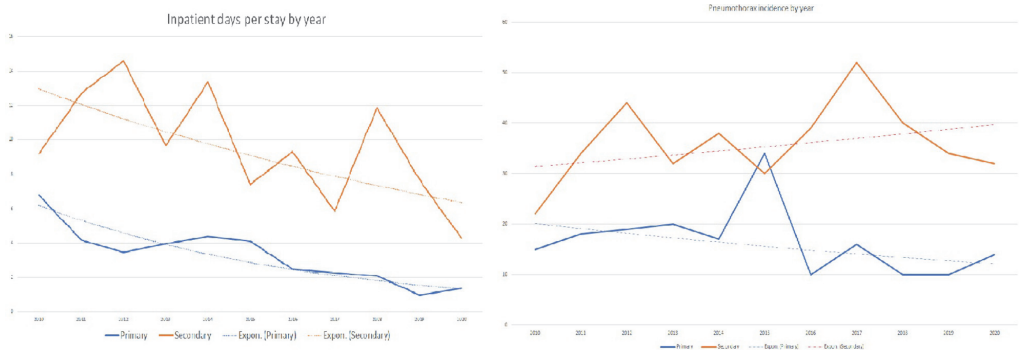
10.1136/thorax-2023-BTSabstracts.156

Introduction Work by Halifax et al in 2018 and 2022, suggested increasing inpatient burden of pneumothorax and widespread variation in management. Local trends have never been elucidated. Northumbria Healthcare NHS Foundation Trust (NHCT) has a well-established pleural service, serving just over 600,000. A retrospective cohort study was thus performed.
Methods A coding search for 'pneumothorax' was performed for all patients attending NHCT between 2010 and 2020 was performed with local Caldicott approval. 1698 notes were analysed to exclude iatrogenic, traumatic and paediatric events. 580 remained and those were analysed- 183 primary pneumothoraces (PSP) and 397 secondary (SSP).
Results Median age for PSP was 26.5 (IQR 35) with 69% male, and for SSP 68 years (IQR 68), 62% male. 23.5% of PSP and 8.6% of SSP were never smokers. Proportion of smokers and ex-smokers has not really changed over time: >65% every year have been smokers or ex-smokers. Yearly pneumothorax incidence shows a downward trend for PSP but upwards for SSP (figure 1). Median length of stay (LoS) for PSP was 2 (IQR 2), and SSP 5 (IQR 8), with a clear downward trend (figure 1). From 2010–2015 >50% PSP were managed with drain, but in 2019–2020 at least 50% managed conservatively, with significant reduction in aspiration. Trends of recurrence for PSP are increasing whereas for PSP is



Abstract P4 Figure 1

decreasing. 76 (20 PSP, 56 PSP) went for surgery at the index time with 5.3% recurrence (20% recurrence in those without surgery).

Conclusions This is the first known analysis of pneumothorax trends in a large trust in the North East of England. The data has limitations (size of pneumothorax, frailty {opting for thus conservative management) not recorded), reliance on clinical coding and not all notes were available. Updated larger datasets should help elucidate trends better.

P5 CONSERVATIVE MANAGEMENT OF LARGE PRIMARY SPONTANEOUS PNEUMOTHORAX – AN INNER CITY, TERTIARY CENTRE EXPERIENCE

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10.1136/thorax-2023-BTSabstracts.157

Background Our centre introduced a pathway for the conservative management of large primary spontaneous pneumothorax (PSP) following increasing evidence to support this strategy in select individuals.[1]

Aims To evaluate our local centre experience of conservatively managing large PSP, the process and outcomes.

To identify any safety or operational concerns.

Methods Retrospect review of all pneumothorax referrals to pleural clinic from October 2020 – October 2022. Patients with large, unilateral PSP (≥2cm at level of hilar or ≥6cm combined measurement Collin's method) were included for analysis.

Results 77 patients were referred with pneumothoraces during the 2-year period. 38 of which was primary (49%) with 15 quantified as large by above methods. [1]patient had large bilateral pneumothoraces and was excluded from analysis.

In total, 14 patients had a large, unilateral PSP and were included for analysis (table 1). 9 met criteria for conservative management, with 4 as outpatients. 3 of the 9 patients managed conservatively required subsequent pleural intervention, 2 had history of previous pneumothorax. Of those managed as outpatients, all were reviewed in pleural clinic within 1 day of discharge and none required subsequent pleural intervention. Those initially managed conservatively had a significantly shorter length of stay compared those receiving pleural drainage. This benefit was lost if they were initially admitted for observation.

Conclusion

- Conservative management of large PSP is safe, with those suitable for outpatient management experiencing a significant reduction in length of hospital stay at the expense of doubling time to radiological resolution.
- Patients not suitable for outpatient conservative management should be considered for pleural drainage over inpatient observation as little clinical advantage is conferred with the latter.
- History of previous pneumothorax may be a risk factor for failure of conservative management. Further research in this area could aid future risk stratification.

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P6 CURRENT MANAGEMENT OF PRIMARY SPONTANEOUS PNEUMOTHORAX IN A TEACHING HOSPITALS AND SUITABILITY FOR AN AMBULATORY PATHWAY

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10.1136/thorax-2023-BTSabstracts.158

Background Primary spontaneous pneumothorax (PSP) occurs predominantly in young adults. The 2010 BTS guidelines recommended management for stable patient is needle aspiration followed by chest drain insertion in case of failure. The

Abstract P5 Table 1 Table summarising the baseline characteristics, radiological characteristics and clinical outcomes of the study population

	Large unilateral PSP (n=14)	Interventional management (n=5) G1	Conservative IP (n=5) G2	Conservative OP (n=4) G3	F value	P value	P value breakdown
Baseline characteristics							
Age, mean yrs	29	29	30	27	0.19	0.83	
% Male	79	80	60	100		0.37	
% Right	71	80	80	50		0.56	
% Positive smoking history	50	40	60	50		0.83	
% previous pneumothorax	43	20	80	25		0.13	
Radiological characteristics							
Pneumothorax size at hilum (mm), median (IQR)	25 (18)	32 (46)	32 (20)	16.5 (17)		0.35	
Pneumothorax size at apex (mm), median (IQR)	63 (36)	88 (43)	66 (42)	49 (16)		**0.04**	**0.03 (G1-G3)**
Clinical outcomes							
Length of hospital stay – days							**0.02**
Mean±SD	4 ± 6.3	7 ± 8.7	4 ± 4.9	0 ± 0	1.49	0.27	**(G2-G3)**
Median (IQR)	1 (7)	3 (15)	1 (8)	0 (0)		**0.03**	
Time to radiological resolution of pneumothorax – days							
Mean±SD	38 ± 30.6	26 ± 17.7	30 ± 15.8	60 ± 45.8	1.78	0.22	
Median (IQR)	35 (30)	20 (32)	32 (30)	47 (82)		0.21	

upcoming BTS guidelines recommend ambulatory management. We aimed to determine the current practices in managing patients with PSP and estimate the proportion of the patients who would have been suitable for ambulatory management.

Method We retrieved from hospital records all hospitalizations with discharge code of 'pneumothorax' between 2020–2022. We excluded cases with age outside 18 years to 54 years age bracket, and those with history of or imaging-proved underlying lung disease. We also excluded cases with traumatic or iatrogenic pneumothorax. For those who underwent drainage for PSP, we determined that the absence of all the following would mean suitability of ambulatory drainage: tension pneumothorax, bilateral disease, haemodynamic compromise at presentation or pregnancy.

Results The search retrieved 160 hospital episodes. 53 admissions (for 43 patients) met the inclusion criteria. Of these 43 patients, 33 (76.74%) were males, the median age was 28 (23–36) years and 27 (62.79%) were smokers. 44 of 53 (83.01%) PSP episodes required drainage with chest drain, the first intervention in 43 episodes and needle aspiration in 1 episode. The median length of hospital stay for all patients with PSP was 2.8 days (1–5 days) and 3.3 days (2–6 days) for patients who required drainage. Out of the total 44 episodes requiring drainage, 36 (81.81%) met the suitability criteria for ambulatory management. Reasons for ineligibility for ambulation were haemodynamic instability (n=4), pregnancy (n=2), and bilateral pneumothorax (n=2).

Conclusion The recommendation of 2010 BTS guidelines for needle aspiration in PSP was not routinely followed. A substantial proportion of patients with PSP requiring drainage can be managed on ambulatory/outpatient basis. These results will be the basis for starting an ambulatory pathway locally.

P7 AN EVALUATION OF THE CONTENT, READABILITY, AND RELIABILITY OF PUBLICLY AVAILABLE WEB-BASED INFORMATION ON PNEUMOTHORAX SURGERY IN IRELAND

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10.1136/thorax-2023-BTSabstracts.159

Introduction The internet is increasingly a first port of call for patients introduced to new treatments. Unfortunately, many websites are of poor quality, thereby limiting patients' ability to make informed health decisions. No study to date has evaluated online information regarding pneumothorax surgery. Knowledge regarding same may allow physicians to recommend appropriate websites to patients and supplement remaining knowledge gaps.

Objective

1. To evaluate the content, readability, and reliability of online information regarding pneumothorax surgery.

Methods 11 search terms including 'Pneumothorax Surgery', 'Pleurectomy', and 'Pleurodesis' were each entered into Google, Bing, and Yahoo. The top 20 websites found through each search were screened, yielding 660 websites.

Only free websites designed for patient consumption that provided information on pneumothorax surgery were included. This criterion excluded 581 websites, leaving 79 websites to be evaluated.

To evaluate website reliability, the Journal of American Medical Association (JAMA) and DISCERN benchmark criteria were applied. To evaluate readability, 10 standardised tools were utilised including the Flesch-Kincaid Reading Ease Score. To evaluate website content, a novel, self-designed 10-part questionnaire was utilised to assess whether information deemed essential by the authors was included.

Website authorship and year of publication were also noted.

Results The mean JAMA score was 1.82+/-1.22 out of 4, with only nine websites achieving all four reliability criteria. There was a moderate correlation between JAMA scores and year of website publication ($r=0.548$, $p<0.001$) indicating that newer websites were more reliable than older websites. The mean readability score was 15.43+/-9.76 which corresponded to a 13th-14th school grade standard. Only four websites were at a 6th-grade reading level. In the novel content questionnaire, 43% of websites (n=34) did not mention any side effects of pneumothorax surgery. Similarly, 48.1% (n=38) did not mention alternative treatment options.

Conclusions Most websites were written above the 6th-grade reading level recommended by the US Department of Health and Human Services. Furthermore, the exclusion of essential information regarding pneumothorax surgery from websites highlights the current gaps in online information. These findings emphasise the need to create and disseminate comprehensive, reliable websites on pneumothorax surgery that enable patients to make informed health decisions.

P8 MY PNEUMOTHORAX JOURNEY. A PRIMARY SPONTANEOUS PNEUMOTHORAX PATIENT INFORMATION RESOURCE

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10.1136/thorax-2023-BTSabstracts.160

Introduction On the back of recent randomised trials, there has been a paradigm shift in the management of primary spontaneous pneumothorax (PSP), towards conservative and ambulatory treatment options.

Due to the clinical equipoise between different options, it is important that patients are actively involved in the management plan and have appropriate information resources available at the time to aid decision making. It is important to ensure patients are involved in the production of such information resources – Patient and Public Involvement and Engagement (PPIE).

Therefore, the aim of this project was to co-produce patient information resource on PSP and related treatment options.

Methods Pleural physicians and nursing staff from Manchester University NHS Foundation Trust and University Hospital of North Midlands NHS Trust worked in collaboration with the West Midlands Academic Health Science Network (WMAHSN) and NHS England Accelerated Access Collaborative (AAC).

The initial draft leaflet was discussed with patients from both hospital sites via a focus group and online survey for

Abstract P8 Figure 1

those who could not attend; the feedback was then used to revise the leaflet.

For greater utility across diverse patient populations, leaflet has been translated into Urdu, Arabic, Polish and Romanian as well as Easy Read format. These languages are a combination of the most commonly requested via interpreter services in the two Trusts.

The key information from the leaflet was then used to produce an animated video. This involved scriptwriting, storyboarding, character design, background theme and voice over.

Results The final product of this piece of work is co-produced patient information leaflets in multiple languages and Easy Read format, as well a 2-minute video animation exploring definitions, aetiology, symptoms, investigations and management options.

All the resources are available for free for patients to access on the WMAHSN website (via the QR code). The leaflets can be viewed online or printed.

Conclusion We successfully produced an online resource to help patients, who present to the hospital with primary spontaneous pneumothorax, to gain better understanding and aid decision making with support from treating clinicians.

'Drug-stabbing time' – Treating thoracic malignancy

P9 IMPROVING THE USE OF ADJUVANT CHEMOTHERAPY FOR LUNG CANCER

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10.1136/thorax-2023-BTSabstracts.161

Introduction and Objectives The Lung Cancer GIRFT report recommendation 14 was for Trusts to monitor rates of adjuvant and neo-adjuvant treatment. Adjuvant treatment may not occur when indicated for a variety of reasons, including patient choice. We reviewed all surgical lung cancer cases in our Trust to ascertain a baseline rate of treatment and the reasons why it might not be given, in order to improve future delivery of both adjuvant and neo-adjuvant treatments.

Methods All lung cancer patients treated with surgery during the period 2017–2019 were identified from the cancer database. Patients with NSCLC eligible for adjuvant treatment on the basis of staging data had further data abstracted from clinical records to determine whether they were planned for adjuvant treatment, saw an oncologist and were given treatment. Survival data were also collected.

Results 381 patients with lung cancer were identified as having had surgical treatment. 124 (32%) would have been eligible for adjuvant treatment. 39 of these patients (31%) started treatment. 32 patients were not seen by an Oncologist. Of those who were seen patient choice was the most common recorded reason for not receiving adjuvant treatment, patient fitness for treatment was also a common reason. Patients over 80 were significantly less likely to receive adjuvant treatment than those under 80 and were less likely to be seen by an Oncologist. Overall survival was good with no statistical difference between those given adjuvant or not.

Conclusions Adjuvant treatment offers a small overall survival benefit in lung cancer patients and should be offered to all eligible patients. These data identify reasons that adjuvant treatment is not given and allows intervention to improve overall patient experience. Fitness for further treatment was a key barrier to receiving adjuvant treatment in this cohort as was patients choosing not to pursue chemotherapy after surgery. These factors may be important in planning delivery of neoadjuvant treatment and may be modifiable in a patient's planned treatment pathway.

P10 'SOMETHING LIKE A HOUSE OF HORRORS': A MIXED METHODS STUDY EXAMINING THE REASONS FOR REFUSAL OF POTENTIALLY CURATIVE TREATMENT IN EARLY-STAGE LUNG CANCER

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10.1136/thorax-2023-BTSabstracts.162

Introduction Around 1 in 5 people diagnosed with early-stage non-small cell lung cancer (NSCLC) do not have treatment,

Abstract P10 Figure 1 Direct quotes from patient participants and healthcare professionals regarding refusal of potentially curative treatment for lung cancer

despite having potentially curative disease. A spotlight audit suggested a third of these chose not to have treatment, however the reasons behind this are unclear.[1]

Methods We performed a mixed methods study to identify reasons people may decline treatment. People with early-stage NSCLC who refused surgery or radical radiotherapy and lung cancer healthcare professionals (HCPs) were interviewed. Results were analysed using the Framework method. Additionally, analyses of medical records for people with stage I-II, performance status (PS) 0–2 NSCLC from 4 local hospitals between 2016–19 were performed.

Results 1183 people with PS 0–2, stage I-II NSCLC were identified for quantitative analysis. 50% were male; median age 73. 65% received surgery, 21% radiotherapy and 2% systemic therapy. 12% did not receive any active treatment. In 18% (24 people) this was personal choice, 37% inadequate lung function and 33% co-morbidities. Age ≥80, PS >0, FVC <80% and TLCO <80% all significantly reduced the odds for receiving surgery. Hospital location did not affect the odds.

15 HCPs were interviewed resulting in thematic saturation. HCPs felt most people were keen for any treatments available. 3 sub-themes regarding treatment refusal were identified: infrastructure and practicalities; patient beliefs; and health status. HCPs supported people to treatment by inspiring confidence, giving time between appointments, and encouraging appointments with treating clinicians. Pressure on resources and HCP education were barriers to care.

Patient recruitment was challenging with 6 people interviewed. 4 sub-themes of refusal reasons were identified: fear; negative healthcare experience (particularly cancer treatments); futility; symptoms. Participants all felt care was person-centred. Barriers to healthcare were health literacy, social isolation, and hospital parking – although transport itself was less limiting.

Discussion In this cohort, treatment refusal was less common than previously found. Most people were unfit for curative intent treatment, which was not adequately captured by stage and PS. Refusal reasons were individualised but suggest previous negative experience is important. Socially isolated people may benefit from increased practical and emotional support.

REFERENCE

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Please refer to page A288 for declarations of interest related to this abstract.

P11 THE RELATIONSHIP BETWEEN SYSTEMIC INFLAMMATION AND SURVIVAL IN GOOD PERFORMANCE STATUS IN PATIENTS WITH ADVANCED, INOPERABLE NSCLC: A COMPARISON OF COMPOSITE RATIOS AND CUMULATIVE SCORES

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10.1136/thorax-2023-BTSabstracts.163

Background Systemic inflammation has been adversely associated with survival outcomes in patients with advanced, inoperable non-small cell lung cancer (NSCLC). The aim of the present study was to examine the relationship between systemic inflammation, defined using composite ratios and cumulative scores, and survival in good performance status (ECOG-PS 0/1) patients with advanced NSCLC receiving radiotherapy with palliative intent.

Methods Prospectively collected data from patients with advanced NSCLC, undergoing radiotherapy with palliative intent at our institution, between 2011–2016, was

retrospectively analysed. Pre-radiotherapy venous bloods were used to calculated composite ratios including neutrophil-lymphocyte ratio (NLR), platelet-lymphocyte ratio (PLR), lymphocyte-monocyte ratio (LMR), C-reactive protein albumin ratio (CAR) and the cumulative scores including the neutrophil-lymphocyte score (NLS), platelet-lymphocyte score (PLS), lymphocyte-monocyte score (LMS), neutrophil- platelet score (NPS) and modified Glasgow prognostic score (mGPS). The primary outcome of interest was 6-month survival. The relationships between systemic inflammatory composite ratios/cumulative scores and 6-month survival were examined using binary logistics regression.

Results A total of 479 patients met the inclusion criteria. 48% (n=231) were male and 71% (n=338) were ≥65 years of age. 56% (n=270) patients had metastatic disease. 52% (n=251) of patients were alive at 6-months following radiotherapy. On univariate analysis, age ($p<0.05$), TNM stage ($p<0.05$), neo-adjuvant chemotherapy ($p<0.05$), ECOG-PS ($p<0.05$), NLR ($p<0.001$), LMR ($p<0.001$), PLR ($p<0.05$), CAR ($p<0.05$), NLS ($p<0.001$), PLS ($p<0.05$), LMS ($p<0.001$), NPS ($p<0.05$) and mGPS ($p<0.001$) were significantly associated with 6-month survival. On multivariate analysis, age ($p<0.05$), LMR ($p<0.05$) and mGPS ($p<0.05$) remained significantly associated with 6-month survival. In patients who were mGPS 1 and 2, LMR was significantly associated with 6-month survival ($p<0.05$ and $p<0.05$, respectively). In patients who were LMR<2.4, mGPS was significantly associated with 6-month survival ($p<0.05$).

Conclusion mGPS and LMR would appear to have independent, prognostic value to survival in good performance status patients with advanced NSCLC. The combination of these markers further stratified survival.

P12 THE RELATIONSHIP BETWEEN 18-F-FDG-PETCT-DERIVED TUMOUR METABOLIC ACTIVITY, TNM STAGE, SYSTEMIC INFLAMMATION, SERUM LDH AND SURVIVAL IN PATIENTS WITH ADVANCED, INOPERABLE NSCLC

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10.1136/thorax-2023-BTSabstracts.164

Background 18F-FDG-PET CT-derived measures of the tumour metabolic activity have been adversely associated with survival outcomes in patients with non-small cell lung cancer (NSCLC). However, the relationship with TNM stage, systemic inflammation and serum lactate dehydrogenase (LDH) is unclear. Therefore, the aim of the present study was to examine the relationship between 18F-FDG-PETCT-derived tumour metabolic activity, TNM stage, systemic inflammation, serum LDH and survival in patients with advanced, inoperable NSCLC.

Methods Prospectively collected data from patients with advanced NSCLC, undergoing radiotherapy with palliative intent at our institution, between 2011–2016, was retrospectively analysed. PET-CT derived measures included maximum standard glucose uptake (SUVmax) and total lesion glycolysis (TLG). Systemic inflammation was defined using the neutrophil- lymphocyte ratio (NLR) and modified Glasgow prognostic score (mGPS). Serum LDH values were grouped as <250/≥250 Units/L. The primary outcome of interest was 6-month survival Relationships were examined using the chi-square test.

Results A total of 114 patients met the inclusion criteria. 47% (n=54) were male and 68% (n=77) were ≥65 years of age. 37% (n=42) of patients had metastatic disease. 76% (n=87) of patients had an NLR>3 and 74% (n=84) an mGPS≥1. 40% (n=46) of patients had an LDH ≥250 Units/L. 81% (n=92) of patients had a high SUVmax and 86% (n=98) a high TLG. On univariate analysis, a high SUVmax was significantly associated with TNM stage ($p<0.05$), high TLG ($p<0.05$) and 6-month survival ($p<0.05$). On univariate analysis, a high TLG was significantly associated with TNM stage ($p<0.05$), high SUVmax ($p<0.05$) and 6-month survival ($p<0.05$). When adjusted for stage, a high SUVmax was significantly associated with a high TLG ($p<0.05$), mGPS ($p<0.05$) and 6-month survival ($p<0.05$). When adjusted for stage, a high TLG was significantly associated with a high SUVmax ($p<0.05$) and 6-month survival ($p<0.05$).

Conclusion Tumour metabolic activity, quantified using 18F-FDG-PET CT measures was significantly associated with disease stage, systemic inflammation and survival in patients with advanced NSCLC undergoing radiotherapy with palliative intent.

P13 PATIENT SURVIVAL WITH MALIGNANT PLEURAL EFFUSIONS (MPE): A RETROSPECTIVE COHORT STUDY LOOKING AT LENT AND CLINICAL PROMISE SCORE CATEGORIES AND SURVIVAL

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10.1136/thorax-2023-BTSabstracts.165

Introduction The LENT[1] and clinical PROMISE score[2] predict survival for patients with MPE, however the original validation studies comprised of patients treated roughly 10 years ago. With advances in cancer management, updated evidence describing survival in these patients is needed.

Methods This was a retrospective cohort study of patients with MPE (followed up for a minimum of 15 months or until death) managed by the pleural team at a tertiary care hospital in 2021. The LENT and clinical PROMISE scores and survival were investigated.

Results 110 patients were included in this study, mean age was 71.69 SD 12.83 years and 50.9% of the patients were female. Median survival was 284 (95% CI 230 – 415) days and 44.5% patients survived 12 months. Underlying malignant diagnoses included lung cancer (28.2%), mesothelioma (19%), breast cancer (16.4%), gynaecological cancer (12.7%), haematological malignancy (9%) and Gastro-Intestinal (GI) cancer (8.2%). Forty four patients (40%) received best supportive care while 57 patients (51.7%) received some form of systemic anti-cancer treatment (SACT). Patients with GI cancers had the worst survival of 29 (95% CI 1 – 145) days.

Categorisation according to LENT and clinical PROMISE score was possible for 103 and 99 patients respectively. Survival analyses showed that survival was significantly different between LENT categories high, moderate and low risk (log rank test $p<0.0001$) and clinical PROMISE categories A, B and C (log rank test $p<0.0001$). However, the survival of this cohort was better than either score predicted (figure 1a and b). Clinical PROMISE category D was excluded as this category had only one patient.

Figure 1a: LENT score categories

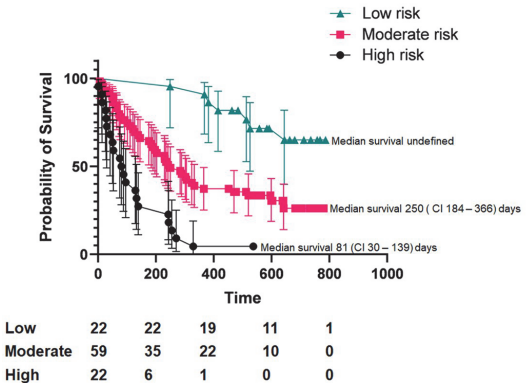
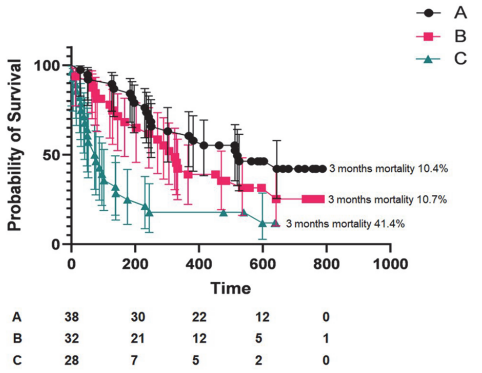


Figure 1b: Clinical PROMISE score categories



Abstract P13 Figure 1 Survival analysis according to LENT score (1a) and clinical PROMISE (1b) categories

Discussion The LENT and clinical PROMISE score predicted a mortality trend in our MPE cohort however, patient survival was better than predicted. This may be due to better diagnostic pathways, improvement in cancer services over time, availability of newer treatment options or other factors. Our findings are limited by a small study population therefore a larger study can explore how primary malignancy and treatment options impact survival.

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P14 PATIENTS WITH MESOTHELIOMA AND THEIR CARERS EXPERIENCE OF DIET AND APPETITE: A QUALITATIVE PRELIMINARY INSIGHT FROM THE HELP MESO STUDY

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Background Evidence around diet and appetite for patients with mesothelioma is lacking, despite known links between malnutrition and adverse health outcomes in cancer patients. In patients with mesothelioma the lived experience of diet and appetite are not researched, and a better understanding could inform the design of treatment strategies. The aim of the Help-Meso study is to develop an understanding of experiences of diet and appetite in patients with mesothelioma and their informal carers and to consider the opportunities for dietary interventions to prevent and treat poor appetite or malnutrition.

Method Nine patients and nine informal carers have been interviewed to date and interviews are ongoing. Open ended questions focussed on experiences of diet and appetite. The Help Meso study was granted ethical approval from Wales Research Ethics Committee (REC 287193) and local National Health Service Research and Development approvals. The study was funded by Mesothelioma UK.

Findings Patients with mesothelioma experience weight loss and appetite problems during the diagnostic pathway, whilst undergoing medical intervention and because of mesothelioma related symptoms (breathlessness, fatigue, pain and feeling bloated). Strategies to managing diet and appetite included taking a daily approach, with individuals eating in accordance with taste preferences and because of physical symptoms. Family played a key role in managing their relative's diet through various ways of coping, this included implementing their own nutritional interventions (use of high calorie food intake and using supplements).

Conclusion Preliminary findings suggest that there are significant appetite symptoms that are often overlooked and that the caregiver take on responsibility of managing dietary behaviour. Completion of the study will give further insight to plan further interventional work.

P15 SURGICAL RESECTION RESULTS IN PROLONGED SURVIVAL IN PATIENTS WITH STAGE III NSCLC

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Introduction Treatment of patients with non-small cell lung cancer (NSCLC) in UICC stage III requires a combined multimodal approach including surgical resection, chemo- radiotherapy and immunotherapy. Yet the role of surgical resection is discussed controversially. Therefore, we sought to study the effect of surgical resection being part of the treatment concept on survival in those patients.

Methods Retrospective investigation of reported data of the regional cancer registry (Baden-Wuerttemberg, Germany) including all patients with NSCLC staged UICC III between 2015 and 2021 and at least 12 months follow up. Analysis of demographic data, treatment regimen and overall survival was performed. In addition to descriptive statistics, Kaplan-Meier curves were calculated to compare overall survival of patients with surgical resection being part of the therapy vs. those without surgical resection.

Results A total of 6784 patients staged UICC III were included, 66.4% female, 33.6% male with a median age of 67 and 69 years. Adenocarcinomas counted for 45%, squamous cell carcinomas for 46%. As for UICC stages percentages for IIIA, IIIB and IIIC were 47.7%, 37.3% and 15% respectively. Median overall survival according for stages IIIA, IIIB and IIIC was 26.2, 17.5. and 10.5. months correspondingly. A

multimodal therapeutic approach was completed in 56% of patients. In patients in whom surgical resection was part of the therapy median overall survival was 45.9 months as compared to patients without resection: 16.0 months ($p<0.0001$) This benefit was independent of primary histology and subgroup.

Conclusion Treatment of patients with stage III NSCLC is multimodal. If surgical resection is part of the multimodal approach survival can significantly be improved as compared to patients in whom resection is not performed. Therefore, patients with stage III NSCLC should be resected whenever possible. If primary resection cannot be achieved concepts should aim at reduction of the tumor burden, e.g. by neo-adjuvant concepts, in order to realize secondary tumor resection and prolong survival.

P16 CLINICAL MANAGEMENT AND OUTCOMES OF GRANULOMATOUS INFLAMMATION FOLLOWING LUNG RESECTION: A RETROSPECTIVE CASE SERIES STUDY

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Granulomatous inflammation (GI) is a common non-cancerous finding following resection for suspected lung cancer. With the implementation of lung cancer screening, it has the potential to become a significant disease burden. Yet, there is limited evidence regarding management and outcomes.

Methods A retrospective case series of patients with GI confirmed at lung resection for suspected lung cancer across three East Midlands NHS Trusts between January 2019 and December 2021. Patient demographics, imaging characteristics, operative procedure, histology, clinical management and 12-month post-operative outcomes were recorded from hospital databases and electronic health records.

Results The study cohort comprised 37 patients, with 45 excised lesions. The mean age was 63 ±11.8 years with 73% (27/37) being smokers. 86% (32/37) were White-British, 11% (4/37) were Asian-Indian, and 3% (1/37) Black.

Lesions were predominantly nodules with mean size of 2.00 ±1.5 cm, and located in the right lung (69%, 31/45) and in an upper lobe (62%, 28/45). Mean Herder score was 66.5% ±26. 81% (30/37) of patients had video-assisted thoracoscopy and 81% (30/37) had a wedge resection. 82% (37/45) of nodules showed necrosis on histology of which 22% (8/37) identified acid fast bacilli. Twenty-four patients (65%) had contemporaneous samples sent for microbiology of which five (21%) were positive: 3 grew NTMD, 1 fungi and 1 other bacteria (not specified). Nine patients (24%) were subsequently tested with QuantiFERON and only one was positive. Seven patients (19%) received empirical anti-tuberculous treatment (ATT) of which only four (57%) tolerated and completed the full course. There were no significant factors associated with patients having microbiological sampling, testing positive or receiving ATT.

All patients remained well at 12-month follow-up. Nine patients had follow-up imaging with no radiological recurrence.

Conclusion GI should be suspected in the pathology of upper lobe nodules. Our study highlights variability in the investigation and management of this heterogeneous condition. Further research in larger cohorts is needed to improve characterisation, inform outcomes and recommend appropriate management strategies for this patient cohort. Surgical specimens should routinely be sent for microbiological testing. While tuberculosis should be considered in the differential diagnosis, our data suggests this is uncommon.

Abstract P16 Table 1 Demographics, management and outcomes of patients who received anti-tuberculous treatment

	Ethnicity	Age	Sex	Smoker	PET Avidity	Thoracotomy/ VATS	Wedge/ Lobectomy	Histology	Surgical sample for Microbiology	QFT	Course	Imaging
1	White – British	71	F	No	Intense	VATS	Wedge	NGI with AFB seen on staining	Yes – Negative	Positive	Completed ATT	6 months post treatment CT scan – No changes
2	Asian – Indian	41	M	Yes	Intense	VATS	Biopsy	NGI	Not sent	Not done	Completed ATT	No follow up imaging
3	Asian – Indian	63	F	Yes	Moderate	VATS	Wedge	NGI	Yes – Negative	Not done	Completed ATT	No follow up imaging
4	White – British	81	F	Yes	Moderate	VATS	Wedge	NGI	Yes – M Kansasii	Not done	ATT discontinued following drug induced hepatitis	6 months post-operative CT scan – No changes
5	White – British	63	M	Yes	No uptake	VATS	Wedge	NGI with AFB seen on staining	Yes – M Xenopi	Not done	Intolerant of ATT. Discontinued	No follow up imaging
6	White – British	66	F	No	Moderate	VATS	Wedge	NGI with AFB seen on staining	Yes – Negative	Not done	Completed ATT	No follow up imaging
7	White – British	47	M	Yes	Moderate	VATS	Wedge	Non Necrotising GI	Yes – Negative	Negative	ATT discontinued following drug induced hepatitis	No follow up imaging

VATS – Video assisted thoracoscopic surgery, NGI – Necrotising Granulomatous inflammation, ATT – Anti-tuberculous treatment, CT scan – Computerised tomography scan

P17 PLANNING THORACIC SURGERY CAPACITY FOR LUNG CANCER SCREENING IN WALES

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10.1136/thorax-2023-BTSabstracts.169

Introduction Targeted lung cancer screening with low-dose CT (LDCT) reduces lung cancer mortality and has been recommended by the UK National Screening Committee. Successful implementation is dependent on sufficient capacity to manage screen-detected findings. Surgical resection is the preferred treatment for screen-detected early-stage lung cancer.

Thoracic surgery services in South Wales are planned to centralise to a single site in coming years. We modelled the projected impact the introduction of a national targeted lung cancer screening programme in Wales would have on demand for thoracic surgery in South Wales.

Methods Demand for thoracic surgery in South Wales from screening was estimated for the years 2027, 2032 and 2037. Estimates for each step of the pathway were made based on data from the NHS England Targeted Lung Health Check programme and other UK activity, relevant screening trials, ONS population and smoking data and projections, and trends in existing Welsh screening programmes. A discrete event simulation modelled 'low impact' (narrow age range, high risk threshold for CT, low uptake), 'high impact' and 'most likely' (phased implementation where age range widens, risk threshold lowers, and uptake increases over time) scenarios.

Results The projected demand for thoracic surgery from screening is summarised in figure 1.

In the most likely scenario, median demand was projected to increase from 89 to 205 cases annually over the first ten years of the programme. Non-lung cancer screen-detected findings were estimated to have a negligible effect on demand. Assuming screening would also cause a modest reduction in non-screen-detected lung cancer surgery (due to these cases becoming screen-detected), it was estimated that overall demand would increase by 40% compared to pre-screening activity.

Discussion In order to realise the benefits of screening, services must be equipped to deal with findings. Following these results, the planning team for thoracic surgery in South Wales have increased the scale of the proposed new thoracic surgery unit.

Please refer to page A288 for declarations of interest related to this abstract.

'Walk this way' – Innovations in pulmonary rehabilitation

P18 BARRIERS AND FACILITATORS OF PHYSICAL ACTIVITY: PERCEPTIONS OF PEOPLE WITH COPD, WITHOUT COPD AND HEALTHCARE PROFESSIONALS IN SAUDI ARABIA

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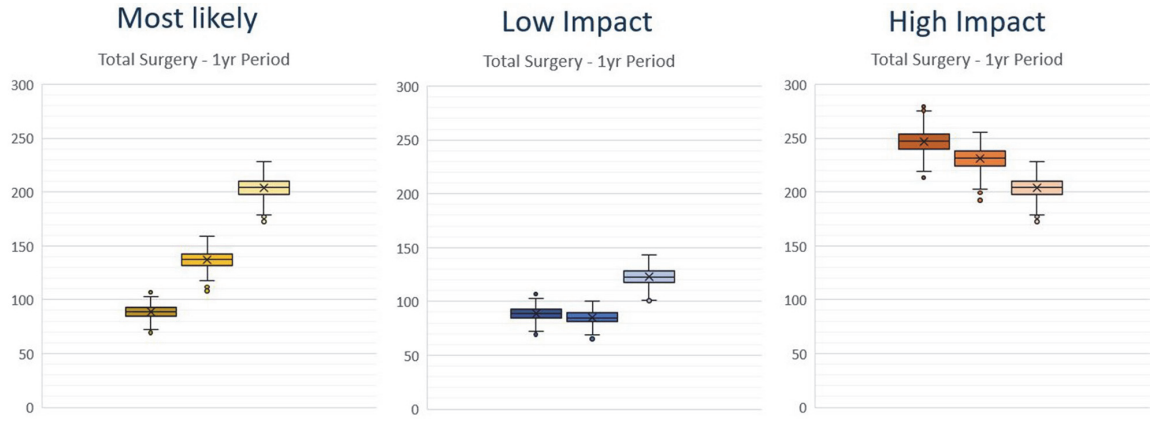
Introduction Physical activity plays a crucial role in managing and improving health outcomes for people with chronic obstructive pulmonary disease (COPD). However, limited research has investigated specific barriers and facilitators of physical activity in Saudi Arabia. This qualitative study aims to explore the factors influencing physical activity engagement in people with COPD, without COPD, and Health Professionals (HPs) in Saudi Arabia.

Methods This qualitative research, included semi-structured online interviews with people with and without COPD and AHP's from Riyadh, Saudi Arabia. The interview schedule was informed by the Social Cognitive Theory (SCT). Interviews were undertaken in Arabic, recorded, transcribed, and translated before being analysed thematically.

Results A total of 19 participants took part, 8 people with COPD and 5 people without COPD, and 6 HPs (3 physiotherapists, 2 respiratory therapists, and 1 physician). Preliminary findings identified barriers and facilitators recognised by all participants. **COPD participants** reported barriers such as lack of desire, COPD symptoms, financial constraints, and cultural factors (such as dress code). Motivational factors included social support, weight loss goals, and doctor's advice. **Non-COPD** participants highlighted cultural norms barriers (such as absence of a culture of walking), lack of awareness of the importance of physical activity, and environmental



Abstract P17 Figure 1 Projected annual thoracic surgery demand from lung cancer screening in South Wales, based on three different roll-out scenarios and at three time- points (years 2027, 2032 and 2037). Box-plots demonstrate median estimates, first and third quartiles, and maximum and minimum estimates

factors such as weather. **Healthcare professionals** identified barriers related to insufficient knowledge and training about physical activity, and limited availability of rehabilitation centres. Facilitators included increased awareness of physical activity, educational sessions, and support from healthcare professionals.

Conclusion This study highlights the barriers and facilitators of physical activity among people with and without COPD and healthcare professionals in Saudi Arabia. The findings provide valuable insights into the unique cultural, personal, and environmental factors that influence physical activity engagement in this population. Understanding these factors is crucial for the development of targeted interventions and strategies to promote physical activity and improve the overall health outcomes of individuals with COPD in Saudi Arabia. Further analysis and interpretation of the data are ongoing.

P19 MOTIVATIONS FOR COMPLETING PULMONARY REHABILITATION – A QUALITATIVE ANALYSIS

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Background Previous studies have focused on demographic factors that might predict non-completion of pulmonary rehabilitation (PR). Limited qualitative data exist for those who do not complete PR, likely due to poor recruitment of a disengaged population. The aim of our study was to explore motivations of those completing PR.

Methods A mixed methods survey of a single Likert scale question and three open answer questions was offered to participants completing a discharge assessment following PR. Descriptive statistics and inductive thematic analysis were used to analyse the survey responses, with investigator triangulation with a second researcher not directly involved in delivering PR co-analysing the data.

Results Sixty-two (33%) of patients completing a discharge assessment after PR completed the survey.

Forty-two (77%) of respondents reported having no thought of leaving PR during the course, yet 69 of 85 coded ideas identified factors that motivated the patient to continue past thoughts of leaving.

Desire to improve health and wellbeing was the most common theme among reasons given for both initially committing to a course (71 of 104 coded ideas) and for continuing with PR past thoughts of leaving (28 of 85 coded ideas).

Staff delivering PR are important in relation to continuing patient commitment to the programme (14 of 85 coded ideas); less common themes included noticing improvements in health and wellbeing (4 of 85 coded ideas) and enjoyment in classes or course (5 of 85 coded ideas)

Abstract P19 Table 1 Shows the number of responses and coding of ideas broken down into themes and subthemes identified from the free text responses in the survey

Question	Which factors were most motivating for you personally in making the commitment to attend the PR programme in the first instance?	Which factors were most motivating for you personally in moving past any thoughts of leaving the programme during the eight weeks of your course	Additional comments
Overall number of responses	**62**	**59**	**30**
Themes (sub-theme)			
Desire to improve health and wellbeing			
(Improve breathing)	16	2	1
(Improve general health/wellbeing, or specific aspect of)	26	15	2
(Improve fitness/strength/ mobility/physical activity)	29	11	2
Positive impact of staff	9	14	16
Noticing improvement in health and wellbeing	4	4	10
Enjoyment in classes/course	2	5	5
Little or no thought of leaving PR once enrolled	0	16	0
Other codes	18	18	14
Uncoded	3	3	5
Total number of unique ideas	**107**	**88**	**55**

Conclusions Desire to improve health and wellbeing and the positive impact of staff delivering PR are important in motivating those patients who experience thoughts of leaving PR during the course to continue. More research is needed identify modifiable factors that might influence completion for those who do not complete PR, and to develop interventions that might reinforce the benefits of PR.

P20 EXPERIENCES AND ATTITUDES OF PULMONARY, BREATHLESSNESS AND COVID-19 REHABILITATION DELIVERERS ABOUT THE PROTECTED CHARACTERISTICS OF SERVICE USERS

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Introduction and Objectives Rehabilitation is beneficial for a number of chronic conditions; however, the inclusivity of rehabilitation services is unclear. To ensure the inclusivity, representativeness and equity of rehabilitation, protected characteristics (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation) are often monitored. The experiences and perception of protected characteristics among healthcare professionals (HCPs) delivering rehabilitation is unknown.

This qualitative study explored HCPs understanding of protected characteristics and their perception of inclusivity, representativeness and equitable benefit of pulmonary, breathlessness and COVID-19 rehabilitation.

Methods Semi-structured qualitative interviews were conducted with HCPs involved in pulmonary, breathlessness and/or COVID-19 rehabilitation from two NHS trusts. Interviews were conducted in person or via videoconferencing. Interviews were audio-recorded, transcribed and analysed using reflexive thematic analysis.

Main Results 12 interviews were conducted with physiotherapists (n=6), occupational therapists (n=2), nurses (n=2) and exercise physiologists (n=2). Four themes were generated (figure 1). Theme 1: Limited knowledge and understanding of protected characteristics, including the lack of knowledge of the difference between sex and gender and surprise at marriage and civil partnership as a protected characteristic. Theme 2: HCP assumptions of service user's protected characteristics, including the assumption of religion or belief based on race and the assumption of gender based on sex assigned at birth. Theme 3: Discomfort when collecting protected characteristics, including HCPs feeling uncomfortable asking questions and service users feeling uncomfortable answering questions about their protected characteristics. Theme 4: Perception of representativeness of service users compared to the local population, including the perception that service users are representative in terms of age and that service users are racially unrepresentative of the local population.

Conclusions This study has highlighted several challenges in HCPs understanding of protected characteristics and the representativeness of pulmonary, breathlessness and COVID-19 rehabilitation that must be addressed to ensure equity for all service users.

Please refer to page A288 for declarations of interest related to this abstract.

P21 COLLECTION AND REPORTING OF EQUALITY ACT 2010 PROTECTED CHARACTERISTICS WITHIN STUDIES OF PULMONARY REHABILITATION IN THE UNITED KINGDOM

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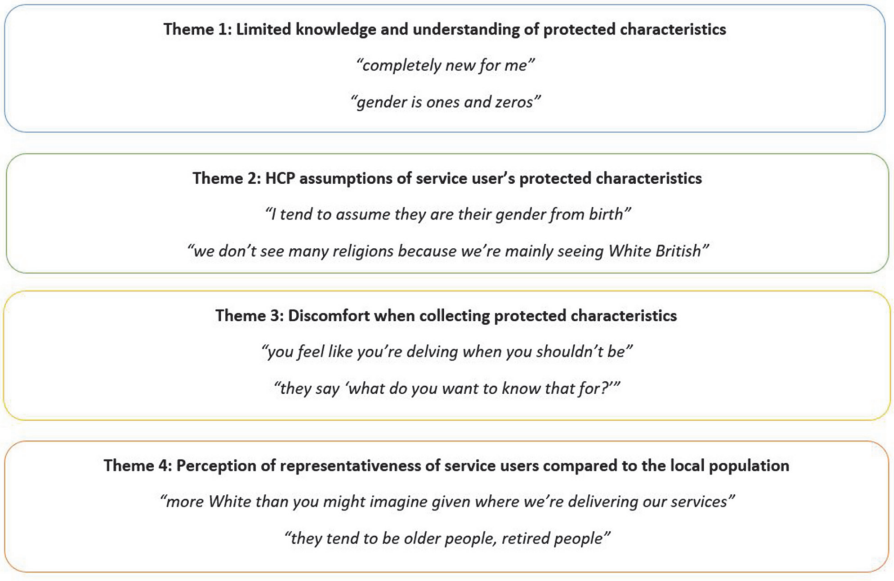

Abstract P20 Figure 1

Background Under the Equality Act 2010, it is illegal to discriminate based on protected characteristics (age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex, sexual orientation). It is anecdotally reported that pulmonary rehabilitation (PR) is poorly attended by minority groups. However, the extent to which protected characteristics are collected and reported, and therefore who is accessing PR, remains unclear.
Objectives To describe the ways in which Equality Act 2010 protected characteristics have been reported in UK studies of PR.
Methods A systematic scoping review following PRISMA-ScR guidelines was conducted across five databases. UK studies of any design collecting data on PR from 1st October 2010 (date of Equality Act 2010 inception) were eligible.
Results Of 36 included studies, 97% (n=35) reported the age of participants, 42% (n=15) reported sex and 19% (n=7) reported gender with only male and female categories. In 17% of studies (n=6), it was unclear if authors reported sex or gender, 8% (n=3) used the terms 'sex' and 'gender' interchangeably and 8% (n=3) reported either male or female, but did not state if this was sex or gender. The majority sex or gender was reported in 70% (n=14) studies. Race was reported through ethnicity in 3% (n=1) of studies and 8% (n=3) discussed the homogeneity of the race of participants as a study limitation. No studies explicitly reported the disability of participants, but all studies reported measures indicating disease severity and functional ability (e.g. FEV_1% predicted (81% (n=29)) and incremental shuttle walk test (72% (n=26))). No studies reported gender reassignment, marriage and civil partnership, pregnancy and maternity, religion or belief or sexual orientation.
Conclusions Apart from age, Equality Act 2010 protected characteristics are either not commonly reported or inconsistently reported in PR studies, and therefore access and representativeness of this intervention remains unclear. A standardised reporting framework would be beneficial.

Please refer to page A289 for declarations of interest related to this abstract.

P22 UNMET NEED AND BARRIERS IN PROVISION OF PULMONARY REHABILITATION FOR PEOPLE WITH COPD: FINDINGS FROM A LARGE UK SURVEY

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10.1136/thorax-2023-BTSabstracts.174

Pulmonary rehabilitation (PR) is a key provision of chronic obstructive pulmonary disease (COPD) treatment, comprising a programme of physical activity and education to improve self-management. PR services were disrupted during the COVID-19 pandemic, and this research aims to identify recent provision and barriers to access among people with COPD.

Between January-March 2023, Asthma + Lung UK ran an online survey of people with lung conditions in the UK, which received 14,450 responses. Of 4,759 respondents with COPD, 43% (2779) scored 3+ on the MRC breathlessness scale,[1] meeting PR eligibility criteria. Within the eligible group, only 48% (1324) had ever received PR while 43% (1191) had not, and the remaining 9% (264) of respondents were not aware of PR. Of eligible respondents who haven't done PR, 70% (830) have not been offered the chance by a healthcare professional. This varied by state of breathlessness – the more breathless a respondent, the more likely it was that they had received or been offered PR (table 1).

Abstract P22 Table 1 Provision of PR and barriers to access by degree of breathlessness as measured on MRC breathlessness scale of people with COPD

	MRC3	MRC4	MRC5
Received PR	40%	50%	52%
Not offered PR	79%	67%	64%
Would consider PR if offered	97%	96%	86%
Reasons for not doing PR			
Wouldn't be able to complete programme	4%	16%	17%
Other medical problems would make it difficult	23%	31%	27%
Did not feel fit enough to travel to attend	13%	13%	37%

95% (519) of eligible COPD respondents who hadn't received PR or an offer for it, would consider it if offered. There was evidence of increasing hesitation with increasing severity of breathlessness, and those who didn't attend cited issues with comorbidities, confidence, and fitness levels (table 1). The other third (29%) of reasons for declining the offer of PR focused on course suitability including inconvenient times, lacking equipment and long waiting lists.

Our research suggests significant gaps in provision of PR to people with COPD. There is unmet need for this service, and several barriers need to be addressed to encourage participation. Improved provision of PR would help improve outcomes and quality of life for people with COPD.

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P23 VIDEOCONFERENCE PULMONARY REHABILITATION (PR) AND CHANGE IN KNOWLEDGE IN PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): A PROPENSITY-MATCHED ANALYSIS

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10.1136/thorax-2023-BTSabstracts.175

Background PR, a programme of supervised exercise and education for people with chronic respiratory diseases is traditionally delivered face-to-face (Bolton et al., 2013). Videoconference PR has emerged as an alternative to the traditional model, but its impact on knowledge remains unexplored (Cox et al 2021).
Aim To compare the effect videoconference PR to face-to-face PR on knowledge (Lung Information Needs Questionnaire (LINQ)) in COPD.
Methods We conducted a matched case-control study comparing 25 consecutively recruited people undergoing

Abstract P23 Table 1 Baseline and response to PR

	F2F PR (n=25)			VIDEOCONFERENCE Pr (n=25)			BETWEEN-GROUP DIFFERENCE
Variable	**Baseline**			**Baseline**			**p-value**
Gender (female)	15 (60%)			14 (56%)			0.774
Age (years)	68.0 (62.5, 76.5)			68.0 (63.0, 75.5)			0.793
LINQ	7 (5, 9.5)			7 (5, 12)			0.792
Variable	**Baseline**	**Response to PR**	**p-value**	**Baseline**	**Response to PR**	**p-value**	**p-value**
LINQ	7.0 (5.0, 9.5)	-3.0 (-5.0, -1.0)	<0.01	7.0 (5.0, 12.0)	-2.0 (-6.0, -0.5)	<0.01	0.99
MRC	3.4 (1.1)	-0.5 (0.1 to 0.9)	0.01	3.0 (1.0)	-0.3 (-0.01 to 0.7)	0.06	0.55
CRQ - T	66.0 (57.0, 82.5)	16.0 (8.0, 33.5)	<0.01	77.0 (63.5, 95.5)	7.0 (-2.5, 15.5)	0.03	<0.01
ISWT	200 (110, 330)	50 (0, 75)	<0.01	290 (170, 460)	20 (-20, 60)	0.15	0.01

Baseline data reported as median (25%, 75%) or mean (standard deviation).
Response data reported as median (25th, 75th centile) change or mean (95% confidence interval) change.
Abbreviations CRQ-T: Chronic Respiratory Questionnaire – total score; ISWT: incremental shuttle walk test; LINQ: Lung Information Needs Questionnaire; MRC: Medical Research Council dyspnoea scale; PR, Pulmonary Rehabilitation

videoconference PR to 25 people undergoing face-to-face PR. Groups were matched using propensity scoring which considered gender, age, and baseline LINQ score. In addition to the LINQ, the following outcomes measures were collected at a face-to-face assessment before and after PR: incremental shuttle walk test (ISWT), Medical Research Council (MRC) Dyspnoea Scale, and Chronic Respiratory Questionnaire (CRQ). Both groups participated in an eight-week, twice-weekly supervised programme involving exercise (one hour) and education (30 minutes). Videoconference PR was delivered by Microsoft Teams. The same education topics, supplemented by an education manual, were discussed with both groups through presentations, quizzes, interactive scenarios, and a question period. The physiotherapy team (staff:patient ratio = 1:8) and multidisciplinary team (staff:patient ratio = 1:32) delivered the education sessions for videoconference and face-to-face PR respectively.

Results Baseline and response data are in table 1. There was a statistically and clinically (minimal important difference of -1 achieved) significant improvement in the LINQ in both groups with no between-group difference (p=0.99). There was no significant improvement in MRC or ISWT in the videoconference group, in contrast to the face-to-face group. Although there was a significant improvement in CRQ in both groups, there was a significantly greater improvement in the face-to-face group (p<0.01).

Conclusion Both videoconference and face-to-face PR resulted in similar and significant improvements in LINQ, indicating knowledge enhancement. Videoconference PR was not associated with improvements in breathlessness or exercise capacity. However, these results may be biased by the small sample size and future research should corroborate these data.

P24 IS HOME-BASED PULMONARY REHABILITATION (PR) ASSOCIATED WITH IMPROVEMENTS IN KNOWLEDGE IN PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD): A PROPENSITY-MATCHED ANALYSIS

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10.1136/thorax-2023-BTSabstracts.176

Introduction PR is traditionally conducted in a face-to-face outpatient setting, but there has been growing interest in alternative programme models including home-based PR. Although home-based PR is associated with improvements in core PR outcomes, it is unclear whether it is as effective as face-to-face programmes in improving knowledge.

Abstract P24 Table 1 Baseline and response to PR

	Face-to-face PR (n=84)			Home-based PR (n=84)		Between-group difference
Sex (male: n (%))	49 (58%)			42 (50%)		0.28
Age (years)	68 (9)			70 (11)		0.27
FEV_1 (% predicted)	38.0 (27.0, 49.0)			44.5(27.0, 52.8)		0.19
Variable	**Baseline**	**Response to PR**	**p-value**	**Baseline**	**Response to PR**	**p-value**
LINQ	8.0 (5.0, 12.0)	-4.0 (-7.0, -2.0)	<0.001	9.3 (4.6)	-3.7 (-4.6 to -2.9)	0.17
MRC	3.4 (1.1)	-0.6 (-0.8 to -0.4)	<0.001	4.0 (3.0, 5.0)	-1.0 (-1.0, 0.0)	0.31
CRQT	74.1 (22.5)	16.5 (5.3, 28.8)	<0.001	71.0 (23.1)	15.5 (2.0, 23.8)	0.20
ISW (m)	260 (140, 350)	60 (13, 108)	<0.001	90 (40, 200)	20 (0, 60)	<0.001

Baseline data are reported as mean (standard deviation) or median (25th, 75th centile).
Response data are reported as mean (95% confidence interval) change or median (25th, 75th centile) change.
Abbreviations CRQT: Chronic Respiratory Questionnaire – Total score; FEV_1: Forced Expiratory Volume in 1 second; ISW: Incremental Shuttle Walk; LINQ: Lung Information Needs Questionnaire; MRC: Medical Research Council; PR: Pulmonary Rehabilitation.

Aim To compare the effect home-based to face-to-face PR on knowledge (Lung Information Needs Questionnaire (LINQ)) in COPD.

Methods We conducted a 1:1 propensity-matched cohort study involving 84 consecutively recruited COPD patients who chose home-based PR and 84 patients who chose face-to-face PR. Groups were matched using propensity scoring which considered age, sex, forced expiratory volume in one second%predicted, and baseline LINQ score. In addition to the LINQ, the following outcomes measures were collected at a face-to-face assessment before and after PR: incremental shuttle walk test (ISWT), Medical Research Council (MRC) Dyspnoea Scale, and Chronic Respiratory Questionnaire (CRQ). Home-based PR comprised twice-weekly unsupervised home-exercise with weekly telephone calls for eight weeks. The call duration (range 20 to 30 minutes) was dependent on the patient's exercise programme progress and questions about the education topics. Face-to-face PR comprised supervised exercise (1 hour) and education sessions (30 minutes) twice a week for eight weeks. The education topics, supplemented by an education manual, were the same in both groups. For home-based PR, the physiotherapist directed the patient to read two specific topics each week in the education manual and answered any questions during the phone-call. For face-to-face PR, a single education topic was delivered in a group-setting by the multidisciplinary team.

Results Baseline and response data are in table 1. There was a statistically and clinically (minimal important difference of -1 achieved) significant improvement in the LINQ in both groups with no between-group difference (p=0.17). There were significant improvements in core PR outcome measures in both groups. However, similar to previous research, there was a significantly smaller improvement in exercise capacity in home-based PR compared to the face-to-face programme (p<0.001).

Conclusion Home-based PR is associated with similar improvements knowledge as face-to-face PR. These data should be corroborated by future research.

P25 A MIXED METHODS EVALUATION OF A 12-WEEK BLENDED DIGITAL AND FACE-TO-FACE REHABILITATION PROGRAMME FOR PEOPLE WITH LONG-COVID-19

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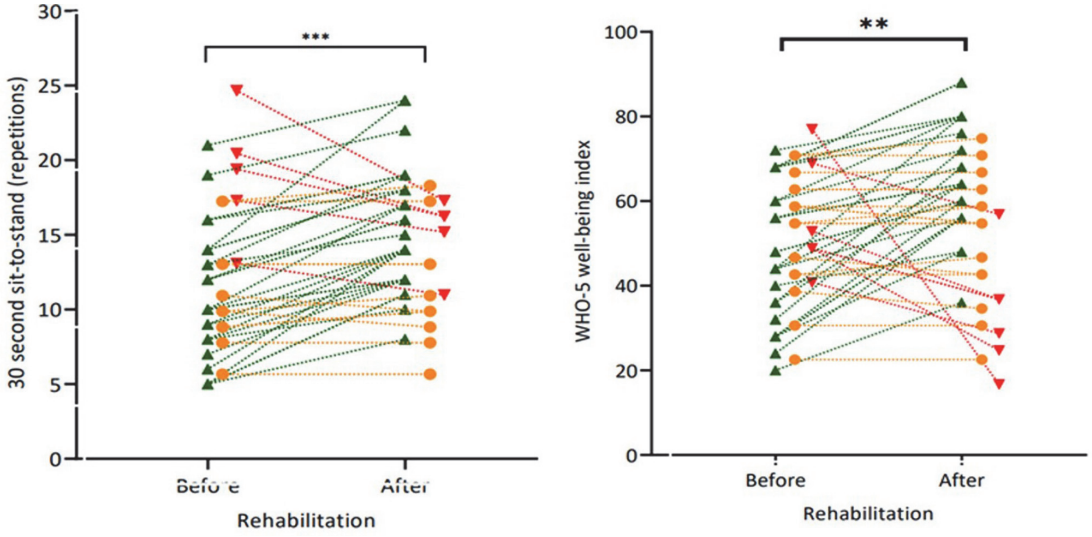
10.1136/thorax-2023-BTSabstracts.177

Introduction Approximately 2 million people in the UK (3% of the population) have self-reported long COVID. Sufferers present a diverse clinical picture which often limits functional capacity and affects mental wellbeing. The need for rehabilitation of long-Covid-19 is becoming increasingly apparent.

Aim Determine the feasibility, efficacy and participant satisfaction of a 12-week blended rehabilitation programme for long-Covid-19.

Methods Participants with self-reported long-Covid-19 completed a 12-week pulmonary rehabilitation programme. The first 6 weeks of the programme was conducted remotely and included live group-based and on-demand exercise sessions. The second 6 weeks incorporated face-to-face rehabilitation sessions in a local authority leisure centre. Throughout the programme participants received a weekly telephone call with a rehabilitation specialist and were invited to online educational and social activities. Functional capacity was measured using the 30 second sit-to-stand test, mental wellbeing was assessed using The World Health Organisation – Five, Well-Being Index (WHO-5) and feasibility and satisfaction was assessed with an exit-questionnaire and interviews in a sub-set of participants (n=8).

Results To date, 71 participants have enrolled on the rehabilitation programme, 49 (69%) female, mean (SD) 48 (13) years. 62 (87%) participants completed the 12-week programme. 30 second sit-to-stand repetitions increased from 12 (5) at baseline to 15 (4) following rehabilitation, (P<0.001), and 62% of people improved by the Minimal Clinically Important Difference (MCID) of 2 repetitions (figure 1). WHO-5 improved by 22% (44) (P=0.006), with 53% of participants improving by



Abstract P25 Figure 1 Change in 30 second sit-to-stand and WHO-5 well being index following a 12-week blended rehabilitation programme in people with long-Covid-19. Green (up-pointing) triangles indicate improvements beyond MCID. ***P<0.0001, **P<0.01

the MCID of 10% (figure 1). The exit questionnaire identified that all participants rated the service as good or excellent. 96% reported that their confidence improved and 92% said they were more active. Common themes arising from the interviews included the value of a supportive instructor in achieving well-being gains, peer support, perceived physical improvements and that 12-weeks was too short.

Conclusion A blended 12-week online and community-based rehabilitation programme for long-Covid-19 is well tolerated and well received, provides support for participants and has shown clinically meaningful improvements in functional capacity and mental well-being.

P26 FEASIBILITY OF A COMMUNITY-BASED EDUCATION AND PHYSICAL THERAPY PROGRAMME TO IMPROVE SYMPTOMS OF LONG COVID-19

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10.1136/thorax-2023-BTSabstracts.178

Aim This feasibility trial examined the acceptability of a community-based COVID-19 education and physical therapy programme for improving the symptomology of individuals with Long COVID-19.

Methods A sample of 22 individuals (age: 46±16, male: 12 & female: 10), 11±4 months since initial infection with Long COVID-19 symptoms (persisting for ≥12 weeks) participated in a 6-week physical therapy & community-based education programme. Participants were provided with guidance for the management of their health, lifestyle, symptomology and physical activity through weekly group-based in-person sessions and telephone consultations. Post-intervention qualitative data was also collected- from both completing and non-completing participants- to assess factors determining their programme compliance.

Results High adherence to both the community-based sessions and telephone consultations was achieved. Physical therapy sessions were deemed safe, with only mild exertional symptoms observed for the 17/22 completers during the programme. Reasons for non-completion included 'symptom exertion' and 'concerns for contracting COVID-19'. Repeated-measures T-test analyses demonstrated meaningful improvements in participants' fatigue (Chalder Fatigue scale & FACIT-F) and respiratory (CAT) symptomology post-intervention [table 1]. Participants' qualitative feedback praised the programme for enhancing their confidence and readiness for resuming activities of daily living, in addition to its feasible and enjoyable delivery style.

Conclusion The feasibility of delivering an accessible COVID-19 education and physical therapy programme within the community was high with good adherence rates and meaningful improvements in fatigue and respiratory symptoms. In terms of research importance, it plausible to suggest that thousands of people with long COVID-19 in the UK cannot be accommodated to hospital-based rehabilitation programmes, so community-based rehabilitation of this nature may provide a feasible alternative.

Abstract P26 Table 1 Means±St.Dev & p-values for symptoms of fatigue and respiratory symptoms

	Baseline	Completion	*P*
CFS (Bimodel)	8±3	6±4	0.018*
CFS (Likert)	23±7	19±7	0.007*
FACIT-F	19±10	23±10	0.005*
CAT	23±7	21±7	0.068

* Significant at α = .05; CFS: Chalder Fatigue Scale; CAT: COPD Assessment Test

P27 REHABILITATION-INDUCED BENEFITS DO NOT DIFFER BETWEEN MEN AND WOMEN WITH LONG COVID-19 SYNDROME

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10.1136/thorax-2023-BTSabstracts.179

Background Female sex is associated with higher prevalence of long COVID-19 syndrome following hospital admission six months after discharge. Patients with long COVID-19 syndrome exhibit improvement in exercise tolerance, quality of life and functional capacity following the implementation of pulmonary rehabilitation programmes. The benefits of rehabilitation on the two genders remain inconclusive.

Aim To compare the effect of a hybrid Pulmonary Rehabilitation (PR) program (including outpatient and home-based sessions) on quality of life (QoL), functional capacity and exercise tolerance in men and women with long COVID-19 syndrome.

Methods 27 patients (15 men mean±SD (53±16 years) and 12 women (54±8.5 years)) completed PR consisting of 8 outpatient PR sessions (twice weekly for 4 weeks) and 24 home-based sessions (3times/week for 8 weeks), 5±2 months post-hospital discharge. QoL, functional capacity, maximum inspiratory (PImax) and expiratory (PEmax) pressure were assessed prior and following the completion of the programme. Exercise tolerance was assessed via an incremental ramp cardiopulmonary exercise test (CPET).

Results Following PR, the magnitude of improvement in MIP as a fraction of predicted normal was identical between men and women corresponding to 10%, whilst the magnitude of improvement in MEP was 15% in men and 5% in women (p=0.164). Fatigue, assessed via Functional Assessment of Chronic Illness Therapy (FACIT) questionnaire, was similarly improved in men and women by 14±9 and by 17±9 (p=0.570), respectively. Six-minute walk distance was improved by 89±58 metres in men and by 52±69 metres in women (p=0.143). Exercise tolerance was similarly improved in men and women by 22±10 Watts and by 16±10 Watts, respectively (p=0.231). Finally, VO_2peak was similarly improved in men and women by 3.3±2.3 ml/kg/min and 2.3 ±1.4 ml/kg/min (p=0.198), respectively.

Conclusions The application of a hybrid PR in patients with long COVID-19 is equally effective in both men and women.

P28 INCREMENTAL AND ENDURANCE SHUTTLE WALK TEST PERFORMANCE AND FUNCTIONAL ASSESSMENT OF CHRONIC ILLNESS THERAPY FATIGUE SCALE ARE MAINTAINED OR IMPROVED AT 3-MONTHS FOLLOWING A 6-WEEK IN-PERSON OR ONLINE COVID REHABILITATION PROGRAMME

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Introduction People with Long Covid have improved quality-of-life, physical and mental wellbeing, following completion of an in-person or online Covid rehabilitation (CoR) programme.[1 2] It is unclear whether these benefits are maintained beyond the end of the programme. Our aim was to examine the maintenance of benefits (if any) following discharge from CoR.

Methods An observational 3-month follow-up (FU) assessment after discharge from CoR (6-week in-person or online). No formal maintenance programme was available for patients in the FU period. Outcome measures: Incremental Shuttle Walk Test (ISWT), Endurance Shuttle Walk Test (ESWT), Chronic Obstructive Pulmonary Disease Assessment Test (CAT), Hospital Anxiety and Depression Scale (HADS), EuroQol 5-dimension Questionnaire (EQ5D), and Functional Assessment of Chronic Illness Therapy Fatigue Scale (FACIT). Measures were compared pre- and post-CoR. Ethics reference: 19/EM/0267

Results Out of 63 patients, 18 declined and 7 were unable to be contacted. 38 (mean±SD: age 54±11 years, 68% female, 63% White British, 21% Asian/British Asian, 13% online CoR) attended a FU assessment. See table 1 for outcomes at pre, post and FU. No differences in outcomes at post and FU were observed between in-person and online CoR ($p \geq .100$). 29/38 patients reported current participation in home-/gym-based exercise at FU.

Conclusion A short course of CoR elicits similar benefits to those reported in the literature. While some are maintained (exercise tolerance) or ameliorated (fatigue), some may take longer to improve (symptoms). The mild symptoms of anxiety and depression and average self-reported health states pre-CoR likely explain the lack of changes (HADS/EQ5D). Overall, performance is maintained in the absence of any formal input and symptom burden continues to decline. Further investigations should explore whether these benefits maintain longer-term.

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P29 EXERCISE-BASED INTERVENTIONS TARGETING BALANCE AND FALLS RISK IN PEOPLE WITH COPD: A SYSTEMATIC REVIEW WITH META-ANALYSIS

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Introduction People with chronic obstructive pulmonary disease (COPD) have balance impairment and fall more frequently than healthy peers. Exercise is a key component in improving balance, yet the effect of different exercise-based interventions remains unclear. This systematic review aimed to investigate the mean treatment effect of exercise-based interventions on balance and falls in people with COPD.

Methods Eight databases were searched in August 2021 (updated January 2023). Studies involving; exercise-based interventions (including pulmonary rehabilitation (PR)) delivered for a minimum 14 days to people with COPD; balance or falls outcomes; with an immediate post-intervention primary endpoint were included. RoB2 or ROBINS-I assessed risk of bias. Pooled effect sizes and 95% confidence intervals were calculated for outcomes reported in five or more studies. Exploratory meta-regression and narrative synthesis were also undertaken.

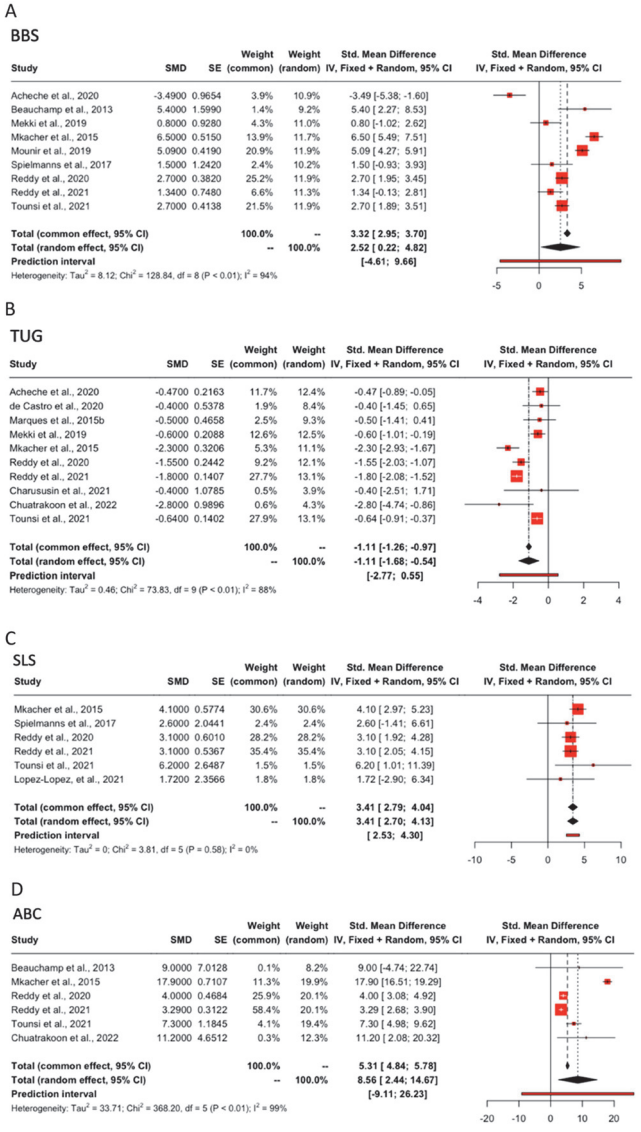
Results Deduplicated searches returned 1349 studies of which n=34 (n= 1712 participants) were included (RCT n=19, non-RCT n=1, pre-post study n=14). Overall, risk of bias

Abstract P28 Table 1 Outcome measures taken before (pre), after (post) and 3-months after (FU) a 6-week course of Covid rehabilitation or online programme (n=38)

Measures	n	Pre	Post	FU	Overall	Pairwise Comparisons		
						Pre vs Post	Post vs FU	Pre vs FU
ISWT (m)	n=33	300±170	360±190	360±160	p=.002	p=.010	p=1.000	p=.011
ESWT (s)	n=29	243±111	556±367	671±402	p<.001	p<.001	p=.395	p<.001
HADS-A	n=36	9±5	8±5	8±5	p=.352	p=1.000	p=1.000	p=.611
HADS-D		8±3	8±4	7±4	p=.083	p=1.000	p=.050	p=.264
CAT	n=34	20±8	18±7	16±8	p=.022	p=.821	p=.354	p=.012
EQ5D-VAS	n=33	55±16	59±18	59±19	p=.077	p=.101	p=1.000	p=.140
EQ5D		0.5348	0.5747	0.5826	p=.154	p=.637	p=1.000	p=.141
Index		±0.2525	±0.2431	±0.2154				
FACIT	n=32	20±10	23±10	28±11	p<.001	p=.027	p<.001	p<.001

was moderate. Random effects meta-analysis (figure 1) indicated greater improvements following exercise-based interventions compared to usual care in; Berg Balance Scale (BBS, n=9) μ=2.52 (95% CI: 0.22 to 4.82); Timed Up and Go (TUG, n=10) μ =-1.11 (95% CI: -1.68 to -0.54); Single Leg Stance (SLS, n=6) μ=3.41 (95% CI: 2.70 to 4.13) and Activities Balance Confidence Scale (ABC, n=6) μ=8.56 (95% CI: 2.44 to 14.67. Narrative synthesis described improvements in BBS, TUG and SLS, plus Tinetti, Functional Reach, Balance Evaluation Systems Test, posturography and Elderly Fall Screening Test.

Meta-regression observed a superior treatment effect in all male vs mixed-sex groups for ABC (μ= 12.8, t(4) = *5.5*, *p <.01, (6.38–19.23)*). Falls history was not associated with changes in balance but studies including balance training with PR were more beneficial at improving BBS and TUG (μ= 4.35, t(7) = 2.73, *p* = .03, 95% CI (0.58 – 8.1), -1.16, t(8) = -6.21, *p*<0.01, the 95% CI (-1.6 – 0.7) respectively).



Abstract P29 Figure 1 Meta-analysis results a) BBS b) TUG c) SLS d) ABC

Discussion Broad treatment effects make it difficult to conclude any benefit of exercise-based interventions on balance and falls in people with COPD. However, findings suggest inclusion of targeted balance training may derive the greatest benefits.

P30 MENTAL HEALTH INTERVENTIONS IN CHRONIC RESPIRATORY DISEASE (MIND PROJECT): A PILOT TRIAL OF SPECIALISED PSYCHOLOGICAL CARE EMBEDDED WITHIN A GENERAL RESPIRATORY SERVICE

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Introduction Living with chronic respiratory conditions can adversely affect individuals' mental health, leading to poor self-management and treatment adherence, increased risk of respiratory infections and hospitalisations, reduced quality of life, and continued smoking. Poor mental health maintains poor respiratory health.

Methods We successfully bid for national funding for a 12-month pilot study to assess the impact of integrating a part-time Clinical Psychologist within the general respiratory service across primary and secondary care. This novel initiative for Scotland aimed to provide evidence-based psychological support to enhance emotional well-being and facilitate the acquisition of self-management skills.

Results 73 patients with chronic respiratory conditions, predominantly COPD (60%, including 6% with co-existent asthma), asthma (16%), and ILD (12%), were referred with symptoms of anxiety, depression, or both, often resulting in non-adherence with medical treatments and frequent hospital attendances. Of the appropriate referrals, 58/67 patients (87%) accepted clinic invitations, with seven patients dying before review. The first 20 patients who completed therapy showed significant improvement in mental health, with reduced Hospital Anxiety and Depression Scale scores. Mean anxiety scores decreased from 'severe' (*M*=15, range 9–18) to 'moderate' (*M*=12, range 8–14), while depression scores decreased from 'moderate' (*M*=13, range 3–18) to 'sub-clinical' levels (*M*=7, range 1–18). Moreover, a decrease in emergency attendance was observed in 6/11 patients, with one patient having 6 admissions in the year before compared to 2 in the year after treatment, although in the context of the pandemic. Feedback from staff questionnaires and patients highlighted the positive impact on wellbeing for individuals living with chronic respiratory conditions.

Conclusions This study highlights the effectiveness of embedded psychological interventions within standard respiratory care with reduced psychological distress for patients who engaged with therapy. The positive outcomes have led to increased recognition and referrals, creating emerging capacity challenges for timely reviews. Ongoing evaluation and service review are necessary to accommodate the growing demand and maintain timely and beneficial patient reviews. Respiratory medicine benefits from Clinical Psychology that is integrated within standard care.

'Danger! High voltage' – Diagnosis and management of sleep disordered breathing and respiratory failure

P31 COMBINING FOUR SCREENING TOOLS FOR COST EFFECTIVE SCREENING OF OSA IN TRAIN DRIVERS

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Background Obstructive sleep apnoea (OSA) in drivers/workers has been implicated in railway and road traffic safety incidents; however, there are insufficient data on its prevalence and cost-effective screening methods.

Aim This pragmatic study examines four OSA screening tools: the Epworth sleepiness scale (ESS), the STOP-Bang (SB), the adjusted neck circumference (ANC) and the body mass index (BMI), exploring their suitability and effectiveness separately and in combination.

Method Using all four tools, 292 train drivers were opportunistically screened between 2016 and 2017. A polygraph (PG) test was carried out when OSA was suspected. Patients with an apnoea-hypopnea index (AHI) ≥5 were referred to a clinical specialist and reviewed annually. Those who had continuous positive airway pressure (CPAP) treatment were evaluated for compliance and control.

Results Of the 40 patients who had PG testing, 3 and 23 participants met the ESS >10 and SB >4, criteria, respectively, whereas 25 participants each had an ANC >48 and a BMI >35 with a risk factor or ≥40 with none. OSA was detected in 3, 18 and 16 of them who met the ESS, SB and ANC criteria, respectively, and was positive for OSA in addition to 16 others who met the BMI criteria. A total of 28 (72%) were diagnosed with OSA.

Conclusion Although when used individually, these screening methods are less effective/inadequate, combining them is easy, feasible and offers the maximum chance of OSA detection in train drivers.

P32 COMPLIANCE AND PATIENT SATISFACTION IN LARGE GROUP FACE TO FACE INITIATION CONSULTATIONS FOR CPAP

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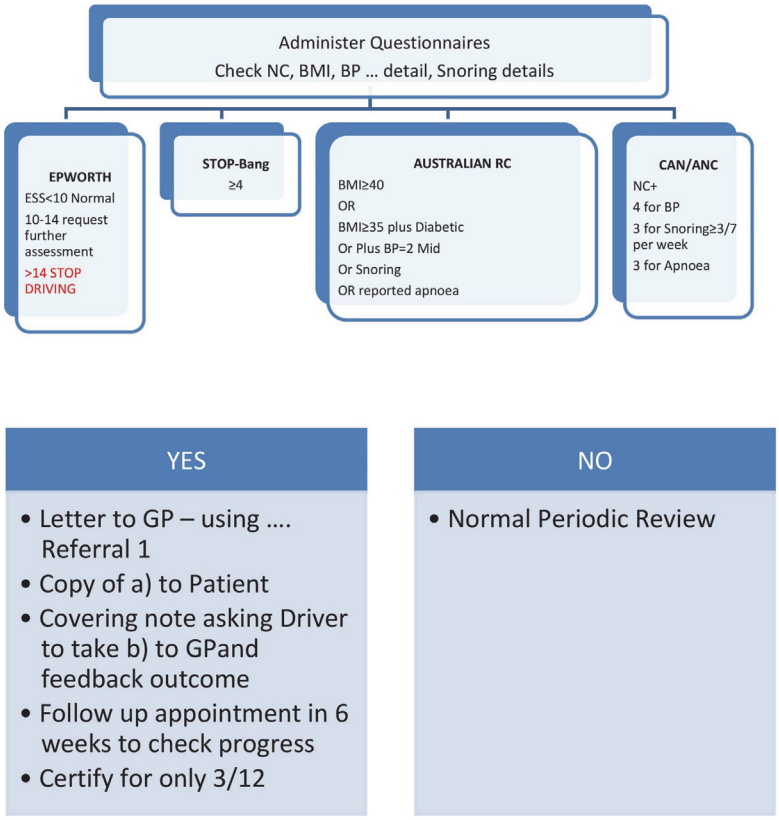
Introduction In June 2021, a large multinational manufacturer of Continuous Positive Airway Pressure (CPAP) machines initiated a global recall of their devices leading to a shortfall in device availability. This coincided with the covid-19 pandemic, resulting in long delays for patients.

Methods The Sleep Service at Liverpool University Foundation Trust provides CPAP initiation for patients with obstructive sleep apnoea syndrome (OSAS) and monitoring through a multidisciplinary team. Initiation and titration are undertaken on an outpatient basis individually, usually taking about one hour to complete. In an effort to overcome long waiting times



Abstract P31 Figure 1 Obstructive Sleep Apnoea Screening Float Chart

in 2023, large group set up events were undertaken. From 18/3/23 to 12/6/23 groups of 35–60 people with OSAS were invited to attend a single morning weekend event in the education centre at Aintree University Hospital. They attended a lecture about the condition and rationale for CPAP and then formed small break out groups to look at the devices, undergo mask fitting and troubleshoot. Each patient was given a patient experience feedback form to complete.

Results Feedback was received from 217 patients and showed a high level of satisfaction. 214 patients (98.6%) reported that when they had important questions, they received answers that they could understand and reported that they thought the care was effective. 100% of respondents would be happy to use the Sleep Service again.

We then compared CPAP compliance (>4 hours for 70% of the time) in the first weekend set up group (n=36) with a control group of patients (n=36) set up individually.

Large group set up showed a use of 42% of days with an average usage per day of 4.9hours (SD 1.9) compared with 39% of days used for an average of 5.1 hours (SD 2.0) for controls. P= 0.9

Conclusion We conclude that large group initiation consultations for CPAP in people with OSAS provide the potential to reduce waiting times for patients whilst maintaining compliance levels and patient satisfaction.

P33 COMPARING CPAP COMPLIANCE IN OBESE AND NON-OBESE PATIENTS WITH OBSTRUCTIVE SLEEP APNOEA

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10.1136/thorax-2023-BTSabstracts.185

Aim Previous literature has suggested that non-obese obstructive sleep apnoea (OSA) patients have a poorer compliance with their continuous positive airway pressure (CPAP) treatment than their obese counterparts.[1] We wanted to expand on this and evaluate this hypothesis in greater detail.

Methods Consecutive patients diagnosed with OSA (apnoea hypopnea index [AHI] > 15) and initiated treatment of CPAP over a 1 year period were included in this study. CPAP compliance, measured by the inbuilt clock within the CPAP machines (in average hours per night), was recorded at 1 week and 1 year. Patient demographics, BMI (obese patients classified by BMI > 30 $kg.m^2$), CPAP compliance (average hours per night), and AHI were collected (found in table 1).

Results 497 patients were included in this study. After applying the exclusion criteria there were 285 patients suitable for inclusion. AHI was significantly higher in the obese group (38.5 vs. 28.2, p=.004). CPAP compliance at 1 week in the obese group and non-obese group were 6.05 vs. 5.87 (p=0.55) respectively; at 1 year this was 5.48 vs. 4.68 (p=.038). 38 patients (31 obese, p=ns) had a compliance of < 4 hours per night at 1 week; compliance at 1 year in this group remained lower (3.49 vs. 5.98 in the obese group, p < 0.001; and 4.68 vs. 5.87 in the non-obese group, p < 0.001), compared to those with > 4 hours per night.

Abstract P33 Table 1 Patient demographics and recorded data

	Non-obese (n=44)	Obese (n=241)	Combined (n=285)
Age (years)	58.1 ± 11.8	56.4 ± 13.1	56.7 ± 12.9
Number of males	37	172	209
AHI	28.2 ± 13.9	38.5 ± 21.7	36.9 ± 21.0
1 week usage (average hours per night)	5.9 ± 2.3	6.1 ± 2.0	6.0 ± 2.1
1 year usage (average hours per night)	4.7 ± 1.9	5.7 ± 3.6	5.5 ± 3.5

Conclusion Our data demonstrates that non-obese OSA patients have a poorer long term CPAP compliance than obese OSA patients. It was also observed that a short term CPAP compliance of < 4 hours per night was a predictor of poorer compliance long term, irrespective of BMI. These patients may benefit from further interventions during the first year to improve their treatment outcomes.

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P34 THE IMPACT OF COPD ON THE DISEASE COURSE IN OSA

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Introduction The co-existence of chronic obstructive pulmonary disease (COPD) in obstructive sleep apnoea (OSA) is defined as the 'Overlap Syndrome' (OS). Overlap syndrome is associated with worse outcomes in COPD; however, its impact in patients with OSA is not fully understood.

Methods We investigated clinical history, comorbidities, Epworth Sleepiness Scale (ESS), home cardiorespiratory polygraphy data, including apnoea-hypopnoea index (AHI) in 370 patients referred to our tertiary sleep service with suspected OSA as part of a service evaluation project.

Results Three hundred and one patients had OSA and 32 (11%) patients had OS. OS was associated with older age (65 years vs. 49 years, p<0.01), higher BMI (38 vs. 35, p=0.047), and similar frequency of males (62.5% vs. 61%, p=0.867) as compared to the OSA only population. As expected, AHI correlated with the ESS (r = 0.18, p=0.002). COPD was associated with more severe daytime sleepiness (ESS 13 vs. 11; p=0.015) after adjusting for AHI, age, and BMI. Amongst patients with mild OSA defined as an AHI <15 the difference was more pronounced (ESS 15 vs. 10, p=0.002). COPD was strongly associated with the presence of co-morbidities such as Type 2 Diabetes Mellitus (60% vs. 13%, p<0.001), hypertension (67% vs. 23%, p<0.001), and cardiovascular disease (33.3% vs. 7%, p<0.001). COPD was an independent predictor for cardiovascular disease (p=0.05) after correcting for age, sex, BMI and AHI.

Conclusions Patients with OS were more co-morbid, and the presence COPD was an independent predictor for cardiovascular disease. These patients also had worse daytime sleepiness; the difference was especially pronounced in patients with a low AHI (mild OSA), offering a possible explanation for disproportionately high ESS in this group. It is critical that we identify and treat COPD in the OSA population to reduce morbidity and mortality in this already under-diagnosed population.

P35 CENTRAL SLEEP APNOEA: PATIENT CHARACTERISTICS AND THERAPY DATA FROM A LARGE TEACHING HOSPITAL IN THE UK

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Introduction Central Sleep Apnoea (CSA) is a pathologically diverse and heterogenous condition. Compared to obstructive sleep apnoea (OSA) it is not as commonly seen in sleep centres, accounting for about <10% of clinic patients.[1] Respiratory polygraphy is required to diagnose CSA and mixed OSA/CSA disorders. Here we present characteristics of patients in our centre including aetiology and treatment of CSA.

Methods This retrospective observational study was conducted using electronic patient records of all patients presenting to the sleep service from 2011 to 2022 in a large teaching hospital. Patients were classified as having Pure CSA (AHI >15/hr with no OSA) or Mixed OSA/CSA (AHI >15/hr with >50% CSA events). Co-morbidities and treatment data were collected.

Results 76 patients had CSA (32% Pure CSA and 68% Mixed OSA/CSA), mean (SD) age 77 (13.5) yrs, and 82% were male. Treatments used in CSA and mixed OSA/CSA included continuous positive airway pressure (CPAP), O_2 alone, non-invasive ventilation – spontaneous timed mode (NIV ST), adaptive servo ventilator (NIV ASV) (table 1).

Patients with mixed OSA/CSA had a better (64%) compliance with positive pressure therapy (>4hrs/night for 70% of time) compared to pure CSA (37.5%).

68 patients (89%) patients were alive at the time of data collection. Mean length of survival from start of therapy was 78 months. There were 8 deaths (2 in the CSA group and 6 in the mixed OSA/CSA group). 6 out of 8 patients who died had heart disease. 3 patients who died were on NIV ASV.

Abstract P35 Table 1 Patient characteristics, aetiology and therapy for Pure CSA and Mixed OSA/CSA

	Diagnosis	Mixed OSA/CSA (N=52)	CSA (N=24)
Demographics	Mean age (SD)	69 (13)	65 (13)
	Number male (%)	47 (90)	19 (79)
Aetiology	Heart disease	18 (35)	8 (33)
N (%)	Idiopathic	11 (19)	10 (42)
	Medication	6 (12)	2 (8)
	Cerebro-vascular disease	10 (21)	3 (13)
	Obesity related	5 (10)	1 (4)
	Treatment emergent	2 (4)	0
Treatment	Oxygen therapy	1 (2)	1 (4)
N (%)	CPAP	26 (50)	10 (42)
	CPAP + O2	4 (8)	1 (4)
	NIV ST	3 (6)	3 (13)
	NIV ASV	13 (25)	5 (21)
	None	5 (10)	4 (16)

Continuous positive airway pressure (CPAP), non-invasive ventilation – spontaneous timed mode (NIV ST), adaptive servo ventilator (ASV)

Conclusion Our data suggests CSA is a complex disease and careful assessment of co-morbidities is required to tailor therapeutic options. Patients tolerated positive pressure therapy better when they have mixed OSA/CSA compared to CSA only.

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P36 EXPERIENCE OF A DISTRICT GENERAL HOSPITAL PHYSIOTHERAPY LED RESPIRATORY FAILURE SERVICE

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10.1136/thorax-2023-BTSabstracts.188

Introduction We report our experience of the first two years setting up a respiratory failure clinic at a district general hospital on the South Coast, UK.

Methods The potential cohort was identified following hospitalisation with hypercapnia and use of non-invasive ventilation (NIV) or via community teams. The team comprised a respiratory physiotherapist and consultant. Emphasis was multi-model: goal-setting, symptom-management conversations, smoking cessation, weight management, increasing physical activity, reducing sedentary behaviour, and reviewing suitability of home mechanical ventilation (HMV). Community referrals included the COPD team, pulmonary rehabilitation, weight management, wellbeing hubs and palliative care. The lead consultant reviewed those symptomatic with hypercapnia and a history of hospital admissions for consideration of HMV.

Results Over 22 months (September 2021 – June 2023), a potential cohort (n=155) was identified, and n= 91 were reviewed. Reasons for exclusion included n=16 not appropriate for review (including on a palliative or cancer pathway), n=19 deaths prior to review, n=29 declined, pending or solely under a tertiary centre. Diagnoses included COPD n=72 (79%), n=16 (18%) had COPD/obesity hypoventilation syndrome (OHS) overlap, n= 8 (9%) OHS/obstructive sleep apnoea, and n=6 (7%) neuromuscular chest wall disease. Mean BMI was 32 (standard deviation, SD 10). Following review, n=26 were discharged and n=24 were subsequently reviewed by the consultant, n=13 (14%) died during this period.

Of those with a BMI ≥40, 13/19 agreed to a weight loss management service referral and 47 were referred to local well-being services. On quality of indicators (EQ5D-5L), patients rated moderate problems with mobility and slight problems washing/dressing; average global score for health was 54/100 (SD 21). Patient rated their own level of frailty (Rockwood clinical frailty scale) at a mean of 4.5 (SD 1.4).

In those with 12 months follow-up, there were 63 admissions over 12 months prior to clinic review and 17 following review (Wilcoxon signed ranks P<0.001). BMI, MRC dyspnoea and quality of life scores did not change.

Discussion In our experience of a local respiratory failure clinic, a multi-modal approach to a complex cohort has been well received. A promising reduction in hospital re-admissions requires further investigation.

P37 A CROSS SECTIONAL SURVEY OF DOCUMENTATION OF TERMINOLOGY, OF ADULT SERVICE USERS RECEIVING NIV & CPAP OUTSIDE OF THE CRITICAL CARE ENVIRONMENT FROM ACROSS THE MULTI-DISCIPLINARY TEAM

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Introduction There is local evidence that positive pressure support (Non-Invasive Ventilation (NIV) and Continuous Positive Airway Pressure (CPAP)) are conflated, leading to incorrect documentation. Inaccurate documentation breaches HCPC, NMC and GMC standards of conduct[1]; but more importantly may be dangerous and life threatening for acutely unwell individuals or those requiring long term support.[2] Incorrect documentation and confusion may be due to Health Care Professionals (HCPs) having insufficient visual cues of device type or a lack of understanding to differentiate between the two. The aim is to establish if other trusts delivering positive pressure support to adults, outside of critical care, experience similar issues.

Methods An 8 question survey was disseminated via social media as part of a local Quality Improvement Project (QIP) to identify if documentation errors occur at a national level. The survey asked about frequency of documentation errors, format of documentation and staff groups involved.

Results A total of 63 responses from Respiratory HCPs across the world were received. 60 (95%) respondents have experienced incorrect documentation, with 33 (52%) stating this often happens. This does not appear to be associated with a single profession. Exploring this further 39 (66%) have observed NIV and CPAP being written in the same entry but referring to the same modality. Respondents were asked if they took action about incorrect documentation and 39 (66%) of HCPs checked yes, with varied expanded answers.

Conclusion This short survey suggests that NIV and CPAP are poorly differentiated, which leads to documentation errors not just at a single hospital but much more widely. This may lead to confusion with regard to correct settings and potentially ineffective ventilation, patient deterioration, increased length of stay and higher financial costs.

Further exploration of the reasons for this are required to allow improvements to be made. Within the local QIP, data is being collected before and after implementation of the Home Mechanical Ventilation in Partnership (HMViP) sticker (figure 1) to see if this improves documentation.

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P38 DOES SPACER/ADAPTER DEVICE CHOICE AFFECT DELIVERY OF A PRESSURIZED METERED DOSE INHALER (PMDI) THROUGH A HUMIDIFIED CIRCUIT TO A SIMULATED PATIENT ON MECHANICAL VENTILATION

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10.1136/thorax-2023-BTSabstracts.190

Introduction Delivery of aerosolized medication to mechanically ventilated patients is a key element of their treatment. To reduce the risk of infection or derecruitment it is desirable to not break the ventilation circuit. This study evaluates the effect pMDI delivery devices have on drug delivery in an adult ventilator setting.

Methods An adult mechanical ventilation circuit (Fischer&Paykel RT210) was humidified (T=37â°C, 100%RH), and a simulated ventilated adult model (500 mL, duty cycle = 33%, 13 breaths/minute) was generated using a Draeger Infinity† C500 ventilator. An aerosol collection filter was located at the distal end of the 8.0mm diameter endotracheal tube (ETT) and the far-side of the filter was coupled to a Draeger Self-TestLung† simulating the patient. 5-actuations of a Ventolin† pMDI were delivered through the device on test, each time followed by 6-complete breathing cycles, shaking the canister between actuations. This procedure (n=5/device) was performed with AeroChamber* VENT Holding Chamber (HC), Spirale† DDS, or Hudson RCI† MDI Adaptor placed in the inspiratory limb, or via the built-in pMDI port adapter within the wye connector of the circuit. Assay of recovered salbutamol was undertaken by HPLC-UV spectrophotometry.

Abstract P37 Figure 1 HMViP Sticker

Results

Device	Total Mass of Salbutamol/Actuation (mean ± S.D.)
AeroChamber* VENT HC	28.1±5.4μg
Spirale† DDS	7.5±3.6μg
Hudson RCI† MDI Adaptor	9.5±2.7μg
Built-in circuit pMDI port	18.1±2.6μg

AeroChamber* VENT HC delivered significantly more medication to the distal end of the ETT compared with the other devices (un-paired t-test, p<0.001).

Conclusions We have shown device type influences aerosolized drug delivery during adult mechanical ventilation. Although Spirale† DDS closely resembles AeroChamber* VENT HC (also marketed as AeroVent Plus* Collapsible Holding Chamber), the Spirale† bellows had difficulties keeping a spacer-like shape when expanded for aerosol delivery. This study highlights the variability in drug delivery using a pMDI and that spacer/adapter choice are critical factors to be considered when using these devices as a treatment option.

P39 OUTCOMES AFTER CRITICAL CARE ADMISSION IN PEOPLE WITH A LEARNING DISABILITY

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People with learning disability (LD) have a higher incidence of respiratory infection causing hospitalisation and avoidable death.[1] Concerns exist around prognostic nihilism and reduced access to critical care interventions, accentuated by poor outcomes and fewer interventions observed in patients with LD during the COVID-19 pandemic.[2] Little is known about critical care outcomes in patients with LD, including those with respiratory infection, profound or multiple LD (PMLD) or requiring invasive ventilation, to aid decision-making. We aimed to investigate critical care outcomes in patients with LD compared with general ITU patients to assess whether poorer outcomes justify withholding critical care interventions.

A retrospective review of patients with LD admitted to critical care between January 2017-October 2022 was performed, identifying patients using ICD10 codes and interrogating the ICNARC database and electronic records. Data were collected from ICNARC and electronic records, including demographics, critical care data and outcome data, then compared against all general ITU admissions between March 2022-March 2023.

176 patients with LD were identified, with 297 critical care admissions overall. 20.5% had multiple admissions. Patients with PMLD (33% of cohort) accounted for 39.4% of admissions. 27.9% of admissions were due to respiratory infection. 36.4% of admissions required invasive ventilation. Outcome data can be seen in table 1. Functional dependence increased in only 7.4% admissions.

Mortality outcomes in patients with LD were better than general ITU admissions, regardless of presence of respiratory infection, severity of LD, or requirement for invasive ventilation. These findings emphasise the importance of not withholding critical care interventions to people with LD based on preconceptions of mortality outcomes. Further research into long-term outcomes and prognostic markers of mortality would further add to the evidence base and help inform practice.

Abstract P39 Table 1

Outcome Data		LD Cohort	General Cohort
Mean ICNARC predicted mortality		8.56%	11.88%
Observed in-hospital mortality	All patients	15/297 (5.1%)	129/1179 (10.9%)
	Invasively ventilated	8/108 (7.4%)	81/289 (28%)
	PMLD	6/117 (5.1%)	N/A
	Respiratory infection	7/83 (8.4%)	N/A
Standardised mortality ratio		0.59	0.92
Length of stay	All patients	6.2 days	4.3 days
	Respiratory infection	10.1 days	

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P40 CHARACTERISTICS OF PATIENTS IN A HOME VENTILATION OUTREACH SERVICE. POTENTIAL DRIVERS BEHIND HEALTH INEQUALITY IN NON-INVASIVE VENTILATION

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Introduction Health inequalities are 'unfair and avoidable differences in health across populations and between different groups within society'[1] Gender, age, ethnicity, disability, location, housing and employment are contributing factors in respiratory conditions, and reduced accessibility to services is also recognised to result in poorer health outcomes.[1] Home Ventilation (HV) users with respiratory failure are likely to have multi-morbidity which could lead to reduced engagement or access to outpatient specialist services. We studied the demographics and characteristics of patients assessed for our HV Outreach service pilot project, identified due to high hospital admission or OP non-attendance rate or inability to attend due to housebound status, to identify drivers behind health inequality in patients requiring HV.

Method All patients assessed for our HV Outreach service were included. Demographic data was collected from hospital records. Admissions frequency and length of stay (LOS) calculated from hospital episode data. Deprivation data was derived by residency postcode.

Results 51 patients were identified. 26 (51%) were housebound, 8 (16%) had high admission rates and 17 (33%) had high outpatient DNA rates. Patients were older (median 73

Abstract P40 Table 1 Patient demographic data; presented as number(%) or median(IQR)

	Eligible patients (n=51)
Age	71 (61.5–79)
Female	37 (73%)
Male	14 (27%)
Ethnicity	
White British	16 (35%)
Black – African/Caribbean	25 (54%)
Asian	2 (4%)
Mixed European	3 (7%)
Index of Multiple Deprivation Rank	8831 3
(1= most deprived, 32,844=least deprived)	
Index of Multiple Deprivation Decile	3
Income Decile	3
Employment Decile	6
Education and Skills Decile	4
Health and Disability Decile	2
Barriers to Housing and Services Decile	2
Living Environment Decile	1
Income Deprivation Affecting Older People Index (ADAOPI) Decile	
BMI >25	40 (78%)
Mental health condition	22 (43%)
Bedbound or reduced function requiring mobility aids	29 (59%)
Indication for Home NIV	
Obesity related respiratory failure	30 (59%)
Airways disease or Overlap	18 (35%)
Neuromuscular disease	3 (6%)
Hospital admissions in previous year	1 (0–3)
Total hospital LOS in previous year	11 (0–32)

years) and predominantly female (87%). There was a high prevalence of black ethnicity (60%), which compares to 60% and 46% in the two local serving boroughs.[2] Deprivation data highlighted high social deprivation despite good education and skills, with significant barriers to housing services. The two boroughs rank 41/326 and 81/326 most deprived boroughs in England, and 12/33 and 11/33 in London.[2] There were high levels of functional limitation (67%) and prevalence of mental health conditions (53%). The hospital admission and LOS burden was high.

Conclusion We identified a group of HV users who experience high hospital burden or inability to access our outpatient services. Patients were older, predominantly female, with high black ethnicity prevalence and mental health conditions. Social deprivation levels were high. Greater understanding of how these characteristics impact on engagement with specialist ventilation services will guide measures targeted at improving health inequality.

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P41 FROM RESPIRATORY FAILURE TO RESPIRATORY SUCCESS: REMOTE MONITORED IVAPS-BASED HOME NIV CONTROLS HYPERCAPNIC RESPIRATORY FAILURE, IMPROVES SURVIVAL AND OFFSETS INEQUALITIES

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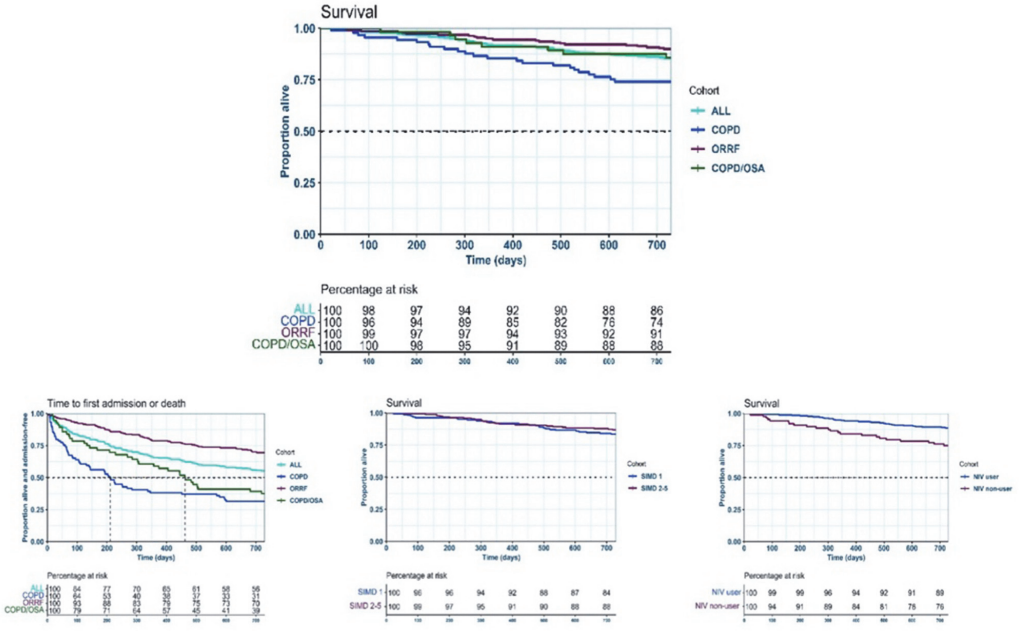
10.1136/thorax-2023-BTSabstracts.193

Introduction Home non-invasive ventilation (NIV) is now integral in managing chronic hypercapnic respiratory failure (CHRF) secondary to various conditions. Developments in NIV technology include remote monitoring and other assistive capabilities, but there is limited data on real-world effectiveness and outcomes with these.

We introduced routine remote monitoring of home NIV for patients with CHRF unrelated to neuromuscular disease at



Abstract P41 Figure 1

our centre in 2016. Home NIV is provided by ResMed Lumis 150 device, typically with an 'autoNIV' IVAPS-autoEPAP mode, with consent for remote monitoring via the Resmed AirviewÔ platform. We reviewed effectiveness and outcomes in our patient cohort.

Methods We undertook a Caldicott guardian approved retrospective observational cohort study. 362 patients with CHRF related to obesity (n=217), COPD (n=89) or COPD-OSA overlap (n=56) commenced remote-monitored home NIV within NHS Greater Glasgow & Clyde between July 2016 and December 2020. Demographics, pre-post NIV blood gases, admission events and survival during follow up were collated from electronic health records, with a censor date of February 2023.

Results CHRF of any aetiology was controlled by remote-managed NIV in all patients who continued therapy use during the first year of follow up (n=274, median reductions in PCO2 of 1.6kPA, bicarbonate of 6mmol/l, p<0.001). Time to readmission or death and annualised admissions (1 fewer per patient per year, p<0.001) and occupied bed days (10 fewer per patient per year, p<0.001) pre-postNIV were improved across all CHRF subgroups in comparison to historical reported outcomes. Overall survival at 1 and 2 years was 96% and 89% in ORRF and COPD-OSA cohorts, and 89% and 74% in COPD cohorts. 1 and 2-year survival was higher in NIV users than non-users (89% vs 76% at 2 years). Deprivation demographics in CHRF-NIV patients mirrored population data. Survival outcomes in patients from SIMD1 deprived residential areas matched those for patients from less deprived residential areas (SIMD2–5).

Conclusion We have confirmed real world effectiveness of our remote-monitored home NIV service model. Control of CHRF, reduced admissions, improved survival vs projected survival and accessibility has been achieved, with offset of the typical excess of adverse outcomes in patients from deprived residential areas.

P42 FIXED VERSUS VARIABLE PRESSURE MODES OF LONG-TERM NON-INVASIVE VENTILATION IN PATIENTS WITH CHRONIC HYPERCAPNIC COPD

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Long-term non-invasive ventilation (LT-NIV) is an emerging treatment for patients with chronic hypercapnic COPD. The ventilatory support can be delivered either through fixed pressure support or by continuously adjusting pressures to achieve a fixed target volume. However, comprehensive data comparing patient-centred outcomes in these two modes of ventilation are lacking.

A total of 181 patients with COPD (mean age: 65±9 yrs, 44% male) receiving LT-NIV were enrolled and followed up until the end of the data collection period or the death of the patient (median follow-up: 17 [IQR=6–39] months). Exacerbation history (moderate and severe), smoking history and capillary blood gas parameters were recorded at the time of enrolment and at follow-up visits. Baseline overnight oximetry was also documented, and treatment adherence was regularly monitored. To account for variations in follow-up durations, annualized AE rate was calculated.

The median AE rate (3 [2–5] vs. 1.7 [0–4.4] AE/year, p<0.001) and blood carbon dioxide levels (7.7 [7.0–8.8] vs. 6.2 [5.6–7.2] kPa, p<0.001) decreased significantly after the initiation on LT-NIV. Patients receiving variable pressures (N=18) were generally younger (60±7 vs. 65±9 yrs, p<0.01), had a higher BMI (42.7±6.8 vs. 29.6±9.3 kg/m^2, p<0.001) and exhibited higher baseline oxygen desaturation index values (41.5 [22.1–58.9] vs 10.4 [5.4–20.2] events/h, p<0.01). On variable settings, the average expiratory airway pressure was higher (9.8±1.5 vs. 5.8±1.9 p<0.001) while the pressure support was similar to the fixed settings. 138 (76%) patients were adherent (>4 h/day usage) to the therapy; however, treatment adherence was significantly lower in the variable pressure group (59% vs. 85% using >4h/day, p<0.01). Although the number of baseline annual exacerbations was similar in the two groups (p=0.14), a greater number of patients in the variable pressure group achieved a reduced annualized exacerbation rate to <2/year (76% vs. 49%, p=0.03).

Our study highlights the effectiveness of LT-NIV in reducing exacerbation rates in patients with chronic hypercapnic COPD. While treatment adherence was higher among patients on fixed pressures, the variable pressure mode showed promising outcomes in terms of reducing annual exacerbation rates. Further research is warranted to explore the long-term benefits and patient preferences associated with these different ventilation modes.

P43 BREATHING MATTERS: PATIENT AND CARER EXPERIENCE OF HIGH FLOW OXYGEN THERAPY AT HOME FOR PROGRESSIVE, IRREVERSIBLE RESPIRATORY FAILURE

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10.1136/thorax-2023-BTSabstracts.195

Background and Aims High flow oxygen therapy (HFOT) is increasingly used in the management of progressive, irreversible respiratory failure; including domiciliary use as a palliative measure. Currently, there is little understanding of patient and carer experiences of receiving HFOT. We aimed to explore experiences of domiciliary HFOT use.

Methods All patients and carers, who had home HFOT initiated for severe hypoxic respiratory failure of any cause, were sent a questionnaire exploring their experiences. Thematic analysis was used to analyse free text responses.

Results 79% (27/34) of questionnaires were returned (67% carers, 33% patients). The majority (91%) of patients had HFOT initiated in hospital prior to a supported discharge. All understood the reason for home HFOT and reported receiving training on HFOT. All received a home visit by a specialist team member following treatment initiation and felt adequately supported at home.

100% of patients and 86% of carers reported domiciliary HFOT being beneficial. 44% of patients and 67% of carers reported that HFOT prevented further hospital admissions.

Thematic analysis of qualitative data revealed 3 emergent themes: treatment concerns, role of specialist support and treatment impact

1. Treatment concerns

Patients and carers expressed anticipated concerns surrounding use of HFOT equipment at home, yet confidence grew with time and support. Financial implications were also raised.

2. Support

Patients and carers felt that specialist support reduced anxiety and was key to managing at home.

3. Treatment impact

Treatment was described as improving symptom management beyond expectations and facilitating staying at home.

Conclusions These findings highlight key experiences of patient and carers for whom a domiciliary HFOT service is provided. This pilot data provides insight into pre-treatment concerns and anxieties, the importance of support and education in managing HFOT at home and the positive impacts of domiciliary HFOT. Further qualitative research is needed to develop an in-depth understanding of the lived experiences of home HFOT users. This would inform developments in treatment delivery and patient support, in addition to much needed improvements in quality of life and choice of place of care for those with progressive, severe respiratory failure.

P44 SUPPORTING PATIENT PREFERENCE FOR LOCATION OF ELECTIVE WITHDRAWAL FROM NON-INVASIVE VENTILATION IN MOTOR NEURONE DISEASE

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Introduction The domiciliary non-invasive ventilation (NIV) service supports patients with a diagnosis of motor neurone disease (MND). The community NIV practitioner team consists of two physiotherapists who outreach to patients with MND as per NICE guidance.[2] The aim of this study was to investigate the location of elective withdrawal of NIV and alignment with patient preference in a rural MND cohort.

Methods We retrospectively studied clinical notes made within the MND service from April 2016 to March 2023, looking at patient preference and the subsequent location of elective withdrawal from NIV. The duration of NIV use and patient dependence on NIV as defined by the association for palliative medicine[1] were also recorded.

Results 170 patients with MND were referred into the NIV service during this period; 52.3% male, mean age 68 (SD 10). Of these, 51 (30%) were initiated onto NIV, with 14% subsequently requesting elective withdrawal from NIV. In the elective withdrawal cohort, the mean duration of NIV use was 23.4 months (range 5 – 61 months) and 100% of the patients at the time of withdrawal, were dependent on NIV (>14/24hrs). All MND patients preferred a community setting, within their home, a hospice or a community hospital, for elective withdrawal of their NIV. This was achieved in 86% of cases (see figure 1 for withdrawal location/place of death), with 14% of elective withdrawals occurring in the acute hospital.

Conclusion In this rural cohort, the majority of MND patients had elective withdrawal of NIV in their preferred location in the community. There should be an emphasis on the avoidance of elective withdrawal in the acute hospital setting to meet patient preference in MND.

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'The heat is on' – Can we get greener in asthma?

P45 ASTHMA OUTCOMES, INHALED CORTICOSTEROID ADHERENCE AND SOCIOECONOMIC DEPRIVATION IN ENGLISH CLINICAL COMMISSIONING GROUP REGIONS

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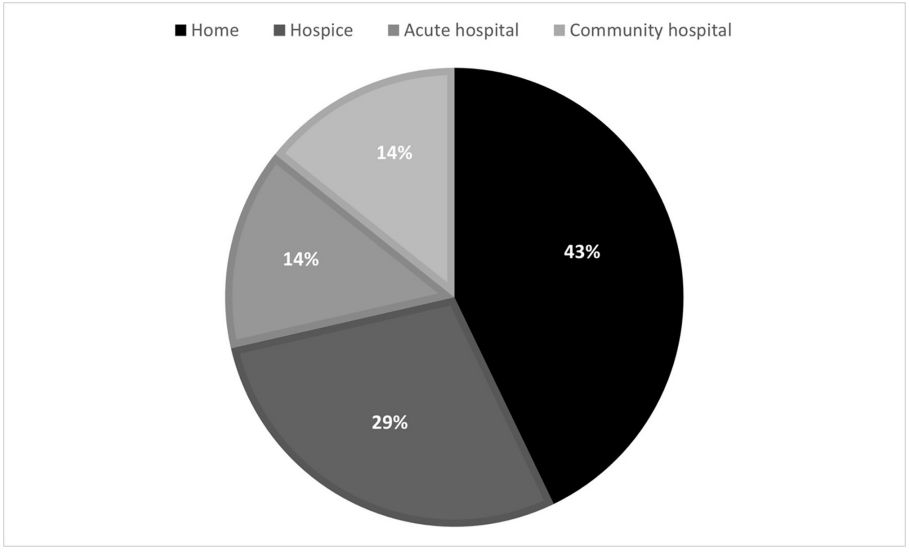
10.1136/thorax-2023-BTSabstracts.197



Abstract P44 Figure 1

Introduction and Objectives Socioeconomic deprivation is known to be associated with adverse asthma outcomes, but the mechanisms of this have not been determined. We aimed to investigate the associations between adverse asthma outcomes (hospitalisations, rescue prednisolone courses, and excessive short-acting β_2 agonist [SABA] use), socioeconomic deprivation and ICS adherence, at a population level in England.
Methods We obtained data for the 106 English Clinical Commissioning Group (CCG) regions from publicly available data sources: Office for National Statistics (median age), Public Health England Fingertips (asthma prevalence, hospital admissions), Ministry of Housing, Communities & Local Government (Index of Multiple Deprivation [IMD] and its seven subdomains of Income, Employment, Education, Barriers to housing and services, Health, Crime and Living environment), and NHS Business Services Authority Respiratory Dashboard (ICS non-adherence, excess SABA use and total prednisolone courses). Pearson's correlations were used to investigate relationships between exposure and outcome variables. Multivariate linear regression models with stepwise entry of predictors were used to determine significant predictors of asthma outcomes. Statistical analysis was performed using IBM SPSS V28, with a p value of < 0.05 as the threshold for statistical significance.
Results IMD was positively correlated with excess SABA use ($R = 0.709$, $p < 0.001$), hospital admissions ($R = 0.620$, $p < 0.001$) and prednisolone courses ($R = 0.438$, $p < 0.001$). ICS non-adherence was negatively correlated with excess SABA use ($R = -0.723$, $p < 0.001$), hospital admissions ($R = -0.241$, $p = 0.013$) and prednisolone courses ($R = -0.519$, $p < 0.001$). In multivariate linear regression models, independent predictors of excess SABA use were the Employment and Living environment components of IMD. Independent predictors of hospital admissions were the Income, Employment, Living environment, and Health components of IMD. Independent predictors of prednisolone courses were the Health component of IMD and median age.
Conclusions Socioeconomic deprivation appears to be a primary driver of regional variability in asthma outcomes in England. Low income, and poor quality work and housing may play a particular role. Populations with worse asthma outcomes appear to adhere better to ICS therapy on average.

P46 HOW AND WHEN DO PATIENTS DISPOSE OF OLD OR UNWANTED INHALERS?

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Introduction and Objectives Inhalers play a central role in the management of respiratory conditions, with 73 million inhalers used annually in the UK, a high proportion of which end up in landfill. If pressurised metered-dose inhalers (pMDIs) are discarded before they are empty, residual propellant leaks out into the atmosphere, which has an impact on the environment. Conversely, using an inhaler beyond the labelled number of doses has implications for disease control and/or patient safety. Therefore, we evaluated how patients determine when their inhaler is empty and how they dispose of old/unwanted inhalers.
Methods A qualitative online survey was circulated to individuals with a respiratory condition who were currently prescribed an inhaler and/or to their carers.
Results Data collected from 199 respondents between February and June 2023 showed that they were prescribed pMDIs (47.7%), dry-powder inhalers (25.6%) or both (26.1%); 85.4% were using at least one inhaler with a dose counter. Of 29 respondents using devices without a dose counter, 55.2% were not confident in identifying when their inhaler is empty. When all respondents were asked how they knew when their inhaler was empty, 24.6% responded that it was when they no longer received a dose; 22.6%, when it felt empty when shaken, and 19.1%, when it stops 'puffing'. Of 170 respondents with an inhaler with dose counter, 77.1% reported starting a new inhaler when the dose counter indicates zero; however, 20.6% carried on using the device beyond zero. When considering disposal of old/unwanted inhalers, 52.8% of respondents disposed of them irrespective of whether they were empty; 41.7% disposed of them in household waste and 27.1%, in household recycling. Many respondents reported a limited knowledge of recycling schemes.
Conclusion Most respondents using devices without a dose counter were not confident in identifying when their inhaler was empty. Furthermore, many respondents who used inhalers with a dose counter continued to use them beyond 'zero'; this has implications for disease control and patient safety. There was a limited awareness of appropriate recycling mechanisms for inhalers. Taken together, there is a clear opportunity for educational initiatives for optimising device use and disposal.

Please refer to page A289 for declarations of interest related to this abstract.

P47 AN OBSERVATIONAL STUDY ON THE CARBON FOOTPRINT FROM INHALER USE IN PEOPLE WITH ASTHMA

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10.1136/thorax-2023-BTSabstracts.199

Introduction and Objective Inhaled asthma therapy contributes to global warming but is currently a non-negotiable element of patient care. The carbon footprint of inhalers has previously been described. Pressurised metered dose inhalers (pMDIs) may have a higher carbon footprint than dry powder inhalers (and soft mist inhalers), but the volume of inhalers is also an important contributor. Those with poor asthma control may have higher numbers of inhalers prescribed. We sought to determine whether people with self-reported poor asthma control (Royal College of Physicians 3 Questions for Asthma (RCP 3 questions)) contributed a different carbon footprint to those with better control.
Methods National Services for Health Improvement (NSHI) staff conduct primary care clinical assessments of people with asthma. Permission has been obtained from participating practices for NSHI to hold anonymised aggregated routinely collected data. Between 1stJanuary 2022 and 30th April 2023, NSHI conducted respiratory audits in 447 practices across

Abstract P47 Table 1 Number of patients and total GHG emissions by RCP score

RCP score	% (n) patients	Total GHG inhaler emissions per year (Kg CO_2/year) Median (lower quartile, upper quartile)	P-value
0	**26.2**	**60.4 (24.2, 130.9)**	<0.001
1	**(30,594)**	**73.1 (28.6, 152.2)**	
2	**43.3**	**89.8 (33.2, 183.7)**	
3	**(50,559)**	116.5 (43.7, 234.6)	
	20.3		
	(23,736)		
	10.2 (11,952)		

111 CCGs/Health Boards/ICBs in the UK. Demographic data, RCP 3 questions, inhaler brands and number of items prescribed for each patient were collected throughout this period. Greenhouse gas (GHG) emission values per inhaler were allocated from a publicly available source (PrescQIPP).[1] Numbers of prescribed inhalers were multiplied by the GHG emission values per inhaler to give total GHG emissions per year.

Results Complete data were available for 116,841 individuals aged between 20–69 years: 59.2% female. The median (lower quartile, upper quartile) GHG was 77.0 (28.7, 160.1) Kg CO_2/year. The minimum value was 0 CO_2 Kg/year and the maximum value 1336.2 Kg CO_2/year.

The number of patients and total GHG emissions from inhaler use by RCP 3 questions score (0–3) are shown.

Conclusion In asthma patients with a self-reported, single assessment of asthma control, those with a higher RCP 3 questions score (poorer control) contributed a higher inhaler related GHG emission.

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Please refer to page A289 for declarations of interest related to this abstract.

P48 HAVE WE TAKEN ANY STEPS TO REDUCE THE ENVIRONMENTAL IMPACTS OF INHALERS? A PERSPECTIVE FROM A SPECIALIST RESPIRATORY TEAM IN A DEPRIVED AREA OF THE UK

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10.1136/thorax-2023-BTSabstracts.200

Introduction Climate change is an important driver of health inequalities. Air pollution disproportionately affects deprived and vulnerable communities.[1] Inhaled therapies are key components of respiratory conditions such as asthma and chronic obstructive pulmonary disease (COPD). Hydrofluorocarbons (HFCs) found in meter dose inhalers (MDIs) are powerful greenhouse gases. MDIs have a high carbon footprint of 500g CO2eq per dose, compared to 20g in Dry powder inhalers (DPIs).[2] The MDI prescribing carbon footprint is equivalent to 850,000 tonnes of carbon emissions each year in England.[2]

Aim Identify the most common inhaler prescribing methods and develop an action plan to support a reduction in MDI prescriptions within our Trust.

Methods A retrospective audit of inhaler prescribing with all respiratory outpatient contacts in a 1-month period from 1 February to 28 February 2022

Results Most prescriptions were MDIs (n=137, 61%) compared to DPIs (n=89, 39%)

Conclusions Most DPIs were prescribed for COPD management, which highlights good practice and adoption of environmental concerns. Most MDIs were prescribed in asthma treatment as well as COPD reliever choice. This suggests possible clinician concerns about the presumed efficacy of DPIs in treating the asthma population and copd exacerbation. Further research and clinician education is advised to align clinical and environmental concerns in this area

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P49 WHAT PROGRESS HAS BEEN MADE IN REDUCING GREENHOUSE GAS EMISSIONS FROM INHALERS IN ENGLAND? AN ANALYSIS OF INHALER PRESCRIBING DATA 2018–2023

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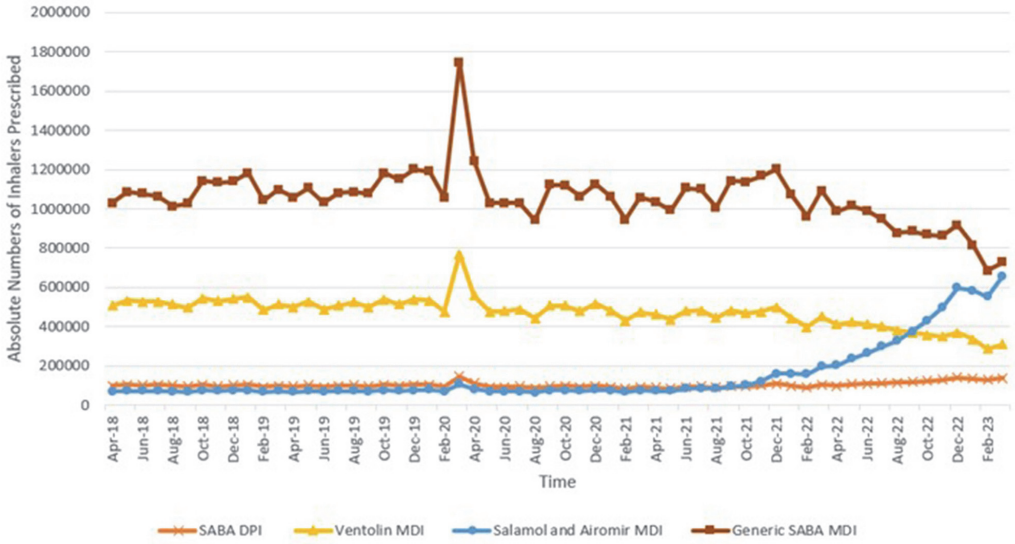
10.1136/thorax-2023-BTSabstracts.201

Introduction Inhalers account for approximately 3% of greenhouse gas emissions in the NHS in England. Reducing inhaler-associated emissions is part of NHS England's 'net zero' by 2040 target. This will require increased use of low-carbon dry powder (DPI) and soft mist inhalers (SMI), and reduced use of high-carbon metered dose inhalers (MDI). Some MDIs have lower carbon footprints than others, for example low-volume Salbutamol inhalers (Salamol, Airomir) have lower carbon footprint than high-volume (Ventolin Evohaler). This study's aim was to describe changes in inhaler prescribing from 2018 to 2023, focusing on changes between high and low-carbon inhalers, and resultant carbon footprint changes.

Methods Publicly available primary care data from England from April 2018 to March 2023 was searched for the number of items issued by inhaler class.[1] Proportional change for inhaler types between 2018/19 and 2022/23 was calculated and tested for statistical significance (Chi squared test). A sub-analysis was done on short-acting beta agonist inhalers (SABA) and HFA227ea containing MDIs, including carbon footprint calculation using NHS footprint estimates.

Results Comparing 2018/19 to 2022/23, the total number of inhalers prescribed increased by 3%. Total numbers of DPIs decreased by 4%, while MDIs increased by 5%. Numbers of SMIs remain small but have increased by 40%. Prescriptions of the highest carbon MDIs, those with HFA227ea propellant, fell by 14.5%. The total number of SABA inhalers increased by 0.5%. Within branded prescriptions for SABA inhalers, low-volume inhalers increased substantially while high-volume inhalers decreased substantially. Generic prescriptions for SABA inhalers decreased (figure 1). All findings were statistically significant ($p<0.01$). The changes in SABA prescriptions represent an approximate saving of 64 ktCO_2e between 2018/19 and 2022/23. Conservatively assuming that HFA227ea inhalers



Abstract P49 Figure 1 Absolute number of Ventolin MDI, Salamol and Airomir MDI (including breath-actuated MDI) generic SABA MDI (including breath-actuated MDI) and SABA DPI inhalers prescribed each month from April 2018 to March 2023

were switched to HFA134 MDIs, this represents an approximate saving of 2.4 ktCO_2e.

Conclusions Carbon emissions from the highest carbon inhalers appears to have reduced. Further efforts are needed to increase use of low-carbon controller therapy, which could reduce the footprint of controller therapies, whilst also importantly improving disease control and reducing the need for SABA inhalers and related emissions.

REFERENCE

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Please refer to page A289 for declarations of interest related to this abstract.

P50 CRADLE-TO-GRAVE EMISSION REDUCTION FOR DRY POWDER INHALER PRODUCT PORTFOLIO

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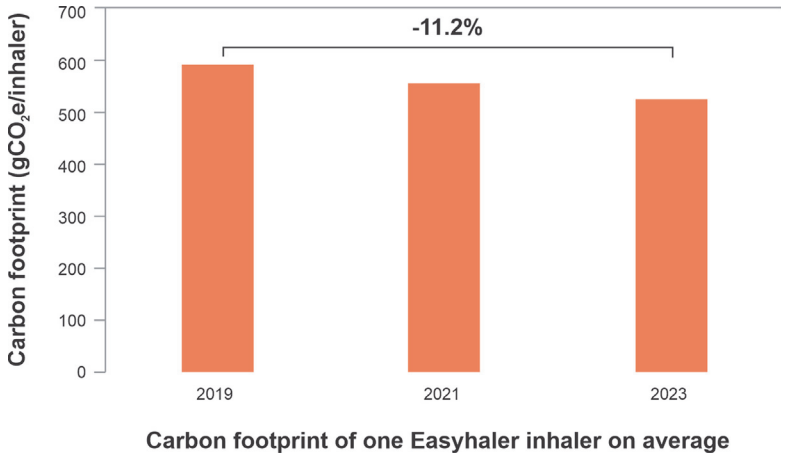
Introduction There is an increasing pressure to prefer propellant free inhaler devices over pressurized metered dose inhalers (pMDI) due to environmental considerations. In this work we present results from three life cycle assessments (LCAs) on dry powder inhaler Easyhaler product portfolio and assess the changes in Easyhalers' environmental impact and carbon footprint (CF) over time.

Methods Three cradle-to-grave life cycle assessments were conducted in 2019, 2021 and 2023. The 2019 assessment covered four products while 2021 and 2023 assessments included all six products in the portfolio. LCA for the protective cover sometimes used with Easyhaler was conducted in 2023. In addition to CF, nine other environmental impact categories were assessed to ensure that no burden shifting occurs.

Results Figure 1 shows the average emissions from the four devices included in all LCAs. For individual products, the decrease in CF was 5.0–6.8% between each assessment. In the latest assessment the CF of average Easyhaler was 547 gCO2e with a range of 452–617 gCO2e. The LCA of the protective cover was assessed for the first time in 2023 and had a CF of 66 gCO2e.



Abstract P50 Figure 1

Conclusions The carbon footprint of Easyhaler show steady decrease between LCAs and is in line with the lower limit of previously reported CF for dry powder inhalers. Climate impact from the protective cover was one-tenth compared to climate impact from the inhaler itself.

P51 SWITCHING INHALER TREATMENT FROM PMDI TO DPI IN REAL-WORLD; REDUCTION OF CARBON FOOTPRINT

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Background EU regulation on F-gases encourages physicians to treat patients with DPIs rather than pMDIs for environmental reasons. However, many fear this may worsen treatment outcomes.

Methods and Aim We performed a post-hoc analysis on clinical outcomes data from a 12-week real-world, non-interventional single arm study[1] of adult patients with asthma, COPD or asthma COPD overlap (ACO) who switched treatment from pMDI to DPI, budesonide-formoterol Easyhaler (B-F EH DPI), according to the treating physician and local guidelines. Clinical end points included ACT, CAT and lung function tests. Range of kg CO2e for one dose as reported in Montreal Protocol2 was used and as a conservative estimate, for lower range for B-F EH DPI, the average estimate reported (0.004 kg CO2e).

Results Among all 253 patients, clinical improvements were observed after switch. Range of estimated kg CO2e emissions per year was (90–97%) lower for B-F EH DPI (2.9 – 14.6 kg CO2e emissions/year) than for pMDI (91–137 kg CO2e emissions/year) assuming twice daily dosing for pMDI and B-F EH DPI.

Conclusion The study shows that switching from a pMDI to B-F EH DPI may enhance disease control among patients with asthma, COPD and ACO and at the same time have a positive environmental impact by reducing the carbon footprint of inhaler treatment.

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P52 EFFECTIVENESS OF A NATIONAL RESPIRATORY TOOLKIT TO DRIVE THE GREEN AGENDA IN INHALER PRESCRIBING IN WALES

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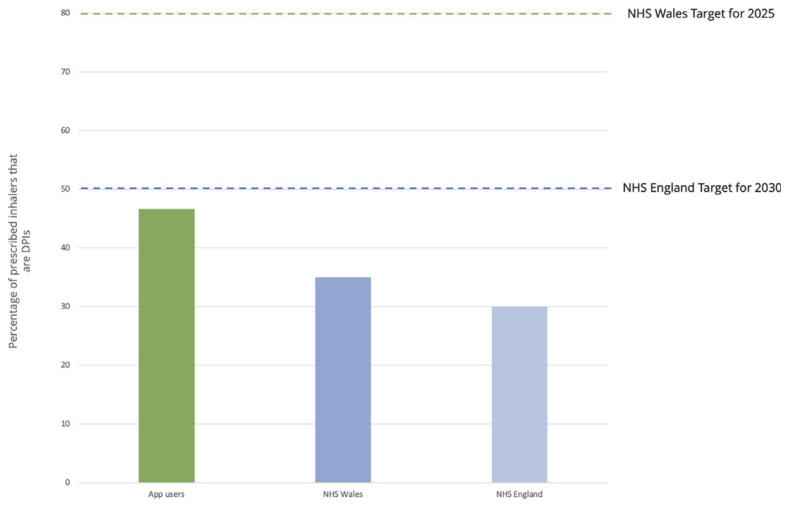
Introduction and Objectives Hydrofluorocarbon (HFC) propellants from metered dose inhalers (pMDI) contribute an estimated 3.5% of the total carbon footprint of the NHS. The UK lags far behind the rest of Europe in terms of the proportion of inhalers that are low global warming potential (GWP), with current rates of 30% for this group, compared to 50% as the European average and 76% in Sweden. England has set a target to reduce the carbon footprint from inhalers by 50% by 2030, but in Wales a more stringent target of 69% reduction (A reduction of pMDI inhalers from 70% to less than 20% by 2025). In carbon footprint terms this would equate to a reduction from 65,000 tonnes of CO2 equivalent to less than 20,000 tonnes. Wales has created a national respiratory toolkit, comprising national guidelines for asthma and COPD, national educational modules and patient apps, all promoting low GWP inhalers.

Methods The national respiratory toolkit was created by senior clinicians working in partnership with the Institute for Clinical Science and Technology (ICST). Guidelines for asthma and COPD highlighted the impact of inhalers using green and red footprints for high and low GWP inhalers choices. Patient apps featured embedded videos on the green agenda, and data

	Asthma (n=142)		COPD (n=95)		ACO (n=16)	
	baseline	12 weeks	baseline	12 weeks	baseline	12 weeks
ACT (mean)	13.3	21.0*			12.3	19.1*
CAT (mean)			23.5	16.8*	25.1	16.8*
FEV1% pred (mean)	76.7	87.1*	51.3	58.8*	60.9	63.6**

*p < 0.001; ** p =0.18

Abstract P51 Figure 1



Abstract P52 Figure 1

on inhaler choices were available from app users. In addition, webinars for healthcare professionals and patients were created and hosted on the ICST platform.

Results As of June 29 2023 there are 12,550 patients utilising the respiratory apps in Wales. Uptake of low GWP inhalers-dry powder inhalers (DPI) and smooth mist inhalers (SMI) in Wales has been greater in Wales than in England with a widening gap at each time point measured. However, these represent relatively small changes from 30% to 35% for the whole population in Wales. For those using the app 48% were using low GWP inhalers.

These outcomes were achieved through the national implementation of a comprehensive population behaviour change system utilising patient apps and a broader respiratory toolkit, including live events, email communications, and tutorials.

P53 PATIENT GROUP EDUCATION SESSIONS: AN EFFECTIVE WAY OF MAKING ASTHMA TREATMENT GREENER?

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10.1136/thorax-2023-BTSabstracts.205

Introduction The NHS aims to achieve net zero by 2040. Inhalers cause 3% of NHS emissions. Compared to metered-dose inhalers (MDI), dry powder inhalers (DPI) are much greener yet 70% of UK inhalers prescribed are MDIs. Inhaler sustainability and asthma care were incentivised in England in 2022–23 to support net zero and improve clinical outcomes.

Aims To assess if patient education sessions in a London Primary Care Network improve the sustainability and clinical outcomes of asthma care.

Methods Between December 22 and March 23, adult asthma patients on Fostair®, Clenil® and salbutamol MDIs were identified and invited to attend a group session. All sessions followed the same format: signing confidentiality forms, brief inhaler-focussed asthma education and inhaler technique demonstrations with Fostair®, beclomethasone or salbutamol DPIs. Patients practiced on training devices and indicated willingness to switch to DPIs. Prescriptions were then generated. A 2-week follow-up text allowed patients to revert to MDIs. Baseline and 3-month post-switch Asthma Control Test (ACT) scores, and baseline adherence rates calculated using Medicines Possession Ratio (MPR), were collected.

Results 115 participants attended overall. Baseline MPR was calculated for 114; ACT was collected for 104. 42/114 (37%) patients had good adherence; 71 were suboptimal/poor. 90% (104/115) patients opted for DPI switch, 41 (39%) of whom had good adherence.

96% (102/104) opted to remain on DPIs at 2 weeks. 3-month post-switch inhaler data was collected for 96/102 patients; 96% (92/96) remained on DPIs.

Mean baseline ACT was 19. 56/104 (54%) were well controlled, 36/104 (35%) poorly controlled and 12/104 (12%) very poorly controlled. At 3 months, ACT was collected for 58/92 patients who remained on DPIs. Mean score was 18.6. 33/58 (57%) were well controlled, 10/58 (17%) poorly controlled and 15/58 (26%) very poorly controlled.

Conclusion Most patients switched to and remained on greener inhalers following the group sessions. Baseline adherence rates were similar in the overall group and switch group. Longer-term post-switch adherence rates remain unknown. Regarding symptom control, 3-month post-switch ACT scores remain similar to baseline. Nonetheless, device switch rates suggest group sessions offer a potential strategy for improving sustainability of inhaled asthma treatments.

P54 TRENDS IN INHALER USE AND ASSOCIATED CARBON FOOTPRINT: A SALES DATA-BASED STUDY IN EUROPE

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10.1136/thorax-2023-BTSabstracts.206

Introduction Physicians are being encouraged to favor dry powder inhalers (DPI) over pressurized metered dose inhalers (pMDI) on environmental grounds. The EU is reviewing the F-gas regulation to accelerate emission cut-down targets (EU Climate Action).

Aims and Objectives Thoughtful use of inhalers can reduce emissions while promoting positive clinical outcomes. We aim to describe the trends of pMDI and DPI use and associated carbon footprint in Europe.

Methods DPI and pMDI sales data between 2011–2021 were extracted from IQVIA MIDAS Smart 2022 and reported as total sold doses in Europe by country (Germany, France, Spain, Italy, Poland, Norway, Sweden, Finland, Denmark, and the UK). Carbon footprint calculations were based on the Medical and Chemicals Technical Options Committee 2018 assessment report.

Results Between 2011 and 2021 the carbon footprint of inhalation therapy increased from 3.37 Mt to 3.89 Mt CO2e as a result of a 16% increase in the number of sold doses of pMDI and a 3% decrease of DPIs during this period. Replacing pMDIs with DPIs would have produced 92% fewer emissions. In 2021, emissions associated with short acting beta-2 agonists (SABA) were 1.64 Mt CO2e (41% of all emissions), 94% from pMDIs. The UK was the largest source of pMDI-related emissions in 2021 with 1.24 Mt CO2e (31% of all emissions).

Conclusions The carbon footprint of inhaler therapy in Europe grew due to an increased use of pMDI and decreased use of DPI in many European countries. Greater focus on guideline-based controller therapy and prioritizing DPIs when clinically appropriate will potentially improve patient outcomes and lower the large greenhouse gas emissions from SABA over-reliance.

P55 A TRAINING TOOL ON INSPIRATORY MANOEUVRE SUCCESS IN PMDIS AND DPIS: THE INSPIRE STUDY

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10.1136/thorax-2023-BTSabstracts.207

Despite the achievements in asthma and COPD treatment inhaler inhalation technique leading to decreased treatment outcome remains a challenge. Simple and easy to use -tools are needed to support both physicians and patients.

We aimed to estimate the impact of INSPIRA training tool on the correct inspiratory manoeuvring for pressurized metered dose inhaler (pMDI) and dry powder inhalers (DPIs).

A multicentre, observational, cross-sectional, non-drug, one-visit study including patients >50 years treated with inhalers was conducted in Spain. The approach of MAPLE Study for design and sample size was followed.[1] The inspiratory manoeuvre of a patient was evaluated by the investigator with In-Check Dial, a hand-held inspiratory measurement device, before and after the training was given with the INSPIRA training tool, a digital tool based on the sound of the inhalation.

pMDI users were evaluated without resistance (R0 level). DPI users were evaluated using low-medium resistance (R2)

Abstract P55 Table 1 Inadequate inhalation manoeuver (%) according to inhaler type and resistance level, before and after training

Inhaler	Resistance level	Error criteria	N	Errors before trainign (%)	Errors after training (%)	P
pMDI	R0	PIF > 60 l/min	255	177(69.1)	168(65.6)	0.222
pMDI	R0	Duration < 3 sec	164	114(69.1)	85(51.5)	<0.001
pMDI	R0	Both (PIF + duration)	164	138(83.6)	125(75.8)	0.024
pMDI	R0	Investigator criteria	255	130(50.8)	45(17.6)	<0.001
DPI	R2	PIF < 30 l/min	272	3(1.1)	1(0.4)	0.500
DPI	R4	PIF <30 l/min	272	4(1.5)	3(1.1)	0.999
DPI	R2	PIF < 60 l/min	272	79(29.0)	50(18.4)	<0.001
DPI	R4	PIF < 60 l/min	272	87(32.0)	69(25.4)	<0.001
DPI	All	Investigator criteria	544	199(36.6)	46(8.5)	<0.001

and high-medium resistance (R4) independently of the resistance level of the inhalers they were using for their treatment.

450 patients aged 64.7±9.1 years (range 50 to 93) were recruited. 250 patients were male (55.6%), 218 patients had asthma (48.4%) and 232 had COPD (51.6%). Main results presented in table 1.

Errors in inhalation manoeuvre were common among those using pMDI, both before and after the training, due to high PIF (>60 L/min) or short time (<3 sec). Training was able to significantly reduce the short duration of the inhalation, but not to reduce the excessive PIF rate. Patients using DPIs were mostly able to reach the target (PIF >30L/min) both at R2 (98,9%) and R4 level (98,5%), with little room to improve. When stricter criteria was used (as required optimal PIF in some device is >60 L/min) then 29% and 32% of the patients failed. In this case, there was a significant rise in PIF success after the training. The investigators found the training useful.

Our tool reduced errors made but failed to control excessive PIF with pMDI. Almost all patients managed to create a PIF >30l/min, whereas that was not the case for 60l/min.

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Please refer to page A289 for declarations of interest related to this abstract.

P56 CLINICAL ACCURACY AND RISK OF HARM IN ASTHMA RELATED CONTENT ON TIKTOK

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Introduction Social media has dramatically changed the way in which the world accesses information. One potential adverse consequences of social media is the risk of disinformation. This is due to the high volume of generated content which platforms have shown an inability – or unwillingness – to police. 2022 saw exponential growth for TikTok, a video streaming platform reaching 1.6 billion users that year.[1] We investigated the content related to the management of asthma on TikTok by evaluating the most popular videos and the nature of the content shared, specifically adherence to the GINA guidelines and potential for harm.

Methods We searched the term 'asthma' and filtered results by the highest number of likes as a marker for popularity. We excluded duplicates, videos in languages other than English and videos which did not discuss the management of asthma.

Results The top 100 relevant videos had 9,375,467 likes combined, with 33% made by healthcare professionals. The majority were aimed towards patients with asthma (90%), with others aimed towards parents of children with asthma (5%), medical professionals (4%) and medical students (1%). Advice was related to homeopathic remedies (28%), medical therapies (20%), environmental/allergen exposures (20%), home modifications (12%), inhaler technique (12%), diet (12%), vaping (9%), breathing techniques (8%), smoking (6%), symptom monitoring (4%) and exercise (4%). Only 29% of the content shared was in accordance with the GINA guidelines, while 25% was considered to have the potential for harm. Sponsored videos accounted for 10%.

Conclusion Results from the search term 'asthma' on TikTok were mostly aimed at individuals with asthma. The majority of the information shared was not in line with international guidelines, and was potentially harmful in a significant minority of cases. With 13–35-year-olds accounting for 76% of TikTok users,[1] medical practitioners should be aware that information is being circulated via this platform and educate their patients on the risks of unregulated, non-evidence-based advice. TikTok could be used as an adjunct to medical care providers as a source of information for people with asthma.

REFERENCE

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P57 ADDRESSING COMPLEX NON-ADHERENCE AMONG PATIENTS WITH SEVERE ASTHMA USING A DEDICATED ADHERENCE CLINIC

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10.1136/thorax-2023-BTSabstracts.209

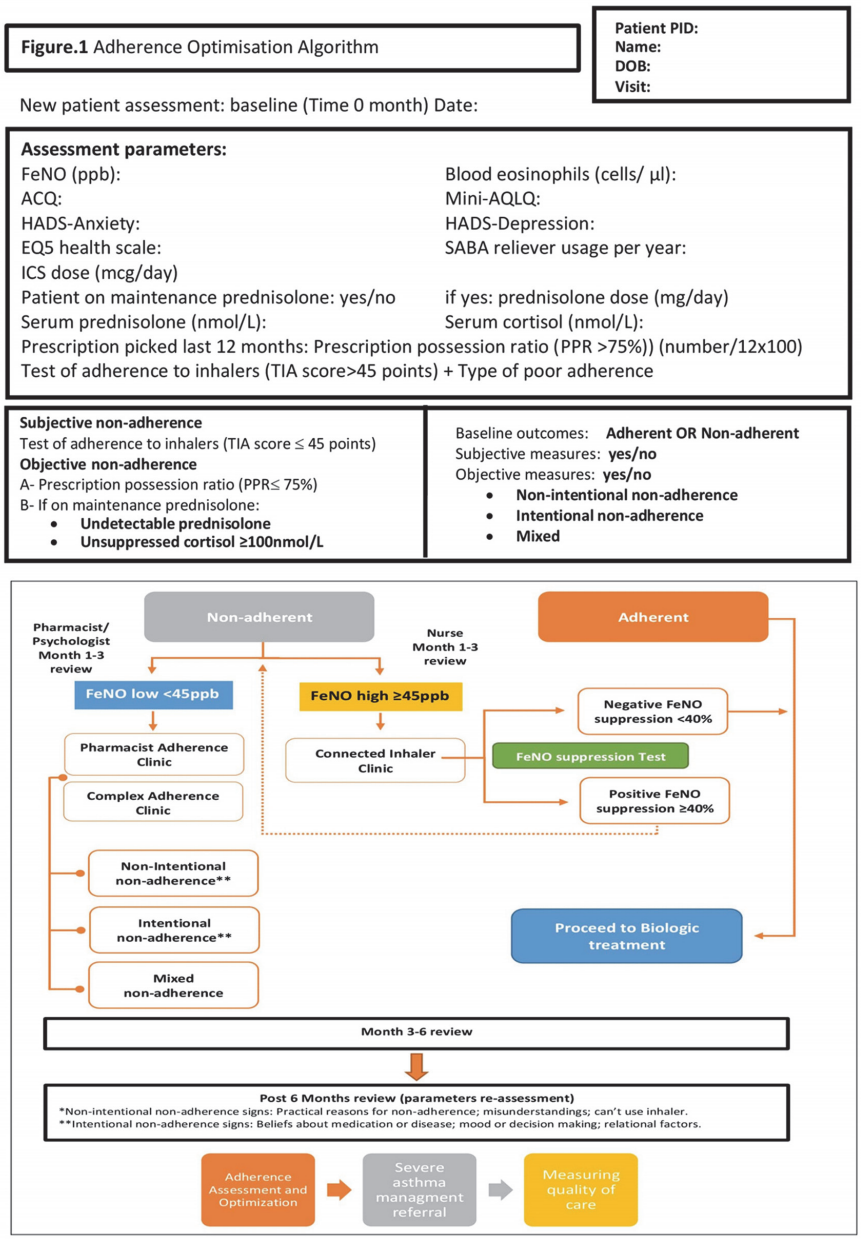
Background Drivers of non-adherence to treatment in some patients with severe asthma can be complex and may benefit from psychological interventions which address patient beliefs, attitudes, and cognitions about their illness and medications[2].

Aims To evaluate the impact of a dedicated clinic on adherence to inhaled corticosteroid (ICS) in patients presenting with complex non-adherence.

Methods A clinic led by a clinical psychologist and a specialist asthma nurse delivered three sessions each a month apart to patients who had complex factors that underpinned their non-adherence (e.g. mental health concerns) or where previous adherence interventions had not worked. An adherence optimisation algorithm (figure 1) was applied. Patients were classed as non-adherent if their ICS prescription possession ratio (PPR) was ≤75%. Adherence barriers and the patient's understanding of their management plan were explored, and shared decision about the management plan was made that took in consideration underlying factors such as mental health and social or personal beliefs. Barriers to adherence were further addressed through treatment regime simplification and cognitive-behavioural and motivational strategies using the SIMPLE strategy [2]

Results A total of 11 patients with complex non-adherence were put through the clinic protocol [mean age 34 years (19–52), 9 (82%) females]. Four patients declined to participate, while three completed the three sessions, two completed two sessions, and two completed one session reflecting the challenges of working with this group of patients. All patients were provided with an individualised written treatment plan that included for example minimal medications for those with depression on a 'bad day'. The mean±SD baseline ICS PPR of 9 cases (2 cases missing follow-up data) was 64±31.98% vs 91±17.71% post-complex adherence clinic intervention, p> 0.09.

Conclusions This study explored the psychological and other barriers to adherence among patients with severe asthma. Our



Abstract P57 Figure 1 Adherence optimisation algorithm

data provides initial evidence that addressing complex factors in this patients' group may improve adherence for some patients. Further research is required confirm these findings.

P58 CARDIO-RESPIRATORY OUTCOMES IN COPD PATIENTS FOLLOWING EXPOSURE TO PARTICULATE MATTER ON THE LONDON UNDERGROUND: PRELIMINARY RESULTS

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10.1136/thorax-2023-BTSabstracts.210

Introduction and Objectives There is a large body of evidence demonstrating the adverse impacts of particulate matter (PM) on health. Concentrations of $PM_{2.5}$ have been shown to be many times higher on the underground compared with ambient levels. Despite millions of passengers across the world using underground transport every year, there is currently little experimental evidence for the health impacts of exposures in this environment.

We hypothesized that airway and vascular dysfunction would occur in participants with COPD following exposure to PM while traveling on the London Underground to a greater extent than on above-ground journeys.

Methods Using a randomised cross-over study design, all participants were exposed to two different exposures (a 90-

Abstract P58 Table 1 Changes in pulmonary and vascular parameters following exposure to 90-minute journeys on the London overground in participants with COPD and no history of cardio-pulmonary disease (controls). Results are presented as mean change vs baseline reading prior to exposure. Statistical significance was assessed by unpaired students' T-test

	COPD			Controls		
	Underground	Overground	p-value	Underground	Overground	p-value
FEV_1 (mean difference % predicted)						
+1.5 h	2.39	1.63	0.612	1.04	2.80	0.163
+6 h	0.74	0.48	0.862	-0.44	-1.36	0.534
+24h	1.23	0.87	0.847	-1.00	-3.68	0.306
PWV (mean difference m/s)						
+2 h	-0.33	0.20	0.062	0.40	0.54	0.689
+6 h	-0.14	0.18	0.323	0.54	0.07	0.607
+24 h	-0.38	-0.21	0.525	0.49	0.18	0.472
IOS 5hz (mean difference kPa/l/s)						
+2 h	0.41	-0.14	**0.008***	0.20	0.21	0.951
+6h	0.59	0.12	0.059	0.31	0.35	0.842
+24 h	0.32	-0.33	**0.005***	0.02	0.04	0.853
IOS 20hz (mean difference kPa/l/s)						
+2 h	0.22	-0.03	**0.042***	0.20	0.11	0.504
+6h	0.30	0.01	**0.021***	0.25	0.33	0.565
+24h	0.20	-0.16	**0.006***	0.06	0.05	0.941

Forced expiratory volume in 1 second, FEVI; Pulse wave velocity, PWV; Airway resistance with impulse oscillometry, IOS

minute journey on the London Underground or a similar journey on the Overground), separated by a washout period of ≥3 weeks.

FEV_1, impulse oscillometry (IOS, Tremoflo, Thorasys), and pulse wave velocity (PWV, Vicorder, Skidmore Medical), were recorded at baseline, +2 hours, +6 hours and +24 hours after each journey. Changes were expressed as mean difference *vs* baseline. Contemporaneous particulate measurements were recorded ($PM_{2.5}$).

We report the interim findings from the first 25 volunteers with no history of cardio-pulmonary disease (controls) and 25 patients with spirometry-confirmed GOLD stage 2–3 COPD, that have completed the study.

Findings The Underground had significantly higher levels of $PM_{2.5}$compared to overground (Underground 236.3µgm^{-3} vs Overground 3.1µgm^{-3}).

There was no significant change in mean FEV_1 or PWV between overground and underground exposures (table 1).

However, there was a significant increase in total and large airway resistance at 2 hours as measured by IOS in the COPD group following exposure to underground compared to overground journeys (mean difference at 5Hz +0.41kPa/l/s vs -0.14 kPa/l/s, p=0.008). These changes were not seen in the control group (mean difference +0.20 kPa/l/s vs +0.21kPa/l/s, p=0.951).

Conclusions These preliminary findings suggest that patients with COPD may be more susceptible to airways dysfunction after exposure to particulate matter on the Underground. Further analysis of this cohort will explore potential changes in other vascular, respiratory and systemic parameters alongside quantification of particulate and gaseous exposures.

'Sweet child of mine' – Innovations in paediatric lung disease

P59 E-CIGARETTE ADDICTION IN ADOLESCENTS – HOW DO WE GET THEM TO STOP?

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10.1136/thorax-2023-BTSabstracts.211

Objective E-cigarette use in adolescents is increasing and the addictive potential of these devices is well recognised. Most health authorities have no E-cigarette cessation programmes. We reviewed randomised control trials evaluating prevention strategies for adolescent E-cigarette use and identified components that may inform future strategies to combat E-cigarette use in adolescents.

Data Sources Search conducted via Ovid MedLine for English-language randomised control trials published from 2020–2023 containing keywords relating to adolescent E-cigarette use.

Study Selection 1452 records, 7 studies were included in the review according to the chosen inclusion and exclusion criteria relating to the study's objectives. Search terms were created in accordance with the main objective (vaping/E-cigarette use prevention/cessation/adolescents), and the main findings of the studies reviewed were collated to establish common themes of qualitative outcomes and identification of clear successes and downfalls of prevention programmes.

Data Synthesis All were conducted in the U.S, and most evaluated abilities of digital prevention techniques to reduce E-

Abstract P59 Table 1

Study	Main Findings
1	Potential feasibility issues with completion [CATCH My Breath]. Importance of youth autonomy. Include mental health/stress resources and health effect visuals. Peer-led delivery. Significant increases in tobacco-related knowledge and risk perceptions of any tobacco products. Significant improvement in general knowledge and perceived risk of E-cigarettes, and lower risk of using other tobacco products. Change in risk perception was also significant in control group.
2	"Real Cost" groups - lower susceptibility to vaping & combustible tobacco compared with control group. "Real Cost" interventions had more significant effect on non-white participants. Intervention groups had better risk perceptions of both health harms and addiction, and higher knowledge of risk of tobacco products
3	Participants in intervention group - more negative sample than control (higher abstinence rate). At follow-up, abstinence rates were the same in both groups. The mobile app used was reported as favourable and highly usable
4	Study specifically focuses on women and non-binary people assigned female at birth Health harm-themed messages and images of both female-presenting couples and individual females found to reduce E-cigarette use intentions the most
5	"Rethink Vape" – increased vaping knowledge, risk perceptions, reduced E-cigarette susceptibility, and increased intention to avoid E-cigarettes. Significantly increased knowledge of health issues related to E-cigarette compared to controls
6	Impact of social media messages was positive (greater E-cigarette-related knowledge compared to the control group). Messages about nicotine side effects better than other aspects of E-cigarettes. Messages that included 'lung damage' - highest perceived effect ['vape designs' – lowest perceived effect]. Previous E-cigarette use did not alter message reactions. High intent to share the social media posts. Highlight social media as a potential tool for preventative efforts
7	"Real Cost" effective at: (1) developing higher risk perceptions of E-cigarette use (2) deterring intentions to use E-cigarettes (3) lowering attitudes to E-cigarettes. Emphasised need to better understand perceptions of messages to evaluate future preventative advertisements

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cigarette use, perceptions of tobacco products, and intentions of future tobacco product use. Studies used text-messaging services, social media delivery methods, and telehealth approaches. Focuses included the influences of message content, image subjects, and delivery method. Many employed focus groups in development processes. The impact of each programme on adolescent E-cigarette perceptions was evaluated to optimise future E-cigarette prevention campaigns.

Results Outcomes included a significant improvement in general knowledge and perceived risk of E-cigarettes, and lower risk of using other tobacco products. Further results showed lower susceptibility to vaping and higher abstinence rate although future studies are required to ensure long term behavioural change (table 1).

Conclusions Focus groups aid development of cessation and prevention campaigns. Messages should be digital and inclusive (including ethnic minorities and LGBTQ+ individuals). Messages should contain health 'harm' warnings. Furthermore, support services should be well signposted for adolescents. Further research is needed to halt teenage E-cigarette addiction.

P60 PERCEPTIONS AND USE OF E-CIGARETTES AMONGST ADOLESCENTS IN A TERTIARY RESPIRATORY SERVICE

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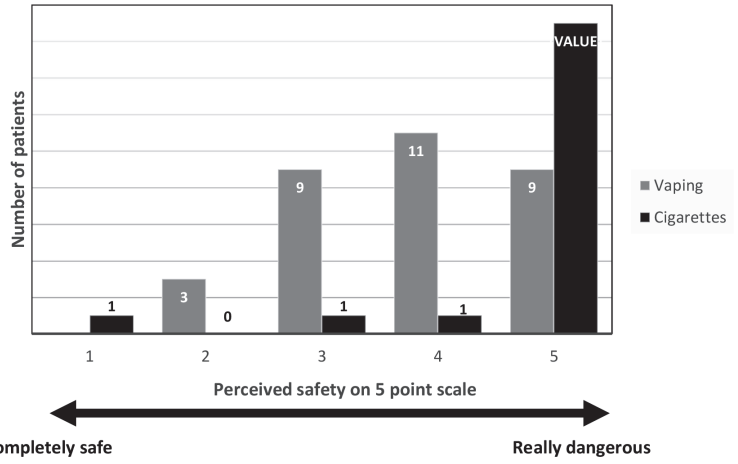
10.1136/thorax-2023-BTSabstracts.212

There has been a significant increase in the use of e-cigarettes by children and young people (CYP) with 20% experimenting with vaping.[1] This is of concern due to the addictive effects of nicotine on this age group and the unknown long-term effects of e-cigarettes. The particular effects of vaping on the lungs of CYP with chronic respiratory issues are also



Abstract P60 Figure 1 Perceived safety of vaping and cigarettes by CYP

unknown. We sought to explore perceptions of vaping amongst CYP with a chronic respiratory diagnosis attending our tertiary respiratory service.

Method A voluntary anonymous QR code questionnaire was provided to CYP (age 11 -18 years) attending our cystic fibrosis (CF) and asthma clinics between November 2022 and April 2023. We also provided the same questionnaire to patients attending diabetes clinic, to explore if there were any differences between those with and without a chronic respiratory diagnosis.

Results 32 CYP responses were collated: 47% no respiratory condition, 34% CF, 12% asthma and 6% stated 'another respiratory condition'. 3 patients (9%) vaped regularly, 6 patients (19%) had experimented with vapes and 72% did not vape. Of the 3 patients that vaped regularly 2 patients did not have a respiratory condition and 1 had 'another respiratory condition'. Of the 6 patients who had tried a vape 3 had an underlying respiratory diagnosis. The perceived safety of vapes and cigarettes is shown in figure 1. There was no difference in the safety perception of vapes between those with and without a respiratory diagnosis.

Discussion Compared to data from ASH, a similar percentage of CYP in our service experiment with vaping. These limited data suggest that the safety perception of e-cigarettes amongst CYP in our clinic is not affected by having an underlying chronic respiratory condition. This may or may not be extrapolated into a personal decision whether or not to vape in this patient group – but does suggest that more work needs to be done to highlight the risks generally to CYP and in particular to those with an underlying respiratory condition.

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P61 IMPROVING THE DETECTION AND MANAGEMENT OF PULMONARY EXACERBATIONS IN CHILDREN WITH PRIMARY CILIARY DYSKINESIA BY DESIGNING AND IMPLEMENTING A WRITTEN SELF- MANAGEMENT PLAN

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Introduction Primary ciliary dyskinesia (PCD) is a rare, inherited disorder of motile cilia, predisposing patients to repeated respiratory infections. These pulmonary exacerbations (PEx) cause significant morbidity, and prompt treatment with antibiotics and increased physiotherapy is important to prevent long-term complications.[1] A written self-management plan can improve adherence to prescribed treatments and enable patients to respond appropriately to symptoms within a defined time frame. The aim of this study was to improve the detection and management of PEx in children with PCD by the introduction of self-management plans.

Methods A Plan-Do-Study-Act model for quality improvement intervention was used to (1) develop a self-management plan jointly with patients and caregivers and (2) introduce it into clinical service. A questionnaire informed design of the management plan and was given out to families attending clinic over a 2-month period. Questions focused on symptoms from the consensus statement on PEx,[1] terminology and triggers for family action. These results informed development of the management plan for step (2), the introduction of self-management plans: a second opportunistic sample of children attending clinic over one month. Data was collected on unscheduled healthcare visits and oral antibiotic usage 3 months pre and post introduction.

Results Part (1): Questionnaire: 33 families responded. 32/33 used increased cough as a sign their child was unwell, 25 sputum volume or colour change, 18 fever, 17 malaise, 17 shortness of breath. 2 understood the term PEx. 'Chesty' (n=25) and 'congested' (n=22) were the two most common terms used. Part (2): 28 received management plans. Oral antibiotic usage decreased (68% to 57%). Attendance at routine clinic with untreated increased symptoms decreased (26% to 7%). No difference in the number of hospital admissions or unscheduled healthcare visits. Service user feedback demonstrated that patients found this self-management plan a useful tool.

Discussion This study suggests that written self-management plans can help families improve their detection and management of PEx in children with PCD. Plans can be a useful tool for non-specialist health providers and can help aid PCD patients receive appropriate treatment.

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P62 HIGH FLOW (HF) THERAPY AT HOME – 7 YEARS OF EXPERIENCE FROM A TERTIARY PAEDIATRIC RESPIRATORY SERVICE

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Aims To review the clinical characteristics and outcomes of children receiving home HF therapy at our tertiary centre.

Methods We conducted a retrospective review of children receiving home HF. Data captured included age, diagnoses, indications for HF, HF settings, treatment duration and outcomes.

Results 34 children were established on home HF between 2016 and 2022. Almost all patients used HF for nocturnal use only. 20 patients were male (59%). Median age at initiation of HF was 9 months (range 1–200). 2 patients received HF via tracheostomy. An 'Airvo' device was used in all patients; device cost was £2500 with monthly consumables approximately £300 per patient.

Indications for home HF are shown in table 1. 30 patients (88%) had multiple co-morbidities. 13 patients (38%) had been born prematurely, 10 of whom prior to 28 weeks gestation. 10 patients (29%) had congenital heart disease. 13 patients (38%) had failed to tolerate non-invasive ventilation (NIV).

Median HF settings were 1.3L/kg (range 0.1–2). Median FiO_2 was 35% (range 21–75). 21 patients (62%) required low flow oxygen when not using HF.

7 patients (20%) successfully weaned off HF: median duration of therapy in this group was 10 months (range 3–48). 4 patients failed to tolerate HF. 2 patients did not adhere to treatment. 3 patients progressed to ventilation via tracheostomy, 1 patient underwent lung transplantation and 4 patients died. 13 patients remain on HF. Median duration of HF for

Abstract P62 Table 1 Indications for initiation of home HF therapy

Indication for home HF therapy	Number of patients
Upper airway obstruction and obstructive sleep apnoea	9 (26%)
Chronic neonatal lung disease	9 (26%)
Other chronic respiratory conditions	7 (21%)
Respiratory support for palliative symptom control	5 (15%)
Lower airway malacia	4 (12%)

all patients at the time of data collection was 11 months (range 0–80 months).

Conclusion We present the largest description to date of a paediatric cohort in the UK using home HF. This demonstrates the use of HF for a variety of respiratory conditions in children with multiple co-morbidities. Home HF may be considered as a method of respiratory support to facilitate discharge home and as a strategy to provide long-term respiratory support where other modes may not have been feasible. Further studies and shared experience are needed to inform which groups of children may benefit most from home HF.

P63 MULTICENTRE PROSPECTIVE COHORT STUDY OF REMOTE LUNG FUNCTION TESTING IN CHILDREN: VALIDATION AND COMPARISON OF SUPERVISED AND UNSUPERVISED SPIROMETRY

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10.1136/thorax-2023-BTSabstracts.215

Background Technological advances in spirometers have enabled objective monitoring of respiratory conditions for children and young people (CYP) at home using portable Bluetooth enabled devices. Adoption of these devices was accelerated due to the Coronavirus pandemic but data they produce in CYP had not been fully validated. Furthermore, reliability of results from spirometry performed without expert supervision requires assessment.

Aims To compare the accuracy of portable Bluetooth enabled vs. hospital based pulmonary function test (PFT) equipment (i.e., gold-standard), and to evaluate the agreement in lung function indices following supervised vs. unsupervised remote spirometry in CYP.

Methods Multicentre prospective cohort study conducted across England and Scotland between 2021–22. Part 1: n = 83 CYP (median age: 12 years (25th/75th centiles=9.5,13.9) (54% female), with and without a doctor diagnosed lung condition, sequentially performed supervised spirometry in the pulmonary function lab on hospital based PFT equipment and a portable spirometer, which was (either a Nuvoair or MIR Spirobank Smart). Randomisation was applied for device order and type of portable spirometer used. Part 2: 73 CYP, median age 12 years (25th/75th centiles=9.4, 14.2) (49% female), with lung disease and previous experience with a home spirometer (3–24 months), performed 2 spirometry tests at home using a portable device. One test was remotely supervised by a healthcare professional, the other unsupervised. Data was analysed using Bland Altman analysis.

Abstract P63 Table 1 Portable vs. laboratory-based & unsupervised vs. supervised

	FEV1 (Litres)	FVC (Litres)	PEF (Litres/min)
Nuvoair			
Mean Bias	0.0	0.03	8
Limits of agreement (LOA)	0.31, -0.31	0.36, -0.43	89, -74
Spirobank			
Mean Bias	-0.01	-0.03	-2
Limits of agreement	0.32, -0.35	0.34, -0.41	50, -54
Unsupervised vs Supervised			
Mean Bias	-0.03	-0.04	-4
Limits of agreement	0.18, -0.24	0.3, -0.38	56, -64

Results Acceptable agreement was observed for FEV_1, FVC and PEF when comparing portable devices to hospital PFT equipment with the mean bias very close to zero. For part 2, there was also acceptable agreement observed for FEV_1, FVC and PEF when comparing unsupervised testing to remotely supervised with the mean bias also very close to zero (table 1).

Conclusion Our findings indicate that the Nuvoair and MIR Spirobank Smart Bluetooth spirometers provide accurate measurements when compared with calibrated hospital based PFT equipment. However, the LOA may be out with acceptable variability in some younger patients. CYP with experience of using a home spirometer can produce unsupervised spirometry test results equivalent to those performed with a healthcare professional. This supports remote disease monitoring for patient-centred care.

P64 USING A REMOTE MONITORING PLATFORM TO SUPPORT SPIROMETRY COACHING IN A CYSTIC FIBROSIS PEDIATRIC POPULATION

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10.1136/thorax-2023-BTSabstracts.216

Rational Acquiring high-quality spirometry data in a clinical setting is important, particularly when clinical decisions are being aided by the data. This analysis investigates if a remote spirometry monitoring program can be used to support children with Cystic Fibrosis (CF) to achieve a high level of spirometry quality.

Methods Children with CF, from a tertiary centre, were offered a remote monitoring program (patient-facing app + Bluetooth-connected spirometer) as part of their normal CF care. Patients were asked to measure spirometry (3 forced expiratory maneuvers) either if they were unwell at home or if they were using it to improve technique. All data recorded via the app were visible to the patient and to the healthcare providers in real-time via a secure browser-based portal. Patients and the clinical team were provided with feedback on the quality of their home spirometry readings through the use of artificial intelligence (AI) based quality control software

(ArtiQ.QC) which assessed the quality of the home spirometry test using the 2019 ATS/ERS criteria and provided a grading of 'Acceptable, Usable or Unusable'. If the quality of blows were consistently low the clinical team ensured further spirometry training was undertaken either virtually or at their next clinic appointment.

Results 175 patients have been enrolled of which 87 were patients with CF. In May-2023, 18 patients with CF completed home spirometry readings. These patients spent a median time of 5 minutes on the patientMpower app during the month. A total of 91 spirometry maneuvers were completed. All patients achieved a home spirometry graded as 'Usable' of those a further 61% (n=11) achieved Acceptable spirometry blow. 44% (n=8) of patients achieved 3 blows that were deemed 'Acceptable or Usable' in a session. 62% (n=56) of the home spirometry maneuvers were graded as 'Usable' or 'Acceptable' by the quality control software.

Conclusion Remote monitoring can be used to support spirometry coaching as seen through patients achieving a high level of usable home spirometry readings (as assessed by quality control software). This high-quality data can support clinical decisions on patient care.

Please refer to page A289 for declarations of interest related to this abstract.

P65 RESPIRATORY CARE BURDEN IN CHILDREN WITH ASPIRATION

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10.1136/thorax-2023-BTSabstracts.217

Background Aspiration is a significant cause of respiratory morbidity in children. It can be difficult to diagnose, often with no clinical symptoms except persistent or recurrent cough. This results in significant Emergency Care attendance and antibiotic use by the patient and/or lung damage.

Aims To assess the importance of diagnosis of aspiration in children with respect to respiratory care.

Methods A service review was carried out between the Leeds Children's Hospital Respiratory team and the Leeds Community Hospital Speech and Language Team (SALT), looking specifically at the length of time to referral, underlying diagnoses and use of antibiotics. This was a retrospective notes based analysis comparing data from two electronic patient records.

Results Sixty one patients looked after by both the SALT and respiratory team were identified. The average age at diagnosis of aspiration was 30.5 months. Fifty two patients had an underlying comorbidity. Two thirds had been referred to respiratory before SALT. Thirty eight (62%) patients had more than 5 courses of antibiotics. Fourteen (23%) had attended the emergency department more than 6 times. The results found a significant statistical relationship between the number of courses of antibiotics prescribed and a larger age difference between participants seeing Respiratory for the first time and seeing SALT for the first time.

Conclusions Children who aspirate have a considerable respiratory burden with respect to antibiotic use and emergency care provision. Some of these children would develop aspiration over time due to their underlying condition. An early recognition and diagnosis of aspiration may reduce antibiotic burden in children who aspirate

P66 THE UTILITY OF SLEEP STUDIES AND TREATMENT OPTIONS IN CHILDREN WITH PRADER – WILLI SYNDROME IN THE GROWTH HORMONE ERA

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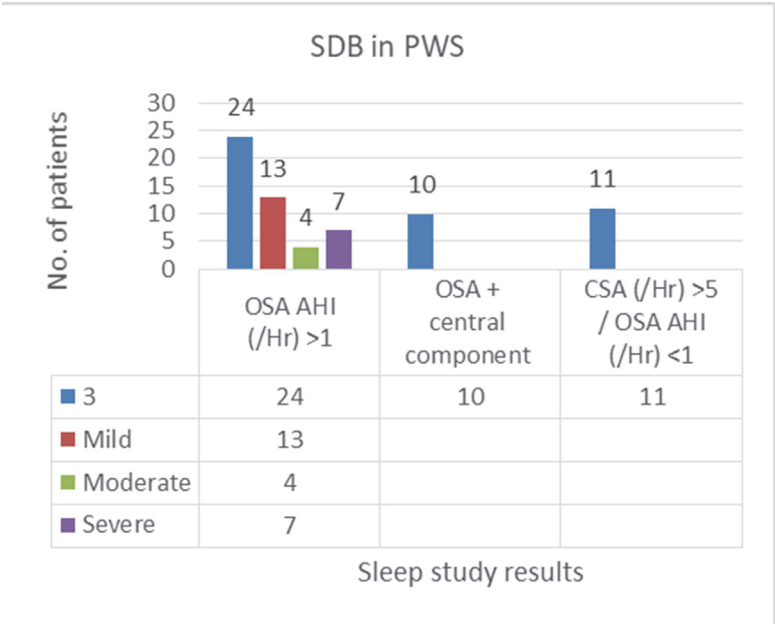
10.1136/thorax-2023-BTSabstracts.218



Abstract P66 Figure 1 SDB in PWS patients, including OSA and CSA

Introduction Prader – Willi Syndrome (PWS) is a rare genetic multisystem disorder, with a high prevalence of sleep disordered breathing (SDB). Treatments include; non-invasive ventilation (NIV), oxygen therapy and adenotonsillectomy. Growth Hormone (GH) therapy is also now being used at an earlier age and may potentially worsen SDB due to adenotonsillar hypertrophy. Our primary aim was to evaluate cardio-respiratory sleep study (CRSS) results from PWS patient's pre and post GH. A secondary aim was to evaluate the use of NIV as a treatment option in this population.

Methods This was a retrospective study. Results from CRSS, pre and post GH initiation from 2013 to present were included. The main outcomes were apnoea hypopnoea index (AHI), the nature of the SDB and treatment provided.

Results 38 patients were included – 20 males, 18 females (mean age: 4.1 [2.8, 5.5], weight mean Z score: 0.1 [-0.72, 0.92]). 92% demonstrated SDB, 69% had Obstructive Sleep Apnoea (OSA) and 31% had Central Sleep Apnoea (CSA) (figure 1). There was no significant difference ($P > 0.05$) in OSA indices pre and post GH. Five patients (mean age: 2.98 [1.14, 4.82]) developed moderate/severe OSA, on average 16 months after starting GH. All of these patients had a subsequent adenotonsillectomy. 24% of the total patient population were established on NIV following an abnormal CRSS, associated with a raised PCO2. Seven of the nine patients have remained on long term NIV.

Discussion This study shows the high prevalence of SDB in children with PWS and treatment interventions used. The risk of OSA development post-GH initiation demonstrates the importance of CRSS. As treatment options involve long term NIV, CRSS should play a major role in monitoring PWS patients over time.

Abstract P67 Table 1 Nebulised HS to NMDs and CP: criteria for prescription and reported side effects

Question	Answer	Count (%)
When do you decide to prescribe/recommend nebulised hypertonic saline to patients with neuromuscular disease or cerebral palsy?	When there is sticky secretion production.	46 (87%)
	When there is difficulty in mobilising secretions.	52 (98%)
	When there is risk of respiratory infections.	19 (36%)
	When there is a history of recurrent respiratory exacerbations.	31 (58%)
	Other (Please specify).	9 (17%)
	• When physiotherapists recommend it.	5 (9%)
	• When 0.9% is not effective.	1 (2%)
	• For chronic *Pseudomonas aeruginosa* infection.	1 (2%)
	• For persistent atelectasis.	1 (2%)
	• For chronic mouth breathing.	1 (2%)
Which side effects of nebulised hypertonic saline have you observed in patients with neuromuscular disease or cerebral palsy? Please select all that apply.	Bronchoconstriction or wheeze.	29 (55%)
	Intense coughing.	21 (40%)
	Excessive secretions production.	15 (28%)
	Sore throat.	5 (9%)
	I have not observed any side effects.	15 (28%)
	Other (Please specify).	4 (8%)
	• Vomiting.	1 (2%)
	• Increased oral secretions.	1 (2%)

P67 CURRENT PRACTICES FOR PRESCRIBING NEBULISED HYPERTONIC SALINE IN PATIENTS WITH NEUROMUSCULAR DISEASES OR CEREBRAL PALSY

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10.1136/thorax-2023-BTSabstracts.219

Introduction Nebulised hypertonic saline (HS, usually 3%, 6% or 7%) is used to aid airway clearance and reduce respiratory exacerbations in patients with Cystic Fibrosis (CF). Its use is extrapolated from evidence in patients with CF to those with Neuromuscular Disease (NMD) and Cerebral Palsy (CP), with only retrospective evidence showing a significant reduction in respiratory exacerbations.[1] This survey aimed to investigate the current practices for using nebulised HS in patients with NMDs or CP

Methods The survey was conducted using an online platform and targeted healthcare professionals involved in the respiratory care of patients with NMDs or CP

Results We received 74 responses (UK= 69; Australia = 3; USA = 1; China = 1), most from paediatric physiotherapists from tertiary care centres in the Midlands, UK. 63.5% prescribed or recommended nebulised HS for NMD or CP during pulmonary exacerbations and as chronic therapy, primarily for difficulty in mobilising secretions (table 1). The severity of symptoms (69%) and tolerability (76%) were the main criteria for choosing the concentration, with most respondents starting from 3% and escalating as needed. 8% of respondents did not recommend or prescribe nebulised HS to NMD or CP, mainly because of a lack of evidence of efficacy. The most reported side effects were wheezing (31%) and intense coughing (24%). Increased secretion burden due to nebulisation with HS was also reported (17%). Assessment of treatment effectiveness focused on respiratory symptoms (37%), frequency of respiratory exacerbations (28%), and quality of life (25%). Ease of airway clearance (3%) and pulmonary function tests (5%) were used less in these groups.

Conclusion This survey offers the first information about current practices for nebulised HS in patients with NMDs or CP. Despite the lack of evidence in this population, a significant percentage of respondents reported using nebulised HS. The findings highlight the need for a better evidence base.

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P68 INEQUALITY IN IMPLEMENTATION OF GOOD CLINICAL PRACTICE ASTHMA ACTIVITIES AMONG CHILDREN IN THE UK

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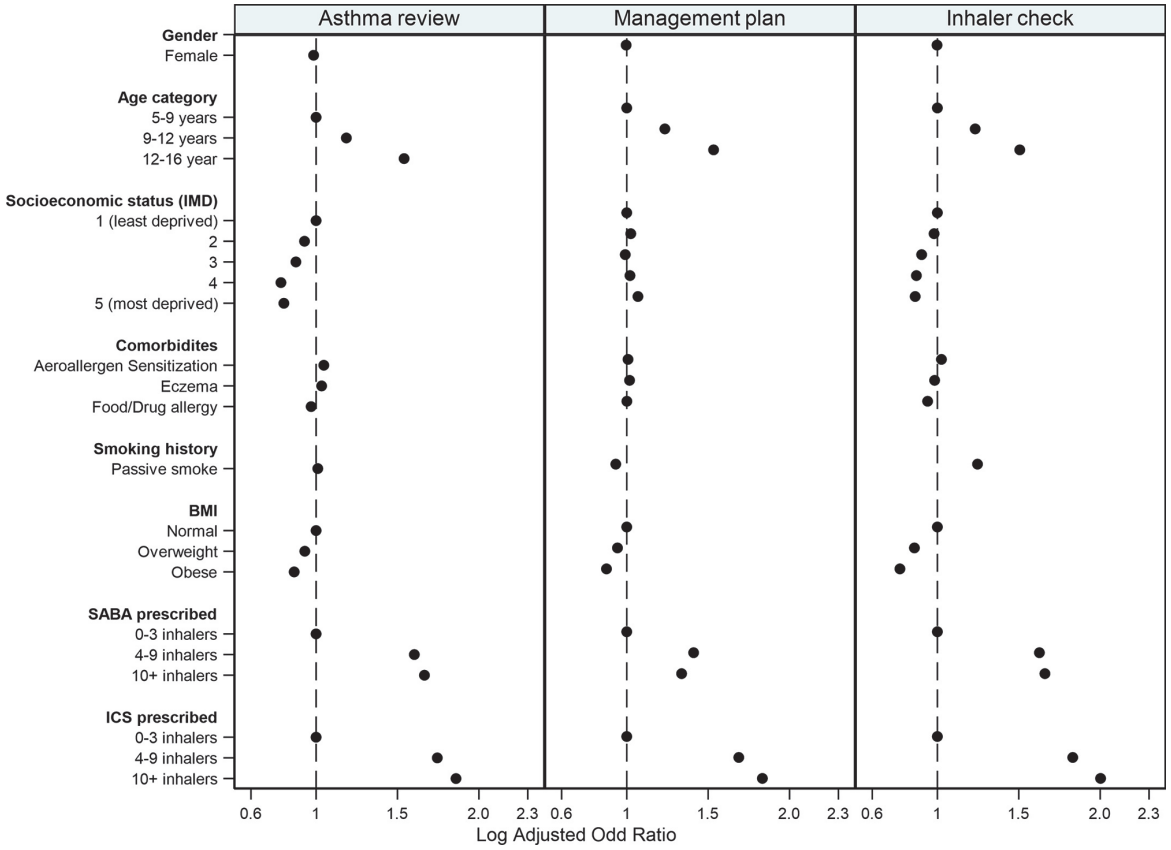
10.1136/thorax-2023-BTSabstracts.220

Introduction National asthma management guidelines recommend annual implementation of good clinical practice activities (GCPA), including, annual asthma reviews, asthma



Abstract P68 Figure 1 Association of patient's characteristics and receiving good clinical practice activity for three years follow-up

management plans, inhaler technique checks and influenza vaccination. However, small UK studies have suggested there is often a suboptimal level of implementation. The objective of this study was to use nationally representative data to describe the annual incidence of receiving GCPA and determine which children are at risk of not receiving them.

Methods Data was obtained from nationwide UK primary care records (Clinical Practice Research Datalink), including children with asthma aged 5–16 years old, from January 2004 to January 2021. The annual incidence of each GCPA (annual asthma review, management plan, inhaler technique check and influenza vaccination) were measured. The association between children's clinical characteristics and receiving each GCPA within three-years from diagnosis, was estimated using mixed effects (GP practice was the random effect) multivariable logistic regression. Age was categorised as 5–8 years, 9–11 years and 12–16 years.

Results One year post-diagnosis: 56% of children received an asthma review, decreasing to around 45% in subsequent years, 42% received an asthma management plan, decreasing to around 30% thereafter, and 59% received an inhaler technique check, decreasing to around 40% thereafter. Only 7% of children received influenza vaccination through their GP practice.

Factors associated with non-receipt of a GCPA were younger age, higher social deprivation, and higher BMI (figure 1). Factors increasing the odds of receiving a GCPA were 4 or more inhaled corticosteroids (ICS) or short-acting beta-agonist (SABA) prescriptions one year before diagnosis (figure 1).

Conclusion The incidence of GCPA appears to match the minimum required for financial reward by QOF (45% for annual reviews). There are significant disparities in the provision of GCPA, where younger, more deprived, and overweight or obese children are at highest risk of not receiving them. Low influenza vaccination rates were likely due to vaccinations being offered at school or by local pharmacists.

P69 A RETROSPECTIVE STUDY EXPLORING NUTRITIONAL STATUS OF CHILDREN WITH BRONCHIECTASIS AND PRIMARY CILIARY DYSKINESIA

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10.1136/thorax-2023-BTSabstracts.221

Introduction Primary Ciliary Dyskinesia (PCD) and paediatric bronchiectasis (PB) unrelated to Cystic Fibrosis are chronic lung diseases affecting lung function and quality of life in childhood. There is limited understanding of the nutritional status in these children.

Aim To investigate nutritional status and change over time in children with PB and PCD.

Methods Patient records of children with PB and/or PCD were audited (2007–2023) for weight, height and BMI at 6 age points: 3, 5, 7, 9, 11, and 15 years. BMI z-scores were calculated based on age, gender and UK reference data and used to categorise nutritional status according to WHO definitions for undernutrition, overweight and obesity (−2SD,

+2SD and +3SD respectively) and expressed as% of the available data for each age group. Change in BMI *between* ages was recorded as deviation by ≥±1 centile over time.

Results Data was collected for 52 patients (76% PB, 12% PCD, 12% PB and PCD; 52% male). Z-scores revealed that most individuals were of a healthy BMI (≥80%). There was no undernutrition at any of the age points except at age 7 (5%). There was higher frequency of overweight at ages 3 & 15 (12% and 16%). Obesity levels were low compared to the general population (age3:4%, age5:0%, age7:2%, age9&11:3%, age15:7%). The frequency of children crossing down ≥1centiles was most pronounced between age 3 to 5 years (60%, n=23). Between the ages of 7–9, 9–11 and 11–15 most children had no major change in BMI (58%, 66% and 41%) but went up ≥1centiles in around a third (30%, 24%, 37%).

Conclusion Most children had healthy weight for height. However, between age 3–5 a high portion showed a decline in nutritional status that may be linked with clinical respiratory symptoms at the time and needs further exploration. An increase in BMI is most notable in teenage years that may or may not be related to their respiratory health and early intervention is indicated. BMI may also not be the most sensitive indicator of nutritional undernutrition in this age group.

'I still haven't found what I'm looking for' – Cancer diagnosis: imaging and bronchoscopy

P70 EVALUATION OF PATIENT EXPERIENCE OF A SELF-REFERRAL CHEST XRAY SERVICE PILOTED IN AREAS OF GREATER MANCHESTER

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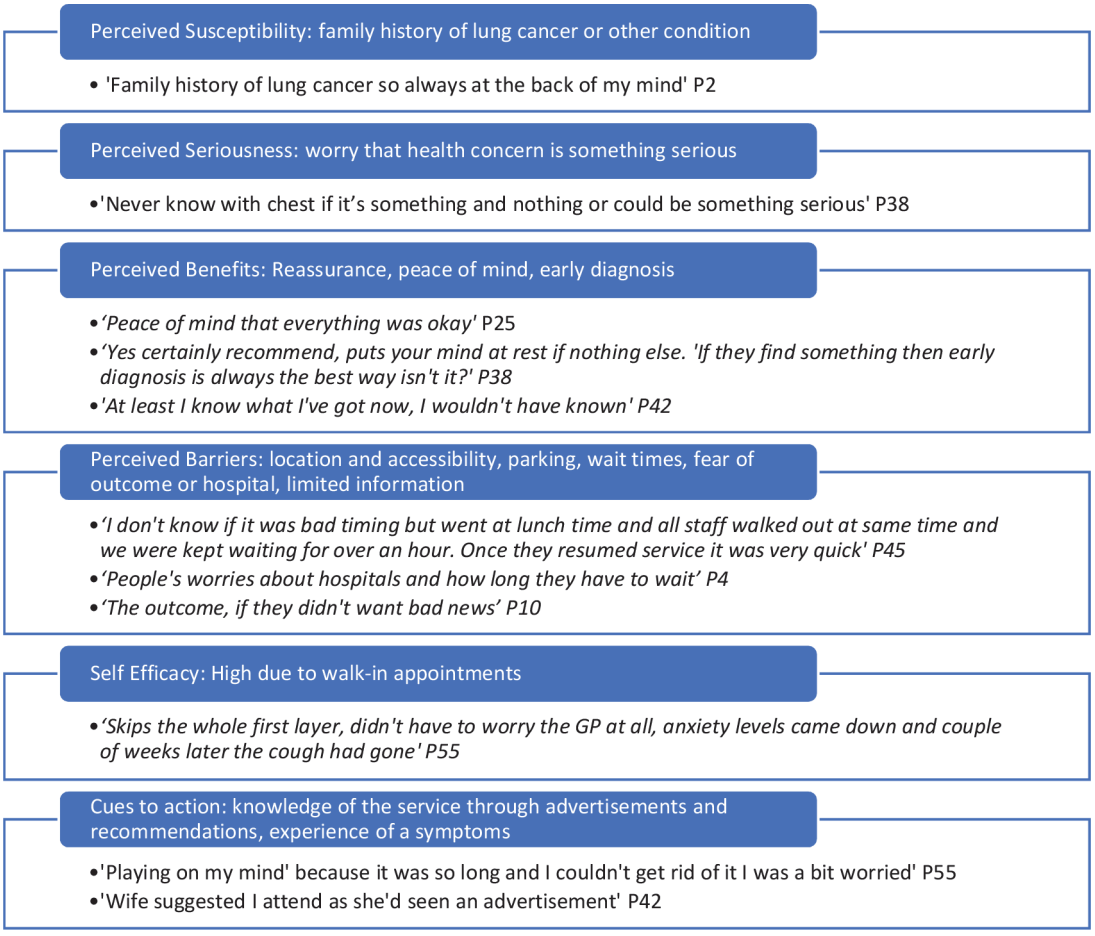
Introduction Increasing the uptake chest X-rays (CXRs) in patients with the common symptoms of lung cancer might lead to a stage-shift towards early diagnosis of lung cancer. However, symptomatic patients experience numerous barriers to accessing CXRs. A self-referral CXR (SRCXR) service was launched in July 2022 allowing symptomatic members of the public to attend for a CXR at one of three Greater Manchester (GM) hospitals without the need for a primary care appointment (if specific criteria were met). Outcomes of this pilot service have been published previously. This project aims



Abstract P70 Figure 1 Patient experiences and how they relate to the health belief model

to understand patient motivations for attending the service to determine how uptake could be increased and to facilitate service expansion.

Methods Deductive thematic content analysis of semi-structured qualitative interviews with a sample of attendees.

Results Fifty-one attendees were interviewed. Respondents were from a wide range of age groups and postcodes within the included areas. The majority of participants were female (57%) and White British (94%). Overall, participants *'couldn't fault the service'* and would recommend it to others. Most participants heard about the service through word of mouth and advertisement (35%) or through their GP surgery (22%). The majority (86%) attended due to a concerning health issue (i.e. cough or chest complaints). Twenty-two percent had tried to see their GP but were unable to get an appointment. Qualitative findings are interpreted within the Health Belief Model (figure 1). Demographic factors may influence engagement. Some forms of advertising may be more suitable to people of different ages, concerns were raised that social media *'may not reach older people'*. Ethnicity barriers such as language or cultural issues were also highlighted. If the chest Xray self-referral service wasn't available, most participants would contact their GP, but highlighted the difficulties, e.g. contacting the surgery, long waits for appointments/referrals. Others would not have done anything if this service was not available.

Conclusion This work provides assurances that the GM SRCXR service is providing a good experience of care and helping to break down barriers to accessing CXRs in patients with the common symptoms of lung cancer and provides guidance for future service enhancements.

P71 THE UTILITY OF THE HERDER SCORE FOR GUIDING DIAGNOSTIC INVESTIGATIONS OF NODULES IN LUNG CANCER SCREENING

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Introduction Suspicious lung nodules on CT are typically investigated with a ^{18}F-FDG PET-CT scan and a Herder score is calculated to guide management. BTS guidelines recommend that nodules with a score under 10% should be offered surveillance and over 70% surgery. However, for a score between 10 to 70%, management decisions are left to the multidisciplinary team (MDT), influenced by the patient's risk and preference. Our aim is to evaluate the outcomes of PET-CT scans performed within a lung cancer screening (Targeted Lung Health Check [TLHC]) programme to assess the utility of the Herder score in decision making.

Methods A retrospective analysis was performed of ^{18}F-FDG PET-CT scans performed between August 2018 and December 2022 for patients with solid nodules >300mm^3 and Brock score>10% from West London TLHC programme. Patients who either had a biopsy or completed 12 months of surveillance scans were included in the analysis. The FDG activity of each nodule was classified using definitions from the BTS guidelines and a Herder score calculated. The accuracy of decision making by the MDT as well as using Herder scores at threshold of 10% and 70% were assessed.

Abstract P71 Table 1 Comparison of diagnostic accuracy between MDT decisions and Herder scores

	MDT decision to investigate for all patients	MDT decision to investigate in patients with Herder 10–70%	Herder score alone ≥ 10%	Herder score alone ≥ 70%
Accuracy	79.7%	82.4%	66.7%	67.3%
Sensitivity	88.2%	81.5%	96.5%	67.1%
Specificity	69.1%	83.3%	29.4%	67.6%
Positive predictive value	78.1%	84.6%	63.1%	72.2%
Negative predictive value	82.5%	80%	87%	62.2%

Results 186 patients underwent a PET-CT scan for a suspicious nodule. 33 patients were excluded owing to loss to follow-up, awaiting a 12-month surveillance scan or being discharged after PET-CT scan; 153 subjects were included in the final analysis. The mean age was 68.6 years (range 56 to 76) with 76 female subjects and 104 ex-smokers. The mean size of nodules was 17.4mm (range 7.7 to 30mm). 85 out of 153 nodules (55.5%) were malignant. Sensitivity, specificity, positive predictive and negative predictive values for identifying malignant nodules are outlined in table 1.

Conclusion An MDT decision to further investigate nodules using a combination of the Herder score between 10–70% as well as imaging and clinical factors provided the greatest overall diagnostic accuracy compared to Herder alone.

P72 THE ROLE OF THE HISTORICAL CLINICAL AND IMAGING DATA IN TARGETED LUNG HEALTH CHECK SCREENING REVIEW MEETINGS

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Introduction The Somerset, Wiltshire, Avon and Gloucester (SWAG) Cancer Alliance are undertaking a Phase 3 Pilot in the National TLHC programme. SWAG covers a population of 2.6 million with an estimated 366,500 eligible participants. Weekly Screening Review Meetings (SRM) are undertaken to review actionable cases. The SWAG SRM has established access to local PACS imaging databases to enable review of relevant historical imaging.

Methods TLHC participant data were captured for participants in the West Bath and Bridgewater regions between August 2022 and June 2023. SRM outcomes were scrutinised and pathway changes were categorised. Actionable incidental findings were downgraded according to additional available clinical information and historical imaging. Pulmonary nodule follow up recommendations were downgraded on the basis of historical imaging.

Results 3133 screening participants underwent a baseline low dose CT scan. 874/3133 (27.9%) participants were discussed in an SRM with 95/874 (10.9%) undergoing pathway change

following review with local historical clinical and imaging information.

56 pulmonary nodule findings and 29 incidental findings were downgraded with the use of historical imaging. Table 1 highlights the range of incidental findings which were downgraded and the rationale for downgrade.

Historic clinical information enabled pathway change in 10 participants. Reasons included known conditions (bronchiectasis, chronic lymphocytic leukaemia) and the participant already being under outpatient surveillance (e.g. ascending aortic dilatation).

In total the use of historical imaging in the SRM prevented 47/874 (5.4%) of the participants discussed undergoing unnecessary interval imaging for a known pulmonary nodule.

Discussion Screening review meetings with access to local historic imaging and secondary care health records can result in a significant reduction in the need for pulmonary nodule surveillance. Access to local historic imaging databases is crucial to reduce unnecessary patient and healthcare burden. Local clinical information can enable SRMs to review findings in the context of known clinical history enabling accurate and personalised decision making. These data would suggest all SRMs should aim to have access to local historical clinical and imaging records regarding their participants.

Abstract P72 Table 1 Incidental findings downgraded in the Screening Review Meeting with the use of historical imaging

Incidental finding downgraded	Number of cases	Screening review meeting rationale for downgrade
Liver lesion (cyst/ haemangioma)	4	Haemangioma seen on MRI 2015 Haemangioma present since 2018 Liver cysts seen on previous imaging Liver cyst present since 2020
Renal cyst	3	Renal cyst seen on prior MRI Renal cyst present since 2009 Renal cyst present since 2017
Adrenal nodule	3	Unchanged adrenal nodule from 2019 Unchanged adrenal nodule from 2017 Bilateral adrenal nodules present since 2008
Vertebral wedge fracture/ osteoporosis	3	Wedge fracture previously seen 2021 Stable wedge fracture from 2008 Known osteoporosis on treatment
Hydronephrosis/renal pelvis dilatation	2	Distended left renal pelvis with no obstruction on renogram 2022 Bilateral hydronephrosis previously investigated
Lingular atelectasis/RML collapse	2	Atelectasis present on previous CT coronary angiogram Right middle lobe collapse present since 2017
Interstitial lung disease (ILD)	2	Stable known combined pulmonary fibrosis and emphysema under respiratory follow up Known ILD under respiratory follow up
Arteriovenous/venous malformation (Thoracic)	2	Known anomalous drainage of left upper lobe veins Arteriovenous malformation present since 2019
Subcarinal cystic lesion	1	Cyst present since 2014
Diffuse oesophageal thickening	1	Stable diffuse oesophageal thickening
Pancreatic lesion	1	Pancreatic mass stable since 2016
Thymic nodule	1	14mm thymic nodule stable since 2020
Splenomegaly	1	Splenomegaly present since 2021
Breast nodule	1	Breast nodule unchanged from 2017
Cirrhosis	1	Known cirrhosis under hepatology follow up
Abdominal cyst	1	Upper abdominal cystic abnormality present since 2021

P73 WHAT IS THE IMPACT OF REVIEWING ADDITIONAL INFORMATION AND PREVIOUS IMAGING ON LUNG CANCER SCREENING OUTCOMES?

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Background Low-dose computed tomography (LDCT) screening reduces lung cancer mortality. In England, regional Targeted Lung Health Check (TLHC) programmes deliver lung cancer screening to high-risk individuals. It is expected that these will be integrated into a national programme in the next few years.

TLHC pathways require further optimisation to deliver screening on a large-scale, population basis. One important consideration is how additional information, such as the presence of previous imaging, may alter screening outcomes. Here, we describe the impact of reviewing previous thoracic cross-sectional imaging or participant history on screening outcomes.

Methods Actionable screening findings within our programme include possible lung cancer requiring urgent referral to a lung cancer multi-disciplinary team (positive), indeterminate pulmonary nodules requiring surveillance within our programme and incidental findings requiring further investigation or interval imaging. Incidental findings may be followed-up within the programme (e.g. diffuse pleural thickening) or referred to secondary care (e.g. suspicious breast lesion).

Previous imaging and clinically relevant history were identified by reviewing health records or self-reported by participants during the initial risk assessment or when communicating results via telephone call. LDCT scans were reviewed in light of this additional information at a screening review meeting (SRM) with clinicians and thoracic radiologists. Screening outcomes were updated if required.

Abstract P73 Table 1 Summary of screening outcomes pre- and post-discussion in a screening review meeting

Initial screening outcome	Outcome of discussion	Referral outcome following SRM
Positive (n=6, 8.6%)	**3 Downgraded**	2 Not referred 1 Followed up in programme
	3 No change	
Indeterminate pulmonary nodules (n=22, 31.4%)	**12 Downgraded**	12 Not followed up
	1 Upgraded	1 Referred urgently as positive
	9 No change	
Incidental findings (n=42, 60.0%)	**26 Downgraded**	23 Not referred 1 Followed up in programme 2 Referred non-urgently
	1 Upgraded	1 Referred urgently
	15 No change	

Cases reviewed in a SRM between 28 December 2022 and 8 June 2023 were included in this analysis.

Results 2261 scans were reported in total. (5.0%, n=112/2261) were discussed in SRM. 3.1% (n=70/2261) were discussed due to previous imaging or additional history being available.

41/70 (58.6%) screening outcomes were downgraded following discussion, with 25 fewer referrals outside the programme and 12 fewer nodule follow-ups (table 1). 60.0% (n=42/70) were discussed due to possible non-lung cancer incidental findings.

Discussion Lung cancer screening may result in increased referral to both lung cancer and non-lung cancer teams. Reviewing scans within an SRM in the context of previous imaging or additional history provides a valuable opportunity to amend screening outcomes.

National pathways should reflect the importance of a SRM and include robust measures to identify participants with relevant prior imaging to minimise unnecessary referrals and imaging follow-up.

P74 EVALUATION OF SHORT-TERM FOLLOW-UP CT FOR THE MANAGEMENT OF CONSOLIDATION IN LUNG CANCER SCREENING

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Background There are no specific guidelines for the management of consolidation in lung cancer screening. BTS guidelines recommend PET-CT for solid nodules $\geq$300mm^3, with a Brock score >10%. At times, consolidation has a nodular or mass-like morphology (figure 1). In this situation, a PET-CT scan may be non-discriminatory as both inflammatory and malignant lesions demonstrate increased FDG uptake. An alternative approach to resolve this dilemma is a short interval (6-week) follow-up CT to check for resolution or persistence.

Methods Between January 2019-May 2023, participants in the West London Lung Screening programme undergoing baseline or incident round imaging, with consolidation >300mm^3 volume of suspected inflammatory aetiology, but where malignancy remained within the differential, were invited for 6-week follow-up CT. Those with persistent unchanged or growing consolidation at 6 weeks underwent a subsequent PET-CT +/- biopsy. Resolution rate, incidence of cancer and rate of cancer upstaging were determined.

Results Ninety-two participants had consolidation $\geq$300mm^3 with nodular or mass-like morphology with 6-week follow-up CT recommended. 19 patients were excluded as final outcomes were not available. A further 8 were excluded after reclassification of consolidation following expert consensus review based on morphology. Sixty-five participants (mean age 68.5 years; opacity volume median 1365mm^3, range 350–25651mm^3; diameter median 20.7mm, range 10.2–49.4mm) were evaluated. Mean time to follow-up scan was 47.7 days. Consolidation resolved or shrunk in 46/65 (71.8%) participants. In 19/65 (29.2%) participants with persistent consolidation, PET/CT was undertaken. Malignancy was diagnosed in 10 of these 19 patients (52.6%): 8 stage I lung cancer, 1 pulmonary lymphoma, 1 metastatic head and neck cancer). 8/10 had radical treatment. None upstaged in the six-week period to follow up.

Discussion In lung screening, consolidation on CT may have morphological appearances indeterminate between an inflammatory and malignant aetiology. In this scenario, a 6-week follow-up CT is a pragmatic and safe approach. Almost three-quarters of such opacities resolve or shrink on short-term follow up preventing the need for PET-CT imaging +/- biopsy. Persistent consolidation at short-term follow-up has a high risk of malignancy and warrants further investigation.

Please refer to page A289 for declarations of interest related to this abstract.

P75 A RADIOMICS PREDICTIVE VECTOR FOR DIFFERENTIATING NEW PRIMARY LUNG CANCER VS LUNG METASTASIS IN PATIENTS PRESENTING WITH PRIOR RADICALLY TREATED CANCER

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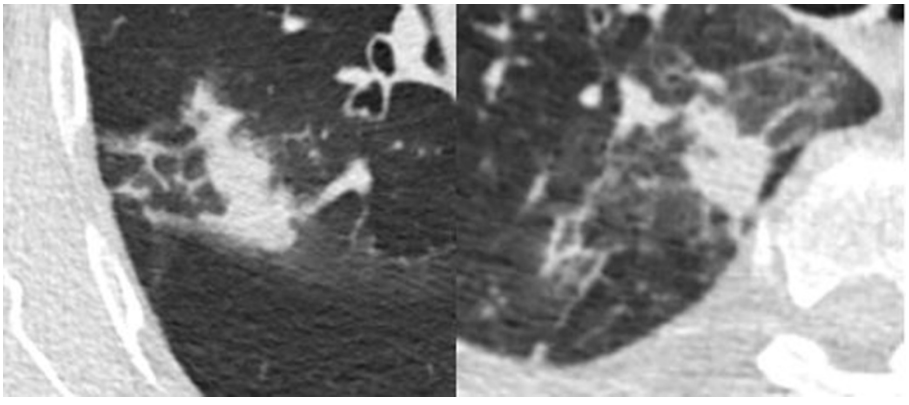
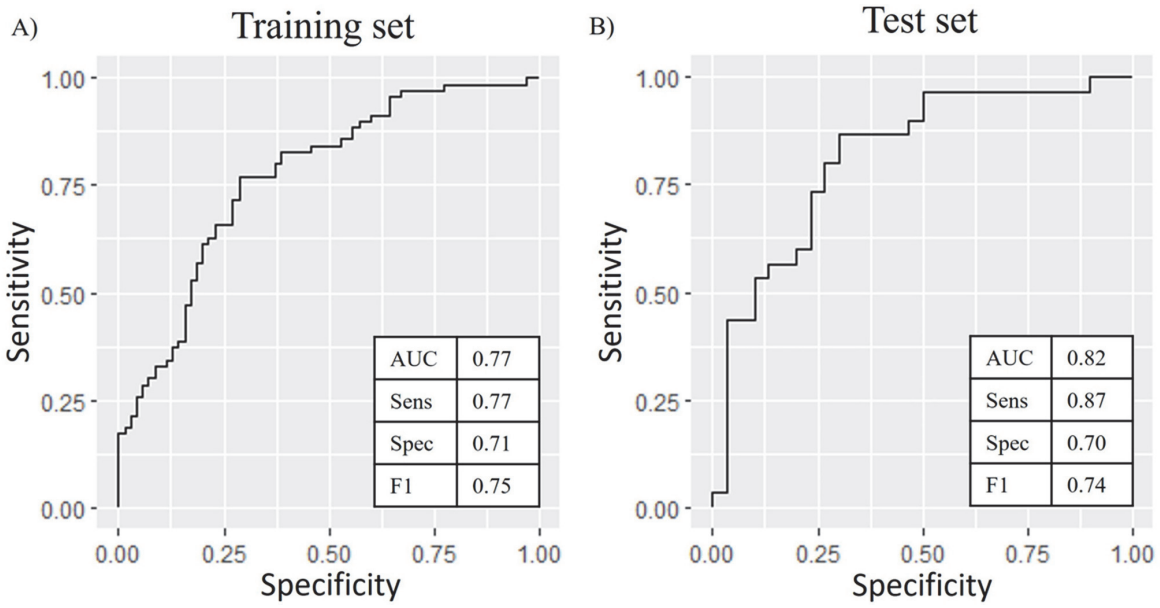


Abstract P74 Figure 1 Examples of mass-like consolidation in participants for whom 6-week follow-up CT was recommended. In both cases, the consolidation resolved at follow-up



Abstract P75 Figure 1 A) Radiomics Predictive Vector (RPV) Model ROC curve for training set data (N=140) with model performance indices, B) Radiomics Predictive Vector (RPV) curve for test set data (N-60) with model performance indices (N=60). Abbreviations: AUC = Area under the curve, F1 = F1 model precision score, ROC = Receiver Operating Charaterstics Curve, Sens = Sensitivity, Spec = Specificity

Introduction New lung nodules observed after prior radical cancer treatment present a complex and increasingly common problem for lung cancer MDTs. Existing research shows lung cancer is common with previous smoking-related cancers, potentially due to shared risk factors or long-term effects of anti-cancer therapies. Radiomics involves computational high-throughput extraction of mathematical features from medical images. Study of AI and machine learning approaches using radiomics data aims to improve lung nodule stratification/malignancy prediction, but this clinical niche remains understudied.

Methods A retrospective series of CT thorax scans of patients with new lung nodules/lesions >5mm and previous radically treated cancer within 10 years curated for the AI-SONAR study, were anonymised and handcrafted manual segmentation performed. Voxel dimension parameters were standardised and 70:30 training/test set split applied. Radiomic feature extraction was performed on each nodule/lesion. Two-step feature reduction identified key radiomic features (<5) and a Radiomics Predictive Vector (RPV) generated and tested for accuracy in differentiating each malignant class. We further compared 88 different machine learning and feature selections combinations assessing for model AUC performance. Validation of both analysis approaches was performed on a public composite dataset.

Results 200 cases identified comprised 100 metastatic lung tumours (MS) and 100 second primary lung cancers (SPLC). Following feature reduction, two key radiomic features were identified to generate an RPV: 1) FOS_lmode_LLL 2) SNS_sph. The RPV achieved a training set performance AUC of 0.77, sensitivity 0.77, specificity 0.71 and F1 model precision score of 0.75. Test set RPV performance demonstrated an AUC of 0.82, sensitivity 0.83, specificity 0.70 and F1 score of 0.74. Analysis using contrast only cases (N=158) showed loss in RPV model performance, AUC 0.55/0.48 and F1 score 0.29/026 in training/test sets respectively.

Conclusion Our early work highlights that a radiomics based machine learning model may provide information to guide clinicians in timely diagnosis and management of new indeterminate lung nodules/lesions in patients with a previous radically treated cancer. Next steps involve a larger dataset analysis with additional data modalities. The scope of impact would be an opportunity to improve hospital resource use, patient anxiety and mitigate delays in early cancer diagnosis.

P76 COMPARISON OF ENDOBRONCHIAL ULTRASOUND (EBUS) FINE NEEDLE ASPIRATION (FNA) AND FINE NEEDLE BIOPSY (FNB) FOR CANCER DIAGNOSIS: A SINGLE CENTRE PROSPECTIVE STUDY

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Introduction EBUS is a key tool in the investigation of lung cancer and other metastatic malignancy. In the era of targeted treatment, acquisition of sufficient tissue for Next Generation Sequencing (NGS) is vital and fine needle biopsy (FNB) may offer an advantage over traditional fine needle aspiration (FNA).[1] More real world experience of EBUS-FNB is required.

Methods A prospective study of FNB and FNA was undertaken at a tertiary centre between 12/2019–03/2020 and 03/2023–06/2023 in patients undergoing linear EBUS for investigation of suspected pathological mediastinal/hilar lymphadenopathy or pulmonary mass with either a Franseen FNB or FNA needle or both. The histopathologist was blinded to the needle type used. Data was collected on patient demographics, EBUS nodal descriptors and pathology reports including sample quality [good, moderate or poor] and tissue adequacy for NGS.

Results 72 specimens (60 nodes, 12 lung masses) were obtained from 32 patients (23 via FNA 22G, 2 via FNA 21G and 47 via FNB 22G) (table 1). Ultrasound appearance was

Abstract P76 Table 1 Diagnostic outcomes with the use of FNB and FNA needles

Patient outcomes			
	FNB (n=29)	FNA (n=17)	p value
Mean Age (SD) in years, sex	62 (14), 27.6% female	66 (13), 29.4% female	
Cancer	9 (31%)	7 (41.2%)	
Sarcoidosis	7 (24.1%)	2 (11.8%)	
Benign	10 (34.5%)	4 (23.5%)	
Overall diagnostic yield	26/29 (89.6%)	13/17 (76.5%)	0.39
Pathological outcomes			
	FNB (n=47)	FNA (n=25)	p value
Mean needle passes	3.08 SD 0.8	2.92 SD 0.8	0.53
Good or moderate specimen quality	26 (55.3%)	7 (28%)	0.04
Tissue architecture preservation	27 (57.4%)	3 (12%)	0.0002
Adequate specimen for pathological diagnosis	36 (77%)	18 (72%)	0.77
Non-small cell lung cancer (NSCLC)	13 (27.6%)	10 (40%)	
Adequate specimen for NGS in NSCLC	10 (75%)	3 (30%)	0.03

recorded for 70 target lesions, 60% were homogenous while 40% were heterogeneous. Commonest lymph node stations sampled were station 7 (51.7%) and 4R (23.3%). Thirteen patients had tissue sampled via both FNA and FNB needles. Diagnoses included cancer (31% in FNB and 41.2% in FNA group), sarcoidosis (24.1% in FNB and 11.8% in FNA group) and benign lymphadenopathy (34.5% in FNB and 23.5% in FNA group).

Pathologist preference for specimen quality was significantly better with FNB vs FNA (55.3% vs 28%, fisher's exact test p=0.04). Tissue architecture preservation was better with FNB (57.4% with FNB vs 12% with FNA fisher's exact test p=0.0002). However, diagnostic yield did not significantly differ between either needle (fisher's exact test p=0.77). In patients with Non-Small Cell Lung Cancer (NSCLC), suitability for NGS (Using the Oncomine Precision Assay on the Genexus platform) was better with FNB than FNA (75% vs 30%, fisher's exact test p=0.03). No significant complications were observed.

Conclusion FNB provides a better quality specimen with preserved architecture than FNA. FNB samples were more suitable for NGS testing in lung cancer diagnosis.

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P77 EBUS TBNA FOR MOLECULAR TESTING IN LUNG CANCER – HOW MUCH IS ENOUGH?

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Background With the advent of immunotherapy and tyrosine kinase inhibitors, molecular testing has become routine and essential to guide oncological treatments. Endobronchial ultrasound and transbronchial needle aspirate (EBUS-TBNA) is a safe and accurate method for sampling mediastinal malignancies to diagnose and stage lung cancers. Sufficient tissue sampling for drug sensitivity testing (DST) is essential to ensure timely diagnosis and treatment. However, there is no clear guidance on the recommended number of passes per lymph node needed to facilitate this.

One study concluded that a median of 4 passes was needed to obtain sufficient tissue in adenocarcinomas.[1] However, this required rapid on-site cytopathology evaluation (ROSE) and didn't include DST for squamous carcinomas.

Standard practice at Royal United Hospital Bath is to perform 3 lymph node passes. Samples are deemed sufficient based on macroscopic appearances determined by the endoscopist. The objective of our audit was to determine if our practice provided adequate tissue for successful DST in line with national standards, which should be greater than 90% of samples.[2]

Method A total of 251 cases were audited between 2018–2023. Of these, 107 were diagnostic of lung adenocarcinoma, squamous cell carcinoma and non-small cell lung cancer NOS and sent for DST.

Exclusion criteria included other diagnoses, samples not sent for DST, and cases with more than 3 lymph node passes recorded on the EBUS report. Samples in which some drug sensitivity testing could take place but there was not enough tissue for all the required tests were categorised as insufficient.

Results Of the 107 cases, 98 (91.6%) were adequate samplings for DST and 9 (8.4%) were insufficient. All insufficient cases had a diagnosis of adenocarcinoma.

Conclusion Performing 3 lymph node passes were sufficient for DST without the support of ROSE and matched national standards in providing enough tissue sample for DST. This potentially can reduce the procedure duration for patients whilst maintaining diagnostic standards.

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P78 A ROSE BY ANY OTHER NAME WOULD SMELL AS SWEET: EVALUATION OF BIOMEDICAL SCIENTIST LED RAPID ON-SITE EVALUATION IN AN UK TEACHING HOSPITAL EBUS SERVICE

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Background Endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) is an established method to investigate hilar and mediastinal lymph node pathology. Rapid On-site Evaluation (ROSE) of lymph node aspirates is thought to be advantageous by ensuring adequate sampling, and can provide a rapid provisional diagnosis. However, ROSE can be associated with significant costs and resource use including cytopathologist time. Our consultant led service in a tertiary centre, has access to ROSE of EBUS-TBNA performed by 2 senior biomedical scientists (BMS), which provides limited microscopic evaluation to provide feedback of specimen adequacy in real time.

We aimed to evaluate the accuracy of BMS led ROSE of EBUS-TBNA, by comparing the initial ROSE assessment to the final pathology report by a cytopathologist.

Abstract P78 Table 1 Final cytopathological diagnosis from EBUS-TBNA

Final diagnosis from EBUS-TBNA	Number of cases
Lung cancer (non small cell carcinoma)	45 (23.4%)
Lung cancer (small cell carcinoma)	8 (4.2%)
Lung cancer (other)	2 (1.1%)
Other cancer site	4 (2.1%)
Granulomatous lymphadenitis	45 (23.4%)
Non-specific lymphadenitis	11 (5.7%)
Normal lymphocytes	77 (40.1%)

Methods Data was collected prospectively for consecutive EBUS-TBNA procedures with ROSE between August 2021 – July 2022.

The BMS rendered assessments were compared with the cytopathologist rendered assessments (as assumed gold standard), with sensitivity and specificity subsequently calculated. The mean turnaround time (TAT) was calculated for all cases analysed, and the final pathological diagnoses were also described.

Results A total of 201 EBUS procedures were reviewed. Nine of these were excluded from our analysis as the final cytopathological review reported inadequate sampling, leaving 192 assessments. 109 of the patients were male (56.8%), and the mean age of all cases was 57.9 years (SD 17.1).

The sensitivity and specificity of EBUS-TBNA with BMS led ROSE was calculated at 92.8% and 100% respectively, with an accuracy of 96.4%. The mean TAT was 5.9 days (SD 2.9).

Conclusion To our knowledge this is the first UK study to evaluate an EBUS service with BMS led ROSE, which demonstrated high sensitivity and specificity when compared to the final cytopathological diagnosis. The service has a quick TAT which is key to empowering cancer pathways such as the National Optimal Lung Cancer Pathway to improve patient outcomes.

We believe this is a unique use of resource in this setting. This is a cost-effective strategy that is likely to increase sample adequacy, reduce time to final diagnosis and reduce the need for repeat procedures.

P79 ENHANCING EFFICIENCY AND ACCESSIBILITY IN ENDOBRONCHIAL ULTRASOUND-GUIDED TRANSBRONCHIAL NEEDLE ASPIRATION(EBUS-TBNA): TRAINED BIOMEDICAL SCIENTISTS DELIVER ACCURATE RAPID ON SITE EVALUATION (ROSE) COMPARABLE TO CYTOPATHOLOGISTS

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10.1136/thorax-2023-BTSabstracts.231

Objectives Rapid on-site evaluation (ROSE) of endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) samples adds value by including adequacy assessment, enhanced sampling (once ROSE has revealed the status of the target), triage for ancillary tests and if appropriate, assignment of a preliminary diagnosis. At West Hertfordshire Teaching Hospitals NHS Trust (WHTH), this may be performed by either a trained Biomedical Scientist (BMS) or a Consultant Cytopathologist. The aim of this study was to compare outcomes by BMS and Consultant cytopathologist, reviewing their independent assessments of adequacy and diagnosis, referring to the final pathology report as the 'gold standard'. ROSE reduces the number of sites requiring sampling and may enhance acquisition of material for molecular analysis. The lack of cytopathologists' availability is one of the limiting factors for implementing a ROSE service. In the UK, the Institute of Biomedical Science (IBMS) now has a formal qualification allowing BMSs to perform ROSE.

Abstract P79 Table 1 Comparative analysis of sample adequacy assessment and diagnosis by biomedical scientists (BMS) and cytopathologists in ROSE service

Sample	Adequacy assessment	Total	BMS	Cytopathologist	Kappa
	Adequate	66	65	66	0.82 [CI: 0.72–0.92]
	Inadequate	20	17	20	**Weighed Kappa**
Diagnosis					0.92
	Malignant	24	24	24	
	Benign	44	41	44	

Methods The BMS and cytopathologist findings for 318 passes from 86 target sites (78 lymph nodes, 5 lung masses, 3 left adrenal glands) from 43 patients over a 1-year period were compared. Comparisons of adequacy and preliminary diagnoses were based on inter-observer Cohen's Kappa coefficient with a 95% confidence interval (CI). The broad diagnostic categories were: 1. Inadequate 2. Adequate 2a. Benign 2b. Malignant. Adequacy was defined as 40 lymphocytes per high power field (in benign nodes) or the presence of diagnostic material.

Results Perfect correlation was found between BMS and Cytopathologist in the above diagnostic categories. The kappa coefficient was 0.82 [CI: 0.72–0.92] and the weighted kappa (appropriate for categories which are ordered or increase in severity) 0.92.

Conclusion Both adequacy assessments and preliminary diagnoses performed by BMS were highly correlated with the assessment by the cytopathologist, the overall correlation being 'almost perfect', This confirms previous studies showing that appropriately trained, competency assessed BMSs can provide a comprehensive ROSE service which may increase availability in UK centres.

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P80 COMPARING THE EFFECTS OF LOCAL ANAESTHETIC VIA TRANSCRICOID INJECTION VS DIRECT VISUALISATION ON COUGH, CHOKING AND PATIENT COMFORT DURING FLEXIBLE BRONCHOSCOPY – AN OBSERVATIONAL STUDY

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Introduction British Thoracic Society bronchoscopy guidelines suggest either direct visualization (DV) or transcricoid local

anaesthetic (LA) delivery can be used during bronchoscopy to anaesthetize the upper airways. This study aimed to assess the effect on lidocaine requirement and patient comfort when using DV vs transcricoid LA delivery during bronchoscopy.

Method A prospective observational analysis from February-June 2023 was performed for patients undergoing bronchoscopy using either transcricoid or DV LA administration. 31 patients underwent bronchoscopy. All received nasal instillagel containing 2% lidocaine, oral spray LA (10 mg lidocaine/spray) and IV Midazolam (2–4 mg) as standard. Data was collected for the total amount of LA used, patient reported cough, choking and comfort throughout the procedure. Comfort was recorded using a patient ranked analogue scale 0–10 (Very uncomfortable to very comfortable). Statistical significance was calculated using unpaired Student's T-test.

Results 31 patients underwent bronchoscopy.16 patients received LA via transcricoid injection (mean age 65.12±13.15 years, female 63%) and 15 via DV (mean age 61.26±14.20 years, female 60%). 3 procedures were not completed due to patient discomfort – 2 in the transcricoid group and 1 in the DV group. There was no significant difference in the dose of midazolam used between DV and transcricoid groups (mean dose 1.63 mg vs 1.75 mg, $p=0.53$). The total dose of lidocaine used in DV (mean dose 424 mg) was significantly higher than the cohort who received transcricoid anaesthesia (mean dose 312.5 mg, $p<0.01$). There was a significant reduction in cough experienced by the patients in the transcricoid group with 37.5% experiencing no cough at all vs 6.66% in the DV group. Equally, 87.5% of transcricoid anaesthetic cohort experienced no episodes of choking vs 46.6% in the DV group. Patient comfort differed between the 2 cohorts with the transcricoid group having a median comfort score of 8 vs DV group with a comfort score of 5. There were no complications of administering transcricoid anaesthesia.

Conclusion This small observational study suggests multiple benefits of transcricoid local anaesthetic delivery vs direct visualization, including reduced lidocaine requirements and improved patient comfort. Our study suggests potential superiority of the transcricoid route and larger scale observational study is warranted.

P81 SINGLE CENTRE EXPERIENCE OF PHYSICIAN LED COMBINED RIGID AND FLEXIBLE BRONCHOSCOPY IN BENIGN AND MALIGNANT AIRWAY MANAGEMENT

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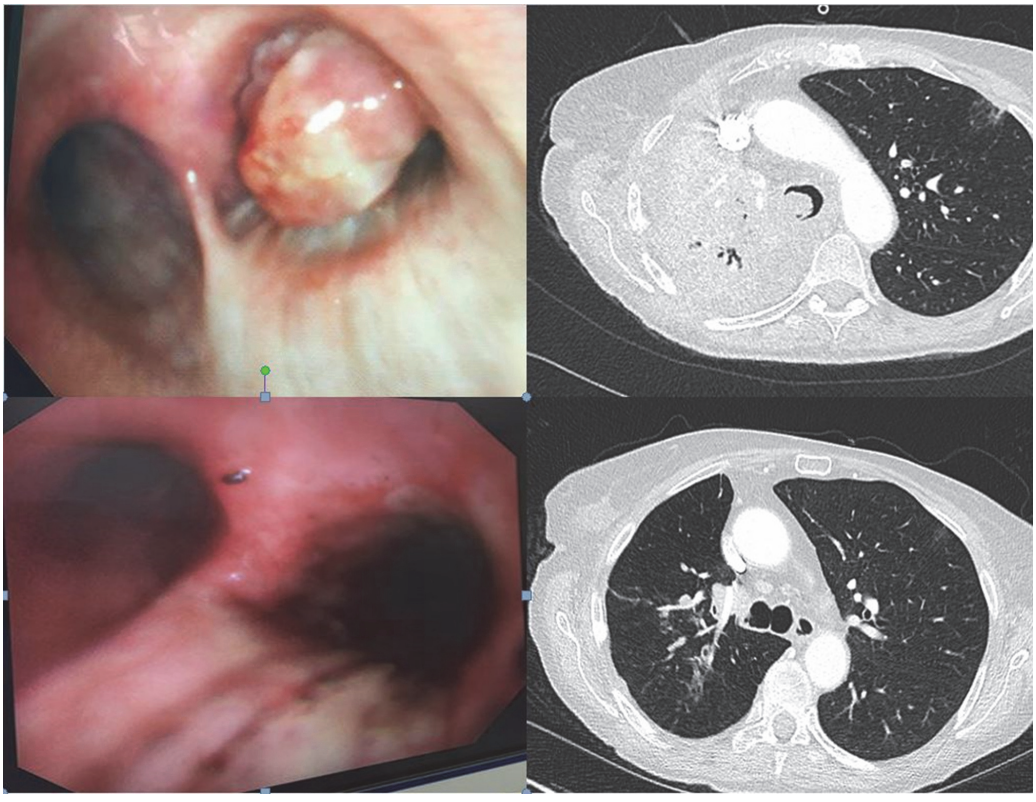
Introduction Successful Rigid Bronchoscopy was first performed in 1897 to allow foreign body removal, and it still remains the cornerstone of complex diagnostic and therapeutic airway management, despite the introduction and technological advancements in flexible bronchoscopy in 1968. It allows safe easy access to the large airways complemented by the use of flexible bronchoscopy to perform diagnostic and therapeutic procedures, whilst maintaining uninterrupted adequate ventilation during the procedure. In the UK however, rigid is performed mostly by the Thoracic Surgeons with limited indications. Physician-led combined rigid and *flexible bronchoscopy* was introduced at the University Hospitals of North Midlands NHS Trust in 2013 and it is now a well-established safe technique to allow advanced bronchoscopic interventions.



Abstract P81 Figure 1

Aim To assess the utility and safety of respiratory physicians-led combined rigid and flexible bronchoscopy in the management of benign and malignant airway diseases.

Results Data was collected retrospectively from 59 patients from August 2018 until June 2023.

27 males, 32 females; mean age 62 years; range 23–90 years including a case of 24 week pregnant lady with severe sub-glottic stenosis.

Bronchoscopic interventions include 18 cases of tumour debulking (partial to complete) using coring technique, rigid forceps, balloon dilatation and Argon Plasma Coagulation (APC); 5 tracheo-bronchial stent placements (self-expanding metallic and silicone stents), 12 sub-glottic therapeutic balloon dilatations, 12 diagnostic bronchoscopy and endobronchial ultrasound (EBUS) guided nodal and or mass sampling, 3 endobronchial valve insertions, 3 therapeutic procedures to manage endobronchial bleeding, 3 foreign body removal and 3 bronchial dilatation.

No significant complications were noted apart from bleeding during the procedure which was managed by the use of APC, topical administration of 1 in 10,000 adrenaline and cold saline along with intravenous tranexamic acid.

Results Our review demonstrates that combined rigid and *flexible bronchoscopy* can be safely performed by trained respiratory physicians to manage complex benign and malignant airway diseases with no significant complications.

'When the going gets tough' – Difficult infection and non-tuberculous mycobacteria

P82 POST-OPERATIVE INFECTIONS ARE ASSOCIATED WITH THE DEVELOPMENT OF AIRWAY COMPLICATIONS AND INCREASED MORTALITY IN LUNG TRANSPLANT RECIPIENTS

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Introduction Airway complications following lung transplantation are caused by ischaemia resulting from disruption to bronchial arterial supply. In this study we defined them as anastomotic dehiscence, bronchial stenosis, infections, granulation tissue excess and bronchomalacia. Several risk factors have been postulated including surgical technique, duration of post-transplant ventilation and pulmonary infection. Airway complications carry a significant morbidity and a mortality of between 2 to 4% and increase in chronic lung allograft syndrome.

Method We conducted a retrospective review of patients with and without airway complications. Airway complication were defined as: anastomotic dehiscence or the need for airway intervention (stenting, cryotherapy, dilatation, and diathermy). All single and bilateral lung transplants between January 2017 and March 2023 were analysed with respect to donor demographics, transplant urgency, ICU length of stay post-transplant and post-transplant infections with the risk of developing airway complications. Logistic regression with a p value of less than 0.1 in association with mortality on chi square test were entered as independent variables and final clinical status (alive or dead) were entered as dependent variables.

Results 229 patients were analysed, and we found no association between sex, number of organs (single/bilateral), patient/donor age and transplant urgency level with the development of airway complications. Patients with airway complications had an average infection incidence rate of 3.54, this compares to an average infection incidence rate of 1.13 in those without airway complications. The difference of 2.41 between the two groups was significant (p value <0.001). Using logistic regression, airway complication was found to be significantly associated with mortality with an odds ratio of 3.151 and a 95% confidence interval of 1.4–7.08 (p value 0.005). Other significant risk factors for mortality independent of airway complications in our cohort included urgent/super-urgent transplant listing and single lung transplantation.

Conclusion There is a significant association between post-transplant infections and airway complications. Airway complications significantly increase the risk of mortality post-transplant. Optimisation of donor and recipient strategies to address organ preservation and microbiology should help to prevent this complication.

P83 SHORT TERM OUTCOMES OF BILATERAL LUNG TRANSPLANT RECIPIENTS WITH POST-TRANSPLANT PSEUDOMONAS AERUGINOSA (PSA) – A TERTIARY CENTRE EXPERIENCE

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10.1136/thorax-2023-BTSabstracts.235

Introduction Pseudomonas aeruginosa (PsA) is the most commonly isolated gram-negative bacterium after lung transplantation. PsA post-transplant isolation is associated with an increased incidence of chronic lung allograft dysfunction (CLAD) (Vos *et al.*, 2008) and its treatment may improve pulmonary function, prevent CLAD progression and improve survival (Muynck *et al.*, 2020). This study compared the short-term outcomes of bilateral lung transplant recipients with and without PsA.

Method All patients undergoing bilateral lung transplantation at Royal Papworth Hospital from 31/03/2018 to 01/04/2021 were included. Positive PsA isolates were identified in respiratory samples (sputum or bronchoalveolar lavage) obtained during routine surveillance and symptom-directed sampling. Patient demographics and outcomes (including hospital stay duration, peak FEV_1, quality of life (EQ5D score)) were compared between *PsA*-positive and *PsA*-negative recipients. Statistical analyses included the chi-square test (dichotomous data), Mann U Whitney test (continuous data), multiple linear regression, and Cox proportional hazard regression analysis.

Results From a total of 76 transplant recipients, 29 (38.2%) isolated PsA in $\geq$1 respiratory culture post-transplant. The median time to the first PsA isolate was 43 days (range: 1–916 days). Antibiotic susceptibility varied, with 41% (n=12) having fully susceptible isolates and 59% (n=17) exhibiting resistance. PsA was most commonly isolated in patients with cystic fibrosis (34%). 13 out of the 29 positive patients isolated PsA pre-transplant. Patients with pre-transplant PsA demonstrated earlier isolation of PsA post-transplant (p= 0.039)

Abstract P83 Table 1 Patient demographics and outcomes of PsA positive and PsA negative group

	Pseudomonas aeruginosa POSITIVE	Pseudomonas aeruginosa NEGATIVE	P value
Number of Patients (%)	29 (38.2%)	47 (61.8%)	
Mean age at transplant	45.2 (SD=11.5)	52.1 (SD=12.4)	**<0.05**
Percentage of female (%)	51.7% (n=15)	38.3% (n=18)	>0.05
Indication for transplant			
Obstructive: COPD/A1AT def/chronic asthma/LCH	12 (41.4%)	18 (38.3%)	
Restrictive: IPF/HP/CTD-ILD/sarcoidosis/ PPFE/unclassified fibrosis	4 (13.8%)	13 (27.7%)	
CPFE (combined pulmonary fibrosis and emphysema)	1 (3.44%)	0	
CF/bronchiectasis	11 (37.9%)	5 (10.6%)	
Pulmonary hypertension	0	4 (8.51%)	
Outcome			
Median hospital stay (days)	34 (range = 15–222)	35 (range = 3–168)	0.634
Acute rejection episode	6	13	0.052
1 year mortality rate	13.8% (n=4)	21.3% (n=10)	0.414
Any episode of airway complication	18/29	7/47	0.129
Peak FEV1 as% predicted (mean)	77.78%	75.04%	>0.05
Any episode of CMV viraemia	5/29	3/47	0.139
Quality of life (EQ-5D score)	9.59	9.22	0.591

and higher antibiotic resistance (p=0.018) compared to patients with *de novo* PsA.

Hospital stay duration, acute rejection episode, 1-year mortality rate, pulmonary function, airway complication, CMV viraemia, and quality of life did not significantly differ between the two groups. Patients with PsA both pre- and post-transplant reported a lower quality of life, averaging an EQ-5D score of 9.53, vs 4.84 for patients with *de novo* PsA (p=0.015). No confounding effect by age or gender were found.

Conclusion Pre-transplant PsA is associated with an earlier occurrence of post-transplant PsA and increased antibiotic resistance. However, short-term patient outcomes do not significantly differ between PsA-positive and PsA-negative lung transplant recipients. Further research is required to define the role of PsA treatment and eradication in longer term outcomes.

P84 DISEASE AND IMMUNOSUPPRESSIVE FACTORS ASSOCIATED WITH PCP IN THE NON-HIV IMMUNOCOMPROMISED POPULATION

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Introduction and Objectives Pneumocystis pneumonia (PCP) occurs in immunocompromised individuals. In the HIV population, those with a CD4 count <200 cells/microlitre are at increased risk. In the immunosuppressed non-HIV population, the risk factors are less clear. Practices for PCP prophylaxis in the non-HIV population vary amongst clinicians due to a lack of evidence-based guidelines. We aimed to determine the risk

Abstract P84 Table 1 Underlying diagnoses and immunosuppressive medications associated with PCP in the non-HIV immunosuppressed population (data was not available for all patients)

	Diagnosis							
	Haematological malignancy	**Solid tumour**	**Connective tissue disease**	**Solid organ transplant**	**Respiratory disease**	**Vasculitis**	**Inflammatory bowel disease**	**Other chronic disease**
Number of patients; n	25	16	11	6	6	3	2	5
No immunosuppression								
No immunosuppression; n (%)	3 (12.0)	-	-	-	1 (16.7)	-	-	1 (20.0)
Immunosuppression only								
Chemotherapy; n (%)	6 (24.0)	7 (43.8)	-	-	-	-	-	-
Immunotherapy; n (%)	-	2 (12.5)	-	-	-	-	1 (50.0)	-
Chemo + immunotherapy; n (%)	-	1 (6.3)	-	-	-	-	-	-
Methotrexate; n (%)	-	-	5 (45.5)	-	-	-	-	-
Tacrolimus; n (%)	-	-	-	1 (16.7)	-	-	-	-
Other immunosuppression; n (%)	-	-	1 (9.1)	-	-	-	-	1 (20.0)
Glucocorticoid only								
Glucocorticoid only; n (%)	1 (4.0)	3 (18.8)	-	-	3 (50.0)	1 (33.3)	-	2 (40.0)
Co-administration immunosuppression and glucocorticoid								
Chemotherapy + glucocorticoid; n (%)	14 (56.0)	1 (6.3)	-	-	-	-	-	-
Immunotherapy + glucocorticoid; n (%)	-	1 (6.3)	-	-	1 (16.7)	-	-	-
Methotrexate + glucocorticoid; n (%)	-	-	3 (27.3)	-	-	1 (33.3)	-	-
Tacrolimus + glucocorticoid; n (%)	-	-	-	5 (83.3)	-	-	-	-
Other immunosuppression + glucocorticoid; n (%)	-	-	2 (18.2)	-	-	1 (33.3)	1 (50.0)	1 (20)

factors associated with PCP in the non-HIV immunocompromised population.

Methods Retrospective study of patients admitted to a large teaching hospital, diagnosed with PCP infection February 2018 to January 2023 inclusive. Those with HIV diagnosis were excluded.

Results 84 patients were identified. Median age was 67.5 years [IQR: 60 – 74.3]. Diagnosis was confirmed via bronchoalveolar lavage (BAL) in 62/84 (73.8%), radiology in 17/84 (20.2%), sputum in 2/84 (2.4%) and information unavailable in 3/84 (3.6%).

30/84 (35.7%) required intensive care admission; of these, 7/30 (23.3%) required ventilatory support. Overall mortality was 29/84 (34.5%).

Table 1 summarises the underlying diagnoses and immunosuppressive medications associated with PCP infection. The greatest risk of PCP infection was with co-administration of immunosuppressive and glucocorticoid medication, particularly in haematological malignancy and solid organ transplant. Of these, patients with haematological malignancy received a median equivalent prednisolone dose of 40 mg; patients with solid organ transplant received a median equivalent prednisolone dose of 5 mg. For patients receiving glucocorticoid medication alone, the median equivalent prednisolone dose was 28 mg [IQR: 16 – 30]. In patients with underlying solid tumour, the greatest proportion received chemotherapy only. In patients with immune-mediated inflammatory diseases, methotrexate was the most common immunosuppressant medication associated with PCP infection.

19/55 (34.6%) were commenced on PCP prophylaxis on discharge.

Conclusions PCP infection in the non-HIV immunocompromised carries high mortality. The risk of PCP is greater with co-administration of immunosuppressive and glucocorticoid medication, particularly in haematological malignancy and solid organ transplant. Methotrexate is associated with risk of PCP infection in immune-mediated inflammatory diseases. The majority of non-HIV immunocompromised patients with PCP infection had underlying malignant diagnosis. A third of patients were prescribed prophylaxis on discharge. Greater guidance should be considered to aid specialist decision making regarding primary prevention of PCP infection in non-HIV immunocompromised patients.

P85 CONTEMPORARY UNDERLYING CAUSES OF IMMUNOCOMPROMISE IN SEVERE PCP: A 10 YEAR TERTIARY-CENTRE EXPERIENCE

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Introduction Pneumocystis jirovecii pneumonia (PCP) is a severe opportunistic fungal respiratory infection, typically occurring in immunocompromised individuals. PCP has historically been most associated with HIV, however there is a rising incidence in non-HIV PCP, with this cohort having a higher reported mortaliy.[1] With increasing use of novel immunosuppressive agents, chemotherapies and immunomodulators, we may see an evolving demographic. Our aim was to establish common risk factors and diagnoses that predisposed to severe PCP requiring admission to an intensive care unit (ICU) in the UK over the last 10 years.

Methods A retrospective case-notes review was conducted, examining all admissions with confirmed PCP to all ICUs in Oxford University Hospitals (OUH) between 2011 and 2021. Demographic data; co-morbidities; and the presence of immunosuppression, chemotherapy, organ transplant, small-molecule inhibitor use or retroviral disease was extracted.

Results Twenty-nine patients received treatment for confirmed PCP infection Eight patients (8/29; 27.6%) had received chemotherapy within the last 6 months. Four (4/29; 13.8%) had received a bone marrow transplant in the preceding 12 months, whereas five (5/29; 17.2%) had received a solid organ transplant during their lifetime. Eighteen (18/29; 62.1%) of patients had documented use of immunosuppressive medications within the 6 months preceding admission to ICU. Eight patients were on methotrexate, nine were on high-dose steroid and four were on a monoclonal antibody. Only four patients (4/29; 13.8%) had a diagnosis of HIV, of which three had detectable viral load. Four (4/29; 13.7%) patients were on PCP prophylaxis at the time of hospital admission.

Discussion In a single centre co-located with a bone-marrow and solid-organ transplant service, the majority of patients requiring ICU admission for treatment of PCP had iatrogenic immunocompromise. Most established literature on PCP prevalence and outcome in critical care involves the HIV population. There is an evolving and expanding cohort of patients with PCP related to non-HIV immunosuppression. There is relatively little dedicated study in this cohort regarding PCP outcomes.

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Please refer to page A289 for declarations of interest related to this abstract.

P86 ADVERSE EVENTS AFTER ANTICOAGULATION IN COVID-19 POSITIVE INPATIENTS: A TRIPLE CYCLE AUDIT AGAINST NICE GUIDANCE NG191

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10.1136/thorax-2023-BTSabstracts.238

Aims Several intra-abdominal bleeding events were reported in University Hospital Southampton (UHS) in COVID-19 positive inpatients on anticoagulation, when optimal thromboembolic prophylaxis was unknown, with national and local guidance changing frequently. The aim of this audit was to compare adherence to evolving NICE COVID-19 rapid guideline (NG191) in UHS, investigating adverse events, bleeding or thrombotic, and their adherence to guidelines.

Methods We conducted a retrospective three-cycle audit with data collected from electronic prescriptions of enoxaparin, for COVID-19 positive patients in UHS for: Jan 15th-Feb 13th2021 (Cycle 1- 100 patients), Aug 29th-Sep 27th2021 (Cycle 2 – 122 patients) and Nov 15th-Dec 14th2021 (Cycle 3 – 87 patients). The 3 components of the audit cycle reflected changing dosing of prophylactic low-molecular weight heparin.

Results Against the NICE NG191 guideline, our audit demonstrated 94% adherence in Cycle 1, with 19 clotting events, 5

Abstract P86 Table 1 Evolving NICE NG191 Guidance

	No supplemental oxygen	Supplemental oxygen	Advanced respiratory support
Cycle 1	Prophylactic dose LMWH for 7 days or discharge		Intermediate double dose
Cycle 2	Standard hospital protocol prophylaxis	Treatment dose for 14 days or until discharge	Intermediate dosing
Cycle 3		Prophylactic dose LMWH for 7 days, if no increased bleeding risk	
		Consider treatment dose for 14 days or discharge, if on low-flow oxygen	
		Intermediate dosing only as part of a clinical trial	

associated with patient deaths, and 1 bleeding event. Cycle 2 showed 100% adherence to the guideline, with 10 clotting and 4 bleeding events. Cycle 3 showed 95% adherence to the guideline, with 10 clotting events, 2 associated with patient deaths, and 2 bleeding events. All events in each cycle were adherent to the NICE guideline.

Conclusion Overall, guideline adherence was good. No adverse events were associated with non-adherence to guidelines. Clotting events were more common that bleeding events in all cycles, and no adverse deaths were associated with bleeding events. Adverse clotting events were higher in patients requiring higher level of care and with treatment resistance to LMWH. Bleeding events were more common when therapeutic anticoagulation was indicated. This audit provides supportive data for prophylactic anticoagulation in hospitalised patients with COVID-19.

P87 LUNG OPACITY SCORE OF COVID-19 PATIENTS AND ITS ASSOCIATION WITH CHEST CT SCAN FINDINGS AND FUNCTIONAL CAPACITY 9 TO 18 MONTHS AFTER DISCHARGE

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Introduction In the Philippines, the total COVID-19 cases have reached over 3.6 million. It has become apparent that not all COVID-19 patients have full symptom resolution, and some patients report the emergence of new symptoms over time.

Objectives To determine the association of lung opacity score during admission with the chest CT scan findings and functional capacity at 9 to 18 months after discharge of COVID-19 patients.

Methods This is an ambispective cohort study. Subjects include those who were discharged from Lung Center of the Philippines from March 2021 to March 2022. Lung Opacity Score was determined using CT Pneumonia Analysis from the chest CT scan on admission. Participants were followed up at 9 to 18 months after discharge and underwent high-resolution chest CT scan and assessment of functional capacity.

Results A total of 731 subjects were invited to participate in the study, and 31 agreed. Most of our patients were middle-aged, female, hypertensive and diabetic, with severe COVID-19 infection, and presenting commonly with symptoms of shortness of breath, cough, fatigue, fever, and myalgia. The majority were classified under Grade 2 (n=19, 61%), pertaining to a Lung Opacity Score of 6–15. More than 50% of the patients had the following CT abnormalities: nodule (90%), curvilinear lines (87%), ground-glass opacities (65%), and traction bronchiectasis (58%). Before admission due to COVID, 87% of patients rated their post-COVID-19 Functional Status (PCFS) as grade 0 (no functional limitation). After discharge, 35% of patients rated their functional capacity as having slight or moderate functional limitation. There is no noted significant association between Lung Opacity Score and chest CT scan findings (p-value > 0.05).

Conclusion This study revealed that there is no significant association between Lung Opacity Score during admission with the chest CT scan findings and functional capacity 9 to 18 months after discharge of COVID-19 patients. Further studies with a larger sample size may be conducted to perform regression analysis to control for the effects of confounding variables.

P88 A PROSPECTIVE STUDY OF THE IMPACT OF A FUNGAL MULTI-DISCIPLINARY TEAM MEETING ON PATIENT MANAGEMENT AT A TERTIARY REFERRAL CENTRE

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10.1136/thorax-2023-BTSabstracts.240

Introduction Respiratory fungal infections are increasingly encountered in clinical practice and can lead to life threatening invasive diseases. A multi-disciplinary approach has been recommended to provide comprehensive medical care for patients with fungal disease. The Imperial Healthcare NHS Trust Fungal MDT meeting was established in 2017 to discuss patients with suspected fungal disease.

Aim To assess the impact of the Fungal MDT discussion on clinical management of patients with suspected pulmonary fungal disease.

Method The MDT comprising of Respiratory physicians, Microbiologist, Mycologist, Radiologist, Haematologist, and an Infection pharmacist convened monthly. Data was collected from the first MDT discussion in 250 consecutive patients from 2017 to 2021.

Results From the 250 patients, 39% were referred to the MDT to guide management and 22% to establish a diagnosis. Advice on diagnosis and management were sought in 32%. At first MDT discussion a diagnosis was made in 62% of patients and the MDT requested further investigations in 66%. MDT discussion resulted in a change in management in 62% of patients including a change in treatment duration in 22%, commencing antifungal therapy in 13% and stopping treatment in 9% of patients.

An underlying respiratory diagnosis was present in 45% of patients with 49% receiving systemic immunosuppression for either renal or haematological conditions. The commonest underlying respiratory diseases were chronic obstructive pulmonary disease (18%) and bronchiectasis (17%). The most common diagnosis was invasive fungal disease occurring in 21% of patients with 10% having semi-invasive fungal disease, 14% chronic pulmonary aspergillosis and 5% allergic

bronchopulmonary aspergillosis. Non-fungal disease was diagnosed in 21% of patients. Concomitant bacterial infection was present in 49% of patients.

Conclusion In our centre, Fungal MDT discussion led to the diagnosis or change in management in 62% of patients referred. Fungal MDTs may be useful in centres with a large population of immunocompromised patients or chronic respiratory disease to increase diagnostic certainty, guide management and promote anti-fungal stewardship in a complex case load.

P89 THE BURDEN AND IMPACT OF NTM-LD AND PERSPECTIVES ON CARE, UK DATA FROM A EUROPEAN PATIENT SURVEY (ENPADE)

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10.1136/thorax-2023-BTSabstracts.241

Background Nontuberculous mycobacterial lung disease (NTM-LD) is a rare but growing health concern, particularly affecting vulnerable patients with chronic lung conditions. Learning from patients about their disease experience can inform decision-making and improve NTM-LD care.

Aims and Objectives The survey aimed to understand patients' needs, identify gaps in patient care, and gain insights into how the disease impacts patients' daily life.

Methods Patients with self-declared active NTM-LD (recruited via communities, online ads/social media and flyers) from 8 European countries were recruited. The survey consisted of an online questionnaire, supported by semi-structured interviews providing qualitative insights (both in local language). All responses were evaluated regardless of whether the online questionnaire was fully completed, resulting in a reduction of responses per question. This is the sub-analysis on the UK survey data.

Results 185 patients with NTM-LD from the UK (34% of the full European cohort (n=543)) met inclusion criteria of which 83% (n=154) were >50 years of age, 71% (n=46) were female and 65% (n=120) were currently under treatment. 6 patients participated in the interview part of the study as well.

Daily and social life were highly restricted for 56% (n=40) and 49% (n=33) of patients, respectively. Satisfaction with care and information about NTM-LD varied between highly satisfied aspects, like overall care during therapy (50%, n=21), and aspects patients were dissatisfied with, like time needed to get referred to a expert (42%, n=48). More than half of patients (62%, n=40) stated a negative impact on their overall emotional situation. In contrast, 39% (n=28) of patients used support services, of which only 14% (n=4) used psychological support.

Conclusions Particular attention should be paid to improving access to specialized NTM-LD care and increasing the use of support services such as psychological support and support from patient advocacy groups to reduce dissatisfaction with care.

P90 REAL-WORLD EXPERIENCE WITH NEBULISED AMIKACIN LIPOSOME INHALATION SUSPENSION (ARIKAYCE®): REPORT FROM A TERTIARY CENTRE

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Background Arikayce was introduced in the UK as add-on therapy for patients with treatment-refractory mycobacterium avium complex (MAC).[1] This review examined the outcomes of patients treated with Arikayce.

Method Eligible patients were identified through clinical, microbiological and radiological review. Patients were given a Drug Response Assessment (safety test-dosing) before starting Arikayce (590 mg OD) and followed clinically to determine treatment tolerability and sputum cultures.

Results Our cohort comprises 11 patients, one of the largest in Europe. Patients with refractory MAC had coexistent bronchiectasis, COPD or ILD; 10F/1M, 37–78 yrs, $FEV_1$0.52l-2.71l (table 1). 2 patients failed the DRA. Of the remaining

Abstract P90 Table 1

Pt no.	F/M	Age (yrs)	Hx*	In pt/ OP	DRA date	FEV_1(l)	FEV_1% pred	Arikayce: mts on Rx	Reported s/e
4	F	37	1	OP	11/22	2.30	66	>6	nil
7	F	60	1	OP	03/23	2.29	83	<6	voice
8	M	69	2	OP	02/23	2.71	91	<6	u/k
9	F	73	1	IP	06/03	1.85	90	<6	voice
10	F	68	1	OP	05/05	2.62	108	<6	voice
11	F	48	3	IP	01/06	1.34	45	<6	cough, headache, SOB, wheeze
6	F	64	1	OP	12/22	1.34	51	Stopped at 2 due to s/e	weak, nauseous, cough, rash, chest tightness
3	F	68	1	OP	11/22	1.10	40	Stopped at 6 due to culture	SOB
1	F	78	1	OP	11/22	1.54	83	Stopped at ~6 due to culture	cough, voice
2	F	59	1	IP	11/22	1.18	52	0	
5	F	67	3	IP	12/22	0.52	23	0	

*KEY
1 Bx, refr MAC, on standard Rx
2 No Bx, IPF, refr MAC, on standard Rx
3 No Bx, COPD, refr MAC, intol of standard Rx

9, within 6 mts' treatment, 1 culture converted, 2 failed to culture convert and stopped Arikayce. 5 others remain on Arikayce, and 1 stopped because of intolerance. Side effects reported include cough, dysphonia and dyspnoea, which some patients manage by stopping/restarting or taking on alternate days.

Discussion Treatment of refractory patients with MAC is challenging. To date 1/3 patients on Arikayce for 6 mts culture converted, reflecting the CONVERT study.[1] Side effects were commonly reported, but most patients were able to continue the medication.

REFERENCE

1. Griffith D, *et al. Am J Crit Care Med* 2018;**198**(12):1559–1569.

Please refer to page A289 for declarations of interest related to this abstract.

P91 A CASE FOR SPECIALIST NON-TUBERCULOUS MYCOBACTERIUM PULMONARY DISEASE SERVICES: A RETROSPECTIVE STUDY ON CURRENT MANAGEMENT OF NON-TUBERCULOUS MYCOBACTERIUM PULMONARY DISEASE IN A REGIONAL TEACHING HOSPITAL

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Introduction Non-tuberculosis mycobacterial pulmonary disease (NTM-PD) commonly affects a frail, multi-comorbid population, and treatment involves extended courses of multi-antibiotic therapy with a vast side effect profile. Whilst specialist tuberculosis clinics are commonplace in most UK hospitals, NTM-PD patients are typically managed across various respiratory clinics. We present data on the management of NTM-PD in our centre over a six-year period and propose a case for a specialist NTM service with specialist nurse involvement to improve patient outcomes.

Methods We retrospectively collected data from 2016 to 2021 on patients with NTM isolated from sputum, bronchoalveolar lavage, pleural fluid or lung biopsy. Cystic fibrosis patients and patients under 18 years old were excluded. A broad range of data were collected, including microbiology, comorbidities, imaging, investigations, treatment and outcomes. We compared the management of patients seen in Specialist (tuberculosis or bronchiectasis) Clinics (SC) with patients in General Respiratory Clinic (GRC).

Results Between 2016 and 2021 we identified 459 positive pulmonary NTM cultures from 158 patients. Eight patients grew more than one NTM organism over the five-year period resulting in 170 cases total. ATS diagnostic criteria was met in 104 cases and 87 of these were clinically diagnosed with NTM-PD by respiratory consultants, with 17 probable contaminants. The average age of the NTM-PD patients was 68 years, 64.4% were female, and patients had an average of 2.8 comorbidities. Fifty-six patients started treatment. Of these, 33 were managed in a SC and 23 in a GRC. In the GRC group, only 4.5% of patients completed all required pre-treatment investigations compared with 40.6% in SC. HIV status was checked in 32.1% of GRC patients compared with 39.0% of SC patients. In the SC group, 78.8% of patients had contact with a specialist nurse compared to 26.1% in GRC. At the time of data collection 23 patient had completed treatment. Culture conversion was achieved in 25.0% of GRC patients compared to 53.3% in SC.

Conclusion Our data reflects the complexity of managing NTM-PD and demonstrates improved management when receiving care in specialist clinics, thus supporting our case for a specialist NTM service with specialist nurse involvement.

P92 OUTCOMES OF NON-TUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE IN AN EAST LONDON COHORT

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Introduction Prevalence of non-tuberculous mycobacterial pulmonary disease (NTM-PD) is increasing. The diagnosis and treatment of NTM-PD present challenges as long treatment regimens with multiple agents can induce intolerable side effects, especially in the elderly. Our primary aim was to compare mortality outcomes between NTM-PD patient groups with chronic obstructive pulmonary disease (COPD), bronchiectasis, both, or neither.

Methods This is a retrospective observational study including individuals aged 18 or over with NTM-PD according to the ATS definition of NTM-PD, and two or more positive NTM isolates in sputum, broncho-alveolar lavage or biopsy. Outcomes are defined according to the 2018 NTM-NET consensus statement.

Results We present outcome data on 59 individuals with NTM-PD treated at a tertiary centre. Out of 59 patients, 26 patients were male (44%). The median age was 69 years (IQR 56.5–77). Fourteen (24%) patients had a background of COPD, 22 (37%) patients had bronchiectasis, eight patients (14%) had both COPD and bronchiectasis, and 15 patients had neither. In the COPD group, four (29%) were smoking at the time of diagnosis, eight (57%) were ex-smokers and two (14%) never smoked. Two (14%) of the 14 patients with only COPD were of mild severity, five (36%) were moderate, three (21%) were severe and four (29%) were very severe. Thirty-seven patients (63%) of the total cohort had Mycobacterium avium complex, ten patients (17%) had Mycobacterium kansasii, nine patients (15%) had Mycobacterium abscessus and three patients (5%) had other mycobacteria.

During the six year period, the mortality rate in patients with COPD was 50% which was significantly higher ($p<0.05$) when compared to patients with bronchiectasis (9%), and patients with both COPD and bronchiectasis (25%). Of the patients who died, 57% had severe to very severe COPD. There was no mortality reported in patients who had neither COPD nor bronchiectasis. In nine patients (15%), treatment was discontinued due to side effects.

Conclusion This study confirms that the overall outcomes in patients with NTM-PD remains poor and patients with a background of COPD have a significantly higher mortality rate than patients with bronchiectasis.

P93

A QUALITATIVE INTERVIEW STUDY TO EXPLORE THE USE OF ADVERSE EVENT MITIGATION STRATEGIES AMONG ADULTS RECEIVING AMIKACIN LIPOSOME INHALATION SUSPENSION (ALIS) IN REAL WORLD SETTINGS

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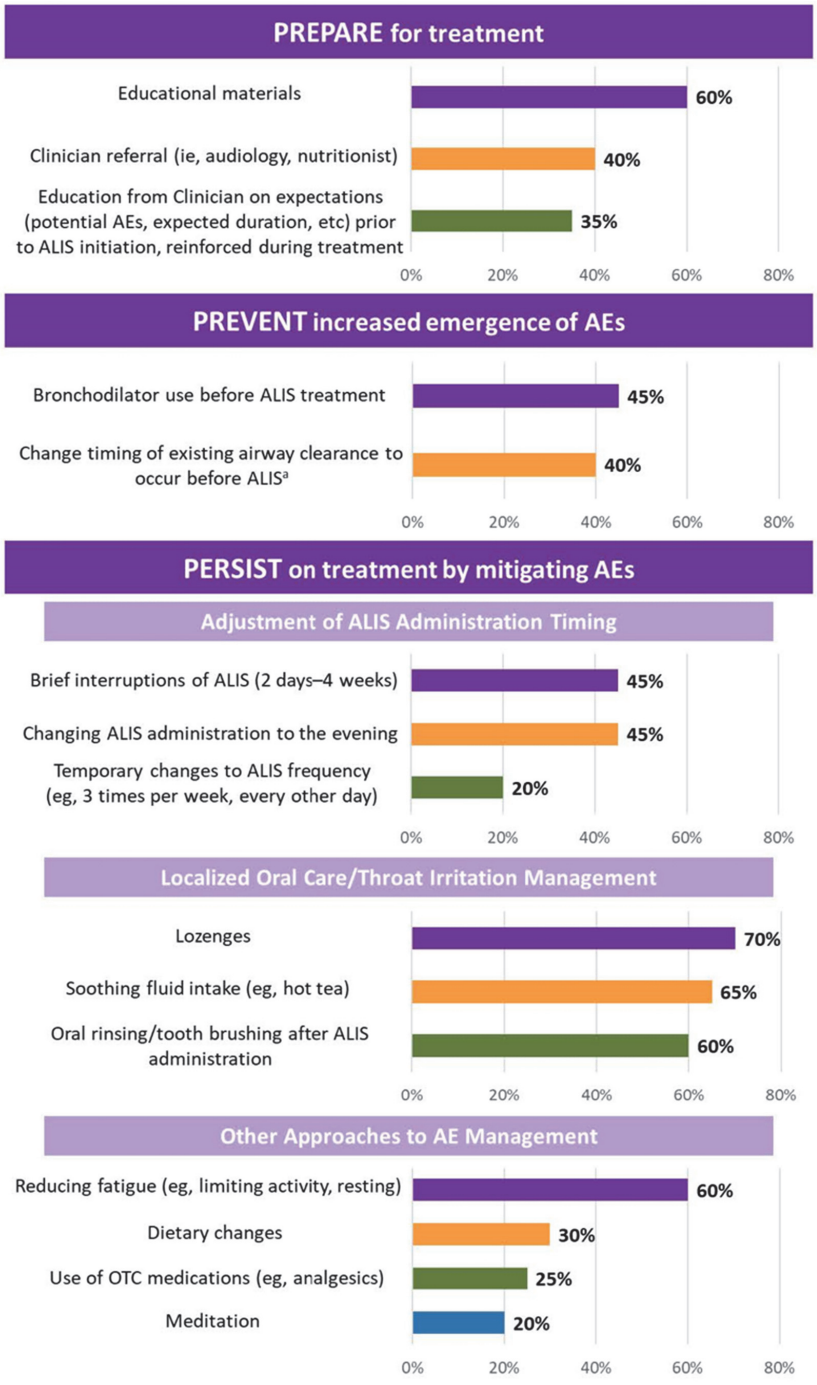
Background Amikacin liposome inhalation suspension (ALIS) is the first FDA-approved treatment included in a combination antibacterial drug regimen for adults with refractory *Mycobacterium avium* complex lung disease (MAC-LD) who have limited or no alternative treatment options. This study used qualitative research methods via one-on-one interviews to gain insight into real-world patient perspectives and practices to mitigate adverse effects (AEs) associated with ALIS.

Methods Adults in the United States were recruited through the patient support program. Patients who received ALIS for ≥7 consecutive days and self-reported a clinician-confirmed



Abstract P93 Figure 1 Proportion of interviewed patients (N=20) Reporting use of AE mitigation strategies intended to

diagnosis of refractory MAC-LD were included. A sample size of 20 patients was targeted. Purposive sampling was used to ensure representation of patients with different ALIS therapy durations. Team members trained in qualitative data collection techniques used a semi-structured interview guide with open-ended questions and follow-up probes to conduct patient interviews via phone. Transcripts were coded and analysed using ATLAS.ti v8.

Results Invitations were sent to 839 patients; 95 patients completed the screening survey and 41 were eligible. Interviews were conducted with 20 patients (mean age, 48.7 years; 90% white; 80% women; mean ALIS duration, 5.45 months). At the time of interview, 15 patients (75%) had experience receiving ALIS for longer than 1 month, and 13 patients (65%) were currently receiving ALIS treatment.

Patients described 44 unique AE mitigation strategies, which can be described using 3 categories (**figure 1**). Most strategies were used to mitigate respiratory AEs. Common strategies (≥50%) included use of relevant informational materials, localized management of throat irritation, and symptom management to reduce fatigue. Concept saturation was achieved, as no new strategies were identified in the last 5 interviews.

Summary Mitigation strategies intended to prepare patients for ALIS treatment, prevent the increased emergence of certain AEs, and mitigate impact of AEs on treatment persistence may have clinical relevance for treatment of MAC-LD with ALIS. Real-world data identified the diverse set of AE mitigation strategies used by patients and also opportunities clinicians can avail of and adopt in improving adherence to ALIS treatment. These qualitative data can inform future studies to further quantify the effectiveness of AE mitigation strategies in real-world settings.

Please refer to page A289 for declarations of interest related to this abstract.

'Take my breath away' – Novel diagnostics in respiratory disease

P94 A COMPARISON OF TWO INHALATION METHODS DURING A EUCAPNIC VOLUNTARY HYPERPNOEA CHALLENGE

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10.1136/thorax-2023-BTSabstracts.246

Introduction The Eucapnic Voluntary Hyperpnoea (EVH) challenge is a surrogate for exercise to diagnose exercise-induced bronchoconstriction (EIB). High minute ventilation (V_E) of dry gas is achieved using either a mouth piece or face mask. To date, no comparison has been made between these two different inhalation methods during an EVH challenge.

Objective To investigate the difference in maximal fall in forced expiratory volume in one second from baseline (ΔFEV_1) post EVH challenge when using a mouth piece or face mask.

Method Following ethical approval (REF No. 152022), 15 recreationally active males (28.9±11.2 years, 176.7±9.2cm and 82.1±11.2 kg) and 10 females (30.1±10.4 years, 163.9 ±5.6cm and 61.7±7.0 kg) were recruited. Participants prescribed asthma/EIB medication (n=8) withheld from Salbutamol on the morning of the testing. Participants completed two EVH challenges separated by a week, using either a one-way valve mouth piece or face mask. Participants inhaled a gas mixture of 21% oxygen, 5% carbon dioxide, balance nitrogen for 6 minutes at a target V_E (30 x baseline FEV_1). Spirometry was performed in triplicate at baseline and in duplicate at 3, 5, 7, 10 and 15 minutes post EVH. A ≥10% reduction in FEV_1 at two consecutive time points was defined as EVH positive. An independent samples and paired samples t-test were used for group comparisons. Significance was set at $p<0.05$.

Results All participants baseline FEV_1 >80% predicted. A total of 16 participants were EVH negative and 9 were EVH positive. In the EVH negative group there was no significant difference in ΔFEV_1 between conditions (p = 0.41). The EVH positive group had a greater ΔFEV_1 when using the mouth piece compared to the face mask (-15.44 ± 6.33% vs -10.67 ± 6.89%, respectively, p = 0.02). There was no significant difference in V_E achieved between conditions for the EVH positive group (p = 0.95).

Conclusion Using a one-way valve mouth piece during an EVH challenge leads to a greater ΔFEV_1compared to using a face mask in participants with a positive challenge. Therefore, caution should be made if an individual presents with a ΔFEV_1 of <10% when using an EVH challenge with a face mask.

P95 THE UTILITY OF NASAL NITRIC OXIDE MEASUREMENTS IN PATIENTS WITH RHINITIS IN A COMPLEX BREATHLESSNESS CLINIC

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Background Patients are referred to our complex breathlessness service with clinical suspicion of inducible laryngeal obstruction (ILO), breathing pattern disorder (BPD) or chronic cough (CC), often with comorbidities including asthma or uncontrolled nasal disease that impacts on patients' symptoms.

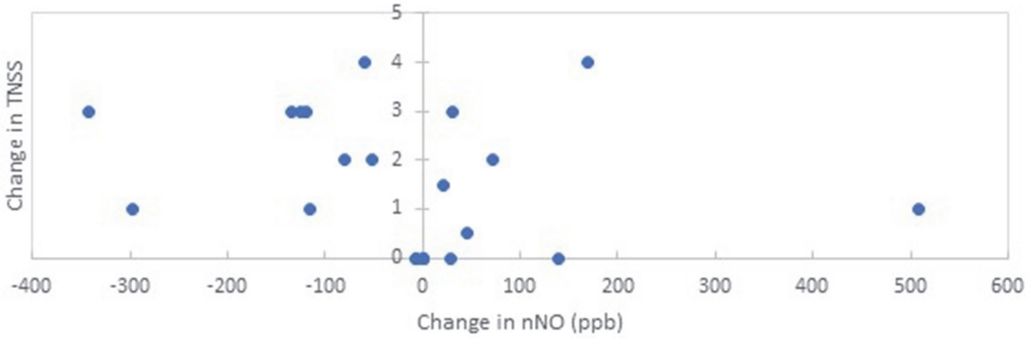
Aim To assess the impact of introducing nasal nitric oxide (nNO) in the assessment of nasal treatment outcomes in complex breathlessness patients.

Methods Demographic data, co-morbidities and clinical outcomes were collected from patients attending the Manchester Airways service (2022–2023). Patients were screened for uncontrolled rhinitis via detailed case history and laryngoscopy. Total nasal symptom score (TNSS) and nNO (right and left nostril) were recorded pre and post therapy. The asthma control questionnaire (ACQ5) and fractional exhaled nitric oxide (FeNO) were recorded in known asthmatic patients. A visual analogue score (VAS) was recorded in CC patients.

Demographic data, co-morbidities and nNO were also collected from 20 staff members.

Results Of 26 patients [17 female, mean (SD) age 50 (15) yrs] with suspected nasal disease, 21 had asthma, 6 CC, 10 BPD, 6 ILO. All were treated with nasal steroids, and 14 (55%) nasal douching. Left and right nostril nNO showed good reproducibility (intraclass correlation coefficient 0.86).

Pre-treatment median (IQR) nNO 333ppb (108–419), TNSS 5.56 (4–7), ACQ5 3.1 (2.1–3.9), FeNO 33ppb (12–43)



Abstract P95 Figure 1 Scatter plot showing association between change in TNSS and nNO

and CC VAS 6.8 (). Following treatment there were significant (Wilcoxon signed rank $p<0.05$) improvements in TNSS to 3.55 (2–5.3), ACQ5 to 2.5 (1.6–3.2), CC VAS to 2.4 (1–3) but no change in nNO or FeNO.

Figure 1 shows that changes in nNO post-treatment were highly variable.

Of 20 staff members [17 female, mean (SD) age 39 (7) years], 2 had known nasal disease, 3 a diagnosis of asthma, 2 were taking inhalers and 2 nasal sprays. Median (IQR) nNO was 484ppb (368–541) and not significantly higher compared to pts with nasal disease (Kruskal-Wallis test $p>0.05$).

Conclusion No change in nNO was found in patients following treatment of nasal disease, despite clinical improvements. In our experience nasal blockage was a confounding factor associated with unexpectedly low nNO levels. nNO is unlikely to be clinically useful in this setting.

P96 USE OF A NOVEL RESPIRATORY RESISTANCE SENSITIVITY TASK TO INVESTIGATE MECHANISMS OF BREATHLESSNESS IN LONG COVID

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Introduction and Objectives Breathlessness involves both perception of levels of neural respiratory drive and respiratory afferent feedback resulting from increased breathing effort (respiratory interoception). Breathlessness is common in people with Long COVID (LC) and is often unexplained by standard clinical tests. Altered respiratory interoception has been demonstrated previously in chronic respiratory disorders (Koh et al., 2001). The study aims were to: 1) investigate the applicability of a novel respiratory resistance sensitivity task (RRST) to the study of breathlessness 2) test the hypothesis that people with LC have heightened sensitivity to changes in respiratory load compared to healthy controls (HC).

Methods Three LC and seven HC participants without Long COVID symptoms were recruited (table 1). The novel RRST was delivered using a fully-automated, software-controlled device attached to a two-way non-rebreathing valve and provided reproducible changes in inspiratory resistive load by compressing a flexible tube (Nikolova et al. 2022). Each trial consisted of two consecutive inhalations with participants indicating which breath was more difficult. Each participant completed 60 trials. Airflow, mouth pressure and respiratory muscle electromyogram (EMG) activity (surface parasternal intercostal EMG (sEMGpara), left and right surface diaphragm EMG ($sEMGdi_L$ and $sEMGdi_R$)) were recorded throughout.

Abstract P96 Table 1 Demographic and anthropometric data, spirometry, respiratory muscle function and symptom burden in Long COVID (LC) and healthy control (HC) participants

	Healthy participants (n=7)	Long COVID patients (n=3)
Demographic and Anthropometric Data		
Age(yrs.)	28 (21–49)	51 (49–51)
Female/Male	5/2	2/1
Weight(kg)	62.0 (53.0–71.8)	83.5 (71.6–117.1)
Height(cm)	163.0 (158.1–180.0)	178.2 (167.9–181.0)
BMI (kg/m^2)	21.7 (20.4–24.4)	25.5 (25.3–36.8)
Spirometry		
FEV_1(L)	3.24 (2.59–4.52)	3.27 (2.66–3.66)
FEV_1%pred	98.5 (92.6–106.9)	90.6 (90.2–96.6)
FVC(L)	3.95 (3.34–5.54)	4.28 (3.28–4.63)
FVC% pred	104.4 (94.3–123.9)	89.0 (89.5–100.2)
FEV_1/FVC (%)	81.6 (74–82.0)	79.0 (76.4–81.1)
Inspiratory muscle strength		
PImax (cmH_2O)	85.6 (48.2–117.9)	70.4 (32.4–139.7)
SNIP (cmH_2O)	73.1 (66.6–113.3)	70.0 (64.0–91.2)
Neural inspiratory drive		
sEMGpara%max	13.1 (5.2–20.0)	7.1 (5.2–21.5)
$sEMGdi_L$%max	6.9 (3.8–13.1)	5.3 (4.2–24.6)
$sEMGdi_R$%max	6.2 (2.6–17.0)	6.6 (4.0–22.8)
Questionnaires		
Chalder Fatigue Scale	10 (1–15)	17 (10–24)
mMRC Dyspnoea Scale	0 (0–1)	1 (0–2)
Nijmegen Questionnaire	3 (0–17)	30 (28–38)
GAD-7	1 (0–9)	3 (1–5)
PHQ-8	0 (0–6)	5 (4–7)

PImax = maximum inspiratory mouth pressure; SNIP = sniff nasal inspiratory pressure; sEMGpara%max = surface parasternal intercostal electromyogram activity normalised to peak sEMGpara during maximal volitional inspiratory manoeuvres; $sEMGdi_L$%max = left-sided surface diaphragm electromyogram activity normalised to peak $sEMGdi_L$ during maximal volitional inspiratory manoeuvres; $sEMGdi_R$%max = right-sided surface diaphragm electromyogram activity normalised to peak $sEMGdi_R$ during maximal volitional inspiratory manoeuvres; GAD-7 = General Anxiety Disorder-7; PHQ-8 = the eight-item Patient Health Questionnaire depression scale. Data are presented as median (range)

Threshold resistance sensitivity (TRS) was calculated online using adaptive psychophysical methods and expressed as% tube compression.

Results RRST was well tolerated in both HC and LC, and median (range) TRS was 80.2 (71.7–91.7)% in HC and 73.9 (69.4–81.6)% in LC. Similar TRS values were obtained between two occasions in three HC participants (TRS1 = 83.9 (71.7–87.8)%, TRS2 = 80.9 (73.9–82.9)%).

Conclusions These early data indicate that RRST is feasible for studying respiratory interoception in LC, and that TRS is reproducible in HC. Currently there are no clear differences in TRS between HC and LC participants, but ongoing recruitment targeting breathless LC patients should allow more definitive conclusions to be drawn.

P97 CPET'S UTILITY IN UNDERSTANDING UNEXPLAINED EXERTIONAL DYSPNOEA IN MILITARY PERSONNEL

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Introduction Cardiopulmonary exercise testing (CPET) is a useful tool for investigating unexplained dyspnoea. CPET is non-invasive, and assesses patients' respiratory cardiovascular and metabolic function during exertion. It can assess patients with exertional symptoms whose' previous diagnostic investigations at rest were normal. Physical fitness is assessed in military personnel; consequently pathological exertional dyspnoea is more frequently identified. We present a case series that demonstrates the utility of CPET in identifying the cause of unexplained dyspnoea in military personnel. The aim is to, guide appropriate future management and enable individuals to be fit for work.

Methods The case series is retrospective analysis of CPETs performed between June 2022 and June 2023 from the Military Respiratory Clinic. Patients in the clinic with persistent symptoms despite normal basic investigations were referred for CPET with or without concurrent laryngoscopy. We reviewed how patients presented, their initial investigation and management, what they were referred for, the outcome of their CPET, probable diagnosis, and subsequent management.

Results Eleven patients underwent CPET. Definitive diagnosis were obtained of. A range of explanations for their symptoms were found including deconditioning following COVID-19 infection (n=3), exercise induced laryngeal obstruction (n=2), breathing pattern disorder (n=2). In four cases it did not provide a definitive diagnosis but guided further investigation. Including cardiac MRI, an echocardiogram and one possible tracheobronchomalacia diagnosis. Following CPET and appropriate management, all patients referred were able to return to full duties and fitness training.

Conclusions We have demonstrated how CPET is a useful tool in understanding unexplained exertional dyspnoea. In this cohort, we frequently confirmed suspected diagnosis from clinical assessment, but in several cases identified unexpected pathology. CPET offers the unique ability to investigate abnormal exertional symptoms. This is especially important in patients whose employment depends on physical fitness and has application to individuals outside the military also.

P98 VENTILATORY DYNAMICS AND CLINICAL STATUS DURING CARDIOPULMONARY EXERCISE TESTING IN PATIENTS WITH INTERSTITIAL LUNG DISEASE

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10.1136/thorax-2023-BTSabstracts.250

Introduction Cardiopulmonary exercise testing (CPET) is a feasible, valid, repeatable, and prognostically important tool in the management of interstitial lung disease (ILD). However, due to the progressive nature of declining pulmonary function in ILD, it is unclear if clinical status has an underlying affect upon ventilatory dynamics during CPET. Differences, should they exist, could therefore guide pulmonary rehabilitation regimens.

Objectives To characterise differences in ventilatory dynamics, specifically breathing frequency (Bf) and tidal volume (Vt), which combine to produce minute ventilation (V_E) during CPET in patients with ILD, based upon GAP Score and forced vital capacity (FVC).

Methods Twenty-four patients with ILD (7 female, 69.7 ± 7.6 years) underwent incremental CPET to volitional exhaustion on a cycle ergometer. Data on Bf and Vt were recorded breath-by-breath, then exported and analysed in 10-second averages. Data were assessed at five metabolically matched points (baseline, 50% gas exchange threshold (GET), GET, 50%Δ, VO_{2peak}) and normalised to peak values, thereby accounting for individual variances in lung volumes. Patients were grouped around median GAP Score and FVC. Independent samples t-tests identified differences between groups for peak values. Repeated measures analysis of variance (ANOVA) identified interaction effects between time and group.

Results When split by median GAP Score (high vs low), no differences existed between groups for VO_{2peak} ($p = 0.31$) or V_{Epeak} ($p = 0.77$). ANOVA showed no effect of group for Bf ($p = 0.07$) or Vt ($p = 0.27$), nor any interaction effect for Bf ($p = 0.10$) or Vt ($p = 0.13$). When split by median FVC (high, 97±14%; low, 71±8%), no differences existed between groups for VO_{2peak} ($p = 0.56$) or V_{Epeak} ($p = 0.18$). ANOVA showed significant differences between groups for Vt ($p = 0.008$) but not Bf ($p = 0.97$). An interaction effect was present for Vt ($p = 0.004$) but not Bf ($p = 0.23$).

Conclusions These data indicate that differences in ventilatory dynamics in ILD are driven by reduced FVC, resulting in impaired Vt during CPET. Therefore, these data indicate that patients may compensate for FVC impairment through increased Vt to maintain physiological ventilation and VO_{2peak}.

P99 EFFICACY OF THE BRITISH THORACIC SOCIETY GUIDANCE ON PRE-FLIGHT ASSESSMENT OF PATIENTS WITH RESTRICTIVE LUNG DISEASE PLANNING A COMMERCIAL FLIGHT

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10.1136/thorax-2023-BTSabstracts.251

Introduction The British Thoracic Society (BTS) clinical statement on air travel for passengers with respiratory diseases in

Abstract P99 Table 1 Comparison of BTS algorithm vs HCT

	Pass	Fail
No HCT	11	11
Consider HCT	13	5
Consider in-flight O_2	12	22

2022 advocates for an assessment based on an algorithm that uses routine clinical data to risk-stratify patients planning commercial flights. The possible outcomes are as follows: 'no in-flight oxygen required', 'consider Hypoxic Challenge Test' (HCT), 'consider in-flight oxygen at 2 L/min greater than the long-term oxygen therapy prescription (LTOT)', or 'consider in-flight oxygen at 2 L/min'.

Methods We evaluated the accuracy of the pre-flight assessment algorithm for patients with restrictive lung disease who had undergone a Hypoxic Challenge Test (HCT) prior to the implementation of the current clinical statement.

Results Seventy-four patients, comprising of 49 males, with a mean age of 70 years, were included in the study. The mean, standard deviation, and percent predicted values for various respiratory parameters were as follows: forced expiratory volume in 1 second (FEV_1) of 2.05 litres (0.81), 77% predicted; forced vital capacity (FVC) of 2.52 litres (0.80), 72% predicted; total lung capacity (TLC) of 4.01 litres (1.12), 67% predicted; and transfer factor of 3.93 ml/min/kPa (1.00), 51% predicted.

Among the patients identified as not requiring in-flight oxygen, eleven individuals failed the hypoxic challenge test (HCT). Twelve patients who were considered to require in-flight oxygen were able to maintain adequate oxygen levels (PaO_2 > 6.6 kPa) while breathing the hypoxic mixture (table 1).

Conclusions The algorithm is a useful and pragmatic tool in identifying patients requiring HCT/oxygen during air travel. However, clinicians need to be aware that some patients advised not to use oxygen may fail an HCT and others in whom oxygen is recommended but not needed may unnecessarily be deterred from travelling. It is important to conduct studies with larger patient cohorts to further investigate these aspects.

P100 EXAMINING THE RELATIONSHIP BETWEEN EXHALED AEROSOL AND CARBON DIOXIDE ACROSS HUMAN ACTIVITIES

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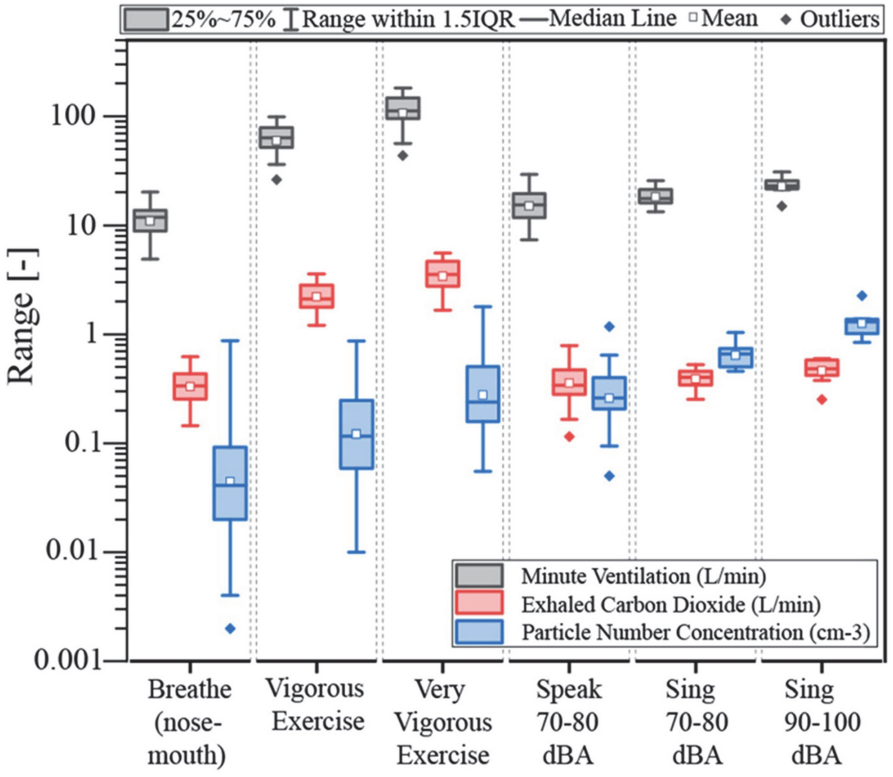
10.1136/thorax-2023-BTSabstracts.252

Background The COVID-19 pandemic caused >750 million infections and just under 7 million deaths worldwide, along with shutdowns in social and economic activities. Respiratory particles produced during non-vocalised activities such as breathing, and vocal activities including singing and speaking



Abstract P100 Figure 1 Box and whisker plots showing time averaged aerosol particle number concentrations in #/cm^3 (blue), minute ventilation in L/min (grey), and exhaled carbon dioxide in L/min (red) for the same series of activities (breathing at rest (n = 33), vigorous exercise (n = 25), very vigorous exercise (n = 25), speaking (n = 33), singing at 70–80 dBA (n = 8), and singing at 90–100 dBA (n = 8) across all relevant participants. Boxes

serve as a major route for respiratory viral disease transmission.

Methods This work reports concomitant measurements of the exhaled volume of carbon dioxide (VCO_2) and minute ventilation (VE), along with respiratory aerosol emitted during breathing, exercising, speaking, and singing, across 33 healthy adult participants.

Results VCO_2 and VE appear to follow a similar trend to aerosol number concentration during the non-vocalised, exercise activities. Vigorous and very vigorous exercises generated 6 and 10 times more exhaled CO_2 (L/min) than breathing at rest ($p<0.001$), ~5 and 8 times greater VE than breathing ($p<0.001$), respectively. And both vigorous and very vigorous exercise generated significantly more aerosol particles than breathing ($p < 0.001$). When considering non-vocalised activities (breathing at rest, vigorous exercise, and very vigorous exercise), a strong correlation ($R^2 = 0.71$) between exhaled CO_2 production (in mL/s) and mean aerosol mass emission rates is evident. During vocalisation the amount of exhaled CO_2 when breathing at rest was similar to that exhaled while speaking ($p=0.27$) and singing at 70–80 dBA ($p=0.23$) and only modestly different to that emitted when singing at 90–100 dBA ($p=0.02$). Conversely, speaking and singing at 70–80 dBA, and singing at 90–100 dBA, generated significantly more aerosol particles than breathing ($p<0.001$). Consequently, a relatively poor correlation ($R^2 = 0.02$) was observed between exhaled CO_2 production in (mL/s) and mean aerosol mass emission during vocalization.

Conclusion The correlation between the aerosol mass exhalation and VCO_2 is only observed across activities that do not involve vocalisation, i.e. from breathing at rest through to vigorous exercise. Subsequently, using CO_2 as a surrogate measure of respirable aerosol in, for example, an indoor space provides and underestimation of the amount of airborne respiratory pathogen exhaled by an infected individual when they are vocalising. Therefore, additional surrogate measures are needed for vocalising.

P101 NEURAL RESPIRATORY DRIVE AMONG COPD PATIENTS WITH MILD OR MODERATE AIRFLOW LIMITATION IN PRIMARY CARE: REPRODUCIBILITY, RELIABILITY AND ASSOCIATION WITH OTHER BIOMARKERS

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10.1136/thorax-2023-BTSabstracts.253

Introduction and Objectives Neural respiratory drive (NRD) is central control of breathing maintained through the respiratory muscles, particularly diaphragm and intercostals. NRD can be measured by surface electromyography (EMG) of the second intercostal space parasternal muscles (EMG_{para}). It is closely correlated to the subjective measurement of breathlessness in COPD patients with severe/very severe airflow limitation. It has not previously been assessed in ambulatory COPD patients with mild or moderate breathlessness in primary care. Its potential as a primary care research tool has not been evaluated.

This study aimed to assess the reliability and reproducibility of NRD across a group of COPD patients with mild/moderate airflow limitation (FEV_1 (forced expiratory volume in one second) ≥50% predicted) in primary care. Relationships between NRD and measures of quality of life, lung function and breathlessness were assessed.

Methods Patients with stable mild/moderate COPD were recruited from general practices. Second intercostal space NRD (EMG_{para}; NRDI), spirometry, measures of breathlessness and quality of life (CRQ-SAS, mBorg, CAT, mMRC) were recorded at baseline, 3 and 6-month follow-up. Intraclass correlation coefficients were calculated for each of the variables and Bland-Altman plots generated.

Results 40 COPD patients with mild/moderate airflow limitation were recruited. There was high intra-rater and inter-rater agreement in each of the measures of NRD, including EMG_{para} & NRDI (ICC > 0.9). There were moderate correlations between EMG_{para} and FEV_1% predicted (Pearson's of r= -0.42; p=0.01) and between NRDI and FEV_1% predicted (Pearson's of r= -0.35; p=0.04). Consistent correlation was not seen between either EMG_{para} or NRDI and any CAT, CRQ domain, mBorg, or mMRC scores across the assessments.

Conclusions Assessment of NRD using surface electromyography had a moderate correlation with FEV_1 but was not found in this study to be a sensitive measure of breathlessness in COPD patients with mild or moderate airflow limitation. The reliability of the recording in these patients and its established usefulness in assessing breathlessness in severe and very severe airflow limitation suggests that if the measurement can be made more sensitive it will be useful in interventional studies in primary care settings.

Please refer to page A289 for declarations of interest related to this abstract.

P102 SYMMETRIC PROJECTION ATTRACTOR RECONSTRUCTION (SPAR): WHOLE-WAVEFORM ANALYSIS OF ABDOMINAL RESPIRATORY MOVEMENT PROVIDES A NEW BIOMARKER OF OBSTRUCTIVE SLEEP APNOEA

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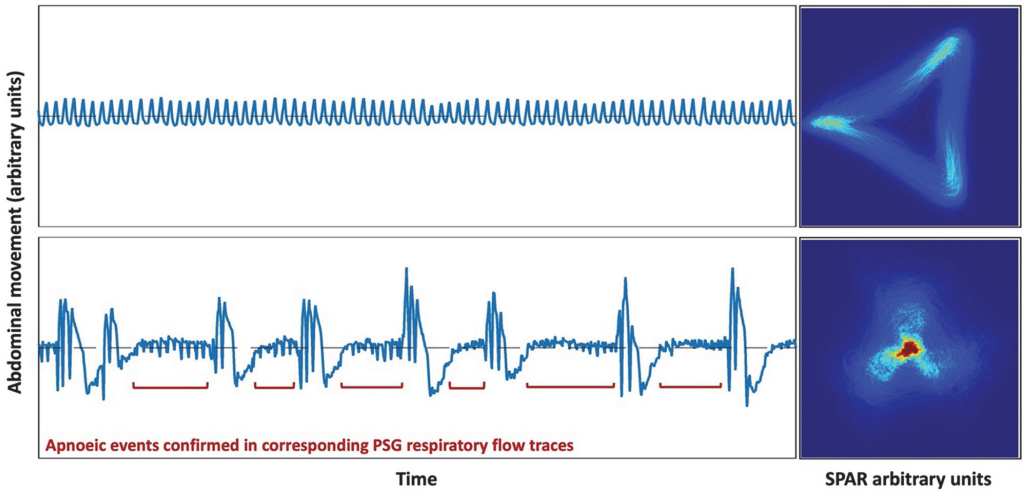
10.1136/thorax-2023-BTSabstracts.254

Background Obstructive Sleep Apnoea (OSA) is conventionally quantified by the Apnoea-Hypopnea Index (AHI), used to classify disease severity. Automation of AHI detection relies on identification of singular data points in long, multi-channel polysomnography (PSG) recordings. This can be easily compromised by signal noise. We present a novel mathematical method, the Symmetric Projection Attractor Reconstruction (SPAR), that may overcome this problem by transforming whole cyclic physiological recordings into corresponding 'at-a-glance' images ('attractors') which capture all available waveform morphology information, without relying on single point detection. Attractor quantification may provide a more rapid and robust mean of quantifying the number and duration of overnight apnoeic and hypopneic events.

Aim To test whether SPAR can categorize overnight obstructive sleep apnoea recordings according to severity classifications informed by expert-annotated AHI.

Methods 74 PSG recordings were analysed (52 non-OSA subjects/22 severe-OSA patients, 43.0/27.3% female, 37.4/48.9



Abstract P102 Figure 1 Overnight 5-minute abdominal movement data and corresponding 3-hour SPAR attractor from a representative non-OSA subject (top, low central attractor density) and severe-OSA patient (bottom, high central attractor density). Y axes on traces shown as $\pm 10^5$ arbitary units

average y.o.). Abdominal-band motion data was chosen for pilot analysis due to its relatively low complexity of waveform morphology. Data were processed through bespoke SPAR software to create SPAR attractors. Quantification of high central attractor density corresponded to low/no-amplitude waveform regions, serving as a surrogate for the number and length of apnoeic and hypopneic events. This metric was used to classify between non-OSA subjects (AHI <5/hour) and severe-OSA patients (AHI>30/hour). Receiver Operator Characteristics Area Under the Curve (ROC AUC) was used to measure classification accuracy.

Results SPAR attractors created from 3 continuous hours of overnight abdominal-band data visually differentiated non-OSA and severe OSA patients, showing a high-density central area in the severe-OSA group (figure 1) which was absent in the non-OSA group. Quantification of attractor central density classified these two groups with high accuracy (ROC AUC = 0.99).

Conclusion SPAR analysis of abdominal-band motion recordings accurately classified non-OSA vs. severe OSA patients. Further analysis will apply SPAR to categorise all types of OSA severities, and test SPAR's ability to serve as a novel, visual, OSA triage tool. Future studies will compare SPAR to automated AHI scoring in various PSG signals to ascertain if the method could benefit the efficiency of current diagnostic processes.

P103 PROVOKING INDUCIBLE LARYNGEAL OBSTRUCTION – TRIGGERS AND CO-MORBIDITIES

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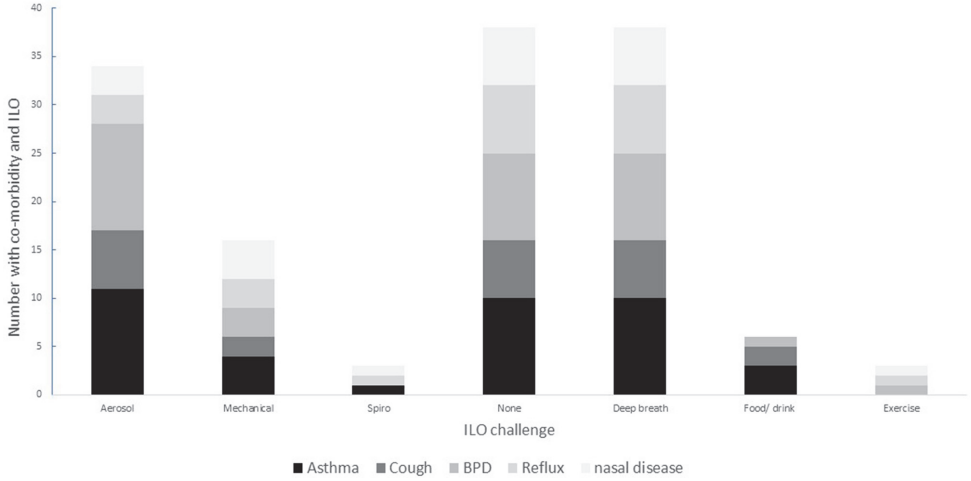
10.1136/thorax-2023-BTSabstracts.255

Background Inducible laryngeal obstruction (ILO) describes an inappropriate narrowing of the glottic and/or supraglottic level causing breathlessness, and often co-existing with other respiratory conditions. Flexible laryngoscopy during a symptomatic episode is the gold standard for ILO diagnosis. Patients can be symptomatic at rest or may need to be challenged with an



Abstract P103 Figure 1 Association between ILO provocation trigger and co-morbidities

irritant. It is unclear if ILO is a direct response to the irritant stimulus itself e.g., *via* mucosal inflammatory reactions or related to altered reflex sensitivity and if there is an association with other respiratory co-morbidities.

Aim To evaluate laryngoscopic findings, provocation challenge irritants and the association with other co-morbidities in a complex breathlessness service.

Method Demographics, clinical outcomes and provocation challenge data were collected for 50 patients who attended the Manchester Airways Service over an 8-month period and had a diagnosis of ILO confirmed on laryngoscopy.

Results Of 50 patients [44 female, mean (SD) age 47 (13.5) years] with a confirmed diagnosis of ILO, 45 (90%) had inspiratory glottic ILO, 20 (40%) inspiratory supraglottic ILO [15 (30%) had both], and 3 (6%) expiratory ILO. 36 (72%) had asthma, 18 (36%) cough, 28 (56%) breathing pattern disorder (BPD), 20 (40%) reflux and 19 (38%) nasal disease. The median (IQR) vocal cord dysfunction questionnaire (VCDQ) was 46 (42–50).

15 patients (30%) required aerosol challenge, 7 (14%) mechanical challenge, 2 (4%) mimicking spirometry, 9 (18%) deep inspiratory breath, 4 (8%) food/drink, 1 (2%) exercise and 13 (26%) did not need to be challenged as they were already symptomatic. There was no clear association between ILO provocation trigger and co-morbidities (figure 1).

Conclusion Patients with ILO have a range of triggers that will provoke their breathlessness symptoms. Their does not appear to be any pattern to the triggers depending on other respiratory or upper airway co-morbidities and patients' awareness of their inducer appears to be a more reliable indicator. Future research is required to understand phenotyping of ILO and the impact of co-morbidities on laryngeal dysfunction.

P104 MEDICATION USE IN INDUCIBLE LARYNGEAL OBSTRUCTION PRE AND POST SPEECH AND LANGUAGE THERAPY

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10.1136/thorax-2023-BTSabstracts.256

Introduction Inducible laryngeal obstruction (ILO) is defined as an inappropriate laryngeal closure causing difficulty breathing. Symptoms mimic those of asthma or allergic reactions, and typically patients have concomitant respiratory conditions leading to missed or delayed diagnoses. Due to misdiagnosis management of the condition can often result in unnecessary use of medication (inhalers, steroids, antibiotics and EpiPens). Such medication is ineffective in the management of ILO, whereas speech and language therapy (SLT) is seen as the gold-standard.

Aim To evaluate outcomes and medication use in patients attending a complex breathlessness service pre and post SLT.

Method We retrospectively reviewed patients who had been referred to Manchester Airways Service and had completed a course of SLT. Demographic data, laryngoscopy findings, co-morbidities and Vocal Cord Dysfunction Questionnaire (VCDQ) scores were recorded.

Results Of 53 patients [47 female, mean (SD) age 46 (14.6) years, mean VCDQ 46 (SD)] with a confirmed diagnosis of ILO made between September 2022 and January 2023, 34 had a diagnosis of asthma, 12 reflux, 14 breathing pattern disorder and 14 nasal disease. Pre SLT, 48 patients (91%) were using inhalers, 11 patients (21%) were having monoclonal antibody therapy injections for their asthma, 9 patients (17%) had been prescribed an EpiPen, the average number of steroid courses was 3, antibiotic courses 2. Post SLT, there was significant reduction in inhaler use [64%, $p<0.001$, with 14 patients (26%) managing to stop inhalers completely], in steroid/antibiotic courses (100%, $p<0.001$) and in VCDQ (table 1). All patients had clinically meaningful improvements in VCDQ ($\geq$4). The average number of SLT sessions was 2.

Abstract P104 Table 1 Improvements in symptoms and medication use post SLT

Category	Pre SLT	Post SLT
Mean (SD) VCDQ	46 (6.82)	28 (6.76)
Inhaler use (n%)	48 (91%)	34 (64%)
Mean steroid courses/year	3	0
Mean antibiotics courses/year	2	0
EpiPen use (n%)	9 (17%)	1 (2%)

Conclusion Speech and language therapy intervention is beneficial in reducing medication use in ILO patients in as little as one session. It highlights the need for early intervention to reduce the burden of unnecessary pharmacological intervention. Further research is needed into specific reduction in inhaler use, which is the most common medication prescribed in this patient cohort.

P105 AIRWAY STENTS: DEVELOPMENT OF A PHYSIOTHERAPY MANAGEMENT GUIDELINE

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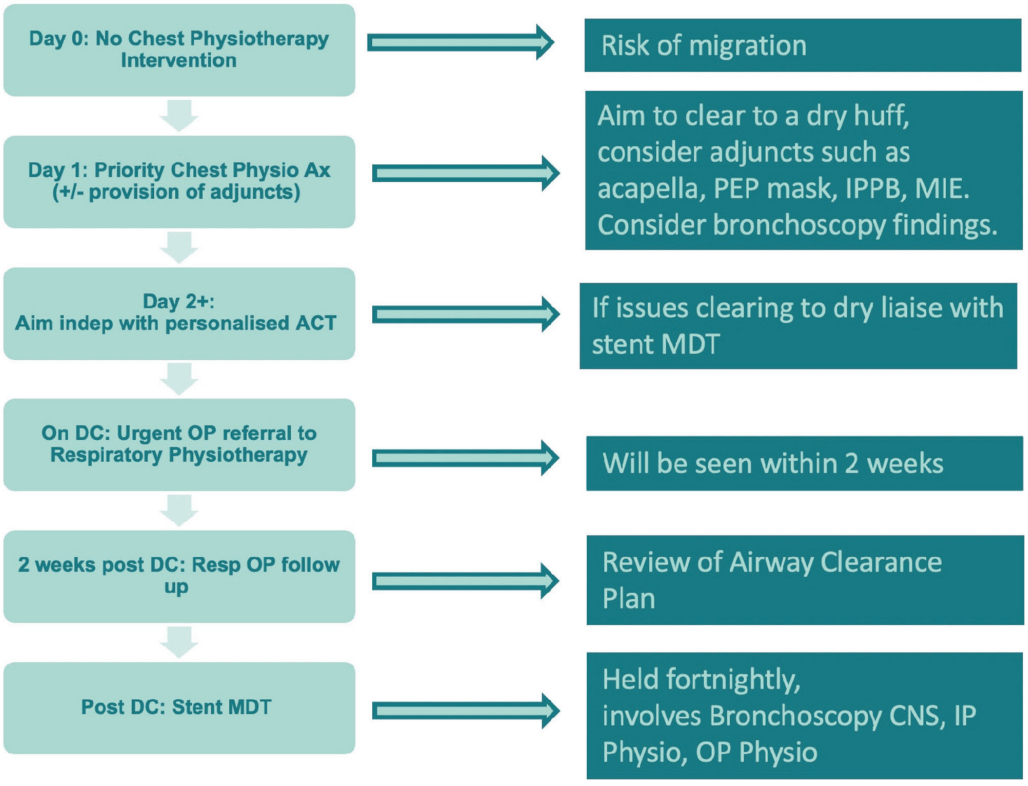
10.1136/thorax-2023-BTSabstracts.257

Introduction Airway stents can be used as a palliative intervention or as a bridge to curative therapy for patients with central airway obstruction, usually due to malignancy. There have been significant advances in airway stents and the number of surgeries has significantly increased. However, stent-related complications occur in up to 60% of patients, with retained secretions causing up to 20% of such complications (Lee et al 2017). Retained secretions are a crucial aspect of respiratory physiotherapy. Despite this, there are no respiratory physiotherapy management guidelines for patients following airway stent insertion.

Methods A multi-step method of data collection was followed. A scoping review was conducted in four different scientific databases and the search strategy included all known variations of keywords around 'respiratory physiotherapy' AND 'airway stent'. A local audit of the current physiotherapy management was performed as well as benchmarking against other trusts via a telephone call. An expert panel was set up and reviewed all aspects of stent patient care.

Results The literature review did not find any studies directly linked to the physiotherapy management of airway stents and there was no recommended best practice. One study by Tjahjono et al (2018) included respiratory physiotherapy in their post-op management. The audit included



Abstract P105 Figure 1 Respiratory physiotherapy management of Airway Stents

the results of 22 patients. 65% of patients seen on day 1 had evidence of retained secretions. On discharge, only 50% of patients had an effective airway clearance technique (ACT). The benchmarking did not provide any consensus for the management of airway stent patients. Two large trusts were contacted but had no guidelines or pathways in place. The expert panel each gave recommendations for best practice which was then implemented into the pathway to guide the final draft. A respiratory physiotherapy patient pathway was developed (figure 1), alongside a patient information leaflet and the establishment of fortnightly MDT meetings.

Conclusion Airway stenting is a new and novel area of respiratory medicine with the limited evidence available. This respiratory physiotherapy pathway has been developed as an initial guide to best practice for physiotherapy care of patients post stent insertion with the aim of further research.

P106 TO HUFF OR NOT TO HUFF: COULD FORCED EXPIRATORY MANOEUVRES BE IMPEDING AIRWAY CLEARANCE IN LARGE AIRWAY COLLAPSE?

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10.1136/thorax-2023-BTSabstracts.258

Background There is minimal literature present on the role of physiotherapy in the management of Large Airway Collapse and airway clearance. Most articles state management should involve chest physiotherapy without the explanation of what physiotherapy may offer. A staple of airway clearance advice in physiotherapy is to encourage Forced Expiratory Manoeuvres (FET) such as HUFF. We hypothesised that a huff worsened airway collapse and impedes airway clearance in this group.

Method Following clinical evidence of suspected dynamic airway collapse patients underwent a Flexible Bronchoscopy under light sedation to quantify any collapse. Quantification was completed through visual inspection and agreement on degree of collapse by at least two specialist clinicians. During the procedure the patient was asked to perform tidal breathing and FETs to assess if these techniques worsened the degree of collapse.

Results 16 patients underwent bronchoscopy to assess for airway collapse that included performing FETs. 87% (n=14) demonstrated worsening collapse of greater than 10% on FETs. Of the 2 patients that did not 1 patient already had 100% collapse.

Discussion There is emerging evidence to indicate the use of Forced expiratory techniques in airway clearance may be a detriment to the patient and likely lead to insufficient clearance. This has potentially large implications on physiotherapy management as a Huff technique is often the first line of treatment for airway clearance. Furthermore in breathlessness associated with the airway collapse these techniques may exacerbate the symptoms of breathlessness and promote hyperinflation through gas trapping in COPD patients. As a result of this, adapting techniques to promote secretion mobilisation with limited FETs should be a consideration for patients that present with large or dynamic airway collapse.

Future research The sample size is small in this study therefore further expanding this would help provide clarity in the area.

In the future assessments of different airway clearance techniques to optimise clearance without the use of FET is essential which should include positive expiratory pressure devices (PEP) and their potential role in airway splinting alongside airway clearance.

'It's not easy being green' – Suppurative lung diseases

P107 REAL-WORLD IMPACT OF ELX/TEZ/IVA ON QUALITY OF LIFE OF CHILDREN WITH CF AGED 6–11 YEARS AND PRIMARY CAREGIVERS IN THE UK: MAGNIFY, A PROSPECTIVE, OBSERVATIONAL, NON INTERVENTIONAL STUDY

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10.1136/thorax-2023-BTSabstracts.259

Objective To describe the impact of ELX/TEZ/IVA on quality of life (QOL) in children and caregivers.
Methods QOL of children with CF aged 6–11 years was evaluated via caregiver proxy using the Cystic Fibrosis Questionnaire-Revised (CFQ-R). Caregivers' QOL was self-reported using the Care-Related QOL (CarerQoL). Data were collected at 13 sites in the UK before (baseline) and every 3 (±1) months after ELX/TEZ/IVA initiation. Change from baseline was calculated as the average of all postbaseline measurements minus baseline (mean [SD]). Additionally, children and caregivers completed a single-item measure assessing overall change in CF symptoms and caregiver's status, respectively, on a 5-level scale from 'much better' to 'much worse.'
Results 27 children and 25 caregivers provided data before and after ELX/TEZ/IVA initiation. 63.0% of children were male and 66.7% were homozygous for *F508del-CFTR*. The mean age was 8.9 (1.8) years at ELX/TEZ/IVA initiation. Mean ppFEV$_1$ was 94.3 (15.5) prior to initiation. Most caregivers were female (84.0%) with a mean age of 37.6 (4.2) years. Mean follow-up for children and caregivers was 124.8 and 122.2 days, respectively. For children, scores for most CFQ-R domains increased after ELX/TEZ/IVA initiation, with the greatest mean increases in the digestion (10.7 [25.9]) and respiratory (6.2 [12.6]) domains. The respiratory domain improvement exceeded the minimal clinically important difference of 4 points. The mean CarerQoL 7D utility score components increased by 3.43 (6.38), suggesting decreased burden of care. Most children (18/27; 67%) and caregivers (17/25; 68%) reported improvement in symptoms/status on the single-item measure.
Conclusions Data suggest that both children with CF aged 6–11 years and caregivers experienced improvement in QOL and well-being following initiation of ELX/TEZ/IVA. Further study is warranted to understand the experiences of those who did not report improvement.

Please refer to page A289 for declarations of interest related to this abstract.

P108 SHORTENING ASSESSMENT OF LUNG CLEARANCE INDEX (LCI): CAN WE AVOID NEEDING TO REPEAT THE TEST THREE TIMES?

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10.1136/thorax-2023-BTSabstracts.260

Background Lung Clearance Index (LCI) is one of the most sensitive lung function tests for detection and monitoring of CF lung disease, but has not been widely adopted into clinical practice. Clinical scalability is limited by long test times, exacerbated by the need to repeat the washout test three times to produce an average. Previous studies have shown little difference between two and three repeats in LCI when looking at group means. We aimed to establish the within-patient impact on final LCI of adding a third repeat, and whether there were features of the first two measurements that could indicate or obviate the need for a third measurement.
Methods This analysis used LCI measurements collected during a prospective longitudinal study of LCI in adults and children with mild-moderate CF (FEV$_1$>50%). We only included visits with three or more technically adequate repeat measurements.
Results Data from 708 visits and 110 subjects (n = 44 adults) were included. 138 of 846 visits with only two technically acceptable repeats were excluded. The impact of a third measurement on final LCI was small: mean (SD) change in LCI was -0.10 (2.37)% when the third measurement was added, and for >95% of measurements LCI from 2 repeats was within 5% of that from 3 repeats. Impact on FRC was similarly small: -0.18 (2.60)% change with addition of a third measurement. The impact on final LCI and FRC was not related to the repeatability of the first two LCI or FRC measurements, nor to a combination of both of these. In other words, if the first two measurements were very close together or up to 20% different, the impact of a third repeat on final LCI output was unchanged.
Conclusions If time constraints exist in routine clinical care, two measures provide a robust approximation of the measurement that would be obtained from three repeats. However, there is no degree of repeatability of the first two measures that can reliably obviate need for a third. To avoid loss of data on detailed quality-control review, the objective should continue to be to collect three measurements during LCI assessment.

P109 WHEN IS BURKHOLDERIA CEPACIA COMPLEX TRULY ERADICATED IN ADULTS WITH CYSTIC FIBROSIS? A 20-YEAR FOLLOW UP STUDY

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10.1136/thorax-2023-BTSabstracts.261

Introduction and Objectives Due to increased morbidity associated with *Burkholderia cepacia* complex (BCC) infection in

cystic fibrosis (CF), it is recommended that patients are segregated to prevent cross-infection. To date there are no evidence-based eradication treatment regimens and there is no universally agreed consensus on the number of negative samples required or the time interval since last isolation of BCC for eradication to be deemed successful. Our objectives were to determine the duration after which it is likely that BCC has been eradicated or cleared, and where BCC was eradicated any significant differences in treatment duration or modality.

Methods All cases of new BCC isolation at a large adult CF centre were followed up between May 2002 and May 2022. The number of subsequent positive and negative sputum samples for BCC were recorded, as well as details of eradication treatment received. Cases of BCC isolation were deemed to have been successfully eradicated if there were ≥3 negative sputum samples and no further positive sputum samples for the same species and strain over ≥12 months until the end of follow-up.

Results Of 50 new BCC isolations, 28 were successfully eradicated and 22 resulted in chronic colonisation. 6 (18.2%) cases with exclusively negative sputum samples 6–12 months after initial isolation subsequently re-isolated BCC and 3 (10%) cases with exclusively negative sputum samples after 12–24 months re-isolated BCC. There were no significant differences in eradication treatment duration, number of antibiotics or administration route between cases of BCC which successfully eradicated versus those which resulted in colonisation.

Conclusions A cautious approach to segregation should be maintained after new isolation of BCC in CF, as some individuals with ≥3 negative sputum samples 12–24 months after initial isolation subsequently re-isolated BCC. Randomisation controlled trials are needed to guide treatment strategies for eradication.

P110 METFORMIN IN PATIENTS WITH CYSTIC FIBROSIS-RELATED DIABETES (CFRD): OUTCOMES FROM A SINGLE UK CENTRE

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10.1136/thorax-2023-BTSabstracts.262

Introduction CFRD is prevalent in 38% of patients with cystic fibrosis aged over 30 years in the UK.[1] A key defect among CFRD's multifactorial aetiology is insulin insufficiency, making insulin the first-line recommended treatment. However, pulmonary exacerbations and corticosteroid therapy are associated with insulin resistance. Moreover, implementing highly effective modulator therapy (HEMT) has been associated with increased body mass index (BMI), generating interest in using oral insulin-sensitizing agents like metformin in selected patients with CFRD.[2] Here, we present the clinical outcomes of 13 patients with CFRD treated with metformin at Royal Papworth Hospital, Cambridge.

Methods We collected retrospective data on insulin requirements, haemoglobin A1C (HbA1C), urine albumin to creatinine ratio (ACR), BMI, and pulmonary exacerbations before and within 1 year of starting metformin. Additionally, we collected information regarding adverse effects relating to metformin.

Abstract P110 Table 1 Parameters before and 1 year after initiating Metformin

	Before metformin (range)	1-year post-metformin (range)
Mean insulin requirement (units/day)	16 (0–150) Total 7 patients	9 (0–114) Total 6 patients
HbA1C (mmol/mol)	55.5 (36–101)	50.7 (33–90)
BMI (kg/m^2)	23.7 (18.9–27.4)	23 (19.5–26.7)
Urine ACR (mg/mmol)	4.8 (0–39)	1.8 (0–14)
Number of pulmonary exacerbations	1.2 (0–3)	0.3 (0–3)

Results 13 CFRD patients (8 female, 5 male) were treated with metformin, median age at starting metformin: 32 years (range: 18–60). 8 patients were homozygous for F508 mutation and 5 were heterozygous. Metformin dosage ranged from 0.5 to 2 grams/day (both Median and Mean 1 gram/day). 7 patients had an overlap period of one year or less between initiating metformin and starting HEMT. Table 1 shows the changes in measured parameters following metformin therapy. No side effects relating to metformin were reported, except for 1 patient whose gastrointestinal symptoms improved with a modified-release preparation.

Conclusion Metformin use in this CFRD cohort was safe without significant adverse effects. It was associated with reduced insulin requirement, HbA1C, and urine ACR. In addition, fewer pulmonary exacerbations were noted in patients when they started metformin therapy, however, this may have also been associated with the start of HEMT. Large randomized controlled trials are imperative.

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P111 DIPEPTIDYL PEPTIDASE-1 INHIBITION IN BRONCHIECTASIS WITH EOSINOPHILIC ENDOTYPE IN THE WILLOW TRIAL

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Background Neutrophilic inflammation and neutrophil serine proteases, e.g., neutrophil elastase (NE), play key roles in bronchiectasis (BE). Blood eosinophilia is present in ~20% of BE patients. The significance of eosinophilic inflammation in BE is unclear. Brensocatib, an investigational dipeptidyl peptidase-1 inhibitor, prolonged time to first exacerbation (Ex) and reduced sputum NE levels vs placebo in the phase 2 WILLOW study (NCT03218917).

Aim To assess baseline characteristics and treatment outcomes by eosinophilic endotype (eosinophil count [EOS] ≥300 cells/μl) among WILLOW patients.

Abstract P111 Table 1 Baseline characteristics and efficacy and safety outcomes in eosinophil subgroups of the WILLOW study population

	Eosinophils <300 cells/µl			Eosinophils ≥300 cells/µl		
	Placebo (n=64)	Brensocatib 10 mg (n=66)	Brensocatib 25 mg (n=76)	Placebo (n=22)	Brensocatib 10 mg (n=16)	Brensocatib 25 mg (n=11)
Baseline characteristics						
BSI score, n (%)						
≤4	15 (23.4)	16 (24.2)	17 (22.4)	2 (9.1)	2 (12.5)	1 (9.1)
5–8	25 (39.1)	22 (33.3)	22 (28.9)	10 (45.5)	5 (31.3)	4 (36.4)
≥9	24 (37.5)	28 (42.4)	37 (48.7)	10 (45.5)	9 (56.3)	6 (54.5)
Baseline NE in sputum						
Median, µg/ml	11.1	22.4	19.1	19.8	25.4	6.6
BLQ, n (%)	13 (20.3)	19 (28.8)	17 (22.4)	5 (22.7)	4 (25.0)	4 (36.4)
LLOQ to <20 µg/ml, n (%)	33 (51.6)	23 (34.8)	30 (39.5)	9 (40.9)	5 (31.3)	6 (54.5)
≥20 µg/ml, n (%)	16 (25.0)	24 (36.4)	28 (36.8)	8 (36.4)	7 (43.8)	1 (9.1)
Use of inhaled steroids, n (%)	36 (56.3)	31 (47.0)	42 (55.3)	15 (68.2)	12 (75.0)	7 (63.6)
Maintenance use of macrolides, n (%)	9 (14.1)	9 (13.6)	12 (15.8)	6 (27.3)	4 (25.0)	4 (36.4)
P. aeruginosa infection, n (%)	20 (31.3)	20 (30.3)	27 (35.5)	9 (40.9)	8 (50.0)	6 (54.5)
History of COPD, n (%)	11 (17.2)	11 (16.7)	10 (13.2)	6 (27.3)	1 (6.3)	3 (27.3)
History of asthma, n (%)	17 (26.6)	16 (24.2)	17 (22.4)	8 (36.4)	2 (12.5)	4 (36.4)
Efficacy and safety outcomes						
Ex during treatment, n (%)						
0	34 (53.1)	45 (68.2)	50 (65.8)	10 (45.5)	11 (68.8)	8 (72.7)
1	21 (32.8)	15 (22.7)	16 (21.1)	9 (40.9)	3 (18.8)	2 (18.2)
2 or 3	9 (14.1)	6 (9.1)	10 (13.1)	3 (13.6)	2 (12.5)	1 (9.1)
Time to first Ex,	–	0.64	0.68	–	0.53	0.42
HR (95% CI) vs placebo		(0.36–1.13)	(0.40–1.16)		(0.19–1.53)	(0.12–1.54)
Annualised Ex rate, estimate	1.49	0.97	1.21	1.26	0.54	0.64
Rate ratio (95% CI)	–	0.65	0.82	–	0.43	0.51
		(0.38–1.11)	(0.50–1.33)		(0.16–1.17)	(0.17–1.53)
Common TEAEs, n (%)						
Cough[a,b]	10 (15.9)	12 (18.5)	9 (11.5)	0 (0.0)	3 (18.8)	3 (27.3)
Headache[a]	3 (4.8)	7 (10.8)	11 (14.1)	0 (0.0)	1 (6.3)	1 (9.1)
Increased sputum[a,b]	5 (7.9)	8 (12.3)	7 (9.0)	1 (4.5)	1 (6.3)	2 (18.2)
Dry skin[b]	4 (6.3)	2 (3.1)	1 (1.3)	0 (0.0)	0 (0.0)	3 (27.3)
Seborrhoeic keratosis[b]	–	–	–	0 (0.0)	1 (6.3)	2 (18.2)
Sinusitis[b]	5 (7.9)	3 (4.6)	3 (3.8)	1 (4.5)	2 (12.5)	1 (9.1)

[a]TEAE with an incidence of ≥10% in the pooled brensocatib results for the EOS <300 cells/µl group; [b]TEAE with an incidence of ≥10% in the pooled brensocatib results for the EOS ≥300 cells/µl group

BE, bronchiectasis; BLQ, below limit of quantification; BSI, BE Severity Index; CI, confidence interval; COPD, chronic obstructive pulmonary disease; EOS, eosinophil count; Ex, exacerbation; HR, hazard ratio; LLOQ, lower limit of quantification; NE, neutrophil elastase; TEAE, treatment-emergent adverse event.

Methods Adults with BE treated with once-daily brensocatib (10 mg or 25 mg) or placebo were analyzed by baseline blood EOS (<300 cells/µl or ≥300 cells/µl). Endpoints were time to first Ex, annualised Ex rate, sputum NE level and treatment-emergent adverse events (TEAEs).

Results Participants with baseline blood EOS ≥300 cells/µl (49/255) had greater BE Severity Index scores and were more likely to receive inhaled steroids or maintenance macrolides or have *P. aeruginosa* in sputum. Brensocatib prolonged time to first Ex and reduced annualised Ex rates levels vs placebo in both subpopulations (table 1). Brensocatib was well tolerated.

Conclusion Brensocatib treatment in BE patients prolonged time to first Ex and reduced Ex rates vs placebo, regardless of eosinophilic subtype.

Please refer to page A290 for declarations of interest related to this abstract.

P112 EFFICACY AND SAFETY OF DIPEPTIDYL PEPTIDASE-1 (DPP-1) INHIBITION IN LONG-TERM MACROLIDE USERS WITH BRONCHIECTASIS: A POST-HOC ANALYSIS OF THE WILLOW TRIAL

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Background Neutrophil serine proteases, such as neutrophil elastase, are activated by DPP-1 in the bone marrow. Brensocatib, a reversible DPP-1 inhibitor, prolonged time to first exacerbation vs placebo in non-cystic fibrosis bronchiectasis (NCFBE) patients in the phase 2 WILLOW trial

(NCT03218917). Long-term macrolides are widely used and have been shown to reduce neutrophilic inflammation. The present post-hoc analysis compares patient characteristics and outcomes in WILLOW subgroups based on long-term macrolide use.

Methods Adult bronchiectasis patients received once-daily brensocatib (10 or 25 mg) or placebo. Patients on stable long-term macrolide therapy could be included in the trial. Endpoints included time to first exacerbation, annualised rate of pulmonary exacerbations, and treatment-emergent adverse events (TEAEs). Pooled results from brensocatib arms are presented.

Results Patients on long-term macrolide treatment (n=44) were more likely to have *P. aeruginosa* cultured from sputum, a higher background exacerbation rate, lower baseline FEV_1, higher baseline levels of sputum NE, higher Bronchiectasis Severity Index (BSI) scores, a medical history of asthma, and inhaled steroid use than patients without long-term macrolide treatment (n=212) (table 1). Brensocatib prolonged time to first exacerbation (hazard ratio 0.60 [95% CI: 0.25–1.45] in the macrolide subgroup; 0.60 [0.38–0.94] for the subgroup without macrolides) and reduced exacerbation rates in patients with and without long-term macrolide treatment (table 1). Similar TEAE rates were observed across all subgroups. The most common TEAEs across the pooled brensocatib arms were increased sputum, cough, and dyspnea.

Conclusions Consistent with overall WILLOW results, brensocatib prolonged time to first exacerbation and reduced exacerbation rates vs placebo regardless of long-term macrolide use, and was generally well tolerated with consistent safety signals. A confirmatory phase 3 trial (ASPEN; NCT04594369) is ongoing.

Abstract P112 Table 1 Baseline characteristics and outcomes in WILLOW patients with and without long-term macrolide use

	With long-term macrolide use		Without long-term macrolide use	
	Placebo (n=15)	Brensocatib 10/25 mg pooled (n=29)	Placebo (n=72)	Brensocatib 10/25 mg pooled (n=140)
Baseline characteristics				
BSI score categories, n (%)				
≤4	0	3 (10.3)	17 (23.6)	33 (23.6)
5–8	7 (46.7)	9 (31.0)	29 (40.3)	44 (31.4)
≥9	8 (53.3)	17 (58.6)	26 (36.1)	63 (45.0)
Sputum NE levels				
Median (µg/mL)	13.3	37.0	13.4	14.8
BLQ, n (%)	0	6 (20.7)	18 (25.0)	38 (27.1)
LLOQ to <20 µg/mL, n (%)	8 (53.3)	8 (27.6)	34 (47.2)	56 (40.0)
≥20 µg/mL, n (%)	6 (40.0)	15 (51.7)	18 (25.0)	45 (32.1)
FEV_1 (% predicted)				
Median	46.0	56.0	72.0	69.0
<50%, n (%)	9 (60.0)	11 (37.9)	15 (20.8)	30 (21.4)
Inhaled steroid use, n (%)	12 (80.0)	21 (72.4)	40 (55.6)	71 (50.7)
P. aeruginosa infection, n (%)	8 (53.3)	18 (62.1)	22 (30.6)	43 (30.7)
History of asthma, n (%)	5 (33.3)	10 (34.5)	20 (27.8)	29 (20.7)
Efficacy outcomes				
Ex during treatment, n (%)				
0	6 (40.0)	17 (58.6)	39 (54.2)	97 (69.3)
1	6 (40.0)	9 (31.0)	24 (33.3)	27 (19.3)
≥2	3 (20.0)	3 (10.3)	9 (12.5)	16 (11.4)
Time to first Ex, HR (95% CI)	–	0.60 (0.25–1.45)	–	0.60 (0.38–0.94)
Annualised Ex rate	1.76	1.17	1.25	0.91
Rate Ratio (95% CI)	–	0.67 (0.31–1.44)	–	0.72 (0.47–1.12)

BLQ, below limit of quantification; BSI, Bronchiectasis Severity Index; CI, confidence interval; Ex, exacerbation; FEV_1, forced expiratory volume in 1 second; HR, hazard ratio; LLOQ, lower limit of quantification.

Please refer to page A290 for declarations of interest related to this abstract.

P113 BRONCHIECTASIS SERVICE-WHAT DO PATIENTS REALLY THINK AND WANT?

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10.1136/thorax-2023-BTSabstracts.265

Introduction and Objectives Our dedicated bronchiectasis service consists of 0.5wte Specialist Nurse, 0.2wte Respiratory Physiotherapist, 0.4wte Secretary and 0.3wte Respiratory Consultant. It has rapidly expanded since set up in 2012 and now cares for 370 adults with bronchiectasis requiring multi-disciplinary care. We wanted patient feedback about the current service and improvements they would like to guide service development.

Methods We surveyed patients who attended bronchiectasis outpatient clinic over 6 weeks using an anonymous paper questionnaire.

Results 89/100 responded to the survey. Age range of patients in clinic 18–93, median age 63 years with 35% male to 65% female patient cohort.

54% of patients reported they would appreciate more contact time with physiotherapists, 52% more time in clinic with the specialist nurse. 19% of patients felt dietetic input would be useful, 12% would like support from psychologists and 17% felt social worker support would be useful.

When asked if patients would be interested in having some clinic appointments virtually using webcam only 36% were interested. When asked about telephone appointment rather than face to face appointments 54% were interested.

To improve support outside clinic appointments, 61% and 36% would like improved communication with specialist nurse and respiratory physiotherapist respectively. 49% report seeking bronchiectasis information with resources such as NHS website, on line forums and support groups and printed literature predominantly used. 78% reported feeling moderately/very confident in managing their bronchiectasis despite only 20% having a written self- management plan.

Conclusion Bronchiectasis is a challenging disease to manage and requires a well-resourced multidisciplinary team with our survey illustrating a need felt by patients for dietetic, psychology and social work support as well as improved outpatient access to specialist nursing and respiratory physiotherapist advice and support. Patient preference for face to face, virtual

or telephone clinic varies and there remains a need to improve patient education and self-management plans within our service.

Our service has expanded without an increase in staffing raising the question of whether a bronchiectasis service staffing tool akin to that of CF services could have an important role in driving up the quality of service we can provide.

P114 NEBULISED MEROPENEM FOR PREVENTION OF BRONCHIECTASIS EXACERBATION

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Introduction Intravenous meropenem is commonly used to treat Pseudomonas aeruginosa. To our knowledge, no study has looked at efficacy and tolerability of nebulised meropenem for prevention of exacerbations of bronchiectasis.

Aim To examine efficacy and tolerability of nebulised meropenem for prevention of bronchiectasis exacerbation.

Methods We retrospectively reviewed clinical data of bronchiectasis patients in our center who were commenced on meropenem nebulisers (Dose 250 mg x BD) between 2011 to 2021.

Data was collected on exacerbations, hospital admissions and sputum culture for the twelve months before and 12 months after starting meropenem nebulisers.

Results 95 patients were included in final analysis. The mean age of the patients was 59.88± 16.56.

Meropenem nebulisers were initiated due to multiple or frequent exacerbations, intolerance to other antibiotics, failure of alternative prophylaxis and/or persistent positive cultures for Pseudomonas aeruginosa

The mean number of total exacerbations per year was reduced by 3.4 ($p<0.001$), following the initiation of meropenem nebulisers. This translates to a reduction in the mean number of exacerbations requiring oral antibiotics, intravenous antibiotics, and hospital admission of 1.064, 1.516 and 0.859 respectively ($p<0.001$).

Furthermore, the odds of having negative microscopy for Pseudomonas aeruginosa was 5.146 times less after starting meropenem nebulisers as compared to before starting meropenem nebulisers.

73.7% of patients showed no side effects. 26.3% of patients showed minor side effects.

Conclusion Nebulised meropenem is a safe and effective treatment option for prevention of bronchiectasis exacerbation and should be tested as part of RCT.

P115 NEBULISED GENTAMICIN IN BRONCHIECTASIS; TREATMENT CONTINUATION IN A LARGE COHORT

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Background Nebulised gentamicin is an effective treatment to reduce exacerbation frequency in patients with bronchiectasis, but treatment cessation by patients is frequently observed. This study aimed to report continuation rates of nebulised gentamicin and describe patterns of cessation to identify factors associated with treatment failure.

Methods A retrospective, cohort study was performed looking at all patients with bronchiectasis started on nebulised gentamicin from April 2010 until February 2022 at a single UK centre. Baseline gender, age, FEV1 (absolute and percentage-predicted), Bronchiectasis Severity Index (BSI), long-acting beta-agonist (LABA) usage and *P.aeruginosa* colonisation were collected. Cessation of treatment at 1, 3 and 12 months was then established and statistical independence and risk ratios calculated at each time point for each characteristic.

Results 148 patients were included for analysis. At 1 month 105/148 (70.9%) tolerated treatment; FEV1 ≤50% was associated with an increased risk of treatment cessation (RR 1.77, 95%CI 1.06–2.96, p=0.028). At 3 months 93/148 (62.8%) tolerated treatment and compared to those who stopped treatment they had higher mean absolute FEV1 (1.57 vs 1.31, p=0.027), higher mean percentage-predicted FEV1 (62.8% vs 53.2%, p=0.016), and lower mean BSI (9.9 vs 11.8, p=0.006); FEV1 ≤50% had an increased risk of treatment cessation (RR 1.78, 95%CI 1.16–2.72, p=0.008). At 12 months 64/148 (43.2%) remained on treatment, and had lower mean age (58.8 vs 64.5, p=0.008), higher mean absolute FEV1 (1.62 vs 1.36, p=0.022) and lower mean BSI (9.5 vs 11.6, p=0.002) than those who stopped nebulised gentamicin; age ≥62 was associated with an increased risk of treatment cessation (RR 1.44, 95%CI 1.02–2.02, p=0.037).

Conclusion Less than half of patients remain on gentamicin at 12 months. Patients who stopped treatment had reduced lung function and more severe bronchiectasis. Awareness of the risk factors for treatment cessation may inform patient discussions about long-term nebulised gentamicin in bronchiectasis.

P116 BRONCHIECTASIS AND INFECTION CONTROL PRACTICES: A SURVEY OF PULMONARY REHABILITATION (PR) SERVICES IN LONDON

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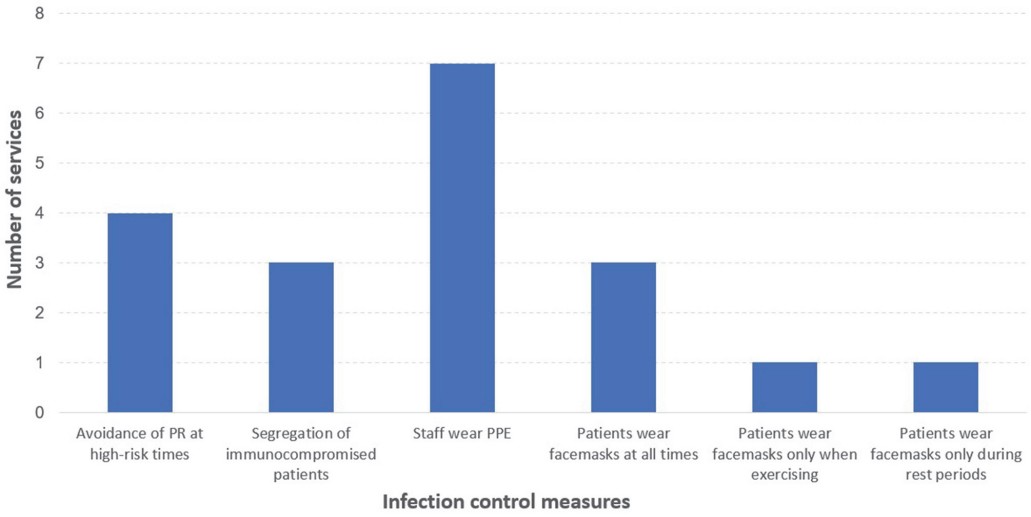
Introduction PR is an integral component of the management of bronchiectasis as it reduces symptoms and improves quality of life. Bronchiectasis is associated with recurrent infections and colonisation with multi-drug resistant (MDR) organisms and accordingly there is a risk of cross-infection during PR. However, there are no national guidelines on the prevention of cross-infection during PR and no data on what infection control measures are used during PR.

Aims 1) To investigate the infection control practices of London PR services regarding the prevention of cross-infection of MDR organisms from bronchiectasis patients and 2) to



Abbreviations: PPE = personal protective equipment; PR = pulmonary rehabilitation.

Abstract P116 Figure 1 Infection control measures used by London PR services who enrol bronchiectasis patients with multidrug-resistant organisms

explore differences in infection control practices pertaining to bronchiectasis between 'community' versus 'community and hospital' PR services, and PR services with and without a named infection control lead.

Methods Service-leads from the London PR Network were invited to complete a 21-item online questionnaire to understand the infection control measures used by their PR services with bronchiectasis patients. Baseline data were reported as number (percentage) and Chi-square tests analysed between-group differences.

Results Nine PR service-leads completed the questionnaire, of which eight (89%) enrol bronchiectasis patients colonised with MDR organisms, four (44%) have a named infection control lead and four (44%) screen referrals for evidence of MDR organisms. The infection control measures used by the eight services are depicted in figure 1. The most commonly used measures are: staff wearing personal protective equipment (number (percentage)) 7 (88%), patients not assessed at the same time as immunocompromised patients 4 (50%), patients not enrolled in classes with immunocompromised patients 3 (38%), patients wear a facemask at all times 3 (38%). There were no statistically significant differences in infection control practices between the sub-groups, however there was a trend for services with a named infection control lead to implement more infection control measures.

Conclusions The majority of PR services included in this study enrol patients with bronchiectasis colonised with MDR organisms but there is variation in infection control practices. This survey is limited by a small sample size and future research should corroborate these data.

P117 EVALUATING THE TREATMENT IMPACT A SPECIALIST INPATIENT CF PHYSIOTHERAPY SERVICE CAN PROVIDE TO A NON-CF BRONCHIECTASIS COHORT

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Introduction There has been a national reduction in CF hospital admissions following the rollout of triple combination CFTR modulator therapy. Our CF specialist ward now also cares for general respiratory patients and has seen an increase in non-CF bronchiectasis admissions, many of whom are already cared for by CF consultants under the specialist Bronchiectasis outpatient service.

With expertise knowledge in airway clearance techniques (ACT), exercise and inhaled therapies, the CF physiotherapy team are well placed to provide high quality care to patients with non-CF bronchiectasis who require hospitalisation for their condition.

Method Activity data was collected over 9-months to evaluate the provision a 7-day inpatient (IP) CF physiotherapy service can deliver to a non-CF bronchiectasis cohort.

Results In total, 66 admissions were recorded from 48 patients (female 43). Mean age 65 (18–85). Mean bronchiectasis severity scores 15.5 (7–23). Mean length of stay 15 days (1–80) Spirometry was completed in 33/66 at admission and discharge, 82% had a static or percentage increase in FEV1 (0–17%).

Physiotherapy provision involved new patient assessment completed by day 1 in 94% of patients and ACT review completed by day 2 in 84% of patients. Subsequent ACT sessions ranged from 1–20 treatment sessions, with an average of 6 per admission. On 27 occasions, ACT was escalated to optimise treatment. All patients had access to twice a day physiotherapy.

Exercise sessions were offered daily to patients, completing a total of 343 sessions (mean 5). Pulmonary rehabilitation was discussed with 27% with only 12% being referred at discharge.

Sputum was sent for microbiology testing in 89% of admissions. 3 patients cultured a new isolate of *pseudomonas aeruginosa* and were subsequently commenced on Colistin 2MU following a successful IP drug challenge. A further 11 drug challenges were completed for treatment escalation. Extended teaching on the medication delivery was required in 50% of those challenged.

Conclusion A specialist in-patient CF physiotherapy service is equipped to deliver high quality care to non-CF bronchiectasis patients in line with national guidelines. Further evaluation is required to review the impact this has on the physiotherapy outpatient bronchiectasis service.

P118 PAEDIATRIC SURVEILLANCE SELF-SAMPLING MODEL IN NCFB AND PCD – A YEAR ON: WHAT HAVE WE LEARNT

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Background International guidance recommends airway microbiology testing in paediatric outpatients with bronchiectasis (NCFB) every 6–12 months,[1] and every 3 months in Primary Ciliary Dyskinesia (PCD)[2] to identify new pathogens early, and guide antibiotic therapy. Previous audits of our caseload showed sporadic microbiology testing for these patient groups.

To enable guideline-driven care, a model for surveillance self-sampling (SS-Sa) was created to meet these targets without increasing appointment burden or health miles.

Objectives

- Evaluate participation by patients and their families/carers in SS-Sa
- Evaluate the impact of increased microbiology data on decision making

Methods Participation was offered to all children and young people (CYP) with NCFB and PCD <15 years old on the 2022 caseload. Sputum samples were preferred and throat swabs when unable to expectorate; an additional nasal swab or nasal rinse sample was collected in PCD. Samples were taken at surveillance timepoints, during clinic reviews if clinically indicated, and at home during an exacerbation through the acute service. If families could be independent, they were encouraged to self-sample using labelled posted-out kits.

Data on sample results, changes to clinical management, and patterns of collection were collected prospectively from March 2020.

Results 18/20 identified patients participated from March 2022-June 2023:

Total number of samples n=130. 15/130 were unsupervised SS-Sa from 11 CYP. 67/130 were positive cultures, and antibiotics were prescribed for 32/74. Those with PCD had a greater variety of pathogens identified, with two CYP isolating Pseudomonas Aeruginosa asymptomatically. Recurrent pathogens were identified through surveillance and guided antibiotic prophylaxis.

Conclusions

- Surveillance sampling identified PsA early and guided empirical and prophylactic prescribing.
- Pre-clinic sampling enabled more streamlined services and were considered advantageous by the families and Respiratory Team.
- Despite training, majority of samples were supervised or taken by a clinician due to delays, exacerbations, non-compliance and clinical needs. Low SS-Sa rates need further investigation to refine this surveillance model.

Abstract P118 Table 1

Participants	PCD n=7	NCFB n=11
Sum of samples	N=86	N=44
Number positive results	51/86 samples (59%)	16/44 samples (36%)
Treatment started as result	24/57(47%)	8/16 (50%)
Recurrent Staphylococcus aureus	3/7	4/11
Recurrent Haemophilus influenza	2/7	0
Patients with no bacterial isolates	0	2 (11%)

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'The way you make me feel' – Beyond the basics in asthma

P119 MORTALITY IN PATIENTS WITH SEVERE ASTHMA AND SEVERE UNCONTROLLED ASTHMA IN THE UK: A RETROSPECTIVE COHORT STUDY

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Introduction and Objectives In the UK, the latest data on mortality in patients with severe asthma was estimated in 2013 (14.8 deaths/1000 person-years). With an increasing trend in asthma-related deaths, a more recent estimate is warranted. In addition, the mortality rate in patients with severe uncontrolled asthma is yet to be explored. To address this, we assessed all-cause and asthma-related mortality rates in patients with severe asthma and severe uncontrolled asthma, and identified characteristics associated with all-cause mortality in severe asthma.

Methods Primary care records from UK's Clinical Practice Research Datalink (CPRD) dataset linked to Hospital Episode Statistics were used to identify patients with severe asthma aged ≥12 years between January 1, 2012 and December 31, 2017. Data on mortality was obtained from the Office for National Statistics linked to CPRD. Index date was the diagnosis of severe asthma (as per ERS/ATS criteria). Patients were followed up until March 29, 2021, death or transferred out. Within this cohort, patients were defined as severe uncontrolled asthma if they had 2 or more exacerbations. The primary outcome was all-cause and asthma-related mortality. Mortality rates were calculated by dividing the number of deaths by the respective number of person-years of follow-up. Patient characteristics associated with mortality were assessed by means of age- and sex-adjusted, as well as multivariable Cox regression analysis.

Results The cohort consisted of 34,301 severe asthma patients, of whom 1679 patients (4.9%) had severe uncontrolled asthma. Median follow-up was 5 years. All-cause mortality rate was 15.77 deaths/1000 person-years (PY) and 22.87/1000 PY in severe asthma and severe uncontrolled asthma, respectively (table 1). Asthma-related mortality rate was 2.01 deaths/1000 PY and 5.31/1000 PY in severe asthma and severe uncontrolled asthma, respectively. Increasing age, deprivation, comorbidity, smoking status, baseline exacerbations and maintenance oral corticosteroid (mOCS) were associated with increased risk of all-cause mortality in patients with severe asthma.

Abstract P119 Table 1 Number of persons, deaths, mortality rates (number of patients who died/1000 PY) and association with age- and sex-adjusted all-cause mortality by baseline characteristics

	Uncontrolled Severe asthma (N=1,679)		Severe Asthma (N=34,301)		
	Incidence Risk (n/N) (%)	Mortality Rate (/1000PY) (95% CI)	Incidence Risk (n/N) (%)	Mortality Rate (/1000PY) (95% CI)	HR (95% CI)
Overall	198/1679 (11.79%)	22.87 (19.90–26.29)	2962/34301 (8.64%)	15.77 (15.22–16.35)	
Age					P<0.001
<20	0/122 (0.00%)	0.00 (.-.)	6/1534 (0.39%)	0.67 (0.30–1.49)	1
20–30	0/164 (0.00%)	0.00 (.-.)	8/3293 (0.24%)	0.45 (0.23–0.91)	0.70 (0.24–2.01)
30–40	7/236 (2.97%)	5.86 (2.80–12.30)	63/4719 (1.34%)	2.44 (1.91–3.13)	3.75 (1.62–8.67)
40–50	12/335 (3.58%)	6.49 (3.69–11.43)	150/6621 (2.27%)	4.02 (3.42–4.71)	6.17 (2.72–13.95)
50–60	20/299 (6.69%)	12.57 (8.11–19.48)	260/6627 (3.92%)	7.06 (6.26–7.98)	11.07 (4.93–24.88)
60–70	39/248 (15.73%)	28.41 (20.75–38.88)	438/5557 (7.88%)	14.14 (12.88–15.53)	22.21 (9.92–49.70)
70–80	50/169 (29.59%)	60.24 (45.65–79.48)	807/3653 (22.09%)	40.78 (38.06–43.69)	65.46 (29.32–146.16)
80–90	55/90 (61.11%)	172.34 (132.32–224.47)	941/1937 (48.58%)	101.80 (95.50–108.52)	173.21 (77.60–386.61)
>90	15/16 (93.75%)	477.04 (287.59–791.29)	289/360 (80.28%)	238.24 (212.30–267.35)	462.77 (206.06–1039.29)
Sex					P<0.001
Male	59/454 (13.00%)	26.29 (20.37–33.93)	1092/13577 (8.04%)	14.61 (13.77–15.50)	1
Female	139/1225 (11.35%)	21.67 (18.35–25.59)	1870/20722 (9.02%)	16.54 (15.81–17.31)	0.78 (0.73–0.85)
Baseline Exacerbations					P<0.001
0	-	-	2500/29534 (8.46%)	15.31 (14.72–15.92)	1
1	-	-	264/3088 (8.55%)	16.70 (14.80–18.84)	1.30 (1.15–1.49)
2	110/900 (12.22%)	23.35 (19.37–28.15)	110/900 (12.22%)	23.35 (19.37–28.15)	1.92 (1.58–2.32)
3+	88/779 (11.30%)	22.30 (18.09–27.48)	88/779 (11.30%)	22.30 (18.09–27.48)	2.03 (1.64–2.52)
Baseline mOCS					P<0.001
No	144/1340 (10.75%)	20.66 (17.55–24.33)	2735/33160 (8.25%)	15.05 (14.49–15.62)	1
Yes	54/339 (15.93%)	32.00 (24.50–41.78)	227/1141 (19.89%)	37.74 (33.13–42.98)	2.00 (1.75–2.29)
Baseline mOCS or 3+ exacerbations					P<0.001
No	94/816 (11.52%)	21.87 (17.87–26.77)	2685/32636 (8.23%)	14.99 (14.44–15.57)	1
Yes	104/863 (12.05%)	23.86 (19.69–28.91)	277/1665 (16.64%)	31.89 (28.34–35.87)	2.00 (1.77–2.27)

Conclusion This study demonstrates substantial mortality in patients with severe asthma. Furthermore, in patients where the disease remains uncontrolled, a marked increase in mortality is observed. This highlights the need for more optimized management and routine monitoring of patients with severe asthma.

P120 PERFORMANCE OF THE NICE, GINA AND ERS ASTHMA DIAGNOSTIC GUIDELINES IN ADULTS

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Introduction The under- and over-diagnosis of asthma is widespread and may cause significant risks to patients. There is no single gold standard test to diagnose asthma, and hence there is considerable variability in national and international guidelines.

Aim Determine the performance characteristics of the National Institute for Health and Care Excellence (NICE), the Global Initiative for Asthma (GINA), and the European Respiratory Society (ERS) asthma diagnostic algorithms in adults with symptoms in keeping with asthma, but not on inhaled corticosteroids, within the Rapid Access Diagnostics in Asthma research clinic (RADicA).

Methods Asthma diagnosis (reference standard) was made by a panel of asthma specialists using clinical history, physical examination, spirometry, bronchodilator reversibility, FeNO, peak expiratory flow variability, bronchial challenge testing, allergy testing, blood eosinophils, and response to 8 wks inhaled corticosteroid treatment. The sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of the NICE, GINA and ERS diagnostic algorithms were calculated against the reference standard.

Results 118 adults [75 female, mean (SD) age 36 (12) yr], had a definitive diagnostic outcome from the asthma specialists: 70 (59%) had asthma. NICE and GINA guidelines provided perfect specificity (100%), but failed to diagnose asthma in 46 (39%) and 37 (31%) cases respectively, resulting in poor sensitivity (table 1). Whilst the ERS algorithm provides better sensitivity, the specificity was reduced (table 1), resulting

Abstract P120 Table 1 Sensitivity, Specificity, PPV and NPV of the NICE, GINA and ERS asthma diagnostic algorithms

	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
NICE	34	100	100	51
GINA	47	100	100	45
ERS	81	85	89	69

in the missed diagnosis of asthma in 13 (11%) cases and 7 (6%) cases being wrongly diagnosed with asthma.

Conclusion Current diagnostic algorithms for asthma either lack sensitivity (NICE and GINA), resulting in the under-diagnosis of asthma in around a third of cases, or provide reasonable sensitivity and specificity, but still result in misdiagnosis (either under- or over-diagnosis) in 1 in 6 people with suggestive symptoms. These data could be used to inform and test future asthma diagnostic algorithms.

P121 UPPER AND LOWER AIRWAY DYSFUNCTION IN ELITE ATHLETES

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Background Some elite athletes suffer significant loss of training and competition availability because of recurrent respiratory tract infection (RTi). Airflow limitation and upper upper airway dysfunction may be relevant in underlying a propensity to RTi. Bacterial microbial dysbiosis is a recognised accompaniment to airways disease, but its role in infection susceptibility, in this context, is not clear

Methods Athletes from the UK Sports Institute (UKSI) completed a systematic assessment of their respiratory health, including measurement of exhaled nitric oxide (FeNO) and spirometry (FEV1 and FVC) with indirect bronchoprovocation testing (eucapnic voluntary hyperpnoea (EVH)). The presence of laryngeal dysfunction was assessed by the Pittsburgh Vocal Score Dysfunction questionnaire (VCD). A positive diagnosis of asthma was defined via spirometry, FeNO and EVH. The number of respiratory infections in the last 18 months was recorded. Bacterial microbial communities from posterior oropharyngeal swabs were quantified by sequencing of the 16S_RNA gene.

Results We studied 127 athletes (47% female), training for international competitionin a wide range of sports. There were no differences in the frequency of symptoms between sports. A total VCD score was elevated (>=4) in 20 athletes (9.4%). Approximately one third (30.7%) of the cohort were diagnosed as asthmatic and 38% had more than 2 respiratory illnesses in the previous 18 months. Asthma and VCD positive groups were quite distinct; in a backwards stepwise multiple regression, asthma was associated with bacterial biomass (β =0.121, p=0.02) and *Haemophilus* spp. abundance (β=0.128, P=0.016). Conversely, frequency of respiratory infections in the last 18 months was positively predicted by the presence of VCD (β=-0.345, P=0.000), sinusitis (β=-0.219, P=0.014) and wheeze β=-0.182, P=0.04), without any clear association with bacterial microbiota.

Discussion Asthma symptoms are prevalent in elite athletes. Our findings indicate that focus on laryngeal dysfunction may be more relevant when considering strategies to reduce RTi in this cohort of individuals.

P122 SUSTAINED WEIGHT LOSS AND IMPROVED ASTHMA OUTCOMES AT ONE YEAR FROM A RANDOMISED CONTROLLED TRIAL OF A WEIGHT MANAGEMENT PROGRAMME FOR DIFFICULT-TO-TREAT ASTHMA AND OBESITY

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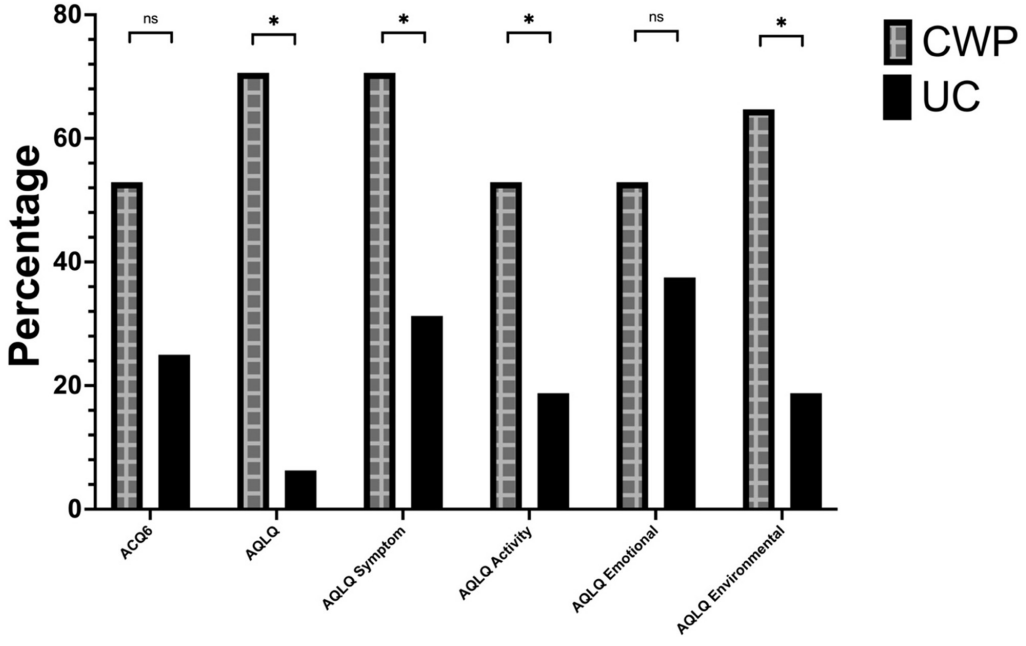
10.1136/thorax-2023-BTSabstracts.274



Abstract P122 Figure 1 Proportion of participants achieving minimal clinically important difference in Asthma Control Questionnaire (ACQ6) and Asthma Quality of Life Questionnaire(AQLQ) with Counterweight-Plus group (CWP) and usual care (UC) over 52 weeks. Compared using χ^2 or Fisher's exact. * denotes significant result; ns = not significant

Introduction We previously reported improved Asthma Control Questionnaire (ACQ6) and Asthma Quality of Life Questionnaire (AQLQ) scores with weight-loss after 16 weeks of the Counterweight-Plus weight management programme (CWP) compared to usual care (UC) in a single-centre, randomised, controlled trial in patients with difficult-to-treat asthma and obesity.[1] Here we report one-year asthma outcomes from this trial.

Methods We randomised (1:1 CWP:UC) adults with difficult-to-treat asthma and body mass index (BMI) $\geq$30 kg/m^2. CWP with dietitian support: 12-week total diet replacement phase (850kcal/day low-energy formula); stepwise food reintroduction and weight loss maintenance up to week 52. Study visits occurred at baseline, 16-weeks and 52-weeks. Outcomes measured include ACQ6, AQLQ and healthcare usage. Minimal clinically important difference (MCID) in ACQ6 is –0.5 and in AQLQ 0.5.

Results Of 36 recruited, 29 attended at 52-weeks for intention-to-treat analysis: 13 CWP, 16 UC. CWP resulted in greater weight change (median –14 kg [IQR –15, –9]) compared to UC (2 kg [-7, 8]; p=0.015) at 52-weeks. 53% in CWP achieved MCID in ACQ6 at 16-weeks (vs 19% UC [p=0.041]) and these 53% sustained improvement at 52-weeks (vs 25% UC [p=0.101]). Over 52-weeks a greater proportion of participants achieved MCID with CWP vs UC in AQLQ (71% vs 6% respectively; p<0.001), including AQLQ symptom domain (71% vs 31%; p=0.024), activity domain (53% vs 19%; p=0.041) and environmental domain (65% vs 19%; p=0.008), figure 1. Median annualised prednisolone courses reduced with CWP from 4 (IQR 2, 5) at baseline to 0 (0, 2) at 52-weeks ($\chi^2_{Friedman}[2]=14.8$, p<0.001, Kendall's W=0.44).

Conclusion Weight-loss, with a structured low-energy formula diet replacement programme, results in sustained weight-loss and improvements in asthma quality of life and frequency of exacerbations compared to usual care over one year. The Counterweight-Plus weight management programme is a non-pharmacological option for the challenging phenotype of difficult-to-treat asthma and obesity. Further study is needed to assess effects on spirometry and inflammation.

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Please refer to page A290 for declarations of interest related to this abstract.

P123 ASTHMA CONTROL IN SEVERE ASTHMA AND OCCUPATIONAL EXPOSURES TO INHALABLE ASTHMAGENS

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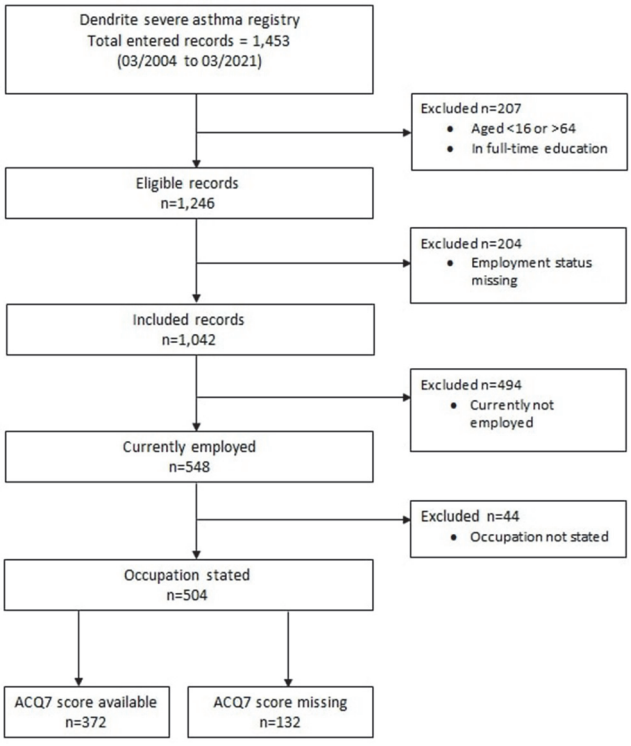
Introduction Work-related asthma accounts for at least 1 in 4 cases of asthma in working-age populations. Despite this the relationship between work exposures and asthma symptoms is frequently missed, leading to poor respiratory health and employment outcomes. We hypothesized that inhalable exposures at work maybe associated with poor asthma control in patients with severe asthma (SA).

Methods We searched the Birmingham Regional NHS Severe Asthma Service electronic clinical database (n=1453 records; 1/3/2004 to 1/3/2021) and undertook a cross-sectional study using baseline data collected at diagnosis. We included all employed patients aged 16–64 with available data on current occupation (n=504; figure 1), and collected socio-demographic data, general health data (atopy, major co-morbidities, BMI) and asthma-related factors (spirometry, asthma control questionnaire (ACQ7) score, asthma related quality of life (AQLQ) score, maintenance oral corticosteroids, peripheral eosinophil count, hospital admissions). The Occupational Asthma Specific Job-Exposure Matrix (OAsJEM) was employed to determine likelihood of exposure to respiratory sensitizers, irritants, cleaning agents and detergents; associations between workplace exposures and ACQ7 score were investigated using binary and multinomial regression analyses.

Results The most frequently reported occupations were care assistants (7%), nurses (6%), office workers (5%), and teachers (5%); 197/504 (39%) patients were likely exposed to any inhalable asthmagen, including 30% to respiratory sensitizers, 38% airway irritants and 29% to a low-molecular weight sensitizing- or irritant cleaning product or disinfectant. ACQ7 score was available for 372/504 (74%) patients, of whom 14% had adequate control (ACQ7 score=0–1.5). After adjustment for major confounders there were no significant associations between inhaled asthmagens and ACQ7 score (either as binary or multinomial outcomes).

Conclusion In a SA population, JEM-determined workplace exposures to inhaled asthmagens are not associated with asthma control; however 29–39% of patients may have current exposure to airborne sensitizers or irritants at work. Routine collection of individual lifetime occupational data including current job role and level of exposure, in the national asthma registry, would give further insights into this relationship.



Abstract P123 Figure 1

P124 STABILITY OF FRACTIONAL EXHALED NITRIC OXIDE LEVELS AS A BIOMARKER IN PATIENTS WITH UNCONTROLLED ASTHMA

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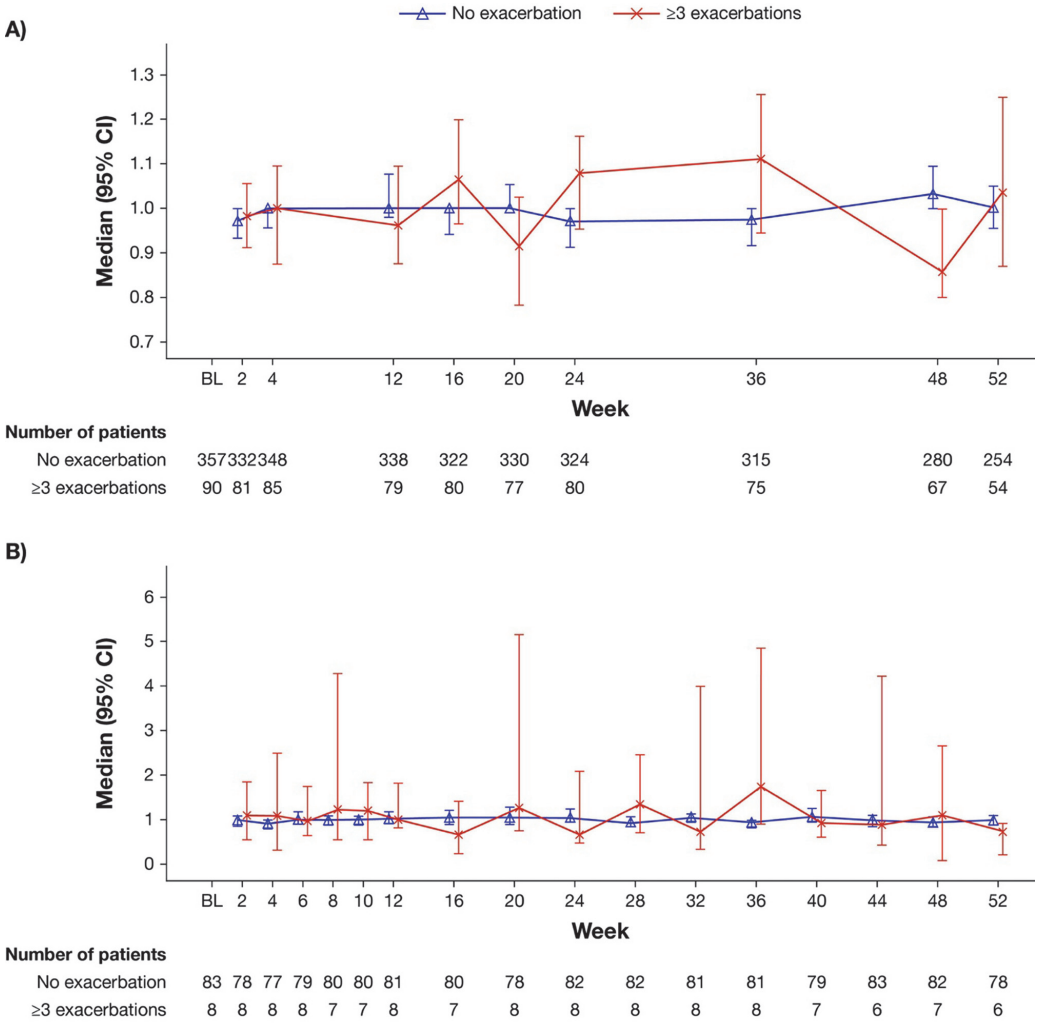
10.1136/thorax-2023-BTSabstracts.276

Introduction and Objectives Dupilumab reduces asthma exacerbation rates and improves lung function in children (VOYAGE, NCT02948959), adults and adolescents (QUEST, NCT02414854) with uncontrolled, moderate-to-severe asthma. Previous data have demonstrated that fractional exhaled nitric oxide (FeNO) is a valid prognostic biomarker, a predictor of response to dupilumab. The aim of this post hoc analysis was to evaluate the stability of FeNO over time in placebo patients from the QUEST and VOYAGE studies, following the standard American Thoracic Society (ATS) and European Respiratory Society (ERS) FeNO guidelines.

Methods FeNO levels were collected in placebo patients from QUEST (≥12 years) and VOYAGE (6–11 years), in non-exacerbating (0 exacerbations during the 52-week treatment period) and frequent exacerbator (≥3 exacerbations during the 52-week treatment period) subpopulations. Intraclass correlation coefficients (ICC) was used to assess repeatability.

Results For combined placebo patients, the median (95% CI) FeNO at baseline in non-exacerbators and frequent exacerbators was 25.0 ppb (22.0, 27.0) and 34.0 ppb (27.0, 40.0) in QUEST, and 18.0 ppb (14.0, 21.0) and 48.5 ppb (9.0, 100.0) in VOYAGE, respectively. At Week 12, fold change in FeNO from the previous visit (Week 4 in QUEST & Week 10 in VOYAGE) was 1.00 (0.98, 1.08) and 0.96 (0.88, 1.10) in non-exacerbators and frequent exacerbators in QUEST, and 1.04 (1.00, 1.20) and 1.02 (0.82, 1.83) in VOYAGE, respectively. At Week 52, fold change in FeNO from the



BL, baseline.
Asthma exacerbation was defined as a worsening of asthma that led to hospitalization, emergency medical care, or treatment with systemic corticosteroids.

Abstract P124 Figure 1 Relative fold change in FeNO (ppb) since the previous visit in patients with no exacerbation vs ≥3 exacerbations who received placebo in QUEST (A) and VOYAGE (B)

previous visit (Week 48 in both studies) was 1.00 (0.96, 1.05) and 1.03 (0.87, 1.25) in non-exacerbators and frequent exacerbators in QUEST, and 0.98 (0.89, 1.09) and 0.74 (0.22, 0.92) in VOYAGE, respectively (figure 1). The estimated ICC (95% CI) was 0.72 (0.69, 0.75) and 0.69 (0.62, 0.76) in non-exacerbators and frequent exacerbators in QUEST, and 0.70 (0.63, 0.77) and 0.39 (0.17, 0.66) in VOYAGE, respectively.

Conclusions FeNO measurements are stable and show reasonable repeatability among exacerbator and non-exacerbator patients from QUEST and VOYAGE on placebo.

Please refer to page A290 for declarations of interest related to this abstract.

P125 LONGITUDINAL STUDY OF THE PREVALENCE AND THE IMPACT OF OBESITY ON CLINICAL OUTCOMES IN PATIENTS REFERRED TO SEVERE ASTHMA CENTRE

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Background Obesity is a risk factor for the development of asthma and may contribute to its severity.

Aim To explore obesity prevalence patterns (defined by BMI) and its effect on clinical outcomes in patient referred to our severe asthma centre over the last 10 years.

Methods Data from the Birmingham Regional Severe Asthma Service (BRSAS) Registry were used to compare BMI kg/m^2 category distributions (<18.5, 18.5–24.99; 25–29.99; 30–34.9; 35–39.9; ≥40 for low; normal; overweight; obese; severely obese; morbidly obese respectively) for patients first presentation to our service in the time intervals (2010–2014, 2014–2018, 2018–2021, coded as periods 1,2,3). The impact of obesity on asthma clinical outcome was also explored.

Results The study cohort consisted of 1278 patients with difficult to treat asthma [400 (31.3%), 453 (35.4%), 425 (33.3%) seen in time intervals 1,2,3 respectively]; the cohort median BMI was 30.7 (IQR, 25.6–36.0). The distribution of BMI categories remained constant over the 3 time intervals with the obese group (BMI ≥30) comprised 52.6% of the total cohort (23.1% obese, 15.7% severely obese, 13.8% morbidly obese). Compared to the non-obese group, the obese group exhibited greater per annum median severe exacerbation frequency [6 (3,10) vs 4 (2,8), p=0.000038], were more likely to be on maintenance corticosteroid (40.5% vs 31.5%, p=0.001), had lower Euro-QoL health scale [50 (30,65) vs 60 (40,75), p<0.00001], lower FEV1 (1.98L (1.45,2.53) vs 2.15 (1.53,2.9), p=0.0004], lower blood eosinophils (0.25x10^9/L (0.11,0.46) vs 0.27 (0.12,0.55), p=0.06, lower FeNO [24ppb (13,50 vs 32ppb (14.3,66), p=0006], lower total serum IgE [111.5 (30,504) ng/L vs 182, p=0.004], with higher proportion of obese patients resided in the worst scale of multiple deprivation index than the non-obese patients (34.7% vs 23.5% (p=0.001)].

Conclusions The distribution of severe asthma patients with obesity remained high and consistent over a 10 years follow up period. Obese patients displayed worsened clinical outcomes and distinct clinical features prompting the need for the development of effective strategies to tackle obesity in severe asthma.

P126 A QUALITATIVE STUDY OF PERCEIVED WORK ABILITY IN SEVERE ASTHMA PATIENTS: DECISION MAKING ABOUT EMPLOYMENT

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Introduction Severe asthma describes asthma that is symptomatic despite adherence to high levels of treatment and control of other trigger factors (e.g., acid reflux, sleep apnoea). It is considered as a separate group to mild or moderate disease, since it has several distinct clinical phenotypes, and represents less than 5% of all asthma. Although about half of patients with severe asthma are employed,[1] poor asthma control may lead to periods of sick leave (absenteeism) or disability at work (presenteeism), more so than for mild/moderate asthma.[2] Poor physical health status and clinical depression have both been implicated as reasons for this, but the relationship has not been investigated in depth, and may only partly explain

Abstract P126 Table 1 Thematic analysis – results summary

Theme	Sub-theme explained
Impact of patients' asthma control on work	Symptoms (work struggles with poorly managed asthma and increased capacity with good asthma control) Triggers (environmental exposures, work stress, seasonal asthma worsening) Impact of treatment and its perceived effectiveness (biologic injections, other treatment, medication administration at work and side effects of medication)
Psychological impact of living with severe asthma on work	Trauma and anxiety (anticipation and experiencing asthma attacks at work – embarrassment, fear, panic, avoidance) Chronic illness burnout (tiredness and lack of motivation, frustration about asthma limitations and affected social roles, low self-worth, and self-doubt about ability to do the job)
Costs and benefits of being in employment	Performance (absenteeism and presenteeism – fear of job loss) Coping financially (reduced hours to cope with asthma, sick pay, benefits entitlement) Work relationships (colleagues understanding of severe asthma, managers awareness of impact on work, discrimination in the workplace and return to work – feeling threatened about job stability) Rely on support from family and friends to continue working (financial, practical, emotional)
Adaptations for remaining in employment	Managing work expectations – patient initiated adaptations (recognising and accepting asthma limitations, confidence building, health comes first vs carrying on as normal – shame, guilt and anger) Structural changes – employer-initiated adjustments (reasonable adjustments under the equality act, changing hours, routine, role or relocation, flexible working)
Perceived importance of work identity	Job satisfaction (feeling valued, meaning and purpose in life, gear of identity loss) Commitment to work (work ethics, pressure to pay the bills, societal pressure to work)

the excess of absenteeism and work disability. We have hypothesised that there may be a variety of other bio-psycho-social and cultural factors that impact on ability to work in severe asthma.

Methods Patients with severe asthma were recruited from the Birmingham Regional NHS Severe Asthma Service for qualitative, semi-structured interviews conducted by an independent student researcher. We included patients from different socio-demographic backgrounds but excluded those who had never been employed. Interviews were performed either face-to-face, online or via telephone, transcribed using software and edited by hand. Thematic analysis was performed to identify patterns of meaning within the data.

Results 12 patients participated in the study (9 females and 3 males). Analysis resulted in 5 major themes describing the experience of working with severe asthma: impact of patients' asthma control on work, psychological impact of living with severe asthma, costs and benefits of working, adaptations to remain in employment and perceived importance of work identity (see table 1).

Conclusions Our data highlights the potential for physical, occupational, psychological, and social support to enhance work ability for the wide-ranging work challenges patients face. There is also a need for greater public awareness and education about severe asthma to minimize patient distress in the work environment.

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P127 INITIAL RESPONSES TO TEZEPELUMAB IN A COMPLEX SEVERE ASTHMA POPULATION

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Introduction Biologic therapies have revolutionised the management of severe type 2 high (T2H) asthma and the armamentarium of injectable asthma therapies continues to grow with the recent NICE approval of a sixth monoclonal biologic, Tezepelumab. Tezepelumab binds to an airway epithelial-cell-derived cytokine, thymic stromal lymphopoietin (TSLP). TSLP is released in response to airway epithelium insult and leads to activation of downstream airways' inflammation pathways. Large international RCTs have demonstrated a significant reduction in asthma exacerbations and an improvement in asthma control in the recruited population,[1] however, the efficacy of Tezepelumab in an unselected severe asthma population remains to be defined. We aim to elucidate initial clinical and serologic responses to Tezepelumab in a complex severe asthma population.

Methods We retrospectively reviewed records of all adult severe asthma patients 8 weeks after initiation of Tezepelumab 210 mg s/c every 4 weeks. All patients were approved to commence Tezepelumab following multidisciplinary team (MDT) approval. These patients were either ineligible for any other NICE approved biologic therapies at that time or had failed to gain oral corticosteroid (OCS) independence whilst on other NICE approved biologic therapies.

Results A total of 46 patients received 2 doses of Tezepelumab with baseline demographics in table 1. The majority of patients were on OCS (91%) and therefore baseline T2H biomarkers were suppressed. 27 (59%) were obese with a BMI $\geq$ 30 kg/m^2 and the mean baseline ACQ-6 score was high 3.3. 35 (76%) patients had previously been on at least 1 asthma biologic. 22 (48%) patients were able to start weaning OCS and there was an overall trend suggestive of improved asthma control (table 1).

Abstract P127 Table 1 Baseline Demographics, Co-morbidities and Responses to Tezepelumab

Age (years)	50.9 (±12.5)	
BMI (kg/m^2)	31.6 (±8.5)	
Female sex – no. (%)	29 (63%)	
Smoking status	*Never smoker*	23 (57%)
	Ex-smoker	19 (41%)
	Current smoker	1 (2%)
Onset of Asthma	*Early (< 18yo)*	30 (65%)
	Adult	12 (26%)
	Late (> 40 yo)	4 (9%)
Nasal Polyposis – no. (%)	13 (28%)	
	Baseline (Week 0)	**After 2 doses (Week 8)**
FEV$_1$ (L)	2.00 (±0.62)	2.15 (±0.63)
FEV$_1$ (% predicted)	66.9 (±20.3)	74.0 (±19.9)
FeNO (ppb) *	21 (14 – 44)	15.5 (10.5 – 25.5)
Blood eosinophil count (x10^9) *	0.1 (0.0 – 0.2)	0.08 (0.0 – 0.2)
Total IgE (kU/L) *	44 (30.5 – 225.5)	40 (24 – 149)
Maintenance Prednisolone dose (mg) *	10 (10 – 20)	10 (5 – 15)
Asthma Control Questionnaire-6 (ACQ-6) score	3.2 (±1.2)	2.4 (±1.2)

Conclusions In a complex, real world, severe asthma population, 8 weeks of Tezepelumab affords patients clinically significant improvements in ACQ-6 scores, a mean FEV$_1$ improvement of 150 ml and, continued suppression of type 2 inflammation biomarkers. Whether this impact is sustained and leads to a reduction in OCS and annualised rate of asthma exacerbations requires further longitudinal studies.

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P128 HEALTHCARE PROFESSIONAL-LED DE-ESCALATION OF BACKGROUND THERAPIES FOR SEVERE ASTHMA AMONG MONOCLONAL SUPER-RESPONDERS

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Introduction There is evidence to support healthcare professional (HCP) led de-escalation of background therapies without loss of asthma control in severe asthma (SA) patients with 'Super-Response' (SR) – cessation of maintenance oral corticosteroids (OCS) and an annualised exacerbation rate (AER) of 0 – to monoclonal antibody (mAb) therapy (R Louis et al.

Severe Asthma Standard-of-Care Background Medication Reduction With Benralizumab: ANDHI in Practice Substudy. *JACI In Practice*. 11(6);1759–1770.). However no deprescribing guidelines currently exist. We assessed deprescribing practices and outcomes at our severe asthma centre.

Methods Retrospective review of SA patients from January 2019 – May 2021 who achieved SR during their first 24 months of mAb therapy. We assessed HCP-led background therapy de-escalation choices, medication adherence, and clinical outcomes at baseline, 12, and 24 months.

Results 70 patients (mean age 53.7±15.3, M/F: 33/37) on mAb therapy demonstrated SR within the first 24 months (Omalizumab n=8, Mepolizumab n=14, Benralizumab n=48).

At 12 months, 21 (30%) discussed de-escalation with a HCP, and 6 had background medications stopped (long-acting muscarinic agonist [LAMA] n=3, leukotriene receptor antagonist [LTRA] n=2, macrolide antibiotics n=1); at 24 month review, 8 (11%) discussed de-escalation with a HCP, and 7 had background medication stopped (LAMA n=2, LTRA n=4, Theophylline n=1).

Patients whose medications were stopped by HCPs had a significantly better Asthma Control Questionnaire (ACQ-6) scores compared to those who did not; other parameters were not statistically significant – table 1.

17 patients (24%) at 12 months and 20 (29%) at 24 months demonstrated poor adherence to their inhaled corticosteroid (ICS), indicated by medicines possession ratio <80%. There was no statistically significant difference in clinical outcomes at 12 and 24 months between patients with and without poor ICS adherence.

Abstract P128 Table 1

	12 Months			24 Months		
	De-Escalation		p-value	De-Escalation		p-Value
	Yes	No		Yes	No	
AER (μ±SD)	0.25 ±0.56	0.60 ±0.56	0.126	0.44 ±1.22	0.69 ±1.22	0.507
ACQ-6 (μ±SD)	1.0 ±1.2	2.3 ±1.2	0.007	1.28 ±1.28	2.45 ±1.28	0.024
Mini Asthma Quality of Life Questionnaire (μ±SD)	4.9 ±1.8	4.2 ±1.8	0.374	4.3 ±2.1	3.7 ±2.1	0.446

Conclusion Among patients with SR, few had background treatment de-escalated, and there were high rates of poor adherence, suggesting these patients may feel their asthma is well-controlled enough to stop medications. Neither de-escalation nor poor adherence were associated with significant degradation of asthma control, but HCP-guided de-escalation is safer and preferable. Further research is needed to develop de-escalation guidelines for patients on mAb therapy.

P129 UK SEVERE ASTHMA PATIENT OUTCOMES IN THE REAL-WORLD VERSUS ITALY AND THE USA: REALITI-A AT 2 YEARS

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Introduction REALITI-A was a 2 year global, prospective observational study in severe asthma patients newly prescribed mepolizumab 100 mg subcutaneously. By-country analysis describes outcomes in the UK (n=200), Italy (n=244) and USA (n=100), the 3 largest cohorts with differing eligibility criteria.

Methods Outcomes included the rate of clinically significant exacerbations (CSEs), magnitude of exacerbation rate change and proportion of patients experiencing zero exacerbations post-mepolizumab initiation versus pre-treatment. Additional outcomes assessed changes in maintenance oral corticosteroid (mOCS) dose and asthma control (ACQ-5) at weeks 101–104 post-initiation.

Results 24 months post-initiation, CSEs were reduced 64% in the UK (CSE rate 6.55 pre-treatment versus 2.34); 85% in Italy (3.79 pre-treatment versus 0.58) and 68% in USA (2.40 pre-treatment versus 0.78). 61% (122/199), 81% (197/243) and 64% (64/100) of patients in the UK, Italy and USA experienced a 50–100% reduction in CSEs. 15% (30/200), 56% (137/243) and 50% (50/100) of patients from the UK, Italy and USA experienced no exacerbations at 24 months.

At weeks 101–104, median daily mOCS dose was reduced 78% from baseline (10.0 mg to 2.25 mg) in the UK; by 100% from baseline (7.32 mg to 0 mg) in Italy and by 100% from baseline (10.0 mg to 0 mg) in the USA.

Mean ACQ-5 scores reduced from 3.30 to 1.78 in the UK; from 2.80 to 0.84 in Italy and from 2.51 to 0.80 in the USA. At 2 years, blood eosinophil levels were reduced 82% from 212 cells/μL at baseline to 38 cells/μL in the UK; 83% from 484 cells/μL at baseline to 82 cells/μL in Italy and 66% from 299 cells/μL at baseline to 101 cells/μL in the USA.

Across the global study cohort, treatment-related adverse events were observed in 90 (11%) patients; 7 (<1%) of which were serious and 1 fatal (hepatic cancer).

Conclusion REALITI-A data demonstrate effectiveness of mepolizumab in the real world in severe asthma patients in the UK, Italy and the USA. Eligibility criteria and baseline demographics may contribute to differing patient outcomes. From a UK perspective, this analysis highlights potential areas for changes to management of severe asthma patients including earlier intervention and appropriate OCS stewardship.

Please refer to page A290 for declarations of interest related to this abstract.

P130 CLINICAL EFFECTIVENESS OVER 2 YEARS OF BENRALIZUMAB TREATMENT IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA AND CONCOMITANT NASAL POLYPOSIS; ANALYSIS FROM THE BPAP STUDY

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Introduction and Objectives Benralizumab is an anti-interleukin-5 receptor α monoclonal antibody indicated as an add-on maintenance treatment in adult patients with severe eosinophilic asthma (SEA). Herein we present real-world data from the Benralizumab Patient Access Programme (BPAP) for a subgroup of patients with SEA and concomitant nasal polyposis (SEAwNP) after 2 years of treatment with benralizumab for SEA.

Methods The BPAP study is a multi-centre, retrospective, observational study of patients with SEA from eight UK centres. Data were collected from the medical records of patients receiving their first benralizumab dose between April 2018 and November 2019. Outcomes were assessed using descriptive statistics, with patients censored when treatment was discontinued.

Results Within the BPAP cohort of 276 patients, 57 (21%) patients had SEAwNP and were included in this subgroup analysis. The mean age was 50.9 (standard deviation [SD] 13.5); 46% (26/57) were female; mean BMI was 30.2 (SD 5.7); 61% (35/57) of patients were receiving maintenance oral corticosteroids (mOCS) at baseline. Clinical outcomes for the overall BPAP cohort and SEAwNP subgroup are shown in the table 1. Patients with SEAwNP had a mean annualised exacerbation rate (AER) of 3.8 (95% confidence interval [CI] 3.1–4.5) at baseline (n=56), decreasing to 0.8 (95% CI 0.5–1.1) at Year 2 (n=48); a relative reduction of 79%, with 44% of patients being exacerbation free over 2 years. For patients with SEAwNP on mOCS at baseline, 57% were off mOCS for asthma after 2 years, with 77% achieving a dose reduction of ≥50%. At baseline, mean asthma control questionnaire (ACQ-6) score was 2.9 (SD 1.5, n=55); this reduced to 1.3 (SD 1.5. n=30) at 2 years. The proportion of patients with SEAwNP achieving an improvement of ≥0.5 was 71% (20/28); 63% (19/30) had an ACQ-6 score of <1.5. Clinical outcomes in the overall BPAP cohort and SEAwNP subgroup were comparable (table 1).

Conclusions This analysis in a subgroup of patients with SEAwNP shows that patients who were treated with benralizumab had clinically relevant and sustained improvements in clinical outcomes comparable to the overall cohort, including improved exacerbation rates, mOCS use and asthma symptom control.

Please refer to page A291 for declarations of interest related to this abstract.

P131 PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA ACHIEVED REMISSION OVER 2 YEARS WITH BENRALIZUMAB: INTEGRATED ANALYSIS OF THE >1000-PATIENT, MULTINATIONAL, REAL-WORLD XALOC-1 STUDY

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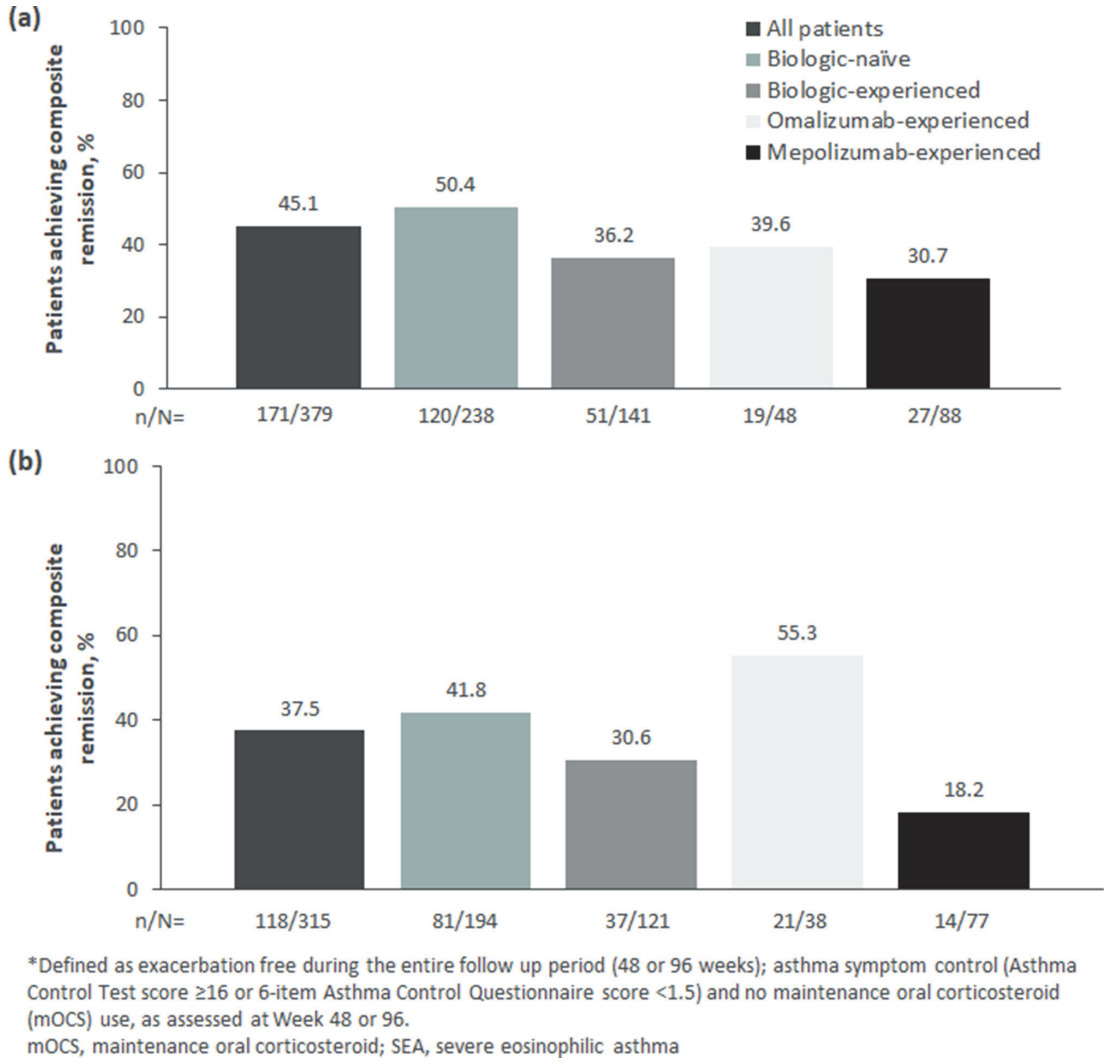
Background Biologic therapies have made clinical remission a viable goal in patients with severe eosinophilic asthma (SEA).

Aim We describe clinical remission in patients with SEA, with/without prior biologic experience, over 2 years of

Abstract P130 Table 1 Annualised exacerbation rate (AER), maintenance oral corticosteroid (mOCS) use and patient-reported outcome data (asthma control [ACQ-6]) in the BPAP sample, and in the subgroup of patients with SEA and concomitant NP

	Overall BPAP cohort		*Subgroup of patients with SEA and concomitant NP*	
AER	***Baseline***	***2 years***	***Baseline***	***2 years***
Mean (95%CI) AER [a]	5.3 (4.8–5.7)	1.1 (0.9–1.2)	3.8 (3.1– 4.5)	0.8 (0.5–1.1)
Relative change in mean from baseline (%)	-	-79%	-	-79%
Proportion exacerbation free (%)	27/273 (10%)	72/209 (34%)	8/56 (14%)	21/48 (44%)
mOCS use	***Baseline***	***2 years***	***Baseline***	***2 years***
Proportion on mOCS in overall cohort, n (%) [a,b]	174/276 (63%)	63/208 (30%)	35/57 (61%)	13/48 (27%)
Proportion on mOCS in patients on mOCS at baseline, n (%) [b]	-	57/127 (45%)	-	13/30 (43%)
mOCS dose (mg/day) in patients on mOCS at baseline, median (IQR) [b]	10.0 (5.0–20.0)	0.0 (0.0–5.0)	10.0 (5.0–15.0)	0.0 (0.0–5.0)
Proportion of patients with ≥50% reduction in mOCS dose; n (%) [95% CI]	-	93/127 (73%) [65%–81%]		23/30 (77%) [58%–90%]
ACQ-6	***Baseline***	***2 years***	***Baseline***	***2 years***
Mean (SD) ACQ-6 score [a]	3.0 (1.5)	1.6 (1.5)	2.9 (1.5)	1.3 (1.5)
Proportion of patients with improvement of ≥0.5 units for AQC-6 from baseline, n (%) [a]	-	89/128 (70%)	-	20/28 (71%)
Proportion of patients ACQ-6 score of <1.5	44/257 (17%)	72/134 (54%)	12/55 (22%)	19/30 (63%)

[a]Calculated for overall cohort (all patients with available data at that time point who remained on treatment)
[b]Calculated for patients on mOCS (≥5 mg) at baseline only



Abstract P131 Figure 1 Percentage of patients with SEA meeting criteria for three-component (no exacerbation, no mOCS use and symptom control*) clinical remission after (a) 48 and (b) 96 weeks of benralizumab treatment, overall and by biologic-experience status

benralizumab therapy in the large-scale, real-world, XALOC-1 study programme.

Methods This analysis of retrospective, multi-national data assessed clinical remission rates over 2 years. Remission was defined as: exacerbation free during the entire follow-up period (48 or 96 weeks); asthma symptom control (Asthma Control Test score ≥16 or 6-item Asthma Control Questionnaire score <1.5) and no maintenance oral corticosteroid use, assessed at Week 48 or 96.

Results Patients (n=1070) had a mean (SD) age of 55.2 (13.7) years; 58.7% were female; 61.9% were biologic-naïve and 37.8% -experienced (omalizumab 43.6%, mepolizumab, 62.6%, reslizumab, 8.2%). 45.1% of patients achieved remission by Week 48, 37.5% by Week 96 (figure 1). Of patients who met remission criteria at Week 96, 59.3% had sustained remission from Week 48. Remission rates were higher in biologic-naïve vs -experienced patients, and in omalizumab- vs mepolizumab-experienced patients, across all timepoints (figure 1).

Conclusions Clinical remission is a realistic, sustainable goal up to 2 years for patients with SEA receiving benralizumab, regardless of prior biologic experience.

Please refer to page A291 for declarations of interest related to this abstract.

'Just like a pill' – TB treatment challenges and outcomes

P132 **ABSTRACT WITHDRAWN**

P133 **IMPACT OF THE COVID-19 PANDEMIC ON TUBERCULOSIS RAPID ACCESS SERVICE PROVISION, DIAGNOSIS AND TREATMENT OUTCOMES**

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Introduction Disruption to tuberculosis (TB)-control programmes caused by restricted and virtual access to healthcare during the COVID-19 pandemic remains to be fully characterised.

Objectives To evaluate performance and patient outcomes of the reconfigured virtual rapid access TB (RATB) service at Leicester (UK), comparing periods before, during and after the pandemic.

Methods Retrospective analysis of patient referrals to Leicester RATB services and outcomes between 1st April and 31stMarch, in 2019/2020 (pre-pandemic); 2020/2021 (lockdown period); and 2021/22 (post-lockdown).

Abstract P133 Table 1 Characteristics of RATB referrals per time period

For TB+ve cases:	1 April 2019 – 31 March 2020 (95)	1 April 2020 – 31 March 2021 (87)	1 April 2021 – 31 March 2022 (88)	p-value*
RATB Service				
Median (IQR) number in-person RATB appointments	6 (4–8)	**1 (1–3)**	2 (1–3)	<0.001*
Median (IQR) number virtual RATB appointments	1 (1–2)	**6 (3–8)**	5 (3–7)	<0.001*
PATIENT CHARACTERISTICS				
Median Age/years (IQR)	39 (29–48)	38 (27–50)	37.5 (27–50.5)	0.50*
Female/N (%)	51 (53.6%)	39 (44.8%)	32 (36.4%)	0.06+
WHO Origin/N (%)				
-Africa	8 (8.4%)	10 (11.5%)	6 (6.8%)	
-Americas	1 (1.1%)	1 (1.2%)	0	
-Eastern/Mediterranean	3 (3.2%)	0	3 (3.4%)	
-Europe (non-UK)	7 (7.4%)	3 (3.5%)	3 (3.4%)	
-South Asia	53 (55.8%)	**55 (63.2%)**	57 (64.8%)	
-UK	15 (15.8%)	10 (11.5%)	9 (10.2%)	
-Unknown	7 (7.4%)	7 (8.1%)	8 (9.1%)	
-Western/Pacific	1 (1.1%)	1 (1.2%)	2 (2.3%)	
Referral Source/N (%)				
-GP	7 (7.4%)	7 (8.1%)	5 (5.7%)	
-Histology	4 (4.2%)	1 (1.2%)	4 (4.6%)	
-Inpatient	21 (22.1%)	12 (13.8%)	14 (15.9%)	
-Microbiology	3 (3.2%)	3 (3.5%)	8 (9.1%)	
-Other	4 (4.2%)	0	2 (2.3%)	
-Outpatient	27 (28.4%)	24 (27.6%)	29 (33.0%)	
-Public Health	2 (2.1%)	0	0	
-Radiology	24 (25.3%)	**30 (34.5%)**	21 (23.9%)	
-TB contact tracing	3 (3.2%)	**10 (11.5%)**	5 (5.7%)	
Symptomatic patients/N (%)	81 (85.3%)	76 (87.4%)	74 (84.1%)	0.81+
DIAGNOSIS (Combined all cases)				
Median symptom duration prior to first healthcare contact/Weeks (IQR)	8 (4–13.5)	8 (4–20)	**11 (4–22)**	0.21*
Median time after referral to first review with RATB/Days (IQR)	10 (5–26)	8 (5–19)	6.5 (2–17.5)	0.06*
Median time to treatment initiation after RATB review/Days (IQR)	3 (0–24)	9 (1–21)	9 (1–37)	0.26*
Median time from symptom onset to treatment initiation/ Weeks (IQR)	11.3 (5.6 – 22.0)	11.5 (6.1 – 24.1)	**16.5 (9.5 – 28.1)**	0.02*
TREATMENT (Combined all cases)				
Median total length of ATT/ Weeks (IQR)	29.5 (24–46)	24 (24–36)	24 (24–38)	0.05*
Successfully completed ATT/N (%)	90 (94.8%)	**85 (97.7%)**	76 (86.3%)	0.03+
Loss to follow up/N (%)	3 (3.2%)	2 (2.3%)	8 (9.1%)	0.07+
Died (of any cause)/N (%)	7 (7.4%)	2 (2.3%)	2 (2.3%)	0.13+
Required enhanced TB care/N (%)	28 (29.5%)	16 (18.4%)	19 (21.6%)	0.25+
Required breaks in ATT/N (%)	25 (26.3%)	9 (10.4%)	17 (19.3%)	0.05+
PTB only				
Number of cases (% of all TB)	54 (56.8%)	48 (55.2%)	41 (46.5%)	0.34+
Symptomatic patients/N (%)	44 (81.5%)	45 (93.8%)	38 (92.7%)	0.22+
Median symptom duration prior to first healthcare contact/Weeks (IQR)	6 (4–12)	**9 (4–20)**	**8 (4–13)**	0.07*
Median time from symptom onset to treatment initiation/ Weeks (IQR)	8.4 (4.3–16.3)	13.9 (6.1–24.1)	14 (8.1–26)	0.04*
Median total length of ATT/ Weeks (IQR)	35 (24–52)	29 (24–36)	32 (24–51)	0.17*
EPTB only				
Number of cases (% of all TB)	41 (43.2%)	39 (44.9%)	47 (53.4%)	0.34+
Symptomatic patients/N (%)	37 (90.2%)	31 (79.5%)	36 (76.6%)	0.21+
Median symptom duration prior to first healthcare contact/Weeks (IQR)	12 (5–20)	**5.5 (3–20)**	12 (5–22)	0.16*
Median time from symptom onset to treatment initiation/ Weeks (IQR)	17 (10–38.6)	**8.7 (6–24)**	16.7 (12–32)	0.02*
Median total length of ATT/ Weeks (IQR)	25 (24–36)	24 (24–36)	24 (24–32)	0.08*

*Kruskal-Wallis test used
+χ^2 test used

Results Overall, TB was diagnosed in 270/772 patients. In the lockdown period, the median number of in-person clinic appointments fell, with a corresponding rise in virtual reviews that persisted post-lockdown. There was a decrease in the proportion of UK-origin patients diagnosed and increase in South-Asian patients. There was also a change in the source of referral, with an increased contribution from contact tracing, radiology and in-patients during the lockdown period, likely reflecting limited access to healthcare services and a higher rate of significant household exposure. Although overall interval from symptom onset to starting antituberculous therapy (ATT) was unchanged in the lockdown period, time to starting treatment increased for pulmonary TB (PTB) and fell for extrapulmonary TB (EPTB), likely reflecting attribution of symptoms to COVID-19 for PTB and possible cancer for EPTB in virtually assessed patients. Importantly, interval to starting ATT after symptom onset increased in the post lockdown period that is partially explained by delayed patient presentation, likely reflecting incomplete recovery of primary healthcare services.

ATT completion rates were highest (97.7%) during the lockdown period, when case-manager support was facilitated by restricted patient mobility, but dropped post-lockdown (86.3%) with more patients lost to follow-up.

Conclusions Our data provides evidence for changes to TB presentation during the pandemic. Expected delays in PTB diagnosis and treatment were observed during lockdown, however these were attributable to delayed presentation to

services. A virtual RATB model, with intensive case-manager support provided effective care. Delayed diagnosis and falling treatment completion rates are observed post-lockdown, supporting prioritisation of recovery from COVID-19 in the TB action plan (2021–26).[1]

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P134 OCULAR TUBERCULOSIS IN THE UK SINCE INTRODUCTION OF THE BRITISH THORACIC SOCIETY CLINICAL STATEMENT

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Introduction The BTS Clinical Statement (CS) on Ocular Tuberculosis (OTB) was published in 2022. It standardised the approach to investigation for OTB and groups patients into diagnostic categories based on the ocular phenotype:

1. Category 1 = 'highly suggestive' of OTB
2. Category 2 = 'consistent with OTB'
3. Category 3 = 'poorly responsive to treatment'

Methods Retrospective analysis from databases and electronic record, including patients started on OTB treatment 1/1/2022–30/6/2023.

Results 46 patients were referred with presumed OTB. 11 were excluded from analysis. 35 had OTB diagnosed (2 declined treatment), leaving 33 patients for analysis. 2 (6%) patients had TB elsewhere (1 lung, 1 mediastinum).

15 (45%) were in Category 1, 16 (48%) in Category 2, and 2 (6%) in Category 3.

26 (79%) had posterior uveitis, 12 (36%) had intermediate uveitis, 17 (51%) had anterior uveitis, 3 (9%) had scleritis, and 1 had sclero-uveitis. 9 of these patients had panuveitis.

32/33 (97%) underwent IGRA, of which 15 (42%) positive, 1 (3%) indeterminate, 16 negative. Of those with negative/indeterminate IGRA, 14 (88%) had tuberculin skin test (TST), of which 12 (86%) were positive.

All patients had chest X-ray, of which 9 (27%) were abnormal. 15 (45%) had CT thorax. Time from CT request to CT report for outpatient requests was median 58 days, IQR 48–102 days. Time on TB pathway similar whether CT done or not (Mann-Whitney U test p=0.31)

Conclusion We had high rates of positivity for LTBI but a low proportion underwent CT scanning, potentially reducing the opportunity to obtain microbiological diagnosis.

Routine use of TST increases the number diagnosed with OTB, as 7 patients (21%) in Categories 2 and 3 had a positive TST but negative IGRA. This may reduce specificity, leading to inclusion of patients who do not genuinely have OTB.

Abstract P134 Table 1

	IGRA		TST (on those with negative or indeterminate IGRA)	
	Positive	Negative or indeterminate*	Positive	Negative*
Category 1	6	8	5	1
Category 2	9	7	6	
Category 3		2	1	1
Total	15	17	12	2

2 of those with negative tests were immunosuppressed.

P135 OCULAR RESPONSE TO ANTI-TB THERAPY: WHAT CAN WE EXPECT?

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10.1136/thorax-2023-BTSabstracts.286

Ocular tuberculosis (TB) is a rare extrapulmonary manifestation of TB, which can cause blindness. Diagnostic accuracy is a clinical challenge and implementing anti-tuberculous therapy (ATT) is not without risk. *BTS clinical statement for the diagnosis and management of ocular TB*[1] encourages input from TB and ophthalmic specialists. We reviewed ocular response to ATT at our tertiary centre, aiming to improve patient information pre-treatment.

Cases from our tertiary centre reported to Enhanced TB Surveillance System with 'uveitis', 'ocular' or 'cryptic disseminated' TB between 1st January 2016 to 31st January 2022 were identified. An additional search was performed using

Abstract P135 Table 1 Patients confirmed to have Ocular TB with follow-up outcomes n = 15*

	Ocular TB with confirmed systemic TB IGRA/TST +ve Abnormal CT imaging TB microbiology +ve	**Ocular TB with possible systemic TB** IGRA/TST +ve Abnormal CT imaging TB microbiology -ve	**Ocular TB alone** IGRA/TST +ve Normal CT imaging No diagnostic sampling for microbiology	**Ocular TB with incomplete diagnostics** IGRA/TST +ve No CT imaging or diagnostic sampling for microbiology
Total no. of patients (% of cohort)	1 (6.7)	5 (33.3)	2 (13.3)	7 (46.7)
No. of patients with **quiescent** eye disease following ATT (% of cohort)	0 (0)	3 (20.0)	0 (0.0)	6 (40.0)
No. of patients with **active** eye disease following ATT (% of cohort)	1 (6.7)	2 (13.3)	2 (13.3)	1 (6.7)

*Two patients lost to follow-up were excluded

electronic patient records. Data on demographics, assessment, treatment and ocular response were collected.

17 patients were included, 10 were male (58.5%) with mean age of 47 years. All patients had evidence of TB exposure and 82.5% had an interferon-gamma release assay (IGRA). All patients with an abnormal CXR (17.6%) went to have a CT. Of those who had an abnormal CT, all proceeded to diagnostic sampling (42.3%). Patients had eye changes suggestive of TB: choroidal granulomas (11.8%), mutton fat keratic precipitates (5.9%), serpiginous chorioretinopathy (5.9%) and peripheral occlusive retinal vasculitis (17.6%). The intended treatment for patients were between 9–12 months (70.6%). However, less than half (41.1%) completed treatment within recommended 365 days; some had ATT temporarily suspended owing to side effects.

Of the 15 patients with confirmed ocular TB and available follow-up, six patients had evidence of systemic disease. One patient had microbiologically confirmed TB (6.7%) and five had imaging, histology and serology consistent with a diagnosis of TB (33.3%). At the end of treatment, over half of patients had quiescent eye disease (60.0%).

In our centre, almost half our patients required further treatment for their ocular disease after completion of ATT, including patients who had evidence of TB beyond the eye. This is important information to set patient expectation at the beginning of ATT and a larger cohort is needed to confirm this outcome.

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P136 TREATMENT OUTCOMES OF SPINAL TUBERCULOSIS PATIENTS

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Introduction The diagnosis of spinal tuberculosis (TB) is often delayed, which may affect treatment outcomes. NICE Guidelines suggest to treat spinal TB for 6 months however it does not take into account severity of disease (multi-level involvement or presence of paravertebral or psoas abscesses) at presentation.

Methods We conducted a retrospective study of consecutive patients attending a spinal TB clinic at a large London Hospital. Information on demographics, clinical manifestation at diagnosis, radiology and treatment outcomes were recorded.

Results Seventy-four cases with Spinal TB were identified during 2010–2022. Twenty-five cases had incomplete data. Out of 49 cases, 30(61%) were male and median age was 33 years (14 IQR). Out of 49 cases 42 (85%) were migrants and 7 cases were born in the UK.

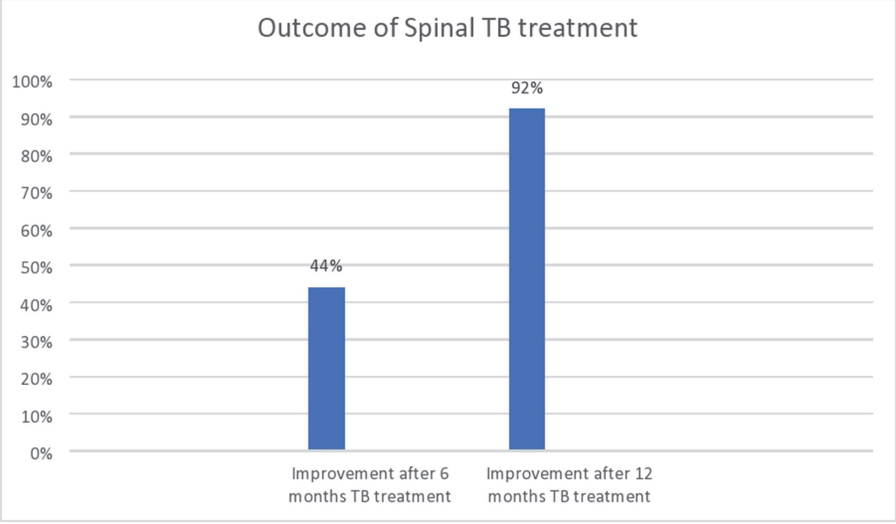
Forty-six patients were HIV negative, and three patients HIV status were unknown. 36(73%) patients had no co-morbidities. 6(12%) patients had Diabetes Mellitus. Twelve (24%) cases had pulmonary TB involvement.

Forty three out of 49(86%) had back or neck pain as their primary symptom at presentation. Thirty-one (63%) patients had constitutional symptoms. Four (8%) patients had spinal cord compression, two patients had paradoxical drug reactions and 17(34%) patients needed surgery/or drainage of paravertebral or psoas abscesses.

All patients had MRI whole spine performed at diagnosis. 19/49 (38%) had multiple spinal level involvement. The most common level affected was the thoracic spine 35/49 (71%), followed by lumbar 25/49 (51%), cervical 10/49 (20%) and sacral spine 7/49(14%). 19/49 (38%) had paravertebral abscesses, 5/49 (10%) had psoas abscesses.

All patients had a repeat MRI spine at around 6 months (range 3 to 8 months) and 12 months (range 10 to 14 months). Twenty-eight out of 49 (56%) patients had persistent paravertebral and psoas abscesses at 6 months. All patients received 12 months of TB treatment and the majority of patients, 46/49 (92%) had complete resolution of paravertebral or psoas abscesses after 12 months of treatment.

Conclusion Patients with spinal TB should have 12 months of treatment compared to 6 months as recommended by NICE guidelines.



Abstract P136 Figure 1

P137 DRUG-INDUCED LIVER INJURY IN TUBERCULOSIS TREATMENT: A RETROSPECTIVE REVIEW FROM A DISTRICT GENERAL HOSPITAL

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Introduction Treatment of tuberculosis (TB) entails a small but significant risk of drug-induced liver injury (DILI); this can have an adverse effect on treatment adherence, in addition to the impact of the DILI itself. We describe the number and characteristics of patients having DILI during TB treatment, their monitoring and alterations to treatment, and the associated outcomes.

Methods All cases of TB completing treatment between 2018 and 2023 inclusive were identified, amounting to 179 patients. As TB treatment related DILI is hepatitic, serum alanine transaminase (ALT) was used as a marker of DILI; this was then classified based on BTS guidelines,[1] with mild being a raised ALT below 2× the upper-limit of normal (ULN), moderate as 2×ULN or above, but below 5×ULN, and severe as 5×ULN or more. The notes and clinic letters were then reviewed to determine whether monitoring and treatment modification were in line with the same guidelines.

Results We identified 50 patients with evidence of abnormal liver enzymes. There was a male predominance. The White and South Asian subgroups had the highest levels of DILI. Treatment was stopped in 10 (20%) patients, although one was because of Ethambutol induced visual disturbance. Of those with treatment interruption, all were successfully re-challenged and completed treatment. None of the patients developed fulminant liver failure. Monitoring and treatment modification was as per guidelines in 32 (64%) of overall patients; non-compliance was around monitoring of patients who had mild or moderate DILI with repeat blood tests.

Conclusion DILI is a potentially severe side-effect of anti-tuberculous medication. In this study, 50 (28%) of patients had DILI with 6 (12%) having a severe form warranting treatment interruption. Patients with mild and moderate DILI had spontaneous resolution.

Further work is needed to risk assess patients for DILI prior to treatment initiation. In addition, review of current guidance on the monitoring of patients who develop mild or moderate DILI is needed, as spontaneous resolution was seen in the majority of patients.

Abstract P137 Table 1

	Mild (N=29)	Moderate (N=15)	Severe (N=6)	Overall (N=50)
Sex				
Male	20 (69%)	10 (67%)	4 (67%)	34 (68%)
Female	9 (31%)	5 (33%)	2 (33%)	16 (32%)
Age				
Mean (SD)	43 (17)	45 (15)	47 (23)	44 (17)
Hepatitis B/C				
Yes	0 (0%)	0 (0%)	0 (0%)	0 (0%)
No	29 (100%)	15 (100%)	6 (100%)	50 (100%)
HIV positive				
Yes	1 (3%)	0 (0%)	0 (0%)	1 (2%)
No	26 (90%)	15 (100%)	6 (100%)	47 (94%)
Missing	2 (7%)	0 (0%)	0 (0%)	2 (4%)
Ethnicity				
White	11 (38%)	6 (40%)	1 (17%)	18 (36%)
Black	2 (67%)	2 (13%)	0 (0%)	4 (8%)
Southeast Asian	1 (3%)	2 (13%)	2 (33%)	5 (10%)
South Asian	15 (52%)	5 (33%)	3 (50%)	23 (46%)

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P138 AN EVALUATION OF CURRENT METHODS OF MONITORING VISION FOR TUBERCULOSIS (TB) PATIENTS DURING ETHAMBUTOL TREATMENT IN ENGLAND, 2021

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Introduction Ethambutol, an antibiotic used to treat TB, is mostly well-tolerated and has a good safety profile. However, there is a rare but significant risk of vision damage, which in severe cases can be permanent. Stopping treatment promptly at symptom onset reduces risk. In 2017, following two incidents in the United Kingdom of severe visual loss in adults due to delayed intervention, The Royal College of Ophthalmologists issued a statement recommending baseline visual assessment prior to treatment start, with patients advised to report changes.[1] Despite this, there seems a lack of clear guidance.

This research project aimed to undertake a service evaluation exploring how TB teams in England monitor vision in ethambutol-treated patients, to highlight good practice and reveal potential service improvements.

Methods Having gained ethical approval to survey NHS staff, online questionnaires were sent to 106 lead TB specialist nurses in England, and 53 responses were analysed using descriptive and inferential tests.

Results Of 53 TB nurse respondents, 34 (64%) led acute trust TB nursing teams, and 19 (36%) led community trust TB nursing teams. Due to questionnaire branching, not all questions were answered by respondents. Visual assessments were provided by 51 respondents (96%). There were minimal differences in overall vision assessment provision, although more testing was conducted by TB nurses than by other practitioners (n=37; 46%). Qualitative comments from some TB nurses suggested a lack of guidance and protocols for conducting vision assessments. The majority of 45 respondents (n=36; 80%), relied on patients to self-report vision changes after initial baseline tests. Although no visual assessment

Abstract P138 Table 1 Who conducted vision testing

Practitioner who conducted testing	Total responses
Prescribing physician	n=13 (15%)
Tuberculosis nurse	n=37 (46%)
Ophthalmologist	n=17 (21%)
Community optometrist	n=4 (5%)
Outpatient clinic nurse/Healthcare assistant	n=10 (13%)
Overall total	n=81 (100%)

telehealth solutions are currently validated for clinical use, 7 (15%) of 46 teams responding used these.

Conclusions As visual assessments were primarily conducted by TB nurses, staff training and protocols should be reviewed, and appropriate testing resources made available. Reliance on patients self-reporting vision changes highlighted importance of patient counselling at the start of treatment. Clinically validated telehealth monitoring resources are also needed, with future innovations anticipated in this emerging and growing technological field.

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P139 ADVERSE EFFECTS OF DRUGS USED IN THE TREATMENT OF MULTI-DRUG RESISTANT TUBERCULOSIS

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Introduction Multi-drug resistant tuberculosis (MDR-TB) remains a challenge despite shorter treatment regimes, with significant adverse effects that can impact psychological and physical aspects of health, potentially affecting treatment outcomes.

Methods A retrospective cohort study was completed at an East London teaching hospital including patients with confirmed MDR-TB or receiving MDR-TB drugs between 2010 and 2023.

Results We evaluated 32 patients who were started on MDR-TB treatment. Thirty patients had MDR-TB and two patients were on MDR treatment due to drug intolerance. Nineteen patients (59%) were male, median participant age was 39 years (IQR=20). Twenty-six patients out of 32 were migrants. Nineteen patients (59%) had pulmonary or pleural MDR-TB, eight patients (25%) had lymph node MDR-TB, with the remainder (16%) having MDR-TB in other sites including the renal system, skin, central nervous system, thyroid gland and/or joints. Twenty-eight patients were initiated on current WHO recommended treatment regimens for MDR-TB. Four patients were commenced on standard TB treatment regimes prior to being switched.

Across our cohort, 24 patients (75%) developed an adverse effect to one or more drugs resulting in a treatment change. The most common drugs causing adverse effects resulting in a treatment change were linezolid (16/24), levofloxacin (5/24), pyrazinamide (10/24) and cycloserine (6/24).

Linezolid was predominantly stopped (62%) due to symptoms suggestive of peripheral neuropathy. Other adverse events that resulted in treatment change included a metallic taste, glossitis, mood disturbance, anaemia, or serotonin syndrome.

Levofloxacin was stopped in five patients due to joint pain and/or tendinopathies. Pyrazinamide was stopped in ten patients due to elevated urate levels and clinical symptoms of gout. Cycloserine was stopped in six patients due to low mood and suicidal ideations.

Conclusion Despite newer more effective MDR-TB regimens, patients on MDR treatment continue to have significant side effects and should have access to shorter drug regimens.

P140 WHAT WE HAVE LEARNT: AN AUDIT OF AN IN-HOUSE VIDEO-OBSERVED THERAPY (VOT) SERVICE FOR ACTIVE TUBERCULOSIS (TB) PATIENTS

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Introduction Directly Observed Therapy (DOT), and VOT are methods to ensure medication adherence and improve outcomes in patients with medically and socially complex TB.[1 2] We developed an in-house VOT service for active TB patients as an alternative to conventional DOT. Patients provided written consent to use the encrypted platform WhatsApp; approved by the internal information governance team.

Abstract P140 Table 1 Patient social and demographic data against adherence rates

N = 38 (%)	'Good' adherence N (%) 21 (55.2)	'Average' adherence N (%) 4 (10.5)	'Poor' adherence N (%) 8 (21.1)	Transferred from service/failed VOT N (%) 5 (13.2)
Male 22 (57.9)	13 (61.9)	0	5 (62.5)	4 (80.0)
Non-UK born 34 (89.5)	19 (90.5)	4 (100)	8 (100)	3 (60.0)
HIV Positive 2 (5.26)	1 (4.76)	0	1 (12.5)	0
Drug/Alcohol misuse 10 (26.3)	4 (19.0)	1 (25.0)	2 (25.0)	3 (60.0)
History of homelessness 3 (7.89)	2 (9.52)	0	0	1 (20.0)
Mental health concerns 4 (10.5)	4 (19.0)	0	0	0
Immigration concerns 5 (13.2)	2 (9.52)	0	3 (37.5)	0
History of imprisonment 3 (7.89)	2 (9.52)	0	1 (12.5)	0
Financial concern/ unemployed 8 (21.1)	4 (19.0)	1 (25.0)	2 (25.0)	1 (20.0)
Previous treatment 7 (18.4)	4 (19.0)	1 (25.0)	1 (12.5)	1 (20.0)
Pulmonary Disease 21 (55.3)	10 (47.7)	1 (25.0)	6 (75.0)	4 (80.0)
Treatment completed 35 (92.1)	21 (100)	4 (100)	8 (100)	2 (40.0)
Fully Sensitive TB 28 (77.7)	17 (81.0)	2 (50.0)	5 (62.5)	4 (80.0)
Pyrazinamide resistance 1 (2.63)	0	0	1 (12.5)	0
Multi-Drug Resistance 7 (18.4)	2 (9.52)	2 (50.0)	2 (25.0)	1 (20.0)

Methods 38 patients underwent in-house VOT for TB in a London teaching hospital between April 2018-July 2022, Data was gathered retrospectively from medical notes, the National TB Surveillance System and daily adherence charts. Adherence was defined as 'Good' (≥85%), 'Average' (<85%-≥75%) and 'Poor' (<75%).

Results 22 (57.9%) patients were male, with a median age of 32.5 (range 19–50). 2 cases of TB were treated empirically. 21 (55.2%) patients had 'Good', 4 (10.5%) had 'Average' and 8 (21.1%) had 'Poor' adherence. 66% of patients had >80% adherence documented. 5 patients transferred service or underwent VOT for less than four weeks (failed). Table 1 outlines demographic factors in accordance with adherence rates.

Discussion VOT is an efficient, cost-effective and less disruptive option for patients undergoing TB treatment compared to DOT.[2] We achieved comparable adherence rates to a previous randomised controlled trial where 70% of patients achieved >80% adherence with VOT.[2] This audit revealed the challenges and complexities of sustaining an in-house VOT service. We noted inconsistencies between documentation and adherence data as well as technical and governance issues arising from WhatsApp usage. Overall, this has highlighted the extent of resource, work-force and logistical planning required to maintain a high standard service. As part of our next steps, we intend on moving towards using an external, UK-based VOT service which will address our documentation and technical concerns. Furthermore, we plan on assessing patient and staff satisfaction from our in-house service to optimise future implementation.

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P141 QUINOLONE-CONTAINING TREATMENT-SHORTENING REGIMENS FOR TUBERCULOSIS: WHAT ARE THE IMPLICATIONS FOR THE NHS?

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Introduction Recent trial data have demonstrated that both Drug-sensitive (DS) and Drug-resistant (DR) tuberculosis (TB) can be treated effectively with short-course quinolone-containing combination therapy. Current WHO guidance includes using a four-month treatment with quinolones throughout for DS TB. The adverse event profile of quinolones is well-recognised, however less is known about the prevalence of quinolone resistance, in particular when used to treat otherwise DS TB. The routine use of *M tuberculosis* complex Whole Genome Sequencing (WGS) in England, provides an opportunity to explore this in both DS and DR TB.

Methods WGS isolate data for *M tuberculosis* complex between 2017 and 2023 were obtained from NMRS-North and Central (N & C) and NMRS-South (S) UKHSA laboratories. After data cleaning, analyses were performed separately and then combined (data presented here). These focused on the relationship between quinolone, isoniazid and rifampicin resistance.

Abstract P141 Table 1

Isoniazid	Quinolone Sensitive	Quinolone Resistant	Quinolone Fail	Quinolone Unknown	TOTAL
Sensitive	11356 (85.2%)	119 (0.9%)	216 (1.6%)	1632 (12.2%)	13323 (100%)
Resistant	974 (80.2%)	91 (7.5%)	23 (1.9%)	126 (10.4%)	1214 (100%)
Fail	142 (64.5%)	3 (1.4%)	58 (26.4%)	17 (7.7%)	220 (100%)
Unknown	468 (78.8%)	13 (2.1%)	6 (1%)	107 (18%)	594 (100%)

Results Isoniazid resistance was present in 7.9% of 15350 isolates. Rifampicin or Rifampicin + Isoniazid resistance was seen in 2.1%, and WGS quinolone resistance was detected in 1.5% of. However, a greater proportion of WGS results for quinolones showed a mutation of uncertain significance ('unknown') than for other drugs (table 1, with all NMRS data combined and Isoniazid WGS profile included for comparison, percentages are for each row). Reassuringly, on phenotypic testing only 4/1021 (0.4%) NMRS-S isolates reported as 'unknown' on WGS were quinolone resistant.

Column 3 of table 1 shows that quinolone resistance was present in 1% and 7.5% of Isoniazid DS and DR isolates.

Discussion Quinolone-resistant *M tuberculosis* is present at a low though detectable frequency in all TB populations. The large number of WGS unknown results for quinolones that require further phenotypic testing is an additional time and financial cost that needs to be considered when implementing programmatic short-course treatment to adults with drug sensitive TB in the UK.

P142 RIFAMPICIN THERAPEUTIC DRUG MONITORING – AN INDIVIDUALISED DOSING APPROACH IN TUBERCULOSIS

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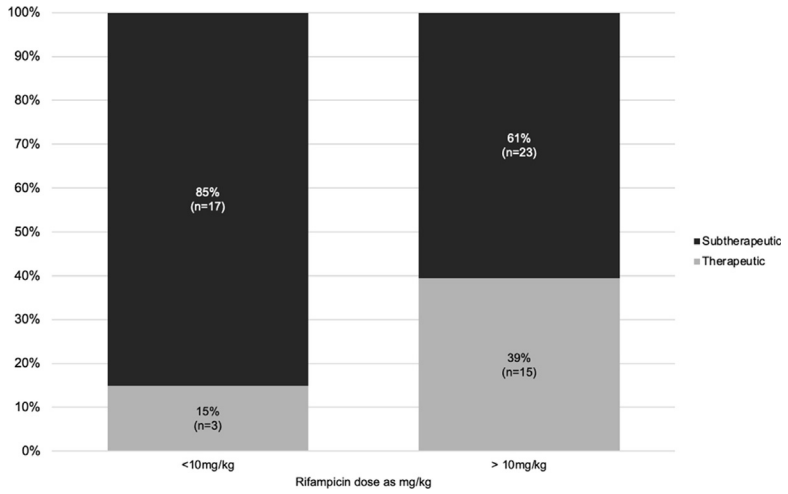
10.1136/thorax-2023-BTSabstracts.293

Introduction Rifampicin plays a key role in tuberculosis (TB) treatment, due to its bactericidal and sterilizing capacity. The dose currently recommended by WHO is 10 mg/kg but achieving this dose can be limited by fixed dose preparations and risks under dosing. Low plasma levels of rifampicin may potentially contribute to poor treatment response. Therapeutic drug monitoring (TDM) has been proposed as a method to support early optimisation of dosing particularly in high-risk groups e.g. CNS TB or slow treatment response. The main aim of this study was to investigate whether standard dosing of rifampicin is likely to lead to therapeutic drug levels and to describe the impact of dose escalation.

Method We performed a retrospective review of all adult patients who had rifampicin levels (2 hours post dose or 6 hours where delayed absorption was suspected) taken between August 2018 and August 2021, identifying 58 patients. Patient demographics, clinical characteristics including weight at time of level, dose adjustments and rationale for taking level were collected from patient records. Levels below 8 mg/L were considered subtherapeutic.



Abstract P142 Figure 1 Percentage of patients attaining therapeutic levels based on initial rifampicin dose (mg/kg)

Results The most frequent reason for conducting a rifampicin level was due to slow/poor response (34%) followed by high burden of disease (24%). Just under half of patients (48%) were being treated for pulmonary TB, followed by extrapulmonary TB (24%). Of the 58 patients who had levels measured, 40 (69%) patients had levels that were considered to be subtherapeutic. Figure 1 displays if therapeutic levels were achieved with standard rifampicin dosing (10 mg/kg). In the subtherapeutic group, 31 (78%) had their dosage increased of which 19 (61%) patients had a level taken post dose escalation. Eleven 11 (58%) patients from this group had levels within therapeutic range.

Conclusion Based on our finding's a significant proportion of patients show subtherapeutic levels on standard dosing particularly in those with apparent severe or poorly responding disease. TDM is a useful tool to individualise rifampicin dosing and early optimisation increases the likelihood of attaining a therapeutic level. This may be particularly beneficial in patients who may be at risk of low plasma levels e.g. malnourished/disseminated/CNS TB.

P143 DIFFICULTIES IN DIAGNOSING TUBERCULOSIS DURING THE COVID-19 PANDEMIC – OBSERVATIONAL REPORT FROM A TERTIARY CARE HOSPITAL IN MUMBAI (INDIA)

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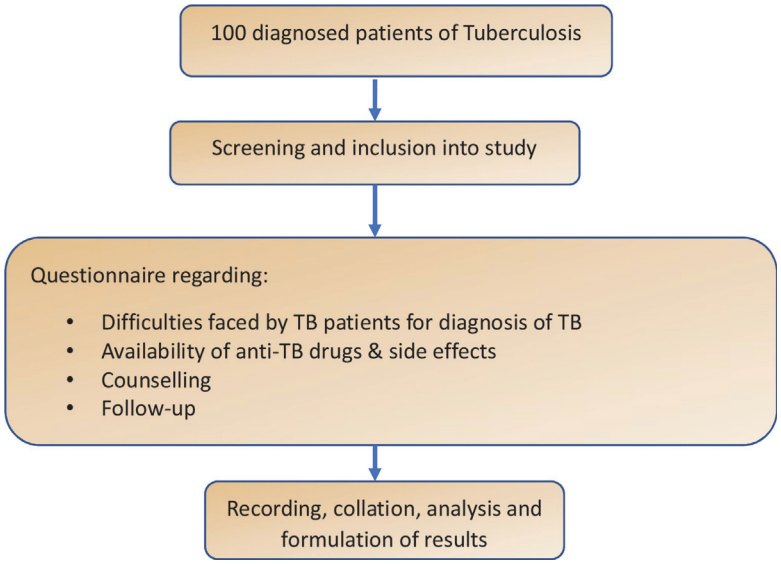
Introduction and Objective The COVID 19 pandemic caused significant disturbances in TB diagnostic and treatment services under national tuberculosis elimination programme (NTEP) in India. As India accounts for 28% of global burden, ending Tuberculosis globally is critically dependent on ending it in India. More than quarter of the world's 10 million estimated cases and 449,700 of the world's estimated 1.3 million TB related deaths occur in India. Between 2020 and 2025, 6 million TB cases and 1.4 million TB-related deaths are expected to occur in India. Due to lockdowns or movement restrictions, fear of contracting COVID-19 infection in hospital settings and diversion of TB services, patients with TB symptoms



Abstract P143 Figure 1

are having difficulty accessing healthcare facilities during this epidemic. The Objective of this study is to identify the real-world practical difficulties faced by TB patients during the COVID 19 pandemic during the second wave from March 2021 to October 2021 in India.

Methods Figure 1.

Results Out of 100 patients diagnosed with drug sensitive Tuberculosis, 42% were COVID-19 suspects.38% had symptoms for less than one month which helped in early diagnosis of Tuberculsosis.6% patients had symptoms for more than 6 months.27% patients faced problems getting diagnosed, out of which 14 patients (51.8%) had travel difficulty, 7 patients (25.9%) had financial problems and 6 patients (22.2%) had lack of health care access. The time taken for diagnosis and starting medication under National TB elimination program (NTEP) was 1–3 days in 47% patients, 4–7 days in 32% patients and 8 or more days in 21% patients. 31% of patients had side effects due to anti-tuberculosis treatment, amongst them 23 (74.1%) patients complained vomiting, 5 (16.1%) patients had itching, 3 patients (9.6%) had joint pains. 84% patients received regular supply of anti-tuberculosis medication and 16% faced problems in access.79% patients had access to high protein diet whereas 21% patients had no access.

Conclusion This study highlights the consequences and impact of the COVID-19 pandemic on the Tuberculosis healthcare services. It highlights the problems faced during the COVID-19 lockdown by Tuberculosis patients.

P144 DOES USE OF A DIAGNOSTIC CERTAINTY SCORE AT TB COHORT REVIEW IMPROVE CULTURE CONFIRMATION OF ACTIVE TUBERCULOSIS?

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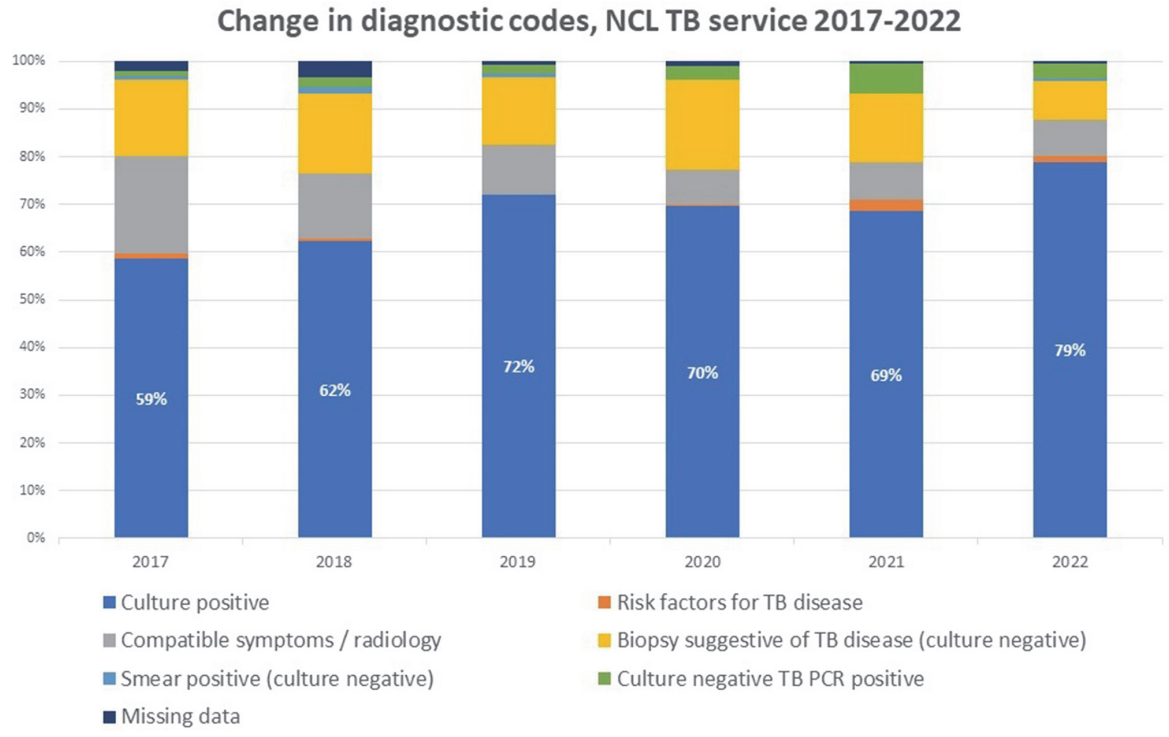
10.1136/thorax-2023-BTSabstracts.295

Background Diagnostic confirmation of TB disease is central to high-quality TB care. It ensures that patients receive the correct treatment, (for TB and conditions that may be mistaken for it) and also allows drug susceptibility testing. However, in 2021 only 61% of TB diagnoses in England were confirmed by positive culture. Improving this is a key objective for the UKHSA/NHSE TB Action Plan, with a specific target of 80% of pulmonary cases being culture-confirmed. Since 2017 in North Central London TB service we have reviewed the evidence for a patient's TB diagnosis at the quarterly Cohort Review, with a diagnostic 'level of certainty' being recorded for each case discussed. We explored how patterns of diagnostic confirmation have changed since this was introduced.

Methods We collated diagnostic codes recorded at cohort review for the period 2017–22. When this was recorded as 'Definite TB', we cross-checked results with data on TB



Abstract P144 Figure 1

cultures and TB PCR results to confirm whether this was based on positive culture or PCR. Site of disease data were also included from 2018.

Results Data on 1311 TB notifications between 2017 and 2022 were available. Over this time-period we observed an improvement in proportion with culture confirmation from 59% in 2017 to 79% in 2022 (figure 1) ($p < 0.001$). In addition, TB diagnosis was confirmed by TB PCR in an increasing proportion of culture-negative cases – rising from 3% of culture negative cases in 2017 to 20% (64 cases) in 2021. Since 2018, 84% of pulmonary TB cases were confirmed by TB culture and 53% of extra-pulmonary cases.

Conclusions The introduction of a diagnostic certainty score as part of the cohort review process has been followed by a significant improvement in confirmation of TB disease in NCL TB service. Culture confirmation of pulmonary cases now reaches the UKHSA target of >80%. Regular discussion of diagnostic confirmation rates at cohort review may have had the effect of changing practice and reducing the proportion of cases treated empirically. We suggest that inclusion of culture confirmation information within the cohort review process is an effective way of evaluating and improving practice.

'Drop the pressure' – Investigating and treating pulmonary vascular disease

P145 INVESTIGATING THE PREVALENCE OF PULMONARY HYPERTENSION AMONGST INDIVIDUALS WITH HEART FAILURE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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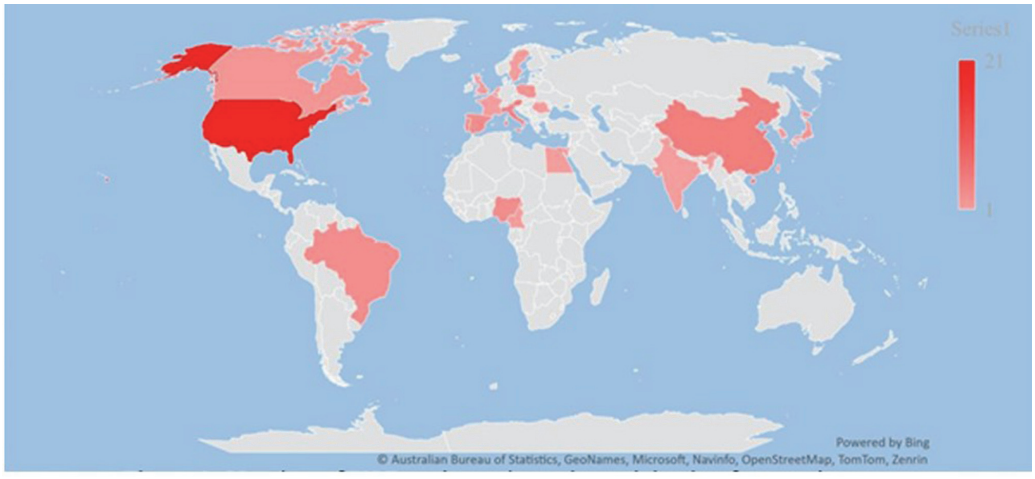
Introduction and Objectives Heart failure (HF) is a leading cause of hospitalisations worldwide. HF can lead to pulmonary hypertension (PH) due to backing up of blood into the pulmonary vasculature. Co-incidence of HF and PH is associated with a poor clinical prognosis. This systematic review and meta-analysis aims to analyse the prevalence of PH amongst individuals with HF.

Methods Following a systematic search of MEDLINE and EMBASE, clinical studies reporting the prevalence of PH amongst HF patients were included. An inverse-variance weighted meta-analysis of HF-PH prevalence, including subgroup analysis, was conducted. Prevalence is expressed according to the common and random effects models, respectively, with 95% confidence intervals (CI). The relationship between HF-PH prevalence and other comorbidities and characteristics were analysed using a meta-regression and Pearson's R correlation coefficient (r).

Results 54 papers were identified for inclusion, with 269,187 HF patients. Of these, 50,828 patients had PH. HF-PH prevalence reported by different papers ranged from 13–94%. The overall prevalence estimates were 19% (CI:19–19%) and 49% (CI:42–56%). HF-PH prevalence was higher in those with reduced ejection fractions (15%, CI:14–16%; 36%, CI:23–51%) than those with preserved (27%, CI:26–27%; 60%, CI:45–73%). Figure 1 demonstrates the geographic location of the included studies. When grouping studies according to continents, Europe has the highest prevalence (66%, CI:65–68%; 65%, CI:56–73%), whilst North America has the lowest (17%, CI:17–17%; 35%, CI:24–47%). Meta-regression revealed that diabetes showed the strongest correlation with HF-PH prevalence (r= -0.429), whilst age and smoking showed almost no correlation. BMI and female gender displayed weakly positive correlations (r= 0.143 and 0.137, respectively).

Conclusions There is notable variability in prevalence estimates reported by different papers, across different continents. This could be attributed to the heterogeneous nature of the included studies. Increased HF-PH prevalence in HF with reduced ejection fraction is consistent with the mechanism of pathology co-incidence. Diabetes could shorten HF patient life expectancy, minimising the chances of developing long-term complications like PH and explaining the negative correlation identified. To our knowledge, this is the first meta-analysis investigating the co-prevalence of HF and PH. Given its poor prognosis, understanding the underlying factors could contribute valuable clinical insight.



Abstract P145 Figure 1 Heat map of geographical location of included studies

P146 SURVIVAL OF IPAH PATIENTS WITH AND WITHOUT COMORBIDITY

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10.1136/thorax-2023-BTSabstracts.297

Introduction Prognosis in idiopathic pulmonary arterial hypertension (IPAH) may be independently affected by major comorbidities. To date this association has not been described in UK patients.

We sought to analyse the relationship between prevalent baseline comorbidities and 10-year outcomes in IPAH patients diagnosed at Royal Papworth Hospital (RPH).

Method The Cohort Study database was interrogated to provide baseline clinical information for all individuals diagnosed with IPAH at RPH between 1/1/2006 and 1/2/2023. Patients were classified according to number of significant cardiorespiratory or prognosis-limiting comorbidities. The primary endpoint was all-cause mortality or lung transplantation.

Abstract P146 Table 1 Comparison of clinical characteristics at time of diagnosis between idiopathic pulmonary arterial hypertension patients with no, 1 or >1 co-morbidity. Data presented as counts (%), mean ± standard deviation or median [interquartile range]. WHO FC= World Health Organisation functional class, 6MW= 6-minute walk, mPAP= mean pulmonary arterial pressure, PVR= pulmonary vascular resistance, RA= right atrial, PH= pulmonary hypertension. * or ‡= between-group p<0.05

Variable	No co-morbidities N= 84	1 Co-morbidity N= 86	>1 Co-morbidities N= 143	P value
Age/years	44.6 ± 17.3*	56.8 ± 16.2*	64.8 ± 14.2*	<0.00001
Male sex	24 (28.6)*	29 (33.7)‡	70 (49.0)*‡	0.005
WHO FC				
1	3 (3.6)	2 (2.3)	2 (1.4)	0.12
2	8 (9.5)	15 (17.4)	9 (6.3)	
3	55 (65.5)	55 (64.0)	109 (76.2)	
4	18 (21.4)	14 (16.3)	23 (16.1)	
6MW distance/m	339 ± 140*‡ N= 72	274 ± 134* N= 76	233 ± 112‡ N= 117	<0.00001
NTproBNP	1062 [344–2477]*	1532 [447–2999]‡	2213 [712–4470]*‡	0.0004
mPAP/mmHg	52.4 ± 13.4	52.0 ± 14.4	49.1 ± 11.4	0.08
PVR/dynes	1103 ± 629	1040 ± 588	1013 ± 571	0.56
Cardiac Index/Lm^{-2}	1.9 ± 0.6	2.0 ± 0.7	1.8 ± 0.7	0.21
RA pressure/mmHg	10.1 ± 5.6	9.7 ± 4.7	10.2 ± 5.4	0.78
Nitric oxide responder	11 (13.1)*	5 (5.8)‡	1 (0.7)*‡	0.0004
PH therapy (6 months)				
No therapy	4 (4.8)	8 (9.3)	12 (8.4)	0.00004
Monotherapy	19 (22.6)	12 (14.0)	55 (38.5)	
Dual therapy	32 (38.1)	46 (53.5)	59 (41.3)	
Triple therapy	29 (34.5)	20 (23.3)	17 (11.9)	
Primary endpoint				
Combined	28 (33.3)*	27 (31.4)‡	79 (55.2)*‡	0.0002
Death	23 (27.4)*	25 (29.1)‡	78 (54.5)*‡	0.00001
Transplant	5 (6.0)*	2 (2.3)	1 (0.7)*	0.05

Significance of associations was assessed using analysis of variance, the Kruskal-Wallis or the $\chi 2$ test as appropriate. Survival to death or transplantation up to 10 years from diagnosis was estimated using Kaplan-Meier analysis and the Cox-PH model. A two-tailed probability of <0.05 was considered significant.

Results 313 patients were diagnosed with IPAH at RPH during the study period. 84 (27%) had no baseline comorbidities, 86 (27%) had 1, and 143 (46%) had >1.

Age at presentation and proportion of males was higher in line with rising number of co-morbidities. Whilst there was no notable difference functional class, average 6-minute walk distance was markedly lower in multi-morbid patients and NTproBNP appreciably higher.

Pulmonary haemodynamics were comparable between groups, though a higher proportion of patients with 0 or 1 co-morbidity were nitric oxide responders (13.1% vs 5.8% vs 0.7%, p<0.05).

Median follow-up was 4.8 [1.9–8.6] years. Over this period death or transplant occurred in 28 (33%) non-comorbid patients, 27 (31%) of patients with 1 co-morbidity and 79 (55%) patients with >1 co-morbidity (p<0.05). Overall event-free survival was significantly higher in patients with 0 or 1 comorbidity than those with >1 co-morbid condition, with adjusted 3-year survival rates of 79.6%, 84.2% and 64.2%. On multivariate analysis, >1 comorbidity remained significantly associated with the primary endpoint (HR 1.8, 95% CI 1.2–2.6, p=0.002).

Conclusion In a large UK cohort, comorbidities were noted in approximately three quarters of IPAH patients at diagnosis. Survival was significantly worse in patients with at least 2 comorbidities, but comparable between patients with no or 1 comorbidity.

P147 HYPOXIA AND/OR ANCA IGG INDUCE CYTOSKELETAL CHANGES IN NEUTROPHILS THAT MAY PROMOTE LUNG ENDOTHELIAL INJURY IN ANCA-ASSOCIATED VASCULITIS

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10.1136/thorax-2023-BTSabstracts.298

Background Anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) is characterised by neutrophil-mediated vascular inflammation. Inflamed tissues are profoundly hypoxic. Neutrophils are able to deform to squeeze through the microvasculature but the degree of cellular deformability can impact their ability to traffic through the lung capillary network. The effect of hypoxia and/or ANCA IgG on neutrophil biomechanical properties is unknown.

Hypothesis Distinct biomechanical properties of neutrophils in patients with active AAV, e.g. in response to ANCA and/or hypoxia, may contribute to endothelial injury and lung inflammation in AAV.

Methods Biomechanical properties (area and deformability) of whole blood neutrophils from patients with active AAV (AAV), patients with AAV in remission (rAAV) or healthy controls (HC) were analysed using real time deformability cytometry (RT-DC). Isolated neutrophils were primed with TNF (2ng/mL, 15min) then stimulated with ANCA IgG (100ug/mL, 1h) under normoxia (21% O2) or hypoxia (1% O2). Cells stained

with AF488-Phalloidin (F-actin) were imaged using confocal microscopy.

Results AAV neutrophils in whole blood were significantly less deformable (stiffer) than rAAV ($p<0.0001$) or HC ($p=0.001$). There was an inverse correlation between AAV neutrophil deformation and disease activity, as measured by BVAS score ($r=-0.6788$). AAV patients with lung involvement had stiffer neutrophils compared to those with kidney involvement alone ($p<0.05$). ANCA stimulation increased area ($p<0.0001$) and F actin polymerisation ($p=<0.001$) of isolated HC neutrophils. Hypoxia both increased HC neutrophil F actin polymerisation at baseline ($p<0.0001$) and potentiated the effect of ANCA stimulation ($p<0.001$). Additionally, hypoxia further enhanced ANCA-induced IL-8 secretion from HC neutrophils ($p<0.05$).

Conclusions Neutrophils from patients with active AAV display distinct physical properties, which correlate with disease activity and lung involvement. Increased neutrophil actin polymerisation and marked lamellopodia formation is seen following ANCA stimulation *in vitro*, which is further enhanced under hypoxia. The phenotype of increased cell stiffness in AAV may be due to reorganisation of the actin cytoskeleton in response to ANCA and/or hypoxia. Increased cell stiffness may lead to neutrophil retention in the pulmonary microvasculature, thus increasing the potential for neutrophil-endothelial interactions and microvascular damage. Targeting cytoskeletal changes in AAV may offer a route to improve clinical outcomes.

Please refer to page A291 for declarations of interest related to this abstract.

P148 READILY AVAILABLE CLINICAL FEATURES CAN HELP IDENTIFY PATIENTS WITH INTERMEDIATE-HIGH RISK PULMONARY EMBOLI WHO MAY BENEFIT FROM THROMBOLYSIS

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Background Fibrinolytic therapy in patients with acute intermediate-high risk pulmonary emboli (PE) remains controversial.[1] The PEITHO investigators have identified additional 'imminent' risk factors (IRF, defined as systolic BP <110, respiratory rate >20 or presence of oxygen requirement and chronic heart failure) for improved identification of thrombolysis candidates.[2]

Method We retrospectively reviewed patients admitted between 2017–2022 with intermediate-high risk PE[1] defined as large volume PE on CT with right ventricular dysfunction on echocardiography and/or CTPA, with a raised troponin I. We compared death at 28 days and 6 months and haemorrhagic events between patients thrombolysed with alteplase or treated with IV heparin alone.

Results 77 patients were thrombolysed and 75 patients were treated with heparin. The mean (SD) age were 61.4(16.9) and 67.6(14.3) respectively.

Death at 28 days was similar in thrombolysis and heparin groups: 2/77(2.6%) patients versus 4/75(5.3%), $p=0.44$. Death at 6 months was lower in the thrombolysis group versus heparin group: 3/77(3.9%) versus 12/75(16%), $p= 0.0145$. Haemorrhagic events were more common in the thrombolysed group vs heparin group: 8/77(10.4%) (2 intracranial haemorrhage, ICH; 6 extracranial haemorrhage, ECH) versus none, $p=0.0065$.

83/152(54.6%) patients had one IRF. 1/42(2.4%) patients in the thrombolysis group died at 28 days compared to 1/41 (2.4%). At 6 months 1/42(2.4%) thrombolysed patients died versus 3/41(7.3%) in the heparin group. In the thrombolysis group there was one ICH and 3 patients had ECH.

27/152(17.8%) patients had >1 IRF. 1/16(6.3%) patients in the thrombolysis group died at 28 days compared to 3/11 (27.3%) patients in the heparin group, $p=0.27$. At 6 months 2/16(12.5%) thrombolysed patients died versus 7/11(63.6%) patients in the heparin group, $p=0.0115$. There was 1 ICH and 1 ECH in the thrombolysis group.

Conclusion Mortality rates were higher in the cohort of patients with >1 IRF with our data suggesting a mortality benefit to thrombolysis in this cohort. ICH rates were low but more prevalent in those receiving thrombolysis.

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P149 IMPLEMENTATION OF A PE RESPONSE TEAM (PERT): A SINGLE CENTRE EXPERIENCE

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10.1136/thorax-2023-BTSabstracts.300

Background Venous thromboembolism is the 3rd commonest acute cardiovascular syndrome. The European Society of Cardiology/European Respiratory Society (ESC/ERS) suggest implementing a Pulmonary Embolism (PE) Response Team (PERT) to guide management of patients with acute PE.

Purpose To investigate the implementation of a PERT at a tertiary hospital and compare mortality data with observational and trial data.

Methods A retrospective case analysis of all patients referred. Routine clinical data on noninvasive haemodynamics, cardiac biomarkers, initial treatment at presentation and follow up data for up to 12 months was collected.

Results 96 patients were referred over 15 months from inception of the PERT in December 2020. The average age was 58.9 with 62.5% male. 40.0% of CT reports suggested PERT referral (which was non-discriminatory for overall risk). The average admission troponin was 345.7, BNP was 246.5 and PESI score was 102.8. There were 15.6% low, 16.7% intermediate low, 60.4% intermediate high and 7.3% high risk PE PERT referrals. 83.3% were started on therapeutic anticoagulation alone, 6.3% received catheter directed thrombolysis (CDT) and 9.4% received systemic thrombolysis. 6.3% suffered complications from treatment, with none dying.

Treatment escalation due to deterioration occurred in 5 cases, with 2 deaths within 30 days. 2 received LMWH and escalated to CDT. The remaining 3 received CDT, 1 receiving CDT again and 2 receiving systemic lysis.

The overall 7, 30 and 90–120 day cumulative PE-related mortality was 3.4%, 6.9% and 6.9% respectively for intermediate-high risk presentations. Please see table 1 for full mortality breakdown per risk class. The commonest reason for

Abstract P149 Table 1 Breakdown for each ESC class, where percentages given are of total number in risk class

	7-day mortality (PE/non-PE related mortality)	30 day (PE/non-PE related mortality)	90–120 day (PE/non-PE related mortality)	PESI	hsT (ng/l)	BNP (ng/l)	LMWH (n)	CDT (n)	Thrombolysis (n)	Deaths after initial lysis
Low (n=15)	0	0	0	57	45	65	100% (15)	0	0	0
Inter-L (n=16)	0	0	0/12.5% (0/2)	80	29	31	100% (15)	0	0	0
Inter-H (n=58)	3.4%/0% (2/0)	6.9%/ 3.4% (4/2)	6.9%/8.6% (4/5)	115	529	348	82.8% (48)	8.6% (5)	10.6% (5)	10.0% (1) [CDT]
High (n=7)	0%/14.3% (0/1)	14.3%/14.3% (1/1)	14.3%/14.3% (1/1)	159	225	262	28.6% (2)	14.3% (1)	57.1% (4)	14.3% (1) [full dose]

CDT – Catheter Directed Thrombolysis, CT – Computerised Tomography, BNP – Brain Natriuretic Peptide, ESC – European Society of Cardiology, PESI – Pulmonary Embolism Severity Index, PERT – Pulmonary Embolism Response Team, hsT – high sensitivity Troponin

non-PE related mortality was malignancy and accounted for all deaths after 120 days.

Conclusion We have evaluated the implementation of a PERT, providing a standardized team-based approach for PE management and reflection on outcomes. The mortality rates demonstrated are comparable to observational data, both prospective and retrospective.[1]

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P150 VENOUS THROMBOEMBOLISM RISK ON THE VIRTUAL WARD

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10.1136/thorax-2023-BTSabstracts.301

Introduction NICE guideline 89 makes recommendations for reducing risk of hospital acquired venous thrombosis/thromboembolism (VTE); the fundamentals of this guideline will be familiar to all hospital clinicians. Since this guideline was last updated (August 2019), NHS England has issued a mandate to increase the use of virtual ward (VW) beds to ease pressure on acute hospital trusts. There are no formal guidelines relating to VTE prophylaxis in a VW setting, and the most appropriate strategy to manage the risk remains unknown.

Methods Retrospective data was analysed for all patients admitted to the VW from a single London hospital over a two month period. Demographic details, reason for admission, length of stay (LOS) in hospital and VW, and 30- and 90-day outcomes were collected. Retrospective VTE assessment, in accordance with NICE guidelines for hospital inpatients, was completed.

Results 49 patients admitted to VW January – February 2023. 20/49 (40.1%) male. Mean age 80.0 years (range 37–90). Mean LOS in hospital 7.1 days; mean LOS on VW 9.9 days. The most common conditions were COPD (32.7%), asthma (20.0%), heart failure (12.2%). 41/49 (83.7%) had VTE risk assessment completed for their inpatient admission, all of whom either had pharmacological prophylaxis prescribed as an inpatient, or were on pre-existing anticoagulation. No patients had an updated VTE risk assessment completed on admission to VW. On retrospective calculation of VTE risk, 46/49 (93.9%) were deemed to be at high risk of VTE. Two patients are known to have been diagnosed with VTE within 3 months of discharge from VW. One of these was felt to be a chronic clot; the other was an acute pulmonary embolism.

Conclusion It remains unknown whether VTE risk of VW patients should be managed in a similar way to acute hospital inpatients, or whether alternative thresholds for pharmacological prophylaxis would be more appropriate. It is imperative that VW services continue to examine outcomes. Our VW patients are issued with wearable armbands which monitor observations and capture movement data – this data is yet to be analysed. Study of VW mobility level may help guide decision-making and future guidelines.

P151 NEUTROPHIL LYMPHOCYTE RATIO TO PREDICT IN-PATIENT MORTALITY OF PULMONARY EMBOLISM DURING THE SARS-COV-2 PANDEMIC

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10.1136/thorax-2023-BTSabstracts.302

Background and Aims A high incidence of pulmonary embolism (PE) has been described during the SARS-CoV-2 pandemic. Inflammation has a key role in venous thromboembolism. Neutrophil Lymphocyte ratio (NLR) is a novel parameter for systematic inflammation. Risk stratification of PE is essential in determining appropriate management. We aim to investigate the prognostic role of NLR in patients with CT confirmed PE in the inpatient setting.

Methods We recorded the incidence of inpatient PE confirmed by CTPA from 2012 to 2022. Focusing on August 2021 through to September 2022 we collected baseline demography, relevant past medical history including cancer diagnosis; CTPA evaluation stratified by descriptors of burden of disease (Single, Bilateral, Multiple, Small, Moderate, Extensive and Right Heart Strain); admission investigations including Troponin, D-Dimer, BNP and NLR; and outcome including treatment, length of stay, further admission and survival. We interrogated the relationship of admission NLR to clinical characteristics, CTPA descriptors and outcomes.

Results During the study period 474 patients were identified, representing an 18% (80/year) increase in projected incidence. Baseline characteristics of the study population age 68.8 (SD 15.4), 253 (53%) male, median length of stay 7 days (IQR 4–13), mortality rate 32.4%. There were

Abstract P151 Table 1 Neutrophil Lymphocyte Ratio Threshold >8

		NLR >8	NLR <8	p-Value
Baseline	n	170	304	
	Age – mean (SD)**	72.3 (13.8)	67.1 (16.0)	0.002
	Sex [Male, n (%)]	91 (54)	162 (53)	0.960
	Malignancy – n (%)	48 (28)	92 (30)	0.430
Biochemistry	XDP – mean (SD)	1720 (1504)	1698 (1459)	0.792
	Troponin – mean (SD)	99 (58)	193 (51)	0.582
	BNP – mean (SD)	3364 (4894)	2596 (3953)	0.241
CTPA	Single – n (%)	31 (18)	52 (17)	0.756
	Bilateral – n (%)	85 (50)	166 (54)	0.336
	Multiple – n (%)	56 (33)	107 (35)	0620
	Small – n (%)*	45 (26)	55 (18)	0.033
	Moderate – n (%)	14 (8)	27 (9)	0.127
	Extensive – n (%)*	26 (15)	77 (25)	0.012
	Right Heart Strain – n (%)	26 (15)	51 (17)	0.675
Outcome	LOS -mean (SD)***	14 (16)	9 (11)	<0.001
	Readmission 3 months – n (%)	40 (23.5)	76 (25)	0.721
	Readmission 6 months – n (%)	11 (6.5)	15 (4.9)	0.482
	Never – n (%)***	69 (40.6)	174 (57.2)	<0.001
	Mortality – n (%)***	85 (50)	69 (23)	<0.001

* p <0.05, ** p <0.01,*** p <0.001

correlations for age (0.319), BNP (0.211), and NLR (0.228) [p <0.001] with risk of death. No significant correlation was found for Troponin. Area under the curve analysis were similar for age (0.645), BNP >500 (0.639) and NLR >8 (0.645). A threshold of NLR > 8 was selected as a predictor of mortality; Relative Risk 2.20 (CI 1.71 to 2.85, p <0.0001). Table 1 documents significant findings using this threshold. A NLR > 8 was significantly associated with increased length of stay and mortality despite lower stratified disease burden on CTPA.

Conclusions NLR is a valid and readily available index of systemic inflammation. NLR is influenced by many conditions including age and may serve as a global predictive marker of outcome. Elevated NLR in this study was associated with longer duration of hospitalisation and higher mortality. This study supports its integration into the assessment of inpatient PE management.

'Fever!' – COVID-19 and pneumonia

P152 THE ASSOCIATION OF ABO AND RHESUS BLOOD GROUP WITH SEVERE OUTCOMES FROM NON-SARS COV-2 RESPIRATORY INFECTION: A PROSPECTIVE OBSERVATIONAL COHORT STUDY 2020–2022

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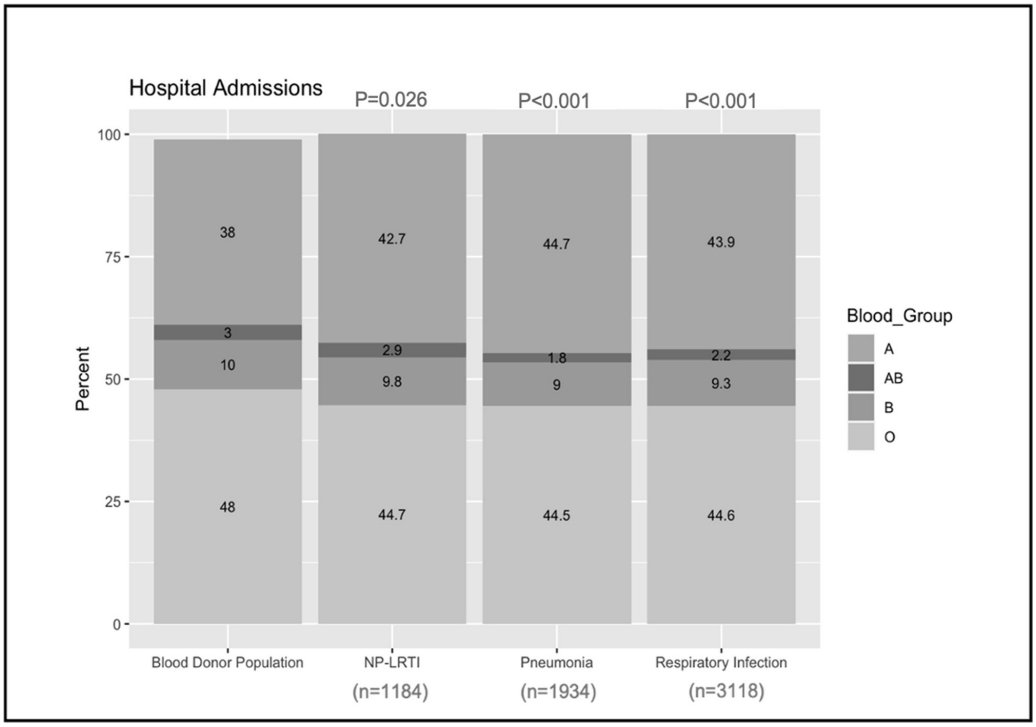
10.1136/thorax-2023-BTSabstracts.303

Background Recently, increased hospitalisation and poorer outcome has been found in blood group A patients with SARS-CoV-2 infection. Although ABO groups have been consistently



Abstract P152 Figure 1 ABO blood group distribution of patients hospitalised with SARS-CoV-2 negative respiratory infection, stratified by pneumonia and NP-LRTI, compared to the NHS blood donor population. All varied from the donor population (multinomial goodness of fit, *P<0.05* in all), being over-represented by group A and under-represented by group O.

linked with disease, there is a lack of data examining their association with non-SARS-CoV-2 respiratory infection.

Methods We analysed data from a prospective cohort study of adults (≥18y) hospitalised with acute lower respiratory tract disease, from 1st August 2020 to 31st July 2022. We included patients with acute respiratory infection, a negative SARS-CoV-2 test, and known blood group status. Univariate and multivariate logistic regression was used to assess ABO and Rhesus (RhD) influence on the likelihood of cardiovascular complications, and Cox proportional hazards for survival and hospital length of stay.

Results 3,118 adults with known blood group status were hospitalised with SARS-CoV-2 negative respiratory infection. Compared to the national donor population, blood group A and RhD-positive were over-represented in adults hospitalised with respiratory infection and in contrast blood group O were under-represented (both $P<0.05$).

Overall, morbidity was high: 61.1% (n=1906) patients had a cardiovascular complication, median hospitalisation was 6-days (IQR:3–12) and 30-day mortality was 14.0% (n=437). Univariate analysis revealed that, following hospitalisation, cardiovascular complications did not differ between A vs O (χ^2 $P=0.818$) or Rhesus (χ^2 $P=0.575$) blood groups: although, this population remained over-represented by group A (χ^2 $P<0.001$) and RhD-positive patients ($\chi^2 P<0.001$) compared to the donor population.

Multivariate analysis found that pneumonia had the strongest effect on cardiovascular complication (OR:1.36, 95%CI 1.17–1.59, $P<0.001$), increased the hazard of 30-day mortality (HR:3.08, 95%CI 2.39–4.0, $P<0.001$), and decreased 60-day discharge (HR:0.65, 95%CI 0.60–0.71, $P<0.001$). Neither ABO blood group nor RhD-status influenced the risk of cardiovascular complications, ICU admission, or 30-day mortality in respiratory infection. However, group A patients were more likely to be discharged in 60 days (HR=1.10, 95% CI 1.01–1.19, $P=0.029$).

Conclusions We found was some evidence that blood group A has a protective effect in SARS-CoV-2 negative respiratory infection, including against longer hospital admission. Further investigation by pathogen may be warranted in the future, and may allow more targeted approaches through stratifying treatment intervention benchmarks based on this varied risk.

Please refer to page A291 for declarations of interest related to this abstract.

P153 ADULT RESPIRATORY ILLNESS ATTENDANCES TO EMERGENCY DEPARTMENTS: THE PINNACLE OF WINTER PRESSURES

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10.1136/thorax-2023-BTSabstracts.304

Respiratory tract illness (RTI), has a major impact on NHS services each winter [1,2] and is an important contributor to serious cardiorespiratory illness. Additionally, Accident and Emergency (A&E) departments, are experiencing record attendances.[3] We sought to document the burden of cardiorespiratory-related A&E attendances during 2010–2020.

NHS Digital provided data including annual A&E attendance (April-March) 2010/11–2019/20 for all patients aged 65yrs+. Analysis was performed on attendances with either respiratory or cardiac conditions (identified by Emergency Department diagnostic codes), the resulting deposition of the attendances (admission or discharge), and trends over the 10-year period. Both cardiac and respiratory codes were chosen to capture all respiratory infections, and conditions exacerbated by infection.

A&E attendances for cardio-respiratory diagnoses rose consistently as a proportion of total attendances between 2010 and 2020 [298,540/3,101,262 (9.63%) to 681,623/4,883,419 (13.96%)]. Of these, the number leading to admission increased from 226,881 in 2010/11 to 356,575 in 2019/20, (15 to 24% of total admissions from A&E). The number discharged increased from 71,659 to 325,050. The absolute number presenting with a primary respiratory diagnosis increased faster than overall attendance.

This analysis suggests an increased percentage of A&E attendances were due to cardiorespiratory illness, cardiorespiratory admissions as a share of all emergency admissions continues to grow in spite of the >4x increase in patients discharged from A&E. The increase in 2019–20 is unlikely to be confounded by COVID-19 as data includes only 1 intra-pandemic month.

Winter season RTIs and cardiac disease exacerbations and events provoked by respiratory infection (e.g., congestive heart failure and myocardial infarction) are known to be important contributors to overall cardio-respiratory diagnoses. Preventative measures including licenced and soon to be licenced vaccines for pneumococcal, covid-19, influenza and RSV as well as early treatments against viral and bacterial RTI provide a potential opportunity to reduce cardiorespiratory presentations to A&E and help reduce the burden on the healthcare system.

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P154 FIFECAP2019: A DETAILED REVIEW OF DIAGNOSTIC TESTING AND ANTIBIOTIC THERAPY IN PATIENTS WITH SEVERE COMMUNITY ACQUIRED PNEUMONIA: A COHORT REVIEW OF 200 CONSECUTIVE HOSPITAL ADMISSIONS

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Background Community acquired pneumonia (CAP) remains a globally significant infection with an estimated UK annual incidence of 1% of all adults. Mortality correlates well with CURB65 scoring. Despite known recommendations from national guidelines through BTS/NICE, there remain inconsistencies in management. Critical areas for review include diagnostic testing, antibiotic use, and audit of care.

Methods Electronic records were reviewed from consecutive patients discharged from a large general hospital with an ICD-10 discharge diagnosis of CAP. Key clinical features were identified including demographics, severity and key outcomes. The study focus was on adherence of diagnostic testing and

antibiotic use to national guidelines. Relevant local service approvals were obtained.

Results 320 consecutive patients given a discharge coding for CAP from January 1st2019 were reviewed and 120 (38%) patients were excluded as they did not meet the definition. Most commonly this was due to the absence of pneumonia on imaging and/or its development during the admission. The remaining 200 patients had the following clinical features: 101 (51%) male, mean age 71 years (range 20–99), presentation with breathlessness (42%), confusion (15%) and cough (13%). Respiratory co-morbidities were apparent in 39% of all patients, including COPD (21%) and lung cancer (8%). CURB65 severity was mild in 44%, moderate in 32%, severe in 23%, with critical care admissions in 12% (HDU/ICU combined), including ICU in 6/200 (3%). Overall 30d mortality was 18.5%, mean length of stay 11.1 days and all-cause 30d readmission rate 22.5%. 60/200 (30%) received guideline-adherent microbiological tests based on their severity. In moderate-to-severe CAP, only 1/200 patients appropriately had both sputum and blood cultures sampled. Antibiotics were clearly documented in 128/200 (64%) patients, with empiric choice adherent to local policy in just 35%. Positive microbiological testing informed antibiotic change in 3/200 patients. 1 year all-cause mortality was 35%.

Discussion Managing CAP is challenging without prospective, electronic, and consistent data collection. Diagnostic tests are no longer fit for purpose, infrequently performed and then inconsistent with national guidelines. High 30d and 1 year mortality rates reflect a sick cohort that deserves a greater scrutiny of care and attention. Prospective CAP registries would improve CAP care.

P155 ASSESSING CONTINUED BENEFITS OF 4C SCORES FOR MORTALITY AMONG PATIENTS WITH COVID-19 PNEUMONITIS ADMITTED TO A TEACHING DISTRICT GENERAL HOSPITAL

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Background and Objectives The 4C (Coronavirus Clinical Characterisation Consortium) score incorporating patient co-morbidities with measures of acute physiology and inflammation is an internationally validated prognostic tool for in-hospital mortality introduced early during the COVID-19 pandemic. With the subsequent strong uptake of SARS-CoV-2-RNA vaccines, more targeted therapies, changing virulence of the coronavirus (now predominantly omicron), and fewer reported deaths, the goal/objectives of this work were to determine continuing relevance of 4C scores by (1) reporting their distribution categorised with risk profile and (2) further analysing mortality in the immediate in-hospital setting and at 12 months.

Methods Retrospective computer-based data including SARS-CoV-2-RNA vaccination status/boosters collected for patients with confirmed infection and COVID-19 pneumonitis admitted during 2 months to July 2022; subsequent analysis for mortality was by regression analysis accepting statistically significant findings for standardised beta coefficients at $p<.05$ adjusting for demographics, vaccination status and targeted COVID-19 directed (Remdesivir/Tocilizumab) therapeutic variables as well as oxygen (O_2) and use of medical devices.

Abstract P155 Table 1

		mortality after COVID-19		
4C score	number	in hospital	follow up	total (% died)
low (0–3)	4	0	0	0 (0.0%)
intermediate (4–8)	17	1	1	2(11.8%)
high (9–14)	40	7	9	16(40.0%)
very high (>15)	1	1	0	1(100%)
	62	9 (14.5%)	10 (16.1%)	19(30.6%)

Results 62 patients (47% males), with mean (SD, range) age 75.8 (15.4, 32–101) years were identified; 19 (30.6%), with mean survival 70 (67, 6–237) days (median 40 days), had died (9 in the initial admission and 10 during follow up). 55 (88.7%) had been vaccinated at least once. Distribution of 4C scores with mortality in-hospital and during follow up are shown in table 1; 8/9 (88.9%) in-hospital and 17/19 (89.5%) overall deaths were from patients with high or very high 4C scores. Independent variables statistically significant on regression analysis for in-hospital mortality included positively with 4C score ($p= .018$) and high O_2/medical ventilatory devices ($p= .000$), and negatively with age ($p= .048$), dexamethasone ($p= .046$), and targeted COVID treatments ($p= .036$) but not gender, status/number of vaccines, or low dose O_2 use. None of the variables were significant at 12 months.

Conclusions Analysis of this real-life data has shown continued role for 4C scores outside of their original validation; despite no statistical significance among independent variables at 12 months, the continued mortality (30.6% in the cohort) likely reflects on the significant burden of co-morbidity.

P156 AN AUDIT OF EMERGENCY AND RESPIRATORY PHYSICIAN CONCORDANCE TO THE AUSTRALIAN THERAPEUTIC GUIDELINE RECOMMENDATIONS FOR THE MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA BEFORE AND DURING THE COVID19 PANDEMIC

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Background In an Australian study of 700 community-acquired pneumonia (CAP) presentations to hospitals, only 18% received antibiotics that were concordant with guidelines. Current guidelines recommend tests for culprit organisms in severe CAP only. Most audits focus on prescribing in emergency departments (EDs).

Aims Our aim was to assess if antibiotic prescribing for adults with CAP and requesting tests for culprit organisms was concordant with the Therapeutic Guidelines (TG – the principal reference standard for antibiotic use in Australia) by emergency and respiratory physicians before and during the pandemic. We hypothesised the arrival of COVID19 would increase rates of non-concordance.

Methods We retrospectively identified adults admitted under a respiratory physician for CAP between January – May 2019

and 2020. CAP severity in ED and at the time of respiratory review was assessed using CORB and SMART-COP respectively. Tests for culprit organisms were recorded. Patients with immunosuppression, underlying lung disease or those from nursing homes were excluded.

Results ED **non**-concordance with TG antibiotic recommendations was 51% (28/55) in 2019 and improved to 37% (23/63) in 2020. Respiratory physician non-concordance was similar at 24% (13/55) and 28% (18/63) in 2019 and 2020 respectively. The most common reason for non-concordance was treating non-severe CAP as severe by both specialities. Documentation of CAP severity by clinicians was less than 30% overall.

Urinary antigens were requested in half of patients and less than one-third of these patients had severe CAP. The positive yield was 10%. Serological tests were requested in 40% of patients and one-quarter of these patients had severe CAP. The positive yield was 8%.

Conclusion Concordance with TG antibiotic recommendations in the ED improved following the arrival of COVID19. This may have been due to increased collaboration between ED and respiratory teams, and increased awareness of viral pneumonia. Encouraging clinicians to document CAP severity in their notes may help to reduce the rates of treating non-severe as severe CAP, improving concordance further. Culprit organism testing has low yield and should be reserved for patients with severe CAP.

P157 ACUTE RESPIRATORY INFECTION TESTING: A NOVEL PATHWAY TO CHARACTERISE EXACERBATIONS OF CHRONIC LUNG DISEASE AND ADDRESS ANTIMICROBIAL STEWARDSHIP

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Background Although COPD and asthma exacerbations are often due to viral infections, most receive antibiotics empirically in the community. Improved access to diagnostics within acute respiratory infection (ARI) virtual wards and diagnostic hubs are discussed within the NHS long term plan and national strategies to combat antimicrobial resistance (AMR).

We hypothesised that a model of care encompassing home assessment and virtual follow-up service with targeted testing using a point of care system, would help address winter pressures and AMR.

Objectives To investigate potential of the Biofire respiratory panel syndromic testing for:

1. Guiding decision making processes around treatment ARI in asthma or COPD in a primary care network, London.
2. Avoidance of hospital attendance
3. Reducing the overall impact on healthcare resource utilisation.

Methods Following AMR awareness campaigns for GPs and patients, a referral system was established whereby patients calling with symptoms suggestive of ARI were triaged and if deemed well enough not to require hospitalisation were evaluated and tested at home. A management plan constructed from this assessment was delivered within a couple of hours as well as relevant prescriptions. Sputum samples sent for those with purulent sputum all tested negative for microbiology. The study took place December 2022 to April 2023 and patients followed up, if necessary, over a period of 2 weeks after their initial review.

Results Of 78 patients, 21 tested positive for a virus; 4 received Oseltamivir and 62 required less than or equal to 1 follow up appointment as they were otherwise well, had recovered and confident in the management plan. Oral steroids were prescribed for only 12 and only one patient required antibiotics. Nobody attended the emergency department or required secondary care.

Discussion Addressing ARI in the community with a targeted approach, incorporating point-of-care diagnostics and virtual follow-up can allow for safer prescribing with better antimicrobial and steroid stewardship. Delivering antivirals at home sooner aids faster recovery from Influenza and prevents nosocomial infection as those testing positive for a virus have been diverted from attending the hospital and treated effectively at home. Health-economic modelling is currently underway.

P158 CHARACTERISTICS AND OUTCOMES OF PATIENTS WITH COVID-19 PRESUMED TO BE TREATED WITH SOTROVIMAB IN NHS HOSPITALS IN ENGLAND

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Introduction We describe characteristics and acute clinical outcomes in patients with COVID-19 treated with a monoclonal antibody (mAb; presumed to be sotrovimab) across six periods covering the emergence and predominance of Omicron subvariants (BA.1, BA.2 and BA.5) in England.

Methods Retrospective cohort study using Hospital Episode Statistics data from 1st January-31st July 2022. Included patients were aged $\geq$12 years and received a mAb at a National Health Service (NHS) hospital as a day-case (primary diagnosis: COVID-19). Patients were presumed to have received sotrovimab as NHS data showed that 99.98% of individuals treated with a mAb for COVID-19 during the study period received sotrovimab. COVID-19-attributable and all-cause hospitalisations were reported for the 28 days following treatment, both overall and across six distinct periods of Omicron subvariant predominance. Multivariate Poisson regression modelling was used to estimate incidence rate ratios for each period. Subgroup analyses were conducted among patients with severe renal disease (stage 4/5 chronic kidney disease, receiving peritoneal dialysis/haemodialysis or with a kidney transplant) and active cancer (patients with cancer receiving chemotherapy/radiotherapy within the previous 12 months).

Results We included 10,096 patients (mean age 56.4 years; 42.0% female). Most common high-risk comorbidities were immune-mediated inflammatory disorders (43.0%; n=4,337), severe renal disease (14.1%; n=1,422), rare neurological conditions (10.4%; n=1,053) and active cancer (9.0%; n=910). The overall proportions of patients with 28-day COVID-19-attributable and all-cause hospitalisations were 1.0% (n=96) and 4.6% (n=465), respectively. In the 28 days following treatment, 0.3% (n=27) of patients died due to any cause. COVID-19-attributable hospitalisation rates were consistent across subgroups and no significant differences were observed

Abstract P158 Table 1 28-day acute clinical outcomes across periods of Omicron subvariant predominance

	Period 1 (BA.1 predominant, BA.2 <25% prevalence) (*n*=2102)	Period 2 (25% > BA.2 <75% prevalence) (*n*=993)	Period 3 (BA.2 >75% prevalence) (*n*=3884)	Period 4 (BA.5 <25% prevalence) (*n*=573)	Period 5 (25% > BA.5 <75% prevalence) (*n*=1161)	Period 6 (BA.5 >75% prevalence) (*n*=1383)
COVID-19 attributable hospitalisation, *n* (%)	22 (1.0)	13 (1.3)	37 (1.0)	6 (1.0)	16 (1.4)	10 (0.7)
Incidence rate per 100 patient-days	0.040	0.050	0.036	0.040	0.052	0.028
Incidence rate ratio[a]	REF	1.16	0.76	0.8	1.07	0.56
(95% CI)		(0.58–2.31)	(0.44–1.30)	(0.32–1.99)	(0.56–2.06)	(0.26–1.19)
p value	REF	0.67	0.31	0.63	0.83	0.13

CI confidence interval, *COVID-19* Coronavirus disease 2019, *REF* reference group.
[a]Incidence of hospitalisation = (hospitalisations observed/total person time in days) x 100.

between periods of Omicron subvariant predominance (p-values 0.13–0.64; **table 1**).

Conclusion Low levels of COVID-19-attributable hospitalisations and deaths were observed in mAb-treated patients. Results were consistent across patients with severe renal disease and active cancer. No evidence of differences in hospitalisation rates were observed whilst Omicron BA.1, BA.2 or BA.5 subvariants were predominant, despite reported reductions in the in vitro neutralisation activity of sotrovimab against BA.2 and BA.5.

Please refer to page A291 for declarations of interest related to this abstract.

P159 COMPARATIVE EFFECTIVENESS OF SOTROVIMAB VERSUS NO TREATMENT IN INITIALLY NON-HOSPITALISED HIGH-RISK PATIENTS WITH COVID-19 IN NORTH WEST LONDON DURING OMICRON PREDOMINANCE: A RETROSPECTIVE COHORT STUDY USING THE DISCOVER DATASET

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Introduction There is uncertainty regarding how in vitro neutralisation activity correlates with clinical efficacy of sotrovimab against SARS-CoV-2 Omicron subvariants. We used observational data to assess the effectiveness of sotrovimab versus no early COVID-19 treatment in highest-risk COVID-19 patients during Omicron BA.1, BA.2, and BA.4/5 predominance.

Methods Retrospective cohort study using the Discover dataset in North-West London. Included patients were non-hospitalised at observed/imputed treatment date (index), aged ≥12 years old and met ≥1 of the NHS highest-risk criteria for early COVID-19 treatment with sotrovimab. We assessed the risk of COVID-19-related hospitalisation and/or death within 28 days of index between highest-risk sotrovimab-treated and highest-risk untreated patients. Subgroup analyses were performed for patients aged <65 and ≥65 years, patients with renal dysfunction, and by Omicron subvariant prevalence period (BA.1/2 emergence: 01/12/2021–12/02/2022 [period 1]; BA.2 reaching/at its peak: 13/02/2022–31/05/2022 [period 2]; BA.2 falling/BA.4/5 emergence: 01/06/2022–31/07/2022 [period 3]). Propensity score-based inverse probability of treatment weighting was used to adjust for measured confounders. Cox proportional hazards models with stabilised weights assessed hazard ratios (HRs).

Results We included 599 sotrovimab-treated and 5191 untreated patients. Compared with untreated patients, sotrovimab was associated with a reduction in the hazard of COVID-19 hospitalisation or death by 50% (HR=0.50, 95% CI: 0.24, 1.06), and the hazard of COVID-19 hospitalisation by 57% (HR=0.43, 95% CI: 0.18, 1.00), although statistical significance was not reached (p=0.07 and p=0.051, respectively). In the ≥65 years and renal disease subgroups, sotrovimab reduced the hazard of COVID-19 hospitalisation by 89% (HR=0.11, 95% CI: 0.02, 0.82; p=0.03) and 82% (HR=0.18, 95% CI: 0.05, 0.62; p=0.007), respectively. In periods 1, 2 and 3, HRs of COVID-19 hospitalisation or death were 0.25 (95% CI: 0.07, 0.89; p=0.032), 0.53 (95% CI: 0.14, 2.00; p=0.35) and 0.78 (95% CI: 0.23, 2.69; p=0.69), respectively.

Conclusion Despite notable effect size, statistically significant evidence of benefit for sotrovimab in reducing the risk of COVID-19 hospitalisation was not demonstrated for the overall cohort at the current sample size (p=0.051). Risk of COVID-19 hospitalisation in sotrovimab-treated patients aged ≥65 years and with renal disease was significantly reduced.

Please refer to page A291 for declarations of interest related to this abstract.

P160 INTERIM RESULTS OF A PROSPECTIVE COHORT STUDY TO MONITOR THE EMERGENCE OF RESISTANCE IN IMMUNOCOMPROMISED NON-HOSPITALISED PATIENTS WITH COVID-19 WHO WERE TREATED WITH SOTROVIMAB IN GREAT BRITAIN: LUNAR STUDY

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Introduction Immunocompromised (IC) patients are at risk of adverse COVID-19 outcomes. The risk of treatment emergent resistance may be high in this population. This study investigated clinical and virological outcomes in sotrovimab-treated

Abstract P160 Table 1 Summary of absolute viral load (log_{10} copies/mL) through Day 28, as measured by qRT-PCR from nasal/oropharyngeal swabs

Visit	Viral load (log_{10} copies/mL)	Sotrovimab (500 mg IV) (N=195)
Baseline	n	188
	Median	7.460
	(Min, Max)	(2.46, 9.52)
Day 7	n	178
	Median	4.435
	(Min, Max)	(0.55, 8.51)
Day 14	n	175
	Median	2.360
	(Min, Max)	(0.55, 8.43)
Day 28	n	172
	Median	0.550
	(Min, Max)	(0.55, 8.35)

Note: Baseline log_{10} viral load was defined as the non-missing assessment taken at Day 0, excluding the negative viral load results. The post-baseline viral load values with Ct value > 38 were imputed as half the lower limit of detection (i.e. 453 copies/mL*0.5=226.5). Negative viral loads were defined as Ct $\geq$ 45 and were imputed as 3.57 copies/mL. These imputed values were used to derive log_{10} viral loads.
Ct, cycle threshold; IV, intravenous; qRT-PCR, quantitative real-time reverse transcriptase polymerase chain reaction

IC patients in Great Britain while the Omicron variant was predominant.

Methods IC, non-hospitalised patients aged ≥18 years who were infected with SARS-CoV-2 and received early treatment with sotrovimab 500 mg IV for COVID-19 as per standard of care were included in this multicentre, single arm, observational prospective cohort study. Nasal/oropharyngeal samples were collected at baseline, Day (D) 7, 14, and 28 (+/-2 days) for viral load and sequencing analyses. Clinical (hospitalisation, respiratory support, intensive care unit [ICU] admission and death) and safety outcomes were assessed through D28. This interim analysis included patients enrolled from 1 July 2022–31 January 2023.

Results Among 195 patients (median age: 58 years), 56% were female, 86% were white, and 98.5% had ≥1 COVID-19 vaccine dose prior to enrolment. All patients received sotrovimab within 8 (median: 2) days of diagnosis. Absolute median viral load declined from 7.46 log_{10} copies/mL at baseline to 0.55 log_{10} copies/mL at D28 (**table 1**). Of 189 patients with spike consensus sequencing data, all harboured the Omicron variant, with 32 sublineages identified. Omicron BA.4, BQ.1, BE.9, BA.5.1.18, and BN.1 were most common in this data cut. We also plan to present interim data on treatment emergent substitutions. No patients were hospitalised due to COVID-19. Six (1.3%) patients had all-cause hospitalisations; none were admitted to ICU. One patient (0.5%; infected with Omicron CH.1.1) with progressive neuromuscular disease needed high flow oxygen/non-invasive mechanical intervention and died on D18 (death deemed not COVID-19-related by investigator). Three mild sotrovimab-related adverse events were reported.

Conclusion Sotrovimab-treated patients had reduced viral load by D7 which further decreased through D28, despite being IC and infected with Omicron subvariants (reduced in vitro neutralization has been reported for some of the subvariants). Few severe clinical outcomes were reported (all unrelated to COVID-19).

Please refer to page A291 for declarations of interest related to this abstract.

P161 ANTIVIRAL EFFECTS OF A NOVEL NANOEMULSION FORMULATION OF NIRMATRELVIR FOR A NASAL DELIVERY ON CORONAVIRUS INFECTION IN HUMAN NASAL EPITHELIUM

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Background During COVID19 pandemic, a small molecule antiviral agent PAXLOVID^{TM} was authorised for emergency use. The main antiviral component is nirmatrelvir, a coronavirus M^{PRO} inhibitor, but it was combined with ritonavir to achieve persistent cell exposure. Respiratory virus usually infects through the nose and intranasal treatment is an attractive option for prophylactic treatment but challenging. Therefore, alternate strategies to deliver and retain nirmatrelvir within a treated cell is of great importance.

Aim The aim of this project is to investigate antiviral effects of nirmatrelvir in a novel nanoemulsion formulation on coronavirus infected human primary nasal epithelium.

Method Seasonal coronavirus (HCOV-229E) was inoculated to the apical surface of air liquid interface (ALI) cultured human primary nasal epithelium. Viral load in apical wash was determined by a 50% tissue culture infectious dose ($TCID_{50}$) assay and RT-PCR. Cell integrity, a marker of cell damage by virus infection, was measured as a transmembrane electrical resistance (TEER). 50 µL of nirmatrelvir (0.1 µM) prepared in water or as a nanoemulsion was applied to apical surface of ALI nasal epithelium for 10 min, and virus inoculum (0.2 MOI) was then applied to apical surface on top of the treatment for 1 hr. Apical surface wash with media was collected after treatment, then 1, 2 and 3 days post virus inoculation.

Results HCoV viral load was maximal at Day 1 post inoculation. Analysis of the area under the curve (AUC) of viral load for 3 days post inoculation revealed that nirmatrelvir in water, nanoemulsion alone, and nirmatrelvir in nanoemulsion showed 69.5%, 89.8% and 100% inhibition of viral load vs. control, respectively. RT-PCR AUC was also inhibited by 13.5%, 52.2% and 100%, respectively, suggesting nirmatrelvir and nanoemulsion component showed synergistic effects. The nirmatrelvir in nanoemulsion also protected from virus induced reduction of TEER. The nirmatrelvir in nanoemulsion was well tolerated and not cytotoxic.

Conclusion Novel nanoemulsion formulation of nirmatrelvir was found to show better antiviral effects against COV infection in human primary nasal epithelium.

Please refer to page A291 for declarations of interest related to this abstract.

P162 EPIDEMIOLOGICAL RISK FACTORS FOR DEVELOPING LONG COVID: A RAPID REVIEW WITH META-ANALYSIS

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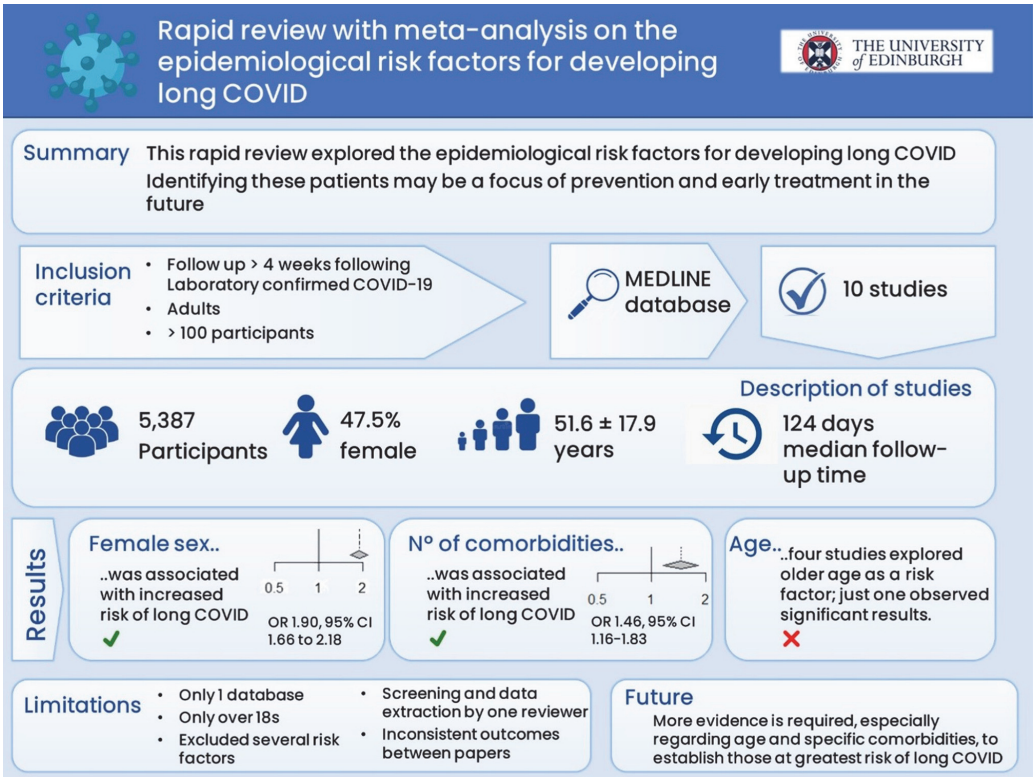

Abstract P162 Figure 1

Introduction Long COVID, characterized by persistent symptoms after the acute phase of SARS-CoV-2 infection, affects an estimated two million (3.1%) people in the UK.[1] However, the epidemiological risk factors for developing this condition remain poorly understood. This study aimed to review the current literature and conduct a meta-analysis of the risk factors associated with long COVID.

Methods MEDLINE database was searched. Multivariate regression analysis studies exploring sex, age or comorbidities as risk factors were included. All studies required > 100 adult participants with laboratory-confirmed COVID-19 and follow-up at least four weeks following diagnosis. The risk of bias was assessed using the JBI critical appraisal tool. For risk factors that met eligibility criteria for meta-analysis, a provision of pooled estimates via a random-effects meta-analysis was conducted.

Results Of 2585 studies screened, ten studies were included in this review; presenting data on 5,387 patients (mean age 51.6 ± 17.9, 47.5% female). Meta-analysis of seven studies found female sex to be a risk factor for long COVID (OR 1.90, 95% CI 1.66 to 2.18). Meta-analysis of four studies found comorbidities to also be a risk factor (OR 1.46, 95% CI 1.16–1.83), and one study found COPD to be a specific risk factor. Four studies explored older age as a risk factor; just one observed significant results.

Conclusion Despite good quality data demonstrating female sex as a risk factor, evidence for the other risk factors, especially age and specific comorbidities, is heterogeneous. Considering the large burden of disease associated with long COVID, research must continue to further understand this condition.

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'Two Way Traffic' – Challenging the status quo in asthma

P163 **INHALED AND ORAL CORTICOSTEROID TREATMENT HIGHLIGHTS DIFFERENTIAL EFFECTS IN BLOOD AND AIRWAY COMPARTMENTS IN TYPE-2 HIGH ASTHMA**

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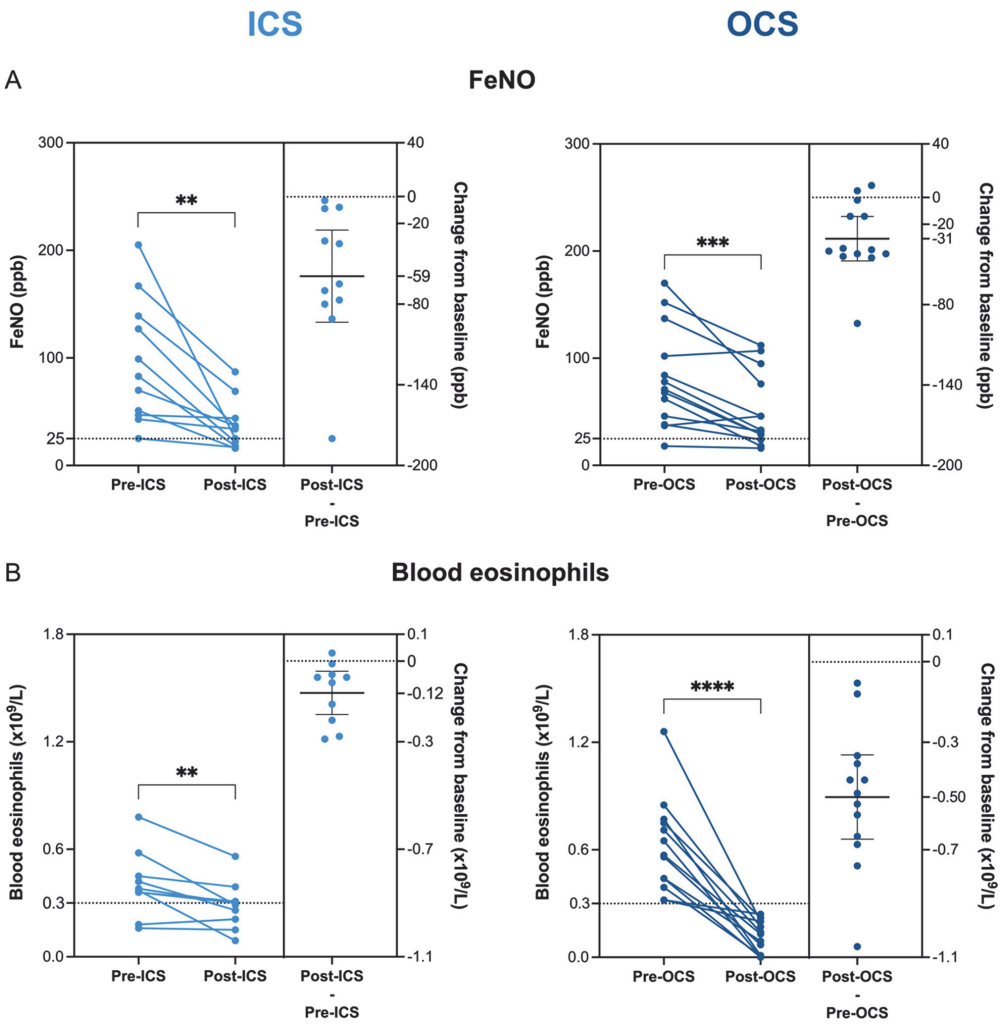
10.1136/thorax-2023-BTSabstracts.314

Exhaled nitric oxide (FeNO) and blood eosinophilia are important biomarkers of type-2 inflammation with additive predictive value in asthma. We have shown that high FeNO correlates with chemokines and cytokines involved in epithelial signalling whilst blood eosinophil levels correlate with serum interleukin-5 only.[1] This suggests that FeNO more accurately reflects inflammation in the airway 'compartment' and blood eosinophil count reflects the systemic 'compartment' in eosinophilic asthma. We now test the hypothesis that the effect of low dose inhaled corticosteroids and oral corticosteroids, both effective treatments for eosinophilic airway inflammation, have differential effects on the airway (reflected by FeNO) and systemic compartment (reflected by blood eosinophils) in patients with eosinophilic asthma.



Abstract P163 Figure 1

Corticosteroid-naïve patients were assessed before and after 8 weeks of 200 mcg twice daily beclomethasone via aero-chamber. Patients with eosinophilic asthma established on inhaled treatment were assessed before and after 10 days of 30 mg prednisolone daily. Patients were at steady state and had evidence of type-2 airway inflammation reflected by either baseline FeNO >45ppb and/or blood eosinophils >0.30x10^9/L.

11 patients were recruited to the ICS group and 13 to the OCS group. Groups were matched for age but not baseline FEV_1. Low-dose ICS produced a large median decrease in FeNO of 53.5%, $p < 0.002$, 95% CI [36.1, 71.0] and a small decrease in blood eosinophilia of 18.8% $p < 0.005$, 95% CI [6.5, 42.8] (figure 1). By contrast, OCS resulted in a comparatively smaller reduction in FeNO of 34.8%, $p < 0.001$, 95% CI [18.0, 51.5] but a large decrease in blood eosinophils of 80.3%, $p < 0.001$, 95% CI [64.3, 92.3].

These results suggest inhaled and oral steroids act differentially in the airway and blood compartments. The relative resistance to inhaled corticosteroids identified in some patients with type-2 high asthma, and the comparative success of oral therapy in this group, may reflect a greater contribution from the systemic reservoir of blood eosinophils.

REFERENCE

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P164 THE INFLUENCE OF AGE ON THE DIAGNOSTIC PERFORMANCE OF TYPE-2 BIOMARKERS IN SUSPECTED ASTHMA

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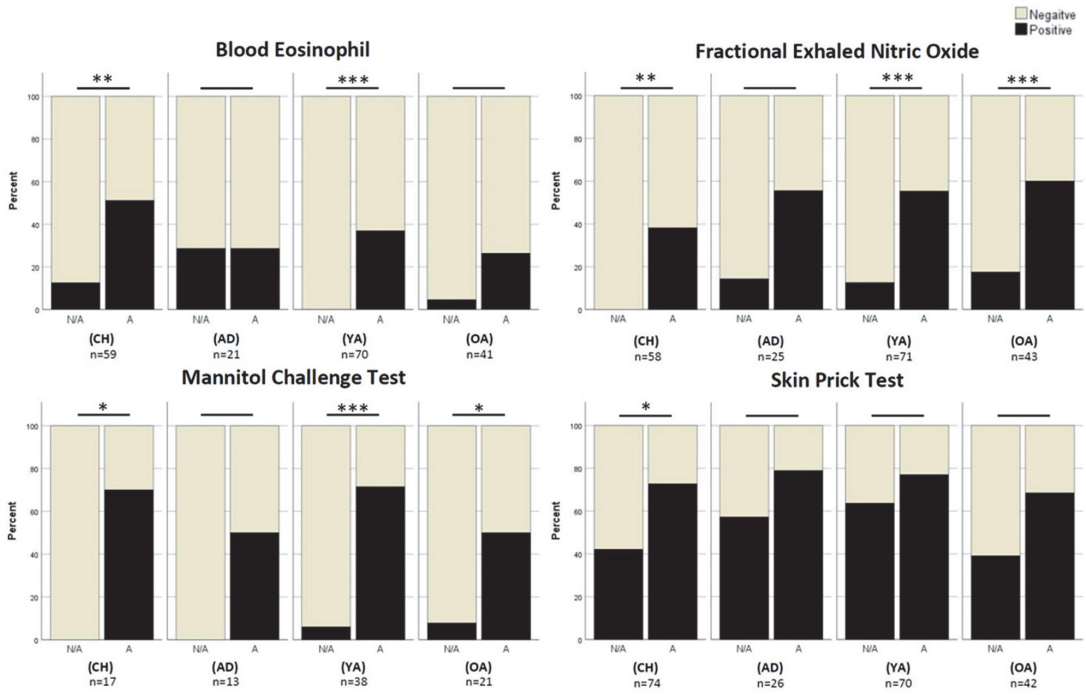
10.1136/thorax-2023-BTSabstracts.315

Background Asthma is a heterogeneous disease and there is no gold-standard diagnostic test. Type-2 biomarkers are utilised in asthma diagnostic and monitoring guidelines, but age-stratified cutoffs are not consistently recommended. We investigated the effect of age on type-2 biomarkers in patients with suspected asthma at the diagnostic setting.

Method Symptomatic and untreated patients with symptoms suggestive of asthma were recruited from primary care. Patients were skin prick tested, fractional exhaled nitric oxide (FeNO) and blood eosinophil counts measured. Key asthma diagnostic tests, including mannitol bronchial challenges (which provokes mast cell degranulation) were performed before 6–8 weeks trial of inhaled corticosteroids. A diagnosis of asthma was confirmed or refuted following a panel discussion



Abstract P164 Figure 1 Type 2 biomarkers by age-group. Cutoffs: blood eosinophils > 0.5 x 10^9/L in children/adolescents, > 0.4 x 10^9/L in adults; FeNO > 35 ppb in children and adolescents, > 40 ppb in adults. * p< 0.05, ** p<0.01, *** p < 0.001 (Fisher's exact test). A Asthma, N/A Not Asthma, (CH) Children (<12 years), (AD) Adolescence (12–17 years), (YA) Young adults (18–39 years), (OA) Older Adults (240 years).

including at least two asthma specialists. Age groups were divided into children (<12 years), adolescents (12–17 years), young adults (18–39 years) and older adults (≥40 years).

Results Of 215 patients with a definitive diagnostic outcome, 74 were children (median [IQR] age 8.3 [7.0–10.4] yrs; 74.3% diagnosed with asthma), 26 adolescents (14.3 [13.2–16.6] yrs, 73.1% asthma), 72 young adults (29.2 [24.7–32.2] yrs, 66.7% asthma) and 43 older adults (48.4 [42.3–56.5] yrs; 46.5% asthma). Median FeNO increased with age in asthmatic children and adolescents (β=6.38 [95%CI: 0.37, 9.05], p=0.032); there was also a trend of increased FeNO with age in symptomatic children and adolescents without asthma (1.12 [-0.004, 2.13], p=0.073). Age did not influence FeNO in symptomatic adults. Median blood eosinophils decreased with age overall (-0.004 [-0.006, -0.002], p=0.004) and in asthmatic individuals (-0.006 [-0.008, -0.002], p=0.001). Using fixed cutoff values, the prevalence of positive FeNO was higher in adults, and high blood eosinophils in children (figure 1). No age related associations were observed in the prevalence of positive mannitol challenges or skin prick tests.

Conclusion Type-2 biomarkers are associated with age in asthma and so refinement of age adjusted cutoff values may improve diagnostic accuracy. The mechanisms which drive the pattern differences in the associations between type-2 biomarkers and age should be further investigated.

P165 HOW BEST TO MEASURE ASTHMA ATTACKS? A METHODOLOGICAL SYSTEMATIC REVIEW

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10.1136/thorax-2023-BTSabstracts.316

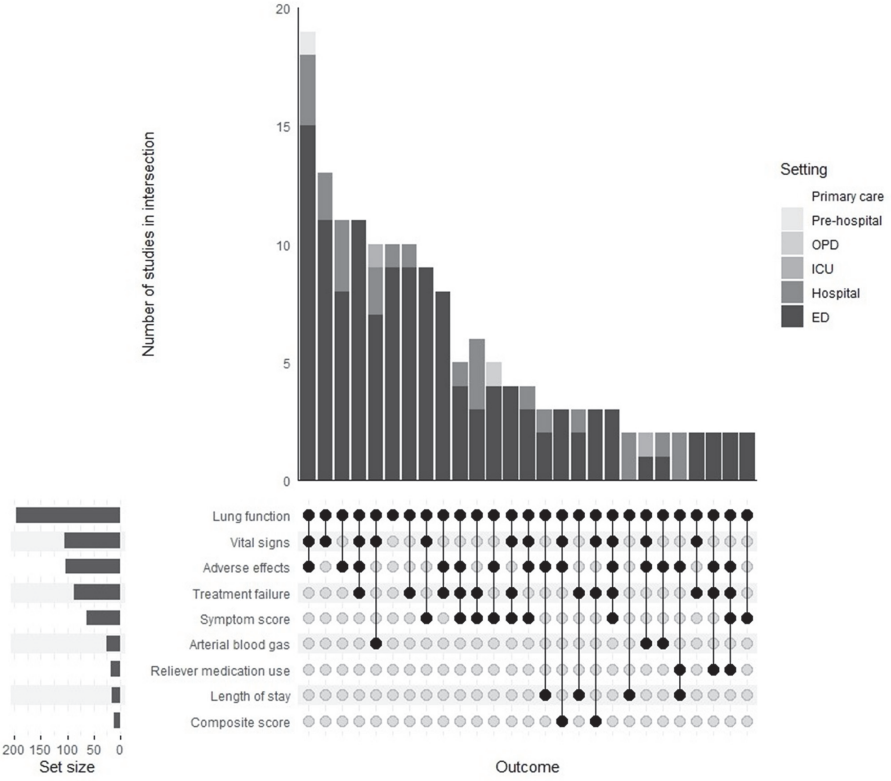
Background Asthma attacks are a common problem for people with asthma and are responsible for significant healthcare costs. There is interest in a precision medicine approach to management. However, the assessment of treatment outcomes is hampered by the absence of a consensus on suitable outcome measures. We carried out a methodological systematic review to understand the characteristics of outcome measures used in randomised controlled trials (RCT) of asthma attacks.

Methods The protocol was registered on PROSPERO (CRD42022311479). We searched for RCTs comparing treatments for adults with asthma attacks, published in English between 1972–2022 on MEDLINE, Embase and Cochrane Library databases. We recorded the outcome measures and study characteristics.

Results We identified 208 RCTs from 35 countries. Trials ranged from 12 to 1109 participants, with a median of 60. The most common settings were the emergency department (165) and hospital admission (33). Only 128 studies had primary and secondary outcomes defined clearly. In those that did, 73% of primary outcomes measured change in lung function or other physiological parameters over a short period (usually <24 hours). Patient-reported and healthcare utilisation outcomes were the primary outcome in 27%.

Conclusions Outcomes in asthma attack RCTs focus on short-term changes in lung function and may not capture patient-centred and economically important longer-term outcomes. More work is needed to investigate patient and other stakeholders' preferences on core outcome sets.

Upset plot demonstrating the grouping of different types of outcome measures used in acute asthma. In the lower panel, intersections (black dots connected with a line) show when a trial reported those outcomes. The bar graph above is a count of the number of trials that report different intersections, shaded by setting. The bar graph on the bottom left shows



Abstract P165 Figure 1 The profile of outcomes chosen for trials of asthma attacks.

the total that each outcome was reported for all trials. Intersections where only one trial reported a specific combination of outcomes are not shown. FEV_1 and PEF have been combined into 'lung function'.

The graph highlights that most asthma trials are conducted in the emergency department setting and predominantly report physiological outcomes.

Please refer to page A291 for declarations of interest related to this abstract.

P166 EXTERNAL VALIDATION OF THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE OF FRACTIONAL EXHALED NITRIC OXIDE USING THE ASTHMA CONTROL QUESTIONNAIRE: A SECONDARY ANALYSIS OF TWO RCTS IN MILD OR MODERATE ASTHMA

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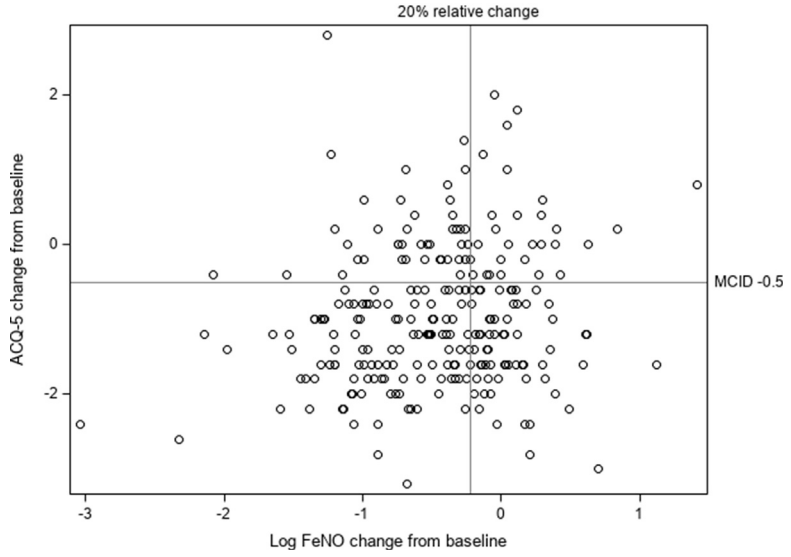
10.1136/thorax-2023-BTSabstracts.317



Abstract P166 Figure 1 Change in ACQ-5 versus log FeNO in 'active uncontrolled' sub-group.

Introduction The utility of fractional exhaled nitric oxide (FeNO) in randomised controlled trials (RCTs) of asthma, particularly the minimal clinical important difference (MCID), is uncertain. The American Thoracic Society recommends that the MCID for FeNO is a relative change of ≥20%. However, this effect size has not been validated against other clinical outcomes. Here we report the relationship between FeNO and a patient reported outcome measure of asthma control, for which the MCID is known, in a secondary analysis of two RCTs in mild-moderate asthma.

Methods The PRACTICAL and Novel-START studies were 52-week open-label RCTs comparing as-required SABA with or without maintenance ICS versus as-required ICS-formoterol. This analysis includes participants with measurements of both FeNO and the Asthma Control Questionnaire-5 item (ACQ-5). FeNO was analysed on the logarithm (log) scale, and associations between change in log FeNO and ACQ-5 were estimated. The MCID for the ACQ-5 is 0.5. Associations were assessed with Spearman's rank correlation coefficient, t-tests, and logistic regression. A sub-group analysis was performed for those participants with 'active uncontrolled' asthma, baseline FeNO ≥25ppb and ACQ ≥1.5.

Results A total of 1398 participants had FeNO and ACQ-5 data and, of these, 242 had 'active uncontrolled' asthma. There was a weak association between change in log FeNO and ACQ-5; correlation coefficient 0.08 (P=0.002) and 0.14 (P=0.026) for the total and sub-group respectively (figure 1). In the total group the mean (SD) change in log FeNO for those with an ACQ-5 improvement of < 0.5 was -0.14 (0.60), N=820; and -0.25 (0.64), N=530 for those with ACQ-5 improvement ≥0.5; representing geometric mean ratios of 0.87 and 0.78 respectively. In the sub-group these values were -0.33 (0.57), N=69; and -0.52 (0.61), N=173; representing geometric mean ratios of 0.72 and 0.59 respectively. AUC-ROC in the two groups for FeNO versus an improvement in ACQ-5 ≥0.5 was 0.54 overall and 0.59 in the sub-group.

Discussion FeNO changes are a poor surrogate for the ACQ-5. However, the magnitude of the changes in FeNO in those with an improvement in ACQ-5 ≥ 0.5 supports that the MCID for FeNO may be about a 20% relative change.

Please refer to page A291 for declarations of interest related to this abstract.

P167 ENDOTHELIAL DYSFUNCTION AND ARTERIAL STIFFNESS IN PEOPLE WITH ASTHMA: A SYSTEMATIC REVIEW OF THE EVIDENCE AND META-ANALYSIS

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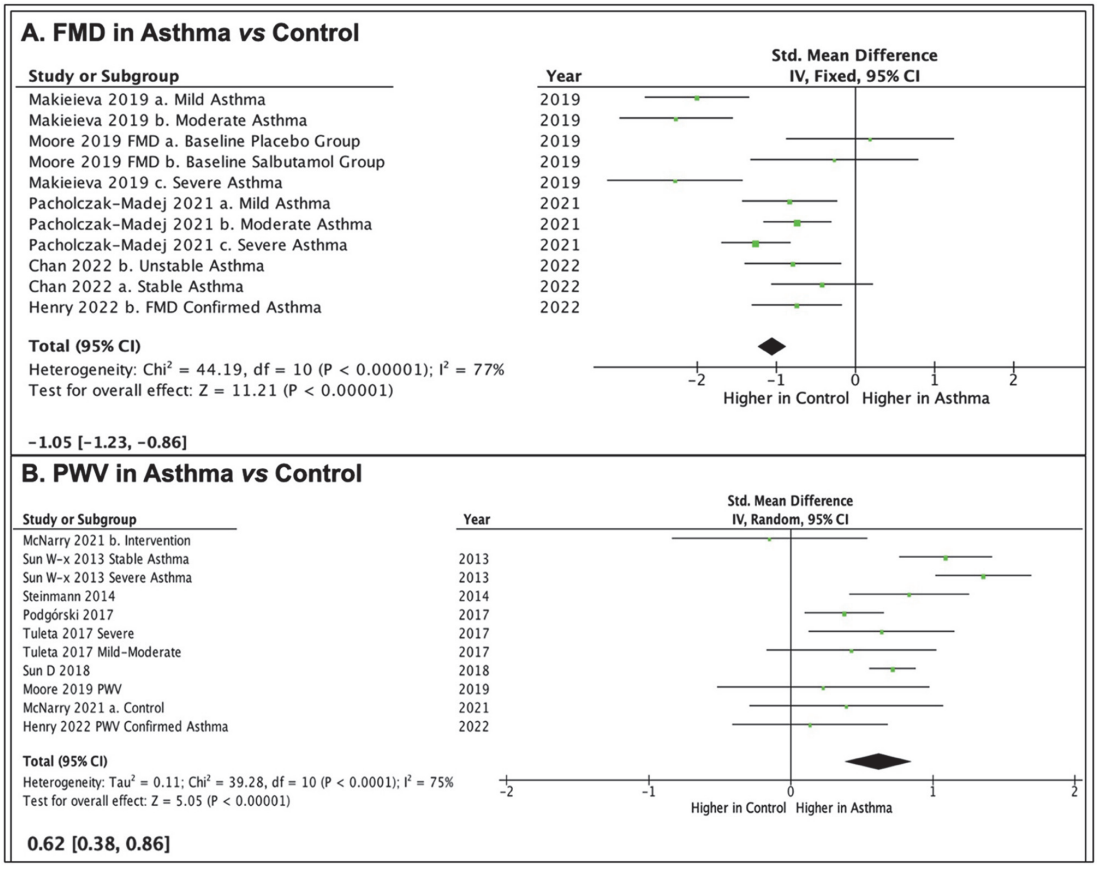
10.1136/thorax-2023-BTSabstracts.318

Introduction and Objectives Epidemiological evidence suggests a link between asthma and increased cardiovascular disease (CVD) risk, but confirmation of a shared disease



Abstract P167 Figure 1 A. Forrest Plot for Flow-mediated dilatation, and B. Pulse-wave velocity.

pathophysiology has not been reported. Therefore, this systematic literature review and meta-analysis evaluated whether people with asthma, and healthy controls, differed by intermediate markers of CVD development, i.e. endothelial function and arterial stiffness (assessed by flow-mediated dilatation (FMD) and pulse-wave velocity (PWV) techniques, respectively).

Methods Studies involving people with asthma and healthy controls, including cross-sectional, observational, cohort studies and parallel-designed, and randomised controlled trials, were identified by searching MEDLINE, EMBASE, EMCARE, CINAHL and PsycINFO in September 2022.

Results Eleven studies were identified for inclusion in both qualitative synthesis and meta-analysis. FMD ($n=5$ studies) was compromised in people with asthma compared to controls (SMD: -1.06, 95% CI = -1.46 to -0.66; I^2= 77%, $P=<0.00001$). Subgroup analysis revealed poorer endothelial function in adults (SMD: -0.77, 95% CI = -1.09 to -0.44; I^2 = 43%), children and adolescents (SMD -1.53, 95% CI = -2.31 to -0.75; I^2 = 85%) with asthma, compared to controls. Likewise, increasing asthma severity exacerbated this observation; with increasing endothelial dysfunction in mild to moderate asthma (SMD: -0.93, 95% CI = -1.44 to -0.42; I^2 = 79%) and severe asthma (SMD: -1.37. 95% CI = -2.07 to -0.67; $I^2$77%) compared to controls. PWV ($n=8$ studies) was also higher in asthma (SMD: 0.68, 95% CI = 0.44 to 0.91; I^2 = 73%, $P=<0.00001$) than controls – with subgroup analysis showing increased arterial stiffness in children and adolescents (SMD 0.70, 95% CI = 0.30 to 1.10; I^2 = 14%), adults (SMD: 0.67, 95% CI = 0.40 to 0.95; I^2 = 78%), those with severe asthma (SMD: 0.81, 95% CI = 0.17 to 1.45; I^2 = 73%) and mild to moderate asthma (SMD: 1.02, 95% CI = 0.32 to 1.72; I^2 = 81%) compared to controls.

Conclusions Endothelial dysfunction and arterial stiffness are worse in those with asthma, and this is apparent in adults, children and adolescents and in those with severe and mild/moderate asthma. This may contribute to higher CVD risk in asthma.

Please refer to page A291 for declarations of interest related to this abstract.

P168 ASSOCIATION BETWEEN METFORMIN AND ASTHMA EXACERBATIONS: A SELF-CONTROLLED CASE SERIES

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10.1136/thorax-2023-BTSabstracts.319

Background Insulin resistance and metabolic dysfunction are linked to asthma exacerbations. The precise action of metformin, the first-line diabetes medication, is incompletely characterised but anti-inflammatory properties have been described. Our objective was to investigate metformin's potential in reducing asthma exacerbations among adults using a self-controlled case series. This methodology is used increasingly to determine drug effectiveness due to its elimination of confounding, as each patient acts as their own control.

Methods This self-controlled case series study utilized primary care data (Clinical Practice Research Datalink) linked to secondary care data. We identified asthma patients aged $\geq$ 18 who initiated metformin between 2004 and 2021 and were regular users. Asthma exacerbations were identified as oral corticosteroids prescriptions, hospital admission, or death. Conditional Poisson regression was employed to determine incidence rate ratios (IRR) of exacerbations in the new metformin treatment period compared to the non-treatment period in the same individuals. The model was adjusted for age.

Abstract P168 Table 1 Risk of asthma exacerbations in metformin users in different treatment periods

	Adjusted IRR	95% CI	p-value
Exposure period			
Non-treatment period	Reference		
30 days	0.61	0.32 – 1.17	0.139
1 year	0.78	0.65 – 0.94	0.011
2 years	0.68	0.56 – 0.83	<0.001
3 years	0.74	0.61 – 0.90	0.002
4 years	0.54	0.53 – 0.68	<0.001
5 years	0.42	0.32 – 0.54	<0.001

Results In total, 1,694 new regular metformin-users were identified (57% female, 58.3 years [SD 14.3]). The IRR of asthma exacerbations was 0.61 (95% CI 0.32 to 1.17) for 30-day use, 0.78 (95% CI 0.65 to 0.94) for 1-year use, and 0.68 (95% CI 0.56 to 0.83) for 2-year use, compared to the non-treatment period. Even lower IRRs were observed for longer metformin use: 0.54 (95% CI 0.43 to 0.68) for 4-year use and 0.42 (95% CI 0.32 to 0.54) for 5-year use.

Conclusion The incidence of asthma exacerbations significantly decreased after the initiation of metformin. Further work confirming the strength of the effect is ongoing, but these initial results indicate a potential innovative therapeutic option to manage diabetes-linked asthma.

P169 OXYSTEROLS IN ASTHMA: A NOVEL PILOT STUDY

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10.1136/thorax-2023-BTSabstracts.320

Introduction Asthma is a complex disease with a multitude of molecular and immunological pathways. Metabolomic studies in asthma are evolving with consistent differences in lipidomic signatures. Oxysterols, oxidised metabolites of cholesterol and its products, have more recently proven to be biologically active molecules demonstrating immune modulating properties. The relationship between oxysterols and asthma has been postulated in a handful of animal studies. Potential roles include LXR agonists, EBI2 ligands and anti-viral properties. This affirms that oxysterols and bile acids are biological molecules of interest in this field.

This novel observational case control study was designed to identify and quantify oxysterol species in the serum of controls compared with asthmatics of different severities. The overall aim was to identify new disease specific biomarkers to aid in diagnosis and understanding of the disease process.

Methods This was a novel observational pilot study. 35 Participants were recruited via Swansea University and divided into a control group (n=15) and asthma group (n=20). The asthma cohort was further divided into 10 mild/moderate and

10 severe according to GINA classification. The control group consisted of non smokers (10) and smokers (5). Serum was collected and oxysterols extracted as per our lab protocol and quantified via liquid chromatography mass spectrometry (LC-MS). ANOVA analysis was conducted on the normally distributed data via SPSS.

Results A total of 11 sterol species and bile acids were quantified following extraction The concentration of 25-Hydroxycholesterol (25-HC) was significantly reduced in the serum of the severe asthma group compared with the mild/moderate group (1.20 ng/ml vs 1.70 ng/ml, p= 0.008). Interestingly no similar difference was observed when comparing the asthma and control group. A reduced concentration of 7α,25-diHC-was observed in the serum of the asthma cohort compared with the control group (0.090 ng/ml vs 0.158 ng/ml, p= 0.026).

Conclusion This observational pilot data highlights potential roles for 25-HC and 7α,25-diHC in the pathogenesis of asthma. Results should be used to inform larger scale studies.

REFERENCE

1. Britt RD, Porter N, Grayson MH, *et al*. Sterols and immune mechanisms in asthma. *J Allergy Clin Immunol*. 2023 Jan;**151**(1):47–59.

P170 TAPERING COURSES OF ORAL CORTICOSTEROIDS AFTER HOSPITAL ADMISSION DUE TO ASTHMA EXACERBATION

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10.1136/thorax-2023-BTSabstracts.321

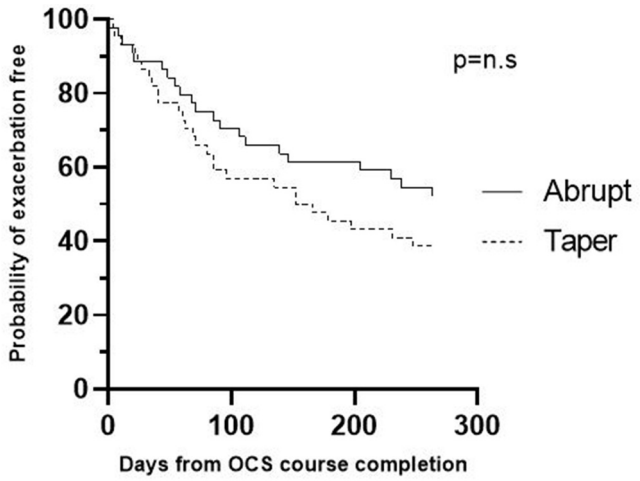
Background Asthma exacerbations requiring hospitalisation are treated with high-dose oral corticosteroids (OCS). However, increased cumulative OCS dose is associated with significant adverse effects. Guidelines suggest only tapering OCS to avoid adrenal insufficiency in patients whose OCS course exceeds 2 weeks, or who take maintenance OCS. There is no evidence that tapering OCS improves future exacerbation risk, although data is limited.

Aims Compare OCS tapering after asthma exacerbation to guidelines, identify factors associated with OCS tapering, and investigate if tapering improves outcomes.

Methods Firstly, asthma exacerbation discharge summaries from May to October 2021 at a large UK hospital trust were reviewed to establish clinician practice compared to national/international guidelines. Secondly, tapering OCS patients were matched to patients with abrupt OCS cessation by admission date. Taper and abrupt patient data were compared using hospital and primary care electronic health records.

Results 44 of 318 (13.8%) asthma exacerbation episodes received tapering OCS. Median duration of highest dose OCS was not significantly different between taper (7 days) and abrupt (6 days) groups. 4/44 taper and 1/44 abrupt patients had an acute OCS course >14 days. 10/44 taper and 13/44 abrupt patients had received OCS within 14 days pre-admission. 13/44 taper and 4/44 abrupt patients were prescribed maintenance OCS. Overall, 17/44 (39%) taper and 6/44 (14%) abrupt patients met guideline criteria for OCS taper.

Tapering OCS patients had a longer hospital admission (median [IQR] 4 [2–5] vs 1 [0–4] days; p=0.004) and more asthma admissions in the preceding 6 months (median [IQR] 0 [0–1] vs 0 [0–0]; p=0.004) compared to abrupt OCS patients. There was no difference in blood eosinophils.



Abstract P170 Figure 1 Exacerbation free survival following completion of oral corticosteroid course in tapering and abrupt cessation patients.

Median [IQR] days from completion of OCS to next exacerbation was no different between taper (69 [33–152]) and abrupt (71 [32–143]) groups (p=n.s). Mean (SD) total dose of OCS (Prednisolone) was 835 (305) mg in taper patients compared to 295 (136) mg in abrupt patients (p=<0.0001).

Conclusion Clinicians often prescribe tapering OCS courses outside of guideline recommendations, possibly with the aim of reducing future exacerbation risk. Tapering OCS was not associated with increased time to next exacerbation, despite 2.8x total OCS dose exposure.

P171 EVALUATION OF A BIOMARKER-LED RAPID ACCESS REVIEW CLINIC TO SUPPORT STEROID STEWARDSHIP IN PATIENTS WITH ASTHMA

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10.1136/thorax-2023-BTSabstracts.322

Background Exacerbations of respiratory conditions including asthma are amongst the most common causes of emergency hospital attendances, but numerous pulmonary and extra-pulmonary comorbidities can mimic asthma exacerbations (AE). Oral corticosteroids (OCS) are effective in treating AE, but are ineffective, with harmful side effects, in those without airways inflammation. The real-world effectiveness of a nurse-led, rapid access review (RAR)-clinic, offering biomarker-guided treatment and its effects on OCS use and emergency GP or hospital attendance is not well understood.

Methods We conducted a retrospective review of adult asthma patients presenting to our RAR-clinic with symptoms of an AE over a 6 months period (October 2021 to March 2022). Patient characteristics including co-morbidities, along with ACQ6, spirometry, blood eosinophil count (BEC), fraction of exhaled nitric oxide (FeNO), and evidence of respiratory

infection were reviewed on assessment and compared to baseline levels. Patients were stratified according to whether they were prescribed OCS or not.

Results 101 patients (74% female, mean age 46±14.6) were included. 26/101 (25.7%) were prescribed OCS. There was no difference in symptom scores between patients needing OCS and those who did not (ACQ6 3.76±1.0 vs 3.33±0.9, p=0.09). Patients prescribed OCS versus those who did not had a significantly higher increase in FeNO (+15 ppb [-36 – 43] vs +0.5 ppb [-5.75 – 5], p = 0.04), BEC (+0.06 x10^9/L [-0.08 – 0.36] vs +0.01 x10^9/L [-0.06 – 0.07]; p= 0.007) and reduction in FEV_1 (-0.29 ml [-0.56 – -0.04] vs -0.08 ml [-0.28 – 0.07]; p= 0.01) compared to their baseline. Of patients not receiving OCS, alternative management included antibiotics for a suspected bacterial infection (12/75), treatment of GORD (7/75), allergic rhinitis (8/75), breathing pattern disorder (9/75), and laryngeal dysfunction (4/75). Thirty-five patients (46.7%) received no additional treatment. In the 7 days following the RAR, 3/75 (4%) of patients went on to receive a course of OCS through their GP; no patients presented acutely to hospital.

Conclusion A biomarker-led RAR clinic offers a precision medicine approach for patients with asthma exacerbations, avoids exposure to and harm from unnecessary OCS and potentially reduces asthma-related emergency GP or hospital attendances.

P172 ASSESSING THE CLINICAL EFFECTIVENESS OF A SECONDARY CARE ASTHMA HOT CLINIC FOLLOWING HOSPITAL ATTENDANCE WITH ACUTE ASTHMA EXACERBATION

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Background Current guidelines recommend patient follow-up after an Emergency Department (ED) visit with acute asthma exacerbation (AE). This is frequently not routinely carried out in either primary or secondary care due to limited resources and the effectiveness of this intervention is not well-described. All patients who attend ED at Guy's and St. Thomas' NHS Trust with an AE are offered follow-up review in the 'Asthma Hot Clinic' where patients undergo a thorough clinical review including T2 biomarker risk assessment and optimization of inhaled therapy and relevant co-morbidities. Here we report on the outcomes of this approach.

Methods We conducted a retrospective review of 100 sequential adult patients referred to the Asthma Hot Clinic between October 2020 and November 2021 following an ED visit with AE. Clinical data including blood eosinophil count (BEC), fraction of exhaled nitric oxide (FeNO) and ACQ-6 score were collected from the patient's medical records at the time of their ED visit, initial and 12-month clinic follow-up.

Results 100 patients (60% female; mean age 43.7 years) were included in this analysis, 57% of whom had adult-onset disease; 18% were current smokers. Median (interquartile range) BEC was 300 cells/mcL (100–600) at time of ED visit compared with 200 cells/mcL (100–400) at initial follow-up (P=0.0001). At time of ED visit, median FeNO was 55ppb (22–98) compared with 32ppb (21–67) at initial follow-up (P=0.17). These improvements were maintained at 12-month follow-up (BEC 150cells/mcL (100–315); FeNO 33ppb (22–70)). At initial follow-up, suboptimal ICS adherence was identified in 36% of patients. Subsequently, inhaled treatment was stepped up in 65% of all patients. At 12-month follow-up, there was a significant reduction in annual exacerbation rate versus the year prior to ED visit (P<0.0001), with 67% of patients being exacerbation-free. Significant improvements were observed in patient-reported symptoms at 12-month follow-up compared with initial follow-up with a change in ACQ-6 of –0.94±1.53 (P=0.034) with 50% of patients moving from ACQ-6 >1.5 to ACQ-6<1.5.

Conclusions We have demonstrated that specialist intervention in a dedicated Asthma Hot Clinic following acute AE was effective at improving exacerbation frequency and patient-reported asthma symptoms at 12-months.

P173 MAINTENANCE STEROIDS ARE USUALLY NOT REQUIRED IN ASTHMA AND CAN BE WEANED

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10.1136/thorax-2023-BTSabstracts.324

Introduction Globally, 30–50% of people with severe asthma (SA) are on maintenance oral corticosteroid (mOCS) treatment. Regular corticosteroid use is associated with significant morbidity. We sought to explore if mOCS is needed to maintain asthma control.

Methods We developed a structured steroid weaning protocol that was implemented through a virtual nurse-led clinic with support from respiratory physiotherapy and clinical psychology if indicated. Retrospective data was reviewed for 42 patients on mOCS referred to our centre who were not on biologic treatment. Data is presented as median(IQR).

Results 29/42(69%) were female and median age was 55(48–65) years. Co-morbidities included: T2DM 16/42(38%), GORD 21/42(50%), chronic rhinitis 21/42(50%), anxiety 16/42(38%), depression 13/42(31%), breathing pattern disorder 23/42(55%) and high BMI 23/42(55%). Baseline mOCS dose was 10 (9–20)mg for a duration of 60 (17–117)months equating to 18 (5.5–46.6)g of lifetime exposure (excluding exacerbations) per patient.

Over 10 (4–12)months, patients were weaned to 5 (3–9) mg. 25/42(60%) were weaned off mOCS completely or weaned to adrenal dose (n=18, dose≤5 mg) and have not had further exacerbations. 6/42(14%) were unable to wean off mOCS due to patient disengagement/reluctance to wean and 3/42(7%) remain in clinic continuing their wean.

8/42(19%) have been started on a biologic due to exacerbations once mOCS weaned from a baseline dose of 10(8–19) mg to 6(4–10)mg prior to biologic initiation. Table 1 compares patients who started on a biologic versus those who did not. ACQ increased with steroid weaning in patients needing biologics (p=0.03), eosinophils and FeNO remained unchanged. In patients who weaned off mOCS for asthma, ACQ and FeNO remained unchanged and there was a trend towards increase in eosinophils (p=0.06).

Conclusion Most patients with severe asthma do not need mOCS, with 60% of patients able to wean off mOCS for asthma with no associated deterioration in asthma control,

Abstract P173 Table 1 Clinical characteristics of patients who weaned off maintenance oral steroids for asthma and those who needed to start on biologic therapy. Analysis completed using Mann-Whitney test

	Weaned off mOCS for asthma (n=25)	Started on a biologic (n=8)	p-value
Age (years)	56 (51–71)	53 (48–60)	0.24
Baseline dose (mg)	10 (5–18)	10 (8–19)	0.62
Duration (months)	60 (12–90)	30 (12–168)	0.80
Total OCS (g)	11 (4–40)	14 (5–40)	0.96
Current dose (mg)	4 (0–5)	6 (4–10)	0.02
ACQ baseline	2.66 (2.20–3.46)	1.58 (0.87–2.33)	0.03
ACQ end	2.63 (1.63–3.62)	3.84 (1.40–4.54)	0.39
Eos baseline	0.1 (0.1–0.2)	0.1 (0.0–0.1)	0.27
Eos end	0.2 (0.1–0.3)	0.2 (0.1–0.7)	0.98
FeNO baseline	25 (9–33)	25 (11–60)	0.70
FeNO end	18 (13–32)	15 (11–69)	0.89
GORD N (%)	14 (56%)	4 (50%)	1.0
Breathing pattern disorder	15 (60%)	4 (50%)	0.695
Anxiety	11 (44%)	2 (25%)	0.431
Smoking status	4 (16%) current smokers 4 (16%) ex-smokers	2 (25%) ex-smokers	

ACQ: asthma control questionnaire; Eos: Eosinophils; FeNO: fractional exhaled nitric oxide; GORD: gastro-oesophageal reflux disease; OCS: oral corticosteroid.

despite being on a mOCS for many years. Less than 20% of patients needed to be initiated on a biologic. This suggests that for the majority of SA patients mOCS were an unnecessary and inappropriate treatment. mOCS can be weaned, but requires time, and patient and multi-disciplinary engagement.

P174 THE UTILISATION OF NOMINAL GROUP TECHNIQUE TO GAIN CONSENSUS ON THE KEY COMPONENTS OF NON-PHARMACOLOGICAL INTERVENTIONS USED TO TREAT ADULTS WITH INDUCIBLE LARYNGEAL OBSTRUCTION

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Background Inducible laryngeal obstruction (ILO) is a transient disorder which causes sudden and reversible narrowing of the larynx. There are currently no standardised guidelines for ILO management and prospective evidence base is in its infancy. Non-pharmacological behavioural therapy, delivered by speech and language therapists (SLT), is the commonly cited treatment. Despite this, professional consensus on the key components of intervention is unknown.

Aim To establish, using a formal method of consensus development, a comprehensive understanding of the key components of non-pharmacological interventions used to treat adults with inducible laryngeal obstruction.

Methods Nominal Group Technique (NGT) was used to gain consensus; NGT is increasingly recognised in health services research as a robust process to generate ideas and enable a structured method in group decision-making, giving each participant an equal voice. Expert SLTs from across the UK were invited to attend two virtual meetings to answer the question, 'what are the key components of non-pharmacological interventions used to treat adults with inducible laryngeal obstruction?'. Participants initially silently generated ideas to answer the question. A facilitator aided a round-robin process (without debate) to share generated ideas then participants anonymously ranked items. Rankings were then aggregated and participants re-ranked items in order of priority. Finally, a discussion was held regarding consensus rankings and items.

Abstract P174 Figure 1 Items identified as the key components of non-pharmacological interventions used to treat adults with inducible laryngeal obstruction

Rank	Item	Item theme
1	ILO Education	Patient engagement
2	Introducing rescue breathing techniques early	Reliever strategies
3	Managing co-morbidities	Preventative techniques
4	Recognising triggers to ILO	Preventative techniques
5	Patient believe in ILO diagnosis	Patient engagement
6	Reducing intrinsic laryngeal muscle tension	Preventative techniques
7	Patient motivation for behavioural therapy	Patient engagement
8	Upper airway hygiene advice	Preventative techniques

Results Seven SLTs participated in the NGT process [median (range) 22 (12–29) years of experience treating ILO]. The group generated 56 items during silent idea generation and after initial ranking the list comprised a total of 9 items. Of these, 2 items were merged following discussion, resulting in a final re-ranked consensus of 8 items (figure 1). In addition to the ranked priority, qualitative analysis revealed items could be grouped into common themes of approach namely patient engagement, preventative techniques, and reliever strategies (figure 1).

Conclusion This study provides insight into the key components of non-pharmacological interventions used to treat adults with inducible laryngeal obstruction, informed by a structured effective method for obtaining group consensus from national experts. Further work, building on this foundation, is now required to develop a standardised approach to ILO management.

'You ain't seen nothing yet' – Imaging across COPD, nodules and lung cancer screening

P175 ABSTRACT WITHDRAWN

P176 BRONCHODILATOR RESPONSE DISCORDANCE IN PATIENTS WITH ASTHMA AND/OR COPD ASSESSED BY 129XE-MRI AND SPIROMETRY

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Introduction ^{129}Xe-MRI directly images the distribution of ventilation in the lung making it ideal for assessing bronchodilator response (BDR). Here we compared the concordance of BDR using ^{129}Xe-MRI and FEV1 and also assessed if the magnitude of BDR is related to diagnosis or disease severity.

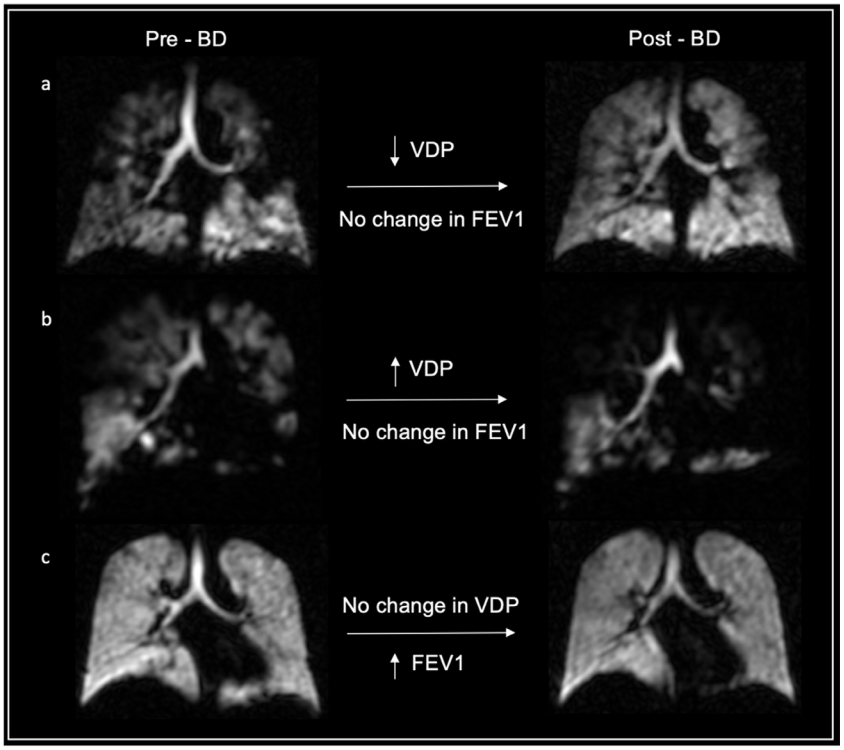
Methods 136 Patients from primary care with asthma and/or COPD taking part in the NOVELTY study [NCT02760329] were assessed pre and post-BD with ^{129}Xe-MRI and spirometry. From ^{129}Xe-MRI, ventilation defect percent (VDP) assesses the proportion of non-ventilated lung. Four BDR responder groups were categorised; G1= No clinically significant change (Δ) in FEV1 or VDP (n=58), G2= ΔFEV1 and ΔVDP (n=23), G3= ΔFEV1 only (n=20), G4= ΔVDP only (n=35). The magnitude of change post-BD was compared between diagnoses and by FEV1%predicted severity (mild >80%, moderate 50–80%, severe <50%).

Results Patients were aged 29–83 years (Female=53%). 72 patients had a diagnosis of asthma, 41-asthma+COPD and 23-COPD. In G1, 86% and 41% of patients had normal FEV1 or VDP respectively, post-BD. In G2, ΔFEV1 correlated to ΔVDP. Discordance of ΔFEV1 and ΔVDP was observed in 40% of patients (G3 and G4). Of those with ΔFEV1 only (G3), 85% had normal FEV1 and 40% normal VDP, post-BD. In G4, 57% had normal FEV1 and 2% had normal VDP post-BD. G4 had significantly worse post-BD ^{129}Xe-MRI acinar dimensions, FEV1, VDP than G3 ($p<0.001$). Notably, seven patients with COPD had a significant worsening in VDP post-BD.

There were no significant differences between diagnosis groups for Δspirometry or Δ^{129}Xe-MRI metrics post-BD. 93 patients had mild FEV1 severity, 34 moderate and 9 severe. ΔFEV1 was not different between severity groups, however there was an increase in ΔVDP ($p=0.02$) and ΔFVC($p=0.001$) with increasing severity.

Conclusions FEV1 and VDP are complementary methods of assessing BD response. For patients in G3 ΔFEV1 may reflect changes in larger conductive airways not assessed by VDP. G4 have more advanced disease where ΔVDP and ΔFVC may reflect dilation of the smaller airways. There was no difference in the magnitude of ΔFEV1 and ΔVDP metrics post-BD between asthma and/or COPD, however ΔVDP was significantly larger in more severe lung disease.

Please refer to page A292 for declarations of interest related to this abstract.



Abstract P176 Figure 1 Single slice pre and post bronchodilator ^{129}Xe ventilation MR images in three patients (a, b & c) highlighting the discordance observed in the bronchodilator response (BDR) between ^{129}Xe-MRI derived ventilation defect percent (VDP) and spirometry derived FEV1. A down arrow next to VDP signifies a ventilation improvement and an up arrow next to VDP signifies a ventilation worsening. Patients a) and b) both have a significant change in VDP post-BD, however there was no clinically significant change in FEV1. Patient a) has a significant improvement in the overall distribution of ventilation, whilst patient b) has an overall worsening of ventilation. Patient c showed no significant change in ventilation post-BD however the change in FEV1 was significant.

P177 **129XE MRI PHENOTYPING AND LONGITUDINAL CHANGE IN PATIENTS WITH ASTHMA AND/OR COPD AND NORMAL PULMONARY FUNCTION TESTS**

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10.1136/thorax-2023-BTSabstracts.327

Introduction ^{129}Xe-MRI provides sensitive measures of pulmonary function and microstructure and may be useful in phenotyping patients and monitoring disease progression.

Methods Patients with asthma and/or COPD from NOVELTY [NCT02760329] were recruited from primary care and assessed post-bronchodilator with ^{129}Xe-MRI (ventilation, acinar dimensions and gas transfer), spirometry and transfer factor for carbon monoxide at 2 visits 1 year apart (mean ±SD=60±6, range=47–79 weeks).

For patients with normal FEV_1 and patients with normal TLco (z-score>-1.64) at visit 1, differences between (i) physician-assigned diagnosis groups at visit 1 and (ii) metrics at visit 1 and visit 2 were assessed.

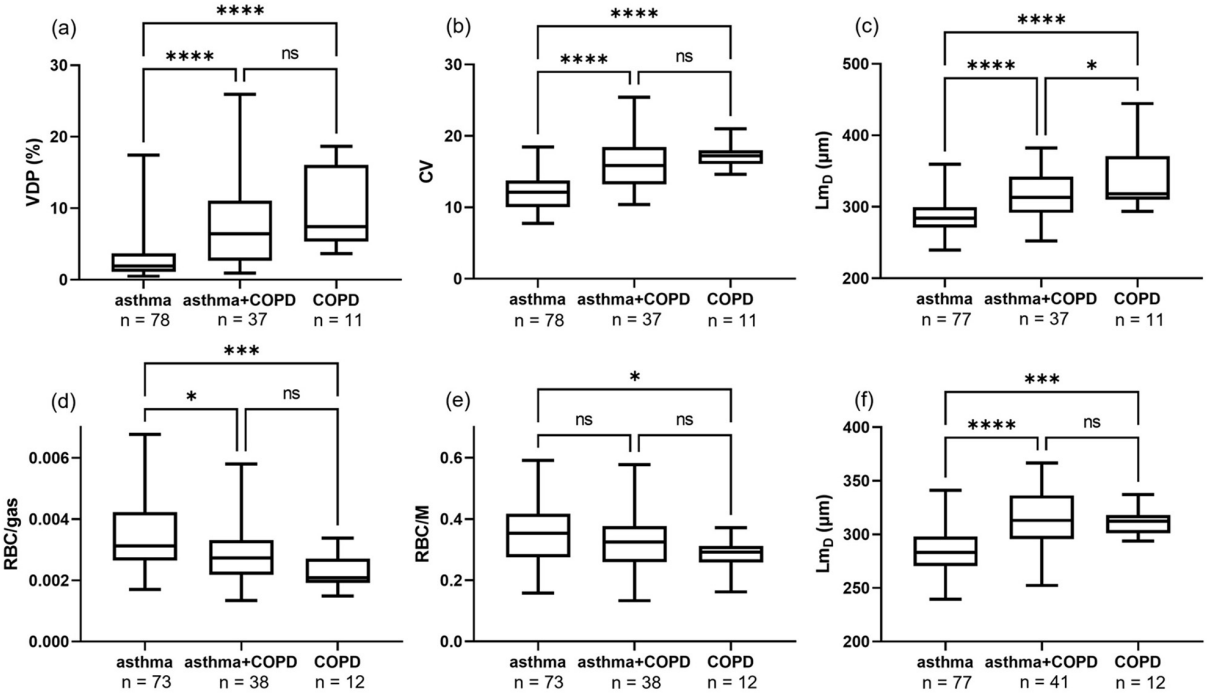
Results 165 patients, aged 28–82 years were assessed at visit 1. 126 (76%) patients had normal FEV_1 and 131 (79%) had normal TLco. 115 patients had normal FEV_1 and TLco.

Physiology by diagnosis (figure 1): In patients with normal FEV_1, ^{129}Xe-MRI metrics of ventilation abnormality and acinar dimensions were better in asthma than COPD or asthma+COPD groups (p<0.0001). In patients with normal TLco, ^{129}Xe-MRI metrics of gas transfer and acinar dimensions were worse in COPD than asthma (p<0.001).

Longitudinal change Gas transfer decreased from visit 1 to visit 2 in patients with normal TLco (average ^{129}Xe-MRI red blood cell/membrane V1=0.334, V2=0.312, p=0.0001, n=102; average TLco z-score V1=0.187, V2=-0.044, p<0.0001, n=114). 31/114(27%) patients had a reduction in TLco>-0.5 z-score. ^{129}Xe-MRI ventilation and acinar dimension metrics did not change significantly over 1 year when considering all patients with normal FEV_1. However, in 43 patients with normal FEV_1 and abnormal FEV_1/FVC (z-score<-1.64), ventilation decreased from visit 1 to visit 2 (average ^{129}Xe-MRI ventilation defect percent V1=8.3%, V2=9.9%, p=0.015).

Conclusion Despite having normal lung function, patients with COPD diagnosis label had significantly higher ^{129}Xe-MRI ventilation abnormalities, larger acinar dimensions and reduced gas transfer than those with asthma diagnosis, highlighting the high diagnostic sensitivity of ^{129}Xe-MRI. ^{129}Xe-MRI gas transfer and TLco decreased in patients with asthma and/or COPD over a period of 1 year in patients with normal TLco. Ventilation and acinar dimensions did not change significantly over 1 year when considering all patients with normal FEV_1, however, ventilation worsened in patients with abnormally low FEV_1/FVC and normal FEV_1.

Please refer to page A292 for declarations of interest related to this abstract.



Abstract P177 Figure 1 ^{129}Xe MRI metrics for physician-assigned diagnosis groups of asthma, asthma+COPD and COPD. Top row: patients with normal FEV_1: (a) and (b) ventilation abnormalities — (a) ventilation defect percent (VDP), (b) coefficient of variation of signal intensity (CV, ventilation heterogeneity) and (c) acinar dimensions (mean diffusive length scale, Lm_D). Bottom row: patients with normal Tlco: (d) and (e) gas transfer – (d) red blood cell (RBC)/gas (RBC/gas), (e) red blood cell/membrane (RBC/M) and (f) acinar dimensions (Lm_D. ****p<0.0001, *** p<0.001, * p<0.05, ns = not significant.

P178 T2*-WEIGHTED OXYGEN-ENHANCED PULMONARY MRI IN COPD AND LINKAGE TO RESPIRATORY PHYSIOLOGY

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10.1136/thorax-2023-BTSabstracts.328

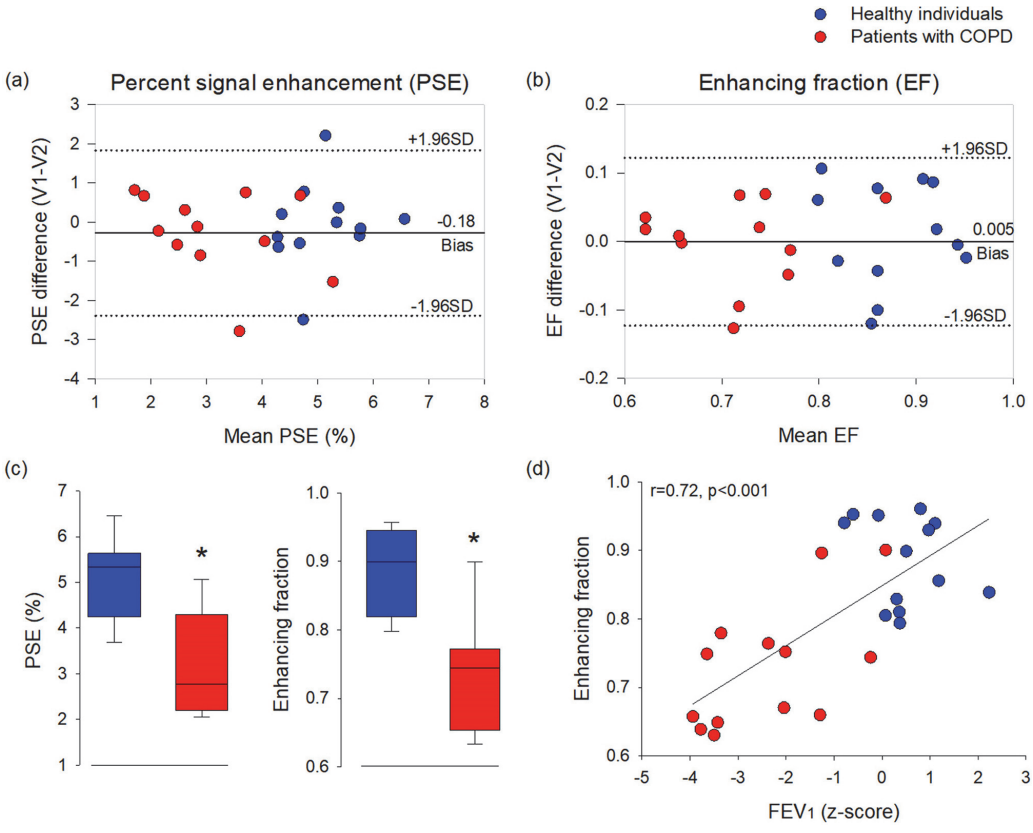
Background T_2*-weighted oxygen-enhanced MRI (T_2*-OE-MRI) exploits the change in magnetic susceptibility gradient resulting from an increase in gaseous oxygen in the alveolar air space, leading to a change in lung T_2*. This technique may provide a more direct assessment of pulmonary ventilation than T_1-weighted OE-MRI. However, there is a paucity of data regarding the additive value of T_2*-OE-MRI over phase-resolved functional lung (PREFUL) MRI and its linkage with lung physiology and clinical outcomes.

Aim To optimize the T_2*-OE-MRI technique and examine the relationship between measurements of ventilation and resting and exertional physiological parameters in patients with COPD. We also aimed to compare measurements of regional lung ventilation using T_2*-OE-MRI versus PREFUL-MRI.

Methods 26 participants (13 mild-severe patients with COPD and 13 age- and gender-matched healthy volunteers (HV)) underwent resting pulmonary function tests, incremental cardiopulmonary exercise test (CPET, patients only), and two lung MRI scans 7–28 days apart using a 3T MRI scanner. For T_2*-OE-MRI, participants were fitted with a non-rebreathing face mask; initially, medical air (21% oxygen) was delivered at a rate of 15l/min, then switched to 100% oxygen during image acquisition.

Results Patients (age: 63±9 years, BMI: 30.2±7.1 kg/m^2, FEV_1: 63±25%predicted, mean±SD) had evidence of pulmonary gas trapping (RV/TLC: 45±11%) and small airway disease (lower $FEF_{25-75\%}$ and higher SVC-FVC compared with HV). During T_2*-OE-MRI, the percentage difference between mean signal intensity at normoxia and hyperoxia (percent signal enhancement (PSE)) and the enhancing fraction (EF) were significantly lower in patients vs. HV (3.17±1.17 vs. 5.08 ±0.90 % and 0.73±0.09 vs. 0.89±0.06, respectively, both p<0.001). Bland-Altman analysis of repeat measurements showed bias±95% limits of agreement of -0.18±1.06 and 0.005±0.13 in PSE and EF, respectively (**figure 1**). In the whole sample, PSE and EF significantly correlated with FEV_1 (z-score)(r=0.67 and r=0.72, respectively), RV/TLC (r=-0.63, r=-0.67), alveolar volume/TLC ratio (r=0.45, r=0.46) and SVC-FVC difference (r=-0.46, r=-0.51). Finally, PSE and EF correlated with measures of dynamic hyperinflation and dyspnoea intensity during CPET. PREFUL data are under analysis.

Conclusion In patients with COPD, T_2*-OE-MRI can provide useful information on pulmonary ventilation that is linked with physiological measures of disease severity, functional limitation, and important clinical outcomes.



Abstract P178 Figure 1

P179 AORTIC VALVE CALCIUM SCORES IN LUNG CANCER SCREENING: A LOCAL TARGETED LUNG HEALTH CHECK PROGRAM EXPERIENCE

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Introduction Aortic valve calcium (AVC) scores on low dose CT (LDCT) as part of the targeted lung health check (TLHC) opens an opportunity to identify cardiovascular disease in an asymptomatic high-risk group.
Objective To describe the prevalence of reported AVC on LDCT.
Methods Index LDCT scans from 4,422 participants in the local pilot Targeted Lung Health Check (TLHC) programme between August 2022 and May 2023 were assessed for reported moderate to severe AVC scores.
Results In total, 76/4422 (1.7%) scans showed evidence of moderate/severe AVC on CT with 36/76 (46%) being severe. Echocardiograms were available for review in 41/77 (53%) patients (including 28/36 severe cases) and confirmed aortic stenosis (AS) in 32/41(78%) cases. Of these seven patients had severe AS.

In those with severe AVC, 19/28 had a program-initiated echocardiogram. Of these, 5/19(26%) had severe AS (new or progressive) and were referred for intervention.

AVC and echo AS severity were concordant in 14/41 (34%) patients with available echocardiograms. In all discordant cases, CT calcification was of higher severity and those with severe AVC were the most discordant. In seven patients with severe calcification of the AV, no AS was detected on echocardiography.

The incidence of moderate/severe AVC was greater in patients with moderate/severe coronary artery calcification (CAC) (3.2% vs 0.9% no/mild CAC) p <0.01). Severity of CAC correlated with degree of AV calcification (r^2=0.24). No association was seen between the degree of emphysema and severity of AVC (1.7% vs 2% p=0.28).
Conclusions In our local population the incidence of moderate to severe AVC was 1.7%. In patients with severe AVC, 1 in 4 patients undergoing an echocardiogram were subsequently referred for cardiology assessment, however there was poor agreement between AVC severity and echocardiography results.

P180 LOCAL EARLY EXPERIENCE OF INTERSTITIAL LUNG ABNORMALITIES IN A TARGETED LUNG HEALTH CHECK PROGRAM

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Introduction Targeted lung health checks (TLHC) with low dose CT thorax (LDCT) detect interstitial lung abnormalities (ILAs) and opens the opportunity to initiate targeted therapies.
Aims To assess the distribution of reported ILAs through the pilot program
Methods Patients undergoing a LDCT through the local TLHC had their scans reported within the pre-determined ILAs protocol. Available clinical data was then reviewed. Those felt to have clinically significant ILAs underwent questionnaire evaluation.
Results Between August 2022 and May 2023, 33/4422 (0.7%) patients were found to have a reportable ILA. This is lower than found in previous studies.[1] The median age of patients was 69 [65–74] years with 22/33 (67%) being male. Extent of lung involvement was reported as none/ILA without reticulation, <5%, 5–10% and >10% in 8, 10, 12 and 3 patients respectively.

In 18/33 (55%) reported ILAs, radiological features were reported as uncharacterised. Usual interstitial pneumonia (UIP) pattern was seen in 3 patients, 4 had smoking-related ILD (SR-ILD), 2 nonspecific interstitial pneumonia (NSIP), 3 post-inflammatory/COVID-19 pneumonitis, 1 sarcoidosis, and 1 had hypersensitivity pneumonitis.

In 17(52%) patients, ILAs were radiographically evident on prior scans and mild progression was noted in 5/17 (29%) of these.

A total of 8 patients were contacted post LDCT and 5 had a subsequent outpatient appointment. All patients reported exertional breathlessness and the median MRC dyspnoea scale was 1[1–3]. In half of patients a cough was reported. Methotrexate usage was note in one patient, and one patient had a reported autoimmune condition. In nine patients with full pulmonary function, the median TLco was 51[43–65%] predicted.
Conclusion The TLHC provides an opportunity to identify ILA early in patients who have a low symptom burden. Progression, course and timing of intervention need to be fully characterized in this population to optimize management in patients passing through future lung cancer screening programs.

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1. Hewitt RJ, Bartlett EC, Ganatra R, *et al.* Lung cancer screening provides an opportunity for early diagnosis and treatment of interstitial lung disease. *Thorax* 2022;**77**:1149–1151.

P181 PREDICTIVE BIOMARKERS OF BENIGN PULMONARY NODULES IN A HIGH-RISK POPULATION IN A LUNG CANCER SCREENING PROGRAMME

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10.1136/thorax-2023-BTSabstracts.331

Lung cancer screening programs (LCSP) have been demonstrated to reduce cancer-related death in selected populations. Nevertheless, the percentage of false positives requiring further testing, including surgery on suspicious lung nodules (PN) reported in the literature, is high (27%). Studies have identified serum biomarkers (BM) associated with the risk of developing various types of cancer, including lung cancer. However, we aim to identify parameters capable of determining benign lung nodules that may reduce the need for further testing. M&M: A cross-sectional analysis of a series of patients belonging to the LCSP was performed. Patients underwent low-dose CT (LDCT), pulmonary function tests, and blood tests according to our protocol. For LDCT results: non-calcified nodules of ≥6 mm were considered indeterminate or suspicious (SPN). Those that remained stable on follow-up for more than three years or with negative results after additional testing were considered benign pulmonary nodules (BPN). Results: A total of 1629 patients were included, of whom 944 were male (58.13%) with a mean age of 62.91±5.99 years

Abstract P181 Table 1

Table 1. General characteristics	All (n = 1629)
Gender, men, n (%)	947 (58.13)
Age, mean ±	62.91 ± 5.99
BMI, mean ±	27.62 ± 5.41
Current smoker, n (%)	1120 (68.75)
Pack-years index (PYI), mean ±	51.0 ± 22.29
History of CVD or arrhythmias, n (%)	151 (9.26)
Family history of lung cancer, n (%)	205 (12.58)
Spirometry (post-BD), mean ±	
FVC (L)	3.25 ± 0.91
FVC (%)	98.06 ± 17.71
FEV_1 (L)	2.21 ± 0.73
FEV_1 (%)	82.30 ± 20.79
FEV_1 /FVC	67.72 ± 12.57
Dlco test, mean ±	84.67 ± 21.33
Dyspnoea mMRC scale, n (%)	
0-I	1504 (92.32)
II-IV	125 (7.67)
COPD, n (%)	803 (49.29)
GOLD GRADE, n (%)	
I	286 (35.61)
II	425 (52.92)
III	85 (10.58)
IV	7 (0.87)
GOLD RISK, n (%)	
A	601 (74.84)
B	115 (14.32)
E	87 (10.83)
Emphysema, n (%)	1279 (78.51)

and smokers with COPD and emphysema. General characteristics are described in table 1. An indeterminate or suspicious nodule (≥6mm) requiring further testing was expressed in 13% of LDCTs. This analysis showed statistically significant differences in serum MBs of indeterminate versus benign pulmonary nodules at follow-up: lower absolute and percentage eosinophil levels (177.92SD107.14 vs. 235.61 SD 181.20 p=0.0022; 2.42% SD1.42 vs. 3.06% SD 2.10; p=0.0022) and higher pro-BNP levels (155.83 SD 173.57 vs9 1.83 SD2 82.97;p=0.0059). No differences were found for the other serum biomarkers analyzed. For benign pulmonary nodules 6 mm, the cut-off point for pro-BNP is 165 mg/dL, with a sensitivity of 100% and a specificity of 91.50% [AUC=0.914 (95% CI: 0.900–1.000)]. Conclusion: The prevalence of indeterminate pulmonary nodules in LCSP is high, involving nearly 50% of LC diagnosed. We found a statistically significant association between the volume of eosinophilia and pro-BNP values for significant pulmonary nodules. Of all these, pro-BNP is the parameter with the best ROC curve values, sensitivity, and specificity close to 100%. These BM are low-cost and easy to obtain and analyze, allowing future research lines to confirm these results.

P182 TARGETTED LUNG HEALTH CHECKS: INCIDENTAL EXTRAPULMONARY TUMOURS

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Objective To evaluate the incidence and outcomes of suspected cases of non respiratory malignancy in patients undergoing low dose CT thorax (LDCT) as part of the Targetted Lung Health Checks (TLHC) pilot in Blackburn with Darwen and East Lancashire

Methods We conducted a retrospective audit of 7732 LDCT scans, undertaken as part of the TLHC pilot between October 2021 and March 2023. As per the TLHC protocol, all patients were aged between 55–74 with a smoking history. Those with findings necessitating a 2WW (2 week wait) referral to a non-respiratory clinician were identified and information regarding diagnosis, staging and treatment type (curative/palliative) analysed through review of clinic letters, MDT outcomes, PACs and electronic patient record (EPR)

Abstract P182 Table 1 By speciality, the number of referrals made from a suspected malignancy on LDCT, the number of cancer diagnosis made and the number of patients who were treated with curative intent.

Speciality	Number	Number with diagnosis of cancer	Number treated with curative intent
Breast	22	2	1
Urology	17	12	11
HPB	10	5	2
UGI	9	2	2
Head and Neck	7	0	n/a
Haematology	6	6	6
Sarcoma	2	2	1
Gynaecology	1	1	0
CUP	1	0	n/a

Results Out of 7732 scans, 75 reported a finding requiring a subsequent 2WW referral to a secondary speciality. The three most common specialities referred to were Breast, urology and HPB; 29%, 23% and 14% respectively. 41% of all patients who were referred were confirmed to have a malignancy and 69% of these diagnosed at an early enough stage to undergo curative surgery/treatments. 3 referrals resulted in a diagnosis of metastasis from known previous malignancies; 1 each from Gynaecology, breast and HPB, all of which had palliative treatment. Therefore, for new cancer diagnosis, 78% were at a curable stage. Haematology, Sarcoma and Urology had the highest diagnostic pick uprate at 100%, 100% and 70.6% respectively, whilst only 4% of Breast referrals resulted in a cancer diagnosis. Haematology and Urology had he highest rates of early diagnosis with curative treatment at 100% and 91.7% respectively.

Conclusion Any cancer screening programme has the aim of identifying cancers at early stages to improve patient outcomes, morbidity, and mortality. The TLHC programme has a proven ability to identify lung cancer at a treatable stage: we have demonstrated that this is also true of incidentally identified extrapulmonary malignancy, the majority of which are at an early/curable stage.

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P183 THE CLINICAL CHARACTERISTICS OF PATIENTS WITH MODERATE OR SEVERE EMPHYSEMA IDENTIFIED BY THE TARGETED LUNG HEALTH CHECK SCREENING PROGRAMME

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Background The Targeted Lung Health Check (TLHC) is a novel screening programme using CT to diagnose early lung cancer in ever smokers. It also presents an opportunity for the earlier detection of emphysema. However, outcomes of patients identified and the cost-effectiveness of screening for emphysema is unknown. We report on the outcome of patients identified by our centre's TLHC with either moderate or severe emphysema who were referred for specialist COPD outpatient reviews.

Method 61 patients with TLHC-identified moderate or severe emphysema were referred to our COPD clinic between November and May 2023. Patients were 55–74 years old and were current or former smokers (as per TLHC criteria). Retrospective data on symptoms, potential exacerbations, spirometry and management were collected from patient's electronic records.

Results 51 of 61 patients attended (i.e. 16.4% did not attend). Of those, 33 were male (64.7%) and 34 current smokers (66.7%). Most patients had a low symptom burden with 41 (80.4%) having a mMRC of ≤ 1. 49 patients (96.1%) had not reported any acute respiratory symptoms or been prescribed antibiotics during the preceding year. 44 patients (86.3%) had airflow obstruction with a median FEV1 percent predicted of 79%. 18 patients (35.3%) had no changes to their management, including initiating medications, referral to pulmonary rehabilitation or smoking cessation. 24 patients (47.1%) were prescribed inhaled treatment. Median FEV1 percent predicted for those commenced on inhaled therapy was 69% vs 86% where no inhaled treatment was commenced. 31 patients (60.8%) were discharged after their first visit. Of those offered follow up, a higher proportion had a mMRC ≥ 2 (25%, n=5).

Discussion This small study suggests that emphysema screening via TLHC identifies a largely asymptomatic group, with mild/no airflow obstruction, no/infrequent exacerbations, who may not require intervention. Therefore, screening for emphysema may not prove effective. However, the above data also suggests that moderate airflow obstruction and patient-reported symptoms could identify those likely to benefit from review. Moreover, the long-term outcomes of asymptomatic COPD patients identified via screening is unknown and any benefits of intervening in this group remains unanswered.

P184 EMPHYSEMA IDENTIFIED DURING LUNG CANCER SCREENING – AN OPPORTUNITY TO INTERVENE OR JUST ANOTHER INCIDENTAL FINDING?

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Background A significant number of people living with Chronic Obstructive Pulmonary Disease (COPD) have not been formally diagnosed. Lung cancer screening programmes provide an opportunity for identification of undiagnosed COPD in a high-risk population.

Aim To investigate the prevalence of airflow obstruction in individuals with emphysema identified during a targeted lung health check (TLHC).

Methods Low dose CT scans performed between 26/04/2021 and 30/09/2022 as part of the Corby THLC programme were screened for presence of emphysema, classified as mild, moderate, or severe. Individuals with moderate to severe emphysema were invited by the TLHC programme to attend for spirometry. Primary care records were reviewed for a code of COPD or emphysema both prior to and after THLC.

Results Of 2488 low dose CT scans performed, 1807 (73%) showed emphysema (severe = 129, moderate = 560, mild = 1118). For individuals with emphysema, 380 (21%) and 46 (3%) had a prior primary care diagnosis of COPD and emphysema respectively. Spirometry was performed in 59% of individuals with moderate to severe emphysema (n=408) and airflow obstruction was identified in 236 (58% of those attending for spirometry). Of these 236 individuals with evidence of airflow obstruction, 134 had no previous COPD diagnosis. However, only 26 (19%) out of 134 went on to receive a new primary care code of COPD at follow up compared to 10% of individuals with spirometry showing no airflow obstruction who received a new primary care code of COPD. A primary care code of emphysema was entered following THLC in 7%, 41% and 28% of individuals with mild, moderate, and severe emphysema respectively.

Conclusions Spirometry performed in people with moderate to severe emphysema identified during lung cancer screening can identify a significant number of people with undiagnosed COPD. However, identification of emphysema on CT may lead to primary care COPD or emphysema diagnosis irrespective of airflow obstruction, potentially prompting inappropriate inhaled therapy prescription.

P185 A PILOT OF CASE-FINDING FOR COPD WITH COMMUNITY SPIROMETRY WITHIN A TARGETED LUNG HEALTH CHECK (TLHC) PROGRAMME

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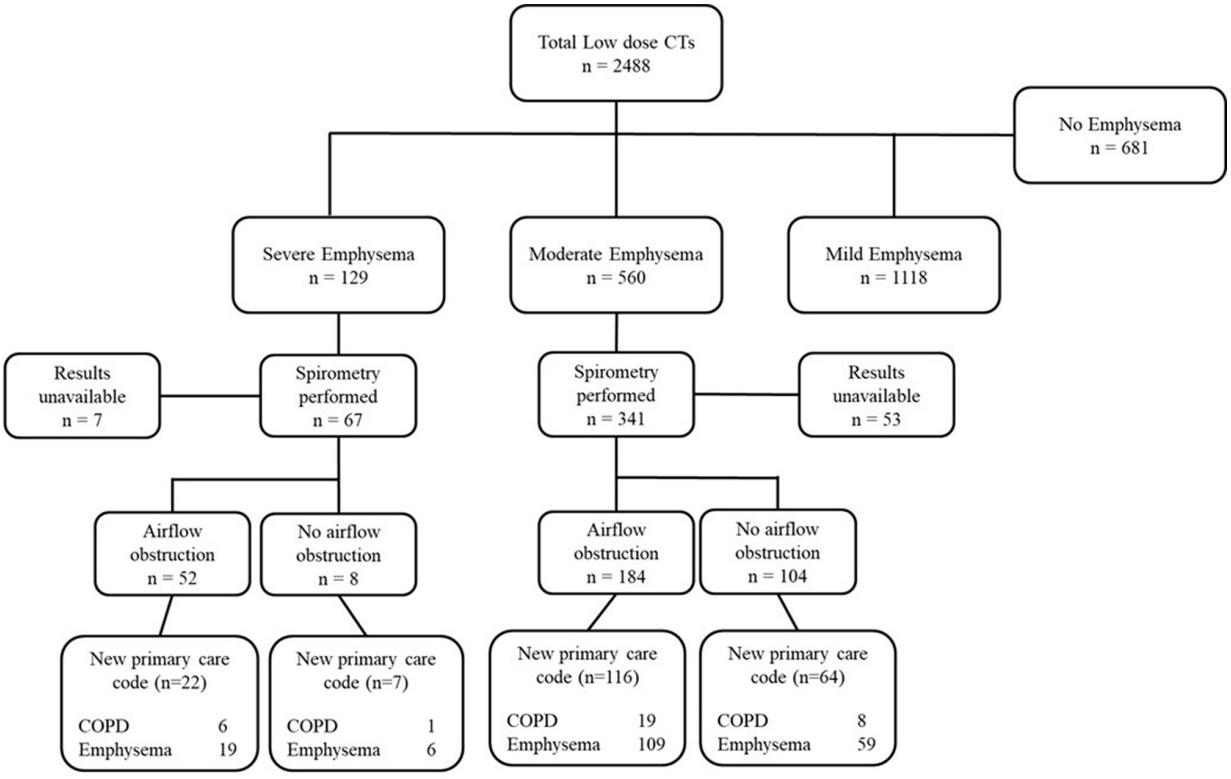
Introduction The Targeted Lung Health Check (TLHC) programme is being rolled out across England as a pilot for a national lung cancer screening programme. Participants are stratified into high and low risk for lung cancer based on two risk prediction models. Spirometry is currently recommended only for high risk participants within the programme.

Case-finding for COPD is not currently implemented internationally due to a lack of supporting large, randomised controlled trial evidence. The TLHC programme offers a new



Abstract P184 Figure 1 Flow diagram of outcomes following targeted lung health check.

opportunity to diagnose COPD within an at-risk population that may not routinely engage with primary care services.

Objectives

- Establish the feasibility of using community spirometry services to perform spirometry in low risk for cancer candidates within the TLHC programme
- Compare case-finding for COPD between the low risk cohort using community spirometry and high risk cohort with on-site spirometry within a TLHC programme

Methods Within the South-East London TLHC programme, initial screening is conducted by a telephone interview. All high risk participants undergo spirometry on the day of CT scanning at the mobile location. As an initial pilot, low risk participants were offered referral to a community spirometry service at King's College Hospital, London. Reversibility testing was not performed in either cohort. Baseline data are collected for all participants at the time of screening.

Results In the low risk cohort, 422 participants were referred to community spirometry within the pilot. In our interim analysis, 120 of the first 135 participants (89%) attended their appointment. Obstructive spirometry was found in 18 participants (15%) in the low risk cohort compared to 421 (54%) of 784 high risk participants. Results for those with obstructive spirometry are shown in table 1.

Conclusions In this novel TLHC protocol, referral to community spirometry for low risk participants was well attended and identified 15% with obstructive spirometry. The majority of patients had mild airways obstruction and correlation with symptoms will be important. Higher rates of obstructive spirometry were seen in the high risk cohort likely due to a higher pack year history. This model could be incorporated into the HTA call for research into screening the TLHC population for COPD.

Abstract P185 Table 1

		Low Risk Cohort (n = 18)	High Risk Cohort (n = 421)
Age	Median	65 years	
Smoking Status	Ex-Smoker	18 (100%)	
Pack years	Median	19	
Severity	Mild	15 (83%)	190 (45%)
	Moderate	3 (17%)	198 (47%)
	Severe	0 (0%)	33 (8%)
Spirometry (Medians)	FEV1	1.85 L	
	FEV1% predicted	68.0%	
	FEV1 SR	-2.01	
	VC max	3.05 L	
	VC max% predicted	94.6%	
	FEV1/VC max	61.3%	
	FEV1/VC SR	-2.14	
	PEF	349 L/min	
	PEF% predicted	86.3%	
	PEF SR	-0.88	

P186 INNOVATION PROJECT WITH BIG DATA FOR LUNG CANCER SCREENING IN COPD/EMPHYSEMA POPULATION

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The implementation of lung cancer screening programs (LCSP) in Spain is limited, which raises doubts about their feasibility on a large scale from logistical and human resources. Since 2014, an LCSP using low-dose CT (LDCT) has been implemented in our center. Since 2014, an LCS has been implemented in our center, targeting a high-risk population. By 2020, 1400 patients were included. The prevalence of LC was 2.31%, where more than 60% of cases were detected at stage I-II, and the median overall survival at 4 years was 95%. These excellent results led us to expand the programme. Aware of how the pandemic would affect patient recruitment and follow-up, with the help of the systems department, we developed a screening tool that would allow access to the programme to all the susceptible population in our area through a mobile application and from there would allow patient selection, interaction with the subject without the need to visit the physician's consulting room to receive the results and only visit the hospital for tests. The pre-selected target population was 9,623 subjects to whom the questionnaire was sent via the patient portal. Of the patients selected, 81.03% use the app. From 02–2021 to 12–2022, 1639 patients were included. male smokers, with a 55.20 ± 18.33 PYI. 1226 LDCT had been performed. Less than 10% of the patients did not attend the scheduled LDCT appointment. Since the start of the program, 40 radiological alerts for suspected oncology or non-oncology have been received. Of these, the majority were males with a mean age of 68.62 years and ex-smokers with a pack-year index of 51.53 ± 17.43. To date, 16 patients have been diagnosed with LC, mostly adenocarcinomas, with an initial stage (I-II). In more than 60% (64.28%) of cases, treatment was surgical, followed by surgery + adjuvant chemotherapy and chemotherapy +/- Radiotherapy. Of the patients diagnosed with LC, 57.14% had a previous diagnosis of COPD with moderate airflow obstruction (mean FEV1 75%). Our program demonstrates the feasibility of implementing lung cancer screening with the help of programs capable of efficient screening and follow-up of the susceptible population.

P187 TARGETING LUNG HEALTH IN COVENTRY: DOES LUNG FUNCTION CORROBORATE WITH CT EVIDENCE OF EMPHYSEMA?

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Introduction The national targeted lung health check (TLHC) programme is currently offering a lung screening service to ever smokers aged 55–74 years in an attempt to diagnose lung cancer earlier. Screening involves a nurse visit to obtain symptom, social, family and basic occupational history plus demographic details, followed by a low dose computerised tomogram (CT) scan. In Coventry, those identified as having moderate or severe emphysema on CT are referred to the community diagnostic centre (CDC) for full lung function and fractional exhaled nitric oxide (FENO) testing. The aim of this study was to assess whether spirometry alone, or full lung function findings better corroborate with CT findings of moderate or severe emphysema.

Methods Consecutive patients with moderate or severe emphysema tested in the CDC from October 2022 until the end of May 2023 were included. Demographic information and lung function parameters were collected. The percentage of patients with abnormal lung function was analysed separately for each parameter.

Results 75 patients were seen in the CDC, 56 with moderate emphysema and 19 with severe emphysema. Females made up 37%, mean age was 66 years and patients had smoked for a mean of 45 pack years. The majority of patients were currently smoking (51%) and 84% were not taking any form of inhaler. A FENO >25ppb (raised) was seen in 18.4% of patients tested. Table 1 shows the sensitivity of abnormal lung function parameters (z-score <-1.645 for spirometry and gas transfer or >1.645 for lung volumes) compared to CT diagnosis of emphysema. In those with normal spirometry, 18.6% had and abnormal KCO, 10.1% a raised FRC and 5.8% a raised RV. Twenty-one percent had no lung function impairment.

Abstract P187 Table 1 Sensitivity of individual abnormal lung function parameters in those with moderate or severe emphysema on CT

Parameter showing abnormality	%
FEV1	30.7
FEV1/FVC ratio (obstructive)	52.0
TLCO	44.3
KCO	58.6
TLC	30.4
FRC (hyperinflation)	40.6
RV (gas trapping)	42.0

Conclusion Spirometry was preserved in more patients than might be expected with moderate or severe emphysema. The addition of gas transfer showed an abnormality in a further 18.6% of cases that spirometry alone would have missed. A proportion of patients may have asthma-COPD overlap given their raised FENO.

'Getting better' – Interstitial lung disease: from genes to therapy

P188 GENETIC RISK OF PULMONARY FIBROSIS ACROSS DIFFERENT ANCESTRY GROUPS

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Introduction Genome-wide association studies (GWAS) have provided insights into the pathogenesis of several forms of pulmonary fibrosis. While these studies have primarily been conducted in populations of European ancestry, previous research has also reported unequal IPF prevalence, risk, and progression among individuals of different ancestry. We aimed to explore shared and distinct genetic determinants of pulmonary fibrosis between different ancestry groups.

Methods We utilised summary statistics from genome-wide association analyses of lung fibrosis in UK Biobank. Cases were defined as any individual with at least one respiratory fibrosis code in their hospital or mortality records. The dataset includes 448,982 individuals clustered based on principal components into six ancestry groups; European, South Asian, Admixed (European-Others), African, Admixed (European-African), and East Asian. Genome-wide association analyses were performed in each ancestry group separately. We compared effect sizes, significance and allele frequencies across ancestry groups for all variants reaching $p<5x10^{-8}$ in any of the ancestry-specific GWAS. We also tested for correlation of variant-effects using the maximum-likelihood method in Popcorn at SNPs common in any two ancestry groups.

Results The most common pulmonary fibrosis trait according to the ICD10 classification across all ancestry groups was

Abstract P188 Table 1 Number of samples included and the two most common variants across the ancestry groups

	European	Admixed (European-Others)	South Asian	African
Samples				
Totals	418,055	8,923	10,040	7,461
Cases	2600 (0.62%)	37 (0.41%)	57 (0.57%)	33 (0.44%)
rs35705950				
EAF	0.112*	0.123	0.089	-
OR	1.70*	1.42	2.38	-
95% CI	[1.58, 1.83]	[0.76, 2.63]	[1.47, 3.86]	-
rs4147987				
EAF	0.015	0.018	0.024	0.011*
OR	0.95	0.79	2.85	12.82*
95% CI	[0.76, 1.19]	[0.11, 5.72]	[1.34, 6.07]	[5.59, 29.39]

*Variant is significantly (p<5x10–8) associated with pulmonary fibrosis in that ancestry group.
- Variant absent in the population data.
EAF: Effect allele frequency, OR: Odds ratio, 95% CI: 95% confidence interval.

Idiopathic pulmonary fibrosis (IPF). Genetic variants associated with pulmonary fibrosis in any one ancestry group were not statistically significant ($p<5x10^{-8}$) in other ancestry groups. Effect size and allele frequency of the MUC5B SNP (rs35705950) were more similar in the ancestry groups where it is present (table 1). However, one variant (rs4147987) that was significant in the African ancestry group had quite different effect sizes yet similar allele frequencies across the ancestry groups where it is present. Genetic-effect correlation of variants common in the European and African ancestry groups was 0.22 (95% CI [-0.46, 0.91], p=0.02), highlighting the difference in effect sizes of the variants common between these two ancestry groups.

Conclusion Our results suggest that genetic risk for pulmonary fibrosis may vary depending on one's genetic ancestry but there is similarity in effect sizes of some variants associated with pulmonary fibrosis.

Please refer to page A292 for declarations of interest related to this abstract.

P189 GENETIC DIFFERENCES BETWEEN SEXES IN IDIOPATHIC PULMONARY FIBROSIS: A GENOME-WIDE SNP-BY-SEX INTERACTION ANALYSIS

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Introduction Idiopathic pulmonary fibrosis (IPF) is a chronic lung disease, whereby scarring of the lungs occurs. IPF is a complex disease and is more prevalent in males than females, however it is not understood why this is. Genome-wide association studies (GWAS), combining males and female, have identified more than 20 independent IPF associated genetic variants. However, there might be sex-specific variants associated with IPF susceptibility.

Objective With IPF being observed in more males than females, we hypothesised that there may be different biological mechanisms modifying IPF susceptibility in males and females, and genetic associations that differ between the sexes may pinpoint the genes and pathways involved.

Method We performed a genome-wide SNP-by-sex interaction meta-analysis of IPF risk using six independent IPF case-control studies and an inverse-variance weighted fixed effect meta-analysis. In total, 4,561 cases (1,280 females and 2,281 males) and 23,500 controls (8,360 females and 14,528 males) of European genetic ancestry were analysed. A threshold of $P<1x10^{-6}$ was used to identify suggestively significant genetic variants from the meta-analysis. We performed polygenic risk score (PRS) analyses to assess the combined effect genetic variants have in predicting IPF risk, focusing on whether risk differentiates between sexes. We used known IPF susceptibility variants, as well as constructing PRSs for different *p*-value thresholds. We tested whether predictive ability of these PRSs differed between males and females when using combined or sex-specific GWAS results.

Results Three independent suggestively significant genetic variants were identified. All showed a consistent direction of effect across all individual IPF studies and a significant opposite direction of effect in IPF susceptibility between females and males. None had been previously identified in IPF susceptibility GWAS. The variant rs62040020 showed an association with expression of *FAHD1* in lung tissue (*p*-value = 4.9×10^{-23}).

The predictive accuracy of the PRSs were similar between males and females, regardless of whether using combined or sex-specific GWAS results.

Conclusion We have prioritised three genetic risk variants of IPF that may be modified by sex, however these require further studies. We found no evidence that the predictive accuracy of PRSs between males and females are distinct.

Please refer to page A292 for declarations of interest related to this abstract.

P190 INTEGRATING GENOMICS INTO ROUTINE INTERSTITIAL LUNG DISEASE MANAGEMENT: EARLY EXPERIENCE OF NHS GENOMIC TESTING

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Background There is increasing evidence for the role of genetic factors in the development of interstitial lung disease (ILD). Genetic testing via NHS Genomic Laboratory Hubs has been available for ILD since April 2022. We aimed to audit the routine clinical recording of family

Abstract P190 Table 1 Demographics and results for R421 NHS Genomic Panel Testing. *Heterozygous for the common MUC5B gene promotor allele (rs35705950) which is associated with increased risk of interstitial lung disease but is associated with improved survival. CPFE = Combined pulmonary fibrosis and emphysema, ILD = Interstitial Lung Disease, IPF = Idiopathic pulmonary fibrosis.

Gender	Age	Diagnosis	Reason for testing	Result
M	59	IPF	Family history of ILD 2. Father pulmonary fibrosis of unknown subtype	No causal variant found*
F	75	Unclassifiable	Family history of ILD • Sister with IPF	No causal variant found*
F	60	IPF	Family history of ILD • Sister with CPFE	No causal variant found*
M	70	IPF	Family history of ILD • Brother died from IPF	No causal variant found*

history, the eligibility for genetic testing and early experience of clinical genetic testing. We aimed to investigate whether an extended family history could identify additional familial risk factors.

Methods All new patient consultations between 1/9/2022 and 31/1/23 with the South West Peninsula and Bristol ILD services were audited. Patient demographics and documentation of family history were recorded. Eligibility for genetic testing was assessed against NHS criteria and results were recorded.

Family histories obtained via routine clinical appointment were compared with structured interview histories taken as part of the STARSHIP Trial.

Results 175 new patients were reviewed with median age of 68.3 (IQR=13.0). The most common clinical diagnoses were idiopathic pulmonary fibrosis (88), fibrotic hypersensitivity pneumonitis (31), rheumatoid arthritis-ILD (14) and unclassifiable-ILD (12).

Family history was recorded in 120/175 (68.6%) consultations. 20/120 (16.6%) patients had a positive family history of ILD (any relative with known or suspected ILD).

29 patients met criteria for genetic testing (20 due to family history, 5 due to age <50 years and unknown cause and 8 due to consideration of lung transplantation or suspected telomerase complex mutation. 8 patients had genetic testing sent. The available results of genetic testing are seen in table 1.

47/175 patients underwent a structured family history as part of the STARSHIP study. Clinical consultation revealed a positive family history in 8/47 patients while in the same patient cohort, this increased to 16/47 patients following more in-depth structured family history.

Discussion Increased understanding of the role of genetic risk factors in ILD necessitates an accurate and reliable family history. A structured family history may highlight familial risk factors which may lead to screening and early intervention to prevent disease morbidity and mortality. National guidance is required to enable informed discussions with patients and families regarding familial ILD.

P191 EXPLORING THE ASSOCIATION BETWEEN HUMAN LEUKOCYTE ANTIGEN (HLA) GENETICS AND IDIOPATHIC PULMONARY FIBROSIS

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Introduction and Objective Idiopathic pulmonary fibrosis (IPF) is a chronic interstitial lung disease characterised by progressive lung fibrosis. Recent studies support the role of infection in IPF development. The Human Leukocyte Antigen (HLA) region has a key role in immune response, and a previous study on idiopathic interstitial pneumonia (IIP) reported a statistically significant signal at *HLA-DQB1*. Here we aimed to explore the specific link between HLA genetic variation and IPF susceptibility.

Methods We conducted a meta-analysis of association results from seven independent case-control studies of IPF, including the prior study of IIP. These comprised a total of 5,159 cases and 27,459 controls of European ancestry. We used an HLA-specific imputation approach to impute single nucleotide polymorphisms (SNPs), classical HLA alleles and amino acids, and performed logistic regression analyses individually for each study. After meta-analysis, we declared significance at $p<4.5\text{x}10^{-4}$ after applying multiple test correction. We evaluated the consistency of association results across studies using MAMBA, designating variants with a posterior probability of replication >90% as robust. We also aimed to validate the previously reported association of *HLA-DQB1* in the subset of IPF studies excluding the IIP study.

Results The meta-analysis revealed four significant independent HLA variants associated with IPF risk. However, the effects were inconsistent across the contributing studies and therefore signals have a poor posterior probability for replication. The *HLA-DQB1* association was not replicated in the independent IPF studies.

Conclusions Variation in the HLA region was not consistently associated with IPF susceptibility in European ancestry populations, although it may have a role in other IIPs. Future studies are also needed to investigate if other immune system genes may be involved in the aetiology of IPF.

Please refer to page A292 for declarations of interest related to this abstract.

P192 ASSESSING CAUSAL RELATIONSHIPS BETWEEN TYPE 2 DIABETES AND IDIOPATHIC PULMONARY FIBROSIS

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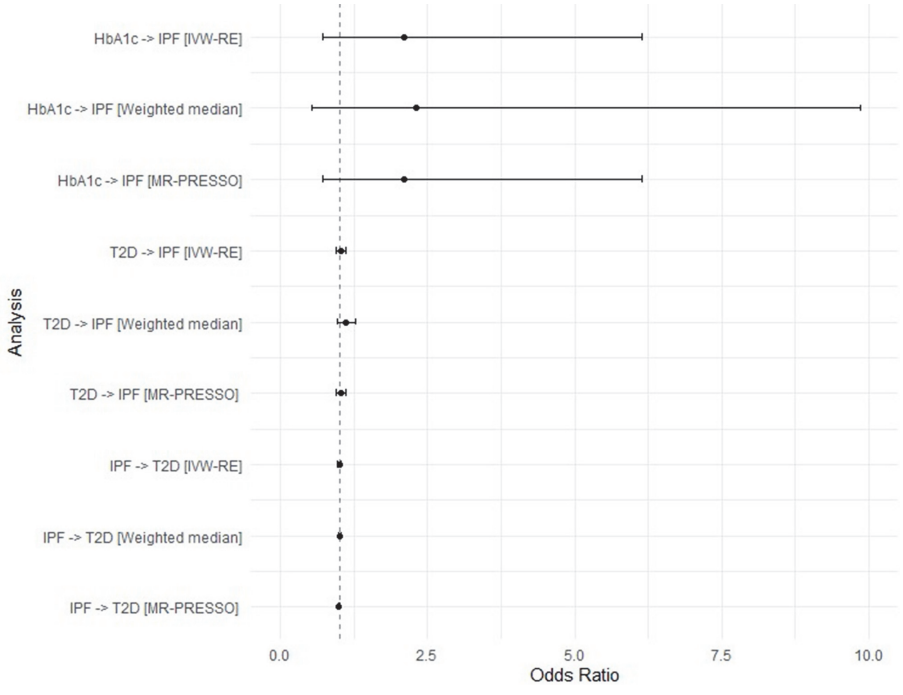
Background Idiopathic Pulmonary Fibrosis (IPF) is a disease of progressive lung scarring. The known association of diabetes with IPF has led investigators to hypothesise a causal role for increased glucose in promoting fibrosis. Mendelian randomisation (MR) uses genetic variants as instruments for an exposure to estimate causal effect on an outcome.

Aim Investigate causal relationships between type 2 diabetes (T2D) and IPF through glycaemic pathways.

Methods A primary one-way two-sample MR analysis assessed whether elevated glycated haemoglobin (HbA1c, a proxy for long-term blood glucose) increased IPF risk. Use of HbA1c as an exposure avoids possible confounding related to highly polygenic exposures associated with complex diseases like T2D. 40 genetic instruments that were significantly associated with both T2D ($p<5\times10^{-8}$) and HbA1c levels ($p<0.001$) in recent genome-wide association studies (GWAS) were selected as likely glycaemic HbA1c variants. Causal effects of the HbA1c exposure on IPF risk were estimated using recent HbA1c and IPF GWAS data.

A secondary bidirectional MR analysis was conducted to investigate for general causal effects of T2D on IPF (137 genetic variants as instruments for T2D), or IPF on T2D (10 genetic variants as instruments for IPF).

Both primary and secondary MR approaches estimated causal effects using the inverse-weighted random-effects MR method (IVW-RE). Sensitivity analyses using weighted median, MR-PRESSO, and leave-one-out approaches were applied to investigate possible pleiotropic effects and their impact on the results.



Abstract P192 Figure 1

Results Primary analyses did not suggest that increased HbA1c has a significant causal effect on IPF risk (IVW-RE, Odds Ratio (*OR*) = 2.10, 95% Confidence Interval (*95% CI*): 0.72–6.15) (figure 1). Secondary analyses did not indicate an effect of T2D on IPF (IVW-RE, *OR* = 1.03, *95% CI*: 0.94–1.12) nor of IPF on T2D (IVW-RE, *OR* = 1.0, *95% CI*: 0.97–1.03). Results of the pleiotropy-robust MR methods were consistent with those of the IVW-RE method.

Conclusions This study suggests that T2D and IPF are unlikely to be causally linked. These findings suggest shared risk factors, such as the use of steroids for example, may underlie this comorbid relationship.

P193 DIABETES AND PROGRESSION IN PULMONARY FIBROSIS

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10.1136/thorax-2023-BTSabstracts.343

Introduction and Aims Diabetes has been independently associated with Idiopathic Pulmonary Fibrosis. Hyperglycaemia is associated with increased IGF-1/insulin signalling, formation of free radicals and advanced glycation end products leading to reduced autophagy and ultimately accelerated cellular senescence. Much interest has emerged around adenosine monophosphate-activated protein kinase (AMPK) activators and peroxisome proliferator-activated receptor (PPAR) agonists, which demonstrate strong potential in ameliorating fibrosis. We aim to assess the impact of hyperglycaemia in disease trajectory in patients with pulmonary fibrosis.

Methods 251 patients attending the ILD clinic were followed for 3 years. They were stratified by radiological diagnosis; Chronic hypersensitivity pneumonitis (n 28), Unclassifiable pulmonary fibrosis (n 66), Probable UIP (n 51), and UIP (n 106). Demographics, pulmonary function tests, treatment and Hb1AC were recorded. Outcome measures included rate of decline in FVC and death. A subgroup analysis assessed the impact of treatment with antifbrotic therapy, AMPK activators (Metformin), PPAR agonists (Pioglitazone) and combination treatment on outcome measures.

Results The average age of the cohort was 75.7 (8.8 SD), 63% male (159), 20% required O2, mortality during follow up was 35% (89). Demographic, baseline data, treatment and outcome for each disease group are presented in table 1. There were no significant differences in rate of FVC decline or mortality in those with persistent hyperglycaemia (Hb1ac >42). Within the UIP group Hazard Ratio for death was higher in the patients with Hb1ac >42 1.57 (0.71–3.46). Comparison of patients treated with antifibrotics and those with concomitant metformin suggested a 132 ml reduction in the annual rate of FVC favouring combination therapy.

Conclusions The presence of hyperglycaemia does not appear to alter the clinical characteristics of pulmonary fibrosis, particularly with regard to FVC decline. There was a suggestion that UIP patients with Hb1ac>42 had higher mortality rates however mortality data may have been affected by pandemic. A possible signal was seen with combination antifibrotic and Metformin treatment, further evaluation is necessary given the increasing evidence of senolytics in fibrosis.

Abstract P193 Table 1 Demographics, Treatment and Outcome

	CHP	PF	Prop UIP	UIP	Total	%>Hb1AC 42
n	28	66	51	106	251	104
Age (sd)	70.54+/- 10.7	75.0 +/- 8.3	77.8 +/- 7.24	76.6 +/- 8.8	75.7 +/- 8.8	76.1 +/- 8.8
%Male (n)	64 (18)	53 (35)	58 (32)	70 (74)	63 (159)	70 (73)
Hb1AC Mean (sd)	48 +/- 16	47 +/- 11	45 +/- 7	44 +/- 9	45 +/- 12	53 +/- 12
%>Hb1AC 42	62 (13)	47 (27)	52 (23)	44 (41)	41 (104)	
Oxygen% (n)	18 (5)	15 (10)	14 (7)	27 (29)	20% (51)	25 (26)
Baseline FVC Absolute/l (sd)	2.43 (0.92)	2.41 (0.87)	2.27 (0.81)	2.38 (0.81)	2.37 (0.86)	2.43 (0.86)
Baseline FVC Percentage (sd)	98 (22)	82 (24)	77 (23)	84 (24)	81 (24)	85 (22)
Prednisolone% (n)	46 (13)	17 (11)	2 (1)	8 (8)	13% (33)	20 (21)
Antifibrotic% (n)	4 (1)	3 (2)	18 (9)	25 (27)	16% (40)	11 (11)
AMPK% (n)	0	9 (6)	14 (7)	11 (12)	10 (25)	24 (25)
PPAR% (n)	0	2 (1)	0	0	0	1 (1)
FVC decline 1yr Absolute/mls (sd)	55 (352)	79 (290)	66 (311)	153 (230)	105 (280)	71 (373)
FVC decline 1yr Percentage (sd)	1 (7)	2 (7)	3 (7)	4 (7)	3 (6)	3 (7)
Mortality% (n) at 3 yrs	25 (7)	28 (19)	31 (16)	44 (47)	35 (89)	36 (37)

P194 OCCUPATIONAL AND PARA-OCCUPATIONAL ASBESTOS EXPOSURE: A CAUSE OF PLEUROPARENCHYMAL FIBROELASTOSIS (PPFE)?

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10.1136/thorax-2023-BTSabstracts.344

Pleuroparenchymal fibroelastosis (PPFE) has recognised associations with collagen vascular diseases (CVD), hypersensitivity pneumonitis (HP) and solid-organ transplantation, but no link with occupational exposures has yet been demonstrated. As the radiological appearance of PPFE can also be seen with fibrotic sarcoidosis and silicosis a full lifetime occupational and environmental history has been standard practice in our

Abstract P194 Table 1

Association	n	Age (mean, range)	Smoking (never/ex/current)	FVC % predicted (mean, range)	DLCO % predicted (mean, range)
Asbestos	5	74.8 (59-85)	4/1/0	62.8 (41-87)	58 (34-96)
CVD	6	56.3 (39-76)	5/0/1	53 (46-55)	54 (34-58)
Familial	3	57.3 (45-68)	2/1/0	65.3 (34-95)	45.5 (37-74)
HP	2	69 (69-69)	0/2/0	86.5 (80-93)	86.5 (80-93)
Idiopathic	4	71.5 (43-83)	4/0/0	62 (49-84)	65 (42-74)
Missing data	2	88.5 (87-90)	1/1/0	93.5 (82-95)	21 (21)

ILD MDT since 2002. We have reviewed all cases of PPFE discussed in ILD MDT meetings in 2021 and 2022, with a definite (with lung histology) or probable (MDT consensus opinion) diagnosis. We have categorised them into those with at least one first degree relative affected with fibrotic ILD, a definite CVD, a history of occupational or para-occupational asbestos exposure, HP and others (idiopathic). 5/22 patients had a significant history of asbestos exposure >20 years before presentation; of whom 3 patients were in high exposure categories (2 carpenters and one bricklayer); one patient was an office worker who for 13 years mixed Artex (containing asbestos) in her garage every morning for her husband who was an Artex plasterer; one patient worked in a building while asbestos lagging was being stripped. 16/22 were lifelong non-smokers, and a further 2/22 had smoked <1 pack year, different from the prevalence of smokers with IPF, suggesting that the aetiology of PPFE differs from IPF, and that asbestos exposure be added to the causes of PPFE.

P195 LUNG TEXTURE ANALYSIS IN PULMONARY FIBROSIS AND EMPHYSEMA

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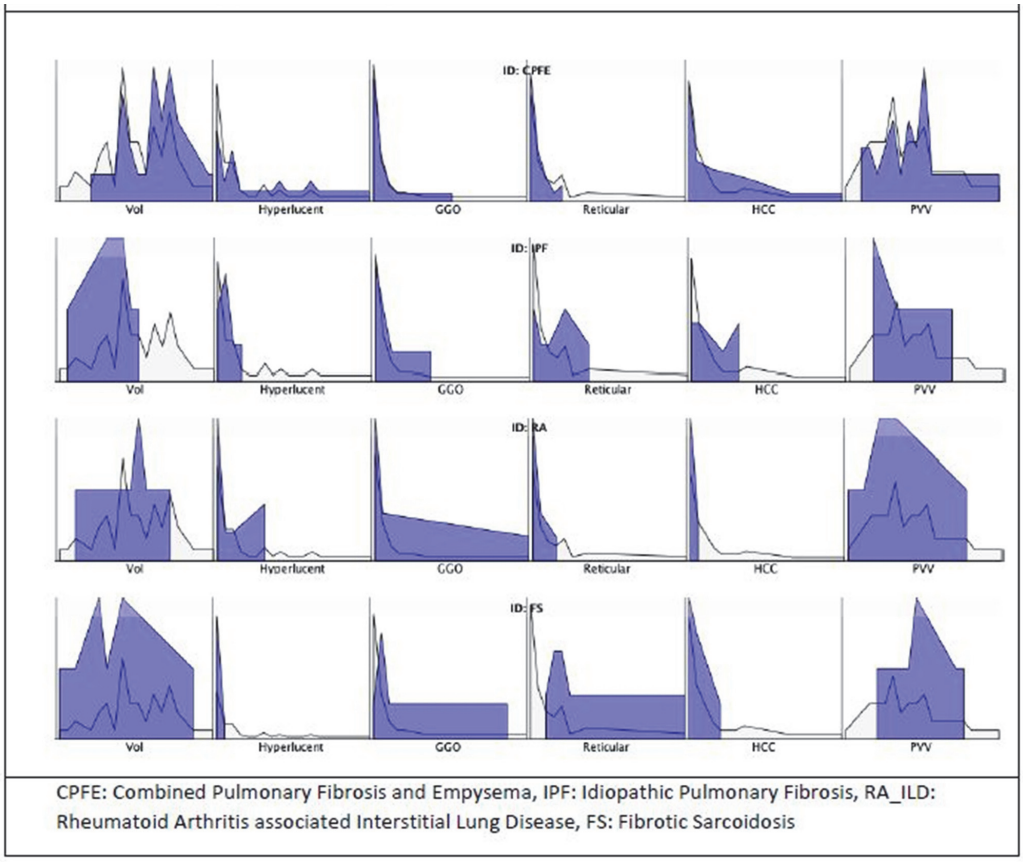

Abstract P195 Figure 1 Global Graph of abnormal lung texture.

Aims Computed Tomography (CT) has a pivotal role in the diagnosis of Interstitial Lung Disease (ILD). Visual evaluation of ILD by CT is prone to high rates of inter-reader variability. The co-existence of emphysema and fibrosis can make the estimation of the extent of fibrosis difficult. Lung texture analysis (Imbio^{TM}) is a digital technology that analyses standard chest CT images and maps the presence of abnormal lung textures. We aim to interrogate the value of Lung Texture Analysis to assess disease burden in patients with pulmonary fibrosis and emphysema.

Methods Clinical data from 63 patients including demographics, diagnosis and pulmonary function tests at time of CT evaluation were captured. Patients were stratified by diagnosis: Combined Pulmonary Fibrosis (CPFE), Idiopathic Pulmonary Fibrosis (IPF), Rheumatoid Arthritis – Interstitial Lung Disease (RA_ILD), and Fibrotic Sarcoidosis (FS). Lung Texture Analysis was performed on CT images providing visualization and quantification on lung textures reporting percentage Hyperlucency, Ground Glass Opacity (GGO), Reticulation, and Honeycomb change (HCC) as well as Pulmonary Vascular Volume (PVV) and total lung volume. An assessment of inter-reader agreement was performed in novice reporters with regards to diagnosis and burden of disease. Quantification values were correlated to pulmonary function tests.

Results The study population consisted of 35 CPFE, 10 IPF, 10 RA-ILD and 8 FS. There were significant differences between diagnostic strata for predicted spirometry (%) as well as Hyperluceny, reticulation and lung volume on LTA providing a finger print of characteristic features represented on global graphing (figure 1). Correlation between reticulation% and uncorrected transfer factor was found -0.351 (p 0.012). A stronger correlation was seen in total LTA score and uncorrected DLCO -0.370 (p 0.007). Review of the visualisation increased diagnostic accuracy by 3–16% in Novice reporters.

Conclusions LTA provided objective quantification of lung textures that are key to identifying Interstitial Lung Diseases. Visualization of the abnormalities through colour coded images provided were useful in identifying the underlying disease. Given the technological advances in image processing and analysis it is likely some form of quantitative CT will be incorporated into routine ILD care.

P196 DEEP-LEARNING CT IMAGING ALGORITHM TO DETECT UIP PATTERN IN PATIENTS WITH SSC-ILD: ASSOCIATION WITH SEVERITY AND SURVIVAL

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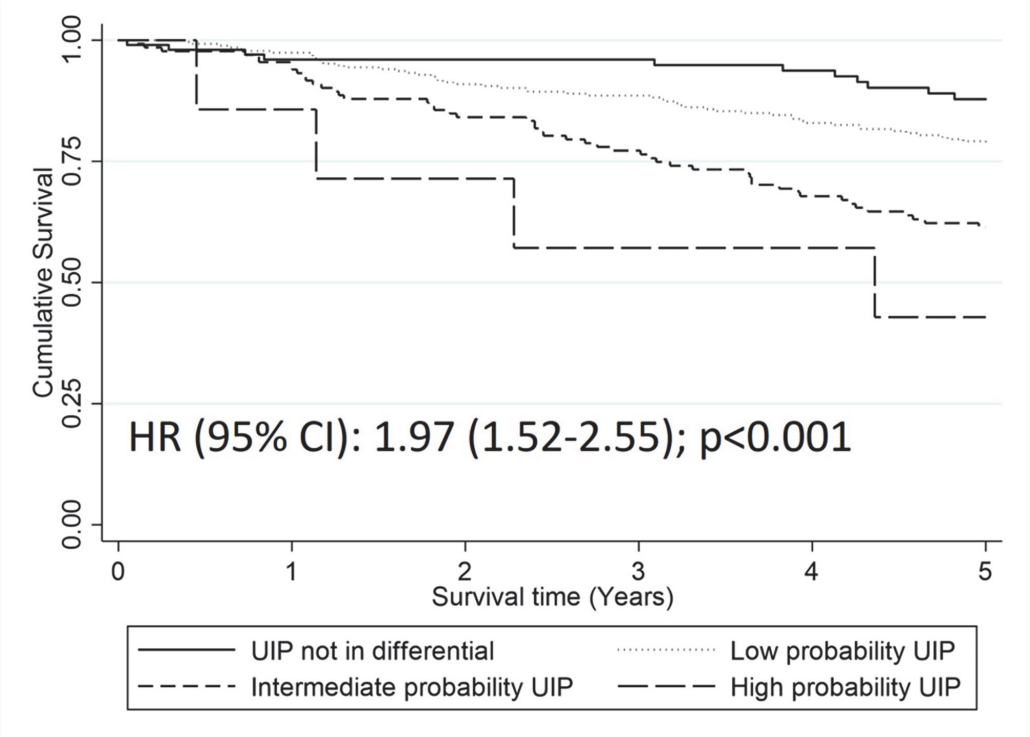
10.1136/thorax-2023-BTSabstracts.346

Interstitial lung disease (ILD) is the most common cause of death in patients with systemic sclerosis (SSc), although disease behavior is highly heterogenous. While a usual interstitial pneumonia (UIP) pattern is associated with worse survival in other ILDs, its significance in SSc-ILD is unclear. We used the Systematic Objective Fibrotic Imaging analysis Algorithm (SOFIA), a convolution neural network algorithm which provides probabilities of a UIP pattern, to assess its associations with disease severity and progression in patients with SSc-ILD. Patients with SSc-ILD, first seen in our Unit between 1990 and 2019, were included if HRCT images, concomitant lung function tests, and follow-up data were available. Of 736 patients, 214 were excluded because of unavailable/poor quality images or lung function, leaving 522 patients. The SOFIA



Abstract P196 Figure 1

scores were converted into the Prospective Investigation of Pulmonary Embolism Diagnosis (PIOPED)-based UIP probability categories: UIP not included in the differential (0–4%); low probability of UIP (5–29%); intermediate probability of UIP (30–69%); high probability of UIP (70–94%); and pathognomonic for UIP (95–100%) (Walsh et al. *Am J Respir Crit Care Med.* 2022 206(7):883–891). 72.9% of patients were classified as either 'UIP not included in the differential' or 'low probability of UIP', with 25.8% classified as 'intermediate probability of UIP' and 1.3% classified as 'high probability of UIP'. On univariable analysis higher likelihood of UIP probability was associated with worse 5-year survival (1.97 (1.52–2.55), p<0.001 (figure 1). However, on multivariable analyses adjusting for age, gender, ethnicity, and baseline composite physiologic index (CPI), the trend did not reach statistical significance (HR: 1.34 (0.94–1.62), p=0.12), suggesting a link between severity and UIP. The distribution of UIP probabilities was therefore examined according to the CPI quartiles, with higher UIP pattern probability associated with increasing baseline CPI quartiles (intermediate or high probability of UIP pattern: 4.6% in the lowest CPI quartile; 18.3% in the second quartile; 33.6% in the third quartile; 51.5% in the highest CPI quartile; p=0.0001). In conclusion, we observed an association between a higher probability of a SOFIA UIP pattern and severity, suggesting that a UIP pattern may occur in more advanced disease in SSc-ILD.

Please refer to page A292 for declarations of interest related to this abstract.

P197 IMPACT OF READING TIME ON RELIABILITY OF RADIOLOGICAL ASSESSMENT TO IDENTIFY PROGRESSIVE PULMONARY FIBROSIS

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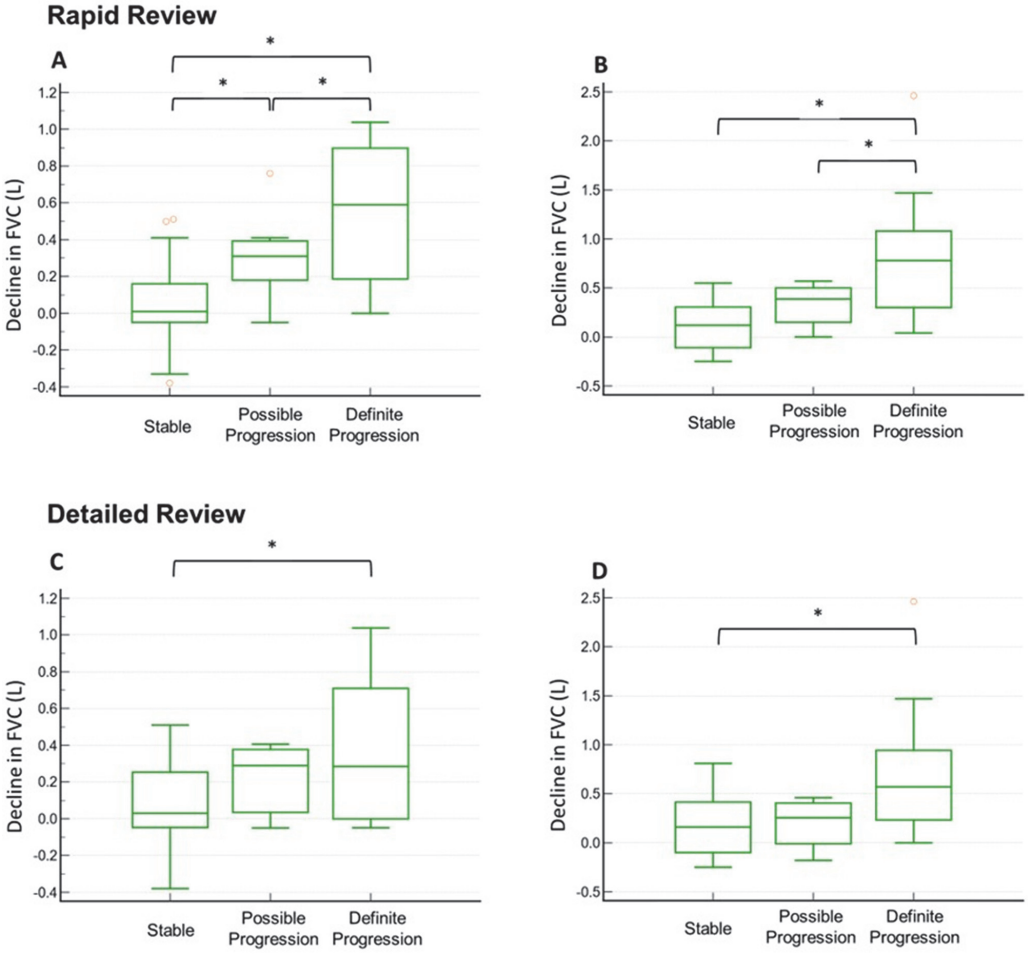
10.1136/thorax-2023-BTSabstracts.347

Introduction Progressive pulmonary fibrosis (PPF) encompasses progressive non-idiopathic pulmonary fibrotic interstitial lung diseases (ILD). Patients with PPF are eligible for treatment with anti-fibrotic therapy, but this is reliant on accurate diagnosis which requires demonstration of physiological or radiological progression. Radiological decline is established by identifying progressive fibrosis on serial CTs. The aim of this study was to evaluate whether the reliability of visual radiological assessment of PPF was influenced by duration of CT reading time.

Methods Fifty patients with fibrotic ILD who had undergone serial CTs 1 and 2 years apart, with contemporary lung function, were retrospectively evaluated from our institutional



Abstract P197 Figure 1 A-D: Box plots of a one-way analysis of variance (ANOVA) comparing observer categories of CT progression against FVC decline at 1 and 2 years from baseline (*p<0.05).

records. Baseline, and 1- and 2-year follow up CTs were compared side-by-side by 3 thoracic radiologists independently. Cases were scored as stable, possible progression or unequivocal progression. During first round of reading, radiologists reviewed cases rapidly within under a minute. After 1 month, readers read the same cases using detailed slice-by-slice comparison, with no time restrictions. Inter-observer agreement (Kw), and FVC change at 1 and 2 years within radiological categories of PPF using rapid and detailed review were compared (ANOVA).

Results In rapid review, median 12 month FVC decline was significantly lower (50 mls) for CTs categorised as stable versus those categorised as unequivocal progression (480 mls). In detailed review, median FVC decline was 80 mls and 410 mls for stable and unequivocal progression respectively. Similar trends were observed for 2 year follow up CT (figure 1). For all 3 readers, the proportion of cases categorised as unequivocal progression increased with detailed review (mean 16% [rapid] to 31% [detailed] at 1 year; mean 46% (rapid) to 59% (detailed) at 2 years). Observer agreement improved for all readers with detailed review (Kw 0.5–0.67 [rapid review] versus Kw 0.52–0.77 [detailed review]).

Conclusion Visual comparison of serial CTs provides reliable assessment of fibrosis progression as demonstrated by FVC decline even with rapid review. In this study, a more detailed review led to an increase in the proportion of cases categorised as PPF and improvements in observer agreement. Observer agreement and the extent of FVC decline increased when comparing CTs 2 years apart compared to 1 year.

P198 A COMPARATIVE ANALYSIS OF THE COMPOSITE PHYSIOLOGICAL INDEX IN PATIENTS WITH INTERSTITIAL LUNG DISEASE(S)

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10.1136/thorax-2023-BTSabstracts.348

Introduction The composite physiological index (CPI) is designed to estimate the extent of fibrosis on a thoracic CT and has been shown to be the best physiological prognosticator in idiopathic pulmonary fibrosis (IPF). However, the transferability of the CPI to other forms of interstitial lung disease (ILD) are less well-understood. The aim of this analysis was to compare the prognostic value of the CPI across different forms of ILD.

Methods CPI was calculated as $91.0-(0.65 \times DLCO^{\%}_{pred})-(0.53 \times FVC^{\%}_{pred})+(0.34 \times FEV_1{}^{\%}_{pred})$. To assess CPI against 1-year, 2-year, and 3-year mortality, receiver operating characteristic (ROC) curves were plotted for patients with IPF, usual interstitial pneumonia (UIP), hypersensitivity pneumonitis (HP), sarcoidosis and combined pulmonary fibrosis and emphysema (CPFE). The cut-off threshold to stratify increased risk was CPI>41.0.[1] Survival analysis was performed using Kaplan-Meier curves. All statistics were performed using GraphPad Prism, with statistical significance accepted when $p<0.05$.

Results For all groups, patients with a CPI>41 had significantly shorter median life expectancy (see table 1). A CPI>41 was better able to discriminate between 3-year survival in patients with IPF and CPFE based on area under the curve (AUC) analysis, and more so in CPFE. Sensitivity and specificity to 3-year mortality was much lower for patients with HP and Sarcoidosis using CPI>41.

Conclusion CPI provides a valuable estimate of prognosis across a range of ILDs. However, its sensitivity and specificity to predict 3-year mortality is variable and likely depends on the underlying progression of fibrosis, concurrent emphysema and pulmonary hypertension.

REFERENCE

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P199 IMPORTANCE OF PRESERVED FVC IN PFILD PATIENTS: INSIGHTS FROM A RETROSPECTIVE ANALYSIS AT A SINGLE SPECIALIST CENTRE

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10.1136/thorax-2023-BTSabstracts.349

Introduction The INBUILD trial (Flaherty KR, et al. N Engl J Med 2019) has been influential in shaping the definition and treatment of progressive fibrosing interstitial lung disease (PFILD) in the UK (NICE TA747, 17/Nov/2021). It showed that patients treated with Nintedanib had a slower rate of forced vital capacity (FVC) decline than those on placebo. PFILD definitions were based on trends in FVC decline rather than set cut-off values. Mean FVC was 69.0±15.6% in the INBUILD trial. This study aims to analyse key characteristics of PFILD patients with preserved FVC (≥80% predicted) and focus on the tolerability of Nintedanib in this group, while

Abstract P198 Table 1 Results of comparative analysis

Measure	IPF (*n* = 164)	UIP (*n* = 181)	Sarcoidosis (*n* = 61)	CPFE (*n* = 32)	HP (*n* = 75)
Median life expectancy (CPI ≤41) #, months	73.5***	75.1***	Undefined***	97.7***	157.5**
Median life expectancy (CPI >41) #, months	24.5	28.0	57.9	20.3	53.3
AUC (1-year mortality)	0.616 (0.53–0.70)*	0.609 (0.53–0.69)*	0.595 (0.41–0.78)	0.643 (0.45–0.83)	0.562 (0.43–0.70)
AUC (2-year mortality)	0.735 (0.66–0.81)***	0.668 (0.59–0.75)***	0.595 (0.41–0.78)	0.833 (0.69–0.97)**	0.582 (0.45–0.71)
AUC (3-year mortality)	0.779 (0.71–0.85)***	0.695 (0.62–0.77)***	0.689 (0.51–0.87)*	0.881 (0.76–0.99)***	0.614 (0.48–0.75)

#Life expectancy measured from date of pulmonary function test where CPI calculated. *Denotes $p< 0.05$, **$p<0.005$, ***$p<0.0005$.

also drawing comparisons to a similar cohort of patients with PFILD and impaired FVC (<80% predicted).

Methods We conducted a 3.7-year retrospective analysis of patient data, including pharmacy records, service evaluations, and Named Individual Patient Supply prescriptions, from November 2019 to June 2023. All 138 patients were diagnosed with PFILD by multidisciplinary team consensus using the INBUILD criteria.

Results Out of the 138 PFILD patients, 104 had impaired FVC at PFILD diagnosis and 34 had preserved FVC. Patients with preserved FVC were older (70.2 vs. 63.7 years, p=0.004), and preserved FVC was found to have a statistically significant impact on survival (88.2% vs. 58.7%, p=0.002). Despite preserved FVC, 84.4% of this cohort had impaired DLCO (<60% predicted, with 31.2% showing severely impaired values of <40%). A higher proportion of patients with impaired FVC started Nintedanib treatment, but there was no difference in discontinuation rates between the two groups. However, a higher proportion of patients with impaired FVC had their Nintedanib dose reduced (17.3% vs. 5.26%). Logistic regression analysis showed that patients were 76% less likely to discontinue Nintedanib if their FVC was ≥80% predicted, controlling for age, sex, survival status, ILD diagnosis, and radiological pattern.

Conclusion Our findings suggest that preserved FVC at PFILD diagnosis is associated with improved survival and a lower likelihood of Nintedanib discontinuation, despite the high prevalence of impaired DLCO. These findings emphasize the importance of early identification of PFILD patients. Future research should explore whether low DLCO predicts FVC progression.

P200 REAL WORLD TOLERABILITY STUDY OF METFORMIN WHEN GIVEN ALONGSIDE NINTEDANIB: INSIGHTS FROM A PFILD RETROSPECTIVE ANALYSIS AT A SINGLE SPECIALIST CENTRE

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10.1136/thorax-2023-BTSabstracts.350

Introduction No real-world studies have examined the tolerability of Nintedanib in patients with progressive fibrosing interstitial lung disease (PFILD), who are also taking Metformin for type 2 diabetes. Metformin may reduce progression of fibrosis and has been associated with reduced all-cause mortality in Idiopathic pulmonary fibrosis (IPF).[1] However, gastrointestinal side effects are commonly reported with Metformin and there are concerns about its concomitant use with nintedanib. The aim of this study was to assess nintedanib tolerability in non-IPF PFILD patients with and without Metformin co-prescription.

Methods We performed a retrospective case-note review of patients diagnosed with PFILD by multidisciplinary team consensus using the INBUILD[2] criteria and commenced treatment with Nintedanib at a tertiary ILD specialist centre between November 2019 and May 2023. Most patients started Nintedanib post NICE approval. Where patients received Nintedanib ahead of marketing authorisation, this was made available upon request to the manufacturer for individual patient supply in exceptional cases only, where no alternative appropriate treatment was available. Tolerability was analysed from the point of counselling to start Nintedanib until June 2023 in patients treated with Metformin and without Metformin.

Results Data from 110 PFILD patients receiving a prescription for Nintedanib, or Nintedanib with Metformin were compared (table 1). 14.3% of those on both Nintedanib and Metformin required a dose reduction of their Nintedanib due to

Abstract P200 Table 1 Demographic, treatment, and physiological characteristics of patients with ILD taking Nintedanib with and without Metformin

	Metformin (n=21)	No Metformin (n=89)	Total (n=110)	p-value
Demographics				
Mean Age in Years (±SD)	63.7 (±12.6)	63.7 (±11.5)	63.7 (±11.7)	0.50 (t-test)
Male n, (%)	10 (47.6)	38(42.7)	48 (43.6)	0.68 (Chi^2 test)
Deceased, n (%)	9 (42.9)	32 (36.0)	41(37.3)	0.56 (Chi^2 test)
ILD Diagnosis	5 (23.8)	23 (25.8)	28 (25.5)	0.59
• HP, n (%)	5 (23.8)	21 (23.6)	26 (23.6)	(Chi^2 test)
• Idiopathic NSIP, n (%)	7 (33.3)	25 (28.1)	32 (29.1)	
• CTD-ILD, n (%)	4 (19.1)	20 (22.5)	24 (21.8)	
• Others, n (%)				
Lung Function				
ppFVC prior to PF-ILD diagnosis	15.0%	15.0%	15.0%	0.91
3. <40%	15.0%	19.5%	18.7%	(Chi^2 test)
4. 40–50%	25.0%	27.6%	27.1%	
5. 50–60%	15.0%	15.0%	15.0%	
6. 60–70%	5.0%	8.1%	7.5%	
7. 70–80%	5.0%	5.8%	5.6%	
8. 80–90%	20.0%	9.2%	11.2%	
9. >90%				
ppDLCO prior to diagnosis	64.7%	52.5%	55.3%	0.26
10. <40%	11.8%	23.7%	21.1%	(Chi^2 test)
11. 40–50%	11.8%	18.6%	17.1%	
12. 50–60%	0%	3.4%	2.6%	
13. 60–70%	5.9%	0%	1.3%	
14. 70–80%	5.9%	1.7%	2.6%	
15. 80–90%	0%	0%	0%	
16. >90%				
Medication				
Nintedanib Discontinued Due to Tolerability n, (%)	1 (4.8)	16 (18)	17 (15.5)	0.13 (t-test)
Nintedanib Dose Reduction Due to Tolerability, n (%)	3 (14.3)	29 (32.6)	32 (29.1)	0.10 (Chi^2 test)
Time on Nintedanib (weeks) (±SD)	23.4 (±17.8)	61.1 (±45.3)	53.9 (±44.0)	**0.00** (t-test)
Loperamide started after Nintedanib, n (% of patients with follow-up data)	4* (23.5%)	34^ (38.6%)	38$^{\Omega}$ (36.2%)	0.2 (Chi^2 test)

UIP= usual interstitial pneumonia; HP=hypersensitivity pneumonitis; NSIP=non-specific interstitial pneumonia; CTD-ILD= connective tissue disease associated interstitial lung disease; ppFVC= percent predicted forced vital capacity; ppDLCO = percent predicted diffusing capacity for carbon monoxide.
*4/17 patients with follow-up data post Nintedanib initiation; ^34/88 patients with follow-up data post Nintedanib initiation; $^{\Omega}$38/105 patients with follow-up data post Nintedanib initiation.

tolerability, compared to 32.6% on Nintedanib alone. 4.8% of those on both treatments stopped Nintedanib due to tolerability, compared to 18% on Nintedanib alone. 23.5% of those on both treatments required loperamide to manage side effects, compared to 38.6% on Nintedanib alone. These differences did not reach statistical significance. The duration of treatment was significantly longer in the group taking Nintedanib alone.

Conclusions This real-world study demonstrated that concurrent Metformin therapy did not affect the tolerability of Nintedanib in PFILD patients, concerns over additive side effects may therefore be unfounded.

Prospective studies are needed to confirm the efficacy and tolerability of concurrent use of metformin and nintedanib.

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'Simply the best' – Exacerbations, senescence and quality of life in COPD

P201 DIFFERENCES IN HOSPITAL ADMISSIONS FOR EOSINOPHILIC AND NON-EOSINOPHILIC ACUTE EXACERBATIONS OF COPD (AECOPD) DURING THE COVID-19 PANDEMIC

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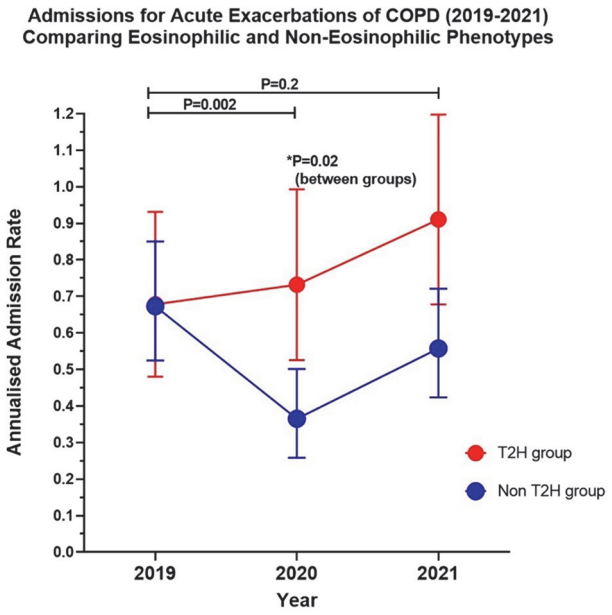
Introduction The initial year (2020) of the COVID-19 pandemic saw a considerable drop in AECOPD with at least 50% fewer hospitalisations. There was a marked decline in infections with a reduction in concomitant pneumonia or influenza, presumably due to reduced social contact, less travel and the routine wearing of face-masks. However, it is unclear if this pattern observed during the pandemic is relevant to those with eosinophilic COPD.

Aim We hypothesised that hospitalisation for an AECOPD in those with eosinophilia would be less affected by the COVID-19 pandemic.

Methodology Participants were recruited in June 2020 to study the impact of the COVID-19 pandemic on patients with severe COPD.[1] Admissions due to AECOPD during 2019 to 2021 were evaluated. Participants were defined as either eosinophilic (T2High) or non-eosinophilic (non-T2High) based a blood eosinophil count (BEC) of $\geq 0.3 \times 109$/L, in the year prior to inclusion (2018). In addition, the highest BEC for each admission was captured. Exacerbations were analysed using negative binomial mixed models.

Results 160 patients were recruited with mean (SD) age of 67.3 (8.1) years, and 88 male (55%). 56 (35%) were T2High at baseline and 104 (65%) non-T2High. 20/56 (36%) of the T2High group had at least 1 admission in 2018, compared with 31/104 (30%) in the non-T2High group. Mean FEV1 (SD) was 0.91L (0.49) and 0.84L (0.37) in T2High and non-T2High groups.

Between 2019–21, 285 hospital admissions were recorded. A significant reduction in hospitalisation was seen in 2020 (p=0.002) compared to 2019. The reduction in admissions in 2020 was seen in the non-T2H group, but not the T2H group (see figure 1) (between groups for 2020, p=0.02). Admission rates returned to similar between groups in 2021 (p=0.44).



Baseline Phenotype	T2H	Non T2H
Year	Mean AER (95% CI)	Mean AER (95% CI)
2019	0.68 (0.48 - 0.93)	0.67 (0.52- 0.85)
2020	0.73 (0.53 - 0.99)	0.37 (0.26- 0.50)
2021	0.91 (0.68 - 1.20)	0.56 (0.42 -0.72)

Abstract P201 Figure 1

Most admissions were non-eosinophilic (n=229 (80%)) with n=56 (20%) associated with blood eosinophilia. 36/121 (30%) of admissions in the T2High group were eosinophilic during hospital admissions, compared with 20/164 (12%) in the non-T2High group.

Conclusion Hospital admission for AECOPD remained similar throughout the pandemic for those with Eosinophilic COPD, with reduction in admissions in 2020 seen in the non-eosinophilic group.

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P202 CLINICAL CHARACTERISTICS OF RHINOVIRUS TRIGGERED COPD EXACERBATIONS

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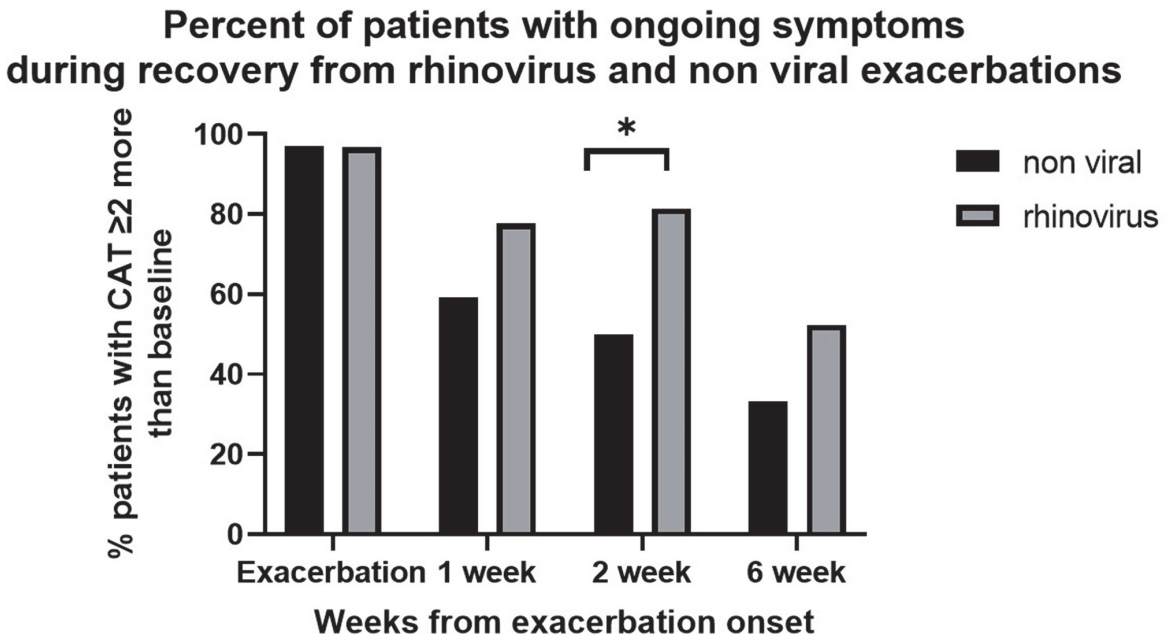
10.1136/thorax-2023-BTSabstracts.352

Background Chronic obstructive pulmonary disease (COPD) exacerbations are the main cause of hospital admission and death from COPD. Respiratory viruses are common triggers for COPD exacerbations (AECOPD) with human rhinovirus (RV) being the most frequently detected. Identifying symptoms to differentiate between RV and non-viral AECOPD may guide clinical management and recruitment into clinical trials of anti-viral therapy.



Abstract P202 Figure 1

Hypothesis RV AECOPD are associated with more cold symptoms and delayed recovery compared to AECOPD where no virus is detected.

Methods Participants were recruited from the London COPD Exacerbation Cohort between 01/01/2017 and 31/12/2017. Participants kept daily diary cards of respiratory symptoms and were seen within 48 hours of exacerbation reporting. Participants were seen at exacerbation, at 1 week, 2 weeks and 6 weeks following exacerbation onset. Spirometry, CAT score, sputum and nasopharyngeal (NP) swabs were performed at each visit. Respiratory viruses were detected by qPCR on sputum and NP swabs. Bacterial infection was identified by microbiological culture. Exacerbation duration was defined by diary cards.

Results There were 70 reported AECOPD between 01/01/2017 and 31/12/2017. RV was detected in 31 (44%) AECOPD respiratory syncytial virus in 2 and Influenza B in 1 AECOPD. No virus was detected in 36 exacerbations (48%). Patients with RV AECOPD were significantly more likely to have colds compared to non-viral AECOPD 56% vs 36% p=0.007. RV AECOPD were more likely to have sore throats compared to non-viral AECOPD 34% vs 13% p<0.001. Neither symptom was reported in 21% of RV AECOPD compared to 59% of non-viral AECOPD. At 14 days only 28% of RV exacerbations had symptomatically recovered on diary card compared to 74% of non-viral exacerbations. At 2 weeks 81% RV AECOPD had a CAT sore ≥2 than baseline compared to 50% of non-viral AECOPD. Bacteria were isolated in 25% of patients with RV AECOPD and 8.3% of non-viral AECOPD at 2 weeks.

Conclusions RV AECOPD were more likely to be associated with colds and sore throats compared non-viral AECOPD. RV AECOPD were associated with delayed recovery which may impact disease progression. Anti-viral treatments are urgently needed to reduce the morbidity and mortality from COPD exacerbations.

Please refer to page A292 for declarations of interest related to this abstract.

P203 POST-PANDEMIC SEASONAL DYNAMICS IN THE FREQUENCY OF HOSPITALISED EXACERBATIONS AND TRIGGERS IN CHRONIC OBSTRUCTIVE AIRWAY DISEASE (COPD) POPULATION

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10.1136/thorax-2023-BTSabstracts.353

Background During the COVID-19 pandemic, there was a reduction in hospital admissions for acute exacerbation of COPD (AECOPD), particularly due to viral triggers. However, with easing of lockdowns and reduced used of facemasks, the future pattern of AECOPD hospitalisation is unclear.

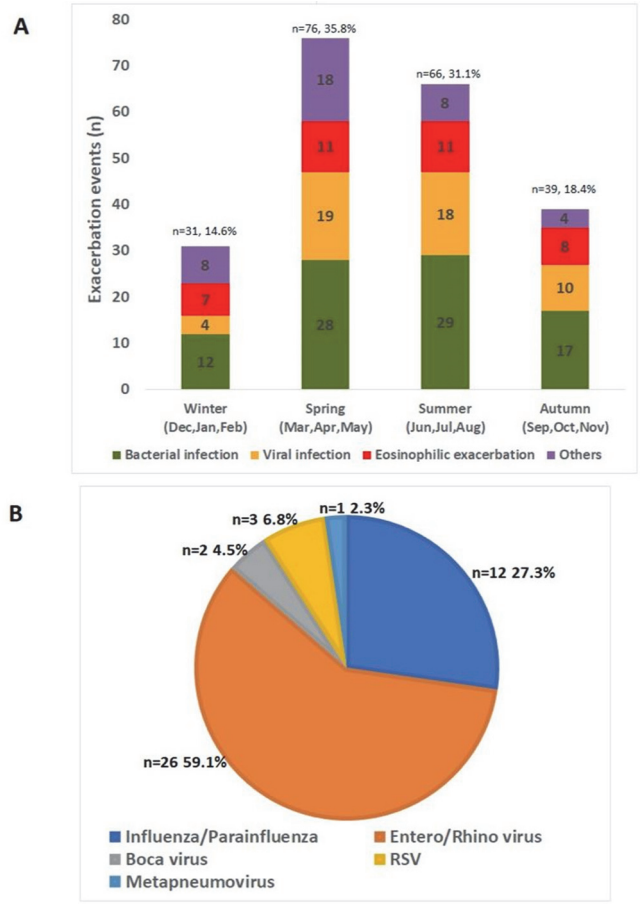
Objective To assess the seasonal variation of AECOPD rate and triggers (viral, bacterial, eosinophilic) during a calendar year post pandemic (2022).

Methodology We conducted an observational cohort study of patients hospitalised with AECOPD in Leicester, UK. Participants were prospectively recruited at time of admission and categorised as viral, bacterial, eosinophilic or others.

Results 212 participants were recruited. Mean age was 67±10 years, 97(46%) were male, mean blood eosinophils count 0.22 (±0.1) x109/L, with n=27(13%) on home oxygen.

Admissions for AECOPD were highest in Spring 2022 (35.8% of all AECOPD) and lowest in winter months (14.6%). Bacterial (40.5%) and viral (24%) infections were the most common triggers. No difference was seen in triggers of exacerbation across seasons (p=0.48), though numerically viral triggers made up the highest proportion in Spring (25%) and Summer (27%) in contrast to Winter (13%) (see figure 1). Rhinovirus was the most frequent cause among all viral PCR-confirmed exacerbations (p=0.005).

The proportion of patients hospitalised for >4 days was significantly different between triggers (Bacterial 72%, Viral 57%, Eosinophilic 54%, Others 47%, p=0.038).



Abstract P203 Figure 1

Conclusion Typical seasonal variation in hospitalisation for AECOPD was lost during 2022, following two years of pandemic lock-down and management. It remains to be seen if seasonality will return in future years

P204 USING THE DECAF SCORE TO RISK STRATIFY AND ANALYSE THE INPATIENT JOURNEY OF PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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10.1136/thorax-2023-BTSabstracts.354

Introduction Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) is common but carries significant morbidity and mortality. Often, patients with AECOPD have a chaotic inpatient journey which may be affecting their length of stay (LOS) and specialist care.

Aims Using the DECAF[1] score to risk stratify, we wanted to evaluate our inpatient COPD service and patient journey and compare our average LOS and use of early supported discharge (ESD).

Method In May 2022, we prospectively collected data on all patients who presented to our hospital with AECOPD. 40 patients admitted during this period. 32 patients were included in final analysis, 8 had incomplete data. All patients were given a DECAF score. Those with LOS >5 days had a second assessment on day 5 determining their reason to reside. We reviewed social factors and key indicators such as oxygen requirement, $PaCO_2$ and NEWS2 score.

Results Of our 32 patients, 17 had a DECAF score of 0–1. Of those, 13 were eligible for ESD at day 1. 0/13 were referred to ESD. Within that cohort of 13, 8 had an eventual LOS of > 5 days. The average LOS for DECAF 0–1 was 9 days. Patients moved to a respiratory ward had an overall lower length of stay compared to non-respiratory wards. The average length of stay in the DECAF 2–5 group was 9.7 days on a respiratory ward compared to 17.4 on a non-respiratory ward.

12/21 patients who had a documented 'medically fit for discharge' date were discharged on that same day, indicating that social factors may play less of a role in delayed discharges than we had previously suspected. Very high DECAF scores (> 4) were all moved to respiratory wards appropriately during this period.

Conclusions Our early supported discharge scheme is underutilised in the low DECAF population. Patient journeys and discharge rates are being adversely affected by bed management. Risk stratifying patients on admission using the DECAF score helps to demonstrate which patients would benefit from respiratory specialty input and those that could be supported on an ESD scheme.

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P205 EFFECT OF METFORMIN ON REDUCING THE RISK OF COPD EXACERBATIONS: A UK NESTED CASE-CONTROL STUDY

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10.1136/thorax-2023-BTSabstracts.355

Background Some second-line medications used to treat type-2 diabetes have been shown in observational studies to reduce COPD exacerbations. The evidence for the first-line medication, metformin, is unclear but animal studies have shown that metformin decreases airway glucose and bacterial colonisation. Diabetes is common in COPD but often managed with diet for a prolonged period before starting medication. We hypothesised that metformin reduces COPD exacerbations and that its effects are enhanced when combined with other diabetic medications.

Method We adopted a nested case-control design using primary care data (Clinical Practice Research Datalink) linked to secondary care data. The case-control was nested from a cohort of COPD patients with diabetes, naive to metformin at the start of follow-up. Cases were exacerbations (course of oral corticosteroids or hospital admission); controls were matched 4:1 by age, sex and GP practice. Conditional logistic regression was used to measure the association between metformin and exacerbations, after adjusting for COPD severity (MRC score, inhaler use and FEV1), BMI, HbA1c, smoking status, social deprivation, cardiovascular disease. The 1-year exposure window was divided into time since last prescription. Interaction analyses were conducted to assess if the association

Abstract P205 Table 1

	Adjusted odd ratio	P value	95% CI
Time since last metformin			
no metfomrin		reference	
0-30 days	0.84	<0.001	0.79 - 0.90
31-90 days	0.88	0.01	0.80 - 0.97
91-180 days	0.76	0.01	0.61 - 0.94
181-365 days	0.94	0.57	0.75 - 1.17

was modified by additional use of other anti-diabetic medications, BMI or HbA1c.

Results 14,292 cases and 54,529 controls were included. Metformin was associated with 24% reduced odds of an exacerbation, its effect remained up to 180 days after the prescription date (OR=0.76, 95%Cl 0.64–0.88) but there was no effect >180 days after metformin use (p>0.05). Using GLP-1 agonists with metformin had a multiplicative effect, associated with a 72% reduction in odds of an exacerbation (with GLP-1: OR=0.28, 95%Cl 0.11–0.75). BMI, HbA1c and other anti-diabetic medications (DDP-4 and SGLT-2 inhibitors, sulfonylureas and insulin) were not found to influence the effect of metformin on exacerbations.

Conclusion Metformin reduces the risk of COPD exacerbations, but its mechanism may not be through improved systemic glycaemic control or weight loss. The concurrent use of GLP-1 receptor agonists augments the effect of metformin, other anti-diabetic medication does not. Diabetes is common in COPD and metformin is relatively cheap, early use may prevent exacerbations.

P206 IDENTIFICATION OF NOVEL SENOLYTIC CANDIDATES FOR THE TREATMENT OF CHRONIC RESPIRATORY DISEASES WITH ACCELERATING AGING

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10.1136/thorax-2023-BTSabstracts.356

Background Cellular senescence is a process that induces cells into a state of irreversible replicative arrest, whereby they are apoptosis-resistant, and release inflammatory mediators known as the senescence-associated secretory phenotype (SASP). Cellular senescence and the SASP potentially have a significant influence on the process of ageing and pathologies of accelerated premature-aging related chronic respiratory diseases such as chronic obstructive pulmonary disease (COPD) and idiopathic pulmonary fibrosis (IPF). Senolytic agents, capable of selectively killing senescent cells by inducing apoptosis, could potentially have major implications for treating the senescence-driven accelerated ageing pathology found in COPD and IPF. The aim of this project is to identify a new class of senolytic agents.

Methods Compounds (0.1 and 10μM) from an FDA-approved chemical library (700 compounds) were treated 2 days after etoposide (1μM)-treated or untreated airway epithelial cells, BEAS-2B. The resazurin cell viability assay was conducted 2-days post-treatment and the ability of the compounds to eliminate senescent cells was assessed. Positive candidates were treated in double hit etoposide senescent BEAS-2B. Senescence markers $p21^{WAF1/CIP1}$ and $p16^{INK4A}$ expression (western blotting) and positive Senescence-Associated-b-Galactosidase (SA-β-Gal) staining were assessed. SASP marker PAI (Plasminogen Activator Inhibitor)-1 was detected in supernatant using ELISA.

Results Single treatment with etoposide was confirmed to induce cellular senescence characterized by an increase in SA-β-Gal staining, $p16^{INK4A}$ and $p21^{WAF1/CIP1}$ expression. After high throughput screening with this cell model, we identified 6 candidates to be able to eliminate senescent cells, but not healthy cells. Further validation revealed that Dipyridamole (DP) showed decrease in $p21^{WAF1/CIP1}$ expression by 20.5% compared to etoposide control (p>0.05, n=4), where a well-established senolytic cocktail (a combination of Dasatinib and Quercetin) reduced $p21^{WAF1/CIP1}$ by 27.6%. DP and Amlodipine (AL) also reduced the proportion of SA-b-Gal positive cells by 15.5% and 31.5%, respectively, compared to etoposide control. Etoposide-induced PAI-1 release was also reduced by those candidates (p>0.05) as well as DQ (57.0% reduction).

Conclusion DP and AL showed some potentials as senolytic agents. Further studies using primary cells obtained from patients with COPD or IPF are needed for full validation.

P207 SENOLYTIC EFFECTS OF TELAGLENASTAT, A GLUTAMINASE INHIBITOR, ON SENESCENT AIRWAY EPITHELIAL CELLS

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10.1136/thorax-2023-BTSabstracts.357

Background COPD is characterized by pulmonary inflammation and accelerated lung aging, where elevated number of senescent cells are observed. Senescent cells may prevent lung repair and drive chronic lung inflammation. Telaglenastat, a non-competitive glutaminase inhibitor, is recently reported as a potential senolytic agent which removes senescent cells (Johmura et al., Science, 2021).

Aim Investigate the senolytic effects of Talaglenastat on airway epithelial cells.

Methods Immortalised bronchial epithelial cell line, BEAS-2B cells, were treated with known senescence inducer etoposide

either once or twice (3 days apart). 10 days post-treatment, cellular senescence was characterised by high levels of $p21^{WAF1/CIP1}$ and $p16^{INK4A}$ expression (western blotting) and Senescence-Associated-b-Galactosidase (SA-β-gal) positive staining (Senescence detection kit, Abcam). Senescent cells were treated with Talaglenastat (0.4 μg/ml) or Dasatinib (200 nM) and Quercetin (50 μM) (D+Q) for 72 hours and changes in senescence markers detected. In addition, human induced pluripotent stem cells (iPSCs)-derived alveolar epithelial cells cultured under the air-liquid interface (ALI) condition (HiLung Inc, Japan), were treated with etoposide to induce senescence, prior to Talaglenastat treatment.

Results Talaglenastat treatment showed reduction of SA-β-gal staining in double etoposide treated BEAS-2B (approx. 33% reduction compared to etoposide treated cells, $p<0.05$, $n=4$). Senolytic cocktail, Dasatinib and Quercetin reduced senescent cell number, but not% SA-β-gal staining. In addition, Talaglenastat showed a concentration dependent reduction of $p21^{WAF1/CIP1}$ and $p16^{INK4A}$ expression with IC_{90} values of 0.725 and 0.284, respectively, in BEAS-2B cells with etoposide single treatment. Etoposide single and double hit also induced cellular senescence in iPSc ALI alveolar epithelium, characterised by an increase in $p21^{WAF1/CIP1}$ and $p16^{INK4A}$ expression, and therapeutic treatment of Talaglenastat (0.057μg/ml) reduced the senescence marker expression.

Conclusion Telaglenastat displayed senolytic activities in etoposide treated senescent BEAS-2B cells and ALI cultured iPSC alveolar epithelium. This profile suggests that Telaglenastat offers the potential therapeutic treatment for patients with COPD.

Please refer to page A292 for declarations of interest related to this abstract.

P208 EXTRACELLULAR VESICLES FROM COPD SMALL AIRWAY FIBROBLASTS SPREAD SENESCENCE TO HEALTHY FIBROBLASTS

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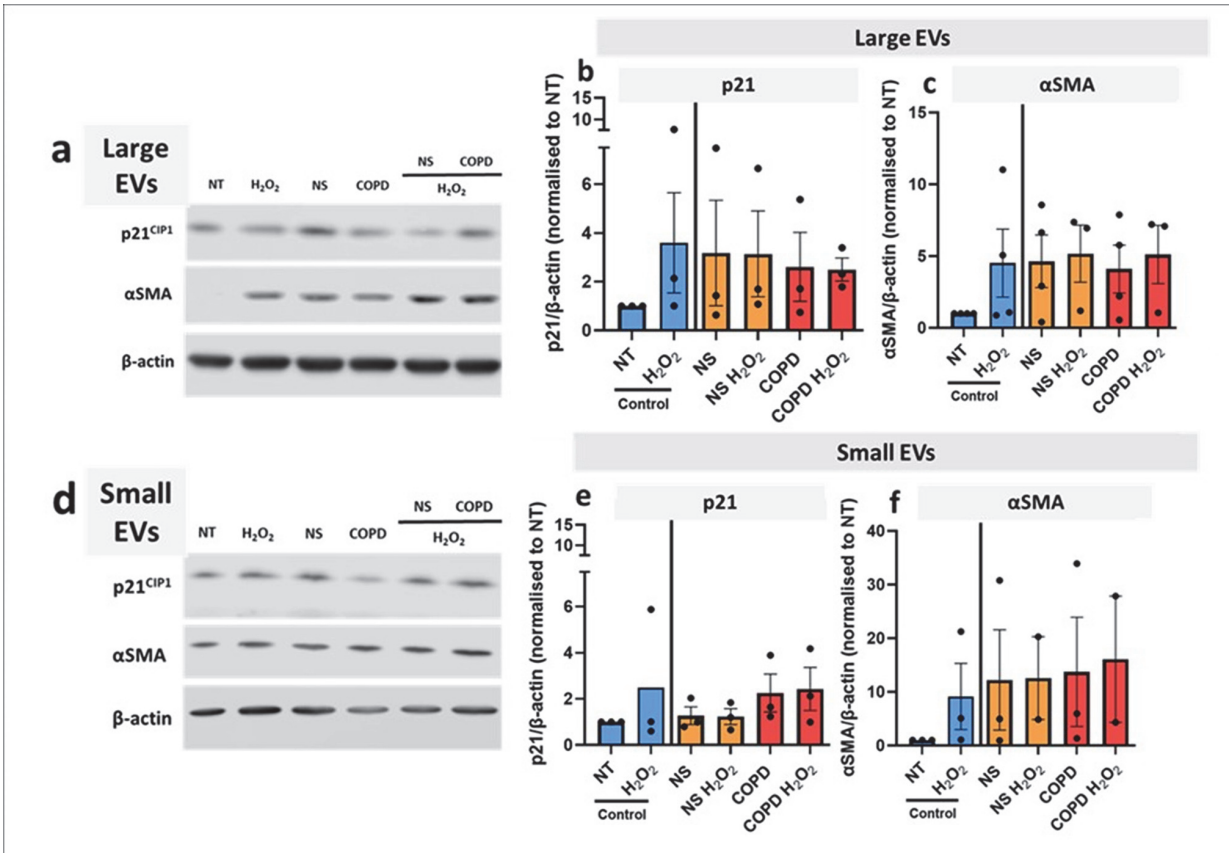
10.1136/thorax-2023-BTSabstracts.358

Background COPD is associated with cellular senescence and fibrosis. Extracellular vesicles (EVs) are membrane-derived vesicles involved in intercellular communication. EVs contain miRNAs, mRNA and proteins and have been implicated in COPD to induce senescence and the transition of fibroblast to myofibroblasts. This study examined whether EVs derived from COPD fibroblasts drive senescence in healthy recipient fibroblasts. Changes in expression of $p21^{CIP1}$ and alpha-smooth muscle actin (αSMA) were chosen as markers of senescence and transition of fibroblasts to myofibroblasts respectively.



Abstract P208 Figure 1 Effect of Large and Small EVs on $p21^{CIP1}$ and αSMA Expression in NS Fibroblasts Stimulated for 48h. Healthy fibroblasts from non-smoker (NS) subjects were incubated with large and small EVs derived from healthy NS or COPD fibroblasts, derived from cells that had been cultured in the absence or presence of 100μM H_2O_2. Cells were also stimulated with media only (NT) and media containing H_2O_2 as controls. Cells were lysed after 48h (a, d) and the expression of $p21^{CIP1}$ (b, e) and αSMA (c, f) was measured relative to β-actin expression and data presented as mean±SEM. Representative blots are presented in panels a and d.

Methods Large EVs, and small EVs were isolated from media from non-smoker (NS) and COPD fibroblasts cultured with or without H_2O_2. EVs were labelled with phk67 and uptake measured by flow cytometry. Healthy recipient fibroblasts were cultured with EVs or EV-free media for 24h and 48h and protein expression of $p21^{CIP1}$ and αSMA measured using western blots and CXCL8 release by ELISA.

Results There was a time-dependent uptake of EVs into recipient cells with no difference between EVs from control or COPD fibroblasts with 91.8 ± 3.8% of recipient cells phk67 positive by 48h (n=4). Incubation of recipient fibroblasts (n=2–5) with large EVs from either non-smokers or COPD subjects did not alter the expression of $p21^{CIP1}$ or αSMA at 24h. Similarly large EVs from fibroblasts exposed to H_2O_2 had no effect on these markers in recipient cells. By contrast, at 48h (figure 1), small EVs from COPD cells showed a trend to increased expression of $p21^{CIP1}$ and EVs from both non-smokers and COPD subjects increased expression of αSMA. Incubation of recipient cells with large EVs from non-smoker fibroblasts that had been cultured with or without H_2O_2 increased release of CXCL8 (0.36±0.15ng/ml to 5.43±3.92ng/ml and 5.44±5.23ng/ml respectively) and small EVs from COPD fibroblasts induced CXCL8 release at 48h (0.36 ±0.15ng/ml to 3.75±3.16ng/ml).

Conclusions Large and small EVs tend to increase the expression of $p21^{CIP1}$ and αSMA in recipient fibroblasts. These results are confirmed by the uptake analysis showing that maximum uptake of EVs from both NS and COPD fibroblasts is reached after 48h. Altogether, these data suggest that EVs participate in COPD pathophysiology by spreading senescence in recipient fibroblasts.

P209 ADHERENCE AND QUALITY OF LIFE IN COPD IS IMPROVED BY A FIXED TRIPLE THERAPY: THE TRIOPTIMIZE STUDY

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10.1136/thorax-2023-BTSabstracts.359

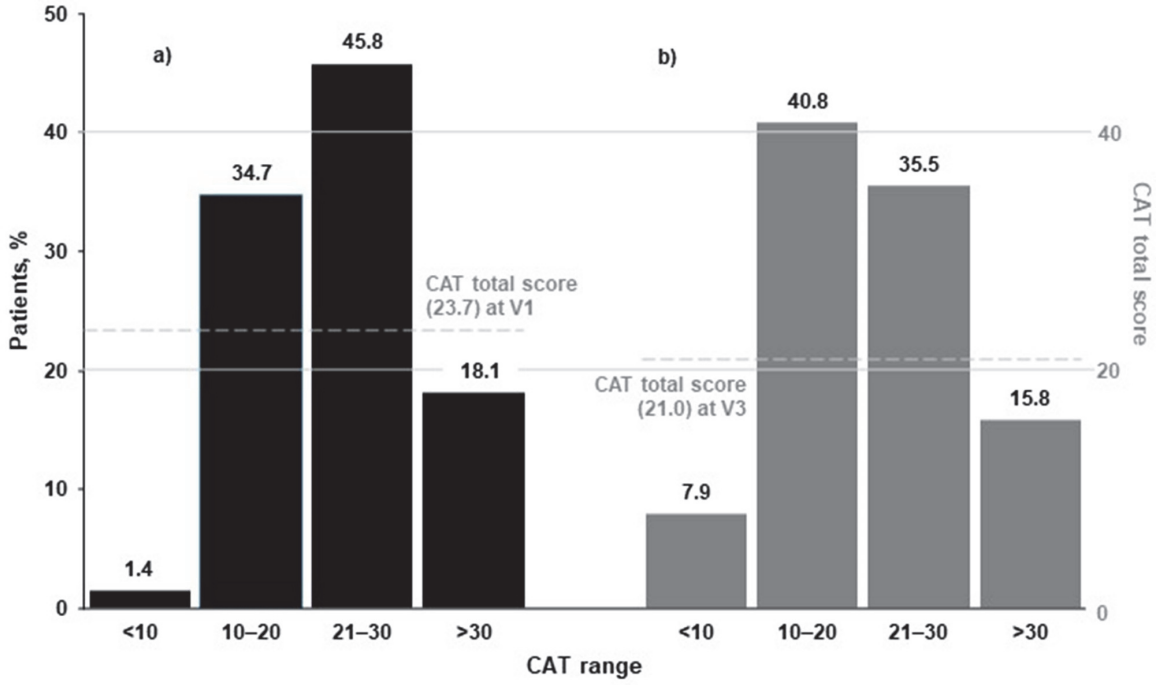
Background The complexity of standard chronic obstructive pulmonary disease (COPD) therapy regimens can lead to treatment non-adherence, negatively impacting on health-related quality of life (HRQoL) and long-term outcomes.

TriOptimize is the first global real-world study to evaluate HRQoL and treatment adherence in patients with poorly-controlled, moderate-to-severe COPD, treated with fixed triple therapy. Here we present the final analysis from the UK study cohort.

Methods TriOptimize-UK (NCT04355546) is a prospective, non-interventional study investigating an extrafine formulation single-inhaler triple therapy (beclometasone;BDP/formoterol: FF/glycopyrronium;G [Trimbow® pMDI 87/5/9]) on HRQoL in patients with COPD.

The primary objective was change in HRQoL (measured by COPD assessment test [CAT]) after prescription of BDP/FF/G, between baseline (Visit1 [V1]) and month 6 (Visit 3 [V3]) stratified by previous COPD therapy. Secondary measures included Test of Adherence to Inhalers (TAI), change in CAT items, and CAT total score at month 3 (Visit 2 [V2]).

The plan was to recruit 3,800 patients worldwide, with 200 from the UK; UK patient recruitment and follow-up was restricted by the COVID-19 pandemic.



Abstract P209 Figure 1 CAT total score distribution at a) baseline (V1) and b) after 6 months (V3) The CAT total score is the sum of its single items and ranges between 0 (best possible condition) to 40 (worst possible condition). If one item is missing CAT cannot be calculated. CAT ranges for assessment of impact level of COPD on patient's life were predefined: >30, very high impact; 21–30, high impact; 10–20 medium impact; and <10, low impact. Number of patients at V1, n=72; number of patients at V3, n=76.

Results A total of 100 patients were enrolled, 94 patients were included in the safety analysis and full analysis sets; 76 (80.9%) patients completed the study and 91.8% planned to continue BDP/FF/G.

In the six months prior to enrolment, 69 patients (73.4%) were treated with ICS/LABA/LAMA (fixed or open inhaled triple therapy combinations); 12 (12.8%) and 13 (13.8%) patients were treated with ICS/LABA or LAMA/LABA, respectively.

After six months treatment with BDP/FF/G CAT total score improved from 23.7 to 21.0 (figure 1); a significant mean change from baseline of -3.6 (P<0.0001); 66.7% of patients were CAT responders (score improvement ≤-2 between V1-V3).

All CAT items improved significantly from V1-V2; mean change in CAT total score at V2 was -4.7, P<0.0001. An improvement in adherence was observed; mean change in TAI domain score V1-V2 of 0.7 (P=0.0126), and a positive trend between V1-V3 of 0.6 (P=0.1159).

Conclusion TriOptimize-UK has demonstrated a positive impact of Trimbow® in patients with poorly-controlled COPD, with significant improvements in HRQoL and the potential to enhance treatment adherence, important for long-term disease control and outcomes.

Please refer to page A292 for declarations of interest related to this abstract.

P210 IS THERE A RELATIONSHIP BETWEEN MEDICINES ADHERENCE TO INHALED TREATMENT, INHALER DEVICE AND AWARENESS OF SUSTAINABILITY ISSUES IN PEOPLE WITH COPD?

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10.1136/thorax-2023-BTSabstracts.360

Introduction and Aims Reports suggest over 50% of people with COPD are non-adherent to their inhaled maintenance therapy. This can result in poorer clinical outcomes. Multiple device types can also negatively affect clinical outcomes by causing confusion around inhaler use. Sustainability is a hot topic in respiratory medicine. Strategies to improve symptom control and reduce healthcare contacts improves sustainability, as does reducing the carbon footprint of inhalers. Two aspects of sustainable COPD treatment are examined here: the effect of multiple device types on adherence, and whether simpler inhaler regimens, along with adherence, affect awareness and attitudes regarding more sustainable COPD treatment.

Methods Inpatients with COPD at a London hospital were identified between October and December '22, and consented to participate in a modified version of the 2020 Asthma UK survey on attitudes to sustainability of inhalers. Their Medicines Possession Ratio (MPR, an estimate of adherence) was calculated using primary care prescription records.

Results 147 patients completed the survey and had an MPR available. 104/147 (71%) patients had good adherence. 61/147 were prescribed different device types for maintenance and reliever medications. 48/61 (79%) patients with differing device types had good adherence, compared to 56/86 (65%) patients with consistent devices.

44/147 patients were aware of the environmental impact of inhalers; 33 (75%) had consistent inhaler device regimens, 31 (70%) had good adherence. Of those unaware, 53/103 (51%) had a consistent device regimen; 73 (71%) had good adherence.

91/147 patients were willing to switch to greener inhalers. Similar proportions of those willing (69%) and unwilling/unsure (73%) to switch inhalers had good adherence. A greater proportion of those unwilling/unsure, 38/56 (68%), had consistent inhaler device regimens, compared to 53/91 (58%) of the willing cohort.

Conclusion This cohort demonstrated better adherence to inhaled COPD therapies than often reported, but it didn't influence willingness to switch to greener inhaler devices. These results present challenges for delivering sustainable care. Those with consistent inhaler device regimens are less adherent and less likely to switch to greener inhalers compared to those with different device types. This may undermine attempts to improve clinical outcomes and the sustainability of inhalers.

P211 COPD PATIENTS' PERSPECTIVES ON THEIR CARE

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10.1136/thorax-2023-BTSabstracts.361

Introduction COPD is a common long-term condition, diagnosed with increasing frequency. Prevalence of COPD is higher in the North West compared with the England average (2.5% versus 1.9%).[1] However, little is known about COPD patients' perspective on their care, on the support they receive and attitudes towards digital tools. In one region in the North West of England a questionnaire was developed to understand patients' thoughts and opinions regarding their COPD care.

Method Patients with a diagnosis of COPD were invited to complete an online/telephone questionnaire, patients received a £5 voucher for their participation.

Results 134 completed questionnaires were analysed, 93 from one region in the North-West over an eight month period in 2022.

23% reported they have never been told about their COPD or did not understand the information provided. 13% of responders reported they are too breathless to leave the house. Over half of patients had experienced an exacerbation in the previous 12 months. Of those admitted to hospital, 33% didn't receive any medication or information when discharged. 22% of patients would be willing to use digital options to speed up access to treatment. Only 38% felt well supported by their GP practice.

Conclusion The results suggest the need to change how we deliver health information to our patient populations, as significant proportions of patients do not understand the information provided to them. Improved information and care are required for those being admitted to hospital with over a third of survey respondents having received no information. With nearly 60% of responders not feeling happy with the support for their GP practice, indicating a need to improve COPD care within this setting. The results suggest a potential role for digital support as over 20% of patients would be

willing to utilise digital options if this could speed up access to treatment.

REFERENCE

1. https://commonslibrary.parliament.uk/constituency-data-how-healthy-is-your-area/

'The show must go on' – What more do we know about cough?

P212 COUGH HYPERSENSITIVITY FEATURES IN INTERSTITIAL LUNG DISEASE

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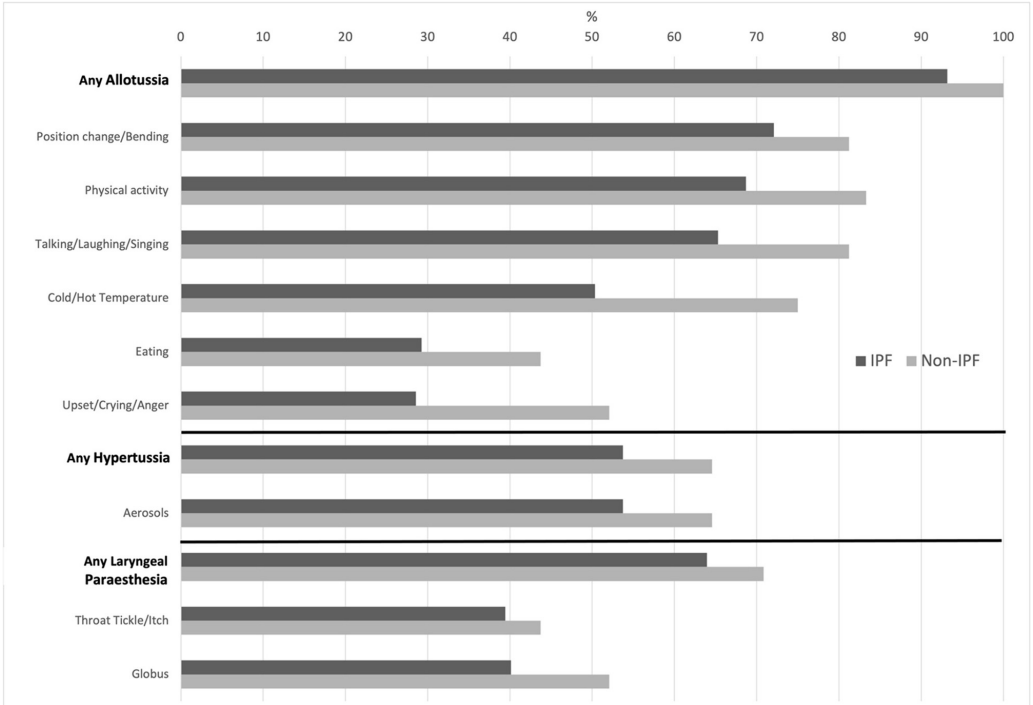
10.1136/thorax-2023-BTSabstracts.362

Introduction Chronic cough (CC, lasting >8 weeks) affects most patients with interstitial lung disease (ILD), is often refractory to treatment, impacts quality of life, and can predict disease progression. Cough hypersensitivity syndrome is defined as cough triggered by low levels of thermal, mechanical, or chemical exposure. Cough hypersensitivity syndrome, akin to neuropathic pain syndrome, has features of allotussia, hypertussia, and laryngeal paraesthesia. Mechanisms of cough in ILD including cough hypersensitivity (CH) features are understudied. We investigated triggers and sensations consistent with CH in ILD.

Methods An anonymised online questionnaire was completed by patients with ILD and persistent cough, in association with Action for Pulmonary Fibrosis. Multiple choice and free text questions included cough triggers, sensations, and impacts. Allotussia was inferred by triggers such as talking, hypertussia by aerosols, and laryngeal paraesthesia by throat sensations (figure 1).

Results The questionnaire was completed by patients with idiopathic pulmonary fibrosis (IPF, n=147) and non-IPF ILD (n=48); 90/195 (46%) female, 123/195 (63%) aged >65 years. Non-IPF included unspecified-ILD (n=16), connective tissue disease-ILD (n=13), chronic hypersensitivity pneumonitis (n=12), nonspecific interstitial pneumonia (n=5), sarcoidosis (n=1), and drug-induced ILD (n=1). Patients with IPF were older and less likely female compared to non-IPF; age >65 years, 109/146 (75%) vs. 14/48 (29%), female sex 52/147 (35%) vs. 37/48 (77%), respectively (all $p<0.001$). CH features were common in IPF and non-IPF; allotussia, 137/147 (93%) and 48/48 (100%); hypertussia, 79/147 (54%) and 31/48 (65%); laryngeal paraesthesia 94/147 (64%) and 34/48 (71%), respectively (figure 1). The majority of IPF and non-IPF had ≥2 features of CH; 111/147 (76%) and 42/48 (88%) respectively ($p=0.08$). In all ILD, patients with 2–3 CH features were more likely to have lives impacted by cough on most or every day, compared to 0–1 CH features; 137/153 (90%) vs. 28/42 (67%) ($p<0.001$).

Discussion Patients with IPF and non-IPF ILD demonstrate multiple cough triggers and sensations consistent with a high prevalence of cough hypersensitivity, which impact patients' lives. The prevalence and profile of CH features was similar between IPF and non-IPF. Further study is needed to understand cough mechanisms in ILD, and trial novel antitussives for this impactful condition.



Abstract P212 Figure 1 Comparison of cough triggers and sensations in idiopathic pulmonary fibrosis (IPF) and non-IPF interstitial lung disease. *Allotussia*, cough triggered by non-tussigenic stimuli; *hypertussia*, excessive cough to tussigenic stimuli; *laryngeal paraesthesia*, abnormal sensation in the throat.

P213 PATIENTS WITH IPF DEMONSTRATE HYPER-RESPONSIVENESS AND HYPERSENSITIVITY TO A RANGE OF TUSSIVE AGENTS IN A DIFFERENT PATTERN TO R/UCC PATIENTS

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10.1136/thorax-2023-BTSabstracts.363

Background Cough in idiopathic pulmonary fibrosis (IPF) is an unmet clinical need. Though previous work has demonstrated heightened sensitivity to the TRPV1 agonist capsaicin using traditional cough challenge methodology, little is known about other potential peripheral neuronal targets to guide treatment development. We aimed to evaluate and compare cough hyperresponsiveness and hypersensitivity to 3 inhaled tussive agents and placebo in IPF to those with refractory/unexplained chronic cough (R/UCC) and to healthy volunteers (HVs)

Methods 21 patients with an MDT diagnosis of IPF, 20 well characterised R/UCC patients and 21 HVs underwent cough challenges 2–7 day intervals inhaling ascending concentrations of capsaicin (0.48–1000mM), citric acid (0.03–4M), and descending osmolarities of hypotonic saline (300, 250, 200, 150, and 100 mOsm/kg, buffered to pH 7.0), and placebo (0.9% saline). The highest total number of coughs evoked by four inhalations of any dose of each challenge agent (Emax; a measure of hyperresponsiveness) and the concentration of agent required to evoke 50% of Emax (ED50; a measure of hypersensitivity) were denoted. GEE modelling was used to compare the dose response curves to each challenge.

Results Groups were gender matched. IPF patients had a median (IQR) age of 70(66.5–77), comparable to R/UCC patients 71(56–76); HVs were younger, 52 (33–61).

LCQ in IPF was higher 15.1 (11.8–18) vs 13.4 (10–16.2) in R/UCC. Their median cough severity VAS was 45mm(10–74).

IPF patients had significant cough hyper-responsiveness compared with HVs to hypotonic saline [Emax 5 (0–11.5) vs 0 (0–2) p=0.003], with a trend towards heightened responses to citric acid (p=0.057) but not capsaicin (p=0.628). They demonstrated a degree of hypersensitivity to all agents with lower ED50 to HVs to capsaicin [15.6 (5.85–62.5) vs 31.3 (11.7–62.5) and citric acid [0.25 (0.125–0.75) vs. 0.5 (0.125–1)] however none reached statistical significance. Their Emax results to all challenges were significantly lower than those of R/UCC patients (p<0.01) (figure 1).

Conclusions IPF patients demonstrated more subtle evidence of hyperexcitability of the neuronal pathways controlling cough and a different pattern of cough hypersensitivity and hyperresponsiveness compared with R/UCC. Further work is needed to endotype cough in IPF to help guide appropriate treatment strategies.

P214 CENTRAL NERVOUS SYSTEM RESTING-STATE FMRI IN REFRACTORY/UNEXPLAINED CHRONIC COUGH

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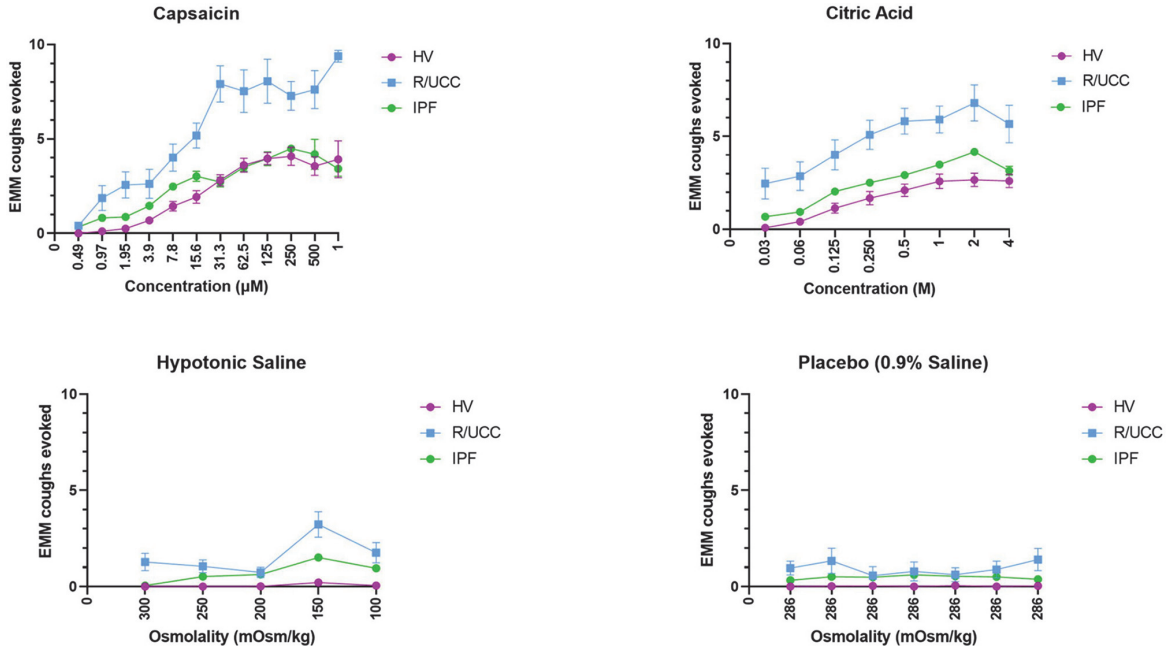
10.1136/thorax-2023-BTSabstracts.364

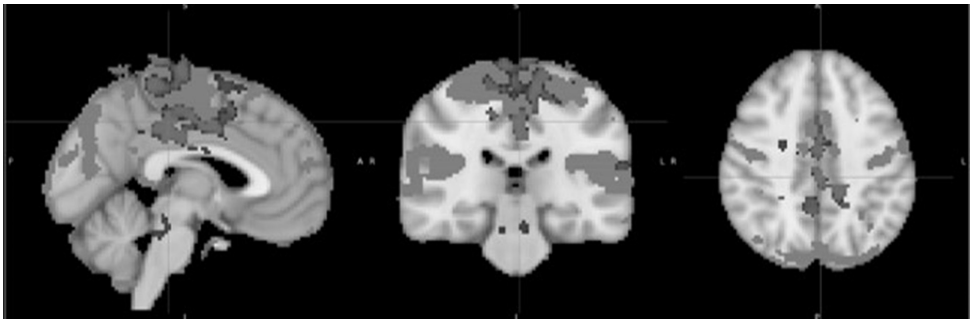
Background Refractory and unexplained chronic cough (RUCC) is a debilitating condition with complex underlying neurobiological mechanisms. The cough reflex is under a degree of cortical control and changes in the CNS may contribute to RUCC.

Aims To evaluate differences in CNS blood-oxygen-level dependent (BOLD) levels across resting-state networks and regions of interest in RUCC compared to healthy volunteers (HV).

Methods We performed CNS resting-state functional MRI (CNS rs-fMRI) in 13 RUCC patients and 7 aged-matched



Abstract P213 Figure 1



Abstract P214 Figure 1

healthy volunteers (HV). Each participant underwent two ten-minute gradient echo-planar imaging scans, one directly after the other. FSL (Oxford, UK) was used for data pre-processing, brain extraction and registration of functional data into standard space. Single subject independent component analysis (ICA), followed by a group ICA and dual regression were used to identify differences in resting-state network activity between HV and RUCC using FSL. Due to processing limitations, both scans for each subject were entered into the analysis as an individual data set, which may have inflated significance. This is a preliminary analysis, with findings to be confirmed in the full study cohort (50 RUCC vs 20 HV).

Results Age, lung function and BMI were comparable between groups. RUCC median (IQR) age was 66 (60–72), 9/13 were female and mean duration of cough was 11 years. Median (IQR) day VAS 46mm (28–68), CQLQ 59 (42–70) and day cough frequency 47 coughs/hr (15–69). There were significant differences in CNS activity between RUCC and HV groups in the cingulate gyrus and sensorimotor areas of the brain ($p<=0.05$). These differences are still present when $p=<0.005$. **Figure 1** Independent components identified by a group analysis comprising of sensorimotor network areas (light grey) and between group differences in activity (RUCC vs HV, $p<=0.05$, dark grey).

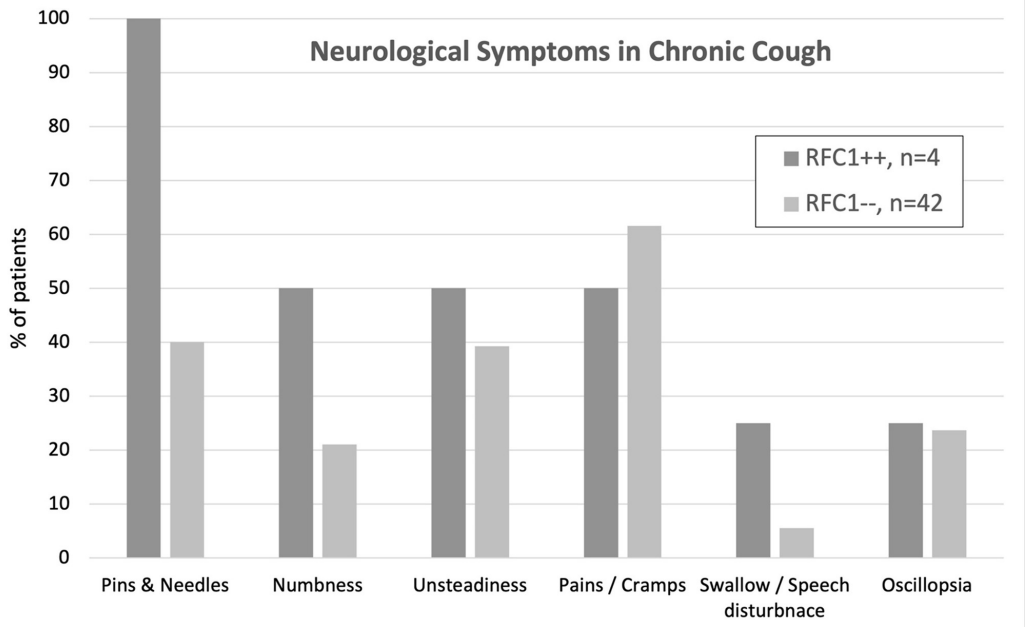
Conclusions Functional alterations in CNS activity may contribute to the pathophysiology of RUCC.

P215 RFC1 DISORDER; A GENETIC, NEUROPATHIC CAUSE OF CHRONIC COUGH

[1,2]B Hirons, [1,2]K Rhatigan, [3,4]R Curro, [3,4]B Rugginini, [5]J Shaw, [6]H Abubakar-Waziri, [1]H Kesavan, [7]RDM Hadden, [1,2]C Jolley, [6]J Hull, [1,2]PSP Cho, [3,4]A Cortese, [1,2]SS Birring. *[1]Department of Respiratory Medicine, King's College Hospital, London, UK; [2]Centre for Human and Applied Physiological Sciences, King's College London, London, UK; [3]Department of Neuromuscular Disease, UCL Queen Square Institute of Neurology, London, UK; [4]Department of Brain and Behaviour Sciences, University of Pavia, London, UK; [5]NHS North Thames Genomic Laboratory Hub, London, UK; [6]Royal Brompton Hospital, London, London, UK; [7]Department of Neurology, King's College Hospital, London, UK*

10.1136/thorax-2023-BTSabstracts.365

Introduction Chronic cough (CC, lasting >8weeks) is often the presenting symptom of CANVAS; Cerebellar Ataxia, Neuropathy, and Vestibular Areflexia Syndrome. CANVAS is a late onset, autosomal recessive, neurodegenerative condition caused



Abstract P215 Figure 1 Comparison of self-reported neurological symptoms in chronic cough patients with biallelic repeat expansions in the *RFC1* gene (RFC1++) and with no *RFC1* repeat expansions (RFC1–).

by biallelic repeat expansions in the *RFC1* gene (RE-RFC1). We investigated the prevalence of biallelic AAGGG repeat expansions in *RFC1* and clinical characteristics of patients with CC.

Methods Consecutive patients attending a specialist CC clinic underwent *RFC1* genetic testing by polymerase chain reaction (PCR). CC was managed as per ERS guideline. Cough symptoms were assessed with cough severity VAS and health status (LCQ). Objective 24hr cough frequency (CF) was measured with Leicester Cough Monitor. Patients were screened for CANVAS neurological symptoms.

Results Patients with CC underwent *RFC1* testing; n=51, female 71%, median (IQR) age 65 (56–70) years, duration of cough 155 (80–240) months, and 50 (98%) had refractory or unexplained cough. Patients had median (IQR) cough severity VAS 68 (51–76), LCQ 9.7 (7.9–12.3), CF geometric mean (logSD) 19.4 (1.7) coughs/hr. Four patients (8%) had biallelic AAGGG RE-RFC1 (RFC1++) (female 75%, median (IQR) age 69 (59–74)). Monoallelic AAGGG RE-RFC1 (carrier) was present in 5 (10)%. Compared to patients with no *RFC1* repeat expansions (RFC1–, n=42), RFC1++ had a longer duration of cough and higher severity VAS; median (IQR) 258 (198–336) vs. 149 (71–240) months, and 77 (70–81) vs. 66 (50–73), respectively. There was no significant difference between RFC1++ and RFC1– in age, sex, BMI, spirometry, LCQ, or CF. Self-reported neurological symptoms were common in patients with CC irrespective of *RFC1* status (figure 1); however, pins and needles were reported in all RFC1++ compared to 39% in RFC1–.

Discussion *RFC1* disorder was the cause of unexplained or refractory chronic cough in 8% of patients attending a specialist clinic. Symptoms suggestive of neuropathy and ataxia were common in both RFC1++ and RFC1–, hence routine *RFC1* testing may be necessary to investigate unexplained cough. Further study is needed to characterise the cough and neurology in *RFC1* disorders.

P216 WHOLE BLOOD AND PLASMA ATP LEVELS IN REFRACTORY/UNEXPLAINED CHRONIC COUGH

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Introduction The efficacy of P2X3 antagonists in refractory/unexplained cough (RUCC) suggests a role for extracellular ATP in the airways. We aimed to compare whole blood ATP and plasma ATP between RUCC and healthy volunteers (HV) and evaluate if ATP measurements correlate with other measures of cough severity.

Methods Whole blood was collected in two EDTA tubes (EDTA 1.6 mg/ml) from 50 patients with RUCC and 20 HVs, then diluted (x 10,000) in PBS. ATP was measured (SystemSure bioluminescence assay) twice, and a third time if discordance >20% between 1st and 2nd samples. A second EDTA sample was centrifuged (1300 xg, 10min, 4â,,*f*), and plasma transferred to 2 ml cryotubes and frozen (-80â,,*f*). ATP was measured in plasma samples using the ATP Detection assay kit (Cayman).

Results Age, BMI, smoking status, and lung function were comparable between groups. SystemSure assay reliability was 0.79 (Cronbach Alpha). Median (IQR) all samples (RUCC n=126/HV n=48) whole blood RLU was higher in RUCC 346 (275–490) than HV 283 (204–489), (p=0.01), but was not significant in 1st sample (p=0.22) or mean sample (p=0.18). By contrast median relative light units (RLU) assessed by plate-based luminescence assay was not different in plasma between RUCC 21050 (14741–27155) and HV 19515 (14109–30948). The only significant correlation between measures (mean whole blood RLU, plasma RLU) and variables (age, FVC predicted or daytime cough frequency) was a weak inverse relationship between plasma RLU and age (r- 0.243, p=0.043; Spearman's).

Conclusion Whole blood ATP was higher in RUCC compared to HV, but this was not replicated in plasma samples. It is unclear whether the different assays or different sample types account for this discrepancy. It is unknown whether whole blood ATP is a a good surrogate for extracellular ATP levels. Between assay differences should be considered when interpreting ATP results.

P217 NIGHT-TIME COUGH FREQUENCY: RELATIONSHIP WITH AWAKE COUGH FREQUENCY

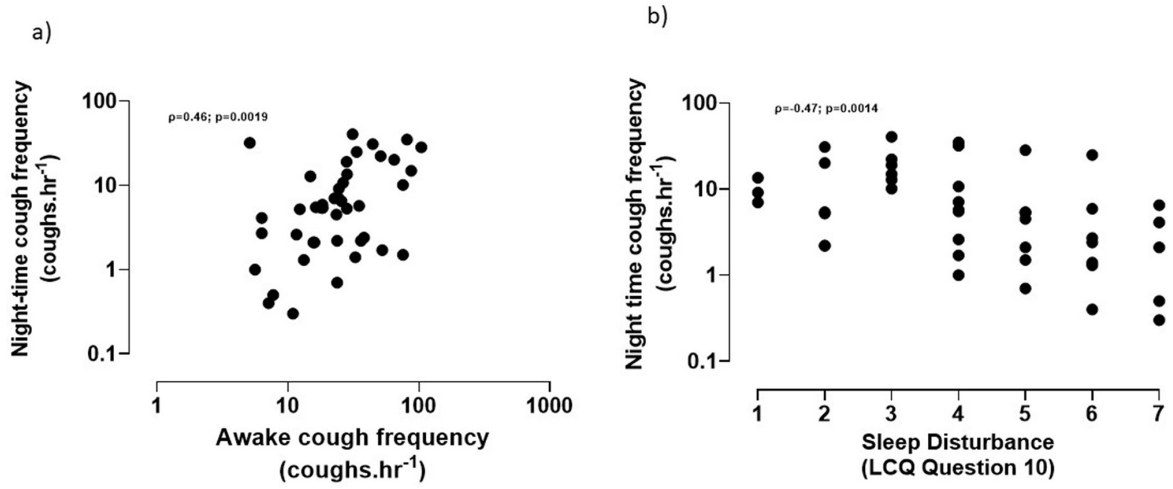
[1,2]K Rhatigan, [1,2]B Hirons, [1]H Kesavan, [3,4]RD Turner, [1,2]K Myall, [5]J Hull, [1,2]CJ Jolley, [1,2]SS Birring, [1,2]PSP Cho. *[1]Department of Respiratory Medicine, King's College Hospital NHS Foundation Trust, London, UK; [2]Centre for Human and Applied Physiological Sciences, King's College London, London, UK; [3]Department of Respiratory Medicine, Gold Coast University Hospital, Queensland, Australia; [4]Griffith University, School of Medicine and Dentistry, Queensland, Australia; [5]Airway Disease Section, Royal Brompton Hospital, Guy's and St Thomas' NHS Foundation Trust, London, UK*

10.1136/thorax-2023-BTSabstracts.367

Introduction Objective ambulatory cough frequency (CF) monitoring is usually assessed over 24 hours. This is inconvenient for some patients and its use has therefore largely been restricted to the research setting. Night-time only objective CF monitoring could reduce ambient noise, and reduce the burden on patients compared to 24-hour CF monitoring. This study aimed to investigate the relationship of night-time CF with awake CF, as well as it's impact on sleep disturbance.

Methods A prospective study of consecutive patients with refractory or unexplained chronic cough completed ambulatory 24-hour cough monitoring with the Leicester Cough Monitor (LCM). Participants completed a diary to report sleep and awake times. Night-time and awake CF were measured. Participants completed cough severity visual analogue scale (VAS) and cough-specific health status Leicester Cough Questionnaire (LCQ). Question 10 of the LCQ was used to assess sleep disturbance ('In the last 2 weeks, has your cough disturbed your sleep?'), which is scored 1–7, with a lower score indicating higher sleep disturbance.

Results 44 participants completed 24-hour CF monitoring; mean (SD) age 62 (11) years, (n) 68% female, median (IQR) cough duration 90 (38–225) months, cough severity VAS 70 (55–79) mm and LCQ score 10.8 (8.5–14.1). Geometric mean (SD) night-time CF and awake CF were 5.0 (3.6) and 23.3 (2.1) coughs.hr^{-1} respectively. Night-time CF was significantly associated with awake CF (ρ=0.46), 24-hour CF (ρ=0.58), LCQ score (ρ=-0.38) and sleep disturbance (ρ=-0.47) and was higher females vs males (geometric mean (SD)



Abstract P217 Figure 1

6.8 (3.1) vs. 2.6 (3.8)) (all $p<0.05$) (figure 1). Night-time CF was not associated with age ($\rho=0.01$) or VAS ($\rho=0.19$) (both $p>0.2$).

Conclusion Night-time CF was moderately associated with awake CF, and may therefore be a less intrusive method of CF monitoring. The moderate association with sleep disturbance and LCQ total score indicates that although night-time cough frequency is low, it does have an impact both on sleep quality and overall quality of life. Our findings should be evaluated in future larger studies, and the repeatability and responsiveness of night time CF should be investigated.

P218 BRONCHIAL THERMOPLASTY IMPROVES COUGH HYPERSENSITIVITY AND COUGH IN PATIENTS WITH SEVERE ASTHMA

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10.1136/thorax-2023-BTSabstracts.368

Background Cough is a troublesome symptom of asthma because it is associated with disease severity and poor asthma control. Bronchial thermoplasty (BT) may be effective in improving cough severity and cough-related quality of life in severe uncontrolled asthma.

Abstract P218 Table 1 Changes in clinical parameters with bronchial thermoplasty

	All patients (n = 12)			Cough-predominant asthma (n = 8)		
	Pre-BT	Post-BT	*P* value	Pre BT	Post BT	*P* value
ACT, points	13 (6)	16 (6)	0.03	11 (6)	15 (6)	0.03
AQLQ, points	4.0 (1.6)	4.7 (1.3)	0.16	3.9 (1.5)	4.7 (1.3)	0.30
LCQ, points	12.7 (5.1)	14.8 (2.7)	0.10	10.0 (3.7)	13.9 (2.4)	0.02
LCQ ≥1.3 after BT	-	6 (50)	-	-	6 (75)	-
Cough VAS, mm	49 (32)	24 (23)	0.02	69 (16)	30 (28)	0.005
FeNO, ppb	22.7 (8.8)	19.4 (9.0)	0.12	22.3 (9.3)	17.2 (8.2)	0.054
AEC,/μL	19.9 (14.6)	86.5 (5.87)	0.06	11.8 (14.7)	121.9 (3.72)	0.04
Serum IgE, IU/mL	34.9 (5.4)	-	-	88.9 (7.14)	-	-
C2, μM	2.30 (3.80)	6.16 (2.70)	0.04	2.43 (2.85)	8.21 (2.99)	0.03
C5, μM	3.07 (4.95)	6.51 (2.60)	0.16	2.66 (3.12)	8.21 (2.99)	0.04
Pre-bronchodilator FEV_1,%predicted	92.4 (19.9)	93.0 (19.2)	0.87	88.9 (21.9)	92.2 (19.7)	0.63
Post-bronchodilator FEV_1,%predicted	95.6 (17.6)	94.5 (17.2)	0.65	92.5 (19.4)	93.6 (18.9)	0.70
Reversibility,%	4.0 (5.1)	1.8 (3.5)	0.26	5.2 (5.6)	0.55 (2.5)	0.16

BT: bronchial thermoplasty, ACT: Asthma Control Test, AQLQ: Asthma Quality of Life Questionnaire, LCQ: Leicester Cough Questionnaire, FeNO: fractional nitric oxides, IgE: immunoglobulin E, AEC: absolute eosinophil count, FEV_1: forced expiratory volume in 1 second.
Transformed log values (AEC and serum IgE) were converted to geometric means (geometric SD). The remaining data were expressed as mean (SD).
Serum IgE was measured only when enrolled patients.
Transformed log values (AEC) were converted to geometric means (geometric SD). The remaining data were expressed as mean (SD).

Objective To evaluate the efficacy of BT for cough in severe uncontrolled asthma.
Methods Twelve patients with severe uncontrolled asthma were enrolled in this study between 2018 May and March 2021 and arbitrarily divided into cough-predominant [cough severity Visual Analog Scale (VAS) ≥ 40 mm, n = 8] and typical asthma (cough VAS < 40 mm, n = 4) groups. Clinical parameters, such as capsaicin cough sensitivity [C-CS: the concentrations to inhaled capsaicin required to induce at least two (C2) and five (C5) coughs], lung function, and type-2–related biomarkers (fractional nitric oxides and absolute eosinophil counts) and cough-related indices [cough severity VAS and the Leicester Cough Questionnaire (LCQ)] were evaluated before and 3 months after performing BT.
Results BT significantly improved both cough-related indices and C-CS in the cough-predominant group (table 1). Changes in C-CS were significantly correlated with changes in the LCQ scores (C5: r = 0.65, p = 0.02 for all patients, and r = 0.81, p = 0.01 for the cough-predominant group).There was an association between changes in C-CS with BT and improvement of cough-specific QoL without the influence of confounder, such as regular use of biologics and/or OCS or more impaired cough-specific QoL at enrollment.
Conclusions BT may be effective for cough in severe asthma by improving C-CS.

Please refer to page A292 for declarations of interest related to this abstract.

P219 TARGETING THE IL-5 PATHWAY IMPROVES COUGH HYPERSENSITIVITY IN PATIENTS WITH SEVERE UNCONTROLLED ASTHMA

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Background Capsaicin cough sensitivity (C-CS) reflects airway neuronal dysfunction and may be a significant biomarker of asthma (Satia I, et al. *J Allergy Clin Immunol*. 2017). Although mepolizumab reduces cough in patients with severe uncontrolled asthma (Faruqi S, et al. *Lung*. 2020), it is unclear whether the cough reduction is associated with improved C-CS.
Objective We aimed to clarify the effect of biologics on C-CS and cough-specific quality of life (QoL) in patients with severe uncontrolled asthma using our previous study cohort.
Methods Overall, 52 consecutive patients who visited our hospital for severe uncontrolled asthma were included in the original study cohort, and 30 patients were eligible for this study. Changes in C-CS and cough-specific QoL were compared between patients treated with the anti-IL-5 pathway (n = 16) and those treated with other biologics (n = 14). C-CS was measured as the concentration of capsaicin required to induce at least five coughs (C5).
Results Biologics significantly improved C-CS (figure 1A, P = 0.03). Anti-IL-5 pathway therapies significantly improved C-CS, whereas other biologics did not (figure 1B,C, $P < 0.01$ and $P = 0.89$, respectively). C-CS improved significantly more in the anti-IL-5 pathway group than in the group treated with other biologics (figure 1B,C, changes in geometric mean C5, 3.4 [95% confidence interval, 1.5–7.6] for the anti-IL-5 pathway vs. 0.9 [95% confidence interval, 0.4–2.1] for other biologics; P = 0.02). Changes in C-CS significantly correlated with improvements in cough-specific QoL in the anti-IL-5 pathway group (r = 0.58, P = 0.01) but not in the group treated with other biologics (r = 0.35, P = 0.22).
Conclusion Anti-IL-5 pathway therapies improve C-CS and cough-specific QoL, and targeting the IL-5 pathway may be a therapeutic strategy for cough hypersensitivity in patients with severe uncontrolled asthma.

P220 THORACIC SOCIETIES MEMBER'S VIEW OF CHRONIC COUGH

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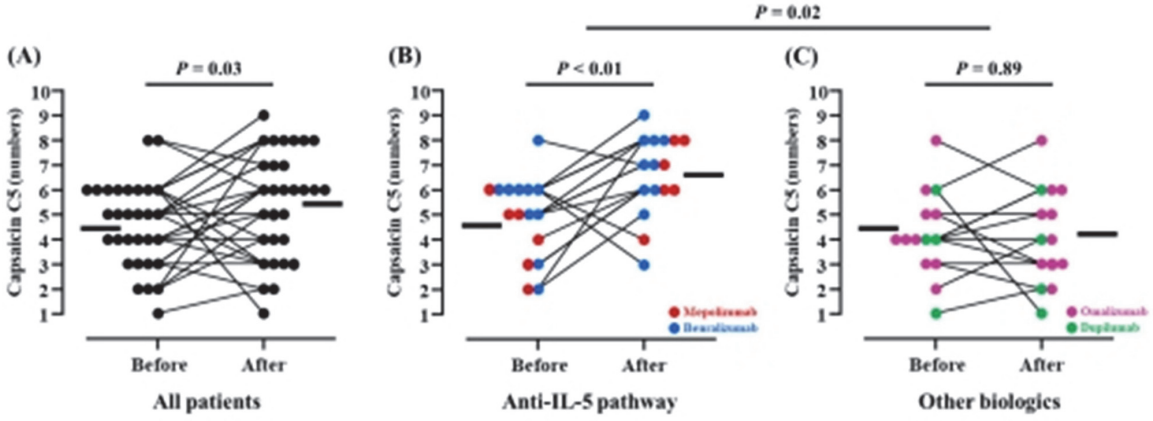
The current understanding of the disease of chronic cough by Society members is unknown. Between February and April 2023 a survey was conducted of the knowledge, therapeutic choices, and educational needs of the membership of the



Abstract P219 Figure 1 Change in C-CS before and after the initiation of biologics in all patients (A), patients treated with the anti-IL-5 pathway (B), and patients treated with other biologics (C). The y-axis represents the concentration of capsaicin required to induce at least five coughs (C5). Bars represent means

Yorkshire Thoracic Society (YTS) and the North-East Thoracic Society (NETS).

The survey was Internet-based and accessible from laptop, tablet and smartphone.

A total of 91 members undertook the survey with approximately half completing all 17 questions. There was an equal division of the sexes. Two thirds were aged between 30 and 50. Just over half were consultants and a further quarter junior doctors in training. Nurses and physiotherapists made up the remainder. There was an even split between teaching and district general hospital practice.

Half of the respondents felt that less than a quarter of their patients were troubled by cough. The majority did not use the guideline recommended definition of 8 weeks cough. 3 investigations, chest x-ray, spirometry, and full blood count, were routinely performed. CT thorax, sputum microbiology, FeNO and allergy testing much less so, with very few performing bronchoscopy, bronchial challenge, or oesophageal testing. The most common therapies used were proton pump inhibitors, carbocisteine and nasal corticosteroids. Opiates, with the exception of morphine were rarely prescribed. Neuromodulators were not used by two thirds of the respondents. Only morphine, proton pump inhibitors, and nasal corticosteroids were considered by the majority to be effective. The most common treatment strategy was for 8 – 12 weeks and then continuous if the patient relapsed.

Chronic cough was considered a 'disease in itself' by 50/60 respondents. The mechanism was thought to be dysregulation of the cough reflex via ATP and P2X3 receptors by the majority. Oesophageal dysmotility was considered rare.

One third had not read any guidelines, most had received some training but over half would attend a course.

These findings indicate that whilst clinical investigation adheres to guidelines, prescribing is not evidence based. There is a need and desire for further training in this disease.

Please refer to page A293 for declarations of interest related to this abstract.

P221 THE BURDEN OF PERSISTENT COUGH IN IDIOPATHIC PULMONARY FIBROSIS (IPF) AND OTHER INTERSTITIAL LUNG DISEASES (ILDS): A SYSTEMATIC EVIDENCE SYNTHESIS

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10.1136/thorax-2023-BTSabstracts.371

Introduction and Objectives As cough remains a challenging symptom of IPF and other ILDs, we aimed to provide the first systematic synthesis of evidence on its associated burden.

Methods Following protocol pre-registration (PROSPERO CRD42022369379), a literature search was performed for English-language articles published between January 2010 and August 2022 using databases including Embase, MEDLINE and Cochrane. Observational and interventional studies reporting cough-related measures in IPF and other ILDs were included. Here, we provide a narrative synthesis of a subset of studies in patients with persistent cough.

Results Ten studies; 6 in IPF (n=271 patients), 2 in ILDs including IPF (n=294 patients), 1 in CTD-ILD (n=1 study, 11 patients) and 1 in sarcoidosis (n=21 patients) were included. Definitions for persistent cough included self-reported chronic cough, stable cough frequency for >4 weeks and cough for >8 weeks, with some studies requiring additional criteria such as refractory cough, 24-hour cough count of >10/15 coughs per/hour and/or cough severity VAS >40mm. Cough severity VAS (n=8 studies, mean range=38.8–73.4/100mm) and cough counts (n=4 studies) were the most frequently used cough measures, and the LCQ (n=7 studies, mean range=11.0–15.3/21), SGRQ (n=4 studies, mean range=57.2–57.4/100) and CQLQ (n=2 studies, mean range=56.5–60.5/112) were the most frequently used impact/HRQoL measures. Four studies assessed concurrent/baseline associations between cough and impact/HRQoL measures, including three trials in IPF where cough severity VAS was negatively correlated with SGRQ, LCQ and/or CQLQ scores, in one of which cough counts were negatively correlated with LCQ scores, and an observational cohort study in ILD where cough severity VAS had an independent negative impact on SGRQ scores. Additionally, in a cross-sectional study in ILD, 31% of patients ranked cough as the worst symptom. None of the studies examined the HCRU/economic burden of cough.

Conclusions Our study highlights the heterogeneity in assessing cough and its impact in IPF and other ILDs. The findings confirm the negative impact of cough on HRQoL in IPF, with indications of a similar impact in other ILDs. Our synthesis underscores the need for standardised assessment, along with dedicated studies, particularly in non-IPF ILDs and on the economic burden of cough.

Please refer to page A293 for declarations of interest related to this abstract.

P222 THE IMPACT OF COUGH AND DYSPNOEA ON ANXIETY AND DEPRESSION IN IDIOPATHIC PULMONARY FIBROSIS

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10.1136/thorax-2023-BTSabstracts.372

Introduction Idiopathic pulmonary fibrosis (IPF) is a debilitating, life-limiting fibrotic lung disease. Cough and breathlessness are among the most commonly reported symptoms and confer negative psychological burden, yet its exact relationship with anxiety and depression remains unknown. We aimed to determine the severity of mood disorders in individuals with IPF and assess the association with symptom burden.

Methods We prospectively recruited incident cases of IPF into an observational study (ethics reference 20/EE/0261). Hospital Anxiety and Depression Scales were collected at baseline and repeated at 12 months (subscales for HADS-A and HADS-D, range 0–21; higher scores depicting worse quality of life). Dyspnoea-12 (range 0–36), Leicester Cough Questionnaires (LCQ, range 3–21) and cough visual analogue scales (VAS, range 0–100mm) were also recorded. Demographic data and lung function were collected.

Results 207 IPF patients were recruited, of whom 107 completed follow-up (table 1). Subjects were on average aged 74.5 years, predominantly male, with moderately impaired lung function (FVC 77.9% ± 14.2%, TLco 47.9% ± 13.6%). The prevalence of anxiety and depression at baseline (HADS > 8) were 29.0% and 29.5% respectively. On univariate analysis worse dyspnoea and cough scores were associated with greater anxiety and depression ($P < 0.001$). However, on multivariate analysis while the relationship with Dyspnoea-12 scores was preserved ($P < 0.001$), out of the cough measures only LCQ was associated with HADS-A ($P = 0.03$). Baseline lung function did not correlate with HADS.

At follow up, both HADS-A and HADS-D increased in the cohort (mean change 0.79 and 0.70 respectively), but these changes were below the threshold for meaningful change.[1] Deteriorating scores in both Dyspnoea-12 ($r = 0.51$ and 0.58 for HADS-A and HADS-D) and cough VAS ($r = 0.29$ and 0.42) correlated with worsening HADS scores. There was no difference in HADS score change between subjects with stable and progressive disease.

Abstract P222 Table 1 Data are presented as mean ± SD or No. (%) unless otherwise indicated

	Baseline (n = 207)	
Variable	**Value**	**Range**
Age	74.5 ± 7.2	51 – 91
Male sex	169 (81.6)	-
BMI	28.5 ± 4.9	17.9 – 47.4
Smoking history		
Current	1 (0.5)	-
Former	143 (69.1)	-
Never	63 (30.4)	-
Long-term oxygen therapy	26 (12.6)	-
ACEi therapy	45 (21.7)	-
Antidepressant therapy	18 (8.7)	-
Pulmonary function tests		
FVC% predicted	77.9 ± 14.2	39.7 – 123
TLCO% predicted	47.9 ± 13.6	20.5 – 106.1
HADS-A	5.31 ± 3.79	0 – 18
HADS-D	6.01 ± 3.92	0 – 18
Dyspnoea-12	13.5 ± 8.9	0 – 36
VAS	32.7 ± 24.6	0 – 91
LCQ	16.1 ± 2.7	8 – 21

Abbreviations: FVC = forced vital capacity; TLCO = diffusion capacity of the lung for carbon monoxide; HADS = Hospital Anxiety and Depression Scale; D-12 = Dyspnoea-12 Questionnaire; VAS = Cough Severity Visual Analogue Scale; LCQ = Leicester Cough Questionnaire.

Conclusion Anxiety and depression are common in patients with IPF. Dyspnoea and, to a lesser extent, cough play a central role.

REFERENCE

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P223 ETHNIC DISPARITIES IN DISEASE SEVERITY AMONG NEWLY DIAGNOSED FIBROTIC INTERSTITIAL LUNG DISEASE PATIENTS – UK SPECIALIST CENTRE PERSPECTIVE

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Fibrotic Interstitial Lung Disease (ILD) represents a heterogenous group of complex lung parenchymal conditions associated with significant morbidity and mortality. Early access to expert care is a key intervention that has been associated with improved outcomes. This study aimed to investigate whether south asian ethnicity was associated with increased disease severity at the time of referral to the ILD services at a UK specialist centre.

All new referrals to the ILD service between January and December 2022 were reviewed. Electronic Medical Records were utilised to collect data including ethnicity, demographics, and MDT diagnosis. The most recent forced vital capacity (FVC) measured within twelve months of referral was captured and GLI derived predicted FVC values were determined.

Abstract P223 Table 1 Baseline demographics and ILD diagnosis of included participants. Data for age, BMI, lung function presented as mean (standard deviation). ILD diagnosis and sex presented as count (percentages)

	White (n=287)	Asian (n=85)	Black (n=4)	All (n=376)
Age	70.6 (11.4)	64.4 (12.1)	53.8 (8.1)	69.1 (11.9)
Male, n(%)	176 (61.3%)	45 (52.9%)	2 (50%)	223 (59.3%)
BMI	29.7 (6.5)	27.3 (5.4)	24.7 (1.7)	29.1 (6.3)
FVC,	2.76 (0.06)	2.10 (0.09)	2.56 (0.33)	2.61 (0.11)
FVC,% predicted	78.1 (19.7)	67.4 (20.4)	74.8 (9.1)	75.7 (20.3)
DLCO,% predicted	65.6 (24.6)	62.1 (26.9)	85 (28.3)	65.6 (24.6)
FEV1/FVC ratio,% predicted	80.6 (9.6)	84.1 (8.5)	74.2 (11.3)	81.4 (9.5)
Diagnosis				
IPF	74 (25.8%)	20 (23.5%)	0	94 (25%)
HP	36 (13.0%)	8 (9.4%)	0	44 (11.7%)
Sarcoidosis	19 (6.6%)	16 (18.8%)	2 (50%)	37 (9.8%)
iNSIP/OP	35 (12.2%)	10 (11.8%)	0	45 (11.9%)
RA-ILD	17 (5.9%)	7 (8.2%)	1 (25%)	25 (6.7%)
CTD-ILD	14 (4.9%)	6 (7.1%)	0	20 (5.3%)
Unclassifiable	29 (10.1%)	7 (8.2%)	0	36 (9.6%)
ILA	16 (5.6%)	2 (2.4%)	1 (25%)	19 (5.1%)
Asbestosis	5 (1.7%)	0	0	5 (1.3%)
Other ILDs	42 (14.6%)	9 (10.6%)	0	51 (13.6%)

BMI, Body Mass index; FVC, Forced Vital Capacity; DLCO, Diffusion Capacity of Carbon Monoxide; FEV1, Forced Expiratory Volume in 1 Second; IPF, Idiopathic Pulmonary Fibrosis; HP, Hypersensitivity Pneumonitis; iNSIP, Idiopathic Non-specific Interstitial Pneumonia; OP, Organizing Pneumonia; RA-ILD, Rheumatoid arthritis related interstitial Lung Disease; CT-ILD, Connective Tissue Disease related interstitial Lung Disease; ILA, Interstitial Lung Abnormality.

The mean FVC was compared between south asian and white caucasians using t-tests.

A total of 472 individuals with subsequent confirmed ILD were referred for a specialist opinion during the study period, of which 96 were excluded due to missing lung function, resulting in a final cohort of 376 individuals. Baseline demographics are described in table 1. The prevalence of individual ILDs was numerically well matched across south asians and white caucasians, with idiopathic pulmonary fibrosis (IPF) the most common ILD. The mean baseline FVC (% predicted) was 10.8% (95%CI 5.9–15.5; p<0.0001) lower in south asians (67.4% SD 20.4) compared with white caucasians (78.1% SD 19.7).

In conclusion, this study suggests individuals from south asian ethnic minorities present to our ILD service with more advanced disease. The reasons for this disparity remain unclear, emphasizing the need to further investigate and address potential inequities in access to ILD specialist care, alongside exploring the validity of current FVC reference equations.

P224 NINTEDANIB IN COMBINATION WITH IMMUNOSUPPRESSANT DRUG PRESCRIBING IS SAFE AND WELL TOLERATED IN A LARGE COHORT OF PATIENTS WITH PROGRESSIVE FIBROTIC INTERSTITIAL LUNG DISEASE

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10.1136/thorax-2023-BTSabstracts.374

Introduction Nintedanib was approved by NICE for use in patients with progressive fibrotic ILD (PFILD) from February 2022. In the INBUILD trial, patients were excluded if they were treated with azathioprine, ciclosporin, mycophenolate mofetil (MMF), tacrolimus, rituximab, cyclophosphamide or oral corticosteroids at a dose greater than 20 mg once daily (Flaherty KR, et al. N Engl J Med. 2019 Oct 31:381 (18):1718–1727). This contrasts with our real-world practice where patients are often prescribed immunosuppressant drugs to manage their primary diagnosis prior and/or in addition to nintedanib. This study aims to determine the safety and tolerability of nintedanib prescribing in combination with immunosuppressant drugs in a large cohort of patients.

Methods Data was collected from the hospital electronic patient prescribing records retrospectively over a 15-month period. Patient demographics, clinical parameters and medication history, including doses, adverse effects, dose reductions and drug discontinuation was recorded. All patients had been discussed in the ILD multidisciplinary meeting and monitored as per guidance.

Results Following referral to ILD specialist pharmacy, 136 patients were prescribed nintedanib for PFILD. Of these, 106 patients (77.9%) were concomitantly prescribed immunosuppressant drugs at the point of nintedanib initiation. Currently, 105 (77.2%) patients continue on nintedanib therapy.

Conclusions The majority of patients with PFILD initiated on nintedanib were established on immunosuppressant drugs. The combination was mostly well tolerated. Despite the combination, only 5% needed nintedanib dose reduction in comparison to 33% in the INBUILD trial. Similarly, 11% discontinued nintedanib in our patient cohort due to adverse effects compared to 19% in the INBUILD trial. This suggests nintedanib is better tolerated in practice, even in combination with immunosuppressant therapy; this may be due to close monitoring and specialist support. The potential for reducing doses of immunosuppression, and/or the frequency of monitoring is yet to be established.

Abstract P224 Table 1 Medication prescribed at time of PFILD diagnosis and changes over 15 months

Initiation	Number of patients (%)	Dose (mean)	Dose (range)
Current medication at time of PFILD diagnosis			
Oral corticosteroids	83 (61.0)	5 mg OD	3–20 mg OD
Mycophenolate mofetil	75 (55.1)	1g BD	500–1500 mg BD
Hydroxychloroquine	15 (11.0)	200 mg OD	200 mg OD to BD
Azathioprine	2 (1.4)	100 mg OD	75–150 mg OD
Tacrolimus	3 (2.2)	3 mg BD	1–5 mg BD
Rituximab	2 (1.4)	1g x 2 doses	1g x 2 doses
Follow up	Number of patients (%)	Reason	Number of patients (%)
Medication discontinued			
Oral corticosteroids	11 (8.0)		
Mycophenolate mofetil	8 (5.8)		
Hydroxychloroquine	1 (0.7)		
Nintedanib	31 (22.7)	Death	16 (11.7)
		Drug tolerability	15 (11.0)
Dose reduction			
Nintedanib	7 (5.1)	Gastrointestinal AE	

Abbreviations: OD = once daily; BD = twice daily, AE = adverse effects

P225 AIRWAY DISEASE IN PULMONARY SARCOIDOSIS

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10.1136/thorax-2023-BTSabstracts.375

Aims Airway involvement in sarcoidosis is less common than nodal and lung parenchymal disease. It may result in airflow limitation which has been reported with increased morbidity and mortality. We aim to interrogate large cohorts to assess the degree of physiological impairment at diagnosis and relationship to CXR stage and need for treatment.

Methods We restrospectively reviewed pulmonary function tests of 599 patients at the point of diagnosis from 2 sarcoidosis centres on the Island of Ireland (North n= 275, South n= 324). The degree of airway obstruction was stratified and compared to age at presentation, CXR stage, and need for treatment. We sampled the Northern cohort for alternative causes of airway disease including exposure, atopy and autoimmunity (AI). Those with preserved ratios were further divided into mild, moderate, and severe impairment in FEF 25–75 to assess for small airway disease.

Results Need for treatment were similar in both centres (table 1). Increasing CXR stage and degree of airflow limitation was associated with increased treatment in both cohorts. The Northern cohort had a higher proportion of stage 4 disease 18.1% v 1.6% and a higher proportion of airflow limitation 19.3% v 15%. Airflow limitation appeared to be associated with fibrotic disease and older age. Ex-smokers (17.8%) were no more likely to present with airflow limitation OR 0.798 p 0.586. RAST testing was performed in 50% (140) and positive

in 10.7% to 16.4% of patients. (Asp 10.7, Epi mix 12.7, HDM 16.4). Sampling of consecutive patients (n=24) attending clinic revealed elevated FENO in 8%. AI Screening was performed in 67.6% (185) with <3% having high titres most commonly Ro 52 and 60. The distribution of atopy and autoimmunity were equal in those with and without airflow limitation. Review of patients with a preserved ratio revealed 17.6% had mild, 9.9% had moderate, and 1.4% had severe small airflow limitation. 10% of the Northern cohort were treated with inhaled therapy.

Conclusion Airflow limitation appears more common than previously reported and could go unrecognised as a cause of symptoms. Careful evaluation is suggested to rule out alternative causes of airflow limitation in sarcoid patients.

Abstract P225 Table 1 Characteristics of Lung Involvement of All Patients at Presentation

		North		South		Combined	
n		275		324		599	
Age (sd)		61.6 (17.35)		40.8 (12.4)		50.2 (16.3)	
Gender		157 (57)		181 (56)		338 (56)	
Scadding Stage		Number	Percentage	Number	Percentage	Number	Percentage
	Stage 0	19	6.9	14	4.5	33	5.7
	Stage 1	108	39.1	140	45.5	248	42.5
	Stage 2	76	27.5	121	39.3	197	33.7
	Stage 3	23	8.3	28	9.1	51	8.7
	Stage 4	50	18.1	5	1.6	55	9.4
Spirometry (% Predicted)							
	Forced Vital Capacity (FVC)						
	<50%	4	1.5	3	0.9	7	1.2
	50–69%	10	3.6	19	5.7	29	4.6
	70–79%	38	13.8	22	6.6	60	9.9
	>80%	223	81.1	289	86.8	512	84.2
	Forced Expiratory Volume 1 Second (FEV1)						
	<50%	24	8.7	10	3.0	34	5.6
	50–69%	25	9.1	28	8.4	53	8.7
	70–79%	29	10.5	37	11.1	66	10.9
	>80%	197	71.3	258	77.5	455	74.8
	FEV1/FVC Ratio (Absolute)						
	<50%	5	1.8	5	1.5	10	1.6
	50–69%	48	17.5	44	13.5	92	15.1
	70–79%	105	38.2	95	29.3	200	32.9
	>80%	117	42.5	190	58.6	307	50.5
Transfer Factor							
	<50%	6	2.2	4	1.2	10	1.6
	50–69%	51	18.8	49	14.6	100	16.4
	70–79%	47	17.3	35	10.4	82	13.5
	>80%	167	61.6	247	73.7	414	68.1
Treatment[#]	ALL	135	48.9	170	50.1	305	50.1
	FEV1/FVC Ratio (Absolute)						
	<50%	3	60	5	100	8	80
	50–69%	29	60.4	31	70	60	65.2
	70–79%	45	42.9	53	55	98	49
	>80%	58	49.6	78	41	136	44.2
	Scadding Stage						
	0	4	21	9	64	13	39.4
	1	42	38.9	47	33.6	89	35.9
	2	44	57.9	72	59.5	116	58.9
	3	15	65.2	27	77.1	42	82.4
	4	38	76	4	33	42	76.4

Defined as requiring >3 months of Oral Corticosteroids

'Call me maybe' – Virtual management of respiratory disease

P226 MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA IN A VIRTUAL WARD SETTING

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10.1136/thorax-2023-BTSabstracts.376

Introduction and Objectives Following the NHS England mandate, virtual wards (VW) are increasingly being set up and developed in secondary care They provide care for patients within their own homes, who otherwise would be admitted to hospital. Respiratory services are at the forefront of delivering this model of care for patients with acute respiratory infections exacerbating COPD or bronchiectasis but there is limited evidence regarding the management of patients with community acquired pneumonia (CAP). We present data from our experience managing patients on a VW from a 350-bed acute hospital trust.

Methods Electronic records from all VW admissions between January 2022 and May 2023 were examined retrospectively to identify patients with a diagnosis of CAP. Patients had to meet specific respiratory VW criteria and be on an improving trajectory to be eligible. Demographic details, respiratory comorbidities and CURB65 score on admission were recorded, along with length of hospital and virtual ward stay, 30- and 90-day outcomes.

Results 37 patients fulfilled our criteria. Average age 72 years (Range 43 to 96). 63% male, 54% had pre-existing respiratory conditions.

Mean length of stay in hospital prior to VW 7.67 days (+/- STD 5.97) followed by 8.15 days (+/- STD 4.28) on VW. Most common CURB65 Score 1 (range 0–4); 18/37 calculated as an inpatient.

Primary goals of admission were monitoring (27%), nebuliser weaning (13%), oxygen weaning (51%) or all (8%). Nearly all (33/37) needed inpatient supplemental oxygen (FiO2 average 36% (max 60%)). Of those admitted to VW for oxygen weaning max FiO2 required was 36%.

In 12 patients, direct actions and interventions from VW team likely prevented acute readmission to hospital. 8 patients were readmitted to hospital or re-presented to ED within 30 days. 2 of these 8 died. 1 further patient died within 90 days.

Conclusions We have demonstrated that with careful patient selection, CAP patients can be safely managed in a VW setting, and they present an option for easing pressures on acute inpatient beds. They may also be useful in supporting patients in end of life care.

P227 COMMUNITY ACQUIRED PNEUMONIA AND READMISSIONS FROM THE VIRTUAL WARD

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10.1136/thorax-2023-BTSabstracts.377

Introduction Respiratory virtual wards have been developed to support the management of community acquired pneumonia (CAP) from secondary care to the community, with careful selection of appropriate patients. Little is understood about the characteristics of those readmitted from virtual wards to secondary care, however in general around 26% of patients discharged from secondary care are readmitted within 30 days, with comorbidities being a predictor.[1]

Methods A retrospective review of consecutive patients managed in our virtual ward for community acquired pneumonia from June 2022 to May 2023 was undertaken using our local electronic healthcare record system. Clinical characteristics, outcomes and readmissions rates at 30 days from index admission were recorded. Groups were compared by 30-day readmission status to assess for characteristics associated with readmission.

Results Overall, 164 patients diagnosed with CAP were supported in the virtual ward during the study period. All patient demographics were; 65 (39.63%) male, mean age 68 years. 30-day readmission occurred in 19/164 (11.6%) of patients and was more likely to occur when the patient was female (57.9%), in those with coexisting COPD (66.2% versus 29.7%, p< 0.5), Bronchiectasis (15.8% versus 7.6%), or Acute COVID-19 (21.1% versus 9.7%), and resident in a postcode within the 1st decile (top 10%) for Multiple Deprivation (73.7% versus 48.3%, p <0.5).

Mean age and length of stay on the virtual ward were identical for the 'readmitted' and 'not readmitted' groups.

Conclusion 30-day readmission within the ARI Virtual ward stands below the 26% reported in other studies for community acquired pneumonia managed in secondary care. Further work is needed to determine the role other comorbidities, baseline physiological readings and level of care prior to onboarding to virtual ward have as determinants of readmission risk, however overall deprivation, and co-existing COPD appear to be predictors of readmission.

Abstract P227 Table 1

ARI Virtual Ward CAP 12-month data	All Patients	Readmitted within 30 days	Not readmitted within 30 days	
Total pts (n)	164	19 (11.6%)	145 (88.4%)	
Male (n/%)	65 (39.63%)	8/19 (42.11%)	57/145 (39.31%)	
Age – Min (years)	24	57	24	
Age – Max (years)	94	87	94	
Age – Average (years)	68	73	68	
Length of stay – min (days)	3	4	3	
Length of stay – max (days)	27	17	27	
Average length of stay (days)	10	10	10	
& COPD (n/%)	55 (33.54%)	12 (66.16%)	43 (29.66%)	$X^2 = .003632$, $p < .05$.
& BRONCHIECTASIS (n/%)	14 (8.54%)	3 (15.79%)	11 (7.59%)	$X^2 = .22875$
& ACUTE COVID (n/%)	18 (10.98%)	4 (21.05%)	14 (9.66%)	$X^2 = .135061$
No with IMID Decile 1 postcode (n/%)	84 (51.22%)	14 (73.68%)	70 (48.27%)	$X^2 = .037214$, $p < .05$.
IMID Average	6581	4244	6887	

ARI Virtual Ward – CAP 12 month data.

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P228 VIRTUAL WARD (VW) IN RESPIRATORY MEDICINE – FLASH IN THE PAN OR GAME CHANGER?

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10.1136/thorax-2023-BTSabstracts.378

Covid-19 has seen an acceleration in assistive technology in the clinical space (Virtual Wards [VW]) to mitigate risk and care for patients effectively in their own homes.

This large university teaching hospital serving a population of approximately one million, is the first UK hospital to set up a 24 hour, 40 monitored bed, acute VW for the management of medical and surgical patients during the Covid-19 pandemic.

Patients admitted to the VW are considered in-patients and are monitored 24/7 using the *'Current Health monitoring system'* by a nursing team with daily consultant review. The VW has evolved over the last 2 years to meet the growing post-Covid demands on the NHS.

We retrospectively reviewed prospectively collected data on respiratory patients admitted to the VW between 09/02/21–26/06/23.

Results Since 2021, 2,404 medical and surgical patients have been through the service with 19,642 bed days saved and an average length of stay (LOS) on the VW of 8.2 days. Patients with respiratory conditions accounted for the majority of referrals to the service (23%).

In the last 28 months, 554 respiratory patients have been admitted to the VW. Their average LOS was 6.9 days with 3282 bed days saved. 98.6% of patients reported being very satisfied with their virtual ward experience.

The VW has been crucial in freeing physical bed capacity of at least 12–15 beds a day and thus improving patient flow at the front door. This translates to a cost-saving of £541,530 in respiratory medicine alone, assuming a bed day saving costs £165.

VW is a sustainable innovative model of providing care that extends beyond the hospital bed in a cost-effective way.

P229 SHOULD HOME OXYGEN ASSESSMENT BE PART OF THE RESPIRATORY VIRTUAL WARD?

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10.1136/thorax-2023-BTSabstracts.379

Introduction The inception of virtual wards (also known as hospital at home) allow patients to get hospital-level care at home safely and in familiar surroundings. Respiratory medicine has seen a shift in historical hospital practices adapted to enhance patient experience and choice. As part of the shift, the home oxygen and review service had been identified as a service to pioneer the hospital at home service where point of care arterial blood gas samplings were utilised for initiation and titration of oxygen, superseding the traditional hospital assessments.

Objectives To evaluate the effectiveness, safety and service user satisfaction of a fully integrated home oxygen assessment service.

Methods Retrospective review of all patients who have been titrated or started on new oxygen therapy at home. April 2021 – April 2023

Results As part of the Home Oxygen Assessment & Review Service, a total of 516 patients have been commenced on new oxygen within the home environment (COPD:379; Palliative: 62; ILD: 50; Heart Failure:24; Cluster Headache:1). 22 (Female:18; Male: 4) of which were started on a new oxygen prescription whilst on the Virtual Ward (COPD/Bronchiectasis:15; Community Acquired Pneumonia:3; COVID: 3). All 22 patients were successfully managed at home with no adverse events. In addition, 3,942 patients have been safely titrated at home (Ambulatory Oxygen Therapy:1,180; Long Term Oxygen Therapy: 1,246; Short Burst Oxygen Therapy: 1,516). Majority of the respondents to the service evaluation would recommend this at home service.

Conclusions Patients that require oxygen therapy usually have advance co-morbidities and limited exercise tolerance, therefore travelling to hospital appointments can be a difficult task and interfere with their daily lives.

Delivering care at home can also be more satisfying for staff. They work across traditional boundaries, sharing knowledge, skills, and information about each person's needs. This can help them offer more holistic care and helps make home visits efficient.

This review illustrates that oxygen initiation and titration at home is safe. This also has the dual purpose of increasing

Abstract P228 Table 1

Copd	Bronchiectasis	Pneumonia	Empyema	Covid-19	TB
Afebrile, no or low flow oxygen requirement, normal CXR or single lobar consolidation, single organ involvement Requiring nebuliser and/or oxygen wean	Need for 10–14 day of iv antibiotics	Clinically improved, afebrile for >24 hours, improvement in inflammatory markers but requiring wean from oxygen	Clinically improving (afebrile, improving inflammatory markers) – needing prolonged iv antibiotics	Stable patients with an oxygen requirement	Video-observed therapy in multi-drug resistant TB (virtual day attenders to ward)

outpatient capacity and providing patients the options to remain at home. It is likely to be a less costly alternative to hospital appointments.

P230 PREDICATORS OF COPD EXACERBATION READMISSIONS FROM THE VIRTUAL WARD

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10.1136/thorax-2023-BTSabstracts.380

Introduction Respiratory virtual wards provide the opportunity to support COPD acute exacerbation management within the community,[1] and can reduce the burden on secondary care admissions, where re-admission rates are approximately 20%.[2] Appropriate patient selection is key for the successful implementation of virtual wards; however little is known about the characteristics of those readmitted to secondary care from virtual wards. We therefore investigated readmissions to secondary care following management of COPD exacerbation on the virtual ward.

Methods A retrospective review of consecutive patients managed in our virtual ward for COPD exacerbation from June 2022 to May 2023 was undertaken using our local electronic healthcare record system. Clinical characteristics, outcomes and readmissions rates at 30 days from index admission were recorded. Groups were compared by 30-day readmission status to assess for characteristics associated with readmission.

Results Overall, 217 patients diagnosed with AECOPD were supported in the virtual ward during the study time period. All patient demographics were; 67 (30.1%) male, mean age 71 years. 30-day readmission occurred in 28/217 (13%) of patients and was more likely to occur when the patient was female (82.1% vs 77.2% not readmitted), in current smokers (32.1% versus 24.3%), and resident in a postcode within the 1st decile (top 10%) for Multiple Deprivation (60.7% versus 50.3%).

Conclusion 30-day readmission within the ARI Virtual ward stands below the 20% reported in other studies for COPD exacerbations managed in secondary care. Further work is needed to determine the role of comorbidities, baseline physiological readings and level of care prior to virtual ward onboarding have as determinants of readmission risk.

Abstract P230 Table 1

ARI Virtual Ward – COPD Exacerbation 12-month data	All patients	Readmitted within 30 days	Not readmitted within 30 days
Total patients (n)	217	28 (12.9%)	189 (87.1%)
Male (n/%)	67 (30.88%)	5/28 (17.9%)	62/189 (32.8%)
Age – Min (years)	50	55	50
Age – Max (years)	95	86	95
Age – Average (years)	71	71	71
Length of stay – min (days)	1	1	2
Length of stay – max (days)	35	21	35
Length of stay – average (days)	11	10	11
Recorded as smoker (n/%)	53 (25.4%)	9/28 (32.1%)	44*/181 (24.3%)
No. with IMID Decile 1 postcode (n/%)	112 (51.6%)	17/28 (60.7%)	95/189 (50.3%)
IMID Average	6524	4856	6771 *not recorded, n=8

ARI Virtual Ward – COPD Exacerbation 12 month data

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P231 MANAGEMENT OF ASTHMA ON THE VIRTUAL WARD

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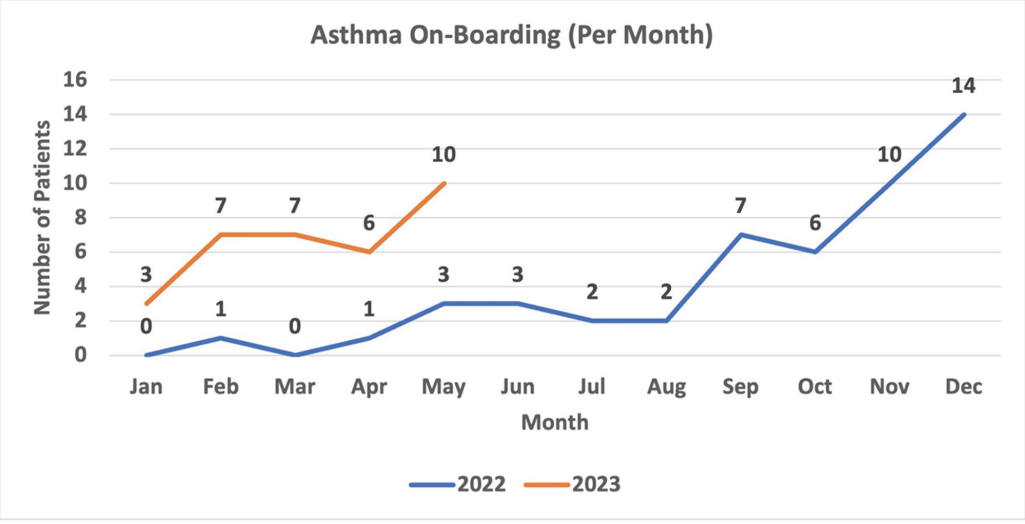
10.1136/thorax-2023-BTSabstracts.381

Introduction and Objectives Virtual Wards (VWs) are increasingly being used following the mandate from NHS England. VWs provide care for patients at home, who would otherwise be admitted to hospital. In KHFT, Respiratory services are at



Abstract P231 Figure 1

the forefront of delivering this model of care. This data shows the management of Asthma patients on an acute trust-based VW.

Methods Admissions from Jan-2022 until May-2023 were examined retrospectively to identify patients with Asthma. Patients must meet specific inclusion criteria and have an improving trajectory to be considered for the VW. Patients with previous ICU admissions were excluded. Demographic details, Asthma severity, Covid/Flu status were recorded, along with Hospital/VW Length of Stay (LOS) and 30/90-Day Outcomes.

Results 82 patients fulfilled these criteria. Average age was 59 (Range 21 – 99). 20% of the patients were Male and 80% were Female, 16% returned a Positive PCR (12% Flu and 4% Covid).

Mean LOS in hospital was 4-days and 11-days for VW admissions. Asthma severity of Mild was most common (71%) with 28% Moderate and one classification as Severe (1%).

Primary treatments included nebulisers (83%), medication changes (4%), monitoring (15%) and oxygen (10%). Some patients had more than one type of treatment (10%). Re-admissions to hospital were prevented by interventions whilst admitted to the VW (Acute advice (11%), medication changes (18%), assessment in ED/SDEC (2%/4% respectively) and point of care testing (5%)). Patients would have required an acute re-admission otherwise.

10% patients were re-admitted to hospital within 30-days of their discharge (D/C) and 10% within 90-days (Those with outcomes at 30-Days were not included in the 90-Days data). There were no deaths in Asthma patients and 90% had no outcome at 30 and 90-days (22% are yet to reach 90-days post-D/C).

Of the combined 14 patients re-admitted (17%), 6 patients (43%) were re-admitted due to worsening Asthma. This included one patient who was re-admitted to another hospital for ICU monitoring only.

Conclusions We have demonstrated that with specific inclusion criteria, Asthma patients can be safely managed in Virtual Wards. They also present an effective option for easing bed pressures in all aspects of hospital admissions.

P232 A COMPARISON OF VISUALLY MEASURED RESPIRATORY RATE AND CONTINUOUS MONITORING WITH AN ELECTRONIC DEVICE IN A TERTIARY CENTRE: A RETROSPECTIVE COHORT STUDY

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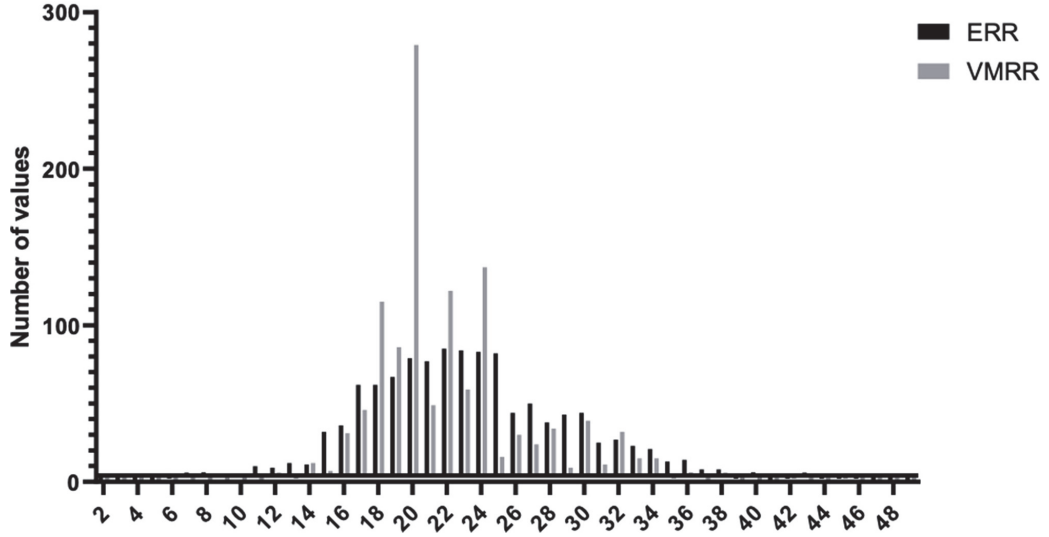
10.1136/thorax-2023-BTSabstracts.382

The most sensitive predicator of clinical deterioration is respiratory rate (RR), however, its usefulness depends on accuracy of its observation and documentation. Respiratory rate continues to be measured visually and is prone to inaccuracy and bias. The RespiraSense™ device is a motion-tolerant digital technology used to continuously monitor RR and may be more accurate in predicting deterioration [1]. The aim of this study is to ascertain if there is a difference between visually measured (VMRR) and electronically measured (EMRR) RR when both are available to clinical staff. RR data was collected from 200 individuals admitted to two wards in a tertiary centre from October 2021 to October 2022. 100 records were randomly selected. Demographics and clinical outcomes collected included sex, age, reason for admission and desaturation within 48 hours. VMRR and EMRR were recorded for the 48-hour period. Of the 92 included participants, 48 (52.2%) were female and 52 (56.5%) were Coronavirus 19 (COVID19) positive on admission. A total of 1104 matched VMRR and EMRR were measured. VMRR was consistently lower than the EMRR, (mean (SD) difference 0.99 (5.079), median [IQR] EMRR 22.5 [19–27] *vs* VMRR 20 [19–24], $p<0.0001$). VMRR was measured at 18, 20, 22 or 24 in 56.7% of cases *vs* 27% of EMRR recorded at those rates (figure 1). A difference of more than three breaths/minute was identified in 431 cases (39%). Total EWS was the same in 591 cases (53.5%), higher in 379 (34.3%) and lower in 98 (9.2%) using EMRR *vs* VMRR. Median respiratory rate was higher in individuals who desaturated in the first 48 hours than those who didn't, using both EMRR (23.0 [19–28] *vs* 22.0 [19–25],$p<0.001$) and VMRR (21.0 [19–24] *vs* 20.0 [19–22],$p<0.001$). VMRR underestimates RR in comparison

Figure 1



Abstract P232 Figure 1

to EMRR. Our study demonstrates that even when EMRR is available, VMRR peaks at commonly reported values between 18 and 24. The differences in EMRR and VMRR may result in escalation of care based on the EWS monitoring system in a proportion of cases. Whether this results in earlier recognition of deterioration and improved outcomes for patients requires urgent prospective assessment.

P233 VIRTUAL PHYSIOTHERAPY FOR BREATHING PATTERN DISORDER IN ASTHMA: NOT ALL THAT GLITTERS IS GOLD

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10.1136/thorax-2023-BTSabstracts.383

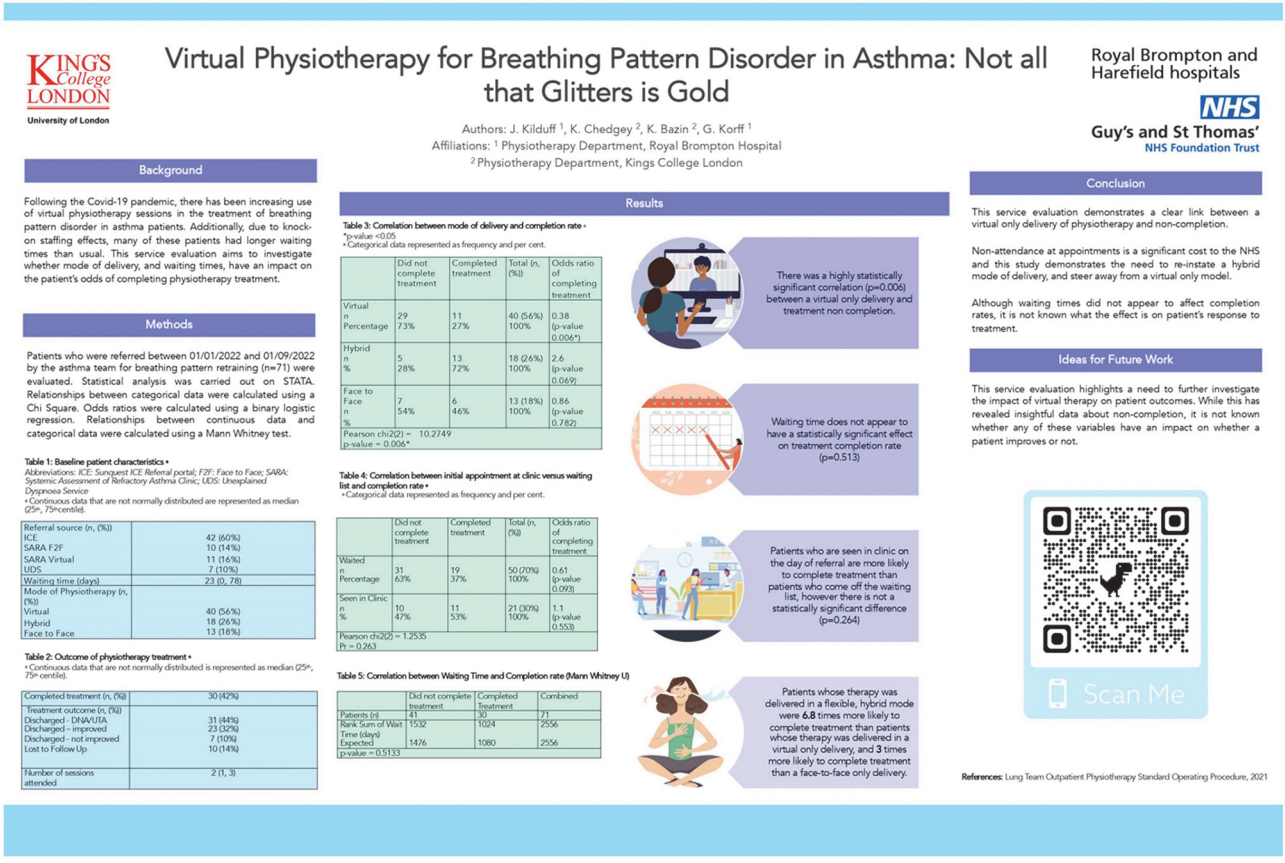
Background Breathing Pattern Disorder (BPD) can cause debilitating symptoms of breathlessness and is being recognised as a significant comorbidity in people with difficult to treat asthma and poor asthma control. Physiotherapy treatment (breathing retraining) can improve symptoms, function, quality of life and inhaler use. Despite this, a local service evaluation revealed that completion rate of treatment is only 42%.

Aims/Objective This service evaluation aims to investigate factors associated with non completion of physiotherapy treatment for breathing pattern disorder in adults with coexisting asthma.

Methodology A retrospective chart audit was completed. Discharged patients referred to physiotherapy by the Asthma team for breathing pattern assessment over a nine month period (n=71) were included. Statistical analysis carried out on STATA, with support from the trust statistician. Shapiro Wilk testing was used to evaluate normality. Chi squared test was used to analyse relationships between categorical variables. A Mann Whitney U was used for non-parametric data. A binary logistic regression was used to calculate the odds ratio.

Results Completion rate was 42% (n=30). There was a highly statistically significant correlation was discovered (p=0.006) between a virtual only delivery and treatment non completion. There were no statistically significant associations between treatment non completion and waiting time or whether the patient was seen in clinic. Patients whose therapy was delivered in a flexible, hybrid mode were 6.8 times more likely to complete treatment than patients whose therapy was delivered in a virtual only delivery, and 3 times more likely to complete treatment than a face-to-face only delivery.

Conclusions/Implications for Practice Telehealth and virtual consultations are a novel and exciting way to deliver therapy



Abstract P233 Figure 1

to as many patients as possible. However, this study highlights that there is a strong correlation between virtual only appointments and likelihood of dropping out of treatment. A flexible, hybrid mix of virtual and face to face appointments appears to be optimal to improve likelihood of treatment completion.

P234 THE FEASIBILITY OF A DIGITAL SELF-MANAGEMENT PROGRAMME (BREATHTEC) TO REDUCE ANXIETY, DEPRESSION, AND BREATHLESSNESS IN PATIENTS WITH CHRONIC RESPIRATORY DISEASES: A RETROSPECTIVE ANALYSIS

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10.1136/thorax-2023-BTSabstracts.384

Background Self-management is recommended for individuals with chronic respiratory diseases. A systematic review identified interventions which address mental health were significantly more effective than targeting symptom management alone for individuals with COPD.[1] Digital solutions which integrate mental and physical health, are seen as an option to provide patients access to timely support.

Methods Patients with chronic respiratory disease were invited by a healthcare professional to use BreathTec, a digital self-management tool. BreathTec, co-developed with patients, carers, and health care professionals, combines cognitive behavioural therapy approaches, tools to manage breathlessness, advice to become more physically active and improve mental health. Throughout five personalised and interactive sessions, patients are asked to complete a number of assessments (Hospital Anxiety and Depression scale [HADS] & 36-item health survey [SF-36]) and reflect upon the usefulness of techniques used within the programme.

Results To date, 40 patients (BMI: 27.6±5.6, HADS anxiety: 8.2±4.9 & HADS depression: 7.6±5.1) have completed all 5 sessions of the BreathTec programme. On a 1–5 Likert scale (1-not tried to 5- life changing), breathing techniques including 'learning to relax' (3.6±0.6), 'stop-rest-relax' (3.7 ±0.7), 'pacing' (3.4±1.0) and 'breathing control' (3.4±0.8) were deemed to be most useful to reduce breathlessness. Meanwhile, effective techniques to improve mood included 'learning to relax' (3.5±0.8), 'balancing days' (3.4±0.9), 'talking' (3.6±0.8), 'staying connected' (3.6±0.8) and 'acceptance' (3.6±0.6). Of the 40 patients, 18 reported elevated (≥8 HADS) symptoms of anxiety (12.4±10.6 units) and/or depression (10.6±4.8 units) at baseline. Following completion of BreathTec, reductions in both anxiety and depression were reported (3 units respectively). Patient feedback was excellent, with 88% reporting improved mood and symptom management and 54% reporting being more active on completion.

Conclusion In this retrospective analysis, BreathTec was a promising digital, personalised intervention that incorporates key components of self-management including mental health, symptom management and physical activity.

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Please refer to page A293 for declarations of interest related to this abstract.

P235 A POINT PREVALENCE STUDY OF COPD THERAPY IN 13361 PATIENTS USING THE MYCOPD APP: EXAMINING REAL-TIME CAPTURE OF DISEASE CONTROL MEASURES

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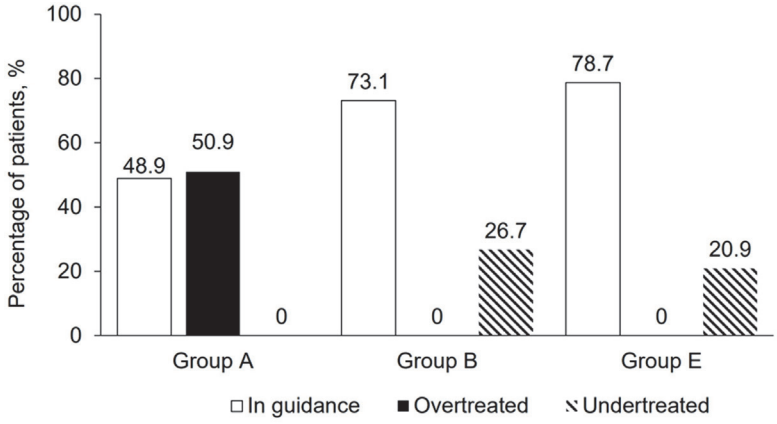
Introduction Digital health platform application (app) myCOPD supports patients with chronic obstructive pulmonary disease (COPD) with self-management and enables remote monitoring, including medication review alerts. Using a novel algorithm, this study assessed if patients using myCOPD received pharmacological treatment recommended by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) report.

Methods The myCOPD algorithm analysed patient data from initial registration to last app use and compared against GOLD recommendations. Patients were initially grouped as follows: ≤1 moderate exacerbation (no hospitalisation) and low symptom burden (COPD Assessment Test [CAT] score <10; Group A) or high symptom burden (CAT score ≥10; Group B); or ≥2 moderate exacerbations or ≥1 leading to hospitalisation with any symptom burden (Group E). Patients were then analysed longitudinally against recommendations, using dyspnoea or exacerbation pathways depending on subsequent symptoms and exacerbation data, which are collected in real time. The algorithm was retrospectively applied to patients managed in the myCOPD app between November 2018 and February 2023. Prescriptions were analysed, and patients categorised as 'in accordance with', 'undertreated' or 'overtreated', according to GOLD 2023 recommendations.

Results The cohort comprised 13361 patients (mean age 66.2 years; mean CAT score 18), categorised at the time of app registration into GOLD Groups A (n=2152), B (n=5821) and E (n=5388). In Group A, approximately half of patients were overtreated and half were treated in accordance with recommendations (**figure 1**). In Groups B and E, >70% of patients were treated in accordance with recommendations. A substantial proportion of patients (26.7% and 20.9%, respectively) were classified as undertreated in Groups B and E.

Conclusion Most patients with COPD in GOLD Groups B and E are treated in accordance with GOLD 2023. However, up to one-quarter of patients with high symptom burden or who have experienced moderate or severe exacerbations are still undertreated. Conversely, approximately half of patients with low symptom burden are overtreated; however, patient classification history prior to app registration is not captured, and some patients in Group A may have transitioned from Groups B or E following appropriate treatment. Further work



Muscarinic antagonist conflict (SAMA/LAMA prescribed together) was reported for <0.5% of patients in each group
Overtreatment and undertreatment were defined as follows (based on group at initial registration):
Group A with CAT <10 and ≤1 moderate exacerbation: undertreatment = not applicable;
overtreatment = LABA/ICS or any combination of LAMA/LABA/ICS
Group A initially, then records CAT ≥10 and ≤1 moderate exacerbation, or Group B with the same criteria: undertreatment = SABD only, LAMA, LABA or LABA/ICS; overtreatment = not applicable
Group A or Group B initially, then records of ≥2 moderate or 1 severe exacerbation, or Group E: undertreatment = SABD only, LAMA, LABA or LABA/ICS; overtreatment = not applicable
CAT, COPD Assessment Test; GOLD, Global Initiative for Chronic Obstructive Lung Disease; ICS, inhaled corticosteroid(s); LABA, long-acting β_2-agonist; LAMA, long-acting muscarinic antagonist; SABD, short-acting bronchodilator; SAMA, short-acting muscarinic antagonist

Abstract P235 Figure 1 Comparison of pharmacological treatment for COPD against GOLD 2023 recommendations, according to GOLD categorisation.

is needed to understand the reasons behind non-adherence to treatment recommendations.

Please refer to page A293 for declarations of interest related to this abstract.

P236 ADHERENCE TO HOME TELEMONITORING FOR COPD WITH DIGITAL COACHING

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Background Telemonitoring (TM) for COPD has been shown to reduce hospital admissions in some but not all studies and its cost-effectiveness has been questioned. However, technical advances, real-time coaching as well as increased digital engagement by patients and healthcare professionals, especially since COVID may have changed things. One of the potential barriers to TM is patient adherence and data quality in the home setting.

Aim To record TM usage, data quality and patient experience in a real-world clinical setting.

Methods Specialist COPD community nurses enrolled 54 patients (32 male) mean (SD) age 68(9) years with COPD mean $FEV_1$37% predicted, attending secondary care into a TM service between April-December 2022. Patients were onboarded by NuvoAir respiratory physiologists via phone/video calls and were coached in how to perform home spirometry (NuvoAir Air Next spirometer) weekly as well as and other TM measures daily. Data was uploaded through an App on the patient's own phone/tablet. The NuvoAir team reviewed data and shared reports with the clinical team through alerts and/or in fortnightly 30 minute MS Teams meetings. Patients were sent a questionnaire for feedback on TM in March 2023.

Results A total of 54 patients were followed for a median of 9 months (range 4 to 13), 4 patients withdrew (at mean 5.5 months) data collected during this period is included. Adherence data are shown in the table 1, 71% of home spirometry was acceptable (graded A-C, ATS/ERS 2005). Patients were

Abstract P236 Table 1 Home monitoring data volume and adherence statistics

TM measure	Measurement frequency per week	Overall adherence: Number of recorded measures/Total number of days (%)	Median (IQR) per participant adherence%
Spirometry	1 (weekly)	1,618/2,133 (76%)	85% (58–99%)
SpO_2	5 (Mon-Fri)	8,485/10,665 (80%)	90% (58–104%)
mMRC		6,479/10,665 (61%)	64% (4–87%)
Fitbit step count	7 (daily)	8,479/13,234 (64%)	81% (27–98%)

offered coaching to improve lower graded tests which were more common during exacerbations.

When surveyed, 89% of patients (23 responses) found weekly spirometry useful to understand patterns of their health, 91% found it provided reassurance and 82% felt it was useful to improve their spirometry technique. TM received a net promoter score of 91.

Conclusion High levels of home TM engagement and adherence to good quality spirometry can be obtained with digital coaching in selected patients with COPD. It is likely that personalised physiologist support drives high engagement and patient experience.

P237 TECHNOPHOBIA IS NOT THE MOST SIGNIFICANT PATIENT-REPORTED BARRIER TO ACCEPTING A DIGITAL ADHERENCE PACKAGE: AN ANALYSIS OF THE MAGNIFY TRIAL

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Introduction COPD exacerbations lead to increased mortality and disease progression. Maintenance inhaled therapies can reduce exacerbation risk amongst COPD patients, but non-adherence reportedly ranges from 20–60% in this population. The ongoing cluster randomised trial (MAGNIFY) is investigating the use of digital adherence support as a solution to this problem, but there is little evidence regarding patients' willingness to accept such devices.

Aims and Objectives To explore patient-reported barriers to accepting a technological adherence package.

Methods COPD patients were screened for eligibility for the UK-based MAGNIFY trial (Price et al 2021 doi: 10.2147/POR.S302809), with main inclusion criteria being aged 40 years or above, with ≥2 moderate/severe exacerbations in the last two years and with ≤50% adherence to mono/dual therapy. Eligible patients received a phone call from a pharmacist who conducted a remote patient review and invited them to use the digital support package, comprising an Ultibro Breezhaler and adherence support technology (Propeller Health). Patients unwilling/unable to accept the package were asked to provide reasons.

Abstract P237 Table 1 Patient demographic data, stratified by acceptance status

	Patients invited to use package (n=1108)‡	Patients accepting package (n=713)‡	Patients with no or incompatible phone (n=273)‡	Patients declining package (n=122)‡
Age; mean (SD)	70.3 (10.7)	68.0 (10.5)	75.6 (9.4)	69.9 (10.1)
Sex; n (%) male	445 (44.8)	275 (45.3)	116 (43.5)	54 (45.4)
FEV1% predicted; mean (SD)*	68.7 (18.2)	69.7 (17.7)	66.7 (19.0)	68.6 (18.8)
Smoking status; n (%)				
Current smoker	393 (39.6)	250 (41.2)	100 (37.5)	43 (36.1)
Ex-smoker	550 (55.4)	330 (54.4)	151 (56.6)	69 (58.0)
Never smoker	50 (5.0)	27 (4.5)	16 (6.0)	7 (5.9)
CAT score; mean (SD)*	13.3 (7.9)	13.4 (8.3)	13.3 (7.2)	12.7 (7.5)
mMRC; n (%) grade 2–4*	373 (40.4)	208 (36.9)	113 (45.4)	52 (46.9)
Cambridge multimorbidity score; mean (SD)*	2.9 (1.4)	2.8 (1.3)	3.1 (1.5)	2.7 (1.3)
Index of Multiple Deprivation decile; n (%)*				
1	78 (8.0)	51 (8.6)	18 (6.9)	9 (7.6)
2	230 (23.7)	151 (25.5)	59 (22.7)	20 (17.0)
3	123 (12.7)	67 (11.3)	37 (14.2)	19 (16.1)
4	108 (11.1)	67 (11.3)	30 (11.5)	11 (9.3)
5	142 (14.6)	74 (12.5)	49 (18.9)	19 (16.1)
6	86 (8.9)	48 (8.1)	27 (10.4)	11 (9,3)
7	28 (2.9)	14 (2.4)	10 (3.9)	4 (3.4)
8	71 (7.3)	48 (8.1)	7 (2.7)	16 (13.6)
9	76 (7.8)	49 (8.3)	19 (7.3)	8 (6.8)
10	28 (2.9)	23 (3.9)	4 (1.5)	1 (0.9)

‡number of patients with extracted electronic medical record data: patients invited (n=993), patients accepting (n=607), patients with no/incompatible phone (n=267), patients declining (n=119).
*missing data.

Results 87 participating practices had a total COPD list size of 33211 patients, of which 1833 patients met the trial eligibility criteria. Pharmacists excluded 541 patients following electronic medical record review, and were unable to contact a further 111 patients. Of the 1181 patients contacted, 73 were clinically unsuitable for the adherence package. Of the remaining 1108 patients, 395 (36%) were unwilling/unable to accept the adherence package; reasons included: no smartphone/incompatible phone (n=273), unwilling to change inhaler (n=71), unwilling to use the support package (n=19), life events (n=12), partially sighted (n=2), no reason (n=18). Patient demographics are reported in table 1.

Conclusions The main reasons for not accepting the adherence package were due to lacking a compatible smartphone or not wanting to change inhaler, rather than unwillingness to use technology. Though this is data from a single trial, the patients are from multiple diverse practices. The data suggest that technophobia may not be the most important barrier to patients accepting digital adherence support. A quarter of invited patients did not have a smartphone, highlighting the need for future implementation to ensure equitable access to digital support.

P238 LONGITUDINAL OBSERVATION OF PATIENT ENGAGEMENT IN AN INTERSTITIAL LUNG DISEASE (ILD) HOME MONITORING PROGRAM

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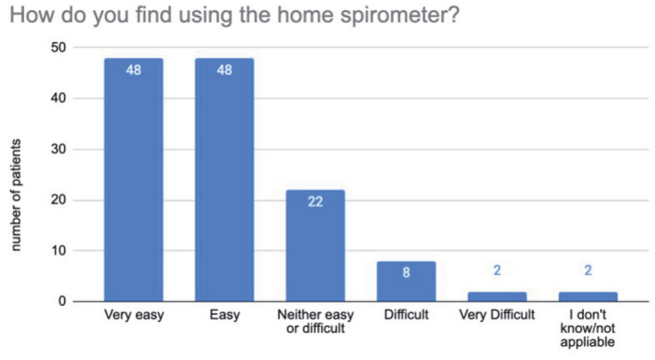
10.1136/thorax-2023-BTSabstracts.388

Purpose To quantify patient engagement with a home-monitoring program designed to support clinical care of patients with interstitial lung diseases (ILD) in two NHS Trusts, in the South of England.

Methods Patients with ILD who met eligibility criteria were approached to participate in a home monitoring program using a patient-facing application with a Bluetooth-connected spirometer and oximeter. Members from both trusts technical partner, UK patient driven charity and patient representatives formed the study steering group, overseeing the project and integrating patient and clinician feedback. Consenting patients were instructed remotely on the use of the application and devices and were asked to record their measurements (1 forced expiratory manoeuver & 1 oximetry reading) once weekly for one year. Patient-Reported Measures (PRMs) were completed electronically once quarterly. Data recorded via the app were visible to the patient and to the healthcare providers in real time via a secure browser-based portal. Alerts to automatically detect significant changes in individual's physiological values (e.g. ≥10% ↓FVC) and to alert the healthcare team were activated and responded to.

Results Patients (n=190) were recruited and 178 patients successfully downloaded the application and recorded ≥1 measurement with the connected spirometer. 168 patients recorded ≥1 oximetry. By 31-May-2023 109 patients had recorded home spirometry for ≥6 months. Patients provide spirometry on median of 73% (n=19) weeks and oximetry 69% (n=18) weeks. 130 patients provided response to a patient feedback questionnaire a sample response is shown in figure 1.



Abstract P238 Figure 1 Patient feedback response

Conclusion Home monitoring is acceptable for many patients as illustrated by the high engagement in their monitoring activity. A high proportion of patients reporting home spirometry find it easy or very easy to use. Further work is needed to assess how a home monitoring program best fits into delivery of care for ILD patients and this is being evaluated in this program.

Please refer to page A293 for declarations of interest related to this abstract.

P239 DELIVERING VIRTUAL RESPIRATORY TEACHING AT A NATIONAL SCALE FOR NON-SPECIALIST TRAINEES

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Introduction The COVID pandemic has shifted the emphasis of local teaching to move online for doctors in training. We worked alongside Health Education England, Royal College of Physicians, and Regional Training Programme Directors to deliver a structured programme of teaching for non-specialty trainees. We aimed to review whether this format could successfully deliver national respiratory teaching.

Methods We delivered annual sessions to Internal Medical Trainees and other non-specialty doctors across all UK deaneries in 2020, 2021 and 2022. The topics included NIV, Pulmonary Embolism, Tuberculosis and Pleural Disease. Teaching was delivered via Zoom using a standardised format incorporating guidelines, multiple-choice questions, chat interactions and post-session Q+A. We reviewed feedback to evaluate outcome measures.

Results We had 278 trainees attend in 2020, 339 attend in 2021 and 297 attend in 2022. In all three sessions over 98% of delegates would recommend the teaching to others. Following the 2022 session, 98.6% thought it ran smoothly, 90.2% thought the virtual teaching was as effective for learning as face-to-face (FTF) and 92.8% felt able to ask questions during the session. When directly comparing virtual to FTF, 72.7% preferred the virtual format, 90.7% found it was easier to access, 81.7% found it as interactive and 92.4% felt the quality of speaker was as good or better than FTF. Specific benefits included a reduction in cost, travel and time as well as the ability to watch the recording and increased comfort asking questions. Some drawbacks included difficulty obtaining study leave, reduced social interaction and concentration.

Conclusions We demonstrated that respiratory teaching can be successfully delivered nationally to non-specialty trainees. Feedback was overwhelmingly positive and supports the benefit to online teaching.

'The long and winding road' – Optimising patient experience of respiratory care

M1 DIRECT TO TEST: THE TREND TO CHEST CT SCANNING REQUESTS THROUGH PRIMARY CARE

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10.1136/thorax-2023-BTSabstracts.390

Background/Objectives Although the concept of 'direct to test' managing patients from primary care is not new, emphasis has been on improving cancer outcomes through earlier radiological detection; evidence on how General Practitioners (GPs) currently request chest CT (computer tomography) scans dealing with a broader range of diagnoses amid the backlog of referrals into secondary care in the post COVID-19 era, is anecdotal. This work (1) documents the uptake and nature of chest CT scans requested, (2) reports on appropriateness and standard of referrals, and (3) outlines subsequent findings.
Methods 12 month computer data collected retrospectively on all patients undergoing chest CT scans at this secondary care hospital; GP referrals were identified through practice codes.
Results 279/1230 (23%) of chest CT scans undertaken were requested through primary care; mean age of patients was 67.6 (SD 12.2, range 20–91) years with 48% males. Uptake/trend over the preceding 12 months are shown in figure 1, GP requests remaining low. All were HRCT (High Resolution CT) rather than staging CT used to stage lung cancer or CTPA (CT Pulmonary Angiograms) investigating pulmonary thrombo-embolic disease (PTE). 263 (94%) of requests were to establish a new finding and 16 (6%) as follow up assessing earlier detected pulmonary nodules; 178 (64%) of referrals were based on symptoms with a provisional diagnosis only proposed in 140 (50%). Referral standards adequately outlining clinical context was only found in 142 (51%) but referral pathway considered appropriate in 268 (96%) with the remainder probably best referred directly to cancer pathways. Findings included bronchiectasis (23%), emphysema (15%), interstitial (including occupational) lung disease (15%) and lung cancer (2%) but with inconclusive or no new radiological finding in 117 (42%).
Conclusions Approximately 23% of chest CT scans are currently being requested through primary care; although the type of CT and most referrals are appropriate, with most lung cancer and PTEs on alternate referral pathways, there remains concern where pulmonary nodules are being followed outside of a more dedicated protocol and clinic. Benefits to the patient, how GPs manage the high number of inconclusive results, and patterns of referrals to secondary care require further assessment.

M2 DIGITAL TECHNOLOGY IN RESPIRATORY PHYSIOTHERAPY: A DOUBLE EDGED SWORD. TRENDS IN DNA (DID NOT ATTEND) RATES FROM 544 RESPIRATORY PHYSIOTHERAPY APPOINTMENTS AT A TERTIARY CENTRE

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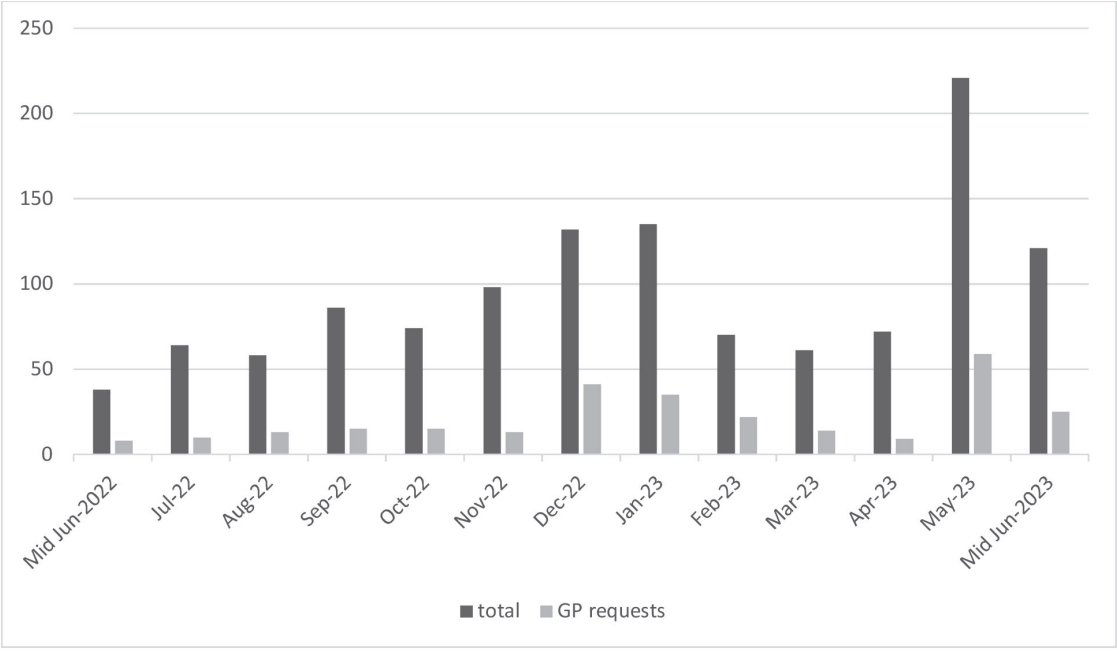
10.1136/thorax-2023-BTSabstracts.391

Introduction Reducing instances of Did Not Attend (DNA) is a key component of the NHS Elective care 2023/24 priorities and is highlighted as a key method of tackling the elective care backlog. Previous local service evaluations have found a high non-completion rate in people attending outpatient respiratory physiotherapy appointments. Recent innovations have been implemented including, addition of automated email reminders and advanced booking of appointments, several months in advance, A service evaluation of these measures



Abstract M1 Figure 1 Number of total versus GP requested chest CT scans

was completed to evaluate changes and to review DNA rates and the potential contributing variables.

Methods Retrospective data of appointments in April and May 2023 were collected. Data were pulled from Microsoft Bookings and kept on an Excel file on a secure network drive. Statistical analysis was completed using STATA software. Shapiro-Wilk testing was used to evaluate normality of data. Categorical data were analysed with Chi Squares and non-parametric continuous data were analysed with Whitney-Mann testing. Binary logistic regressions were used to obtain odds ratios.

Results 544 appointments were reviewed. 449 attended, 95 DNA's. E-mail reminders were significantly associated with increased likelihood of attending an appointment ($p<0.001$). Patients were 3.15 times more likely to attend an appointment if they had had an email reminder. Patients were significantly more likely to attend a face to face follow up than a virtual follow up ($p=0.003$). For all appointments there was no association with DNA rates and the type of appointment and for new patients specifically there was no association with mode of appointment (face to face or virtual) and how far in advance the appointment was booked.

Conclusion These findings correlate with previous studies demonstrating the effectiveness of automated reminders in reducing DNA rates. While digital advances in healthcare can provide benefits such as automation of reminders, these data demonstrate a need for caution in replacing face to face healthcare delivery with a virtual model. A flexible hybrid model may be optimal to enable delivery of elective healthcare while minimising DNA rates. Additionally, these data indicate that booking patient appointments off a waiting list for many weeks in advance does not increase risk of DNA.

Abstract M2 Table 1 A table to show the attendance and 'did not attend' rates in respiratory physiotherapy outpatients in April and May 2023 in different categories

Total appointments for April and May 2023						
	Attended		**DNA**		**P value**	
Number of appointments	449 (82.54%)		95 (17.46)			
NP	137		35		0.228	
FU	312		60			
F2F	272		49		0.097	
Virtual	176		46			
Email	414		75		0.000*	
No Email	35		20			
BPD	248		53		0.131	
ACT	175		40			
DRA	13		1			
LACS	5		0			
EILO	7		0			
Number of days from appointment booking to appointment date	37 (28, 51)		37 (25, 55)		0.6133	
Comparing New Patient and Follow Up Appointments						
	New Patient			**Follow Up**		
	Attended	DNA	p-value	Attended	DNA	p-value
F2F	104	29	0.381	169	20	0.003*
Virtual	33	6		143	40	
Email	110	22	0.029*	304	53	0.001*
No Email	27	12		8	7	
BPD	53	17	0.408	195	36	0.160
ACT	64	17		112	23	
DRA	13	1		0	0	
LACS	4	0		4	0	
EILO	3	0		2	1	
Number of days from appointment booking to appointment date	56 (46,60)	55 (51,63)	0.489	32 (25,41)	30.5 (22.5, 42)	0.512
Odds ratios						
	Email reminder		No Email reminder		P value	
Odds of attending appointment	5.52		1.75		0.000*	
	Virtual		F2F			
Odds of attended FU appointment	3.575		8.45		0.000*	

NP = New patient, FU = Follow up, F2F = face to face, BPD = Breathing pattern dysfunction, ACT = Airway clearance, DRA = drug response trial, LACS = Large airway collapse, EILO = Exercise induced laryngeal obstruction. X (y,z) = median (lower and upper percentiles)

M3 CLINICAL OUTCOMES OF AN INTEGRATED OBSTRUCTIVE LUNG DISEASE PROGRAM IN PAKISTAN

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10.1136/thorax-2023-BTSabstracts.392

Chronic Obstructive Pulmonary Disorder (COPD) and asthma have a high prevalence in Pakistan but are poorly diagnosed and managed. At Indus Hospital & Health Network (IHHN), Karachi, the Obstructive Lung Diseases (OLD) program was initiated in 2019 and expanded to six other IHHN primary care sites in Sindh and Punjab. Lung Health specialist nurses (LHNs) work with family physicians to diagnose and manage patients at risk of OLD according to international guidelines. We evaluated clinical outcomes of the OLD program from January 2019 to June 2023.

Hand-held spirometers were provided at seven sites sequentially. Local doctor and nurse were trained using bespoke e-modules and supported by pulmonologists and eventually a lead LHN. Patients with breathlessness were referred to LHNs for spirometry and counselling. Data collection included gender, FEV1, comorbidities, modified Medical Council Research (mMRC) scale, Asthma Control Test (ACT), COPD Assessment Test (CAT), GOLD staging, standardized inhaler technique score, and inhaler prescriptions were recorded (REDCap software). Excel and STATA were used for statistical analysis.

At all sites (figure 1), 7693 referrals were made to the OLD program; 88.4% had spirometry performed. Of 7614 records, 3511 (46.1%) were diagnosed with asthma (58.1% female). Comorbidities (17.9%) included hypertension (69%) and diabetes mellitus (32.8%). Median mMRC was 1 and poor disease control measured in 79% (ACT<19). Inhaled corticosteroids were prescribed to 53.1%. COPD was diagnosed in 1526 (20%, 80.2% male) referrals and 25.5% had comorbidities (hypertension 64.5%, diabetes mellitus 34.8%). FEV1 revealed 18.6% had mild (mean CAT 12.6), 37.3% moderate (CAT 13.8), 31.8% severe (CAT 14.9) and 12.3% very severe (CAT 15.3) disease (n=1165). The median mMRC was 1–2 in all groups. Inhaled corticosteroids were prescribed to 58.2% of GOLD stages A and B; and 39.9% of stages C and D. Inhaler technique, assessed in 3496 (90.5%) prescriptions, revealed poor scores in 48.9% (moderate 24.7%, good 26.4%).

The OLD program, through capacity-building, has provided access to lung health services in low- and middle-income groups throughout Pakistan. Asthma is the predominant OLD. Patient follow-up will be integrated into the program to continue improving care.

M4 CENTRAL LONDON OUTREACH ILD TRANSPLANT CLINIC EXPERIENCE

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10.1136/thorax-2023-BTSabstracts.393

Introduction Interstitial lung disease (ILD)may result in progressive fibrosis and respiratory failure. Historically, ILD patients have been disadvantaged for lung transplantation due to associated comorbidities, unpredictability of disease progression making timing of referral difficult. Additionally, there may be mismatch between the small chest cavity of the recipient and the generally larger size of donor lungs, often from fit young individuals. It is essential to time transplant referrals and manage patients and family expectations. To address these challenges, we established an outreach clinic within a Central London, national referral Centre for ILD to introduce the Royal Papworth transplant team early in the patients' disease course.

Methods A retrospective cohort analysis of all patients reviewed in the ILD/transplant outreach clinic between 2013–2023 was conducted. Data were collected from electronic clinical records.

Results During this period, 105 patients were reviewed, of which 87 had a diagnosis of ILD. The breakdown of ILD diagnoses was as follows: 34.4% IPF, 14.9% NSIP/OP, 11.5% HP, 10.3% autoimmune ILD, 6.9% sarcoid, UIP 9.2%, other 8.0%, mixed differential or undifferentiated 5.0% (figure 1).

Figure 1: OLD sites in Pakistan (June 2023)

1. QF, NST & SNP Campus, Lahore
2. Gurmani Primary Care Clinic, Multan
3. Recep Tayib Erdogan Hospital, Muzaffargarh
4. Al-Ghazi Trust Campus, Bhong, Rahim Yar Khan
5. Tharparkar Foundation Hospital, Islamkot
6. The Indus Hospital, Korangi Campus, Karachi
7. Martin Dow-IHHN Community Health Center, Baba Island

Abstract M3 Figure 1 OLD sites in Pakistan (June 2023)

The median age of ILD patients was 58 yrs (range 26 – 73), with most patients being of white British ethnicity (46.0%) and 12.6% South Asian. The median number of days from first respiratory clinic review to transplant assessment was 500 days (range 3 – 5623 days). The longest referral period was for sarcoidosis. The median predicted FVC at referral was 56%, and TLCO, 40.5%. Of the 87 ILD patients reviewed, 55 were taken forward for transplant assessment, with 8 patients (14.5%) undergoing successful transplant. Collectively, the outreach clinic not only allowed patients to be introduced to transplantation in familiar surroundings but additionallysaved 164 miles of travel as patients were seen closer to home.

Abstract M4 Table 1 Summary of patient characteristics in ILD/ transplant outreach clinic

Types of Interstitial Lung Diseases (ILD)	Number
Autoimmune	9
- Anti- synthetase	3
- Interstitial pneumonia with autoimmune features (IPAF)	2
- Rheumatoid arthritis associated ILD (RA- ILD)	1
- Systemic lupus erythematosus (SLE)	1
- SSc-ILD	1
- Undifferentiated connective tissue disease (CTD)	1
HP	10
IPF	30
NSIP, NSIP/OP	13
Other ILD	7
- GVHD	4
- LAM	2
- Post-ARDS	1
Mixed differential	3
Sarcoid	6
UIP	8
Undifferentiated	1
Total	**87**
Age at referral	56.9 (average)
	58 (median)
	26 – 73 (range)
Ethnicity	
white irish	4
white british	40
mixed heritage	2
Black carribean	4
Black African	4
Asian pakistani/indian/bangladeshi	11
Other white	6
Other	1
black other	1
Other asian	6
unknown	7
Chinese	1
	59% (average)
FVC% at referral	56% (median)
TLCO at referral	40.50% (median)
	771 days (average)
	500 days (median)
	3 to 5623 (range)
Days from first respiratory clinic to outreach transplant review	
Outreach ILD/transplant assessment	**N**
Number of patients not taken forward for transplant assessment	28
Died before ILD/transplant outreach review	1
Awaiting outreach review	3
No data	3
Number of patients taken forward for transplant assessment	52
Outcomes:	
Too well/early	7
Transplanted	8
Advised to lose weight	4
awaiting assessment	6
died before review or on transplant list	5
Patient refused	6
Rejected for transplant	10
Remain under review	4
On active transplant list	1
Discharged from transplant list	1
Transplanted patients	8
Age	60.25 (average)
Ethnicity	
- White British	5
- Asian Indian	1
- Other ethnicity	2
Diagnosis	
- IPF	4
- NSIP/OP	1
- HP	2
- UIP	1

Conclusion Our outreach clinic facilitated an improved patient journey to transplant assessments with the main respiratory provider on hand to support and facilitate decisions. Furthermore, given the physical vulnerability of these patients an outreach approach also limits unnecessary exposures and clinic journeys as informed decisions are made earlier with appropriate expertise.

M5 IS IT POSSIBLE TO PREDICT NINTEDANIB TOLERANCE IN PATIENTS WITH PROGRESSIVE FIBROTIC INTERSTITIAL LUNG DISEASES (PF-ILD)? EXPERIENCE FROM A UK TERTIARY ILD CENTRE

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10.1136/thorax-2023-BTSabstracts.394

Since February 2022, patients at Leeds Teaching Hospitals with PF-ILD have been offered treatment with Nintedanib. We aimed to identify characteristics that may predict Nintedanib tolerance in this cohort.

We performed a retrospective review of all patients prescribed Nintedanib for PF-ILD as per INBUILD criteria. We included patients who initiated Nintedanib between March 2022 and March 2023, using our Trust's electronic patient record. We categorised patients into 'Nintedanib Continued' (including patients who paused then restarted Nintedanib) and 'Nintedanib Discontinued'. We used students T-test, Mann Whitney U rank testing and Chi Square or Fishers Exact test as appropriate for group comparisons. Multivariate regression analysis was performed to identify independent characteristics associated with stopping Nintedanib.

Abstract M5 Table 1

	Nintedanib Stopped	Nintedanib Continued	P value
Patients n	56	88	
Age (years)	69.84 (±11.16)	67.49 (±12.39)	0.203
Time taking Nintedanib (months)	4.83 (±4.45)	6.49 (±5.08)	**0.012**
FVC% predicted	65.14 (±16.91)	68.87 (±18.46)	0.175
TLCO% predicted	45.21 (±12.77)	46.59 (±14.18)	0.762
BMI	26.02 (±5.65)	29.03 (±6.68)	**0.007**
Oral steroids	22 (39.3%)	34 (38.6%)	1.000
Other additional immunosuppression	20 (35.7%)	35 (39.8%)	0.725
Domiciliary oxygen	29 (51.8%)	46 (52.3%)	1.000
UIP pattern fibrosis	16 (28.6%)	13 (14.8%)	0.056

Values are mean ± SD or n (%). FVC forced vital capacity. TLCO transfer factor of lung carbon monoxide. BMI body mass index. Additional immunosuppression included (not limited to) mycophenolate, azathioprine, methotrexate, hydroxychloroquine. UIP pattern includes definite or probable UIP

We identified 144 patients who met inclusion criteria. Common diagnoses were unclassifiable fibrosis (25.0%), hypersensitivity pneumonitis (21.8%), rheumatoid arthritis ILD (16.7%), and idiopathic non-specific interstitial pneumonia (14.7%).

56 (38.9%) patients permanently discontinued Nintedanib within the study period. Overall reasons for discontinuation included drug intolerability (55.4%), death (26.8%), and deranged liver function (14.3%). 28 (50%) patients stopped Nintedanib within 3 months of initiation. Mean duration of Nintedanib use was 4.83 months in the 'Nintedanib Stopped' group and 6.49 months in the 'Nintedanib Continued' group during the study period. Results of group comparisons are shown in figure 1.

There was a significant difference in BMI at treatment onset between the groups, with lower BMI associated with stopping Nintedanib. There was a borderline significant difference in the presence of UIP pattern fibrosis between the groups. No other significant differences were detected. Logistic regression analysis identified lower BMI (regression co-efficient -0.84 p= 0.020) at treatment onset to be independently associated with stopping Nintedanib, with no other independently associated variables. Sensitivity power analysis suggested our sample size was adequate to identify moderate effect sizes. Although patients in this study share a similar progressive fibrotic phenotype, they are a heterogenous group incorporating a large range of ages, lung function, and duration of Nintedanib use. They also have a high incidence of domiciliary oxygen and additional mediation use. In our cohort, only lower BMI was independently associated with stopping Nintedanib.

M6 CRITICALLY EXAMINING THE END OF LIFE CARE OF PEOPLE WITH INTERSTITIAL LUNG DISEASE: VIEWS OF PATIENTS, FAMILIES AND HEALTHCARE PROFESSIONALS

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10.1136/thorax-2023-BTSabstracts.395

Background Interstitial lung diseases (ILDs) are a heterogeneous group of conditions causing inflammation and fibrosis of the lung parenchyma. Progressive fibrotic ILD is characterised by the development of irreversible lung fibrosis, causing progressive respiratory failure, which is associated with a poor prognosis.

People with ILD experience a high symptom burden and many experience poorly controlled symptoms at the end-of-life. There is a paucity of research considering the end of life experience of people with ILD.

Aims This research study aimed to explore the experience of end of life for people with ILD and examine potential barriers to accessing palliative care services.

Methods Semi-structured interviews were conducted with people with ILD (n=9), bereaved relatives (n=9) and healthcare professionals (n=12). Constructivist grounded theory methodology was employed for data collection and analysis.

Findings Four overarching categories were constructed from the research data: i) acknowledging uncertainty, ii) accessing and organising support, iii) avoiding discussion about an uncertain future, iv) accelerating symptoms at the end of life.

Rapid deterioration of symptoms at the end of life influenced symptom control, presence of family and location of death. People with ILD prioritised a peaceful death over the location of death; central to this concept were well-controlled symptoms and that death was anticipated.

Patient associated barriers preventing access to specialist palliative care services included prognostic uncertainty, misconceptions about the role of palliative care and avoiding advance care planning conversations. Healthcare professional related barriers included prognostic uncertainty, time limitations, remote consultations, prioritisation of malignant disease, geographical disparity and scarce community palliative care resources.

Conclusions These findings highlight the requirement for increased explanation of prognostic uncertainty and acknowledgement that symptoms may deteriorate rapidly, meaning that end of life plans should focus on ensuring a peaceful death rather than on location of death.

Please refer to page A293 for declarations of interest related to this abstract.

M7 IMPROVING THE USE OF TREATMENT ESCALATION PLANS IN THE CARE OF RESPIRATORY INPATIENTS IN A LARGE TERTIARY CENTRE

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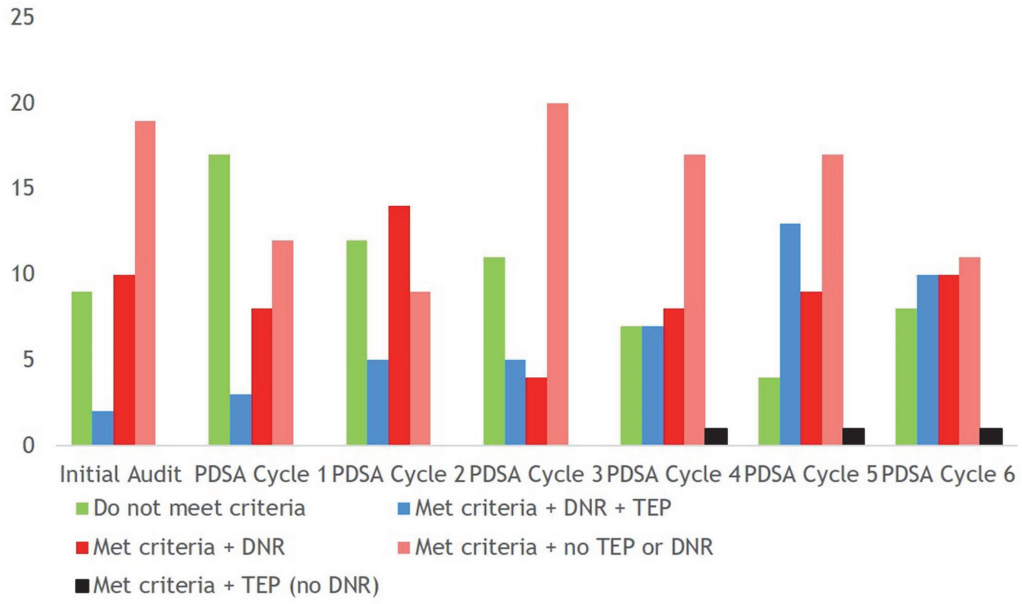
10.1136/thorax-2023-BTSabstracts.396

Introduction and Objectives A Treatment Escalation Plan (TEP) is a communication tool designed to improve quality of care for the deteriorating inpatient. TEPs aim to reduce variation caused by discontinuity of care, avoid harm from inappropriate treatment and promote patients' priorities and preferences.

Despite evidence in favour of TEP use and regular morbidity and mortality (M&M) data demonstrating the case for TEPs in our 112-bedded respiratory unit, engagement with treatment escalation planning was consistently low. Our goal was to increase clinician confidence in using TEP forms and create a culture where TEP is a normalised part of the respiratory patient pathway, improving quality of care.



Abstract M7 Figure 1

Methods We implemented a series of educational interventions at departmental and directorate level and made TEPs more visible/accessible on the respiratory unit. We also recruited ward managers, nurse specialists and junior clinical staff as 'TEP Reps' to regularly advocate for TEP use.

PDSA cycles were carried out with monthly re-audit of TEP use following each intervention.

Results Consistent improvement in TEP use was demonstrated across the respiratory unit (see figure 1). Baseline data December 2022 showed that, of those meeting criteria for consideration of TEP (as outlined on the healthboard TEP proforma) only 6% of patients had documented TEPs. By the end of PDSA cycle 5 in May 2023 this improved to 39%, sustained at 34% at 6 months. Qualitative data suggests a growing TEP culture amongst clinicians with increased awareness of TEP forms and confidence in OOH care delivery. Qualitative data about patient experiences of TEP conversations is awaited. M&M data review showed that TEP use in the deceased respiratory inpatient population had increased from 25% December 2022 to 32% March 2023 (M&M data July 2023 awaited).

Conclusion We have demonstrated that TEPs can be incorporated into respiratory inpatient care, improving clinician confidence in management of the deteriorating respiratory patient.

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M8 THE ROLE OF SOCIETAL STIGMA IN ENGAGEMENT WITH PHYSICAL ACTIVITY FOR PEOPLE LIVING WITH A LUNG CONDITION

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10.1136/thorax-2023-BTSabstracts.397

Introduction and Objectives Asthma + Lung UK carried out a survey into the experiences of people living with lung conditions. The findings included insights into how disability discrimination can affect life with a lung condition, from socialising to career opportunities and, of particular note to the medical community, people's relationship with physical activity.

Methods The survey was conducted by Asthma + Lung UK from January to March 2023. We received 14,460 responses, of which 12,740 provided free-text responses. 20% of these were randomly selected for thematic analysis. Inductive coding was used to develop codes iteratively, and then grouped into themes and subthemes.

Results We asked 'what is the one thing you would like everyone to know about living with a lung condition?'. Among the themes was the importance of regular physical activity.

Respondents mentioned both positive and negative perspectives on physical activity, either expressing freedom to exercise within their limitations, or frustration with not being able to do more.

Frustration appeared linked to respondents' perceptions of their own abilities, with those expressing negative perspectives often describing exercise as 'difficult' or that they 'can't exercise'.

We also asked respondents about experiences of discrimination due to their lung condition. Response themes included dismissive attitudes towards lung conditions, breathlessness not being taken seriously, and stigma around weight and fitness levels.

These themes were echoed in the negative perspectives on physical activity. For example, comments such as 'I am not lazy, my lung condition makes it difficult for me to exercise or rush around' reflect a self-consciousness of the judgement of others not seen in the positive perspectives.

Conclusions We found indications that experiences of stigma may be a limiting factor in engaging with physical activity. We suspect that an individual's' experience of societal stigma may increase the salience of the limitations of living with a lung

condition, lowering their perception of their ability to exercise.

Under the B=MAP model, levels of motivation and perception of ability combine to influence behaviour. Behaviour change interventions commonly focus on increasing motivation. These findings may point to opportunities to encourage physical activity by addressing perceived ability.

M9 IMPORTANCE OF PATIENT VOICE IN GUIDING THE MANAGEMENT OF COPD

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10.1136/thorax-2023-BTSabstracts.398

Introduction and objectives Patient-healthcare professional (HCP) communication is central to optimising chronic obstructive pulmonary disease (COPD) management, yet influencing factors are poorly understood. The objective of this study is to gain patient insights around treatment awareness and preferences, sources of education on COPD management, and factors influencing shared decision-making in COPD management.

Methods Qualitative insight data from Europe, US, Brazil, China and Japan were collected in 2021 from 1) 2966 interactions between HCPs and a pharmaceutical company (including feedback on unmet medical needs, treatment pathways and disease burden); 2) 988 social media posts from patients/caregivers across both specialist and non-specialist platforms; and 3) an independent market research survey (33 patients, 11 caregivers). Informed consent was obtained. Data were anonymised, collated, and categorised using key words to identify common themes.

Results Lack of disease awareness/restrictions in accessing services may delay diagnosis. Once diagnosed, most individuals reported seeing their HCP every 6 months and feeling empowered to ask questions. They also report using non-specialist and specialist social media sites (400+) to access information on treatment options. HCP-reported information highlight patients seek additional sources of accurate information including from patient testimonials. Key findings and insights are listed in table 1.

Conclusions Improved patient/HCP education and communication can lead to greater patient empowerment and shared decision-making.

Please refer to page A293 for declarations of interest related to this abstract.

M10 CHALLENGES OF PATIENT ENGAGEMENT TO A COPD VIRTUAL WARD, FOLLOWING AN ADMISSION FOR AN ACUTE EXACERBATION OF COPD

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10.1136/thorax-2023-BTSabstracts.399

Background Following the COVID pandemic, virtual wards (VW) are increasingly being offered. An integrated COPD nursing team (inpatient and community) devised a patient pathway aiming to improve discharge care post-acute exacerbation of COPD (AECOPD), with an agreed selection criteria. The COPD VW monitored patients two weeks post discharge, following NHS England guidance (2022). However, there was a cohort who declined the VW, or who were deemed clinically unsuitable.

Aim To understand the reasons why some patients admitted with an AECOPD were not suitable for/declined discharge to a VW.

Methods Referral records to the COPD VW, following an admission AECOPD between Jan 2023-April 2023, were reviewed. Reasons for declining/assessment of clinical unsuitability were collected. All inpatient COPD nurses had previous experience of running a COVID VW.

Results The inpatient COPD nursing team identified 438 patients who met the criteria for the integrated COPD VW. 100 patients were suitable, and were admitted with consent. 338 patients (77.2%) were not admitted to the VW. Of these, 42 (12.4%) patients readmitted; 36 (10.6%) died. There was a mean frailty score of 5, with a mean of 3 comorbidities.

Of those not admitted, 192 (56.8%) patients declined; 74 (21.9%) were deemed as clinically unsuitable. 72 patients (21.3%) were not reviewed as an inpatient.

The reasons for declining the COPD VW were cited as;

1. Patient does not want to (89, 26.3%)
2. No experience with technology (103, 30.5%)

Abstract M9 Table 1 Factors influencing patient-HCP communication and shared decision making

Diagnosis and treatment challenges	Patient understanding and awareness	Patient treatment preference considerations	Treatment considerations in decision-making
Delay in seeking medical advice (~3 months to 1-year post-symptom onset)	Lack of disease awareness and risks (e.g. mortality risk)	Dosage: two vs one treatment dose (due to psychological element and habit)	Costs and ease of access to treatments
Seek advice when symptoms impact daily life (sleep, finances, employment, etc)	Lack of understanding why a combined treatment may be better than separate treatments	Bitter after-taste of treatment	Ease of use and convenience to aid treatment adherence
Restricted access to HCPs (COVID-19)	Patients compare treatment experience and seek support/advice on treatment options via social media/patient advocacy groups	Concerns of treatment side effects	Patient preferences
Perceived under-estimation of symptom impact by HCPs		Treatment efficacy/onset of action	
Lack of confidence in HCP diagnosis/ treatment decisions		Treatment education (e.g. device training)	

COVID-19, coronavirus disease 2019; HCP, healthcare professional

The reasons for clinical unsuitability were assessed as;

1. Too frail (22, 6.5%)
2. Anxiety/mental health (9, 2.7%)

1. Excluded by community nursing team (10, 3.0%)
2. Cognitive impairment (3, 0.9%)
3. Non-concordance (6, 1.8%)
4. On telehealth (11, 3.3%)
5. Other reasons (13, 3.7%)

Conclusion The inpatient COPD nursing team identified 438 suitable patients for the COPD VW. 100 (22.8%) patients were admitted. However, the majority of patients (60.7%) were either unsuitable, or unwilling to engage with the technology. A greater understanding of patients' unwillingness to participate is required to extend the reach of VW.

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M11 A SCOPING REVIEW EXPLORING ADOPTION OF DIGITAL STRESS MANAGEMENT RESOURCES FOR LONG-TERM HEALTH CONDITIONS – JUST USEFUL FOR RESPIRATORY CONDITIONS?

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10.1136/thorax-2023-BTSabstracts.400

Background Digital technologies offer the potential for patients with long-term health conditions to access interventions that can support condition self-management and enhance overall quality of life. Anxiety and depression are common in long term health conditions (COPD, asthma, Long-COVID, stroke, Parkinsons etc), and little is known about the adoption of digital technologies for anxiety management in these populations. This review consolidates the published literature exploring existing studies about the adoption of digital stress management resources.

Methods A five-step scoping review framework, utilising 7 bibliographic databases including CINHAL, MEDLINE and PsychInfo was undertaking. All relevant English language publications reporting on the adoption of digital anxiety resources among patients with the specified long-term health problems, published between 2012–2023 were eligible for inclusion.

Results Six articles were included, four of the studies were primary research studies using experimental and/or mixed methods designs; 2 were systematic reviews. The target study population in the studies were individuals diagnosed with COPD (n=3), mixed cohorts of long-term physical conditions such as asthma and long-term respiratory illness (n=2) and stroke (n=1). The digital technologies were primarily used to monitor anxiety levels and deliver cognitive behavioral therapy-based interventions. The delivery of which were guided by health professionals and mediated through telephone, videoconference, IoT, web-based platforms, emails and mobile texts. Two studies evaluated the acceptability of digital interventions; four studies assessed their usability.

Conclusions The literature found highlighted the use of apps for anxiety in predominately respiratory populations who experience high levels of anxiety and depression. Whilst usability of the digital anxiety management resources among the target population was high, acceptability and perceived effectiveness of the digital interventions in reducing anxiety was not.

Healthcare professionals and researchers must consider the acceptability of these interventions as a core construct when developing or delivering digital interventions in clinical practices. In the absence of user acceptability, perceived effectiveness will remain low. Co-production of digital resources is imperative if they are to be fully embraced as a useful adjunct to anxiety self-management in long-term conditions.

Please refer to page A293 for declarations of interest related to this abstract.

M12 ROTATING THROUGH RESPIRATORY MEDICINE – WHAT CAN WE DO TO IMPROVE EFFICIENCY, PERFORMANCE, AND CONFIDENCE?

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10.1136/thorax-2023-BTSabstracts.401

Rotating into a new department is a daunting experience for many doctors. A high-quality induction aims to relieve anxiety and create a safe changeover. An independent research piece commissioned by the General Medical Council investigated issues surrounding induction. It concluded that doctors would like a tailored induction, created by those who understand the role.

Our aim was to produce and deliver a tailored induction into respiratory medicine at a district general hospital.

From August'22 to June'23, 3 groups rotated through respiratory medicine. Group 1 received no induction, group 2 lectures and group 3 both lectures and a detailed respiratory handbook, encompassing key respiratory procedures, prescribing and referring to respiratory subspecialities.

Each group completed a questionnaire pre and post rotation which self-assessed their confidence (not confident at all, slightly confident, somewhat confident, fairly confident, completely confident) and capability (yes, no) in carrying out various respiratory tasks. 22 questionnaires were completed.

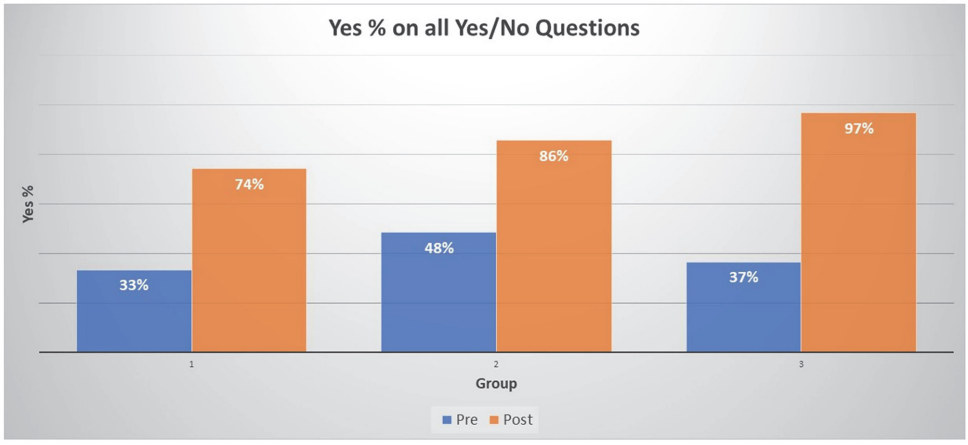
Group 1 had the lowest initial confidence levels; with 50% of foundation year 1 doctors 'not confident at all'.

Overall, post placement performance in all topics was better in Group 3; with 97% in the 'yes' category, whilst group 1 was 74% and group 2 86% (figure 1).

Significant enhancements post placement were observed in prescribing and monitoring aminophylline and theophylline, 25% 'yes' in group 1, 71% group 2 and 100% group 3. For administering intrapleural enzymes, 50% of group 1 were 'somewhat confident' post rotation, compared to Group 3 which saw the biggest improvement, with 57% 'completely confident'.

88% of group 1 and 2, and 71% of group 3 were 'not confident at all' with chest drain management. This improved across all groups but most significantly in group 3, rising to 'fairly confident' in 71%. A substantial improvement post rotation in knowledge of clinic and list schedules occurred; with 38% 'yes' in group 1, 43% group 2 and 100% group 3.

The study clearly demonstrates the positive impact of a comprehensive induction amongst doctors, with higher levels



Abstract M12 Figure 1 Performance amongst doctors of various grades on all 'yes' 'no' questions pre and post placement

of confidence and capability in various aspects of respiratory care.

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'Against all odds' – Fight for the future of asthma

M13

ACCURATE DIAGNOSIS OF ASTHMA USING EITHER SINGLE OR LONGITUDINAL BREATH RECORDS CAPTURED ON A NOVEL FAST RESPONSE CAPNOMETER

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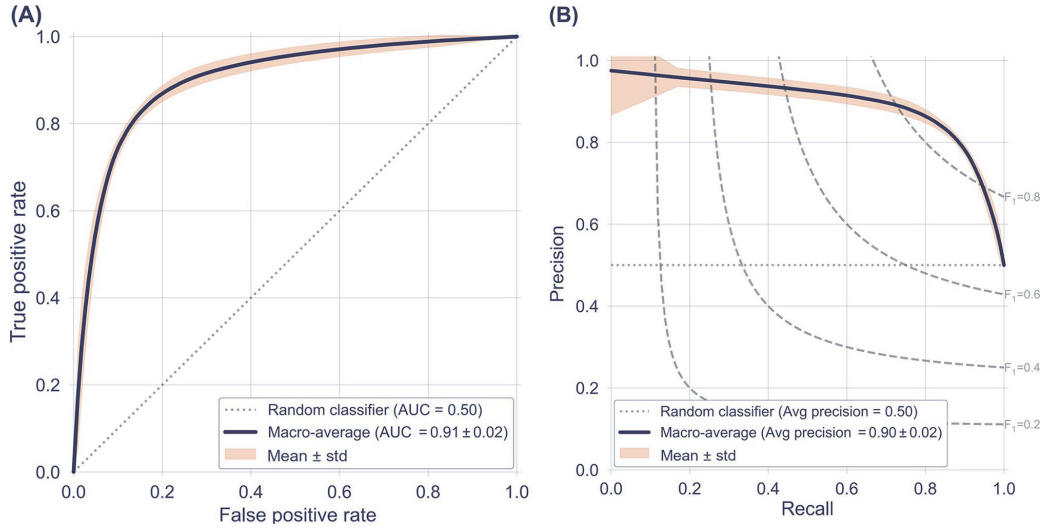
10.1136/thorax-2023-BTSabstracts.402

Introduction The diagnosis of asthma can be challenging and often requires multiple diagnostic tests and forced expiratory manoeuvres, such as spirometry with reversibility testing or regular peak flow measurements in order to capture variable airflow obstruction.

Objective To assess the performance of a diagnostic model in its classification of participants with and without asthma, built using interpretable data processing and machine learning techniques applied to a dataset of CO2 breath records (75 seconds of tidal breathing), captured on TidalSense's N-Tidal™ handheld capnometer.

Methods Participant records were drawn from 4 clinical studies (GBRS, ABRS, CBRS, CBRS2). This pooled dataset included participants recruited from primary and secondary care. Two XGBoost models were trained and validated on 82 features derived from the high-resolution CO2 data of 146 asthmatic and 133 non-asthmatic participants (which included healthy volunteers, those with COPD, bronchiectasis, pulmonary fibrosis, heart failure, anaemia, and other cardiorespiratory conditions).

The model used breath waveform features from a single breath record. The model was trained using 117 asthmatic,



Abstract M13 Figure 1 Performance of the diagnostic classifier summarised in an (A) ROC curve and a (B) Precision-recall curve

and 106 non-asthmatic participants and performance metrics were generated from an unseen validation set of 29 asthmatic, and 27 non-asthmatic participants. This was repeated 20 times with different validation participants for additional statistical power, and the average and variability of these metrics were recorded.

Results The classification model achieved AUROC of 0.908 ± 0.016, sensitivity of 0.800 ± 0.043, specificity of 0.883 ± 0.012, positive predictive value (PPV) of 0.873 ± 0.010, and negative predictive value (NPV) of 0.817 ± 0.031 in detecting asthma from a single breath record.

Conclusion TidalSense's N-TidalTM capnometer and machine learning classifier could be used as an accurate, rapid, point-of-care diagnostic test for asthma, particularly in primary care. Future work will incorporate longitudinal capnography data into a diagnostic classifier.

Please refer to page A293 for declarations of interest related to this abstract.

M14 SCREENING TOOLS FOR WORK-RELATED ASTHMA AND THEIR DIAGNOSTIC ACCURACY: A SYSTEMATIC REVIEW

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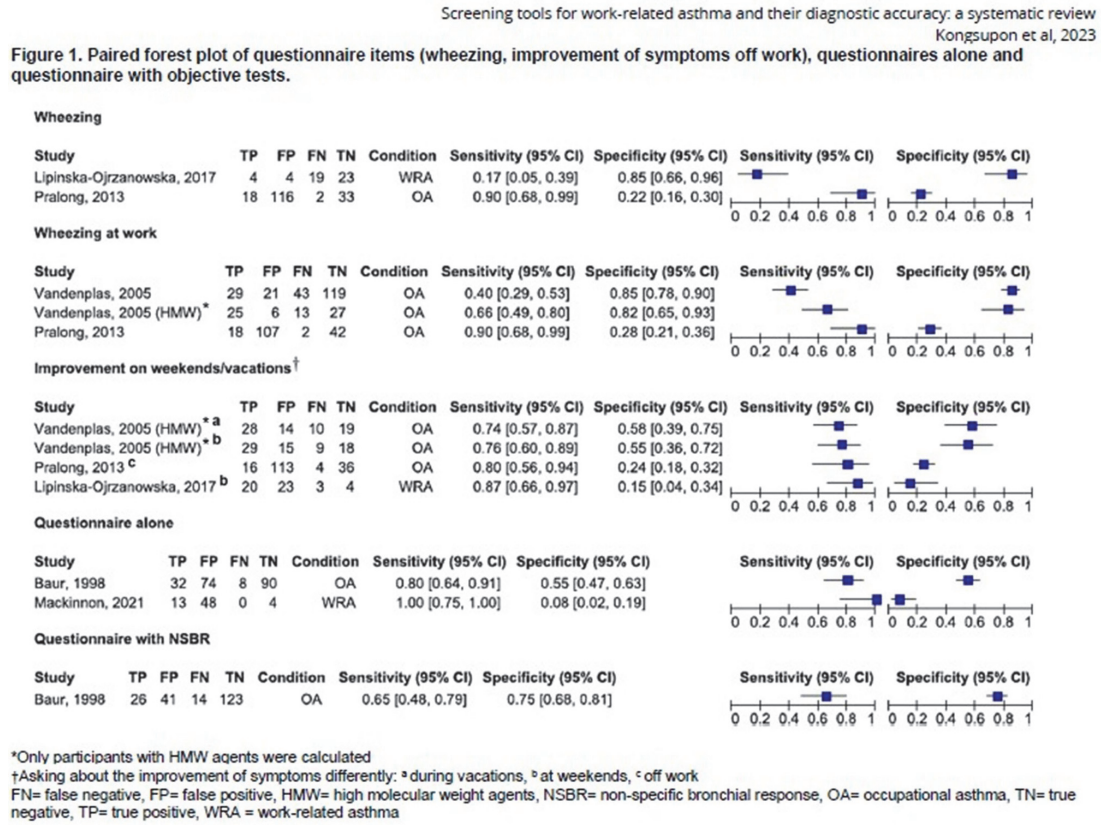
10.1136/thorax-2023-BTSabstracts.403

Introduction One in four cases of asthma in adults are caused or worsened by work (work-related asthma: WRA). Early detection of WRA could prevent poor health and employment outcomes, but WRA is often missed, or diagnosis delayed. Standardised screening tools and their effectiveness in practice are not well established. We aim to summarise and compare the performance of screening tools for identifying WRA in both clinical settings and workplaces.

Methods We searched for articles using structured questionnaires or prediction models (that may also include physiological tests) to identify WRA in clinical settings or workplaces, in MEDLINE, EMBASE, other bibliographic databases and grey literature between 1975–2021. Studies were screened independently by two reviewers using predetermined criteria, also with data extraction. Quality was assessed using QUADAS-2 and/or PROBAST tools. Screening tools and their indices of accuracy were summarised with paired forest plots of sensitivities and specificities.

Results Of 17,006 articles identified by the search, 6 studies were included following full-text review. Four studies focused on occupational asthma and two on WRA. All comprised tertiary hospital (n=4) and specialist centre (n=2) populations. The screening tools used were questionnaires alone (asking about generally respiratory symptoms and their relation to work, n=5), questionnaire with methacholine challenge test (n=1) and diagnostic models (n=3). Three studies using questionnaires alone reported only the performances of each individual questionnaire items (e.g. wheezing, wheezing at work). The item 'improvement of symptoms on weekends/vacations' showed 74–87% sensitivity



Abstract M14 Figure 1 Paired forest plot of questionnaire items (wheezing, improvement of symptoms off work), questionnaires alone and questionnaire with objective tests

and 15–58% specificity. Another two studies using questionnaires alone had 80–100% sensitivity and 8–55% specificity. Addition of methacholine challenge test in one questionnaire gave 65% sensitivity and 74% specificity. Diagnostic models which added extra variables (e.g. age, exposure duration, sensitization result) reported AUC 0.58–0.94. Forest plots for individual questionnaire items and questionnaires are shown in the figure 1.

Discussion Questionnaires alone give a high sensitivity but low specificity for WRA, which could be sufficient for purposes of screening. Adding demographic variables and objective tests can improve specificity. However, studies on screening tools for WRA are few and inadequately reported; further evaluations of performance are needed, especially in general populations and workplaces.

M15 QUANTIFICATION OF CLINICAL DETERIORATION OF ASTHMA BASED ON THRESHOLD FOR SABA USE IN TWO STUDIES OF THE DIGIHALER SYSTEM

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10.1136/thorax-2023-BTSabstracts.404

Background In two studies of the Digihaler System (DS), patients with suboptimally controlled asthma used an albuterol inhaler with an integrated sensor that objectively recorded real-time reliever use.

US asthma experts, through a modified Delphi process, developed clinical thresholds for reliever use which likely represent impending or ongoing asthma exacerbations.

Methods Two conservative clinical threshold rules ('≥25 episodes of reliever use in any 7-day period' or a '≥100% increase in weekly reliever use from patient baseline') were retrospectively applied to data from patients using the albuterol DS for ≥3 months in the CONNECT1 and CONNECT2 studies. A clinical deterioration episode was defined as ≥1 consecutive day(s) with ≥1 threshold met, separated by ≥7 days.

Aim To compare the number of threshold-defined clinical deterioration episodes with confirmed clinical exacerbations in CONNECT1 and CONNECT2 participants.

Results Across the 360 patients in both studies, 513 unrecognized deteriorations occurred whereas only 22 exacerbations were clinically confirmed (figure 1).

Conclusions Even using these very conservatively defined thresholds, a substantial incidence of unrecognized episodes of clinical deterioration was detected. Electronic monitoring of reliever use has clear potential to identify periods of clinical deterioration that would otherwise remain hidden, thereby supporting risk management.

Please refer to page A293 for declarations of interest related to this abstract.

M16 RECOGNIZING ASTHMA RISK SCENARIOS: INDIVIDUALIZED INHALER USAGE AND INHALATION PARAMETER PROFILES FROM AN ELECTRONIC INHALER WITH INTEGRATED SENSORS

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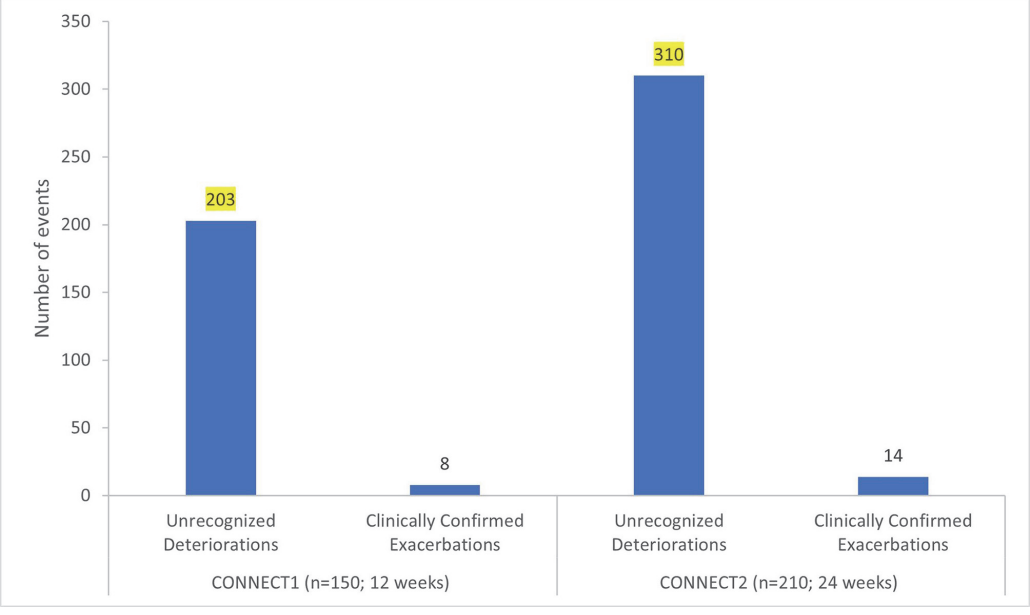
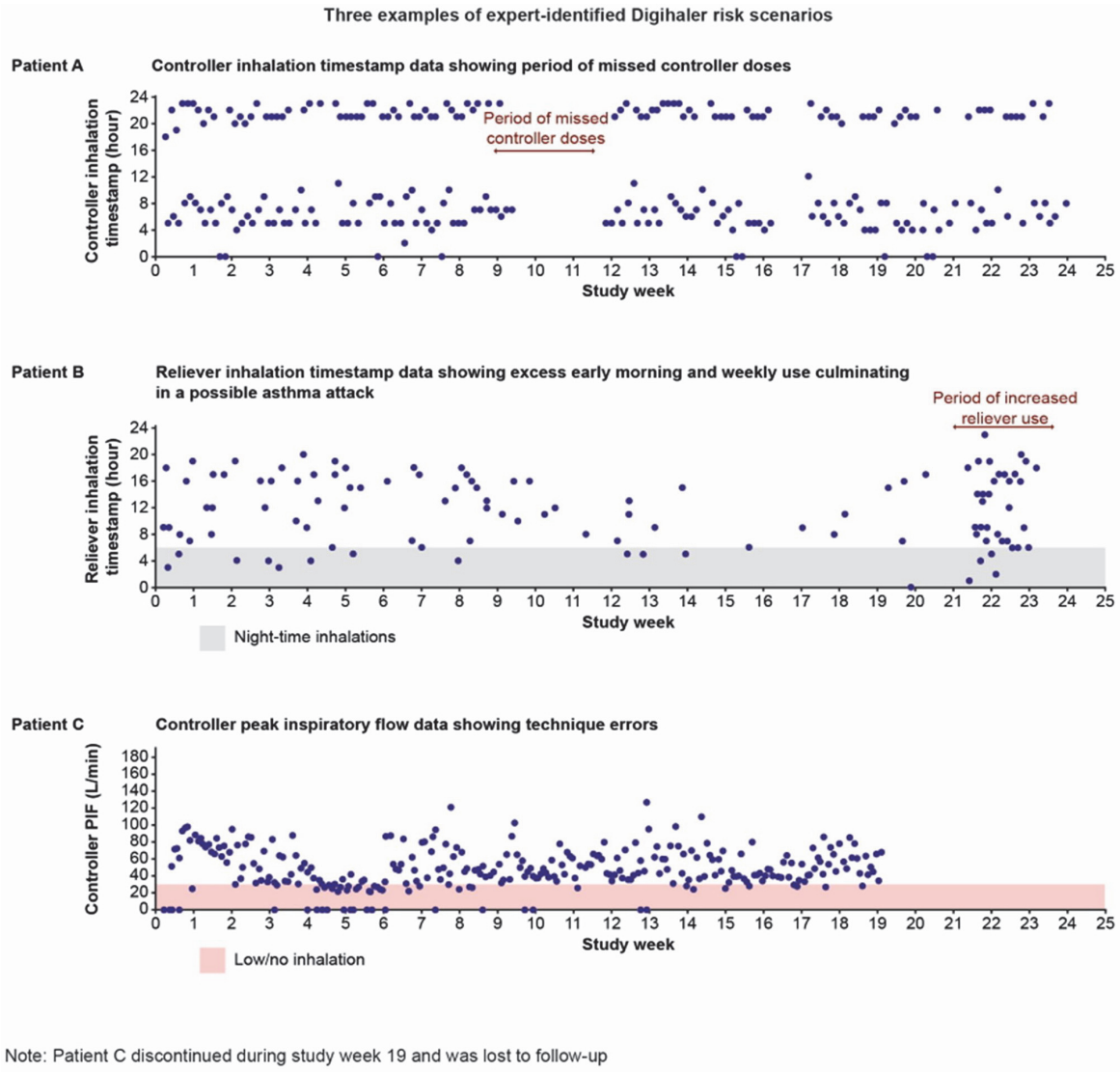
10.1136/thorax-2023-BTSabstracts.405

Rationale Suboptimal adherence, errors in inhaler technique, and reliever overuse are risk factors associated with poor asthma outcomes. The Digihaler® electronic inhaler provides objective data on usage and inhalation parameters that can be



Abstract M15 Figure 1



Abstract M16 Figure 1

accessed via a mobile App by the patient and via a web-based Dashboard by the clinician (together, the Digihaler System [DS]). In the CONNECT2 study (NCT04677959), participants aged ≥13 years with uncontrolled asthma used the fluticasone/salmeterol DS and albuterol DS for delivery of controller and reliever medication.

Aim To identify inhaler usage patterns and inhalation parameters reflecting high-risk asthma scenarios.

Methods Inhaler data from 210 CONNECT2 participants using the DS were profiled, analyzed descriptively and categorized based on expert-identified risk status.

Results Several expert-identified risk scenarios were identified, including missing controller doses, increasing reliever use, and inhaler technique errors (figure 1).

Conclusions Objective data from the DS offer opportunities to identify individual asthma patients with elevated risk of adverse asthma outcomes. Real-time identification of these high-risk patterns may allow clinicians and patients to intervene early and prevent future asthma exacerbations.

Please refer to page A294 for declarations of interest related to this abstract.

M17 PATIENT ENGAGEMENT WITH ADHERENCE TECHNOLOGY: LEARNINGS FROM THE 'FINANCIAL INCENTIVES TO IMPROVE ASTHMA' (FINA) STUDY

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10.1136/thorax-2023-BTSabstracts.406

Background Digital interventions are acceptable and often effective for improving short-term medication adherence for children and young people (CYP) with asthma. Interventions using electronic monitoring devices (EMDs) can be supported by behaviour change techniques such as reminders and financial incentives. Most digital interventions require patient engagement; however, it is important to understand how patients engage to maximise effectiveness. As part of the feasibility assessment of the FINA study, a pilot RCT of a digital financial incentives intervention, patient engagement with EMDs and smartphone app was explored.

Methods During the FINA study, CYP (aged 11–17 years old) with asthma monitored their adherence for 24-weeks using an EMD. Participants randomised to financial incentives

intervention viewed their adherence (table and bar-graph) and their reward progress (totaliser, traffic-light calendar, and weekly notifications) through a smartphone app. Financial reward was delivered regularly (at 4-, 8- and 12-weeks) and relied upon real-time data; participants were advised to sync their EMD and app daily. Control group viewed their sensor syncing history only and were advised to sync their EMD and app weekly. All participants were requested to promptly report any problems to the research team. Patient engagement was explored using syncing data, technical issue reporting and research team involvement.

Results 32 participants are enrolled in on-going trial (intervention, n=16); 84% have completed first 12-weeks. Technical problems were experienced by 13/16 intervention and 8/16 control participants; 12 of whom did not report these until research visit 2 (12-weeks, post-intervention). 7/16 intervention participants did not sync their EMD and app as advised and were reminded by research team at least once ahead of reward delivery; 1 participant only synced once throughout intervention. 14/16 control participants did not sync weekly.

Discussion Limited patient engagement with digital technology throughout this study impacted the potential for intervention efficacy; participants who were not regularly syncing regularly may not have effectively monitored their adherence/reward progress. Research team involvement was greater than anticipated. CYP focus groups will enable exploration of reasons for digital engagement/non-engagement.

Please refer to page A294 for declarations of interest related to this abstract.

M18 ASSESSING ICS RESPONSIVENESS IN SEVERE ASTHMA USING BDP/FORMOTEROL NEXTHALER™ DOSE-COUNTING

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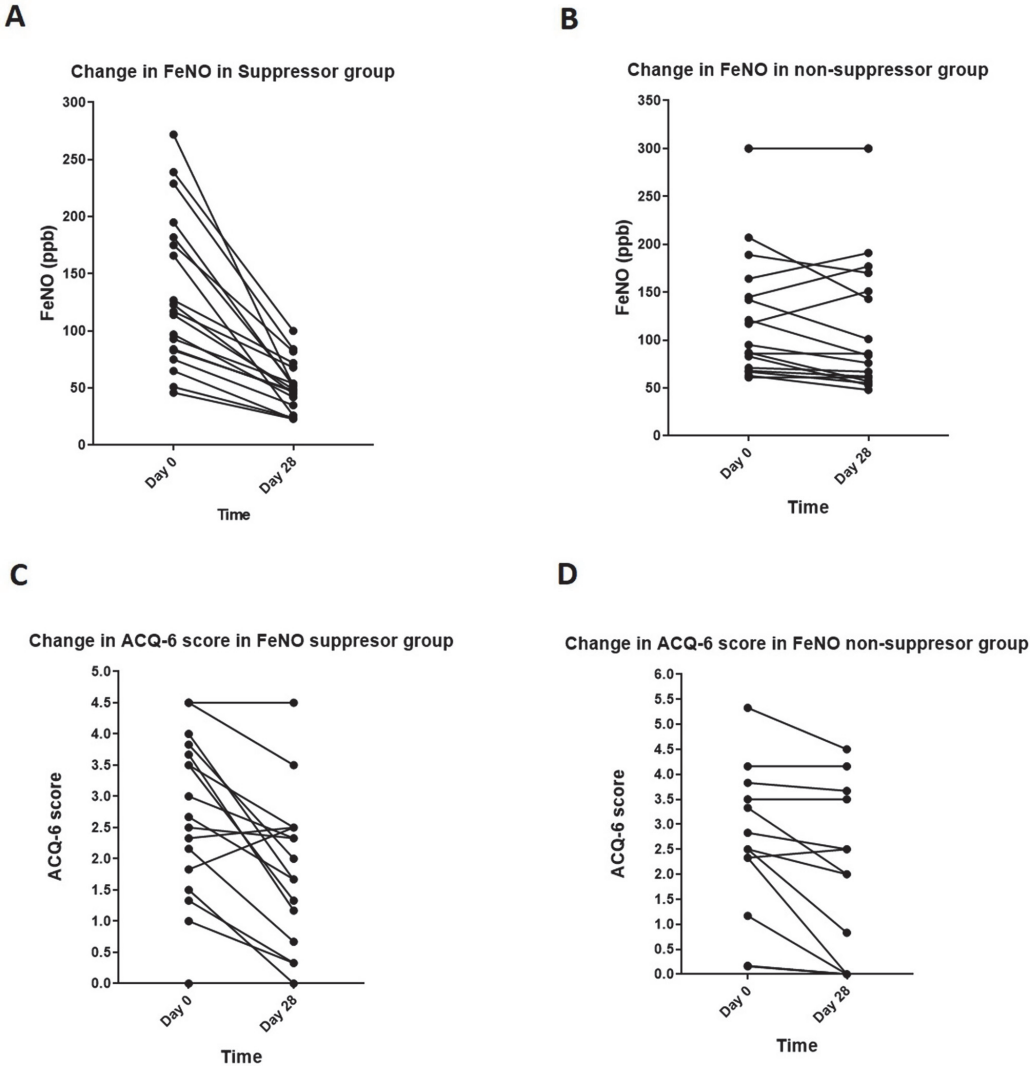
10.1136/thorax-2023-BTSabstracts.407

Background 65% of people with severe asthma and FeNO ≥45 ppb are non-adherent to inhaled corticosteroids (ICS). Digital monitoring that records both time-of-use and inhaler technique can identify non-adherence and ICS responsiveness, but these devices are not readily available. As the dose



Abstract M18 Figure 1

counter on the NEXThaler™ only counts down when an inspiratory flow of 35 L/min is achieved, this may present an alternative to identifying ICS responsiveness.

Aim To use BDP/formoterol (200/6 mcg, 2 bd) NEXThaler® (BFN) dose-counting to assess ICS responsiveness in severe asthma.

Methods People with severe asthma with a FeNO ≥45 ppb were trained to use BFN in place of their usual ICS/LABA. Patients re-attended 28 days later, and the dose count was recorded. Day 0 and 28 FeNO and ACQ6 were recorded. A log10âˆ†FeNO ≥0.24 defined people suppressing their FeNO (FeNO suppressors), confirming ICS responsiveness.

Results All patients (n=37) completed day 28 follow up. 19/37 (51%) suppressed their FeNO (median [IQR] pre-117[83–182], post 49[35–68] ppb, p<0.0001). A smaller reduction occurred in FeNO non suppressors (pre 106 [70–170], post 85[60–172] ppb, p=0.023). ACQ6 fell in FeNO suppressors (ACQ mean±SD pre-2.70[±1.29], post 1.73 [±1.25] p=0.0005), and in non suppressors (pre-2.63 [±1.5], post 1.97 [±1.7] p=0.0095). Comparing the highest blood eosinophil counts from the previous 12 months with post monitoring, blood eosinophils fell significantly in FeNO suppressors (n=13, p=0.005), but not in FeNO non suppressors (n=6, p=0.999). Of 27 people with baseline ICS/LABA prescription refills of >75%, 12 (44%) were FeNO suppressors, indicating prescription refill data alone does not guarantee adequate adherence. 3/19 FeNO suppressors and 4/18 FeNO non suppressors took <75% of BFN doses.

Conclusion Nexthaler™ dose counting demonstrates that 50% of people in a severe asthma service with FeNO ≥45 ppb respond to ICS when used regularly. This approach may miss some people with non-intentional non-adherence due to inhaler technique errors. There were also improvements in ACQ in FeNO non suppressors suggesting some prior non adherence in this group.

M19 MANAGEMENT OF UNCONTROLLED ASTHMA IN PREGNANCY: CHALLENGES AND CONCERNS

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10.1136/thorax-2023-BTSabstracts.408

Introduction Management of uncontrolled, moderate-to-severe asthma during pregnancy can be challenging. Despite advances in treatments, a limited evidence base and potential maternal and foetal risks can result in clinician uncertainty and anxiety amongst patients. Our aim was to describe our current practice and compare asthma at baseline and during pregnancy.

Methods Retrospective review of patients attending a new dedicated asthma in pregnancy clinic at a large tertiary severe asthma service between December 2020 and March 2023. Standardised questionnaire results, adherence, exacerbation, and medication history was compared before and during pregnancy. A paired t-test was used to investigate differences in asthma control at baseline and during pregnancy.

Results 47 women with 48 pregnancies were reviewed. Median age was 28 years (interquartile range, 26–32 years). Pre-pregnancy, most women were on a Global Initiative for Asthma treatment step 3–5 (42/48, 88%) and were considered to have uncontrolled asthma (an asthma control questionnaire (ACQ-6) score of ≥1.5 and/or ≥1 exacerbation requiring high dose steroids in the previous 12 months; 35/48, 73%). 12 women (26%) had documented anxiety about their asthma while pregnant, of which 4 women (4/12, 33%) admitted to stopping some or all their asthma treatments prior to coming to the first clinic appointment.

A switch to a more suitable inhaled-device, dose increase, or addition of another controller was attempted in 23/48 (48%) pregnancies to optimise asthma. 6 (6/48,13%) pregnancies were associated with a deterioration of asthma, 9 (9/48, 19%) improved and 32 (32/48, 68%) women's asthma control remained the same.

Measures of asthma (ACQ-6, exacerbations, hospitalisations, short-acting bronchodilator collections) did not significantly change during pregnancy except for the mean mini-Asthma Quality of Life Questionnaire score (3.7±1.8 vs. 3.1±1.6, p=0.04) which decreased and mean percentage adherence which improved (65%±27 vs. 77%±22, p=0.03).

Conclusions Asthma management during pregnancy is guided by asthma control pre-conception. Attending a dedicated asthma in pregnancy clinic is an opportunity to educate women, improve adherence and manage anxiety. Attempts to optimise treatment were not always successful, which may partly be due to other physiological mechanisms in pregnancy. Further qualitative research and improved education may be a patient-centred solution.

M20 PRESERVED ANTIBODY RESPONSES TO COVID-VACCINES AND LOWER ODDS OF DEVELOPING COVID IN PEOPLE WITH SEVERE ASTHMA

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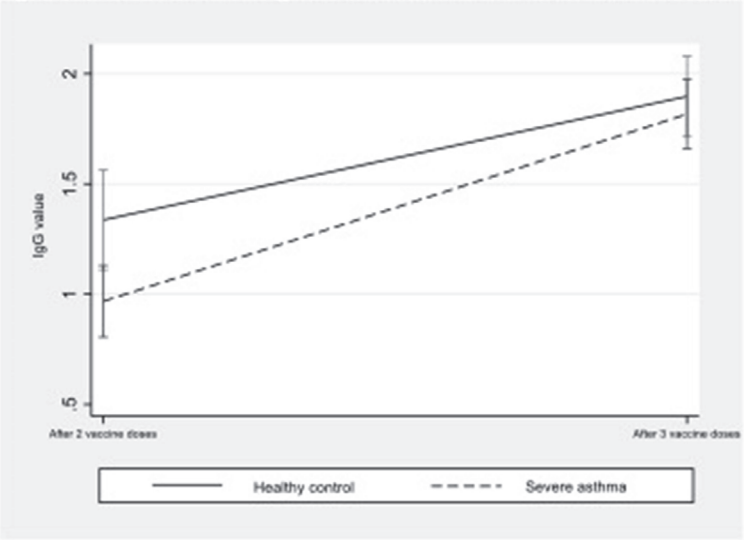
10.1136/thorax-2023-BTSabstracts.409

Background and aims Patients with severe asthma (SA) may be at higher risk of severe COVID-19 illness. In this study we compared post vaccination antibody (IgG) levels following 2 doses or 3 doses of the COVID-19 vaccine and the incidence of COVID-19 illness in patients with SA and healthy controls (HC) without asthma.

Methods The Virtus finger-prick quantitative COVID-19 antibody test was used to detect post vaccination IgG levels 24 +/-4 weeks after the second COVID-19 vaccine and after third/booster vaccine. IgG>0.2 AU was considered a positive response. SA was defined as per ATS/ERS criteria. All patients were on high dose inhaled corticosteroids (hICS) and some also on maintenance oral corticosteroids (hICS/mOCS) or biologics (hICS/biologics). Patients with a prior history of COVID illness were excluded.

Results Post vaccination IgG results were obtained from 127 patients with SA (46 hICS, 13 hICS/OCS and 84 hICS/biologics) and 57 HC 24 weeks after 2 vaccine doses (and just before the third/booster dose). After adjusting for age, days since vaccination, biologic use, gender and number of courses of steroids in preceding 12 months, the odds of a positive post vaccination IgG result were 80% lower in SA (81%



Abstract M20 Figure 1 Post vaccination IgG levels after 2 and 3 COVID-19 vaccine dose

positive) than in HC (95% positive), p=0.016; with SA patients having significantly lower IgG levels than HC (median IgG 1.0 vs 1.2, p=0.017). However, after receiving the third/booster dose, post-vaccination IgG levels were similar in SA (1.97, CI 1.33–2.8) and HC (1.96, CI 1.57–2.30) (figure 1), even if patients had developed COVID-19 illness between the two vaccine doses. Despite a higher proportion of patients having negative IgG responses and lower median IgG levels after 2 vaccine doses, COVID illness was significantly less frequent in SA patients (19/90, 21%) than in HC (21/54, 39%) (OR 0.40, CI 0.18–0.86, p=0.018).

Conclusion After 3 doses of COVID vaccine, SA patients have similar IgG levels to HC, confirming the effectiveness and need of the booster strategy. The lower incidence of COVID illness in SA patients which may be due to stricter social distancing and isolation strategies.

Please refer to page A294 for declarations of interest related to this abstract.

M21 ON-TREATMENT CLINICAL REMISSION WITH TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA IN THE PHASE 3 DESTINATION STUDY

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10.1136/thorax-2023-BTSabstracts.410

Abstract M21 Table 1 Proportion of patients receiving tezepelumab or placebo who achieved remission over 2 years in DESTINATION

Timepoint (week)	Tezepelumab only (n = 379)	Placebo only (n = 187)
0 to 24	126 (33.2)	57 (30.5)
> 24 to 52	141 (37.2)	49 (26.2)
0 to 52	108 (28.5)	41 (21.9)
> 52 to 104	103 (27.2)	39 (20.9)

Results are reported as n (%).
Patients included in this analysis were initially enrolled in the NAVIGATOR study and either received tezepelumab in both NAVIGATOR and DESTINATION (tezepelumab only) or received placebo in both NAVIGATOR and DESTINATION (placebo only).
Patients completing treatment but with missing data were assumed not to achieve remission.

Introduction and Objectives Asthma remission is characterized by long-term disease stabilization and control with or without ongoing treatment. This *post hoc* exploratory analysis assessed the proportion of patients who received tezepelumab in DESTINATION (NCT03706079) who achieved on-treatment remission over 2 years.
Methods DESTINATION was a phase 3, multicentre, randomized, placebo-controlled, double-blind extension study. Patients (12–80 years old) included in this analysis received tezepelumab in both NAVIGATOR (NCT03347279) and DESTINATION (tezepelumab only) or placebo in both NAVIGATOR and DESTINATION (placebo only). Patients received treatment up to week 104. Remission was predefined as an Asthma Control Questionnaire-6 score ≤ 1.5, stable lung function (a forced expiratory volume in 1 second > 95% of baseline) at the end of each year, and no exacerbations or use of oral corticosteroids during the time periods assessed.
Results The proportion of patients who achieved remission in the tezepelumab only and placebo only groups are summarized in the **table 1**. An intercurrent exacerbation requiring systemic corticosteroid use was the main reason why a patient no longer met the definition of remission.
Conclusion Among patients with severe, uncontrolled asthma, a numerically greater proportion of patients who received tezepelumab than placebo achieved remission during the time periods assessed.

Please refer to page A294 for declarations of interest related to this abstract.

M22 CHANGE IN FENO WITH DUPILUMAB AND TEZEPELUMAB IN SEVERE EOSINOPHILIC ASTHMA

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10.1136/thorax-2023-BTSabstracts.411

Background The level of fractional exhaled nitric oxide (FeNO) correlates with exacerbation risk and lung function decline in asthma and is a well-recognised biomarker of airway IL-13. FeNO has been shown to significantly fall following inhibition of either TSLP with tezepelumab, or IL4R with dupilumab. It remains unclear whether these two biologic agents result in similar falls in FeNO after 4 weeks of treatment despite their different immune targets.
Methods We performed a retrospective analysis of FeNO levels at baseline and after 4 weeks of dupilumab or tezepelumab in a real world severe eosinophilic asthma (SEA) cohort at a tertiary severe asthma centre in the UK. All patients received these therapies in clinic for the first 4 weeks and the dose of inhaled corticosteroids remained constant. Change in FeNO and the proportion of patients who continued to have an elevated FeNO at 4 weeks despite these therapies was assessed.
Results Eighty-five adults with SEA meeting NICE criteria for biologic therapy with tezepelumab (n=47) and dupilumab (n=38) were included. Baseline FeNO levels were similar in both groups (tezepelumab: 46 ppb [IQR 27–99], dupilumab: 57ppb [IQR 32–92], p=0.61). At week 4, both therapies led to a significant reduction in FeNO (p<0.0001), which was statistically comparable: tezepelumab -15ppb vs dupilumab -27ppb, p = 0.14. At 4 weeks, 62% of tezepelumab and 58% of dupilumab patients still had a FeNO>25ppb (p=0.28), whilst 26% of tezepelumab and 16% of dupilumab treated patients continued to have a FeNO >50ppb (p=0.27). For both therapies, clinical improvements in excess of the MCID for both ACQ6 and mAQLQ were observed at week 4 with no significant difference between groups.
Conclusion In a real-world cohort of SEA with comparable baseline FeNO levels, dupilumab and tezepelumab led to similar reductions in FeNO at 4 weeks post-initiation. In both cohorts, the majority of patients had evidence of persistent T2 inflammation with a FeNO >25ppb. The clinical implications of this residual inflammation and the longer term impact of continued treatment with either dupilumab or tezepelumab on FeNO requires further assessment.

M23 EFFICACY OF TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA BY PRIOR OMALIZUMAB USE: A POST HOC ANALYSIS OF THE PHASE 3 NAVIGATOR STUDY

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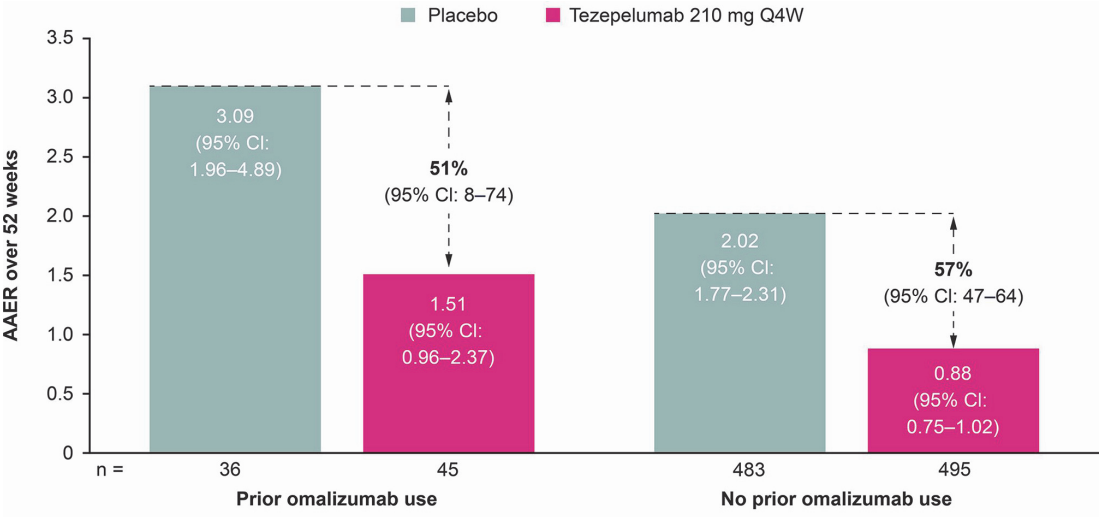
10.1136/thorax-2023-BTSabstracts.412

Introduction and Objectives Omalizumab, an anti-immunoglobulin E humanized monoclonal antibody, was the first biologic approved for the treatment of severe allergic asthma. Tezepelumab, a human monoclonal antibody, blocks thymic stromal lymphopoietin (TSLP). In the phase 3 NAVIGATOR study (NCT03347279), tezepelumab significantly reduced exacerbations and improved lung function, asthma control and health-related quality of life versus placebo in patients with severe, uncontrolled asthma. This *post hoc* analysis assessed the efficacy of tezepelumab in NAVIGATOR patients with and without reported prior omalizumab use.
Methods NAVIGATOR was a multicentre, randomized, double-blind, placebo-controlled study. Patients (12–80 years old) who were not currently receiving biologic treatment and who were receiving medium- or high-dose inhaled corticosteroids and at least one additional controller medication with or without oral corticosteroids, were randomized 1:1 to receive tezepelumab 210 mg or placebo subcutaneously every 4 weeks for 52 weeks. Patients who had received biologic treatments were enrolled if the last dose was taken over 4 months, or over five half-lives, before screening. The annualized asthma exacerbation rate (AAER) over 52 weeks was assessed in patients with and without prior omalizumab use.
Results Of 1059 patients included in the study, 81 (8%) reported previous omalizumab use (tezepelumab, n = 45; placebo, n = 36). Baseline demographics and clinical characteristics were generally similar between those with and without prior omalizumab use. More patients with prior omalizumab use (n = 53, 65%) had over two exacerbations in the past 12 months versus those who had not used omalizumab (n = 371, 38%). Among the placebo group, the AAER was numerically higher in those who had received omalizumab (3.09)



The AAER over 52 weeks was estimated using a negative binomial regression model with treatment, region, age group, history of exacerbations, subgroup and treatment-by-subgroup interaction as covariates.

AAER, annualized asthma exacerbation rate; CI, confidence interval; Q4W, every 4 weeks.

Abstract M23 Figure 1 The AAER over 52 weeks in patients with and without prior omalizumab use

than in those who had not (2.02) (**figure 1**). Tezepelumab reduced the AAER over 52 weeks versus placebo by 51% (95% confidence interval [CI]: 8–74) and 57% (95% CI: 47–64) in patients with and without prior omalizumab use, respectively.

Conclusions Tezepelumab reduced the AAER versus placebo in patients with severe, uncontrolled asthma irrespective of prior omalizumab use. These results further demonstrate the efficacy of tezepelumab in a broad range of patients with severe, uncontrolled asthma, including those who previously received omalizumab.

Please refer to page A295 for declarations of interest related to this abstract.

M24 3-YEAR REAL WORLD OUTCOMES WITH BENRALIZUMAB FOR SEVERE EOSINOPHILIC ASTHMA

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The monoclonal antibody, benralizumab targets the IL-5R α subunit on eosinophils, inhibiting their maturation and activation, thus disrupting the eosinophilic pathway of inflammation. Real-life data has shown the short-term efficacy of benralizumab in reducing asthma exacerbations requiring oral corticosteroids (OCS), in patients with severe eosinophilic asthma. However, there is limited data on it's long-term efficacy. The aim of this study was to assess the 3-year efficacy of benralizumab.

Data was collected retrospectively from patients initiated on benralizumab from September 2019 to December 2020 at our severe asthma centre. Clinical data included: asthma control questionnaire-6 (ACQ6); mini asthma quality of life questionnaire (mAQLQ); maintenance OCS dose; number of exacerbations requiring OCS; spirometry; fractional exhaled nitric oxide (FeNO); blood eosinophils; weight. Patients who had stopped treatment before three years were assessed to identify the reason for stopping. Data was analysed using SPSS (IBM, USA 2022).

Eighty-five patients were identified of which 50 (59%) were women and the mean age was 52yrs (14.7). There was a statistically significant reduction in blood eosinophils. This was associated with a statistically and clinically significant improvement in the ACQ6, mAQLQ, maintenance OCS dose and the number of asthma exacerbations requiring OCS (table 1). Additionally, the reduction in mean asthma exacerbations requiring OCS was maintained from year one of treatment to year 3 (n=51 mean (SD) baseline=4 (3.56); yr 1=1.51 (2.48); yr 2=1.06 (1.77); yr 3=1.41(1.98)(p<0.001)).

There was no statistically significant improvement seen in spirometry or FeNO. However, spirometry data was limited due to COVID19 and a further study is required to determine this. Additionally future work on monitoring patient ICS

Abstract M24 Table 1 3-year clinical outcomes for patients treated with benralizumab

	n	Baseline	3 years	p
ACQ6 (1)	79	3.17 (1.49)	1.71 (1.39))	< 0.001
mAQLQ (1)	52	3.70 (1.56))	4.75 (1.57)	< 0.001
Maintenance prednisolone dose (mg) (2)	69	5 (0.00–13.75)	0 (0.00–1.00)	< 0.001
Annual exacerbation rate(1)	56	4.04 (3.53)	1.41 (1.94)	< 0.001
FEV1% predicted (1)	20	73.75 (25.16)	78.50 (23.60)	0.270
FeNO (ppb) (2)	61	35.00 (19.00–61.00)	31.00 (13.00–63.00)	0.780
Blood eosinophils x10^9/L (1)	78	0.56 (0.34)	0.03 (0.13)	< 0.001

Summary table of 3-year clinical outcomes in patients after they received treatment with benralizumab compared to baseline.(1): mean (SD), (2): median (Q1-Q3)

adherence more accurately via digital inhaler systems will assist in determining whether FeNO suppression can be achieved.

This study demonstrates the long-term efficacy of benralizumab as an add-on treatment for severe eosinophilic asthma in terms of both patients' perception of their disease control and in clinical improvements in asthma control.

M25 REDUCTIONS IN HEALTHCARE RESOURCE UTILISATION (HCRU) OVER 2 YEARS OF BENRALIZUMAB TREATMENT IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA; ANALYSIS FROM THE BPAP STUDY

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10.1136/thorax-2023-BTSabstracts.414

Introduction Benralizumab is an anti-interleukin-5 receptor α monoclonal antibody indicated as an add-on maintenance therapy in adult patients with severe eosinophilic asthma (SEA). Herein we present real-data from the Benralizumab Patient Access Programme (BPAP) on the asthma-related, hospital healthcare resource utilisation (HCRU) in patients with severe asthma.

Methods The BPAP study is a multi-centre, retrospective chart review study of patients with SEA from eight severe asthma centres in the UK. Data were collected from the medical records of patients receiving their first benralizumab dose between April 2018 and November 2019. Outcomes were assessed using descriptive statistics. HCRU including hospitalisations and emergency department (ED) visits related to exacerbations were described in the 12 months prior to benralizumab initiation (baseline), 1- and 2-years post benralizumab initiation. Patients remaining on treatment were included at each timepoint.

Results A total of 276 patients were included. During baseline, 42% of patients had ≥1 asthma-related ED attendance; this proportion decreased to 23% at Year 2. Mean (SD) ED attendances reduced from 1.2 (2.2) at baseline to 0.4 (1.0) at Year 2, a relative reduction of 67%. The proportion of patients with ≥1 hospitalisation was 39% at baseline, falling to 18% in Year 2. Mean (SD) hospitalisations reduced from 1.0 (1.8) at baseline to 0.4 (1.0) at Year 2, a relative reduction of 70%. For patients with inpatient hospitalisations during the baseline with a recorded length of stay (n=50), median (IQR) length of stay was 6.5 (3.0–17.3) days; this decreased to 2.5 (0.0–8.3) days (n=38) at Year 2; a relative reduction of 62%. There was also a reduction in intensive care admissions from 16/241 (7%) at baseline to 5/209 (2%) at year 2.

Conclusions The results show that patients with SEA treated with benralizumab experienced clinically meaningful and sustained reductions in un-scheduled hospital HCRU. Treatment with benralizumab may be associated with >60% reduction in ED visits, hospitalisation and length of stay across all sites. This would reduce pressures on acute services and further work is warranted to investigate the overall economic impact of reduced HCRU.

Please refer to page A295 for declarations of interest related to this abstract.

Abstract M25 Table 1 Asthma-related healthcare resource utilization: ED attendances, hospitalisations and length of hospital stay (days) and ICU admissions at baseline, 1 and 2 years post benralizumab treatment

HCRU			*Baseline*	*1 year*	*2 years*
ED visits	**Proportion of patients with a given number of visits**	No visits	137/237 (58%)	196/245 (80%)	160/209 (77%)
		1 visit	36/237 (15%)	28/245 (11%)	32/209 (15%)
		2 visits	26/237 (11%)	7/245 (3%)	7/209 (3%)
		≥3 visits	38/237 (16%)	14/245 (6%)	10/209 (5%)
	Mean (SD)		1.2 (2.2)	0.2 (0.6)	0.4 (1.0)
	Median (IQR)		0.0 (0.0–2.0)	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Hospitalisations	**Proportion of patients with a given number of visits**	No visits	153/249 (61%)	208/245 (85%)	171/209 (82%)
		1 visit	38/249 (15%)	23/245 (9%)	28/209 (13%)
		2 visits	25/249 (10%)	5/245 (2%)	3/209 (1%)
		≥3 visits	33/249 (13%)	9/245 (4%)	7/209 (3%)
	Mean (SD)		1.0 (1.8)	0.3 (0.9)	0.3 (0.9)
	Median (IQR)		0.0 (0.0–1.0)	0.0 (0.0–0.0)	0.0 (0.0–0.0)
Length of hospitalisation stay (days)*	**Proportion of patients with a given number of days**	0 days	2/50 (4%)	9/38 (24%)	10/39 (26%)
		1 day	5/50 (10%)	4/38 (11%)	3/39 (8%)
		2 days	3/50 (6%)	4/38 (11%)	6/39 (15%)
		≥3 days	40/50 (80%)	21/38 (55%)	20/39 (51%)
	Mean (SD)		12.6 (13.4)	6.6 (10)	5.5 (8.2)
	Median (IQR)		6.5 (3.0–17.3)	3.0 (0.5–8.0)	2.5 (0.0–8.3)
ICU admissions			16/241 (7%)	8/245 (3%)	5/209 (2%)

*Denominator (n=50) is patients with length of hospitalisation recorded. Proportions may not sum to 100% due to rounding.

M26 THE PROPORTION OF PATIENTS ACHIEVING LOW BIOMARKER LEVELS WITH TEZEPELUMAB TREATMENT IN THE PHASE 3 NAVIGATOR STUDY

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10.1136/thorax-2023-BTSabstracts.415

Introduction and Objectives Tezepelumab reduces both blood eosinophil counts (BECs) and fractional exhaled nitric oxide (FeNO) levels versus placebo in patients with severe, uncontrolled asthma. The proportion of patients achieving low type 2 biomarker levels with tezepelumab treatment has not been previously evaluated. To assess the proportion of patients who achieved biomarker levels below those associated with an increased risk of asthma-related morbidity (BEC <150 cells/μL or <300 cells/μL; FeNO <25 ppb or <50 ppb) with tezepelumab versus placebo in the phase 3 NAVIGATOR study (NCT03347279).

Methods NAVIGATOR was a multicentre, randomized, double-blind, placebo-controlled study. Patients (12–80 years old) received tezepelumab 210 mg or placebo subcutaneously every 4 weeks for up to 52 weeks. BECs and FeNO levels were compared at baseline and week 52.

Results Overall, 528 and 531 patients received tezepelumab and placebo, respectively. At week 52, a greater proportion of tezepelumab recipients achieved BEC <150 cells/μL and <300 cells/μL, and FeNO levels <25 ppb and <50 ppb versus placebo recipients (**figure 1**).

Conclusion At week 52, most tezepelumab recipients in NAVIGATOR had maintained or reduced their biomarker levels to below those associated with an increased risk of asthma-related morbidity.

Please refer to page A295 for declarations of interest related to this abstract.

'My way' – Innovative pathways in asthma management

M27 DIAGNOSIS TO TREATMENT: A UK COST-OF-ILLNESS STUDY OF THE ASTHMA CARE PATHWAY AND ITS IMPACT ON HEALTH, ENVIRONMENT AND SOCIETY

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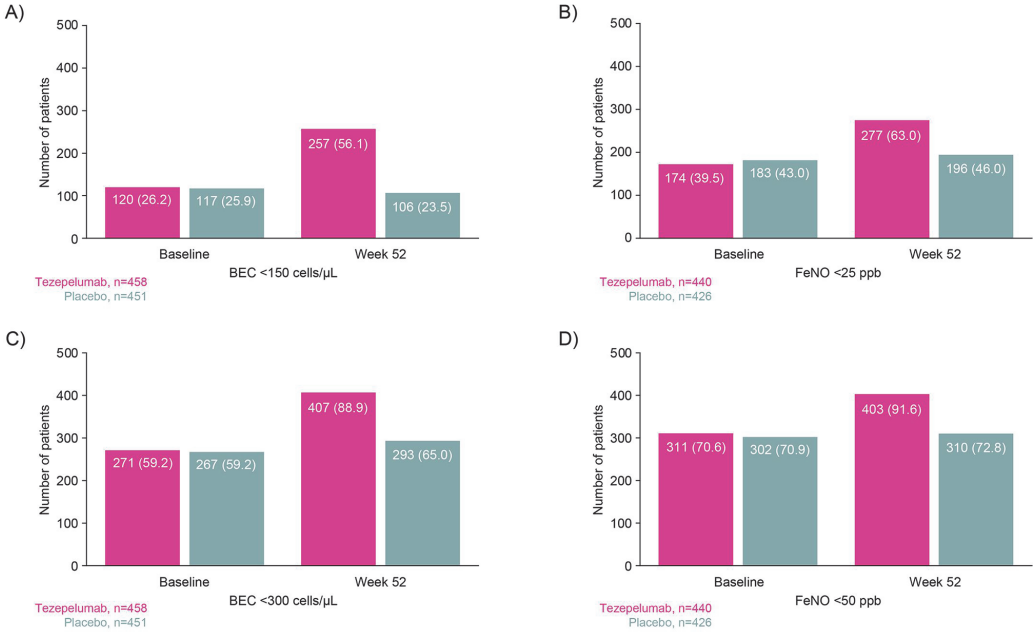
10.1136/thorax-2023-BTSabstracts.416

Background Previous research has reported the possible economic and environmental impact of inhaler switching policies. However, there remains a lack of awareness of the entire asthma pathway from diagnosis to treatment and its ramifications on health, environment and society in the UK.

Aims We aim to understand the extent to which the asthma pathway has a wider impact in the UK through a comprehensive cost-of-illness model. From this, we can view the long-term consequences of poor asthma control and we can assess



Data are presented as N (%). Percentages were calculated using the number of patients with data for BEC and FeNO levels at baseline and week 52. Baseline was defined as the last non-missing measurement recorded before randomization in NAVIGATOR. BEC, blood eosinophil count; FeNO, fractional exhaled nitric oxide; Q4W, every 4 weeks.

Abstract M26 Figure 1 Number and percentage of patients with A) BECs <150 cells/μL, B) FeNO < 25 pb, C) BECs < 300 cells/μL and D) FeNO < 50 ppb baseline versus week 52

policies which advocate inhaler switching with cost or environmental motivations.

Method The model captured the impact of the asthma care pathway on NHS costs, greenhouse Gas (GHG) emissions, patient travel costs, health-related quality of life (HRQoL), and productivity loss. Model inputs were developed by a focused literature review, and clinical expert opinion. The analysis was conducted for the period 2022–2031, with projections to future years made based on historical data, and values presented in net present monetary value. Patients were categorised as Severe, Non-severe – uncontrolled and non-severe – controlled.

Results The total impact of asthma in the UK was estimated to be £47bn between 2022–2031, with the majority (77%) of costs attributed to the loss of asthma control (i.e., worsening or exacerbation of symptoms) on HRQoL and productivity. The environmental impact expressed in monetary terms for the same period was £1.169bn. Per patient, severe asthma had the highest NHS costs, CO_2 emissions and patient travel costs followed by uncontrolled patients. In 2022, loss of asthma control is also estimated to lead to a 22% increase in NHS costs, and 65% in GHG emissions due to higher use of secondary care and reliever inhalers.

Conclusion Asthma control significantly impacts patient's HRQoL, the environment and economy with severe patients having the greatest impact. Policies directed in asthma management should be patient-centered and prioritise disease control to reduce healthcare resource utilisation and environmental impact.

M28 SEVERE ASTHMA, BIOLOGICAL THERAPY, AND HOMECARE: A REVIEW OF NATIONAL PRACTICE

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10.1136/thorax-2023-BTSabstracts.417

Background Availability of biological therapy for severe asthma patients has rapidly expanded over the last few years. Increased treatment options for those appropriately identified comes with the challenge to provide equitable access to care, timely treatment initiation and monitoring whilst managing increasing referral numbers.

Our aim was to explore existing practice.

Methods An online questionnaire was disseminated among UK severe asthma centres.

Results Geographical representation across the United Kingdom was achieved with 33 severe asthma centres completing the questionnaire (31 adult/2 paediatric). Paediatrics was excluded from this analysis due to low response-rate.

Tertiary level care was provided by 14(45.2%) centres, secondary level care by 14(45.2%) centres. There was a variation in total biologic patient numbers: 24(77.4%) centres had <500 patients and 5(16.1%) had >500patients. The estimated spread of biologic use amongst the centres was Omalizumab (21.0%), IL5 (67.0%) and IL4/13 (9.0%).

A dedicated pre-biologic counselling clinic was offered by only 13(42%) of centres; 29(93.5%) of centres ensure a steroid weaning plan is established at start of biologic initiation.

Time to initiation from approval ranged from 18(58.1%) within 4 weeks, 13(41.9%) >4 weeks.

Homecare self-administration is undertaken by 69.1% of the total cohort and a variability in timing of homecare training was seen across centres with 11(35.4%) of centres training at dose 1, 8(25.8%) at dose 2, 5(16.1%), at dose 3 and 3 (9.7%) and 3(9.7%) at >dose 4.

Face-to-face review of biologic response was performed annually in 16(51.6%) centres, bi-annually in 5(16.2%) centres, quarterly in 1(3.2%) centre and variable in 7(22.6%) of centres. Only 80% of centres have capacity for rapid access review of the deteriorating patient.

Conclusion Results show good national practice in alignment with guidance as recommended by the Accelerated Access Collaborative- Rapid uptake, Asthma biologics.[1] However, some disparity exists in areas including access to dedicated pre- biologic counselling, initiation of biologic within <4 weeks, transfer onto homecare and variation in follow up. We propose that a national collaborative approach to ensure prompt, equitable access to care in this cohort is promoted.

REFERENCE

1. Asthma biologics toolkit – Oxford Academic Health Science Network (oxfordahsn.org) [Accessed 29/06/2023]

M29 IMPROVING ACCESS TO BIOLOGIC TREATMENTS FOR PATIENTS WITH SEVERE ASTHMA: DELIVERING AN 12 MONTH ACCELERATED ACCESS COLLABORATIVE PROJECT

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10.1136/thorax-2023-BTSabstracts.418

Introduction Approximately 5.4 million people currently receive asthma treatment with an estimated 200,000 people having severe asthma.[1] Despite taking maximal 'conventional medication' this patient group remain symptomatic. This has a significant impact and burden on the health economy.

Aims and Objectives We implemented an enhanced severe asthma pathway in November 2021, aiming to optimise primary care referrals through training/education and increasing hospital and multidisciplinary team (MDT) clinic capacity.

Methods We targeted GP practices in Stoke-on-Trent and Staffordshire ICB with high bronchodilator use and >2 courses of Prednisolone in the last 12 months. A nurse educator ran the SPECTRA tool to identify poorly controlled asthma and delivered bespoke educational sessions and offered 1:1 support.

Results By November 2022, 564 patients across 28 GP practices had been reviewed for asthma biologics eligibility, of whom 125 were referred to secondary care (22.2%) with 87 patients starting biologics (69.6%).

Abstract M29 Table 1

Criteria	Reduction
Mean wait from referral to 1st appointment	59% 10.7 vs 21.1 weeks p=0.002
Time from 1st appointment to f/up	45% 13.3 vs 24.4 weeks p<0.001
Time from follow up to MDT discussion	63% 6.7 vs 17.9 weeks p=0.004
OCS use	60% p<0.001
SABA prescribing	P=0.037
Exacerbations and hospital admissions	P<0.001
ACQ 6 score	3.13 to 1.89

Two data streams were collected a) pathway time log, b) patient qualitative data 12 months pre biologics and at the end of the 12 month treatment trial. The West Midlands Applied Research Collaboration conducted the project evaluation.

Conclusion The enhanced pathway was associated with increased number of patients on biologics with substantial reductions in patient waiting times, significant reductions in Prednisolone use, bronchodilator prescribing rates, hospital admissions and significant improvements in asthma control.

REFERENCE

1. www.AsthmaandlungUK: accessed 28/06/2023

M30 ACCELERATING ACCESS TO SPECIALIST CARE FOR ASTHMA PATIENTS THROUGH INNOVATIVE PATHWAY TRANSFORMATION

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10.1136/thorax-2023-BTSabstracts.419

Introduction and Objectives The Severe Asthma Service (SAS) covers the Integrated Care Board footprint (ICB) with 128,811 patients on the asthma register. Evidence suggests that 5% (6,440) have severe asthma, of these 18% (1,180) are eligible for biologic therapies, which could have a significant impact on patients' quality of life.

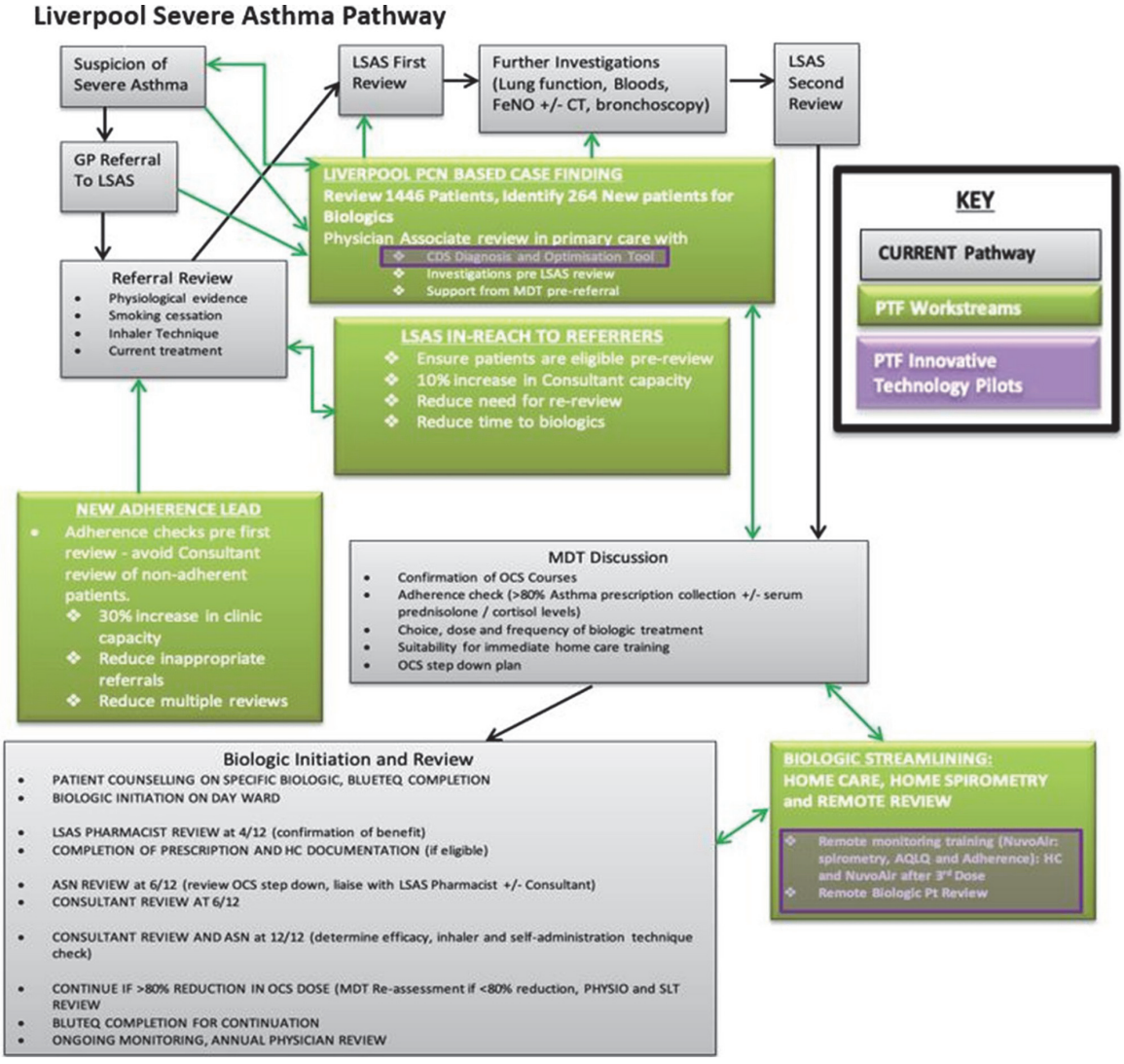
Before the project, only 50% patients were established on severe asthma therapies.

Methods One Place was selected within the ICB as a target for this project.

A flow diagram illustrating the severe asthma pathway is included as figure 1. The redesigned elements are highlighted on the key.

The revised pathway aimed to provide specialist in-reach support into PCNs to:

- Provide primary care with education on improving adherence and optimising inhaler therapy
- Expedite biologic initiation for those eligible
- Improve optimisation of therapies and use of technology (NuvoAir) to enhance the care experience and remotely monitor patients prior to biologic therapy initiation



Abstract M30 Figure 1

The pathway also included in-reach into secondary care to support MDTs and expedite referrals to the SAS.

To address the lack of knowledge in primary care around severe asthma and how to make a good quality referral into the severe asthma service, an educational package, comprising 2 videos and a podcast, was produced.

Results The re-designed pathway released resource to reduce waiting times from referral to review, from 70 to 18 days and improved access to biologics. Moving some of the LSAS asthma confirmation process, adherence checking and biologic counselling, into the community reduced waiting times from referral to first injection, in eligible patients, from 167 to 53 days.

In-reach into one secondary care Trust will result in it becoming a prescribing site for biologics.

Conclusions

- The work has highlighted a proof of concept re rolling the pathway out to a wider population which includes innovation and partnership working
- The project has formed the basis for a funding bid to spread this approach across the ICB footprint.
- Written/recorded guidance is vital to support education
- Wider staff such roles such as Physician Associates and Clinical Pharmacists can support specialist areas such as asthma
- Remote review works

M31 BRIDGING THE GAP: EMPOWERING COMMUNITIES THROUGH ADVANCED PHARMACIST-LED SPECIALIST ASTHMA CLINICS IN PRIMARY CARE

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10.1136/thorax-2023-BTSabstracts.420

Introduction The project aimed to utilise the skills of highly advanced respiratory pharmacists, usually based in tertiary care, who provided outreach clinics in general practices serving populations of highest deprivation.

Objectives

1. Identify uncontrolled severe asthma patients, including biologics candidates.
2. Optimise treatment with a focus on immediate SABA reduction and environmental inhaler switches.
3. Upskill primary care colleagues to improve diagnosis and management of asthma patients.

Methods Pilot study assessing the effectiveness of a digital risk stratification tool to identify uncontrolled severe asthma patients. Between January and December 2022, three project pharmacists analysed 2000 primary care notes across 8 recruited PCNs (26 general practices) from across 3 CCGs (now 1 ICS). They subsequently reviewed consultation notes, test results, admissions and medication history before inviting patients to 30–40-minute clinics. Each patient was provided with medicines review and, where appropriate, optimisation, adherence and inhaler technique check, asthma education (including risks and benefits of oral steroids use) and FeNO testing. Patients who required a referral to a tertiary centre were fast-tracked to a consultant collaborating on this project. The consultant also provided clinical supervision to the project pharmacists.

Results

- 241 patients offered a pharmacist-led clinic and 149 attended
  - 100% had medicines reviewed, adherence checked and bespoke education provided
  - 55 referred to tertiary centre (78% referrals rated as excellent vs. 20% pre-project)
  - 40 patients started on biologics.
  - 35 patients switched to MART and SABA stopped
  - 45 environmental inhaler switches
- Primary care teams surveyed rated the project highly and would recommend delivered educational sessions to colleagues
- 25 randomly selected patients provided service feedback
  - 96% found project pharmacists good/very good at shared decision-making and the consultation helpful/very helpful
  - 92% considered seeing a specialist pharmacist importa

Conclusion The project successfully utilised highly advanced respiratory pharmacists to provide outreach clinics in deprived general practices, achieving its objectives. We demonstrated positive outcomes with a high attendance rate, successful referrals to tertiary centres, medication optimisations, and positive patient and clinician feedback, highlighting the importance and effectiveness of involving specialist pharmacists in improving asthma management in underserved populations.

Please refer to page A295 for declarations of interest related to this abstract.

M32 ASTHMA BUS – ONE STOP ASSESSMENT FOR PATIENTS PRESENTING TO HOSPITAL WITH ACUTE ASTHMA SYMPTOMS

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10.1136/thorax-2023-BTSabstracts.421

Background Patients with Asthma frequently engage with health care services at times of acute worsening. Emergency presentation is costly both to the health service and patients. Improving Asthma management is core to national health policy, as is identifying and treating patients who maybe eligible for biologic therapy. MDT assessment is essential in assessing and managing this cohort.

Aim To identify Asthma patients presenting to hospital who would benefit from a one respiratory MDT appointment and who may be eligible for biologic therapy.

Methods We ran Astra Zeneca's 'Precision' software to search through in-patient, out-patients, and emergency attendance records over an eight-month period Jan-Sept 2022.

Inclusion 1 or more A&E attendances (respiratory) (OR) 1 or more inpatient admissions (asthma as a primary diagnosis) (OR) 1 or more ICU stay (asthma primary & ventilation/respiratory support).

A respiratory nurse consultant and consultant physician independently reviewed patient records and identified suitable patients.

Patients were invited to see a voice and upper airways speech and language therapist, a specialist respiratory physiotherapist, respiratory nurse consultant and a respiratory medical consultant on a bespoke Asthma mobile unit.

Results 408 patients were screened. 42 biologic naïve patients were considered appropriate and invited . 23 patients agreed to attend, 19 attended (n11; 55% female), median age was 38

Abstract M32 Table 1 Baseline information for one stop asthma patients

Sex: female/male (n, %)	11 (55%)/ 8 (45%)
Age years range: (median)	20-78 (38)
Smokers: current (n, %)	7 (37%)
FEV1 litres: range (median)	0.83-4.11 (2.42)
FEV1 BDR >12%	7 (37%)
FEV1/FVC: range (median)	0.48-0.98 (0.81)
FENO ppb: range (median)	8-77 (21)
Blood eosinophils x10^9/L: range (median)	0.1-1.1 (0.6)

years. Baseline assessments are shown in table 1. 8/19 (42%) had at least one inpatient admission in the preceding 12 months, 4/19 (21%) had an ICU admission in the preceding 12 months. 17/19 (89%) were on an ICS/LABA, 1/19 was taking daily oral prednisolone. 7/19 (36.8%) were referred on for laryngoscopy, 12/19 (63%) were referred for breath retraining support with respiratory physiotherapist. 4/19 (21%) have been commenced on biologic therapy with a further 3/19 (6%) likely to start in the next few months.

Conclusion The search tool yielded a high number of initial patients. This group were young, had confounding factors that may be contributing to their respiratory symptoms (including disordered breathing), resulting in emergency presentation. The one stop bus allowed us to provide rapid assessments with same day access to the wider MDT.

M33 THE IMPACT OF A NEWLY DEVELOPED SELF-DIRECTED ONLINE LEARNING MODULE TO SUPPORT HEALTHCARE PROFESSIONAL TO MANAGE NON-ADHERENCE TO INHALED CORTICOSTEROIDS IN ASTHMA

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10.1136/thorax-2023-BTSabstracts.422

Introduction and Objectives Inhaled corticosteroids (ICS) are the cornerstone of asthma treatment, yet many patients are poorly adherent. Non-adherence to an ICS is associated with significant morbidity including: debilitating symptoms, frequent exacerbations, hospitalisation, and even death. As many different factors influence a patients' adherence to an ICS, healthcare professionals (HCPs) require multifactorial skills to identify and address these issues. A free online self-directed learning module was developed as part of the NHSE Accelerated Access Collaborative to support HCPs to foster this expertise. The objective of this study was to assess if completion of the module resulted in a change in HCP confidence in discussing ICS non-adherence in asthma and improved their knowledge on choosing appropriate and tailored interventions to manage it.

Methods Before starting the module, participants rated their confidence to manage medicines non-adherence in asthma on a 5-item Likert scale and answered 5 multiple choice questions that tested clinical knowledge. Upon completion of the module the same questions were answered again. Changes in knowledge and confidence between pre- and post- module completion were analysed using a paired samples *t*-test. Difference between HCP groups was analysed using one-way ANOVA. Volunteers took part in semi-structured interviews following module completion and data were scrutinised using thematic analysis.

Results In the 3 months after its release, 125 HCP participants completed the module and both the baseline and post-module questionnaires. There was a statistically significant increase in confidence and knowledge scores compared to baseline (t = -14.465, df = 124, $p < 0.001$ and t = -14.606, df = 124, $p < 0.001$ respectively). 9 participants were interviewed. The key themes that emerged included: an increased awareness of effective strategies to manage non-adherence, greater confidence in implementing these strategies, and positive changes to their practice.

Conclusion Completion of the self-directed online module improved HCP knowledge of, and confidence to, manage non-adherence to an ICS in asthma. Further research is required to determine the longer-term retention of these improvements, and if they have a measurable impact on patients' clinical outcomes.

M34 IS A SPOKE OCCUPATIONAL ASTHMA SCREENING SERVICE USEFUL?

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10.1136/thorax-2023-BTSabstracts.423

Introduction Occupational Asthma (OA) is one of the most common forms of occupational lung disease. The use of serial peak expiratory flow (PEF) measurements in the diagnosis of OA using the occupational asthma system (OASYS) program has been well defined providing a sensitivity and specificity of 72% and 100% respectively for the area between the curves (ABC) clock time score. A positive ABC score is ≥15L/min and OASYS score ≥2.51.

The NHS promotes a hub and spoke model for the delivery of specialist clinical services allowing patients to access diagnostic screening and treatment in smaller local centres without the requirement to travel further distances to access larger tertiary centres.

Methodology All patients who were referred to the OA screening service since it was implemented in January 2018

Abstract M34 Table 1 BMI= body mass index. SABA=short acting beta against. ICS= inhaled corticosteroids. FEVI= forced expiratory volume in one second as % patient predicated value. FENO= fraction of expired nitric oxide. ABC= area between the curves. WR DV = whole record diurnal variation. Data reported as mean and number

	N=15 (SD)
Sex (male)	9
Age (years)	46 (13)
BMI (kg/m^2)	26.38 (5.01)
Smoking (Pack/years)	8.95 (12.79)
SABA (n)	13
ICS (n)	13
Occupational History (n=positive)	14
Atopic (n)	8
FEV_1 (%pred)	77.15 (24.61)
FENO (ppm)	48.43 (27.63)
OASYS Score	2.11 (1.01)
ABC Score (L/min/h)	-2.38 (34.83)
WR DV (%)	23.67 (12.25)

were retrospectively reviewed for presenting symptoms, medication, occupation. OA screening outcomes were obtained from the OASYS plotter.

Results In total 15 patients were referred over 5 years. Patient demographics are reported in table 1. The main patient symptom was work associated dyspnoea (n=14). Isocyanates was the predominant workplace exposure. Ten patients were high risk by occupation type. Thirteen patients had previous spirometry. OASYS data quality was adequate for 8 patients. OASYS or ABC scores were positive for 6 patients. Seven patients were referred for expert assessment and investigation.

Conclusion Forty-five percent of patients were referred to the regional OA centre for expert opinion who may not have been fully diagnosed otherwise. OASYS data quality was limited and a future focus should be patient education and training. Overall, our data supports clinical usefulness of a satellite occupational screen service.

M35 THE DESIGN AND DEVELOPMENT OF CULTURALLY SPECIFIC RESOURCES FOR ASTHMA PATIENTS

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Background Asthma patients need to self-manage their condition. However, in the UK, there is a paucity of information available in languages other than English and a lack of information in other formats. Many people in the UK cannot speak or read English well and suffer poorer health outcomes, using acute health resources more frequently. Translated health information is largely absent from strategies to tackle such health inequalities. Indubitably, self-management is harder to embed in communities where health literacy is poor. Indeed, a previous evaluation revealed a lack of culturally appropriate multilingual resources for asthma self-management and proposed a redesign and delivery of such resources, ensuring fitness for purpose.

Aim The purpose of this study was to:

- Design and develop culturally specific resources for the self-management of asthma for individuals from the South Asian communities

Methods Drawing upon a project framework that embraced collaboration and collegiality enabled the development of a relationship of respect and participation with all partners. This upstream focus involved people from South Asian and disadvantaged communities, and health care professionals working together through all stages of the design, development, and evaluation process. Evaluation and testing were conducted by group and individual interview and content analysis.

Results Following in-depth discussions with all partners, the need for a video type resource was made. Production: 7 multilingual videos in 10 languages were curated using a computer-generated avatar. A QR code poster was produced to publicise the resources. Evaluative data collected was positive: reported as culturally sensitive, accurate, impactful, and accessible. Positive evaluative comments were also made by wider community members and health care professionals. The Patient Information Forum approved the processes involved in the production of the resources and the links have been hosted on the BTS Respiratory Futures website. This was spread via social media and to date has been viewed globally more than 65,000 times.

Implications Inequity in literacy can be mitigated by utilising upstream interventions. Further, evaluation of patient information materials in other diseases is required, with the appropriate dissemination of the information to enable and improve equity of access for all groups.

Please refer to page A295 for declarations of interest related to this abstract.

2023 BTS Winter Meeting Declarations of Interest

T5 UNDERSTANDING THE EXTRACELLULAR IMMUNOPROTEASOME IN THE ACUTE RESPIRATORY DISTRESS SYNDROME

This work was funded by the Medical Research Council (MR/T016760/1).

T6 GENOME-WIDE MUTAGENESIS SCREENS IDENTIFY REGULATORS OF CELLULAR IRON METABOLISM AND FERROPTOSIS

Wellcome Trust.

S1 A PHASE 3B TRIAL OF GEFAPIXANT, A P2X3-RECEPTOR ANTAGONIST, IN WOMEN WITH CHRONIC COUGH AND STRESS URINARY INCONTINENCE

SSB has received advisory board/consultancy fees from Bayer, Bellus, Merck & Co., Inc., NeRRe, and Shionogi; and grant support from Merck & Co., Inc. LC and RD have served as consultants for Merck & Co., Inc. PD has received advisory board/consultancy fees from Bayer, Bellus, Chiesi, Merck Sharp & Dohme Corp, and Shionogi. ASA, CL, SL, AMN, RY, and PR are employees of Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA, and may hold stock or stock options in Merck & Co., Inc., Rahway, NJ, USA.

S3 GEFAPIXANT EFFICACY AND SAFETY IN PARTICIPANTS WITH HISTORY OF REFRACTORY OR UNEXPLAINED CHRONIC COUGH FOR ≥1 VS <1 YEAR

JAS has received personal fees from Bayer, Bellus Health, Boehringer Ingelheim, GSK, Menlo, NeRRe, and Shionogi; nonfinancial support from Vitalograph; grant support and personal fees related to the submitted work from Afferent Pharmaceuticals/Merck & Co., Inc.; and grant support from Bayer, Bellus Health, GSK, Menlo, and NeRRe. The VitaloJAK algorithm is owned by Manchester University NHS Foundation Trust (MFT) and licensed to Vitalograph Ltd; royalties from Vitalograph to MFT may be shared with the department in which JAS works. JAS is also funded by the NIHR Manchester Biomedical Research Centre and a Wellcome Investigator Award and is an NIHR Senior Investigator. IS has received personal fees from educational talks for general practitioners from AstraZeneca and GSK; grants and personal fees from Merck Canada; consulting fees from Bellus Health, Genentech, Respiplus, and Roche; a European Respiratory Society Respire 3 Marie Curie Fellowship; and an E.J. Moran Campbell Early Career Award from the Department of Medicine, McMaster University (outside the submitted work). SSB has received advisory board/consultancy fees from Bayer, Bellus Health, MSD, NeRRe, and Shionogi; and grant support from MSD. LM has received grants from Bayer, Bellus Health, Chiesi, MSD, and Shionogi; and personal fees from Applied Clinical Intelligence, AstraZeneca, Bayer, Bellus Health, Chiesi, Genentech, GSK, MSD, Nocion, Reckitt Benckiser, Shionogi, and WCG Clinical. SL, AMN, JX, PR, EU, GP, and CL are employees of Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA, and may hold stock or stock options in Merck & Co., Inc., Rahway, NJ, USA.

S5 EARLY COUGH SEVERITY CHANGES OVER THE FIRST 4 WEEKS OF TREATMENT WITH GEFAPIXANT IN TWO PHASE 3 STUDIES

AHM reports receiving consultancy fees from Bayer, Bellus Health, Boehringer Ingelheim, MSD, Pfizer, Procter & Gamble, and Shionogi; receiving payment or honoraria for lectures, presentations, or speakers bureaus from AstraZeneca, Boehringer Ingelheim, and MSD; receiving grant support from Afferent, Infirst, MSD, and Procter & Gamble; and serving as chair of the Hull University Teaching Hospitals Drug and Therapeutics Committee. SSB has received advisory board/consultancy fees from Bayer, Bellus, MSD, NeRRe, and Shionogi; and grant support from MSD. PD has received advisory board/consultancy fees from Bayer, Bellus, Chiesi, MSD, and Shionogi. QL, EU, GP and CL are employees of Merck Sharp & Dohme LLC, a subsidiary of Merck & Co., Inc., Rahway, NJ, USA, and may hold stock or stock options in Merck & Co., Inc., Rahway, NJ, USA.

S8 THE BURDEN OF COMORBIDITY IN IDIOPATHIC PULMONARY FIBROSIS VERSUS CHRONIC OBSTRUCTIVE PULMONARY DISEASE

JJ reports the following; Consultancy fees: Boehringer Ingelheim, F. Hoffmann-La Roche, GlaxoSmithKline, NHSX; Advisory Boards: Boehringer Ingelheim, F. Hoffmann-La Roche; Lecturefees: Boehringer Ingelheim, F. Hoffmann-La Roche, Takeda; Grant Funding: GlaxoSmithKline, Wellcome Trust, Microsoft Research.

S11 SERIAL SAMPLING FOR NOVEL BIOMARKER EVALUATION IN MALIGNANT PLEURAL EFFUSION: THE PREDICTIVE POTENTIAL OF PLEURAL FLUID SUPAR

Funding for this work was provided by Southmead Hospital Charity Research Fund.

S18 LONG-TERM SYMPTOM PROFILES AFTER COVID-19 VS OTHER ACUTE RESPIRATORY INFECTIONS: A POPULATION-BASED OBSERVATIONAL STUDY

This study is funded by Barts Charity. We declare no competing interests.

S19 **GAS EXCHANGE IMAGING USING DISSOLVED-PHASE 129XE MRI IN POST COVID COHORTS**

Grant funding was received from GE Healthcare, GSK and Sheffield NIHR BRC.

S25 **BENEFITS OF LUMACAFTOR/IVACAFTOR (LUM/IVA) INITIATION IN CHILDREN WITH CF AGED 2 THROUGH 5 YEARS: INTERIM RESULTS FROM AN ONGOING REGISTRY-BASED STUDY**

CK, MH, RZ: Employees of Vertex Pharmaceuticals and may own stock or stock options in Vertex Pharmaceuticals; AZ: No conflict of interest; LN: Acting as pharmacovigilance study manager of the ECFSPR; institutional fees for study participation from Vertex Pharmaceuticals and the German Center for Lung Research.

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S26 **CLINICAL, MICROBIAL AND INFLAMMATORY CHARACTERISATION OF EOSINOPHILIC BRONCHIECTASIS.**

Funded by the European Respiratory Society through the EMBARC3 consortium. EMBARC3 is supported by project partners Armata, AstraZeneca, Boehringer Ingelheim, Chiesi, CSL Behring, Grifols, Insmed, Janssen, Lifearc, Novartis, and Zambon.

S31 **EFFICACY OF DUPILUMAB IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE WITH TYPE 2 INFLAMMATION BY BASELINE BLOOD EOSINOPHIL COUNT**

Bafadhel M has received grant funding to institution from AstraZeneca and Roche; consultancy and speaker honoraria to institution from AstraZeneca, Chiesi, GSK; scientific advisor to ProAxsis® and AlbusHealth®. Bhatt SP has received grants from the NIH, and has received consulting fees from Sanofi/Regeneron, Boehringer, and CME fees from IntegrityCE. Rabe KF is a consultant for and received speaker fees from AstraZeneca, Boehringer Ingelheim, Novartis, Sanofi and Teva. Hanania NA has received honoraria for serving as consultant or on advisory boards for Sanofi, GSK, Amgen. Teva, Astra Zeneca, Genentech, Verona Pharma and research grant support from GSK, Astra Zeneca, Genentech, Sanofi, Teva and Novartis. Vogelmeier CF has been a speaker at symposia and/or served on scientific advisory boards sponsored by Aerogen, AstraZeneca, Boehringer Ingelheim, CSL Behring, Chiesi, GlaxoSmithKline, Grifols, Insmed, Menarini, Novartis, Nuvaira, MedUpdate, Roche and Sanofi. Cole J has no conflicts of interest to disclose. Christenson SA reports grant funding to institution from the National Institutes of Health (NIH) and Merck; consulting fees paid from AstraZeneca, GlaxoSmithKline, and Glenmark Pharmaceuticals; payment and honoraria paid from AstraZeneca, Sanofi/Regeneron, Genentech, and Sunovion; and participation in advisory boards or Data and Safety Monitoring Boards (DSMBs) for AstraZeneca, GlaxoSmithKline, Sanofi/Regeneron, and Glenmark Pharmaceuticals. Papi A reports grants, personal fees, nonfinancial support, and other from AstraZeneca, Boehringer Ingelheim, Chiesi, GSK, Mundipharma, and Teva; has received personal fees and nonfinancial support from Menarini, Novartis, and Zambon; and has received grants from Sanofi. Singh D has received Consultancy fees and honoraria from Aerogen, AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, CSL Behring, EpiEndo, Genentech, GlaxoSmithKline, Glenmark, Gossamer Bio, Kinaset Therapeutics, Menarini, Novartis, Orion, Pulmatrix, Sanofi, Teva, Theravance Biopharma, and Verona Pharma. Laws E, Mannent LP, Lu X, Bauer D, Robinson LB, Abdulai RM: Sanofi – employees, may hold stock and/or stock options in the company. Mortensen, E, Maloney, J, Bansal A: Regeneron Pharmaceuticals Inc. – employee and/or shareholder.

S33 **PERFORMANCE OF VOLUME AND DIAMETER THRESHOLDS IN PREDICTING AND EXCLUDING MALIGNANCY IN SCREEN-DETECTED SOLID NODULES IN THE SUMMIT STUDY**

The SUMMIT study is funded by GRAIL through a research grant awarded to SMJ as principal investigator.

S36 **OUTCOMES AFTER CURATIVE TREATMENT FOR PATIENTS DIAGNOSED WITH CLINICAL STAGE I LUNG CANCER IN THE YORKSHIRE LUNG SCREENING TRIAL**

Yorkshire Lung Screening Trial was funded by Yorkshire Cancer Research (L403).

S40 **ERUPT: EVALUATION OF REAL-WORLD USE OF PULMONARY EMBOLISM (PE) THROMBOLYSIS**

Asthma + Lung UK contributed funds to the INSPIRE network to create a REDcap database to support the study.

S42 **DIAGNOSING ASTHMA IN CHILDREN - HOW CAN IT BE IMPROVED?**

Asthma + Lung UK.

S44 **DEVELOPING A QUALITY OF LIFE OUTCOME MEASURE FOR PAEDIATRIC SEVERE ASTHMA: A QUALITATIVE STUDY**

This study is partly funded by the European Commission's Innovative Medicines Initiative 2 Joint Undertaking (JU) under grant agreement number 831434 (3TR).

S45 FORCED OSCILLOMETRY TECHNIQUE IN CHILDREN WITH PRESCHOOL WHEEZE: FEASIBILITY AND RELATIONSHIP TO CLINICAL PARAMETERS

This study was part of a Masters of Science degree funded by Imam Abdulrahman bin Faisal University (Dammam, Saudi Arabia) through the Saudi Arabian Cultural Bureau (London, UK).

S52 DIETARY NITRATE SUPPLEMENTATION TO ENHANCE EXERCISE CAPACITY IN PULMONARY HYPERTENSION: EDEN-OX2 A DOUBLE-BLIND, PLACEBO-CONTROLLED, RANDOMISED CROSSOVER STUDY

The study was funded by a grant from the Moulton Charitable Foundation and the Saudi Arabia Cultural Bureau. The funders played no role in the conduct or analysis of this study.

S53 CO-DESIGN OF A WALKING FOOTBALL INTERVENTION FOR PEOPLE WITH CHRONIC BREATHLESSNESS

First author is supported by NIHR ARC NENC - No conflicts of interest to declare.

S54 ALTERNATIVE PULMONARY REHABILITATION (PR) FOR PEOPLE WITH INTERSTITIAL LUNG DISEASE (ILD): DEVELOPING THE MODEL USING EXPERIENCE-BASED CO-DESIGN

This research was funded by the Royal Brompton and Harefield Hospitals Charity.

S61 OCCUPATIONAL EXPOSURE TO PARTICULATE MATTER AND STAFF SICKNESS ABSENCE ON THE LONDON UNDERGROUND

This research was funded by Transport for London (TfL). The views expressed are those of the author(s) and not necessarily those of TfL.

S65 TEZEPELUMAB REDUCED OCS USE IN OCS-DEPENDENT PATIENTS WITH SEVERE ASTHMA: PHASE 3B WAYFINDER STUDY INTERIM RESULTS

This study was funded by AstraZeneca and Amgen Inc. David J Jackson has received consultancy fees and speaker fees from AstraZeneca, GSK, Novartis, Sanofi and Teva Pharmaceuticals. Njira Lugogo has received consultancy fees for participation in advisory boards from Amgen, AstraZeneca, Genentech, GSK, Novartis, Regeneron, Sanofi and Teva Pharmaceuticals; has received honoraria for non-speaker bureau presentations from AstraZeneca and GSK; has received travel support from AstraZeneca; and her institution has received research support from Amgen, AstraZeneca, Avillion, Genentech, GSK, Gossamer Bio, Regeneron, Sanofi and Teva Pharmaceuticals. Mark Gurnell has attended advisory board meetings for AstraZeneca and has received speaker fees from AstraZeneca and Novartis. Liam G Heaney has received grant funding from, participated in advisory boards for and given lectures at meetings supported by Amgen, AstraZeneca, Boehringer Ingelheim, Circassia Pharmaceuticals, Evelo Biosciences, GSK, Novartis, Roche, Sanofi, Teva Pharmaceuticals and Theravance Biopharma; has received grants from Aerocrine, Amgen, AstraZeneca, Genentech, GSK, MedImmune, Novartis and Vitalograph; has received sponsorship for attending international scientific meetings for AstraZeneca, Boehringer Ingelheim, Chiesi, GSK and Napp Pharmaceuticals; has taken part in asthma clinical trials sponsored by Boehringer Ingelheim, GSK and Roche, for which his institution has been remunerated; and is the Academic Lead for the Medical Research Council Stratified Medicine UK Consortium in Severe Asthma, which involves industrial partnerships with several pharmaceutical companies, including Amgen, AstraZeneca, Boehringer Ingelheim, GSK, Janssen Pharmaceuticals and Roche. Stephanie Korn has received fees for lectures and/or advisory board meetings from AstraZeneca, GSK, Novartis, Roche, Sanofi Aventis and Teva Pharmaceuticals. Guy Brusselle has received fees for advisory boards and/or speaker fees from Amgen, AstraZeneca, Boehringer Ingelheim, Chiesi, GSK, Novartis, Sanofi and Teva Pharmaceuticals. Pascal Chanez has provided consultancy services for Boehringer Ingelheim, Johnson & Johnson, GSK, Merck Sharp & Dohme, AstraZeneca, Novartis, Teva, Chiesi, Sanofi and SNCF; has served advisory boards for Almirall, Boehringer Ingelheim, Johnson & Johnson, GSK, AstraZeneca, Novartis, Teva, Chiesi, and Sanofi; has received lecture fees from Boehringer Ingelheim, Centocor, GSK, AstraZeneca, Novartis, Teva, Chiesi, Boston Scientific and ALK; has received industry-sponsored grants from Roche, Boston Scientific, Boehringer Ingelheim, Centocor, GSK, AstraZeneca, ALK, Novartis, Teva, and Chiesi; and is the on the president scientific committee « Fondation du souffle » 2021-2025. Jean-Pierre Llanos is an employee of Amgen and owns stock in Amgen. Neil Martin, Nanna Keeling, Kinga Salapa and Bill Cook are employees of AstraZeneca and may own stock or stock options in AstraZeneca.

S67 BIOMARKERS AND CLINICAL OUTCOMES AFTER CESSATION OF TEZEPELUMAB AFTER 2 YEARS OF TREATMENT (DESTINATION)

This study was funded by AstraZeneca and Amgen Inc. Christopher E Brightling has received grants and consultancy fees from 4D Pharma, AstraZeneca, Chiesi, Genentech, GSK, Mologic, Novartis, Regeneron, Roche and Sanofi. David Jackson has received consultancy fees and speaker fees from AstraZeneca, GSK, Novartis, Sanofi and Teva Pharmaceuticals. Ales Kotalik, Gene Colice and Neil Martin are employees of AstraZeneca and may own stock or stock options in AstraZeneca. Nestor A Molfino and Scott Caveney are employees of Amgen and own stock in Amgen. Celeste Porsbjerg has received grants and consultancy fees from ALK-Abelló, AstraZeneca, Chiesi, GSK, Novartis, Sanofi and Teva Pharmaceuticals. Elliot Israel has served as a consultant to and received personal fees from 4D Pharma, AB Science, Amgen, AstraZeneca, Avillion, Biometry, Cowen, Equillium, Genentech, GSK, Merck, Novartis, Pneuma Respiratory, PPS Health, Regeneron Pharmaceuticals, Sanofi, Sienna Biopharmaceuticals and Teva Pharmaceuticals; has received non-financial support from

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S68 **CAFFEINE HAS DIFFERENTIAL EFFECTS ON EXPRESSION OF TGFβ ISOFORMS AND PROMOTES EPITHELIAL WOUND HEALING THROUGH A TGFβ-DEPENDENT PATHWAY.**

E Cash is funded on a Wellcome Trust PhD studentship.

S69 **TARGETING THE RESPONSE OF LAM CELLS TO EXTRACELLULAR MATRIX COULD PROVIDE NEW THERAPIES FOR LYMPHANGIOLEIOMYOMATOSIS**

Funded by LAM Action and the LAM Foundation.

S70 **MESENCHYMAL CELL SENESCENCE INFLUENCES ATII CELL VIABILITY IN LAM**

Funding. Medical Research Council, The LAM Foundation.

S72 **SPECIFIC THORACIC CT PATTERN OF PERIHILAR CONGLOMERATION AND CONSOLIDATION IS ASSOCIATED WITH DEVELOPMENT OF LUNG FIBROSIS IN PULMONARY SARCOIDOSIS**

Source of funding: Oxford NIHR Biomedical Research Centre.

S75 **QUANTIFICATION OF SMOKING-RELATED AIRWAY REMODELLING IN COPD USING A NOVEL FAST-RESPONSE CAPNOMETER**

NIHR (i4i grant), Innovate UK, SBRI Healthcare and Pfizer OpenAir.

S76 **THE SUMMIT STUDY: FOUR-WEEK QUIT RATES AMONGST INDIVIDUALS REFERRED TO STOP SMOKING SERVICES FOLLOWING ATTENDANCE AT A LUNG HEALTH CHECK**

The SUMMIT Study is funded by GRAIL through a research grant awarded to SMJ as Principal Investigator.

S82 **RESIDUAL LUNG ABNORMALITY FOLLOWING COVID-19 HOSPITALISATION IS CHARACTERISED BY EPITHELIAL INJURY**

PHOSP consortium contributed to this study on behalf of the UKILD Post COVID consortium.

S84 **SINGLE-CELL LANDSCAPE OF BRONCHOALVEOLAR CELLS IN INFLAMMATORY AND FIBROTIC POST-COVID RESIDUAL LUNG ABNORMALITIES**

UCLH NIHR BRC.

S85 **ACUTE CORONARY SYNDROME (ACS) AFTER EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) COMPARED TO OTHER CAUSES OF ACUTE LOWER RESPIRATORY TRACT DISEASE IN A PROSPECTIVE COHORT STUDY OF HOSPITALISED ADULTS.**

This study is an investigator-led, University of Bristol sponsored study which is funded through a collaborative agreement by Pfizer Inc.

S86 **FACTORS ASSOCIATED WITH NON-FATAL ATRIAL FIBRILLATION OR FLUTTER WITHIN THE FIRST 30 DAYS POST-EXACERBATION OF COPD: A NESTED CASE-CONTROL STUDY**

The EXACOS-CV study is funded by AstraZeneca.

S89 **PREVALENCE OF MICROSPIROMETRY-DEFINED CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN TWO EUROPEAN COHORTS OF PATIENTS WITH SIGNIFICANT SMOKING HISTORY HOSPITALISED FOR ACUTE MYOCARDIAL INFARCTION**

This work was funded by AstraZeneca.

S91 **THE EFFECTS OF INHALED CORTICOSTEROIDS ON HEALTHY AIRWAYS**

Supported by Genentech, NIHR Leicester Biomedical Research Centre, Wellcome Trust.

S92 **PROTEOMIC AND TRANSCRIPTOMIC ANALYSIS OF RESIDUAL STEROID-RESPONSIVE INFLAMMATION IN MEPOLIZUMAB TREATED PATIENTS**

I Howell and F Yang contributed equally. This study was funded jointly by the Medical Research Council (MRC) UK (MR/M016579/1) and industrial partners within the MRC Refractory Asthma Stratification Program consortium. Proteomics and transcriptomics analysis was funded by GSK, as part of the RASP-UK MRC Programme.

S93 **CIRCADIAN PATTERNS IN IMMUNE CELL TRAFFICKING IN CHRONIC ALLERGIC AIRWAYS DISEASE**

J.C. is funded by The Kennedy Trust IMPACT Inflammation MBPhD scheme; H.D. is a MRC Clinician Scientist [grant number MR/V029460/1].

S94 **COMPUTED CARDIOPULMONOGRAPHY: AN INNOVATIVE ASSESSMENT OF LUNG FUNCTION BEFORE AND AFTER STARTING BIOLOGIC THERAPY FOR TH-2 HIGH ASTHMA**

This study is sponsored by GlaxoSmithKline (GSK), National Institute for Health and Care Research (NIHR), Biomedical Research Centre (BRC), and Royal Embassy of Saudi Arabia Cultural Bureau (SACB). I don't have anything to disclose except that I am (AA) sponsored by my scholarship from the government of Saudi Arabia. IP and PR are in receipt of an investigator-led award from GSK in relation to this research. Oxford University holds/ has filed patents in relation to the underlying technology of this study. GR and PR have an interest in those patents. In the last 5 years IP has received speaker's honoraria for speaking at sponsored meetings from Astra Zeneca, Boehringer Inglehiem, Aerocrine, Almirall, Novartis, Teva, Chiesi, Sanofi/Regeneron, Menarini and GSK and payments for organising educational events from AZ, GSK, Sanofi/Regeneron and Teva. He has received honoraria for attending advisory panels with Genentech, Sanofi/Regeneron, Astra Zeneca, Boehringer Ingelheim, GSK, Novartis, Teva, Merck, Circassia, Chiesi and Knopp and payments to support FDA approval meetings from GSK. He has received sponsorship to attend international scientific meetings from Boehringer Ingelheim, GSK, Astra Zeneca, Teva and Chiesi. He has received a grant from Chiesi to support a phase 2 clinical trial in Oxford. He is co-patent holder of the rights to the Leicester Cough Questionnaire and has received payments for its use in clinical trials from Merck, Bayer and Insmed. In 2014-5 he was an expert witness for a patent dispute involving Astra Zeneca and Teva.

S95 **THE EFFECT OF SMALL AIRWAYS DISEASE (SAD) ON NON-PHYSIOLOGICAL PARAMETERS IN ASTHMA: FINDINGS FROM THE ASSESSMENT OF SMALL AIRWAYS INVOLVEMENT IN ASTHMA [ATLANTIS] STUDY**

ATLANTIS was designed and funded by Chiesi Ltd. D Singh has received consultancy fees from Aerogen, AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, CSL Behring, EpiEndo, Genentech, GlaxoSmithKline, Glenmark, Gossamer Bio, Kinaset Therapeutics, Menarini, Novartis, Orion, Pfizer, Pulmatrix, Sanofi, Synairgen, Teva, Theravance Biopharma, and Verona Pharma. M Choudhury, S Niazi-Ali, A Browne, and M Ochel are employees of Chiesi Ltd. S Siddiqui has received advisory services and/or speaker fees from CSL Behring, GSK, AZ, Roche, Chiesi, Areteia and ERT Medical. No tobacco company interests, no funding or shares from tobacco companies.

S96 **FIBROBLAST G□Q/11 SIGNALLING CONTROLS LUNG EPITHELIAL CELL-DRIVEN REPAIR VIA MODULATION OF EXTRACELLULAR MATRIX PROPERTIES**

This work was funded by a Malcolm Weallans Pulmonary Fibrosis Research Grant from Asthma + Lung UK (PFT21F\7).

S98 **GENOME-WIDE ASSOCIATION STUDIES OF PULMONARY AND NON-PULMONARY FIBROSIS**

This work was funded by MRC grant MR/W014491/1.

S100 **MAIT CELLS CONTRIBUTE TO PROTECTION AGAINST BLEOMYCIN-INDUCED LUNG TISSUE DAMAGE BY PROMOTING MONOCYTE DIFFERENTIATION INTO TYPE 1 CONVENTIONAL DENDRITIC CELLS**

Funded by China Scholarship Council (CSC) – Nuffield Department of Medicine (NDM) award (X.Z) and grants from the Wellcome Trust (104553/z/14/z, 211050/Z/18/z) (T.S.C.H.).

S101 **IDENTIFICATION AND VALIDATION OF NOVEL THERAPEUTIC TARGETS IN IPF USING HUMAN TISSUE MODELS**

Project funded by Pfizer through academic collaboration- no conflicts of interest.

S105 **THE INCIDENCE OF RESIDUAL EXCESSIVE DAYTIME SLEEPINESS IN OBSTRUCTIVE SLEEP APNOEA SYNDROME TREATED WITH CONTINUOUS POSITIVE AIRWAYS PRESSURE: THE LIVERPOOL SLEEPHEALTH STUDY**

Drs Chakrabarti, Angus and Craig are all Directors of SleepHealth Solutions Ltd. Sources of funding: This work was funded by Bioprojet UK Limited.

S108 **BIOLOGICAL PREDICTORS OF SEVERITY IN RESPIRATORY VIRAL INFECTION (RVI): PRELIMINARY DATA FROM UNIVERSAL, A MULTICENTRE PROSPECTIVE OBSERVATIONAL STUDY.**

UNIVERSAL study supported by Synairgen, AstraZeneca, Janssen. Tom Wilkinson is the co-founder, shareholder and director of Mymhealth Limited; he has received grants or consultancy fees from GSK, AstraZeneca, Janssen, Bergenbio, UCB, Olam, Valneva, Synairgen, Novavax, Teva, BI.

S109 A SEROPOSITIVE SARS-COV-2 CONTROLLED HUMAN INFECTION MODEL DEMONSTRATING POTENT PROTECTIVE IMMUNITY AND IDENTIFICATION OF IMMUNE CORRELATES OF PROTECTION

Study funded by the Wellcome Trust (grant code WT 222305/Z/21/Z) & the Department for Health and Social Care (DHSC)/UK Health Security Agency (UKHSA) relating to the COVID-19 Human Challenge Study COV-CHIM01.

S115 EFFICACY OF HIGH-DOSE TRIPLE THERAPY ON ASTHMA EXACERBATIONS IN ASTHMATICS WITH PERSISTENT AIRFLOW LIMITATION AND HIGH BLOOD EOSINOPHIL COUNT: A POST-HOC ANALYSIS OF THE TRIGGER STUDY

TRIGGER trial was the registration Phase III study funded by Chiesi Farmaceutici.

S116 TREATMENT WITH EXTRAFINE FORMULATION SINGLE-INHALER TRIPLE THERAPY IMPROVES DISEASE CONTROL AND ADHERENCE IN PATIENTS WITH ASTHMA – A 3-MONTH INTERIM ANALYSIS FROM THE TRIMAXIMIZE UK STUDY

TriMaximize UK was designed and funded by Chiesi Ltd. J Richards and N Rangwani are employees of Chiesi Ltd. R Russell has no relevant conflicts of interests.

S117 CLINICAL REMISSION IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA: AN ANALYSIS OF SIROCCO AND CALIMA TRIAL DATA

AMG, AS, SS, and DC are employees of and may own stock in AstraZeneca. AMG has attended advisory boards for AstraZeneca, GlaxoSmithKline, Novartis, Regeneron, Sanofi, and Teva; has received speaker fees from AstraZeneca, Novartis, Sanofi, and Teva; has participated in research with AstraZeneca for which his institution was remunerated and has attended international conferences with Teva; and has had consultancy agreements with AstraZeneca and Sanofi. FLH has attended advisory boards for AstraZeneca and Genentech; has received speaker fees from AstraZeneca and Genentech; and has participated in research sponsored by AstraZeneca, GlaxoSmithKline, Genentech, Teva, and Sanofi, for which her institution has been remunerated. Her family owns Amgen stock. DBP has board membership with AstraZeneca, Boehringer Ingelheim, Chiesi, Mylan, Novartis, Regeneron, Sanofi Genzyme, and ThermoFisher; consultancy agreements with Airway Vista Secretariat, AstraZeneca, Boehringer Ingelheim, Chiesi, EPG Communication Holdings Ltd, FIECON Ltd, Fieldwork International, GlaxoSmithKline, Mylan, Mundipharma, Novartis, OM Pharma SA, PeerVoice, Phadia Ab, Spirosure Inc, Strategic North Limited, Synapse Research Management Partners SL, Talos Health Solutions, Theravance, and WebMD Global LLC; grants and unrestricted funding for investigator-initiated studies (conducted through Observational and Pragmatic Research Institute Pte Ltd) from AstraZeneca, Boehringer Ingelheim, Chiesi, Mylan, Novartis, Regeneron, Respiratory Effectiveness Group, Sanofi Genzyme, Theravance, and the UK National Health Service; received payment for lectures/speaking engagements from AstraZeneca, Boehringer Ingelheim, Chiesi, Cipla, GlaxoSmithKline, Kyorin, Mylan, Mundipharma, Novartis, Regeneron, and Sanofi Genzyme; received payment for travel/accommodation/meeting expenses from AstraZeneca, Boehringer Ingelheim, Mundipharma, Mylan, Novartis, and ThermoFisher; stock/stock options from AKL Research and Development Ltd, which produces phytopharmaceuticals; ownership of 74% of the social enterprise Optimum Patient Care Ltd (Australia and United Kingdom) and 92.61% of Observational and Pragmatic Research Institute Pte Ltd (Singapore); 5% shareholding in Timestamp, which develops adherence monitoring technology; served as peer reviewer for grant committees of the UK Efficacy and Mechanism Evaluation programme and the Health Technology Assessment; and served as an expert witness for GlaxoSmithKline.

S118 DUPILUMAB EFFICACY IS NOT AFFECTED BY PRIOR ASTHMA EXACERBATION STATUS IN LIBERTY ASTHMA TRAVERSE OPEN-LABEL EXTENSION STUDY

Research sponsored by Sanofi and Regeneron Pharmaceuticals, Inc. ClinicalTrials.gov Identifiers: NCT02414854 and NCT02134028. Medical writing/editorial assistance was provided by Bruno Manso, PhD, of Excerpta Medica, and was funded by Sanofi and Regeneron Pharmaceuticals Inc., according to the Good Publication Practice guideline. Papi A: AstraZeneca, Boehringer Ingelheim, Chiesi, GSK, Mundipharma, Teva – reports grants, personal fees, non-financial support, other; Menarini, Novartis, Zambon – personal fees, non-financial support; Sanofi – grants (all outside the submitted work). Castro M: American Lung Association, AstraZeneca, Gala Therapeutics, NIH, Novartis, PCORI, sanofi-aventis, Shionogi, Teva, Theravance Biopharma – research support; Genentech, Novartis, sanofi-aventis, Teva – consultant; AstraZeneca, Genentech, GSK, Regeneron Pharmaceuticals Inc., Sanofi, Teva – speaker fees; Elsevier – royalties. Busse WW: GSK, Novartis, Sanofi – consultant, speaker fees. Langton D: Sanofi – research funding. Korn S: AstraZeneca, Novartis, GSK, Sanofi – consultant, research grant. Pandit-Abid N, Jacob-Nara JA, Rowe PJ: Sanofi – employees, may hold stock and/or stock options in the company. Xia C, Soler X, Radwan A, Deniz Y: Regeneron Pharmaceuticals Inc. – employees and shareholders.

S119 EFFECT OF TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA BY AGE OF ONSET, ALLERGIC STATUS, AND EOSINOPHILIC PHENOTYPE

This study was funded by AstraZeneca and Amgen Inc. Sameer K Mathur has received consultancy fees from AstraZeneca, GSK, and Regeneron and has received honoraria for presentations from AstraZeneca and GSK. Jennifer L. Hill has served as a consultant or advisor for Amgen, AstraZeneca, GSK, Optinose, Regeneron, and Sanofi. Christopher S. Ambrose, Nicole Martin and Neil Martin are employees of AstraZeneca and may own stock or stock options in AstraZeneca. Gene Colice was an employee of AstraZeneca at the time of the study. Jean-Pierre Llanos is an employee of Amgen and owns stock in Amgen.

S127 **IS STREPTOCOCCUS PNEUMONIAE SEROTYPE 3 (SPN3) A NEWLY FOUND CAUSE OF PHARYNGITIS?**

The analysis is part of a study funded by Pfizer Inc.

S128 **PREVALENCE OF RSV AMONG ACUTE LOWER RESPIRATORY TRACT DISEASE (ALRTD) HOSPITALIZATIONS AND PROJECTED SEASONAL RSV-RELATED ALRTD HOSPITALIZATION INCIDENCE AMONG ADULTS IN BRISTOL UK – 2022–2023**

This study is an investigator-led, University of Bristol sponsored study which is funded through a collaborative agreement by Pfizer Inc.

S129 **AN IMPACT OF AGE ON RESPIRATORY SYNCYTIAL VIRUS INFECTION IN AIR-LIQUID-INTERFACE CULTURE BRONCHIAL EPITHELIUM**

This study is funded by Pulmocide ltd.

S132 **'RACE-NEUTRAL' AND 'GLOBAL'? IMPACT OF REFERENCE STANDARDS ON INTERPRETATION OF SPIROMETRY AMONG SOCIO-ECONOMICALLY DEPRIVED, SOUTHERN AFRICAN ADOLESCENTS AND ADULTS.**

ERASE-TB is part of the EDCTP2 programme supported by the European Union (Grant number RIA2018D-2508). CJC is funded by the Wellcome Trust.

S133 **QUALITY OF PRIMARY CARE SPIROMETRY ACCORDING TO ATS/ERS 2019 STANDARDS AND INTER-EXPERT AGREEMENT ON THEIR APPLICATION**

The study is being funded by National Institute for Health Research (NIHR) through an AI Award in Health and Care (Phase 3 Application: Grant number AI_AWARD02204). AS is supported by a Scientia PhD scholarship from UNSW Sydney. KS is a medical advisor to ndd.

S134 **EUPNOOS: ADVANCING EARLY DIAGNOSIS OF RESPIRATORY DISEASES WITH SMARTPHONE-BASED AUDIO PHENOTYPING.**

Study Funded by the Institute for Life Sciences (Southampton).

S135 **LUNG FUNCTION OUTCOMES IN MILITARY PERSONNEL WHO SUSTAINED COMBAT-RELATED TRAUMATIC INJURY; THE ADVANCE STUDY**

The ADVANCE study is funded through the ADVANCE Charity. Key contributors to this charity are the Headley Court Charity (principal funder), HM Treasury (LIBOR Grant), Help for Heroes, Nuffield Trust for the Forces of the Crown, Forces in Mind Trust, National Lottery Community Fund, Blesma - The Limbless Veterans and the UK Ministry of Defence.

S144 **FAILURE TO REPAIR: AN IN VITRO MODEL OF ASPERGILLUS FUMIGATUS INFECTION IN AIRWAY EPITHELIAL INJURY**

MRC Scholarship.

S145 **THE FUNGAL BURDEN IN NONTUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE**

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S146 **ASPERGILLUS IN BRONCHIECTASIS: DATA FROM THE EMBARC REGISTRY.**

Funded by the European Respiratory Society through the EMBARC3 consortium. EMBARC3 is supported by project partners Armata, AstraZeneca, Boehringer Ingelheim, Chiesi, CSL Behring, Grifols, Insmed, Janssen, Lifearc, Novartis, and Zambon.

P10 **'SOMETHING LIKE A HOUSE OF HORRORS': A MIXED METHODS STUDY EXAMINING THE REASONS FOR REFUSAL OF POTENTIALLY CURATIVE TREATMENT IN EARLY-STAGE LUNG CANCER**

This project was funded by Roy Castle Lung Cancer. No relevant disclosures.

P17 **PLANNING THORACIC SURGERY CAPACITY FOR LUNG CANCER SCREENING IN WALES**

NHS Wales Modelling Collaborative is supported by the Health Foundation.

P20 **EXPERIENCES AND ATTITUDES OF PULMONARY, BREATHLESSNESS AND COVID-19 REHABILITATION DELIVERERS ABOUT THE PROTECTED CHARACTERISTICS OF SERVICE USERS**

This work was supported by the Wellcome Trust on the Leicestershire Health Inequalities Improvement Programme and

the Institutional Strategic Support Fund 'Creating New Opportunities' pump-priming funding scheme.

P21 COLLECTION AND REPORTING OF EQUALITY ACT 2010 PROTECTED CHARACTERISTICS WITHIN STUDIES OF PULMONARY REHABILITATION IN THE UNITED KINGDOM

This work was supported by the Wellcome Trust on the Leicestershire Health Inequalities Improvement Programme and the Institutional Strategic Support Fund 'Creating New Opportunities' pump-priming funding scheme.

P46 HOW AND WHEN DO PATIENTS DISPOSE OF OLD OR UNWANTED INHALERS?

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P47 AN OBSERVATIONAL STUDY ON THE CARBON FOOTPRINT FROM INHALER USE IN PEOPLE WITH ASTHMA

Chiesi Limited has funded this research and worked in collaboration with the authors to interpret and present the outputs.

P49 WHAT PROGRESS HAS BEEN MADE IN REDUCING GREENHOUSE GAS EMISSIONS FROM INHALERS IN ENGLAND? AN ANALYSIS OF INHALER PRESCRIBING DATA 2018-2023.

AW is a member of the UN Medical and Chemical Technical Options Committee, the NHSE/I inhaler experts working group, and has made unpaid contributions to research on the carbon footprint of inhalers which was funded by AstraZeneca, Orion and GlaxoSmithKline. JS is a member of the NHSE/I inhaler experts working group and is married to a general practitioner partner in a dispensing practice in Cambridgeshire.

P55 A TRAINING TOOL ON INSPIRATORY MANOEUVRE SUCCESS IN PMDIS AND DPIS: THE INSPIRE STUDY

The study was funded by Orion Corporation.

P64 USING A REMOTE MONITORING PLATFORM TO SUPPORT SPIROMETRY COACHING IN A CYSTIC FIBROSIS PEDIATRIC POPULATION

R Borton is an employee and shareholder in patientMpower.

P74 EVALUATION OF SHORT-TERM FOLLOW-UP CT FOR THE MANAGEMENT OF CONSOLIDATION IN LUNG CANCER SCREENING

Two authors are members of the BTS Pulmonary Nodules Guideline Development Group (GCG).

P85 CONTEMPORARY UNDERLYING CAUSES OF IMMUNOCOMPROMISE IN SEVERE PCP: A 10 YEAR TERTIARY-CENTRE EXPERIENCE.

AJK is an NIHR-funded academic clinical fellow.

P90 REAL-WORLD EXPERIENCE WITH NEBULISED AMIKACIN LIPOSOME INHALATION SUSPENSION (ARIKAYCE®): REPORT FROM A TERTIARY CENTRE

GH: nil; EB: nil; ML: Michael R. Loebinger reports receiving consulting fees from 30T, AN2 Therapeutics, Armata, Boehringer Ingelheim, Chiesi, Electromed, Insmed Incorporated, Parion Sciences, Recode Therapeutics, Cepheid, Mannkind and Zambon within the past 24 months.

P93 A QUALITATIVE INTERVIEW STUDY TO EXPLORE THE USE OF ADVERSE EVENT MITIGATION STRATEGIES AMONG ADULTS RECEIVING AMIKACIN LIPOSOME INHALATION SUSPENSION (ALIS) IN REAL WORLD SETTINGS

This study was sponsored by Insmed Incorporated. JT, NT, and KM are employees of OPEN Health, which received funding from Insmed Incorporated to conduct the research activities. JW, MH, and MB are employees of Insmed Incorporated. MB reports stock ownership in Insmed Incorporated. AC is a former employee of Insmed Incorporated. JA serves on an advisory board and is a speaker for Insmed Incorporated.

P101 NEURAL RESPIRATORY DRIVE AMONG COPD PATIENTS WITH MILD OR MODERATE AIRFLOW LIMITATION IN PRIMARY CARE: REPRODUCIBILITY, RELIABILITY AND ASSOCIATION WITH OTHER BIOMARKERS

NIHR Doctoral Research Fellowship.

P107 REAL-WORLD IMPACT OF ELX/TEZ/IVA ON QUALITY OF LIFE OF CHILDREN WITH CF AGED 6-11 YEARS AND PRIMARY CAREGIVERS IN THE UK: MAGNIFY, A PROSPECTIVE, OBSERVATIONAL, NONINTERVENTIONAL STUDY

Sponsor: Vertex Pharmaceuticals Incorporated.

P111 DIPEPTIDYL PEPTIDASE-1 INHIBITION IN BRONCHIECTASIS WITH EOSINOPHILIC ENDOTYPE IN THE WILLOW TRIAL

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P112 EFFICACY AND SAFETY OF DIPEPTIDYL PEPTIDASE-1 (DPP-1) INHIBITION IN LONG-TERM MACROLIDE USERS WITH BRONCHIECTASIS: A POST-HOC ANALYSIS OF THE WILLOW TRIAL

This study was funded by Insmed Incorporated. Charles Haworth reports receiving consultancy/speaker fees from 30 Technology, CSL Behring, Chiesi, Insmed, Janssen, LifeArc, Pneumagen, Vertex, and Zambon. Pamela McShane reports receiving grant/research support from AN2 Therapeutics, Armata, Boehringer Ingelheim, Electromed. Hillrom, Insmed, Paratek, Redhill, and Renovion; trial steering committee membership for Boehringer Ingelheim and Insmed; and honoraria from Insmed. James Chalmers reports receiving grants and personal fees from AstraZeneca, Boehringer Ingelheim, GlaxoSmithKline, Zambon and Insmed Incorporated; a grant from Gilead; and personal fees from Novartis and Chiesi within the past 24 months. Ariel Teper, Carlos Fernandez, Sebastian Fucile, Melanie Lauterio, and Andrea Maes are employees and shareholders of Insmed Incorporated. Medical writing support was provided by Erin Burns-Tidmore, PhD, of Envision Pharma Group, and funded by Insmed Incorporated.

P122 SUSTAINED WEIGHT LOSS AND IMPROVED ASTHMA OUTCOMES AT ONE YEAR FROM A RANDOMISED CONTROLLED TRIAL OF A WEIGHT MANAGEMENT PROGRAMME FOR DIFFICULT-TO-TREAT ASTHMA AND OBESITY

Funded by NHS endowment fund.

P124 STABILITY OF FRACTIONAL EXHALED NITRIC OXIDE LEVELS AS A BIOMARKER IN PATIENTS WITH UNCONTROLLED ASTHMA

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P129 UK SEVERE ASTHMA PATIENT OUTCOMES IN THE REAL-WORLD VERSUS ITALY AND THE USA: REALITI-A AT 2 YEARS

Funding: GSK (204710); Conflicts of interest statements: Jessica Weir, Ben Egan and Peter Howarth are employees of GSK and hold GSK shares. Rekha Chaudhuri has been an advisory board member for GSK, AstraZeneca, Novartis, Teva, and Chiesi; received speaker/lecture fees from GSK, AstraZeneca, Teva, Chiesi, Novartis and Sanofi, received grants for investigator-led projects from AstraZeneca, Novartis and Aerocrine; received conference travel funding from AstraZeneca, Chiesi, NappPharmaceuticals and Boehringer; involved in clinical trials for AstraZeneca, GSK, Roche, Johnson & Johnson, Pfizer, Boston Scientific, Genentech. Liam Heaney is the Academic Lead for the UK MRC Consortium for Stratified Medicine in Severe Asthma – Industrial Pharma partners Amgen, AstraZeneca, MedImmune, Janssen, Novartis, Roche/Genentech, GSK and Boehringer Ingelheim; has received grant funding, been involved in clinical trials, has received travel funding and/or attended advisory boards/lectures supported by Astra Zeneca, Chiesi, Boehringer Ingelheim, MedImmune, Novartis, Roche/Genentech, and GSK, Evelo Biosciences, Schering Plough, Synairgen, Teva, Theravance and Vectura. Daniel Menzies is the severe asthma lead for north Wales. He has received consulting fees and participated in paid advisory meetings for GSK, Novartis, Cheisi and Astra Zeneca. Paul Pfeffer is the lead of the North Central and East London Severe Asthma Network and a member of the UK and

International Severe Asthma Registry steering groups; has received research funding from NIHR and GSK; has participated in paid speaker and advisory board activities for AstraZeneca, GSK and Sanofi.

P130 **CLINICAL EFFECTIVENESS OVER 2 YEARS OF BENRALIZUMAB TREATMENT IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA AND CONCOMITANT NASAL POLYPOSIS; ANALYSIS FROM THE BPAP STUDY**

DJJ has received advisory board fees and speaker fees from AstraZeneca, GSK, Sanofi Regeneron, Chiesi, Teva, and Boehringer Ingelheim, and research grants from AstraZeneca and GSK. HB has received speaker fees from AstraZeneca, Chiesi, GSK, TEVA; has received advisory board fees from Astrazeneca, Chiesi, GlaxoSmithKline; has received travel support / hospitality from AstraZeneca and Chiesi; has received grant funding from AstraZeneca, Chiesi, The Health Foundation, NHSE (AAC). HR has received speaker fees and research grants from AstraZeneca and GSK. PEP has attended advisory board for AstraZeneca, GlaxoSmithKline and Sanofi; has given lectures at meetings with/without lecture honoraria supported by AstraZeneca and GlaxoSmithKline; has taken part in clinical trials sponsored by AstraZeneca, GlaxoSmithKline and Novartis; and is conducting research funded by GlaxoSmithKline for which his institution receives remuneration. IJC has received speaker fees from GlaxoSmithKline and honorarium from AstraZeneca and Glaxosmithkline. SF has received speaker fees from AstraZeneca, GlaxoSmithKline, Chiesi and Novartis. JD has received support to attend medical conferences from Sanofi Regeneron. AMN has received speaker fees and conference support from AstraZeneca, Teva and Chiesi. MW, JL and TM are employees of AstraZeneca UK. This study was funded by AstraZeneca, including medical writing support provided by OPEN Health.

P131 **PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA ACHIEVED REMISSION OVER 2 YEARS WITH BENRALIZUMAB: INTEGRATED ANALYSIS OF THE >1000-PATIENT, MULTINATIONAL, REAL-WORLD XALOC-1 STUDY**

Funding: AstraZeneca

P147 **HYPOXIA AND/OR ANCA IGG INDUCE CYTOSKELETAL CHANGES IN NEUTROPHILS THAT MAY PROMOTE LUNG ENDOTHELIAL INJURY IN ANCA-ASSOCIATED VASCULITIS**

NIHR Imperial Biomedical Research Centre, Academy of Medical Sciences

P152 **THE ASSOCIATION OF ABO AND RHESUS BLOOD GROUP WITH SEVERE OUTCOMES FROM NON-SARS COV-2 RESPIRATORY INFECTION: A PROSPECTIVE OBSERVATIONAL COHORT STUDY 2020-2022.**

AH is funded by the British Heart Foundation 4-year PhD Studentship. The AvonCAP study is an investigator-led, University of Bristol sponsored study which is funded through a collaborative agreement by Pfizer Inc

P158 **CHARACTERISTICS AND OUTCOMES OF PATIENTS WITH COVID-19 PRESUMED TO BE TREATED WITH SOTROVIMAB IN NHS HOSPITALS IN ENGLAND**

Funding: GSK and Vir Biotechnology, Inc (Study 219450).

P159 **COMPARATIVE EFFECTIVENESS OF SOTROVIMAB VERSUS NO TREATMENT IN INITIALLY NON-HOSPITALISED HIGH-RISK PATIENTS WITH COVID-19 IN NORTH WEST LONDON DURING OMICRON PREDOMINANCE: A RETROSPECTIVE COHORT STUDY USING THE DISCOVER DATASET**

Funding: GSK and Vir Biotechnology, Inc (Study 219543)

P160 **INTERIM RESULTS OF A PROSPECTIVE COHORT STUDY TO MONITOR THE EMERGENCE OF RESISTANCE IN IMMUNOCOMPROMISED NON-HOSPITALISED PATIENTS WITH COVID-19 WHO WERE TREATED WITH SOTROVIMAB IN GREAT BRITAIN: LUNAR STUDY**

Funding: GSK and Vir Biotechnology, Inc (study 218407)

P161 **ANTIVIRAL EFFECTS OF A NOVEL NANOEMULSION FORMULATION OF NIRMATRELVIR FOR A NASAL DELIVERY ON CORONAVIRUS INFECTION IN HUMAN NASAL EPITHELIUM**

This study is funded by SubIntro Ltd.

P165 **HOW BEST TO MEASURE ASTHMA ATTACKS? A METHODOLOGICAL SYSTEMATIC REVIEW**

Oxford NIHR BRC

P166 **EXTERNAL VALIDATION OF THE MINIMAL CLINICALLY IMPORTANT DIFFERENCE OF FRACTIONAL EXHALED NITRIC OXIDE USING THE ASTHMA CONTROL QUESTIONNAIRE: A SECONDARY ANALYSIS OF TWO RCTS IN MILD OR MODERATE ASTHMA.**

The Novel START study was funded by AstraZeneca and the Health Research Council of New Zealand (HRC NZ); the PRACTICAL study was funded by the HRC NZ. RB has received institutional funding from AstraZeneca, CureKids (NZ), Genentech, and HRC NZ, and personal fees from AstraZeneca, Avillion, Cipla, HRC NZ and Teva.

P167 **ENDOTHELIAL DYSFUNCTION AND ARTERIAL STIFFNESS IN PEOPLE WITH ASTHMA: A SYSTEMATIC REVIEW OF THE EVIDENCE AND META-ANALYSIS**

This work is funded by AUKCAR and there are no conflicts of interest

P176 **BRONCHODILATOR RESPONSE DISCORDANCE IN PATIENTS WITH ASTHMA AND/OR COPD ASSESSED BY 129XE-MRI AND SPIROMETRY**

Study Funded by AstraZeneca

P177 **129XE MRI PHENOTYPING AND LONGITUDINAL CHANGE IN PATIENTS WITH ASTHMA AND/OR COPD AND NORMAL PULMONARY FUNCTION TESTS**

Study Funded by AstraZeneca

P188 **GENETIC RISK OF PULMONARY FIBROSIS ACROSS DIFFERENT ANCESTRY GROUPS**

Nabunje, R is funded under a Wellcome Trust DTP(218505/Z/19/Z). Wain, LV reports funding from GSK, Pfizer, Orion Pharma and Genentech, outside of the submitted work. Wain, LV reports consultancy for GSK, Galapagos and Boehringer-Ingelheim. Jenkins, RG has received grants from Astra Zeneca, Biogen, Galecto, GlaxoSmithKline, Nordic Biosciences, RedX and Pliant and consulting fees from AstraZeneca, Brainomix, Bristol Myers Squibb, Chiesi, Cohbar, Daewoong, GlaxoSmithKline, Veracyte, Resolution Therapeutics, Pliant and personal fees for advisory board participation or speaking fees Boehringer Ingelheim, Chiesi, Galapagos, Vicore, Roche, PatientMPower and AstraZeneca.

P189 **GENETIC DIFFERENCES BETWEEN SEXES IN IDIOPATHIC PULMONARY FIBROSIS: A GENOME-WIDE SNP-BY-SEX INTERACTION ANALYSIS**

The presenting author has no COIs. Some co authors report current employment by Genentech/Roche and GSK Outside of the submitted work, co authors report financial interactions with GSK, Genentech/Roche, Boehringer Ingelheim, Genentech, United Therapeutics, AmMax Bio, Lupin Pharmaceuticals, Astra Zeneca, Biogen, Bristol Myers Squibb, Chiesi Daewoong Galapagos, Galecto Heptares NuMedii PatientMPower Pliant, Promedior Redx Resolution Therapeutics, Roche, Veracyte Orion Pharma, Eleven P 15 and Vicore

P191 **EXPLORING THE ASSOCIATION BETWEEN HUMAN LEUKOCYTE ANTIGEN (HLA) GENETICS AND IDIOPATHIC PULMONARY FIBROSIS.**

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P196 **DEEP-LEARNING CT IMAGING ALGORITHM TO DETECT UIP PATTERN IN PATIENTS WITH SSC-ILD: ASSOCIATION WITH SEVERITY AND SURVIVAL**

Work supported by SRUK grant: RBH1

P202 **CLINICAL CHARACTERISTICS OF RHINOVIRUS TRIGGERED COPD EXACERBATIONS**

LF is supported by an NHLI Foundation Clinical Lectureship

P207 **SENOLYTIC EFFECTS OF TELAGLENASTAT, A GLUTAMINASE INHIBITOR, ON SENESCENT AIRWAY EPITHELIAL CELLS**

This study is funded by Sitryx Ltd.

P209 **ADHERENCE AND QUALITY OF LIFE IN COPD IS IMPROVED BY A FIXED TRIPLE THERAPY: THE TRIOPTIMIZE STUDY**

TriOptimize UK was designed and funded by Chiesi Ltd. L Warner and T Amodu are employees of Chiesi Ltd. R Russell has no relevant conflicts of interests. D Wat has received Advisory Board membership from Insmed and Chiesi, personal fees from Chiesi, Boehringer Ingelheim, AstraZeneca, GSK and Insmed and travel grants from Chiesi and Insmed.

P218 **BRONCHIAL THERMOPLASTY IMPROVES COUGH HYPERSENSITIVITY AND COUGH IN PATIENTS WITH SEVERE ASTHMA**

This study was supported in part by the Grant-in-Aid for Scientific Research from the Ministry of Education, Culture, Sports, Science, and Technology of the Japanese government (20K17219) and the JFE (The Japanese Foundation for Research and Promotion of Endoscopy) Grant.

P220 **THORACIC SOCIETIES MEMBER'S VIEW OF CHRONIC COUGH**

This survey was supported by a grant from MSD.

P221 **THE BURDEN OF PERSISTENT COUGH IN IDIOPATHIC PULMONARY FIBROSIS (IPF) AND OTHER INTERSTITIAL LUNG DISEASES (ILDS): A SYSTEMATIC EVIDENCE SYNTHESIS**

R. Green and N. Pooley report personal fees from Boehringer Ingelheim outside the submitted work. M. Baldwin and N. Patel are employees of Boehringer Ingelheim. M. Rutten-van Mölken reports consulting fees from Boehringer Ingelheim outside the submitted work. Outside the submitted work, M. Wijsenbeek reports grants or contracts from The Netherlands Organisation for Health Research and Development, The Dutch Lung Foundation, The Dutch Pulmonary Fibrosis organization, Sarcoidosis.nl, Boehringer Ingelheim, Hoffman la Roche and AstraZeneca-Daiichi, consulting fees from Bristol Myers Squibb, Boehringer Ingelheim, Galapagos, Galecto, Hoffman la Roche, Horizon therapeutics, Kinevant Sciences, Molecure, Nerre Therapeutics, Novartis, PureTech Health, Thyron, Trevi and Vicore, payments or honoraria from Boehringer Ingelheim, CSL Behring,Hoffman la Roche and Novartis, support for attending meetings/travel from Boehringer Ingelheim, Hoffman la Roche and Galapagos and participation on a Data Safety Monitoring or Advisory board for Savara and Galapagos. M. Wijsenbeek also reports that she is Chair of the Idiopathic Interstitial Pneumonia group of the European Respiratory Society, Member of the board of the Netherlands Respiratory Society, Member of the scientific advisory board of the European Idiopathic Pulmonary Fibrosis and related disorders federation, Chair of the educational committee of the European Reference Network for rare Lung Diseases, and part of an advisory board for the Dutch Lung fibrosis and Sarcoidosis patient associations.

P234 **THE FEASIBILITY OF A DIGITAL SELF-MANAGEMENT PROGRAMME (BREATHTEC) TO REDUCE ANXIETY, DEPRESSION, AND BREATHLESSNESS IN PATIENTS WITH CHRONIC RESPIRATORY DISEASES: A RETROSPECTIVE ANALYSIS.**

KHM & GB received a grant from NIHR for a CBT study and are joint directors for BreathTec.

P235 **A POINT PREVALENCE STUDY OF COPD THERAPY IN 13361 PATIENTS USING THE MYCOPD APP: EXAMINING REAL-TIME CAPTURE OF DISEASE CONTROL MEASURES**

This study was conducted by my mHealth, with funding from AstraZeneca. Medical writing support was provided by Louisa McKay, on behalf of Helios Medical Communications, funded by AstraZeneca. SB is a co-founder, shareholder and director of my mHealth, the developer of the myCOPD app. TW is a co-founder, shareholder and director of my mHealth, the developer of the myCOPD app. AV and JE-K are employees of AstraZeneca.

P238 **LONGITUDINAL OBSERVATION OF PATIENT ENGAGEMENT IN AN INTERSTITIAL LUNG DISEASE (ILD) HOME MONITORING PROGRAM**

M Naqvi, S Lines, R Borton, W Adams are joint authors.

M6 **CRITICALLY EXAMINING THE END OF LIFE CARE OF PEOPLE WITH INTERSTITIAL LUNG DISEASE: VIEWS OF PATIENTS, FAMILIES AND HEALTHCARE PROFESSIONALS.**

This study was jointly funded by Marie Curie and Newcastle Hospitals NHS Charity as part of a Newcastle University MD studentship (Evelyn Palmer).

M9 **IMPORTANCE OF PATIENT VOICE IN GUIDING THE MANAGEMENT OF COPD**

GSK sponsored study

M11 **A SCOPING REVIEW EXPLORING ADOPTION OF DIGITAL STRESS MANAGEMENT RESOURCES FOR LONG-TERM HEALTH CONDITIONS – JUST USEFUL FOR RESPIRATORY CONDITIONS?**

Funded by Edinburgh Napier University

M13 **ACCURATE DIAGNOSIS OF ASTHMA USING EITHER SINGLE OR LONGITUDINAL BREATH RECORDS CAPTURED ON A NOVEL FAST RESPONSE CAPNOMETER**

NIHR (i4i grant), Innovate UK, SBRI Healthcare and Pfizer OpenAir.

M15 QUANTIFICATION OF CLINICAL DETERIORATION OF ASTHMA BASED ON THRESHOLD FOR SABA USE IN TWO STUDIES OF THE DIGIHALER SYSTEM

FH has received advisory and unbranded speaking honoraria from AstraZeneca, serves as a consultant for Genentech, and has served as an investigator for clinical trials sponsored by GlaxoSmithKline, Genentech, Teva and Sanofi, for which her institution has received funding. GM receives current research grant support from GlaxoSmithKline, Novartis and Sanofi-Regeneron, receives consulting fees from Novartis, and has received past research grant support from Teva, Alk-Abello, and Genentech. GS, RB, TH and KS are employees of Teva Pharmaceuticals. SBA reports grant and personal fee for advisory board contribution and/or expert lectures/educational activities from GSK, AstraZeneca, Mylan, Viatris, Boehringer Ingelheim, and Sanofi, and serves as a consultant for Teva. MW has received consulting, advisory, or speaking honoraria from Amgen, AstraZeneca, Avalo Therapeutics, Boehringer Ingelheim, Cerecor, Cohero Health, Cytoreason, Eli Lilly, Equillium, GlaxoSmithKline, Incyte, Kinaset, Novartis, Phylaxis, Pulmatrix, Rapt Therapeutics, Regeneron, Restorbio, Roche/Genentech, Sanofi/Genzyme, Sentien, Sound Biologics, Teva and Upstream Bio.

M16 RECOGNIZING ASTHMA RISK SCENARIOS: INDIVIDUALIZED INHALER USAGE AND INHALATION PARAMETER PROFILES FROM AN ELECTRONIC INHALER WITH INTEGRATED SENSORS

MLL has received consultancy fees from Chiesi, Clement Clarke International, Respiri (Australia), SmartRespiratory, and Teva; fees for advisory board participation from AstraZeneca, Chiesi, GlaxoSmithKline, Novartis, Orion Pharmaceuticals, and Trudel Pharmaceuticals; fees from Chiesi for data safety monitoring board); lecture fees from AstraZeneca, Chiesi, Menarini, Novartis, Orion Pharmaceuticals, Soar Beyond, and Teva; conference sponsorship from Chiesi, Orion Pharmaceuticals, and Napp; travel expenses and accommodation support from Orion and the Global Initiative for Asthma; educational grant from Consorzio Futuro in Ricerca for work as a member of the ADMIT group; accommodation at conferences from NAPP and Chiesi; fees for clinical leadership and mentorship, and assessment and reporting of outcomes, from the National Services for Health Improvement (nurse asthma reviews). FH has received advisory and unbranded speaking honoraria from AstraZeneca, serves as a consultant for Genentech, and has served as an investigator for clinical trials sponsored by GlaxoSmithKline, Genentech, Teva and Sanofi, for which her institution has received funding. GM receives current research grant support from GlaxoSmithKline, Novartis and Sanofi-Regeneron, receives consulting fees from Novartis, and has received past research grant support from Teva, Alk-Abello, and Genentech. MW has received consulting, advisory, or speaking honoraria from Amgen, AstraZeneca, Avalo Therapeutics, Boehringer Ingelheim, Cerecor, Cohero Health, Cytoreason, Eli Lilly, Equillium, GlaxoSmithKline, Incyte, Kinaset, Novartis, Phylaxis, Pulmatrix, Rapt Therapeutics, Regeneron, Restorbio, Roche/Genentech, Sanofi/Genzyme, Sentien, Sound Biologics, Teva and Upstream Bio. GS, NM and KS are employees of Teva Pharmaceuticals. SB-A reports grant and personal fee for advisory board contribution and/or expert lectures/educational activities from GSK, AstraZeneca, Mylan, Viatris, Boehringer Ingelheim, and Sanofi, and serves as a consultant for Teva. JWK reports grants, personal fees and non-financial support from AstraZeneca, grants, personal fees and non-financial support from Boehringer Ingelheim, grants and personal fees from Chiesi, grants, personal fees and non-financial support from GSK, non-financial support from Mundi Pharma, grants and personal fees from Teva, personal fees from MSD, personal fees from COVIS Pharma, grants from Valneva outside the submitted work; and Janwillem Kocks holds <5% shares of Lothar Medtec GmbH and 72.5% of shares in the General Practitioners Research Institute.

M17 PATIENT ENGAGEMENT WITH ADHERENCE TECHNOLOGY: LEARNINGS FROM THE 'FINANCIAL INCENTIVES TO IMPROVE ASTHMA' (FINA) STUDY

Funding: Asthma UK Centre of Applied Research (AUKCAR)

M20 PRESERVED ANTIBODY RESPONSES TO COVID-VACCINES AND LOWER ODDS OF DEVELOPING COVID IN PEOPLE WITH SEVERE ASTHMA.

Study part funded by Asthma Allergy and Immunology Research and AstraZeneca

M21 ON-TREATMENT CLINICAL REMISSION WITH TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA IN THE PHASE 3 DESTINATION STUDY

This study was funded by AstraZeneca and Amgen Inc. Michael E Wechsler is an employee of National Jewish Health and has received consultancy fees from AstraZeneca, Equillium, Genentech, GSK, Novartis, Regeneron Pharmaceuticals, resTORbio, Sanofi and Teva Pharmaceuticals. Guy Brusselle has received fees for advisory boards and/or speaker fees from Amgen, AstraZeneca, Boehringer Ingelheim, Chiesi, GlaxoSmithKline, Novartis, Sanofi and Teva Pharmaceuticals. J Christian Virchow has received grants for research or clinical trials from DFG, GlaxoSmithKline and MSD; has received consulting fees from Avontec, Boehringer Ingelheim, Chiesi, Essex Schering-Plough, GlaxoSmithKline, Janssen-Cilag, MEDA, MSD, Mundipharma, Novartis, Regeneron, Revotar, Roche, Sandoz-Hexal, Sanofi-Aventis, Teva Pharmaceuticals and UCB Schwarz-Pharma; has received fees for lectures from AstraZeneca, Avontec, Bayer, Bencard, Bionorica, Boehringer Ingelheim, Chiesi, Essex Schering-Plough, GlaxoSmithKline, Janssen-Cilag, Leti, MEDA, Merck, MSD, Mundipharma, Novartis, Nycomed Altana, Pfizer, Revotar, Sandoz-Hexal, Stallergenes Greer, Teva Pharmaceuticals, UCB Schwarz-Pharma and Zydus Cadila; has received fees for data safety-monitoring board participation from Chiesi and has received travel support from Boehringer Ingelheim and Sanofi. Liam G Heaney has received grant funding from, participated in advisory boards for and given lectures at meetings supported by Amgen, AstraZeneca, Boehringer Ingelheim, Circassia Pharmaceuticals, Evelo Biosciences, GlaxoSmithKline, Novartis, Roche,

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M23 EFFICACY OF TEZEPELUMAB IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA BY PRIOR OMALIZUMAB USE: A POST HOC ANALYSIS OF THE PHASE 3 NAVIGATOR STUDY

This study was funded by AstraZeneca and Amgen Inc. Andrew Menzies-Gow has a new and additional affiliation of Respiratory and Immunology, BioPharmaceuticals Medical, AstraZeneca, Cambridge, UK. Andrew Menzies-Gow is an employee of AstraZeneca and may own stock or stock options in AstraZeneca; has attended advisory boards for AstraZeneca, GSK, Novartis, Regeneron, Sanofi and Teva; has received speaker fees from AstraZeneca, Novartis, Sanofi and Teva; participated in research with AstraZeneca, for which his institution has been remunerated; has attended international conferences with Teva; and has consultancy agreements with AstraZeneca and Sanofi. Gene Colice was an employee of AstraZeneca at the time of the study. Christopher S Ambrose, Neil Martin, Åsa Hellqvist and Bill Cook are employees of AstraZeneca and may own stock or stock options in AstraZeneca. Jean-Pierre Llanos-Ackert is an employee of Amgen and owns stock in Amgen. Marco Caminati has received honoraria from AstraZeneca for serving on advisory boards, has received speaker fees from GSK and Sanofi.

M25 REDUCTIONS IN HEALTHCARE RESOURCE UTILISATION (HCRU) OVER 2 YEARS OF BENRALIZUMAB TREATMENT IN PATIENTS WITH SEVERE EOSINOPHILIC ASTHMA; ANALYSIS FROM THE BPAP STUDY

DJJ has received advisory board fees and speaker fees from AstraZeneca, GSK, Sanofi Regeneron, Chiesi, Teva, and Boehringer Ingelheim, and research grants from AstraZeneca and GSK. HB has received speaker fees from AstraZeneca, Chiesi, GSK, TEVA; has received advisory board fees from Astrazeneca, Chiesi, GlaxoSmithKline; has received travel support / hospitality from AstraZeneca and Chiesi; has received grant funding from AstraZeneca, Chiesi, The Health Foundation, NHSE (AAC). HR has received speaker fees and research grants from AstraZeneca and GSK. PEP has attended advisory board for AstraZeneca, GlaxoSmithKline and Sanofi; has given lectures at meetings with/without lecture honoraria supported by AstraZeneca and GlaxoSmithKline; has taken part in clinical trials sponsored by AstraZeneca, GlaxoSmithKline and Novartis; and is conducting research funded by GlaxoSmithKline for which his institution receives remuneration. IJC has received speaker fees from GlaxoSmithKline and honorarium from AstraZeneca and Glaxosmithkline. SF has received speaker fees from AstraZeneca, GlaxoSmithKline, Chiesi and Novartis. JD has received support to attend medical conferences from Sanofi Regeneron. AMN has received speaker fees and conference support from AstraZeneca, Teva and Chiesi. MW, JL and TM are employees of AstraZeneca UK. This study was funded by AstraZeneca, including medical writing support provided by OPEN Health.

M26 THE PROPORTION OF PATIENTS ACHIEVING LOW BIOMARKER LEVELS WITH TEZEPELUMAB TREATMENT IN THE PHASE 3 NAVIGATOR STUDY

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M31 **BRIDGING THE GAP: EMPOWERING COMMUNITIES THROUGH ADVANCED PHARMACIST-LED SPECIALIST ASTHMA CLINICS IN PRIMARY CARE**

Project funded mainly by the NHS Accelerated Access Collaborative with additional grant from the GSK

M35 **THE DESIGN AND DEVELOPMENT OF CULTURALLY SPECIFIC RESOURCES FOR ASTHMA PATIENTS**

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The Society's Specialist Advisory Groups also provided suggestions for symposia content.

Topic Leaders, who organised the symposia, were:

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Professor James D Chalmers, Chair, BTS Science and Research Committee

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