November 2022 Volume 77 Supplement 1

Thorax

AN INTERNATIONAL JOURNAL OF RESPIRATORY MEDICINE

British Thoracic Society Winter Meeting 2022

QEII Centre
Broad Sanctuary
Westminster
London SW1P 3EE

23 to 25 November 2022

Programme and Abstracts

thorax.bmj.com

BMJ

Veklury® ▼ remdesivir 100 MG FOR INFUSION | EVERY DAY COUNTS

VEKLURY has received conditional marketing authorisation in Great Britain as a treatment for SARS-CoV-2 infection, the virus that causes COVID-19.[1]

COMMITTED TO SUPPORTING YOU AND YOUR COVID-19 PATIENTS SINCE 2020

We're proud to have played a part in the treatment of over 11 million COVID-19 patients worldwide.[2]

Clinical evidence collected ever since the beginning of the pandemic has supported the broadening endorsement of the antiviral VEKLURY by UK and WHO guidelines.[3,4]

With ongoing research, Gilead strive to further inform and support COVID-19 management.

Visit the VEKLURY website to find out more **gileadcovid19.co.uk**

Veklury is indicated for the treatment of coronavirus disease 2019 (COVID-19) in:

- Adults and paediatric patients (at least 4 weeks of age and weighing at least 3 kg) with pneumonia requiring supplemental oxygen (low- or high-flow oxygen or other non-invasive ventilation at start of treatment).
- Adults and paediatric patients (weighing at least 40 kg) who do not require supplemental oxygen and who are at increased risk of progressing to severe COVID-19.

UK-VKY-0237 – October 2022

▼ This medicine is subject to additional monitoring.

This document is intended for UK healthcare professionals only.

Prescribing information can be found here for Great Britain and here for Northern Ireland.

References: 1. VEKLURY (remdesivir) Summary of Product Characteristics. Accessed October 2022
2. Gilead Sciences Ltd. Data on File. 3. NICE. Guideline [NG191]. COVID-19 rapid guideline: managing COVID-19. Available at: https://app.magicapp.org/#/guideline/L4Qb5n. Accessed September 2022.
4. Agarwal A, et al. BMJ 2020;370:m3379

This document has been developed and funded by Gilead Sciences.

GILEAD

Adverse events should be reported. For Great Britain and Northern Ireland, reporting forms and information can be found at coronavirus-yellowcard.mhra.gov.uk or via the Yellow Card app (download from the Apple App Store or Google Play Store). Adverse events should also be reported to Gilead to safety_FC@gilead.com or +44 (0) 1223 897500.

PROGRAMME

AND

ABSTRACTS

Thorax

British Thoracic Society
Winter Meeting 2022

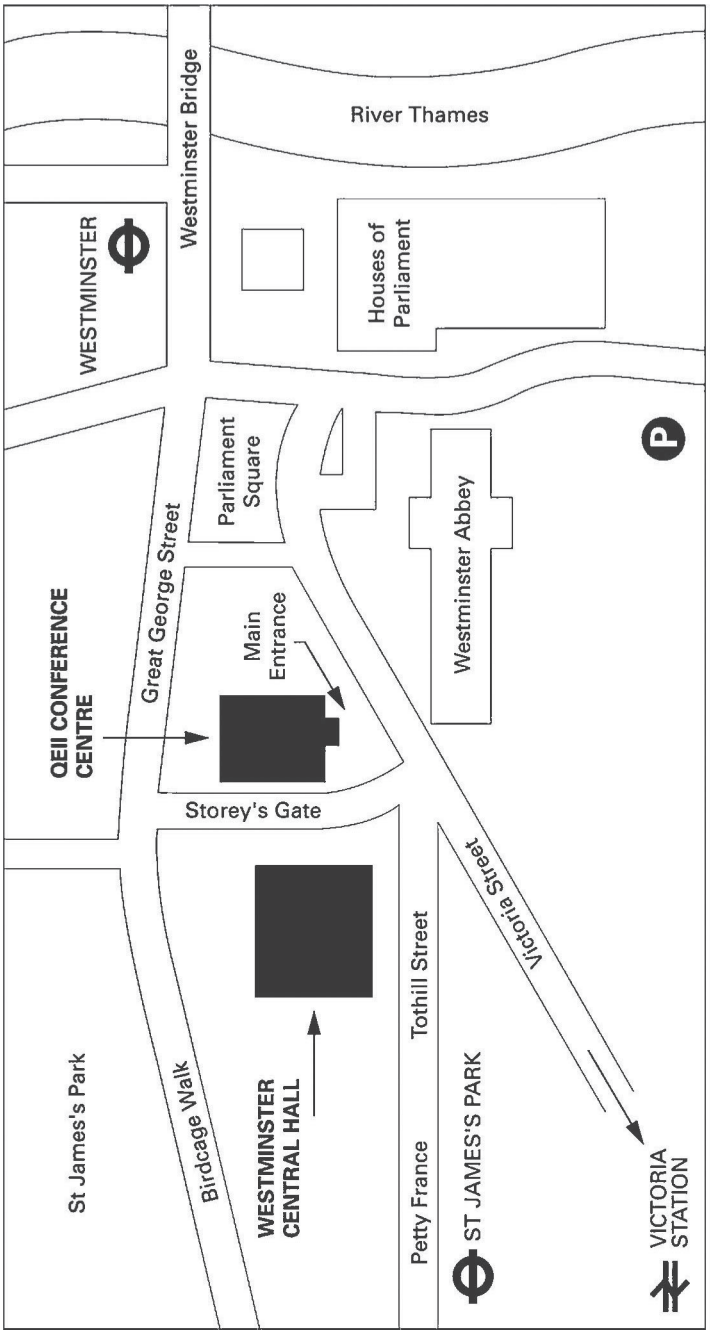
QEII Centre
Broad Sanctuary
Westminster
London SW1P 3EE

Wednesday 23 to Friday 25 November 2022
Programme and Abstracts

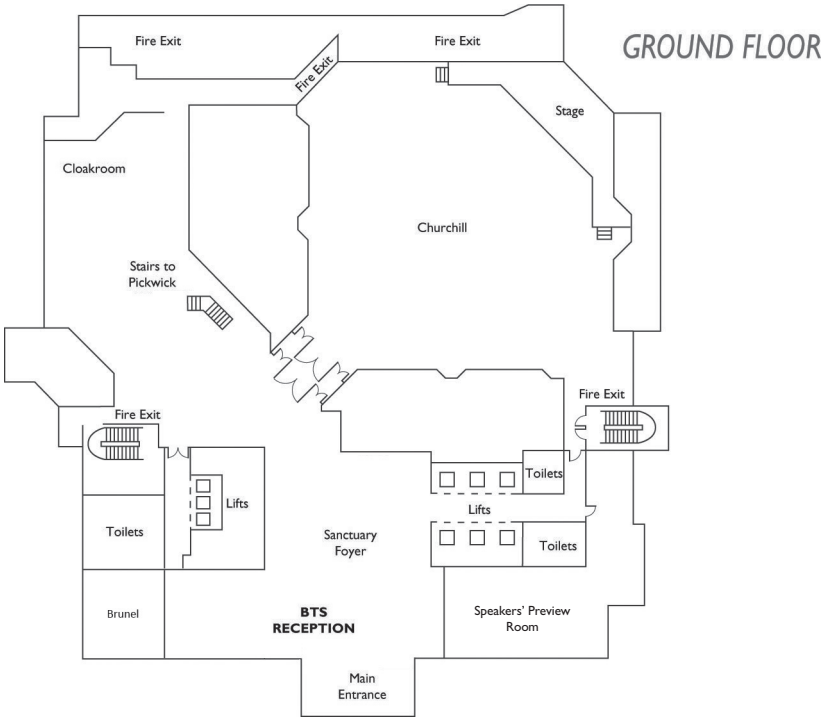
Approved by the Federation of the Royal Colleges of Physicians of the UK for 18 category 1 (external) credits (6 credits per day).
Code: 141699

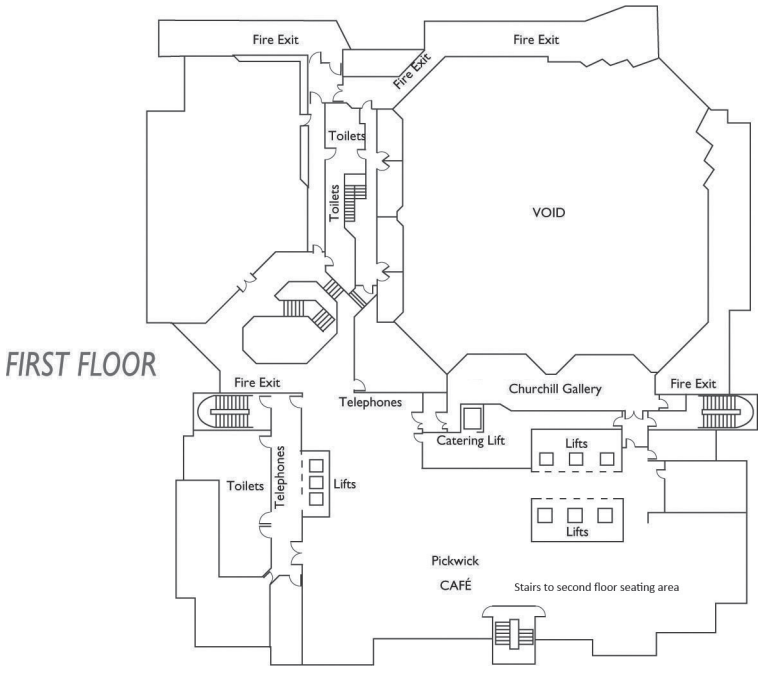
Map to the QEII Centre

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.



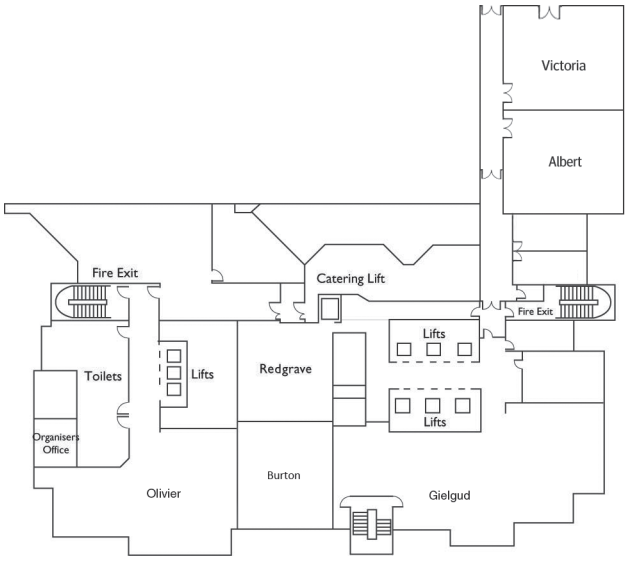
The QEII Centre - Ground and First Floors



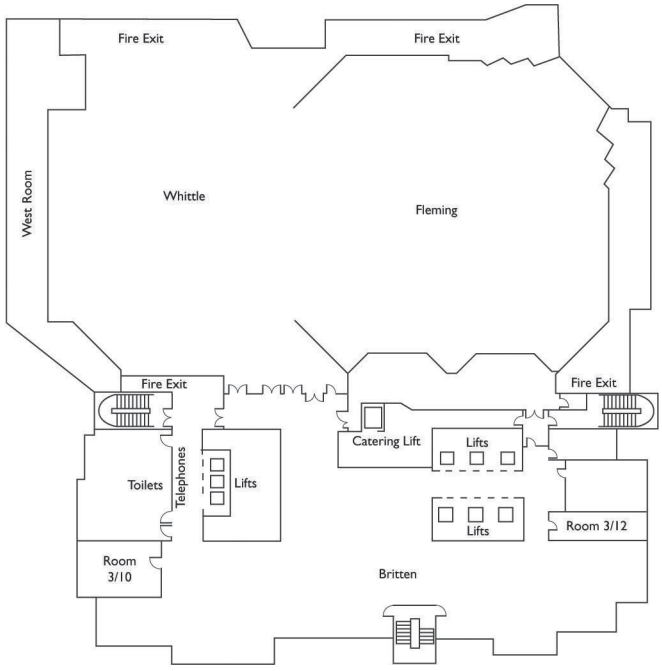


Full café facilities will be open in the Pickwick on the 1st floor from 8.00am to 4.00pm on Wednesday 23 and Thursday 24 November and from 8.00am to 2.30pm on Friday 25 November. A snack bar, serving hot and cold drinks, sandwiches and confectionery only, will be open at the same times in the Whittle & Fleming on the 3rd floor.

The QEII Centre - Second and Third Floors



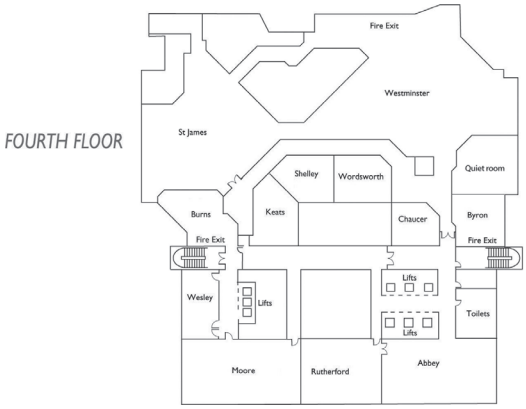
SECOND FLOOR

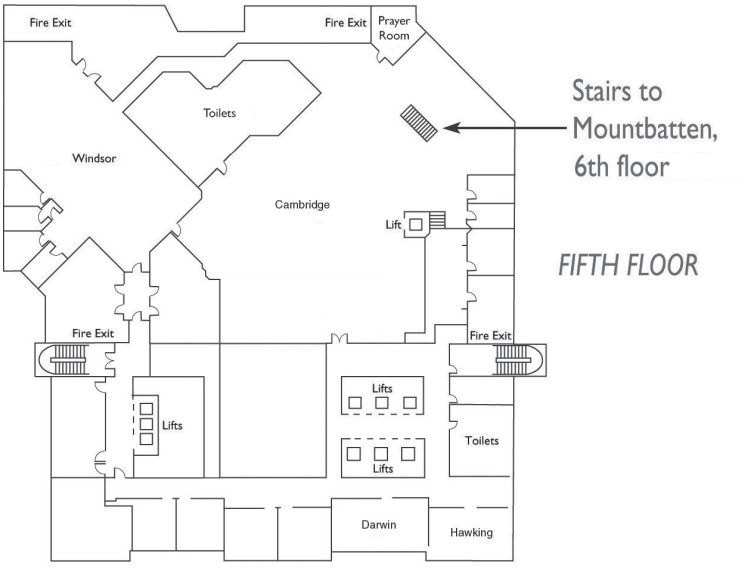


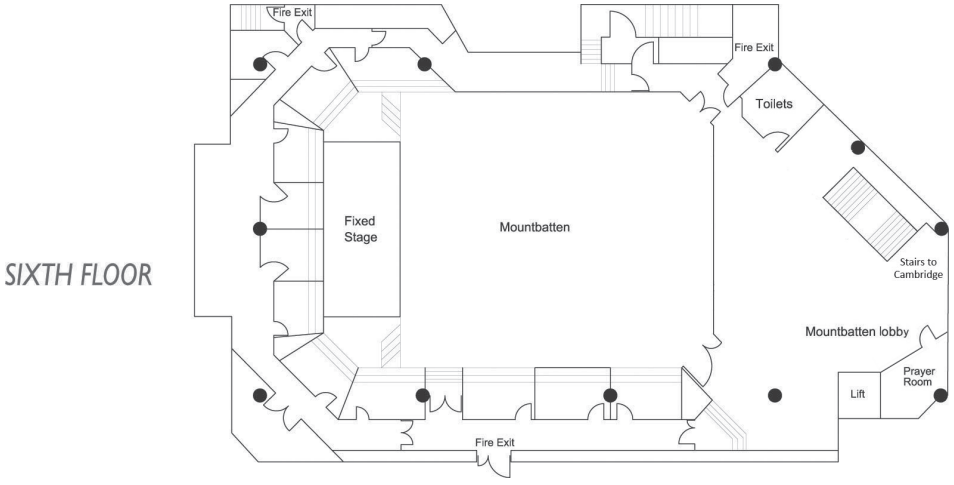
THIRD FLOOR

Full café facilities will be open in the Pickwick on the 1st floor from 8.00am to 4.00pm on Wednesday 23 and Thursday 24 November and from 8.00am to 2.30pm on Friday 25 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 23 NOVEMBER 2022

Time	Details			Location/Floor
8.00am-9.00am	COFFEE/TEA	Whittle & Fleming/3rd		
8.45am-4.00pm	Poster viewing	P1-P10	"For Your Eyes Only" – What's hot in infection?	Whittle & Fleming /3rd
10.00am-11.00am	Authors present	P11-P22	Deciphering "The Da Vinci Code" – Biomarkers in airways disease	
		P23-P34	"Scar Wars" – The pot pourri of ILD	
		P35-P47	"Mission (Im)possible" – Pulmonary vascular disease	
		P48-P61	"Sleepless in Seattle" – Treatments and monitoring in sleep and ventilation	
8.00am-8.30am	BTS Journal Club		Critical care	Albert/2nd
8.30am-10.30am	Joint BTS/BALR symposium (part I)		Seven ages of the lung: in the beginning ...	Windsor/5th
8.45am-10.15am	Symposium		Eosinophils in the lung: what do they do and what can we do?	Churchill/Ground
8.45am-10.15am	Symposium		Beyond CFTR modulation	Mountbatten/6th
8.45am-9.50am	Spoken session	S1-S4	"Scar Face" – The burden of fibrosis	St James/4th
8.45am-10.05am	Spoken session	S5-S9	"Flushed Away" – What's new in pleural disease?	Westminster/4th
8.45am-10.05am	Spoken session	S10-S14	"Chariots of Fire" – Interventions and assessment in respiratory physiotherapy	Moore/4th
8.45am-10.20am	Spoken session	S15-S20	"Hot Shots!" – What's hot in cough?	Abbey/4th
10.00am-11.00am	COFFEE/TEA	Whittle & Fleming and Britten/3rd		
10.45am-12.05pm	Spoken session	S21-S25	"Edge of Tomorrow" – Optimising thoracic cancer diagnosis and follow up	St James/4th
10.45am-12.05pm	Spoken session	S26-S30	"Transformers" – Transformational treatments and technologies in CF	Moore/4th
10.45am-12.05pm	Spoken session	S31-S35	"Toy Story I" – Hot topics in childhood asthma	Abbey/4th
10.45am-12.15pm	Symposium		COPD: piecing together the jigsaw	Churchill/Ground
10.45am-12.15pm	Symposium		Do the right thing: personalised care in TB	Mountbatten/6th
10.45am-12.20pm	Spoken session	S36-S41	"Outbreak!" – COVID-19 epidemiology	Westminster/4th
11.00am-1.00pm	Joint BTS/BALR symposium (part 2)		Seven ages of the lung: wear, tear and repair?	Windsor/5th
11.00am-12.00pm	SAG open meeting		Cough	Rutherford/4th
11.00am-12.00pm	SAG open meeting		Critical Care	Albert/2nd
12.00pm-2.00pm	LUNCH Cash catering only	Pickwick /1st and Whittle & Fleming/3rd		
1.00pm-1.45pm	The BTS Scientific Lecture		Targeting the transforming growth factor beta superfamily in pulmonary arterial hypertension	Churchill/Ground
2.00pm-3.00pm	SAG open meeting		COPD	Albert/2nd
2.00pm-3.00pm	SAG open meeting		Pharmacist	Victoria/2nd

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).

NTM action

Scan the QR code or visit NTMaction.com to sign up and learn more

What are you waiting for?

The 2020 international guidelines, jointly developed by **ATS/ERS/ESCMID/IDSA**, suggest initiating treatment over 'watchful waiting' in patients who meet the diagnostic criteria for NTM-PD – especially in the context of positive acid-fast bacilli sputum smears and/or cavitary lung disease[1]

NTM, non-tuberculous mycobacterium; NTM-PD, NTM pulmonary disease.

1. Daley CL *et al. Eur Respir J* 2020; 56 (1): 2000535

NTM action is a non-promotional medical education website for healthcare professionals developed by Insmed Ltd.

February 2022 | NP-UK-00365

insmed®

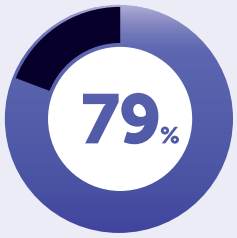
Treat obstructive sleep apnoea

with just the click of a button

No mask.
No hose.
Just sleep!

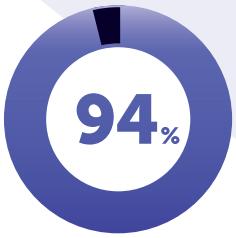
Come and visit us at Stand #19 at the **BTS Winter Meeting**

Efficacy[1]



Reduces breathing pauses and snoring considerably

Patient satisfaction[2]



Soundless and simple application

1. Otolaryngology-Head and Neck Surgery 2018; 159(1):194–2
2. Eur Respir J 2019; 53(1):1801405 20

Inspire upper airway stimulation is indicated for patients with the following characteristics:

- Moderate to severe OSA (AHI 15-65)
- CPAP intolerance, refusal, or failure
- Body Mass Index ≤ 35kg/m^2

Inspire
Sleep Apnea Innovation

Find out more at **www.InspireSleep.com**
information@inspiresleep.de

801-031-001

2.15pm-3.45pm	Symposium		Highlights from Thorax	Churchill/Ground
2.15pm-3.45pm	Joint BTS/BPRS symposium		Paediatric asthma: time to join up the dots	Mountbatten/6th
2.15pm-3.45pm	Award symposium	T1-T6	BTS/BALR/A+LUK Early Career Investigator Award Symposium	Windsor/5th
2.15pm-3.30pm	Poster discussion	P1-P10	"For Your Eyes Only" – What's hot in infection?	St James/4th
2.15pm-3.45pm	Poster discussion	P11-P22	Deciphering "The Da Vinci Code" – Biomarkers in airways disease	Westminster/4th
2.15pm-3.45pm	Poster discussion	P23-P34	"Scar Wars" – The pot pourri of ILD	Abbey/4th
2.15pm-3.50pm	Poster discussion	P35-P47	"Mission (Im)possible I" – Pulmonary vascular disease	Rutherford/4th
2.15pm-4.00pm	Poster discussion	P48-P61	"Sleepless in Seattle" – Treatments and monitoring in sleep and ventilation	Moore/4th
3.00pm-4.00pm	COFFEE/TEA	Whittle & Fleming and Britten/3rd		
4.15pm-4.30pm	Award presentations			Churchill/Ground
4.30pm-5.15pm	The BTS President's Address		Back to the future – old roots to new routes	Churchill/Ground
5.35pm-6.05pm	BTS AGM		BTS Annual General Meeting (BTS members only)	Churchill/Ground

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DAILY PROGRAMME

THURSDAY 24 NOVEMBER 2022

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	P62-P73	"Training Day" – Learning from CF patients	Whittle & Fleming/3rd
		P74-P81	"Contagion" – The impact of COVID-19	
		P82-P91	"Toy Story II" – Paediatric lung disease: pot pourri	
		P92-P105	"Blade Runner" – Diagnosis and follow up of thoracic malignancy	
		P106-P116	"Avengers Assemble" – Impact of the MDT in respiratory disease	
		P117-P124	"Interview with a Vampire" – Blood gas monitoring in clinical care	
		P125-P138	"Sliding Doors" – Beyond the drain: new insights in pleural disease	
		P139-P148	"The Force Awakens" – The asthma patient experience	
8.00am-8.30am	BTS Journal Club		COPD trials	Albert/2nd
8.45am-10.15am	Symposium		Key updates in the world of pulmonary vascular disease	Churchill/Ground
8.45am-10.15am	Symposium		How do we develop the respiratory nurse leaders of the future? The impact of ...	Windsor/5th
8.45am-9.50am	Spoken session	S42-S45	"The Fast and the Furious" – Clinical studies in COVID-19	Moore/4th
8.45am-9.50am	Spoken session	S46-S49	"Fight Club" – Biologics in asthma: RCTs	Abbey/4th
8.45am-10.05am	Spoken session	S50-S54	"Inside Out" – Bronchiectasis diagnostics and mechanisms	Westminster/4th
8.45am-10.05am	Spoken session	S55-S59	"Change in the Air(ways)" – Airway biology	Rutherford/4th
8.45am-10.20am	Spoken session	S60-S65	"The Day After Tomorrow" – Impact of the carbon footprint in lung health	St James/4th
10.00am-11.00am	COFFEE/TEA	Whittle & Fleming and Britten/3rd		
10.45am-12.15pm	Symposium		Plenary Scientific Symposium	Churchill/Ground
10.45am-11.50am	Spoken session	S66-S69	"Back to the Future" – Novel technology of the airways	Westminster/4th
10.45am-11.45am	SAG open meeting		Nurse	Abbey/4th
10.45am-11.45am	SAG open meeting		Pulmonary Rehabilitation	Rutherford/4th
10.45am-11.45am	SAG open meeting		Global Lung Health	Albert/2nd
12.00pm-1.00pm	SAG open meeting		Tobacco	Rutherford/4th
12.00pm-1.00pm	SAG open meeting		Interstitial and Rare Lung Disease	Albert/2nd
12.00pm-1.00pm	Open meeting		BTS/ARTP Joint Strategy Board	Victoria/2nd
12.00pm-2.00pm	LUNCH Cash catering only	Pickwick/1st and Whittle & Fleming/3rd		
1.00pm-1.45pm	The BTS Clinical Lecture		Pandemic parables	Churchill/Ground
2.00pm-3.00pm	SAG open meeting		Asthma	Albert/2nd
2.00pm-3.00pm	SAG open meeting		Pulmonary Vascular Disease	Victoria/2nd
2.15pm-3.45pm	Symposium		Stop normalising poverty: how can African children achieve their true lung potential?	Churchill/Ground

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

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100/6 + 200/6 = £1.06 million

Luforbec could support annual cost improvements of £1.06 million on average per ICS/Health Board vs Fostair pMDIs NHS list price[1,2]

To discuss the cost improvement potential Luforbec could offer your ICS/Health Board and our price reassurance contact: **ukrespiratory@lupin.com**

Luforbec®

beclometasone/formoterol

100/6 & 200/6

Extrafine formulation

Carbon Neutral Product

CARBON NEUTRALITY ACHIEVED THROUGH CARBON OFFSETTING[3-5]

Luforbec 100/6 is indicated for adult asthma and COPD (FEV_1 <50% predicted normal)[6] Luforbec 200/6 is indicated for asthma in adults[7]

Prescribing Information: Luforbec® 100/6 and 200/6 pressurised metered dose inhaler (pMDI) Consult the full Summary of Product Characteristics (SmPC) before prescribing. Presentation: Pressurised inhalation solution. Luforbec 100/6 pMDI: Each dose contains beclometasone dipropionate (BDP) 100 micrograms (mcg) and formoterol fumarate dihydrate 6 mcg. Luforbec 200/6 pMDI: Each dose contains beclometasone dipropionate (BDP) 200 mcg and formoterol fumarate dihydrate 6 mcg. **Indications:** ***Asthma:*** Regular treatment of asthma where use of an inhaled corticosteroid/long-acting $beta_2$-agonist (ICS/LABA) combination is appropriate: patients not adequately controlled on ICS and as needed short-acting $beta_2$-agonist, or patients already adequately controlled on both ICS and LABA. ***COPD*** **(Luforbec 100/6 only):** Symptomatic treatment of patients with severe COPD (FEV_1 <50% predicted normal) and a history of repeated exacerbations, who have significant symptoms despite regular therapy with long-acting bronchodilators. **Dosage and administration:** For inhalation in adult patients (≥18 years); not recommended for children and adolescents under 18 years. ***Asthma:*** **Maintenance therapy:** Luforbec 100/6 pMDI: 1–2 inhalations twice daily. Luforbec 200/6 pMDI: 2 inhalations twice daily. The maximum daily dose is 4 inhalations, ensuring a separate short-acting bronchodilator is available as needed. Patients should receive the lowest dose that effectively controls symptoms. **Maintenance and reliever therapy (Luforbec 100/6 pMDI only):** Luforbec can be taken as a regular maintenance treatment and as needed in response to asthma symptoms: 1 inhalation twice daily (morning and evening) plus 1 additional inhalation as needed in response to symptoms. If symptoms persist after a few minutes, an additional inhalation is recommended. The maximum daily dose is 8 inhalations. Patients should be advised to always have Luforbec available for rescue use. Close monitoring for dose-related adverse effects is needed in patients who frequently take high numbers of Luforbec as-needed inhalations. ***COPD*** **(Luforbec 100/6 pMDI only):** 2 inhalations twice daily. Luforbec pMDI can be used with the AeroChamber Plus® spacer device. BDP in Luforbec is characterised by an extrafine particle size distribution which results in a more potent effect than formulations of BDP with a non-extrafine particle size distribution (100mcg of BDP extrafine in Luforbec are equivalent to 250mcg of BDP in a non-extrafine formulation). When switching patients from previous treatments, it should be considered that the recommended total daily dose of BDP for Luforbec is lower than that for non-extrafine BDP containing products and should be adjusted to the needs of the individual patient. **Contraindications:** Hypersensitivity to the active substances or to any of the excipients. **Warnings and precautions:** Not intended for initial management of asthma. Treatment should not be initiated during an exacerbation, or during significant worsening or acutely deteriorating asthma. Treatment should not be stopped abruptly. Medical attention should be sought if treatment is ineffective. Patients should be advised to take Luforbec every day even when asymptomatic. Treatment should be discontinued immediately if the patient experiences a paradoxical bronchospasm. Use with caution (which may include monitoring) in patients with cardiac arrhythmias, especially third degree atrioventricular block and tachyarrhythmias, aortic stenosis, hypertrophic obstructive cardiomyopathy, severe heart disease, particularly acute myocardial infarction, ischaemic heart disease, congestive heart failure, occlusive vascular diseases, arterial hypertension, aneurysm, thyrotoxicosis, diabetes mellitus, phaeochromocytoma and untreated hypokalaemia. Caution should be used when treating patients with known or suspected prolongation of the QTc interval (QTc > 0.44 seconds). Formoterol itself may induce QTc prolongation. Potentially serious hypokalaemia may result from $beta_2$-agonist therapy and may also be potentiated by concomitant treatments (e.g. xanthine derivatives, steroids and diuretics). Particular caution is advised in severe asthma as this effect may be potentiated by hypoxia. Formoterol may cause a rise in blood glucose levels. Luforbec should not be administered for at least 12 hours before the start of anaesthesia if halogenated anaesthetics are planned due to risk of arrhythmias. Use with caution in patients with pulmonary tuberculosis or fungal/viral airway infections. An increase in pneumonia and pneumonia hospitalisation in COPD patients receiving ICS has been observed. Clinical features of pneumonia may overlap with symptoms of COPD exacerbations. Systemic effects of ICS may occur, particularly at high doses for long periods e.g. Cushing's syndrome, Cushingoid features, adrenal suppression, decrease in bone mineral density, cataract and glaucoma and more rarely, psychological or behavioural effects including psychomotor hyperactivity, sleep disorders, anxiety, depression and aggression. Consider referral of patients reporting blurred vision or visual disturbances to an ophthalmologist as causes may include cataract, glaucoma or rare diseases such as central serous chorioretinopathy. Prolonged treatment with high doses of ICS may result in adrenal suppression and acute adrenal crisis. **Interactions:** Possibility of systemic effects with concomitant use of strong CYP3A inhibitors (e.g. ritonavir, cobicistat) cannot be excluded hence caution and appropriate monitoring is advised. Beta-blockers should be avoided in asthma patients. Concomitant administration of other beta-adrenergic drugs and theophylline may have potentially additive effects, therefore exercise caution. Concomitant treatment with quinidine, disopyramide, procainamide, phenothiazines, antihistamines, monoamine oxidase inhibitors (MAOIs) and tricyclic antidepressants can prolong the QTc interval and increase the risk of ventricular arrhythmias. L-dopa, L-thyroxine, oxytocin and alcohol can impair cardiac tolerance towards $beta_2$-sympathomimetics. Concomitant treatment with MAOIs including agents with similar properties (e.g. furazolidone, procarbazine) may precipitate hypertensive reactions. Concomitant treatment with xanthine derivatives, steroids, or diuretics may potentiate a possible hypokalaemic effect of $beta_2$-agonists. Hypokalaemia may increase the likelihood of arrhythmias in patients receiving digitalis glycosides. There is a small amount of ethanol in Luforbec pMDI hence a theoretical potential for interaction in particularly sensitive patients taking disulfiram or metronidazole. **Pregnancy and lactation:** Use only during pregnancy or lactation if the expected benefits outweigh the potential risks. A risk/benefit decision should be taken to discontinue/abstain from therapy in the mother or discontinue breastfeeding. **Effects on driving and operating machinery:** Unlikely to have any effect on the ability to drive and use machines. **Side effects:** ***Common:*** Pharyngitis, oral candidiasis, headache, dysphonia. ***Uncommon:*** Influenza, oral fungal infection, oropharyngeal candidiasis, oesophageal candidiasis, vulvovaginal candidiasis, gastroenteritis, sinusitis, rhinitis, pneumonia (in COPD patients), granulocytopenia, allergic dermatitis, hypokalaemia, hyperglycaemia, restlessness, tremor, dizziness, otosalpingitis, palpitations, electrocardiogram prolonged QTc interval, ECG change, tachycardia, tachyarrhythmia, atrial fibrillation (in COPD patients), hyperaemia, flushing, cough, productive cough, throat irritation, asthmatic crisis, diarrhoea, dry mouth, dyspepsia, dysphagia, burning sensation of the lips, nausea, dysgeusia, pruritus, rash, hyperhidrosis, urticaria, muscle spasms, myalgia, C-reactive protein increased, platelet count increased, free fatty acids increased, blood insulin increased, blood ketone body increased, blood cortisol decrease (in COPD patients). ***Rare:*** Ventricular extrasystoles, angina pectoris, paradoxical bronchospasm, angioedema, nephritis, increased blood pressure, decreased blood pressure. ***Very rare:*** Thrombocytopenia, hypersensitivity reactions, including erythema, lips, face, eye and pharyngeal oedema, adrenal suppression, glaucoma, cataract, dyspnoea, exacerbation of asthma, peripheral oedema, decreased bone density. ***Unknown frequency:*** Psychomotor hyperactivity, sleep disorders, anxiety, depression, aggression, behavioural changes (predominantly in children), blurred vision. Refer to SmPC for full list of side effects. **Legal category:** POM **Price and Pack:** £20.52 1x120 actuations. **Marketing authorisation (MA) No(s):** PL 35507/0204, 35507/0205 **MA holder:** Lupin Healthcare UK Ltd, The Urban Building, Second Floor, 3-9 Albert Street, Slough, Berkshire, SL1 2BE, United Kingdom. **PI Last Revised:** June 2022. AeroChamber Plus® is a registered trademark of Trudell Medical International.

Adverse events should be reported. Reporting forms and information can be found at https://yellowcard.mhra.gov.uk or search for MHRA Yellowcard in the Google Play or Apple App store. Adverse events should also be reported to Lupin Healthcare Limited on +44 (0)1565 751 378 or email us at EU-PV@lupin.com

Ref: 1. NHS BSA. Drug Tariff. https://www.nhsbsa.nhs.uk/pharmacies-gp-practices-and-appliance-contractors/drug-tariff Accessed: October 2022. **2.** UK General Practice Prescribing Data July 2021 - June 2022 https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/. **3.** Carbon Footprint Limited, Life Cycle Assessment Report 2022. Data on File. **4.** Certifications of carbon neutrality for Luforbec 100/6 & 200/6 pMDI. **5.** MIMS: Inhaler Carbon Emissions. https://www.mims.co.uk/inhaler-carbon-emissions/respiratory-system/article/1739635. Accessed: October 2022. **6.** Luforbec 100/6 pMDI. Summary of Product Characteristics (SPC). Lupin Healthcare UK Limited. **7.** Luforbec 200/6 pMDI. Summary of Product Characteristics (SPC). Lupin Healthcare UK Limited. Fostair® is a registered trademark of Chiesi Ltd

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UK-LUF-2210-00008 October 2022

Chiesi

The ONLY 3-in-1 ICS/LABA/LAMA combination licensed for the maintenance treatment of both adult asthma and moderate to severe COPD[1,2]

Think triple (ICS/LABA/LAMA), think Trimbow

See full licences below

Trimbow®

beclometasone/formoterol/
glycopyrronium 87/5/9
Extrafine formulation

COPD: Trimbow pMDI 87/5/9 is indicated for maintenance treatment in adult patients with moderate to severe chronic obstructive pulmonary disease (COPD) who are not adequately treated by a combination of an inhaled corticosteroid and a long-acting β_2-agonist or a combination of a long-acting β_2-agonist and a long-acting muscarinic antagonist (for effects on symptoms control and prevention of exacerbations see section 5.1 of the SPC).[1]

Adult asthma: Trimbow pMDI 87/5/9 is indicated for maintenance treatment of asthma, in adults not adequately controlled with a maintenance combination of a long-acting β_2-agonist and medium dose of inhaled corticosteroid, and who experienced one or more asthma exacerbations in the previous year.[1]

Certified B Corporation

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Prescribing Information and Adverse Event reporting can be found below.

UK-TRI-2200108 July 2022

COPD: chronic obstructive pulmonary disease; **ICS:** inhaled corticosteroid; **LABA:** long-acting β_2-agonist; **LAMA:** long-acting muscarinic antagonist; **pMDI:** pressurised metered dose inhaler; **SPC:** Summary of Product Characteristics.

References: 1. Trimbow pMDI 87/5/9 Summary of Product Characteristics. Chiesi Limited. **2.** MIMS online. 2022. Available at: www.mims.co.uk

Trimbow 87/5/9 and 172/5/9 Pressurised Metered Dose Inhaler (pMDI) & Trimbow 88/5/9 NEXThaler Prescribing Information

Please refer to the Summary of Product Characteristics (SPC) before prescribing.

Presentation: Each Trimbow 87/5/9 pMDI delivered dose contains 87micrograms (mcg) of beclometasone dipropionate (BDP), 5mcg of formoterol fumarate dihydrate (formoterol) and 9mcg of glycopyrronium. Each Trimbow 88/5/9 NEXThaler delivered dose contains 88 micrograms of BDP, 5 micrograms of formoterol and 9 micrograms of glycopyrronium. These are both the equivalent to a metered dose of 100mcg BDP, 6mcg formoterol and 10mcg glycopyrronium. Each Trimbow 172/5/9 pMDI delivered dose contains 172mcg of BDP, 5mcg of formoterol and 9mcg of glycopyrronium. This is equivalent to a metered dose of 200mcg BDP, 6mcg formoterol and 10mcg glycopyrronium. **Indication:** ***COPD*** *(Trimbow 87/5/9 pMDI and Trimbow 88/5/9 NEXThaler only)*: Maintenance treatment in adult patients with moderate to severe chronic obstructive pulmonary disease (COPD) who are not adequately treated by a combination of an inhaled corticosteroid and a long-acting beta2-agonist or a combination of a long-acting beta2-agonist and a long-acting muscarinic antagonist (for effects on symptoms control and prevention of exacerbations see section 5.1 of the SPC). ***Asthma (Trimbow 87/5/9):*** Maintenance treatment of asthma, in adults not adequately controlled with a maintenance combination of a long-acting beta2-agonist and medium dose of inhaled corticosteroid, and who experienced one or more asthma exacerbations in the previous year. ***Asthma (Trimbow 172/5/9):*** Maintenance treatment of asthma, in adults not adequately controlled with a maintenance combination of a long-acting beta2-agonist and high dose of inhaled corticosteroid, and who experienced one or more asthma exacerbations in the previous year. **Dosage and administration:** For inhalation in adult patients (≥18 years). ***COPD & Asthma:*** 2 inhalations twice daily. Maximum dose 2 inhalations twice daily. Trimbow pMDI can be used with the AeroChamber Plus® spacer device. Patients should be advised to take Trimbow every day even when asymptomatic. If symptoms arise in the period between doses, an inhaled, short-acting beta2-agonist should be used for immediate relief. When choosing the starting dose strength of Trimbow in asthma patients, the patients' disease severity, their previous asthma therapy including the inhaled corticosteroid (ICS) dose as well as the patients' current control of asthma symptoms and risk of future exacerbation should be considered. Patients should be regularly reassessed by a doctor, so that their doses of Trimbow remain optimal and are only changed on medical advice. The doses should be titrated to the lowest doses at which effective control of asthma symptoms is maintained. The aerosol particles of Trimbow are characterised by an extrafine particle size distribution. For BDP this results in a more potent effect than formulations of BDP with a non-extrafine particle size distribution (100mcg of BDP extrafine in Trimbow are equivalent to 250mcg of BDP in a non-extrafine formulation). **Contraindications:** Hypersensitivity to the active substances or to any of the excipients. **Warnings and precautions:** Not for acute use in treatment of acute episodes of bronchospasm or to treat an acute disease exacerbation. Discontinue immediately if hypersensitivity or paradoxical bronchospasm occur. Deterioration of disease: Trimbow should not be stopped abruptly. Cardiovascular effects: Due to the presence of a long-acting beta2-agonist and a long-acting muscarinic antagonist, use with caution in patients with cardiac arrhythmias, idiopathic subvalvular aortic stenosis, hypertrophic obstructive cardiomyopathy, severe heart disease, occlusive vascular diseases, arterial hypertension and aneurysm. Caution should also be used when treating patients with known or suspected prolongation of the QTc interval (QTc > 450 milliseconds for males, or > 470 milliseconds for females) either congenital or induced by medicinal products. Limited data in asthmatic patients with cardiovascular co-morbidities or risk-factors suggest that these patients are also at higher risk of adverse reactions like local fungal infections or dysphonia. Trimbow should not be administered for at least 12 hours before the start of anaesthesia as there is a risk of cardiac arrhythmias. Caution in patients with thyrotoxicosis, diabetes mellitus, pheochromocytoma and untreated hypokalaemia. Increase in pneumonia and pneumonia hospitalisation in COPD patients receiving ICS observed. Clinical features of pneumonia may overlap with symptoms of COPD exacerbations. Systemic effects of ICS may occur, particularly at high doses for long periods, but are less likely than with oral steroids. The daily dose of both Trimbow 87/5/9 & 88/5/9 correspond to a medium dose of ICS and the daily dose of Trimbow 172/5/9 corresponds to a high dose of ICS. Possible systemic effects include Cushing's syndrome, Cushingoid features, adrenal suppression, growth retardation, decrease in bone mineral density and, more rarely, a range of psychological or behavioural effects including psychomotor hyperactivity, sleep disorders, anxiety, depression and aggression. Patients on Trimbow should be reviewed regularly and the dose of ICS is reduced to the lowest dose at which effective control of asthma is maintained. Use with caution in patients with pulmonary tuberculosis or fungal/viral airway infections. Potentially serious hypokalaemia may result from beta2-agonist therapy (particular caution with severe disease). Formoterol may cause a rise in blood glucose levels. Glycopyrronium should be used with caution in patients with narrow-angle glaucoma, prostatic hyperplasia or urinary retention. Use in patients with severe hepatic impairment (classified as having Child-Pugh class C) or severe renal impairment (glomerular filtration rate [GFR] <30mL/min/1.73m^2), should only be considered if benefit outweighs the risk. Consider referral of patients reporting blurred vision or visual disturbances to an ophthalmologist as causes may include cataract, glaucoma or rare diseases such as central serous chorioretinopathy. To reduce risk of oropharyngeal candida infection, patients should be advised to rinse mouth or gargle with water without swallowing or brush teeth after inhaling prescribed dose. Trimbow 88/5/9 NEXThaler contains lactose. Lactose includes small amounts of milk proteins, which may cause allergic reactions. **Interactions:** Since glycopyrronium is eliminated via renal route, interactions could occur with medicinal products affecting renal excretion mechanisms e.g. with cimetidine (an inhibitor of OCT2 and MATE1 transporters in the kidney) co-administration, glycopyrronium showed a slight decrease in renal clearance (20%) and a limited increase in total systemic exposure (16%). Possibility of systemic effects with concomitant use of strong CYP3A inhibitors (e.g. ritonavir, cobicistat) cannot be excluded and therefore caution and appropriate monitoring is advised. *Related to formoterol:* Non-cardioselective beta-blockers (including eye drops) should be avoided as reduces effect of formoterol. Concomitant administration of other beta-adrenergic drugs may have potentially additive effects. Concomitant treatment with quinidine, disopyramide, procainamide, antihistamines, monoamine oxidase inhibitors (MAOIs), tricyclic antidepressants and phenothiazines can prolong the QTc interval and increase the risk of ventricular arrhythmias. L-dopa, L-thyroxine, oxytocin and alcohol can impair cardiac tolerance towards beta2-sympathomimetics. Hypertensive reactions may occur following co-administration with MAOIs including drugs with similar properties (e.g. furazolidone, procarbazine). Risk of arrhythmias in patients receiving concomitant anaesthesia with halogenated hydrocarbons. Concomitant treatment with xanthine derivatives, steroids or diuretics may potentiate a possible hypokalaemic effect of beta2-agonists. Hypokalaemia may increase the likelihood of arrhythmias in patients receiving digitalis glycosides. *Related to glycopyrronium:* Co-administration with other anticholinergic-containing medicinal products is not recommended. *Excipients:* Presence of ethanol in Trimbow 87/5/9 and 172/5/9 pMDI may cause theoretical potential interaction in sensitive patients taking metronidazole or disulfiram. **Fertility, pregnancy and lactation:** No studies have been performed in regards to safety in human fertility, but animal studies show impaired fertility. Should only be used during pregnancy if the expected benefits outweigh the potential risks. If treatment during pregnancy is necessary, the lowest effective dose should be used. Children born to mothers receiving substantial doses should be observed for adrenal suppression. Glucocorticoids and metabolites are excreted in human milk. It is unknown whether formoterol or glycopyrronium (including their metabolites) pass into human breast-milk but they have been detected in the milk of lactating animals. Anticholinergics like glycopyrronium could suppress lactation. A decision must be made whether to discontinue breastfeeding or to discontinue/abstain from therapy. **Effects on driving and operating machinery:** None or negligible. **Side effects:** *Common*: pneumonia (in COPD patients), pharyngitis, oral candidiasis, urinary tract infection, nasopharyngitis, headache, dysphonia. *Uncommon:* influenza, oral fungal infection, oropharyngeal candidiasis, oesophageal candidiasis, fungal oropharyngitis, sinusitis, rhinitis, gastroenteritis, vulvovaginal candidiasis, granulocytopenia, dermatitis allergic, hypokalaemia, hyperglycaemia, restlessness, tremor, dizziness, dysgeusia, hypoaesthesia, otosalpingitis, atrial fibrillation, electrocardiogram QT prolonged, tachycardia, tachyarrhythmia, palpitations, hyperaemia, flushing, hypertension, asthmatic crisis, cough, productive cough, throat irritation, epistaxis, pharyngeal erythema, diarrhoea, dry mouth, dysphagia, nausea, dyspepsia, burning sensation of the lips, dental caries, aphthous stomatitis, rash, urticaria, pruritus, hyperhidrosis, muscle spasms, myalgia, pain in extremity, musculoskeletal chest pain, fatigue, C-reactive protein increased, platelet count increased, free fatty acids increased, blood insulin increased, blood ketone body increased, cortisol decreased. *Rare:* Lower respiratory tract infection (fungal), hypersensitivity reactions, including erythema, lips, face, eye and pharyngeal oedema, decreased appetite, insomnia, hypersomnia, angina pectoris (stable and unstable), extrasystoles (ventricular and supraventricular), nodal rhythm, sinus bradycardia, blood extravasation, paradoxical bronchospasm, exacerbation of asthma, oropharyngeal pain, pharyngeal inflammation, dry throat, angioedema, dysuria, urinary retention, nephritis, asthenia, blood pressure increased, blood pressure decreased. *Very rare:* thrombocytopenia, adrenal suppression, glaucoma, cataract, dyspnoea, growth retardation, peripheral oedema, bone density decreased. *Frequency not known*: psychomotor hyperactivity, sleep disorders, anxiety, depression, aggression, behavioural changes, blurred vision. (Refer to SPC for full list of side effects). **Legal category:** POM. **Price and Pack:** £44.50 1x120 actuations. **Marketing authorisation (MA) No(s):** PLGB 08829/0193 (GB), EU/1/17/1208/002 (UKNI), PLGB 08829/0199 (GB), EU/1/17/1208/007 (UKNI), PLGB 08829/0200 (GB), EU/1/17/1208/010 (UKNI). **GB MA holder/ UKNI Distributor:** Chiesi Limited, 333 Styal Road, Manchester, M22 5LG, United Kingdom. **Date of Preparation:** Jan 2022.

Adverse events should be reported. Reporting forms and information can be found at www.mhra.gov.uk/yellowcard or search for MHRA Yellow Card in the Google Play or Apple App Store. Adverse events should also be reported to Chiesi Limited on 0800 0092329 (UK) or PV.UK@Chiesi.com.

2.15pm-3.45pm	Symposium		New treatments for chronic cough	Mountbatten/6th
2.15pm-3.45pm	Symposium		Improving uptake of PR: a patient-centred approach	Windsor/5th
2.15pm-3.35pm	Spoken session	S70-S74	"Inception" – Embracing complexity in lung science	Westminster/4th
2.15pm-3.45pm	Poster discussion	P62-P73	"Training Day" – Learning from CF patients	Moore/4th
2.15pm-3.15pm	Poster discussion	P74-P81	"Contagion" – The impact of COVID-19	Abbey/4th
2.15pm –3.30pm	Poster discussion	P82-P91	"Toy Story II" – Paediatric lung disease: pot pourri	Rutherford/4th
2.15pm-4.00pm	Poster discussion	P92-P105	"Blade Runner" – Diagnosis and follow up of thoracic malignancy	St James/4th
3.00pm-4.00pm	COFFEE/TEA	Whittle & Fleming and Britten/3rd		
4.00pm-5.25pm	Poster discussion	P106-P116	"Avengers Assemble" – Impact of the MDT in respiratory disease	Abbey/4th
4.00pm-5.00pm	Poster discussion	P117-P124	"Interview with a Vampire" – Blood gas monitoring in clinical care	Rutherford/4th
4.00pm-5.45pm	Poster discussion	P125-P138	"Sliding Doors" – Beyond the drain: new insights in pleural disease	Westminster/4th
4.00pm-5.45pm	SAG open meeting		Cystic fibrosis	Windsor/5th
4.15pm-5.45pm	Symposium		What's hot in ILD?	Churchill/Ground
4.15pm-5.45pm	Joint BTS/BPRS symposium		Back to the future: where now for digital healthcare?	Mountbatten/6th
4.15pm-5.30pm	Poster discussion	P139-P148	"The Force Awakens" – The asthma patient experience	Moore/4th
4.15pm-5.35pm	Spoken session	S75-S79	"The World is Not Enough" – The epidemiological picture in airways disease	St James/4th
4.15pm-5.15pm	SAG open meeting		Lung Cancer	Albert/2nd
4.15pm-5.15pm	SAG open meeting		Pulmonary Infection	Victoria/2nd
5.45pm-7.00pm	The President's Reception – All welcome!			Britten/3rd

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).

DAILY PROGRAMME

FRIDAY 25 NOVEMBER 2022

Time	Details			Location/Floor
8.00am-9.00am	COFFEE/TEA	Whittle & Fleming/3rd		
8.45am-2.00pm	Poster viewing	P149-P159	"Die Hard II" – Antibiotic resistance and challenges in TB	Whittle & Fleming/3rd
10.00am-11.00am	Authors present	P160-P170	"Infinity War" – Ongoing clinical challenges in COVID-19	
		P171-P182	"Cool Runnings" – Innovations in pulmonary rehabilitation	
		P183-P196	"Catch Me If You Can" – Opportunities to improve care in airways disease	
		P197-P206	"WALL-E" – The future of digital healthcare delivery	
		P207-P217	"Into the Woods" – Managing co-morbidities in airways disease	
		P218-P230	"Endgame" – Long term impacts of COVID-19	
8.00am-8.30am	BTS Journal Club		COVID-19 and respiratory infections	Albert/2nd
8.30am-10.00am	Symposium		Respiratory physiology in 2022: innovations and evolution	Churchill/Ground
8.30am-10.00am	Symposium		CT screening for lung cancer: the next steps	Mountbatten/6th
8.30am-10.00am	Symposium		Mistaken identities: when might exposures at work be key?	Windsor/5th
8.30am-10.05am	Spoken session	S80-S85	"Die Hard I" – Resistance, screening and best management in TB	St James/4th
8.45am-9.50am	Spoken session	S86-S89	"Mission (Im)possible II" – Improving outcomes in COPD	Westminster/4th
8.45am-9.50am	Spoken session	S90-S93	"The Sixth Sense" – Prognostication in pulmonary vascular disease	Moore/4th
8.45am-9.50am	Spoken session	S94-S97	"The Terminator" – Neutrophils in respiratory disease	Abbey/4th
9.00am-10.00am	SAG open meeting		Sleep	Rutherford/4th
9.00am-10.00am	SAG open meeting		Pleural Disease	Victoria/2nd
10.00am-11.00am	COFFEE/TEA	Whittle & Fleming and Britten/3rd		
10.30am-12.00pm	Symposium		Pleural infection in 2022: challenging the status quo	Churchill/Ground
10.30am-12.00pm	Symposium		Asthma: is it all about biologics?	Mountbatten/6th
10.30am-12.05pm	Spoken session	S98-S103	"Gone with the Wind" – Measuring breathlessness and airway obstruction	Windsor/5th
10.30am-12.05pm	Spoken session	S104-S109	"Beyond the Matrix" – Fibroblast biology	Westminster/4th
10.30am-12.05pm	Spoken session	S110-S115	"The Winter Soldier" – Pneumonia epidemiology and impact	St James/4th
10.30am-11.50am	Spoken session	S116-S120	"Home Alone" – Remote monitoring in lung disease	Moore/4th
10.30am-11.50am	Spoken session	S121-S125	"I, Robot" – Advances in sleep and ventilation	Abbey/4th
10.30am-11.30am	SAG open meeting		Specialty Trainee	Rutherford/4th
10.30am-11.30am	SAG open meeting		Tuberculosis	Albert/2nd

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

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10.30am-11.30am	SAG open meeting		Occupational and Environmental Lung Disease	Victoria/2nd
12.00pm-2.00pm	LUNCH Cash catering only	Pickwick/1st and Whittle & Fleming/3rd EXHIBITION closes at 2.00pm		
12.30pm-1.15pm	The BTS Grand Challenge Lecture		Science during the pandemic	Churchill/Ground
1.30pm-3.00pm	Symposium		Air pollution and children's health: the need for urgent action	Churchill/Ground
1.30pm-3.00pm	Symposium		Precision medicine for bronchiectasis	Mountbatten/6th
1.30pm-3.00pm	Symposium		Getting a good night's sleep: improving sleep and brain outcomes for our patients	Windsor/5th
1.30pm-2.55pm	Poster discussion	P149-P159	"Die Hard II" – Antibiotic resistance and challenges in TB	St James/4th
1.30pm-2.55pm	Poster discussion	P160-P170	"Infinity War" – Ongoing clinical challenges in COVID-19	Moore/4th
1.30pm-3.00pm	Poster discussion	P171-P182	"Cool Runnings" – Innovations in pulmonary rehabilitation	Abbey/4th
1.30pm-3.15pm	Poster discussion	P183-P196	"Catch Me If You Can" – Opportunities to improve care in airways disease	Westminster/4th
2.45pm-3.45pm	COFFEE/TEA	Britten/3rd		
3.15pm-4.45pm	Symposium		Tobacco dependency: current treatments to future eradication	Churchill/Ground
3.15pm-4.45pm	Symposium		BTS audit and quality improvement	Mountbatten/6th
3.15pm-4.30pm	Poster discussion	P197-P206	"WALL-E" – The future of digital healthcare delivery	Moore/4th
3.15pm-4.35pm	Spoken session	S126-S130	"Finding Neverland" – T2 inflammation and its absence	Windsor/5th
3.15pm-4.40pm	Poster discussion	P207-P217	"Into the Woods" – Managing co-morbidities in airways disease	St James/4th
3.30pm-5.05pm	Poster discussion	P218-P230	"Endgame" – Long term impacts of COVID-19	Westminster/4th

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

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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 23 NOVEMBER

Time	Details	Location/Floor
11.00am – 12.00pm	Cough	Rutherford, 4th floor
11.00am – 12.00pm	Critical Care	Albert, 2nd floor
2.00pm – 3.00pm	COPD	Albert, 2nd floor
2.00pm – 3.00pm	Pharmacist	Victoria, 2nd floor

THURSDAY 24 NOVEMBER

Time	Details	Location/Floor
10.45am – 11.45am	Nurse	Abbey, 4th floor
10.45am – 11.45am	Pulmonary Rehabilitation	Rutherford, 4th floor
10.45am – 11.45am	Global Lung Health	Albert, 2nd floor
12.00pm – 1.00pm	Tobacco	Rutherford, 4th floor
12.00pm – 1.00pm	Interstitial and Rare Lung Disease	Albert, 2nd floor
12.00pm – 1.00pm	BTS/ARTP Joint Strategy Board	Victoria, 2nd floor
2.00pm – 3.00pm	Asthma	Albert, 2nd floor
2.00pm – 3.00pm	Pulmonary Vascular Disease	Victoria, 2nd floor
4.00pm – 5.45pm	Cystic Fibrosis	Windsor, 5th floor
4.15pm – 5.15pm	Lung Cancer	Albert, 2nd floor
4.15pm – 5.15pm	Pulmonary Infection	Victoria, 2nd floor

FRIDAY 25 NOVEMBER

Time	Details	Location/Floor
9.00am – 10.00am	Sleep	Rutherford, 4th floor
9.00am – 10.00am	Pleural Disease	Victoria, 2nd floor
10.30am – 11.30am	Specialty Trainee	Rutherford, 4th floor
10.30am – 11.30am	Tuberculosis	Albert, 2nd floor
10.30am – 11.30am	Occupational and Environmental Lung Disease	Victoria, 2nd floor

BTS MEDAL AND AWARD PRESENTATIONS

Wednesday 23 November at 4.15pm in the Churchill, Ground floor

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

THE BTS PRESIDENT'S RECEPTION

Thursday 24 November from 5.45pm to 7.00pm in the Britten, 3rd floor

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

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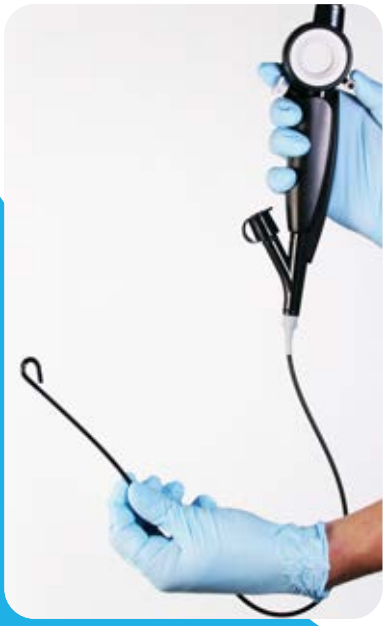

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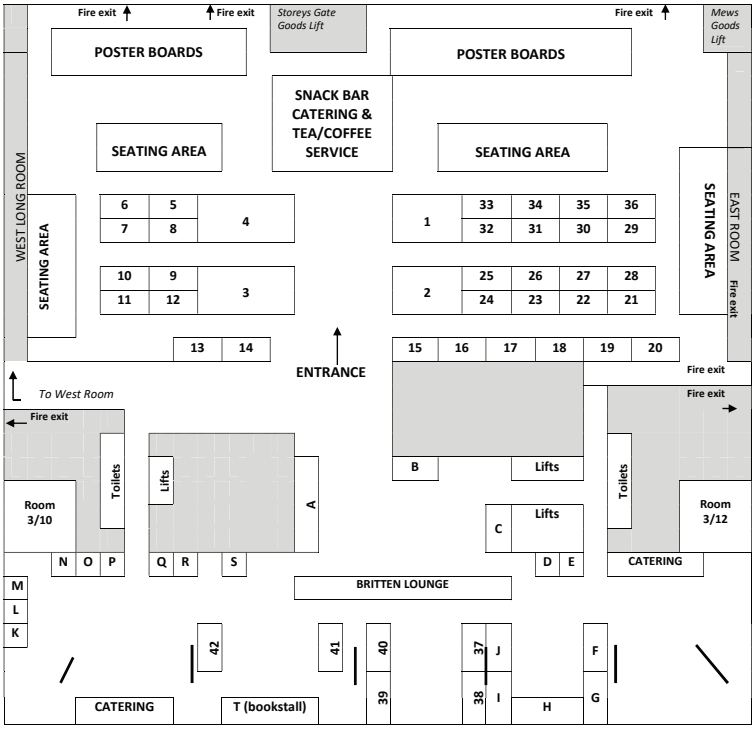

Exhibitors and stand numbers

12	Adherium
28	Air Liquide
31	Ambu
11	APR Medtech
2	AstraZeneca
20	BD
13	Broncus Medical / Uptake Medical
3	Chiesi
9	Creo Medical
16	CSL Vifor
30	Dolby Vivisol
7	Gilead Sciences
23, 24, 25 & 26	GSK
32	Insmed
19	Inspire Medical Systems
34	It's Interventional
33	Janssen
8	Medtronic
6	Nuvoair
14	Olympus Medical
10	Orion Pharma
40	Pari Medical
22	Pentax Medical
15	Pulmonx
36	Rocket Medical
1	Sandoz
4	Sanofi
17	Signifier Medical Technologies
29	Trudell
5	Vertex
18	Vitalograph
35	Vygon

Charity and non-commercial stands

P	Action for Pulmonary Fibrosis
J	Association for Respiratory Technology and Physiology
F	Association of Chartered Physiotherapists in Respiratory Care
I	Association of Respiratory Nurse Specialists
G	British Association for Lung Research
A	British Thoracic Society & Respiratory Futures
D	INSPIRE
E	IMPROVE Trial
Q	London Asbestos Support Awareness Group
S	Mesothelioma UK
R	LifeArc
C	PRSAS
41	The Limbic
B	National Asthma and COPD Audit Programme

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

P1-P10
"For Your Eyes Only" – What's hot in infection?
Discussion of abstracts will take place from 2.15pm to 3.30pm in the St James, 4th floor

P11-P22
Deciphering "The Da Vinci Code" – Biomarkers in airways disease
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Westminster, 4th floor

P23-P34
"Scar Wars" – The pot pourri of ILD
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Abbey, 4th floor

P35-P47
"Mission (Im)possible I" – Pulmonary vascular disease
Discussion of abstracts will take place from 2.15pm to 3.50pm in the Rutherford, 4th floor

P48-P61
"Sleepless in Seattle" – Treatments and monitoring in sleep and ventilation
Discussion of abstracts will take place from 2.15pm to 4.00pm in the Moore, 4th floor

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

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

Critical care

Dr Bronwen Connolly (Belfast)

Learning objectives

- *To learn the latest evidence for interventions in critically ill patients.*
- *To learn the unique challenges and opportunities in critical care research.*

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 – Seven ages of the lung: in the beginning ...

Chaired by: Dr Amanda Tatler (Nottingham) and Dr Owen Tomlinson (Exeter)

8.30am	Beyond the map: uncharted regions in the human lung and their implications to human lung regeneration and disease Dr Purushothama Rao Tata (Durham, North Carolina)
9.10am	Bringing the outside in: assessing environmental impacts on development Dr Renata Jurkowska (Cardiff)
9.50am	Only as good as the foundation: impact of matrix remodelling on asthma development Dr Hans Michael Haitchi (Southampton)

Learning objectives

- *This symposium will open with an overview of the new cell types that have been discovered, particularly progenitor and stem cells, and the role these cells play in lung development.*
- *The session will continue by discussing how environmental exposures can alter the epigenetic programming of these cells, leading to the development of lung disease.*
- *Finally, the session will conclude by highlighting the mechanisms by which asthma may develop in utero as a result of the activation of catalytic proteins such as ADAM33.*

8.45am-10.15am
Churchill, Ground floor
SYMPOSIUM

Eosinophils in the lung: what do they do and what can we do?

Chaired by: Professor Rekha Chaudhuri (Glasgow) and Dr Rocio Martinez-Nunez (London)

8.45am	The role of eosinophils in health and disease Professor Florence Roufosse (Brussels)
9.15am	Applying the eosinophil in airways disease

Professor David Jackson (London)

9.45am EGPA: old disease, new treatment

Professor Michael Wechsler (Denver, Colorado)

Learning objectives

- *Novel insights into eosinophil biology, their recruitment and activation in the lung in health and different diseases.*
- *Clinical and molecular insights into the roles played by eosinophils in asthma, COPD and bronchiectasis and impact of treatment strategies targeting eosinophils in these disease areas.*
- *Update on EGPA: impact of novel treatments on clinical course and underlying inflammatory pathways.*

8.45am-10.15am
Mountbatten, 6th floor
SYMPOSIUM

Beyond CFTR modulation

Chaired by: Dr Jamie Duckers (Cardiff) and Dr Nicola Robinson (Edinburgh)

8.45am The future of small molecule therapy for CF

Dr Jennifer Taylor-Cousar (Denver, Colorado)

9.15am Alternative chloride channel therapies

Professor Robert Tarran (Chapel Hill, North Carolina)

9.45am A US take on gene/cellular therapy

Dr JP Clancy (Cincinnati)

Learning objectives

- *To understand the current state of the art in terms of small molecule therapy for cystic fibrosis and future therapeutic approaches.*
- *To learn about the therapeutic approaches to restore airway surface liquid by modulating other ion channels, approaches that could have wider application to CF and other inflammatory lung diseases.*
- *To understand the approaches taken through the US Cystic Fibrosis Foundation initiatives in gene therapy and cellular therapy to target CF mutations that are untreatable with current small molecules.*

8.45am-9.50am
St James, 4th floor
SPOKEN SESSION: S1-S4

"Scar Face" – The burden of fibrosis

Chaired by: Dr Nazia Chaudhuri (Ulster/Manchester) and Dr Hannah Woodcock (Cambridge)

8.50am **S1**

Progressive pulmonary fibrosis: top ten research priorities

L Fabbri, K Cowan, W Adams, J Conway, S Jones, L Wright, N Chaudhuri, AM Russell, MA Gibbons, S Hart, J Lynch-Wilson , GR Jenkins

9.05am **S2**

Nocturnal hypoxaemia rather than obstructive sleep apnoea is associated with progressive deterioration in quality of life in patients with fibrotic interstitial lung disease

KJ Myall, AG West, JL Martinovic, JL Lam, D Roque, V Domi, Z Wu, DJ Jackson, T Maher, PL Molyneaux, ES Suh, BD Kent

9.20am **S3**

Characterising cough burden in hypersensitivity pneumonitis

Z Wu, P Saunders, D Smith, TM Maher, J Smith, PL Molyneaux

9.35am **S4**

Pulmonary function decline and survival in silicosis: a retrospective longitudinal study

CC Huntley, PS Burge, VC Moore, AS Robertson, GI Walters

8.45am-10.05am
Westminster, 4th floor
SPOKEN SESSION: S5-S9

"Flushed Away" – What's new in pleural disease?

Chaired by: Professor Kevin Blyth (Glasgow) and Dr Helen Davies (Cardiff)

8.50am **S5**

Bacterial isolates from infected and non-infected indwelling pleural catheters

DK Sethi, J Rhodes, MA Webber, EK Mishra

9.05am **S6**

Timing of pneumothorax post-CT-guided thoracic biopsy in a tertiary referral centre: implications for the ambulatory pneumothorax pathway

C Vella, M Majid, K Balasundaram, S Hadani, R Azam, R Sudhir, R Panchal, I Das, S Agrawal, JA Bennett, M Tufail

9.20am **S7**

Single-centre 14-year retrospective analysis of patients with post-thoracoscopy diagnosis of non-specific pleuritis

S Mohammad, D Li, C Vella, M Tufail, R Sudhir, RK Panchal

9.35am **S8**

Do physical activity levels and PROMs improve following therapeutic aspiration of pleural effusions?

H Welch, E Barton, E Beech, S Patole, L Stadon, A Clive, N Maskell

9.50am **S9**

Outpatient CT guided lung biopsy service with conservative management of pneumothorax

SHM Rizvi, A Banerjee, G Tsaknis, M Naeem, S Rawson, R Reddy

8.45am-10.05am
Moore, 4th floor
SPOKEN SESSION: S10-S14

"Chariots of Fire" – Interventions and assessment in respiratory physiotherapy

Chaired by: Dr Samantha Harrison (Teesside) and Mrs Ema Swingwood (Bristol)

8.50am **S10**

The effect of inspiratory muscle training in older adults: a randomised-controlled trial

J Manifield, C Alexiou, D Megaritis, K Baker, N Adams, G Barry, I Vogiatzis

9.05am **S11**

Improvement of inspiratory muscle and one minute sit to stand function associated with interstitial lung diseases pulmonary rehabilitation

H Alsomali, F Chambers, L McNeillie, M Alquaimi, C Donaldson, L Langlands, J Hartley, J Harper, AM Bourke, C Ward, I Forrest

9.20am **S12**

Efficacy of a physical activity behavioural modification tele-coaching intervention in lung transplant recipients: an interim analysis

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

9.35am **S13**

The validity and reliability of the Breathing Vigilance Questionnaire (Breathe-VQ)

J Steinmann, A Lewis, T Ellmers, M Jones, V MacBean, E Kal

9.50am **S14**

Physiotherapists' opinions of the physiotherapy assessment of breathing pattern dysfunction: a qualitative study

L Grillo, A Lewis, H Shannon, AM Russell

8.45am-10.20am
Abbey, 4th floor
SPOKEN SESSION: S15-S20

"Hot Shots!" – What's hot in cough?

Chaired by: Dr Peter Cho (London) and Dr Sabrina Zulfikar (Plymouth)

8.50am **S15**

Efficacy of oral nalbuphine extended release for the treatment of chronic cough in idiopathic pulmonary fibrosis: interim analysis of a phase 2 study

PL Molyneaux, W Forbes, E Bortey, T Sciascia, TM Maher

9.05am **S16**

Remote control: real world effectiveness of virtual, group-delivered speech and language therapy for chronic refractory cough

A de Looper, A Melville, SS Birring, CJ Jolley, JH Hull, J Selby

9.20am **S17**

A relevant definition of cough bouts

RJ Dockry, KJ Holt, JA Smith, K McGuinness

9.35am **S18**

Describing the triggers and sensations associated with coughing across different disease groups

S Galgani, L Boone, J Wingfield-Digby, J King, R Dockry, J York, H Badri, K Smith, J Shaw, S Hogarth, P Marsden, JA Smith

9.50am **S19**

Use of sputum eosinophils to help guide management in a tertiary referral cough centre

G Tavernier, T Qureshi, SJ Fowler, J Smith, P Marsden

10.05am **S20**

Suicidal ideation, depression and anxiety in chronic cough

B Hirons, K Rhatigan, A Simpson, H Kesavan, R Turner, J Hull, M Docherty, C Jolley, SS Birring, PSP Cho

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

10.45am-12.05pm
St James, 4th floor
SPOKEN SESSION: S21-S25

"Edge of Tomorrow" – Optimising thoracic cancer diagnosis and follow up

Chaired by: Dr Sadia Anwar (Leeds) and Dr Alastair Moore (Oxford)

10.50am **S21**

Targeted lung health check associated lung cancer fast track clinic data analysis from a major teaching hospital in Northwest UK

SA Jagtap, B Manoharan, A Bhatta, A Mirakhur, D Denby

11.05am **S22**

The incidence of malignancy in a prospective observational study on incidental pulmonary nodules (IDEAL study)

KL Ng, JA Moreland, W Hickes, TC Barton, ME Callister, DR Baldwin, F Gleeson

11.20am **S23**

Effectiveness of a risk-stratified clinical and imaging surveillance protocol (LNC-PATH) following surgical resection of lung cancer

C Brockelsby, P Bradley, C Craig, D Ryan, J Martin, J Lyons, N Sinnott, P Crosbie, R Booton, H Balata, M Evison

11.35am **S24**

Optimising the radiological surveillance of lung cancer following surgical resection

B Wyatt, A Lewis, J Weller, A Prasad

11.50am **S25**

Reflecting real-world patients in mesothelioma research: a pre-specified interim report from the pragmatic, prospective, observational ASSESS-meso cohort

N Smith, R Conway, W Cooper, S Patole, J Symonds, A Edey, NA Maskell, AC Bibby

10.45am-12.05pm
Moore, 4th floor
SPOKEN SESSION: S26-S30

"Transformers" – Transformational treatments and technologies in CF

Chaired by: Professor Andres Floto (Cambridge) and Dr Jennifer Taylor-Cousar (Denver)

10.50am **S26**

Untargeted sputum proteomics reveals anti-inflammatory effects of CFTR modulation

RE Maher, E Barrett, PJ Barry, E Emmott, AM Jones, PS McNamara, Smith JA, D Tewksbury, RW Lord

11.05am **S27**

Sustained anti-inflammatory effects of lumacaftor-ivacaftor in sputum and peripheral blood samples of adult cystic fibrosis patients – an observational study

P Arooj, D Morrissy, N Ronan, Y McCarthy, C Fleming, JA Eustace, DM Murphy, BJ Plant

11.20am **S28**

Paws for thought: sniffer dogs for infection surveillance in non-sputum producing people with CF

JA King, A Cunanan, S Aziz, S Morant, R Murphy, M Coates, E Alton, C Guest, JC Davies

11.35am **S29**

Immunological response to airway Aspergillus in CF is reduced following treatment with the CFTR modulator Elexacafor-Tezacaftor-Ivacaftor

FP Goldsmith, N Francis, D Tewkesbury, E Barrett, A Horsley, P Barry

11.50am **S30**

Longitudinal monitoring of LCI in patients with CF: what represents a clinically relevant change?

IR Roberts, AJ Jones, AM Maitra, CF Fullwood, FG Gilchrist, AH Horsley

10.45am-12.05pm
Abbey, 4th floor
SPOKEN SESSION: S31-S35

"Toy Story I" – Hot topics in childhood asthma

Chaired by: Dr Louise Fleming (London) and Professor Clare Murray (Manchester)

10.50am **S31**

The prevalence, severity, and risk factors for asthma in school-going adolescents in KwaZulu Natal, South Africa.

REM Mphahlele, M Lesosky, R Masekela

11.05am **S32**

Characterising school-age children with asthma: English population-cohort study

Z Khalaf, S Saglani, CI Bloom

11.20am **S33**

Duration and nature of symptoms prior to asthma diagnostic testing in a paediatric population

S Machin, E Gallacher, M Bennett, L Healy, R Tudge, L Lowe, G Kerry, R Wang, S Fowler, A Simpson, C Murray

11.35am **S34**

Supporting self-management of indoor asthma triggers and allergens in children and teens with severe asthma: what do families value and what further information do they need?

G Lewis, L Milnes, A Adams, J Schwarze, A Duff

11.50am **S35**

Treatable traits in symptomatic and untreated children and adults with suspected asthma

T Adjei, R Wang, L Healy, S Drake, L Lowe, M Bennet, R Tudge, L Willmore, G Kerry, J Sale, A Simpson, CS Murray, SJ Fowler

10.45am-12.15pm
Churchill, Ground floor
SYMPOSIUM

COPD: piecing together the jigsaw

Chaired by: Professor Charlotte Bolton (Nottingham) and Dr Sanjay Ramakrishnan (Oxford)

10.45am Laying out the pieces: latest cell science in COPD

Professor Louise Donnelly (London)

11.15am Seeing the wider picture: improved stratification using imaging

Professor Eric Hoffman (Iowa)

11.45am Fitting the pieces: phenotyping the patient for the treatment options

Professor Christopher Brightling (Leicester)

Learning objectives

- *A bench to bedside approach in the current state of COPD research and clinical practice.*
- *To update on the leading advances in imaging and how imaging and AI could personalise further COPD care.*
- *Recent RCTs using both repurposed and novel compounds have advanced our understanding of*

therapeutic targets, even if not all of them have been resoundingly positive. A clearer focus on phenotyping the patient for the right treatment.

10.45am-12.15pm
Mountbatten, 6th floor
SYMPOSIUM

Do the right thing: personalised care in tuberculosis

Chaired by: Dr Lucy Baker (London) and Dr Richard Ward (London)

10.45am Treatment shortening in drug sensitive TB: can everyone go low?
Professor Susan Dorman (South Carolina)

11.15am The science behind therapeutic drug monitoring in TB
Professor Rob Aarnoutse (Nijmegen)

11.45am How infectious are people with TB? New insights and new approaches
Dr Caroline Williams (Leicester)

Learning objectives

- *To discuss new data regarding novel regimens, treatment short-courses and their application to people with drug sensitive TB disease.*
- *To explore the scientific basis of therapeutic drug monitoring during treatment for TB, and whether it adds value to clinical management.*
- *To review the potential for rapid determination of individual infectivity as an aid to TB control management.*

10.45am-12.20pm
Westminster, 4th floor
SPOKEN SESSION: S36-S41

"Outbreak!" – COVID-19 epidemiology

Chaired by: Dr Gareth Hynes (Oxford) and Professor Jennifer Quint (London)

10.50am **S36***
Acute and long-term impacts of COVID-19 on economic vulnerability: a population-based longitudinal study in 16,910 adults
AE Williamson, F Tydeman, AR Martineau

11.05am **S37**
Risk factors for breakthrough COVID-19 in 14,713 UK adults after primary and booster doses of SARS-CoV-2 vaccines
G Vivaldi, DA Jolliffe, H Holt, M Talaei, F Tydeman, SO Shaheen, AR Martineau

11.20am **S38**
Omicron (B.1.1.529) SARS-CoV-2 infection results in less severe disease than infection with Delta (B.1.1.617.2) variant among hospitalised adults: a prospective cohort study
C Hyams, R Challen, R Marlow, JL Nguyen, E Begier, J Southern, A Morley, J King, J Kinney, M Clout, J Oliver, G Ellsbury, N Maskell, L Jodar, BD Gessner, JM McLaughlin, L Danon, A Finn

11.35am **S39**
COVID-19 incidence and hospitalisation in routine clinical practice among asthma patients in England in 2020
KJ Rothnie, T Tritton, X Han, T Holbrook, B Numbere, AF Ford, L Massey, Q Fu, FM Hutchinson, HJ Birch, D Leather, R Sharma, C Compton, AS Ismaila

11.50am **S40**
Impact of statin therapy on mortality and morbidity in patients with COVID-19
S Waring, R Wijesinha, M Lu, M Lim-Cooke, H Jeffrey, V Abeysuriya, P Russell

12.05pm **S41**
Incidence of SARS-CoV-2 and non-SARS-CoV-2-associated community acquired lower respiratory tract infections in Bristol, UK: a prospective cohort study
C Hyams, R Challen, E Begier, J Southern, J King, A Morley, Z Szasz-Benczur, M Garcia Gonzalez, J Kinney, J Campling, S Gray, J Oliver, R Hubler, SR Valluri, A Vyse, L Jodar, JM McLaughlin, G Ellsbury, N Maskell, BD Gessner, L Danon, A Finn

***S36 BTS Medical Student Award Winner**

11.00am-1.00pm
Windsor, 5th floor
SYMPOSIUM

Joint BTS/BALR symposium part 2 – Seven ages of the lung: wear, tear and repair?

Chaired by: Dr Alison John (London) and Dr Karl Staples (Southampton)

11.00am	The ticking clock: biomarkers of ageing in the human lung
	Dr Maaike de Vries (Groningen)
11.40am	Partners in crime? Role of lung bacteria
	Professor Julie Morrissey (Leicester)
12.20am	Can we fix it? Possibilities for lung regeneration
	Dr Marko Nikolic (London)

Learning objectives

- *The first presentation will discuss mechanisms of normal lung ageing and the abnormal ageing processes that are associated with COPD.*
- *We will then discuss the often-overlooked role of resident bacteria in response to environmental exposures such as pollution and how these responses may modulate host-pathogen interactions to promote airway colonisation impact on lung disease.*
- *Finally, this symposium will end with an overview of the new cell types that have been discovered, particularly progenitor and stem cells, and the role these cells may play in lung repair and regeneration.*

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

Cough

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

Critical Care

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

LUNCH (cash catering only)

1.00pm-1.45pm
Churchill, Ground floor
THE BTS SCIENTIFIC LECTURE

Targeting the transforming growth factor beta in pulmonary arterial hypertension

Guest lecturer: Professor Marc Humbert (Paris)

Introduced by: Dr Paul Walker (Liverpool)

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

Pharmacist

2.15pm-3.45pm
Churchill, Ground floor
SYMPOSIUM

Highlights from Thorax

Chaired by: Dr Christophe Dooms (Leuven), Professor Frank Kelly (London) and Dr Ed Moran (Bristol)

2.15pm	Bronchoscopic needle-based confocal laser endomicroscopy (nCLE) as a real-time detection tool for peripheral lung cancer
	Dr Tess Kramer (Amsterdam)
2.45pm	SARS-CoV-2 environmental contamination from hospitalised COVID-19 patients receiving aerosol generating procedures
	Dr Christopher Green (Birmingham)
3.15pm	Association between lung function of school age children and short-term exposure to air pollution and pollen: the PARIS cohort
	Dr Fanny Rancière (Paris)

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

Joint BTS/BALR/A+LUK Early Career Investigator Symposium

Chaired by: Professor Onn Min Kon (London)

Judged by: Professor James Chalmers (Dundee), Dr Karl Staples (Southampton) and Professor Louise Wain (Leicester)

2.15pm **T1**

Genetic overlap study between acute respiratory distress syndrome and idiopathic pulmonary fibrosis

B Guillen-Guio, RJ Allen, OC Leavy, T Hernández-Beeftink, E Suarez-Pajes, RG Jenkins, C Flores, LV Wain

2.30pm **T2**

Subphenotypes in patients with severe acute respiratory failure requiring extracorporeal membrane oxygenation

K Reddy, JE Millar, MV Malfertheiner, P Sinha, D Antcliffe, CS Calfee, CM O'Kane, T Müller, DF McAuley

2.45pm **T3**

Altered neutrophil proteomes in COVID19 patients 29-days post hospital admission are associated with delayed recovery: results from the PREDICT-COVID19 study

MB Long, AJ Brenes, AJM Howden, HR Keir, C Rollings, YH Giam, T Pembridge, L Delgado, H Abo-Leyah, A Lloyd, G Sollberger, RC Hull, A Gilmour, C Hughes, S Gallant, DM Cassidy, BJM New, D Connell, H Richardson, A Shoemark, AI Lamond, DA Cantrell, JD Chalmers

3.00pm **T4**

Novel lung organoid model reveals crucial role of lung resident mesenchymal stromal cells in COPD pathogenesis

DM Butler, I Heijink, AD Krasnodembskaya

3.15pm **T5**

Point of care blood eosinophil guided oral prednisolone for COPD exacerbations: a multi-centre double blind randomised controlled trial (the STARR2 trial)

S Ramakrishnan, H Jeffers, B Langford-Wiley, J Davies, M Mahdi, C A'Court, I Binnian, S Bright, S Cartwright, R Fox, REK Russell, M Bafadhel

3.30pm **T6**

Elevated serum Cathepsin K is associated with disease activity in Lymphangioleiomyomatosis and Cathepsin K inhibition is beneficial in vitro and in vivo

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

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2.15pm-3.45pm
Mountbatten, 6th floor
SYMPOSIUM

Joint BTS/BPRS symposium – Paediatric asthma: time to join up the dots

Chaired by: Dr Ann McMurray (Edinburgh) and Dr Katy Pike (Bristol)

2.15pm Delivering optimal care for children with asthma: barriers and opportunities

Dr Matthew Clark (Eastbourne)

2.45pm Management of paediatric asthma: are we being SMART enough?

Dr Liesbeth Duijts (Rotterdam)

3.15pm Eosinophils: friend or foe?

Professor Sejal Saglani (London)

Learning objectives

- *To gain an understanding of CYP asthma management and outcomes in the UK.*
- *To explore initiatives to improve asthma care for CYP.*
- *To discuss the use of anti-inflammatory reliever (AIR) therapies in CYP.*
- *To review the current evidence for AIR in children and understand the evidence gaps.*
- *To consider the role of the eosinophil in respiratory disease and understand the risks and benefits of strategies to block eosinophils.*

2.15pm-3.30pm
St James, 4th floor
POSTER DISCUSSION: P1-P10

"For Your Eyes Only" – What's hot in infection?

Chaired by: Professor Paul Elkington (Southampton) and Ms Shikha Tandel (Belfast)

P1 Community acquired pneumonia (CAP) and the advent of virtual hospital wards: how useful is the CURB-65 criteria for risk stratification in 2022?

C Baker, M Gobinath, M Shamsher Ahmed, P McDermott, W Kent

P2 Mouth care and pneumonia: a clinician's insight

N Sehgal, J Hoyle

P3 ECBS study: Exacerbation of Chronic Bronchial Sepsis – utility of a novel rapid molecular diagnostic test (MBLA) to detect and quantify viable bacteria

DJ Dhasmana, N Walbaum, S Finch, DJ Sloan, SH Gillespie, W Sabiiti

P4 Nebulised medications in secondary care: rising to the challenge

M Bettany, S Pilsworth, D Barber, D Wat

P5 Increasing NTM caseload within the BTS MDR TB National Clinical Advice Service: the tip of an iceberg?

MCI Lipman, L Altass, T Capstick, G Davies, P Haldar, M Dedicoat, M Loughenbury, K Manalan, E Robinson, OM Kon

P6 What guidelines say and what actually happens: a survey of UK physiotherapy practice in the management of non-tuberculous mycobacterial pulmonary disease

L Morrison, M Lipman, J Pond, S Bryant

P7 Testing at-risk patients for NTM-PD in current clinical practice: results of an international survey

MR Loebinger, R van der Laan, M Obradovic, J van Ingen

P8 A systematic literature review and meta-analysis of patient risk factors for non-tuberculous mycobacterial pulmonary disease (NTM-PD)

MR Loebinger, JK Quint, R van der Laan, M Obradovic, R Chawla, A Kishore, J van Ingen

P9 Outcomes of non-tuberculous pulmonary disease in an East London referral centre

AD Saleh, C Chen, B Augustine, A Naksho, S Hadyanto, E Ferran, H Kunst

P10 Miliary tuberculosis: a retrospective review of cases presenting to a UK teaching hospital

H Molloy, R Noonan, T Gorsuch, SO Brij

2.15pm-3.45pm
Westminster, 4th floor
POSTER DISCUSSION: P11-P22

Deciphering "The Da Vinci Code" – Biomarkers in airways disease

Chaired by: Dr Paul Pfeffer (London) and Professor Celeste Porsjberg (Copenhagen)

P11 Characteristics and long-term real-world outcomes of severe asthma patients treated with benralizumab in the United Kingdom; the BPAP study

DJ Jackson, H Burhan, A Menzies-Gow, H Rupani, PE Pfeffer, IJ Clifton, S Faruqi, AM Nanzer, J Dhariwal, T Morris, J Lipworth, M Watt

P12 A FeNO-based strategy to guide oral corticosteroid initiation in patients with severe asthma experiencing an exacerbation whilst on treatment with anti-IL5/5R therapy

JL Lam, AP Hearn, LA Thomson, LM Green, M Fernandes, C Roxas, G D'Ancona, J Dhariwal, AM Nanzer, DJ Jackson

P13 T2 biomarker-guided oral corticosteroid weaning in asthma

LA Thomson, AP Hearn, JL Lam, M Fernandes, LM Green, C Roxas, G d'Anconna, J Dhariwal, AM Nanzer, DJ Jackson

P14 Early predictive markers of clinical response to Mepolizumab – a clinical, biochemical and immunogenic perspective

YL Pang, R Clifford, L Matthews, C Clayton, H Lee, K Rakkar, I Stewart, T Harrison, T McKeever, I Sayers, DE Shaw

P15 Clinical characteristics of responders and non-responders: experience of five years of mepolizumab therapy in the Liverpool Severe Asthma Service

F Fyles, A Nuttall, H Joplin, G Jones, H Burhan, L Watkins

P16 Past smoking does not influence response to biologic therapy in patients with severe asthma

M Rahman, P Dennison, A Azim, A Freeman, HM Haitchi, R Kurukulaaratchy, H Rupani

P17 Association between Azithromycin use and stable state blood eosinophils in COPD patients

A Prasad, C Echevarria, J Steer, SC Bourke

P18 Respiratory viruses lead to airway dysbiosis in exacerbations of chronic obstructive pulmonary disease

R Pritchard, D Wiseman, H Shahbakti, M MacLeod, J Gent, A Ritchie, GC Donaldson, LJ Finney, JA Wedzicha

P19 Systemic changes in monoacylglycerols could be an indicator of inflammation in chronic obstructive pulmonary disease (COPD) patients

T Kramarić, R Paes de Araujo, K Love, T Asibey-Berko, S Ghosh, KE Lewis, LAJ Mur

P20 Mucolytics for acute exacerbations of chronic obstructive pulmonary disease: a systematic review and meta-analysis

E Papadopoulou, J Hansel, Z Lazar, K Kostikas, S Tryfon, J Vestbo, AG Mathioudakis

P21 Predicting exacerbation frequency in patients with COPD using established risk factors

P Dobson, A Dewar

P22 Airways oscillometry in asthma diagnosis in treatment naive but symptomatic adults

M Hiza, L Healy, S Drake, R Wang, M Bennett, L Wilmore, J Sale, R Tudge, L Lowe, G Kerry, S Fowler, C Murray, A Simpson

2.15pm-3.45pm
Abbey, 4th floor
POSTER DISCUSSION: P23-P34

"Scar Wars" – The pot pourri of ILD

Chaired by: Dr Amanda Goodwin (Nottingham) and Dr Philip Molyneaux (London)

P23 Predictors of mortality in progressive fibrosing interstitial lung disease patients treated with Nintedanib: real-world data from a single ILD specialist centre

L Stranks, K Newman, T Garfoot, H Morris, K Zakis, J Swale, M Greaves, S Stanel, S Ramjug, C Avram, J Blaikley, C Leonard, C Hayton, P Rivera-Ortega

P24 A retrospective study exploring GAP index as a predictor of mortality in patients with combined pulmonary fibrosis and emphysema

H Alsomali, W Funston, S Wiscombe, J Simpson, C Ward, I Forrest

P25 Swallowing safety and performance in patients with idiopathic pulmonary fibrosis: evidence from the water swallow test

A Alamer, J Patterson, M Drinnan, I Forrest, C Ward

P26 Impact of hiatus hernia in hypersensitivity pneumonitis – experience at a tertiary centre

DA Heriot, CJW Stock, Z Mumtaz, RG Jenkins, F Chua, PL Molyneaux, A Devaraj, V Kouranos, AU Wells, EA Renzoni, SPG Padley, SR Desai, PM George

P27 Blood neutrophil levels in IPF patients are significantly associated with quantitative radiological progression of fibrosis

A Achaiah, E Fraser, P Saunders, R Hoyles, R Benamore, LP Ho

P28 Prognostic value of routine peripheral blood markers in fibrotic hypersensitivity pneumonitis

CJW Stock, W Bray, M Kokosi, V Kouranos, PM George, PL Molyneaux, F Chua, GR Jenkins, AU Wells, EA Renzoni

P29 Delivery of Nintedanib in patients with progressive fibrotic interstitial lung disease: experience from a UK tertiary centre

JL Martinovic, M Naqvi, A West

P30 Real-world tolerability study of Nintedanib in patients with progressive fibrosing interstitial lung disease compared to patients with idiopathic pulmonary fibrosis

K Newman, T Garfoot, L Stranks, H Morris, K Zakis, J Swale, M Greaves, S Stanel, S Ramjug, C Avram, J Blaikley, C Leonard, C Hayton, P Rivera-Ortega

P31 Comparison of percent predicted and percentile values for $\dot{V}O_2$max in people with interstitial lung disease

SH Kranen, OW Tomlinson, CA Williams, MA Gibbons, CJ Scotton

P32 Using genetic information to define idiopathic pulmonary fibrosis in UK Biobank

OC Leavy, RJ Allen, LM Kraven, AD Morgan, MD Tobin, JK Quint, RG Jenkins, LV Wain

P33 What affects acceptability of remote digital monitoring of spirometry in patients with interstitial lung disease?

S Barth, C Edwards, G Saini, Y Haider, N Williams, W Storrar, I Stewart, G Jenkins, M Wickremasinghe

P34 Feasibility of remote monitoring with daily home spirometry and pulse oximetry in an interstitial lung disease clinical service setting

S Barth, C Edwards, G Saini, Y Haider, N Williams, W Storrar, I Stewart, G Jenkins, M Wickremasinghe

2.15pm-3.50pm
Rutherford, 4th floor
POSTER DISCUSSION: P35-P47

"Mission (Im)possible I" – Pulmonary vascular disease

Chaired by: Dr Katherine Bunclark (Cambridge) and Dr Sheila Ramjug (Manchester)

P35 Remote exercise testing can detect clinical change in pulmonary hypertension

H Stubbs, B Jani, M Brewis, C Church, M Johnson

P36 Validating pulmonary arterial hypertension-associated genomic mutations of EIF2AK4: when is a variant pathogenic?

G Emanuelli, NW Morrell, SJ Marciniak

P37 Correlation of emPHasis-10 with clinical tests: insights from the ASPIRE registry

S Alabed, K Dwivedi, C Durrington, F Alandajani, R Condliffe, C Elliot, A Charalampopoulos, A Hameed, R Thompson, A Rothman, I Armstrong, AJ Swift, DG Kiely

P38 Assessing the repeatability of NT-proBNP testing using laboratory and point of care testing in PAH (REPEAT-PAH)

C Durrington, C Battersby, L Holt, A Fairman, T Salisbury, H Turton, L Watson, AG Hameed, A Charalampopoulos, CA Elliot, AMK Rothman, J Middleton, H Zafar, R Condliffe, RA Lewis, DG Kiely, AAR Thompson

P39 Establishing minimally important differences for cardiac MRI endpoints in pulmonary arterial hypertension

S Alabed, P Garg, F Alandejani, K Dwivedi, A Maiter, K Karunasaagarar, S Rajaram, C Hill, S Thomas, M Sharkey, JM Wild, L Watson, A Charalampopoulos, A Hameed, I Armstrong, R Condliffe, AJ Swift, DG Kiely

P40 The distance saturation product as an outcome predictor in idiopathic pulmonary arterial hypertension

EH Emily, HS Stubbs, MB Brewis, MJ Johnson, CH Church,

P41 CT lung parenchymal appearances in chronic thromboembolic pulmonary hypertension (CTEPH)

L Abdulaal, K Dwivedi, MJ Sharkey, S Alabed, M Mamalakis, D Alkhanfar, R Condliffe, DG Kiely, AJ Swift

P42 Pulmonary embolism (PE) to chronic thromboembolic pulmonary disease (CTEPD): findings from a survey of UK physicians

J Pepke-Zaba, L Howard, D Kiely, T Donovan-Rodriguez, M Johnson

P43 Retrospective analysis on the use of age-adjusted D-dimer in patients with suspected pulmonary embolism with a low clinical probability score in a tertiary hospital

AB Huda, Y Negreskul, M Culasso, R Sudhir

P44 Sensitivity of the YEARS diagnostic algorithm in an unselected UK cohort

T Wilson, A White, S Roberts

P45 Assessment of bleeding risk in patients diagnosed with pulmonary embolism at diagnosis and follow-up: a service evaluation at a large regional hospital

M Bhatnagar, K Burke, A Roy, K Musgrave, AJ Simpson, A Rostron

P46 SARS-COV-2 – a major risk factor for pulmonary embolism, a retrospective observational study from a single tertiary care hospital

R Azam, H Zafar, M Tiwari, R Sudhir

P47 Retrospective application of the YEARS algorithm to an ambulatory PE clinic cohort

S Toor, H Mcauley, R Spriggs, E Bailie, N Parmar, N Greening

2.15pm-4.00pm
Moore, 4th floor
POSTER DISCUSSION: P48-P61

"Sleepless in Seattle" – Treatments and monitoring in sleep and ventilation

Chaired by: Dr Nayia Petousi (Oxford) and Dr Eui-Sik Suh (London)

P48 An observational, cross-sectional study to investigate whether room-air ventilators, used in the community setting, are colonised with Potential Airborne Pathogens (IPAP study)

AD Armstrong, B Messer

P49 Customised mandibular advancement splints (MAS) therapy in obstructive sleep apnoea syndrome (OSAS) patients – Clinical outcomes and follow up

AP Witton, L Earnshaw, AOC Johnson, A Dwarakanath

P50 Effectiveness of an NIV mask adaptation, in reducing post-gastrectomy critical care utilisation

Y Madhu, B Messer

P51 CPAP treatment outcomes and patient characteristics in relation to the level of diagnostic sleep study

A Komand, D Wozniak, M Chowaniec, F Ali

P52 Postal diagnostics and teleconsultation can increase attendance for investigation of sleep apnoea, with the greatest impact seen in people from areas of deprivation

C Salmon, Y Huang, DR Wozniak, M Mason, N Oscroft, MG Davies, TQ Quinnell, IE Smith

P53 CPAP supply challenges to UK sleep centres in 2022

SD West, AH Nickol, SE Craig, G Gibbons, B Cooper, M Morrell, J Steier

P54 The impact of a clinical decision support system in the assessment of CPAP compliance in obstructive sleep apnoea and in the identification of residual excessive daytime sleepiness

B Chakrabarti, R Angus, P England, M Osborne, T Qureshi, M Mir, L Reed, E McKnight, SE Craig

P55 The implementation of a computer guided consultation (clinical decision support system) for the assessment of suspected obstructive sleep apnoea in a large sleep service: a twelve month analysis

R Keane, T Qureshi, M Mir, L Reed, P England, E Mcknight, M Osborne, RM Angus, B Chakrabarti, SE Craig

P56 CPAP compliance, safety and optimal follow-up; a retrospective analysis

A Kamenova, R Dhunnookchand, L Mann, IS Stone

P57 Implementing a novel clinical pathway for the assessment of obstructive sleep apnoea: integration of clinical decision software with a practice support service team

B Chakrabarti, R Angus, M Grass, L Reed, P England, A Withington, L Foster, M Osborne, S Adams, E McKnight, S Craig

P58 Symptomatic improvement in patients with excessive dynamic airway collapse (EDAC) following initiation of positive airway pressure therapy

NM Shah, K Jadeja, M Cheng, P Marino, M Ramsay, S Srivastava, J Steier, N Hart, ES Suh, PB Murphy, G Kaltsakas

P59 Continuous positive airway pressure therapy in patient with excessive dynamic airway collapse: a single centre experience

MZ Hassan, S Khurana, S Fowler, S Bokhari, A Bikov

P60 Provision of home high flow therapy for people with COPD is feasible and associated with positive patient experience and reduced hospital admissions

AJ Taylor, M Manthe, G McDowell, DJ Lowe, C Carlin

P61 Clinical characteristics of patients with positional obstructive sleep apnoea

B Zagandi, A Bikov

3.00pm-4.00pm,
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

4.15pm-4.30pm
Churchill, Ground floor
AWARD PRESENTATIONS

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

4.30pm-5.15pm
Churchill, Ground floor
BTS PRESIDENT'S ADDRESS

Back to the future – old roots to new routes

BTS President: Professor Onn Min Kon (London)

Introduced by: Rachael Moses (London)

5.25pm-6.05pm
Churchill, Ground floor
BTS ANNUAL GENERAL MEETING

British Thoracic Society members only

Thursday 24 November 2022

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

Authors present: 10.00am – 11.00am

P62-P73
"Training Day" – Learning from CF patients
Discussion of abstracts will take place from 2.15pm to 3.45pm in the Moore, 4th floor

P74-P81
"Contagion" – The impact of COVID-19
Discussion of abstracts will take place from 2.15pm to 3.15pm in the Abbey, 4th floor

P82-P91
"Toy Story II" – Paediatric lung disease: pot pourri
Discussion of abstracts will take place from 2.15pm to 3.30pm in the Rutherford, 4th floor

P92-P105
"Blade Runner" – Diagnosis and follow up of thoracic malignancy
Discussion of abstracts will take place from 2.15pm to 4.00pm in the St James, 4th floor

P106-P116
"Avengers Assemble" – Impact of the MDT in respiratory disease
Discussion of abstracts will take place from 4.00pm to 5.25pm in the Abbey, 4th floor

P117-P124
"Interview with a Vampire" – Blood gas monitoring in clinical care
Discussion of abstracts will take place from 4.00pm to 5.00pm in the Rutherford, 4th floor

P125-P138
"Sliding Doors" – Beyond the drain: new insights in pleural disease
Discussion of abstracts will take place from 4.00pm to 5.45pm in the Westminster, 4th floor

P139-P148
"The Force Awakens" – The asthma patient experience
Discussion of abstracts will take place from 4.15pm to 5.30pm in the Moore, 4th floor

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

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

COPD trials

Professor Tony de-Soyza (Newcastle upon Tyne)

Learning objectives

- *To learn about the latest evidence for the management of COPD.*
- *To learn about the optimal conduct and delivery of clinical trials in COPD.*

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-10.15am
Churchill, Ground floor
SYMPOSIUM

Key updates in the world of pulmonary vascular medicine

Chaired by: Dr Colin Church (Glasgow) and Dr Rachel Davies (London)

8.45am	Covid endotheliitis and pulmonary thromboembolism: what is new and how do we treat it?
	Dr Robin Condliffe (Sheffield)
9.15am	Post-PE syndrome: definition, pathophysiology and how do we manage it?
	Professor (FA) Erik Klok (Leiden)
9.45am	Treatments for hypoxic lung disease PH: do we finally have some?
	Dr Steven Nathan (Falls Church, Virginia)

Learning objectives

- *To discuss the clinical and biological significance of pulmonary vascular involvement in COVID-19.*
- *To understand the definition, pathophysiology and management of patients post-PE*
- *To raise awareness of new advances and remaining limitations in the understanding and management of patients with Group-3 pulmonary hypertension.*

8.45am-10.15am
Windsor, 5th floor
SYMPOSIUM

How do we develop the respiratory nurse leaders of the future? The impact of the team, organisational culture and education

Chaired by: Dr Kate Lippiett (Southampton) and Wendy Preston (Royal College of Nursing)

8.45am How can the new CNO's (England) plan for research help empower respiratory nurses and teams to be more involved in research?

Professor Ruth Endacott (NIHR)

9.15am What can a global nurse respiratory curriculum contribute to the development of respiratory nursing?

Dr Lindsay Welch (Southampton)

9.45am Do we adequately prepare pre-registration nurses for a potential career in respiratory? A review of UK pre-registration respiratory skills and curriculum

Dr Nicola Roberts (Edinburgh)

Learning objectives

- *To inspire nurses to get involved in research and highlight the recent CNO strategy for research for nurses and the opportunities for those working in respiratory clinical areas.*
- *Provide an overview of what a global respiratory nurse curriculum can contribute to the development of respiratory nursing.*
- *Provide an understanding on what nursing students are being taught about respiratory care and clinical respiratory skills.*

8.45am-9.50am
Moore, 4th floor
SPOKEN SESSION: S42-S45

"The Fast and the Furious" – Clinical studies in COVID-19

Chaired by: Professor Kev Dhaliwal (Edinburgh) and Professor Ling-Pei Ho (Oxford)

8.50am **S42**

Vitamin D to prevent COVID-19 or other acute respiratory infections: phase 3 randomised controlled trial (CORONAVIT)

DA Jolliffe, H Holt, M Talaei, A Sheikh, CJ Griffiths, SO Shaheen, C Relton, AR Martineau

9.05am **S43**

Results from the STAR-COVID19 trial, a double-blind RCT of stabilised, synthetic sulforaphane in hospitalised patients with suspected COVID19

MB Long, H Abo-Leyah, YH Giam, T Vadiveloo, RC Hull, HR Keir, T Pembridge, D Alferes de Lima, BJM New, S Inglis, A Gilmour, C Hughes, L Delgado, G MacLennan, AT Dinkova-Kostova, JD Chalmers

9.20am **S44**

Repair of acute respiratory distress syndrome in COVID-19 by stromal cells (REALIST-COVID trial): 1 year follow up for safety and pulmonary dysfunction

HJ Gardiner, EA Gorman, AJ Rostron, M Shankar-Hari, J Bannard-Smith, AM Bentley, D Brealey, C Campbell, G Curley, M Clarke, A Dushianthan, P Hopkins, C Jackson, K Kefela, JG Laffey, C McDowell, M McFarland, J McFerran, P McGuigan, GD Perkins, J Silversides, J Smythe, J Thompson, WS Tunnicliffe, IDM Welters, B Williams, DF McAuley, CM O'Kane

9.35am **S45**

Inflammatory biomarkers as predictors of mortality and persistent symptoms at follow-up in patients with severe COVID-19

DL Sykes, L Holdsworth, J O'Halloran, C Vanderfeltz-Cornelis, S Holding, MG Crooks

8.45am-9.50am
Abbey, 4th floor
SPOKEN SESSION: S46-S49

"Fight Club" – Biologics in asthma: RCTs

Chaired by: Professor Florence Roufosse (Brussels) and Professor Michael Wechsler (Denver)

8.50am **S46**

Tezepelumab reduces mucus plugging in patients with uncontrolled, moderate-to-severe asthma: the phase 2 CASCADE study

L Nordenmark, C Emson, Å Hellqvist, J Johnston, H Greberg, JM Griffiths, JD Newell Jr, JR Parnes, G Colice, CE Brightling

9.05am **S47**

DESTINATION: tezepelumab long-term safety and efficacy versus placebo in patients with severe, uncontrolled asthma

A Menzies-Gow, ME Wechsler, CE Brightling, S Korn, A Bednarczyk, S Ponnarambil, G Almqvist, K Lawson, S Caveney, K Bowen, G Colice

9.20am **S48**

Efficacy of tezepelumab according to age at asthma onset in NAVIGATOR

G Brusselle, JD Spahn, G Hunter, N Martin, J-P Llanos-Ackert, S Ponnarambil

9.35am **S49**

Effect of tezepelumab on a composite of severe asthma exacerbations and acute worsening events, CompEx, in the phase 3 NAVIGATOR study

G Brusselle, N Martin, S Ponnarambil, G Hunter, Å Hellqvist, M Fagerås, CA Da Silva

8.45am-10.05am
Westminster, 4th floor
SPOKEN SESSION: S50-S54

"Inside Out" – Bronchiectasis diagnostics and mechanisms

Chaired by: Professor Sanjay Chotirmall (Singapore) and Dr Arietta Spinou (London)

8.50am **S50**

Profiling the microbiological and proteomic heterogeneity in patients with bronchiectasis and chronic Pseudomonas aeruginosa infection

H Abo-Leyah, D Alferes de Lima, H Richardson, T Pembridge, J Huang, P Goeminne, CS Haworth, JD Chalmers

9.05am **S51**

Heterogeneity of sputum and systemic inflammatory mediator profiles in bronchiectasis

A De Soyza, G Smith, H Killick, M Guscott, Z Afzahl, J Bradley, S Elborn, S Cohen, M Gavala, C McCrae, IC Scott, C Kell

9.20am **S52**

The incidence and impact of viral respiratory infections in adults hospitalized with exacerbations of bronchiectasis

B Diggins, N Prasad, C Newbern, WR Good, A Trenholme, QS Huang, C Wong

9.35am **S53**

What should we measure in physiotherapy research for bronchiectasis? Qualitative interviews to inform the development of a core outcomes set

H Hamzeh, S Spencer, C Kelly

9.50am **S54**

The lung microbiome in nontuberculous mycobacterial pulmonary disease

K Kumar, L Cuthbertson, HC Ellis, C Churchward, MR Loebinger, MF Moffatt, WOC Cookson

8.45am-10.05am
Rutherford, 4th floor
SPOKEN SESSION: S55-S59

"Change in the Air(ways)" – Airway biology

Chaired by: Dr Lareb Dean (London) and Dr Karl Staples (Southampton)

8.50am **S55**

Tissue resident MAIT cell phenotype in the upper airway

MF Jabeen, A Qureshi, H Ferry, P Klenerman, TSC Hinks

9.05am **S56**

ZFP36L1 and ZFP36L2 deficiency contribute to steroid refractoriness and epithelial remodelling in severe asthma

J Rynne, E Ortiz-Zapater, N Ponde, P Khooshemehri, M Plate, G Bucca, C Smith, R Chambers, RT Martinez-Nunez

9.20am **S57**

Serine proteases in house dust mite extract mediate PAR-2-associated calcium signaling and a pro-inflammatory response in asthma human primary bronchial epithelial cells

X Ouyang, JA Reihill, LEJ Douglas, SL Martin

9.35am **S58**

UPF1 is a novel modulator of antiviral responses against rhinovirus and is deficient in patients with severe asthma

A Richardson, N Ponde, S Ong, P Khooshemehri, D Bagley, G Bucca, A Hesketh, C Smith, J Rosenblatt, RT Martinez-Nunez

9.50am **S59**

Epithelial immune activation and intracellular invasion by non-typeable Haemophilus influenzae

MA Brown, SB Morgan, G Donachie, KL Horton, ID Pavord, C Arancibia, TSC Hinks

8.45am-10.20am
Moore, 4th floor
SPOKEN SESSION: S60-S65

"The Day After Tomorrow" – Impact of the carbon footprint in lung health

Chaired by: Dr Richard EK Russell (Oxford) and Dr Alexander Wilkinson (Stevenage)

8.50am **S60**

A new medical propellant HFO-1234ze(E): reducing the environmental impact of inhaled medicines

C Hargreaves, N Budgen, A Whiting, K Lachacz, M Sommerville, J Archbell, V Joshi

9.05am **S61**

Reducing the environmental impact of pressurized metered dose inhalers: relative bioavailability of budesonide/glycopyrronium/formoterol fumarate dihydrate with novel propellant formulations in healthy subjects

M Aurivillius, L Dunsire, A Bednarczyk, M Kokot, J Madriaga, J Mei, K Collison, R Surujbally, M Gillen

9.20am **S62**

Exploring the environmental impact of inhaler disposal and the feasibility of postal inhaler recycling in the UK: results from the Take AIR pilot, postal inhaler recycling scheme

A Murphy, D Howlett, A Gowson, H Lewis

9.35am **S63**

Partnering patients on climate change; assessing patients' understanding of the carbon footprint of inhalers

AJK Wilkinson, AA Woodcock

9.50am **S64**

Impact of choice of salbutamol pMDI and use of Spacer on drug delivery and emissions – best for patient and environment

J Suggett, J Patel, M Nagel, W Carroll

10.05am **S65**

Global warming impact of inhalers: the patient perspective

KF Florman, HW Wickham, AH Hodge, RU Umastuthan, SLY Yeoh, JP Pang, AT Tynan, SB Brill, JB Brown, AP Patel

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

10.45am-12.15pm
Churchill, Ground floor
SYMPOSIUM

Plenary Scientific Symposium

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

10.45am Airways disease
Professor Mona Bafadhel (Oxford)

11.05am Genetics
Professor Louise Wain (Leicester)

11.25am How macrophage metabolism controls chronic lung disease
Dr Adam Byrne (London)

11.45am Pulmonary hypertension research: go big or go home?
Dr Mark Toshner (Cambridge)

Learning objectives

- *Understanding of how eosinophilic airways disease can be identified and treated across the spectrum of airways disease.*
- *Learning about the genetic underpinnings of complex chronic respiratory diseases such as idiopathic pulmonary fibrosis, COPD and COVID-19.*
- *Learning about the role of macrophages in the pathophysiology of chronic respiratory disease.*

10.45am-11.50am
Westminster, 4th floor
SPOKEN SESSION: S66-S69

"Back to the Future" – Novel technology of the airways

Chaired by: Dr Hannah Durrington (Manchester) and Dr Dan Nicolau (London)

10.50am **S66**

Towards implementation of live AI-based prognostic risk-prediction scores in a COPD MDT

S Burns, G Subasic, D Morgan, A Taylor, P McGinness, DJ Lowe, C Carlin

11.05am **S67**

Symmetric Projection Attractor Reconstruction (SPAR): advanced respiratory pattern analysis provides additional biomarkers of COPD

M Serna Pascual, G Rafferty, J Steier, Y Huang, P Aston, C Jolley, M Nandi

11.20am **S68**

Assessing pulmonary ventilation and treatment response in patients with asthma and COPD using 19F-MRI: results from the LIFT study

C Holland, M Neal, B Pippard, I Forrest, G Burns, I Sabroe, R Lawson, HF Fisher, JNS Matthews, AJ Simpson, JM Wild, PE Thelwall

11.35am **S69**

Point of care (POC) breath test to accurately predict asthma exacerbations

V Higgs, H Ahmed, JA Flavier, F Hegazy

10.45am-11.45am
Abbey, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Nurse

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

Pulmonary Rehabilitation

10.45am-11.45am
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Global Lung Health

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

LUNCH (cash catering only)

12.00pm -1.00pm
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Tobacco

12.00pm-1.00pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Interstitial and Rare Lung Disease

12.00pm-1.00pm
Victoria, 2nd floor
OPEN MEETING

BTS/ARTP Joint Strategy Board

1.00pm-1.45pm
Churchill, Ground floor
THE BTS CLINICAL LECTURE

Pandemic parables

Guest Lecturer: Professor Sir Jonathan Van-Tam (Nottingham)

Introduced by: Rachael Moses (London)

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

Asthma

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

Pulmonary Vascular Disease

2.15pm-3.45pm
Churchill, Ground floor
SYMPOSIUM

Stop normalising poverty: how can African children achieve their true lung health potential?

Chaired by: Dr Amsalu Bekele Binegdie (Addis Ababa) and Dr Johanna Feary (London)

2.15pm	This story started long, long ago: the legacy of poor lung health across the generations Professor Refiloe Masekela (Durban)
2.45pm	In the beginning, there was fire: but is this the "killer in the kitchen" or just smoke and mirrors? Professor Kevin Mortimer (Liverpool)
3.15pm	Taking turns to breathe the same air: why the air in Africa matters to us all and the health of our planet Dr Gabriel Okello (Cambridge)

Learning objectives

- *Discuss early life determinants of lung health centred around air pollution exposures in Africa.*
- *Discuss controversies around the role of household air pollution in causing lung disease in children and adults.*
- *Discuss air quality and lung health in Africa and the UK in the context of the new WHO air quality recommendations.*

2.15pm-3.45pm
Mountbatten, 6th floor
SYMPOSIUM

New treatments for chronic cough

Chaired by: Dr Sean Parker (Northumbria) and Claire Slinger (Preston)

2.15pm	The cough reflex and hypersensitivity Professor Jacky Smith (Manchester)
2.45pm	Speech therapy treatment for cough hypersensitivity Jennifer Butler (Newcastle upon Tyne)
3.15pm	New drugs for cough hypersensitivity Dr Paul Marsden (Manchester)

Learning objectives

- *'Deep dive' into the current science of cough. Particular focus on cough reflex physiology and cough hypersensitivity. Important this has a translational slant but the emphasis on clinical aspects.*
- *Non pharmacological approaches, usually delivered by SALT are very effective for managing cough. Update on evidence and what is involved. Particular focus on developing clinical services, the role of AHP's in the respiratory MDT and development of speech therapy 'upper airway' service to support respiratory medicine.*
- *Update the audience on current antitussives and on the current state of play with novel antitussives, in particular P2X receptor antagonists that are currently being reviewed by the FDA and NICE. Really important area as these drugs are likely to transform how cough is managed.*

2.15pm-3.45pm
Windsor, 5th floor
SYMPOSIUM

Improving uptake of pulmonary rehabilitation: a patient-centred approach

Chaired by: Lucy Gardiner (Birmingham) and Dr Claire Nolan (London)

2.15pm	Service user perspectives of factors influencing pulmonary rehabilitation uptake Dr Jane Watson (London)
2.45pm	Improving pulmonary rehabilitation uptake: are remote models the answer? Dr Linzy Houchen-Wolloff (Leicester)
3.15pm	Real world strategies for improving uptake of pulmonary rehabilitation Professor Keir Lewis (Swansea)

Learning objectives

- *To understand some of the potential barriers to PR uptake.*
- *To determine the evidence base for remote models of PR.*
- *To demonstrate some real-world attempts to improve PR uptake.*

2.15pm-3.35pm
Westminster, 4th floor
SPOKEN SESSION: S70-S74

"Inception" – Embracing complexity in lung science

Chaired by: Dr Jodie Ackland (Southampton) and Dr Andrew Durham (London)

2.20pm **S70**

Collagen deposition by fibroblasts could contribute to disease progression in Lymphangioleiomyomatosis

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

2.35pm **S71**

Mesenchymal cell senescence influences ATII cell viability in LAM

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

2.50pm **S72**

Towards a murine model of pulmonary veno-occlusive disease

M Schwiening, R Nibhani, S Moore, A Crosby, M Southwood, C Huang, NW Morrell, SJ Marciniak, E Soon

3.05pm **S73**

The inflammatory response of airway epithelial cells to soluble mediators obtained from H. influenzae infected macrophages

S Carson, FT Lundy, LP McGarvey, A Crilly, SL Martin

3.20pm **S74**

The effect of hypoxia on MMP-1 production in M. avium lung disease

SM Tandel, DP Brazil, GN Schroeder, CM O'Kane

2.15pm-3.45pm
Moore, 4th floor
POSTER DISCUSSION: P62-P73

"Training Day" – Learning from CF patients

Chaired by: Dr Charlotte Addy (Cardiff) and Professor Alexander Horsley (Manchester)

P62 A discrete choice experiment (DCE) to quantify the influence of trial features on the decision to participate in cystic fibrosis (CF) trials

RA Dobra, JC Davies, JS Elborn, F Kee, S Madge, M Boeri

P63 Levelling the playing field: improving access to cystic fibrosis clinical trials for a large, regional population. Lessons learned from the London Network of the UK Clinical Trials Accelerator Platform

D Brown, J Davies, R Dobra, J Matthews

P64 Using the CFHealthHub learning health system to understand the experiences of adults with cystic fibrosis of obtaining repeat supplies of nebulised medicines: results of a national survey

A Bevan, S Dawson, J Hall, I Davids, C Girling, E Cross, M Wildman

P65 Are patients with cystic fibrosis attending a virtual leisure centre representative of the cystic fibrosis population?

Y Qin, A Johnson, K Hamana, J Duckers, C Bridges, NS Gale

P66 Patient-reported outcomes in patients with cystic fibrosis with homozygous for the Phe508del CFTR mutation on Lumacaftor-Ivacaftor treatment: results from an observational study

P Arooj, D Morrissy, N Ronan, Y McCarthy, C Fleming, JA Eustace, DM Murphy, BJ Plant

P67 Moving into year 7: a pilot study to assess to the usefulness of an on-line group session to prepare young people with cystic fibrosis for transitioning to secondary school

G Beech, C Lawrence, A Walsh, H Fogg, C Woodland, RM Thursfield

P68 Changing demographics of the cystic fibrosis population with ageing – how will this impact future provision of care?

K Sapru, R Bright-Thomas, S Patterson, PJ Barry, AM Jones

P69 The impact of elexacaftor-tezacaftor-ivacaftor (ETI, Kaftrio) treatment on the opinions of children and young people with cystic fibrosis about physiotherapy and nebulised treatment: a qualitative study

M Almulhem, C Ward, N Harnett, S Graham, S Visram, M Brodlie

P70 Corrector therapies (with or without potentiators) for people with cystic fibrosis with class II CFTR gene variants (most commonly F508del)

M Heneghan, KW Southern, J Murphy, IP Sinha, SJ Nevitt

P71 Remote respiratory sampling and unusual Pseudomonas growths in adults with cystic fibrosis: is there a link?

K Ur Rehman, M Tausan, N Ramadan, I Felton, E Ukor, S Madge, A Jones, NJ Simmonds

P72 Feasibility of combined structural and functional proton lung imaging in young children with cystic fibrosis

A Yule, C Ng, N Palaniyappan, Z Peggs, C Bradley, J Brooke, N Deelschaft, R Spiller, C Hoad, S Francis, P Gowland, I Hall, AR Smyth, AP Prayle

P73 A prospective multifaceted evaluation of the impact of Kaftrio in children with cystic fibrosis

H Gajaweera, M Day, G Connett, C Cannell, J Legg

2.15pm-3.15pm
Abbey, 4th floor
POSTER DISCUSSION: P74-P81

"Contagion" – The Impact of COVID-19

Chaired by: Dr Rizwan Ahmed (Bolton) and Dr Rachael Evans (Leicester)

P74 Assessing burnout and mental health of respiratory high care unit (RHCU) staff two years into the COVID-19 pandemic

B Jones, J Reece, R O'Neill, A Lal, SL Tan

P75 Evaluation of a complex home ventilation population before and after the advent of COVID-19 in the UK

K Ward, M Weir, L Campbell, K Faulkner-Byrne, J Jordan, A Hughes, RM Angus, B Chakrabarti, R Parker, N Nwosu, PK Plant, A Manuel

P76 Impact of the COVID-19 pandemic on referral processes to a regional occupational lung disease service – a single centre experience

CK Ho, J Macfarlane, H Tedd, C Dilks

P77 Other impacts of COVID: observations from the frontline

RP Pancharatnam, RE Evans, BK Khan

P78 Impact of COVID-19 pandemic on thoracoscopy services – change in practice to day-case procedure

M Aboushehata, M Haris, S Leyakathali Khan, Q Abdullah, S Iftikhar, E Hussain

P79 Analysis of antifungal use from 2015 – 2021 in a tertiary care cardiopulmonary hospital: the impact of the COVID-19 pandemic on antifungal prescribing practices

R Jabbar, Z Shang, A Shah

P80 Rebound in asthma exacerbations following relaxation of COVID-19 restrictions

F Tydeman, A Martineau, P Pfeffer

P81 Effect of COVID-19 infection and preventive public health measures on haemodynamics, activity and quality of life in patients with pulmonary arterial hypertension

CP Battersby, JT Middleton, H Zafar, SK Binmahfooz, J Patel, D Neelam-Naganathan, M Toshner, A Reddy, R Lewis, L Watson, A Swift, R Condliffe, CA Elliot, A Hameed, R Thompson, A Charalampopoulous, DG Kiely, AMK Rothman

2.15pm-3.30pm
Rutherford, 4th floor
POSTER DISCUSSION: P82-P91

"Toy Story II" – Paediatric lung disease: pot pourri

Chaired by: Dr Cara Bossley (London) and Dr Samantha Sonnappa (Edinburgh)

P82 Is the presence of bacterial infection in nasal brushings associated with challenges in PCD diagnostics?

A Sepahzad, T Burgoyne, S Carr, JC Davies, F Daudvohra, M Dixon, C Hogg, R Rai, A Shoemark

P83 Changes in UK paediatric long-term ventilation practice over 10 years

NJ Barker, A Sinha, CA Jesson, O Narayan, HE Elphick

P84 "I am not fixed;" a qualitative study exploring the views about respiratory care of people born with OA/TOF

L Bray, V Gray, P Cullis, S Gorst, J Faulkner, RM Thursfield

P85 Outcomes of severe life threatening bronchopulmonary dysplasia (BPD) – single centre experience

N Kiddo, S Rao, R Negrine, I Brookes

P86 Is multiple breath washout a useful tool in other respiratory conditions other than cystic fibrosis in paediatrics?

P Lawrence, S Mayell, RM Thursfield

P87 Are Black, Asian and Minority Ethnic (BAME) children disadvantaged performing spirometry?

H Sandhu, S Carr, S Irving

P88 An assessment of self-performed home spirometry in paediatric asthma patients

P Chen, S Irving, L Fleming

P89 Comparison of aerosol drug delivery across delivery devices in a spontaneously breathing asthmatic paediatric patient model

S Murphy, L Reilly, O O'Sullivan, M Mac Giolla Eain, M Joyce, R MacLoughlin

P90 Acceptability and feasibility pilot of co-designed telehealth physiotherapy interventions for children with asthma and dysfunctional breathing

C Wells, N Wilkinson, S Makhecha, P Hall, A Jamalzadeh, S Sonnappa, L Fleming, A Bush, S Saglani

P91 Acceptability and feasibility of measuring blood eosinophils using a point-of-care device in children with asthma

B Pavlou, E Scotney, I Makariou, Y Bingham, A Jamalzadeh, P Hall, C Jackman, A Bush, S Sonnappa, L Fleming, S Saglani

2.15pm-4.00pm
St James, 4th floor
POSTER DISCUSSION: P92-P105

"Blade Runner" – Diagnosis and follow up of thoracic malignancy

Chaired by: Dr Haval Balata (Manchester) and Dr George Tsaknis (Kettering)

P92 Should all 2WW referrals undergo CT scanning? An exploration of symptoms in the context of a normal chest radiograph

E Hall, P Arooj, I Zaki, S Snook, D Crowle, RD Riordan, LM Taylor, TJ Howell, TW Nicholson, D Waine, JP Corcoran, LA Telisinghe, C Daneshvar

P93 A novel approach to referrals with urgent suspicion of cancer (USOC). Two-year evaluation of "Virtual USOC" service for patients with low probability of lung cancer

KA Woods, LG McAlpine, SH Baird

P94 Incidence of lung cancer in patients with haemoptysis referred through cancer pathway in a district general hospital

I Perera, V Joshi

P95 Circulating tissue DNA for diagnosis of non-small cell lung cancer in patients unsuitable for biopsy: real world experience

RS Thorley, AT Low

P96 Neck ultrasound and lymph node biopsy by respiratory physicians in patients with thoracic disease

B El-shaarawy, A Elhefny, H Gharraf, M Hassan

P97 Usefulness of fibre-optic bronchoscopy for the investigation of lung cancer in patients with non-massive haemoptysis and non-diagnostic CT

A Navarra, R Mogal

P98 Consent and complications in bronchoscopy: a trainee-led, region-wide evaluation

B Pippard, D Wilkinson, W Ong, HJ Carlin, R Sobala, S Shakir, T Fretwell, M Carling, J Kibbler, C Holland

P99 Day case thoracoscopy with IPC insertion – experience from two district general hospitals

M Turner, F Craighead, J Mackenzie, A Aujayeb

P100 The utility of EBUS-TBNA in tissue acquisition for next generation sequencing of non-small cell lung cancer (NSCLC)

N Adroja, L Rogers, A Bhamani, R Thakrar, P Bennett, SM Janes, D Moore, N Navani

P101 Pericardial effusion and lung cancer: experience from Northumbria HealthCare

H Tufayl, A Aujayeb

P102 The impact of a dedicated interventional team in the management and outcome of central airways obstruction in lung cancer patients

I Zaki, P Arooj, D Crowle, A Talbot, TW Nicholson, A Marchbank, LA Telisinghe, C Daneshvar

P103 Characterisation, prediction, and impact of readmission within 90 days of surgery for non-small cell lung cancer

EG Roberts, N Shalom, H Scholes, H Gleeson, HA George, JN Rao, L Socci, DN Hopkinson, S Tenconi, JG Edwards

P104 Lung cancer with co-existing interstitial lung disease: incidence, treatment and outcomes

M Bhatnagar, L Farthing, C Storey, C Murphy, S Haney

P105 Anterior mediastinal masses: a diagnostic and follow-up challenge

S Ghattas, S Anderson, M Lawson

3.00pm-4.00pm
Whittle & Fleming and Britten, 3rd floor
COFFEE/TEA BREAK

4.00pm-5.45pm
Windsor, 5th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Cystic Fibrosis

4.00pm-5.25pm
Abbey, 4th floor
POSTER DISCUSSION: P106-P116
"Avengers Assemble" – Impact of the MDT in respiratory disease

Chaired by: Dr Ruth de Vos (Portsmouth) and Claire Slinger (Preston)

P106 Multidisciplinary assessment of inducible laryngeal obstruction (ILO) and upper airway symptoms in severe asthma. Single centre experience of service development and outcomes

DH Higbee, C Morgan, C Dixon, S Brady, R Shrimanker, JW Dodd

P107 UK speech and language therapy (SLT) diagnostic and therapy services for inducible laryngeal obstruction

S Percy, SF Ludlow, B Tidmarsh, SJ Fowler

P108 Making waves: evaluation of the use of impulse oscillometry in the assessment of inducible laryngeal obstruction (ILO), and determining the prevalence of ILO within a UK Northwest respiratory service

P Cruise, C Slinger, H Lever, K Prior, M Swainson, T Barry

P109 Two bronchiectasis coughs: SLT or physio?

J Harrison, H Lever, K Prior

P110 The untold tale of diaphragmatic paralysis: epidemiology, natural history and decision-making for surgical repair

A Gardiner, R Bilancia

P111 Nurse specialist led sleep pathway is clinically and cost effective compared to a pathway delivered by consultants

M Darda, L Ward, S Devasia, W Pratley, S Bloxham, D Cooke, MA Pittman

P112 – Withdrawn The effect of specialist palliative care provision on end of life care outcomes for patients with advanced lung pathology, within a community respiratory service

J Reilly-Donohoe, S Pilsworth

P113 Advanced clinical practitioner (ACP) hot airways clinic: a 12 month feasibility study

ER Bradley, R Baron, SO Brij, WA Khan

P114 Evaluation of a one-stop respiratory outreach clinic for patients attending a substance misuse service: addressing under-diagnosis and unmet needs; acceptability and impact

A Monsell, A Shatta, S Sathanandan, O Price, LJ Restrick

P115 Investigating a structured diagnostic pathway for chronic breathlessness in primary care; a feasibility cluster randomised controlled trial (cRCT)

G Doe, J Clanchy, S Wathall, S Chantrell, S Barber, N Baxter, D Jackson, N Armstrong, MC Steiner, RA Evans

P116 A systematic review to identify and collate the patient-centred factors influencing patient journeys through clinical trials

RA Dobra, M Boeri, JS Elborn, F Kee, S Madge, J Matthews, G Wilson, JC Davies

4.00pm-5.00pm
Rutherford, 4th floor
POSTER DISCUSSION: P117-P124

"Interview with a Vampire" – Blood gas monitoring in clinical care

Chaired by: Dr Chris Carlin (Glasgow) and Joshua Burrough (Manchester)

P117 Does the differential measurement error of pulse oximeters in patients with non-white skin delay the initiation of oxygen therapy?

M Williams, R Holt, J Churchill, R Singh, D Shaw, A Fogarty

P118 What oxygen target saturation ranges are currently prescribed for non-hypercapnic patients in UK hospitals and what target ranges would respiratory registrars prefer to use?

H Bailey, H Lee Evans, N Majeed, M Nayyar, BR O'Driscoll, V Palissery

P119 An automated audit of hospital oxygen use devised during the COVID pandemic

BR O'Driscoll, ND Bakerly

P120 Evaluating the use of the NEWS2 SpO2 Scales in COPD patients admitted to medical wards: a prospective clinical audit

H Asfour, S Saeed, A Murad, F Farman, A Hassan, M Punjabi, S Jayalekshmi, R Imdhad, A Alkhayyer, H Lwin, A Sallam, R Singh

P121 An audit of ambulatory oxygen assessments utilising a pre-established blinded treadmill protocol

S McArthur, S Baxter

P122 Admission bicarbonate as a determinant of long-term mortality in obesity-related respiratory failure requiring acute non-invasive ventilation

A Krishnan, P Antoine-Pitterson, A Oakes, E Gallagher, A Cartwright, R Mukherjee

P123 Respiratory failure: assessing knowledge and key skills amongst healthcare professionals in interpreting blood gas analysis and recognising and managing acute disease

A Gogokhia, E Madueke, A Fatima, J Kapofu, J Nixon, E Crawford, A Makan, K Srinivasan, H Moudgil

P124 Transcutaneous CO_2 measurement in a long term ventilation (LTV) service

WH Ong, N Lane, B Messer, H Tedd, A Armstrong, R Davidson, P Ireland, J Rodger, K George, K Cattermole, Y Madhu, R Fowkes, CK Ho, A DeSoyza

4.00pm-5.45pm
Westminster, 4th floor
POSTER DISCUSSION: P125-P138

"Sliding Doors" – Beyond the drain: new insights in pleural disease

Chaired by: Dr Owais Kadwani (London) and Dr Clare Ross (London)

P125 Diaphragm dynamics in pleural effusion

ER Graham, M Hassan, LM Taylor, WE Falconer, B Probyn, H Rai, A Ghoshal, TW Nicholson, JP Corcoran, LA Telisinghe, C Daneshvar

P126 Patient experiences of malignant pleural effusion management: a qualitative study

DN Addala, A Sundaralingam, EO Bedawi, B Iqbal, P Denniston, N Kanellakis, N Russell, JM Wrightson, NM Rahman

P127 Regional erector spinae block for medical thoracoscopy

J McPherson, E Halvey, M Blundell, A Aujayeb

P128 Conservative management of primary and secondary spontaneous pneumothorax: case series

AK Mavilakandy, S Rawson, M Naeem, G Tsaknis, RV Reddy

P129 Autologous blood patch pleurodesis – a UK multi-centre retrospective case series

S Shakir, B Choo-Kang, K Conroy, C Ross, R Thorley, S Walker, A Aujayeb

P130 The Glenfield pleural fluid chart: standardising pleural fluid descriptors for patients and healthcare professionals

D Li, S Johnstone, F Hinchcliffe, C Vella, R Sudhir, R Panchal

P131 Pleural nurse specialists: an evolving role within the National Health Service

D Li, S Johnstone, F Hinchcliffe, C Vella, R Sudhir, R Panchal

P132 Informed decision or 'formed decision': are we giving choice to patients to choose definitive management of malignant pleural effusion? A retrospective cohort study

B Iqbal, P Denniston, D Addala, E Bedawi, R Hallifax, A Sundralingam, J Wrightson, NM Rahman

P133 A cut above the rest – the utility of physician ultrasound guided, non-targeted, percutaneous pleural biopsy to improve diagnostic pathways

A Thayanandan, L Gleeson, R Sinharay, R Turner, C Ross

P134 Once daily fibrinolytic therapy in the management of pleural infection

HS Virk, G Tsaknis, M Naeem, R Reddy

P135 Small cell lung cancer and pleural effusion: an analysis from a district general hospital

N Keidan, A Aujayeb

P136 Questions clinicians are asked when offering patients pleurodesis: a survey of practice

A Sundaralingam, D Addala, E Bedawi, P Denniston, B Iqbal, R Hallifax, N Kanellakis, J Wrightson, N Rahman

P137 Success rate and safety profile of IPC insertion in benign pleural effusions

Q Abdullah, S Bikmalla, M Haris

P138 Indwelling pleural catheter-rare complication: a survey of practice in UK

S Iftikhar, A Moustafa, S Leyakthali Khan

4.15pm-5.45pm
Churchill, Ground floor
SYMPOSIUM

What's hot in ILD?

Chaired by: Dr Anjali Crawshaw (Birmingham) and Dr Simon Hart (Hull)

4.15pm Genetic profiling in IPF. Is it all about MUC5B?

Dr Justin Oldham (Sacramento)

4.45pm Needle in a haystack: how do we find a biomarker for lung fibrosis?

Professor Gisli Jenkins (London)

5.15pm Pulmonary hypertension with ILD: how do we treat?

Dr Sheila Ramjug (Manchester)

Learning objectives

- *Understand genetic contribution to ILD and IPF and discuss the complex interplay between genes, ageing and tendency to develop ILD. Furthermore, it would be important to know if airway related genes are significantly more important than matrix genes and if we are approaching an era where personalised therapy is going to be offered in IPF/ILD.*
- *Appreciate the emerging biomarkers in ILD*
- *Since the licence of inhaled Treprostinil in PH-ILD (in USA by FDA), it is very timely that we discuss the state of play here in the UK as there are many patients with the condition and would benefit from therapy.*

4.15pm-5.45pm
Mountbatten, 6th floor
SYMPOSIUM

Thursday 24 November 2022

Joint BTS/BPRS symposium – Back to the future: where now for digital healthcare?

Chaired by: Dr Louise Fleming (London) and Professor Dominick Shaw (Nottingham)

4.15pm Technology dependent children: past, present and future

Professor Heather Elphick (Sheffield)

4.45pm The virtual ward and oximetry at home: a life beyond COVID-19?

Professor Matthew Inada-Kim (Eastbourne)

5.15pm Telemonitoring: opportunities, pitfalls and ethical challenges

Dr David Drummond (Paris)

Learning outcomes

- *To gain an understanding of the number of children on LTV and trends over time.*
- *To discuss transition of children and young people on LTV and the impact on adult services.*
- *To explore how some of the innovations in remote monitoring developed for COVID-19 could be extended to a wider range of respiratory diseases.*
- *To discuss some of the ethical and logistical challenges of remote monitoring.*
- *To explore the development and further implementation of telemonitoring.*

4.15pm-5.30pm
Moore, 4th floor
POSTER DISCUSSION: P139-P148

"The Force Awakens" – The asthma patient experience

Chaired by: Dr James Melhorn (Oxford) and Laura Rush (Bridgwater)

P139 Patient recognition of, and response to, acute exacerbations of COPD is related to previous experiences of help-seeking

A Hutchinson, R Russel, H Cummings, O Usmani, J Cohen, S Macfadyan, T Morris, H Mullerova, Y Xu, G Hellens, K Roy, M Crooks

P140 Every picture tells a story – a pilot study of producing comics on the patient experience severe asthma and its treatment

RCM Jones, J Kilburn, D Aoki, A Inman, I Keen, D Tipping, D Glover, A Lichtensztejn, J Lanario

P141 Assessing the efficacy of information videos available on the website 'Moving On Asthma' at improving the knowledge base of adolescent children

AAC Gardiner, N Barker, M Gibbons, N Butler, H Elphick

P142 Asthma attacks: patient impact, experience and understanding

L Jayes, M Bains, MJ Martin

P143 Evaluation of a pharmacist led severe asthma medicines optimisation clinic

L Elsey, C Whitehurst, T Pantin

P144 Adherence to inhaled corticosteroids in pregnant asthmatics

AE Sandar, ER Bradley, R Baron, SL Paterson, WA Khan

P145 What is the severe asthma patient journey to biologic initiation in UK severe asthma centres?

H Rupani, J Rose, A Cumella, C Renwick

P146 Biologic treatments across the South-West severe Asthma Network (SWsAN): real-world effects on ED attendance and hospital discharges

J Page, J Davidson, M Lyons, N Andrews

P147 Use of a connected inhaler system in the pre-biologic assessment of patients with severe asthma

J Holmes, P Dennison, DJ Jackson, G D'Ancona, A Mansur, PH Patel, P Pfeffer, C Chen, D Shaw, Propeller Health, LG Heaney

P148 Impact of patient support programs on outcomes among patients with severe asthma treated with biologic therapies – a systematic literature review

APJ Rabe, WJ Loke, D Kielar, T Morris, VH Shih, L Olinger, MG Musat, S Harricharan, A Majeed, L Heaney

4.15pm-5.35pm
St James, 4th floor
SPOKEN SESSION: S75-S79

"The World is Not Enough" – The epidemiological picture in airways disease

Chaired by: Dr Chloe Bloom (London) and Professor Richard Hubbard (Nottingham)

4.20pm **S75**

Asthma exacerbations in routine clinical practice during COVID-19 in England in 2020

KJ Rothnie, T Tritton, X Han, T Holbrook, B Numbere, AF Ford, L Massey, Q Fu, FM Hutchinson, HJ Birch, D Leather, R Sharma, C Compton, AS Ismaila

4.35pm **S76**

Increased risk of cardiovascular disease in asthma

CA Valencia-Hernandez, R Zakeri, V Sundaram, CI Bloom

4.50pm **S77**

A population health management approach to identifying patients with poorly controlled asthma

WD McConnell, P Ellison

5.05pm **S78**

Biologic therapy practices in severe asthma; outcomes from the UK Severe Asthma Registry and survey of specialist opinion

AH Mansur, S Gonem, T Brown, H Burhan, R Chaudhuri, JW Dodd, T Pantin, R Gore, D Jackson, A Menzies-Gow, M Patel, I Pavord, P Pfeffer, S Siddiqui, J Busby, LG Heaney

5.20pm **S79**

COPD exacerbations in routine clinical practice during COVID-19 in England in 2020

KJ Rothnie, T Tritton, X Han, T Holbrook, B Numbere, AF Ford, L Massey, Q Fu, FM Hutchinson, HJ Birch, D Leather, R Sharma, C Compton, AS Ismaila

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4.15pm-5.15pm
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Lung Cancer

4.15pm-5.15pm
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING

Pulmonary Infection

5.45pm-7.00pm
Britten, 3rd floor
THE PRESIDENT'S RECEPTION

All participants are warmly invited to attend this social occasion

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

Authors present: 10.00am – 11.00am

P149-P159
"Die Hard II" – Antibiotic resistance and challenges in TB
Discussion of abstracts will take place from 1.30pm to 2.55pm in the St James, 4th floor

P160-P170
"Infinity War" – Ongoing clinical challenges in COVID-19
Discussion of abstracts will take place from 1.30pm to 2.55pm in the Moore, 4th floor

P171-P182
"Cool Runnings" – Innovations in pulmonary rehabilitation
Discussion of abstracts will take place from 1.30pm to 3.00pm in the Abbey, 4th floor

P183-P196
"Catch Me If You Can" – Opportunities to improve care in airways disease
Discussion of abstracts will take place from 1.30pm to 3.15pm in the Westminster, 4th floor

P197-P206
"WALL-E" – The future of digital healthcare delivery
Discussion of abstracts will take place from 3.15pm to 4.30pm in the Moore, 4th floor

P207-P217
"Into the Woods" – Managing co-morbidities in airways disease
Discussion of abstracts will take place from 3.15pm to 4.40pm in the St James, 4th floor

P218-P230
"Endgame" – Long term impacts of COVID-19
Discussion of abstracts will take place from 3.30pm to 5.05pm in the Westminster, 4th floor

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

8.00am-8.30am
Albert, 2nd floor
JOURNAL CLUB
COVID-19 and respiratory infections

Dr Andrea Collins (Liverpool)

Learning objectives

- *To update on the latest evidence for the management of patients with COVID-19.*
- *To discuss preventative strategies for severe respiratory infections.*

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
Respiratory physiology in 2022: innovations and evolution

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

8.30am	Defining normal: insights from the Global Lung Initiative Professor Brendan Cooper (Birmingham)
9.00am	AI in respiratory physiology Professor William Man (London)
9.30am	New approaches to remote diagnosis and monitoring Dr James Hull (London)

Learning objectives

- *To understand the effect of the global lung initiative on defining abnormal spirometric values.*
- *To recognise the potential use of artificial intelligence in respiratory physiology.*
- *To summarise recent advances in remote diagnosis and monitoring of respiratory disease.*

8.30am-10.00am
Mountbatten, 6th floor
SYMPOSIUM
CT screening for lung cancer: the next steps

Chaired by: Dr Neal Navani (London) and Dr Emma O'Dowd (Nottingham)

8.30am	Alternatives and adjuncts to CT screening for early lung cancer Professor Robert Rintoul (Cambridge)

9.00am Screening inequities – a time and a place
Dr Samantha Quaife (London)

9.30am Challenges and opportunities in CT screening implementation
Professor David Baldwin (Nottingham)

Learning objectives

- *To gain an understanding of the additional screening modalities in development for lung cancer and how these might fit in to a national screening programme.*
- *To explore the barriers to participation in a national screening programme.*
- *To explore the challenges and opportunities a national screening programme may present.*

8.30am-10.00am
Windsor, 5th floor
SYMPOSIUM

Mistaken identities: when might exposures at work be key?

Chaired by: Dr Huda Badri (Manchester) and Dr Gareth Walters (Birmingham)

8.30am Phenotyping severe occupational asthma
Professor Frédéric de Blay (Strasbourg)

9.00am Can we currently attribute occupational causation to cases of COPD?
Professor David Fishwick (Sheffield)

9.30am Workplace outbreaks of COVID-19: what do we know and what can we do?
Dr Sarah Beale (London)

Learning objectives

- *Understand the different phenotypes of patients with severe occupational asthma.*
- *Understand modifiable risk factors for severe OA.*
- *Discuss the relative contributions to mortality from work and non-workplace factors.*
- *Understand how SARS-CoV-2 seropositivity varies across occupations.*
- *Discuss factors within a workplace that contribute to transmission of SARS-CoV-2 infection.*

8.30am-10.05am
St James, 4th floor
SPOKEN SESSION: S80-S85

"Die Hard I" – Resistance, screening and best management in TB

Chaired by: Dr Pranabashis Haldar (Leicester) and Dr Kartik Kumar (London)

8.35am **S80**
A cluster-randomised evaluation of a theory-based intervention to help people with TB disease get the most from their treatment and care: the IMPACT feasibility study
EF Walker, Z Moon, CNJ Campbell, CS Clarke, A Copas, P Costello, M Darvell, R Horne, ASK Jones, AS Karat, K Kielmann, A Kılıç, H Kunst, M Mandelbaum, HR Stagg, JY Weng, MCI Lipman on behalf of the TB IMPACT study group

8.50am **S81**
Chronic diseases and TB risk factors among TB household contacts in Southern Africa
CJ Calderwood, E Marambire, D Banze, C Nhamuave, A Mfinanga, LT Minja, C Khosa, J Mutsvanga, N Heinrich, K Kranzer

9.05am **S82**
The British Thoracic Society Multi Drug Resistant TB Clinical Advice Service Activity: 2018-2022 summary
K Manalan, L Altass, T Capstick, S Coles, G Davies, M Dedicoat, P Haldar, O M Kon, M Lipman, M Loughenbury, E Robinson

9.20am **S83**
Genetic diagnosis of bedaquiline resistance – an individual isolate meta-analysis
C Nimmo, N Bionghi, R Perumal, M Cummings, M Hopson, A Wolf, B Mathema, M Larsen, M O'Donnell

9.35am **S84**
How good is Xpert MTB/XDR in drug resistant TB?
M Park, OM Kon, G Satta

9.50am **S85**

Leucine-rich 2 glycoprotein-1 upregulation in plasma of patients with active tuberculosis

J Kutschenreuter, MC Loader, DE Kirwan, RH Gilman, JS Friedland, DLW Chong

8.45am-9.50am
Westminster, 4th floor
SPOKEN SESSION: S86-S89

"Mission (Im)possible II" – Improving outcomes in COPD

Chaired by: Dr Steven Cass (London) and Professor Wisia Wedzicha (London)

8.50am **S86**

A single-blind, multicentre, multinational, randomised controlled trial of online Singing for Lung Health (SLH) vs usual care for people with COPD: The Singing for Health, Improving Experiences of Lung Disease (SHIELD) Trial

KEJ Philip, SC Buttery, S Bowen, A Lewis, SM Alghamdi, PJ Williams, AM Alasmari, AS Alsulayyim, CM Orton, F Conway, L Chan, B Vijayakumar, A Tana, J Tonkin, A Perkins, J Garner, K Srikanthan, A Sadaka, M Pavitt, W Banya, A Lound, S Elkin, MI Polkey, W Man, K Lewis, D Fancourt, NS Hopkinson

9.05am **S87**

Greater exercise tolerance in COPD during acute intermittent compared to endurance shuttle walking protocols: a proof-of-concept study

C Alexiou, F Chambers, D Megaritis, L Wakenshaw, C Echevarria, I Vogiatzis

9.20am **S88**

Adverse outcomes following initiation of oral corticosteroids for chronic obstructive pulmonary disease: long-term observational study

G Tse, B Emmanuel, C Ariti, M Bafadhel, A Papi, V Carter, J Zhou, D Skinner, X Xu, H Müllerová, D Price

9.35am **S89**

Withdrawal of inhaled corticosteroids from COPD patients with mild or moderate airflow limitation in primary care: a feasibility randomised trial

TH Harries, G Gilworth, CJ Corrigan, PT White, PB Murphy, N Hart, M Thomas

8.45am-9.50am
Moore, 4th floor
SPOKEN SESSION: S90-S93

"The Sixth Sense" – Prognostication in pulmonary vascular disease

Chaired by: Dr Colin Church (Glasgow) and Dr Joanna Pepke-Zaba (Cambridge)

8.50am **S90**

Right ventricular remodelling assessed using cardiac magnetic resonance predicts survival and treatment response in pulmonary arterial hypertension

ZM Goh, N Balasubramanian, S Alabed, K Dwivedi, Y Shahin, AMK Rothman, P Garg, A Lawrie, DG Capener, AAR Thompson, F Alandejani, JM Wild, CS Johns, RA Lewis, R Gosling, M Sharkey, R Condliffe, DG Kiely, AJ Swift

9.05am **S91**

Remote monitored physical activity is related to established measures of clinical risk in patients with pulmonary arterial hypertension

J Patel, J Middleton, C Battersby, H Zafar, S Binmahfooz, DG Neelam-Naganathan, M Toshner, A Reddy, R Lewis, L Watson, A Swift, R Condliffe, C Elliot, A Hameed, R Thompson, A Charalampopoulos, D Kiely, A Rothman

9.20am **S92**

Remote monitoring enabled evaluation of risk and physiological response to therapeutic escalation and clinical worsening in patients with pulmonary hypertension

JT Middleton, S Binmafooz, H Zafar, J Patel, D Giri, C Battersby, M Toshner, A Reddy, R Lewis, C Durrington, A Swift, R Condliffe, C Elliot, A Hameed, R Thompson, A Charalampopoulos, DG Kiely, AMK Rothman

9.35am **S93**

Systematic follow-up of patients following acute pulmonary embolism is associated with an increased incidence of chronic thromboembolic pulmonary hypertension and less severe disease

C Durrington, I Armstrong, A Charalampopoulos, R Condliffe, T Devey, C Elliot, A Hameed, N Hamilton, C Hill, J Hurdman, RA Lewis, R Maclean, S Rajaram, AMK Rothman, G Saccullo, AJ Swift, S Thomas, AAR Thompson, JJ Van Veen, JM Wild, DG Kiely

8.45am-9.50am
Abbey, 4th floor
SPOKEN SESSION: S94-S97

"The Terminator" – Neutrophils in respiratory disease

Chaired by: Professor Alison Condliffe (Sheffield) and Dr Merete Long (Dundee)

8.50am **S94**

Dysfunctional neutrophil response in COVID-19 infection vary by subtype

OS Thein, KBR Belchamber, AA Faniyi, J Hazeldine, FS Grudzinska, MJ Hughes, AE Jasper, L Crowley, KP Yip, S Lugg, E Sapey, D Parekh, DR Thickett, A Scott

9.05am **S95**

Prolonged neutrophil dysfunction and phenotype in elderly hospitalised community acquired pneumonia patients

AA Faniyi, OS Thein, KBR Belchamber, D Parekh, A Scott, E Sapey, DR Thickett

9.20am **S96***

Neutrophil metabolism is reprogrammed in patients with acute respiratory distress syndrome

GM Cooper, P Sadiku, DM Griffith, SR Walmsley

9.35am **S97**

Neutrophil epigenetic signatures in the context of acute respiratory distress syndrome

X Xu, P Sadiku, D Griffith, MA Sanchez-Garcia, SR Walmsley

*S96 BTS Medical Student Award Highly Commended

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

9.00am-10.00am
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Pleural Disease

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

10.30am-12.00pm
Churchill, Ground floor
SYMPOSIUM

Pleural infection in 2022: challenging the status quo

Chaired by: Sarah Johnstone (Leicester) and Dr Eleanor Mishra (Norwich)

10.30am New insights into the microbiome of pleural infection

Dr Nikolaos Kannelakis (Oxford)

11.00am Refining diagnostics and antibiotic management

Dr David Arnold (Bristol)

11.30am Fibrinolytics versus surgery: insights from the MIST-3 study

Dr Eihab Bedawi (Oxford)

Learning objectives

- *To gain a deeper understanding of the pathogens contributing to the development of pleural infection.*
- *To explore novel biomarkers of diagnosis and rationalise current antibiotic strategies.*

• *To explore the roles of fibrinolytics and surgery in the management of pleural infection.*

10.30am-12.00pm
Mountbatten, 6th floor
SYMPOSIUM

Asthma: is it all about biologics?

Chaired by: Dr Andrew Hearn (London) and Dr Hitasha Rupani (Southampton)

10.30am A scientific review of poor/partial biological response and how we interpret and manage this clinically
Professor Celeste Porsbjerg (Copenhagen)

11.00am Barriers to remission: age, gender, ethnicity, social and health
Professor Liam Heaney (Belfast)

11.30am Air pollution and environmental challenges and asthma: a review and take-home messages for clinical delivery
Dr Paul Pfeffer (London)

Learning objectives

• *An insight into our understanding of biologic response and potential underlying mechanisms that underlie super response versus poor response to biologic therapy with an introduction to asthma remission.*

• *Understand the impact of these non-modifiable factors on asthma control by discussing recent outputs from the UK Severe Asthma Registry.*

• *Provide an oversight into the links between air pollution and asthma development and control: from bench to bedside to the air.*

10.30am-12.05pm
Windsor, 5th floor
SPOKEN SESSION: S98-S103

"Gone with the Wind" – Measuring breathlessness and airway obstruction

Chaired by: Dr Lorna Latimer (Leicester) and Professor Ioannis Vogiatzis (Newcastle upon Tyne)

10.35am **S98**
Unexplained breathlessness: the demographics of patients with inconclusive cardiopulmonary exercise tests (CPET) and their future outlook
SP Bates, A Buttress, R Sabit

10.50am **S99**
The impact of wearing face masks on neural respiratory drive and breathlessness in healthy subjects
J Bilby, C Jolley, D Patel, S Taylor, GF Rafferty, Z Samara

11.05am **S100**
Neural respiratory drive among patients with COPD with mild or moderate airflow limitation: consistency, reliability, and association with other biomarkers
TH Harries, G Gilworth, CJ Corrigan, PT White, R D'Cruz, PB Murphy, N Hart, HF Ashdown, L Daines, M Thomas

11.20am **S101**
Comparing the patient acceptability, sensitivity and specificity of methacholine and mannitol bronchial challenge tests in asthma diagnosis
DM Freeman, CS Murray, A Simpson, S Fowler, M Bennett, R Wang, G Kerry, L Healy, R Tudge, L Willmore, L Healy

11.35am **S102**
Assessment of two oscillating positive expiratory pressure (OPEP) devices: how do the differing mechanisms of action impact lab performance
J Suggett, R Costa, A Meyer, J Patel

11.50am **S103**
The association of small airways obstruction with respiratory symptoms, cardiometabolic disease, and quality of life: results from the Burden of Obstructive Lung Disease (BOLD) study
B Knox-Brown, J Patel, P Burney, A Amaral

10.30am-12.05pm
Westminster, 4th floor
SPOKEN SESSION: S104-S109

"Beyond the Matrix" – Fibroblast biology

Chaired by: Dr Manuela Plate (London) and Dr Amanda Tatler (Nottingham)

10.35am **S104**

Communication between infection experienced lung stromal cell subsets and resident immune cells is altered in the influenza virus infected lung

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

10.50am **S105**

Pulmonary fibroblasts display conserved damage response phenotypes following sterile and viral injury

JC Worrell, GE Finney, KE Hargrave, C Hansell, JS Nijjar, F Morton, J Cole, MR Jackson, K Stevenson, SK Chahal, E Curely, RG Quintana, E Onwubiko, A Rupp, K Strathdee, K Williams, C McSharry, AJ Chalmers, MKL MacLeod

11.05am **S106**

Fibroblast Gαq/11 controls lung repair via regulation of lung extracellular matrix properties

T Owens, C Joseph, AL Tatler, AT Goodwin

11.20am **S107**

SOX9 regulates alveolar damage and extracellular matrix secretion by fibroblasts in idiopathic pulmonary fibrosis: downstream secreted proteins are promising biomarkers

L Pearmain, E Jokl, K Simpson, L Birchall, P Rivera-Ortega, K Piper Hanley

11.35am **S108**

Using forward genetic screens and novel human alveolar organoid models to study surfactant protein C trafficking in heath and disease

EN Rutherford, D van den Boomen, K Lim, PJ Lehner, EL Rawlins, SJ Marciniak, JA Dickens

11.50am **S109**

Genome-wide analysis of longitudinal lung function and gas transfer in individuals with idiopathic pulmonary fibrosis

RJ Allen, JM Oldham, DA Jenkins, OC Leavy, B Guillen-Guio, CA Melbourne, SF Ma, J Jou, JS Kim, WA Fahy, E Oballa, RB Hubbard, V Navaratnam, R Braybrooke, G Saini, KM Roach, MD Tobin, N Hirani, MKB Whyte, N Kaminski, Y Zhang, FJ Martinez, AL Linderholm, A Adegunsoye, ME Strek, TM Maher, PL Molyneaux, C Flores, I Noth, RG Jenkins, LV Wain

10.30am-12.05pm
St James, 4th floor
SPOKEN SESSION: S110-S115

"The Winter Soldier" – Pneumonia epidemiology and impact

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

10.35am **S110**

Increased mortality of hospitalised community acquired pneumonia in winter 2020/21 compared to 2019/20

FS Grudzinska, DP Dosanjh, DR Thickett, E Sapey

10.50am **S111**

Adult hospitalised community acquired pneumonia incidence in Bristol: comparison of retrospective ICD-10 based analysis and prospective study data

JA Campling, E Begier, M Lahuerta, A Vyse, J Southern, S Valluri, C Hyams, A Finn, MPE Slack, BD Gessner, G Ellsbury

11.05am **S112**

A comparison of weekend and weekday hospital admissions due to community acquired pneumonia in the North West of England: an analysis of the Advancing Quality Pneumonia program dataset

B Chakrabarti, S Wickham, T Jenks, J Higgins, B Pearce, DG Wootton

11.20am **S113**

The risk of pneumonia in COPD patients with concomitant bronchiectasis using inhaled corticosteroids: a UK case-control study

AI Ritchie, A Singayaganam, S Mitchell, J Wedzicha, A Shah, C Bloom

11.35am **S114**

Use of front-door thoracic ultrasound to predict and improve outcomes in pleural infection in patients with community-acquired pneumonia

M Bhatnagar, N Chamberlin, NM Rahman, AE Stanton

11.50am **S115**

Wastewater-based epidemiology (WBE) for the detection and prediction of respiratory syncytial virus (RSV) outbreaks

DM Allen, MI Reyne, A Levickas, J Carson, C McSparron, H Groves, D Downey, CGG Bamford, JW McGrath, DF Gilpin

10.30am-11.50am
Moore, 4th floor
SPOKEN SESSION: S116-S120

"Home Alone" – Remote monitoring in lung disease

Chaired by: Dr Irene Valero-Sanchez (Leicester) and Dr Lindsay Welch (Southampton)

10.35am **S116**

MyCare24 COPD: measuring the initial impact of a new large scale remote monitoring service for COPD

R Woodington, C Lawless, M Buchan

10.50am **S117**

Poor adherence in exacerbating COPD patients: magnitude and related factors at baseline in the MAGNIFY pragmatic 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, S Davis, E Vijaykumar, D Price

11.05am **S118**

Digital peak flow monitoring can predict next-day peak flow measurements

S Ananth, S Alpi, T Antalffy

11.20am **S119**

Domiciliary fractional exhaled nitric oxide and spirometry in predicting asthma control and exacerbations

R Wang, OS Usmani, KF Chung, J Sont, A Simpson, M Bonini, P Honkoop, SJ Fowler

11.35am **S120**

Adherence and quality of home-based spirometry in patients with ILD using a digital health platform during a 6-month period: data from the RALPMH study

MA Althobiani, Y Ranjan, J Jacob, M Orini, R Dobson, JC Porter, JJ Hurst, A Folarin

10.30am-11.50am
Abbey, 4th floor
SPOKEN SESSION: S121-S125

"I, Robot" – Advances in sleep and ventilation

Chaired by: Dr Sonya Craig (Liverpool) and Dr Neeraj Shah (London)

10.35am **S121**

Mandibular movement monitor for the diagnosis of obstructive sleep apnoea: clinical application

SS Alsaif, W Douglas, J Steier, MJ Morrell, MI Polkey, JL Kelly

10.50am **S122**

Mathematically arterialised venous blood gas sampling in the management of patients with hypercapnic respiratory failure

MG Davies, DR Wozniak, TG Quinnell, E Palas, S George, Y Huang, VEA Stoneman, IE Smith, LP Thomsen, SE Rees

11.05am **S123**

De-ventilation dyspnoea among patients with chronic obstructive pulmonary disease using home non-invasive ventilation: prevalence and associations

S George, F Smith-Johnson, E Palas, Y Huang, J Ayson, RT Santiago, MG Davies, IE Smith, DR Wozniak

11.20am **S124**

Cardioprotective medication in Duchenne muscular dystrophy: a single-centre cohort study

J Kisel, E Ballard, E Suh, N Hart, S Kapetanakis, S Srivastava, P Marino, P Murphy, J Steier

11.35am **S125**

The effect of transcutaneous submental electrical stimulation on the blood pressure response in healthy volunteers

A Alsharifi, N Carter, I Akbar, M Pascual, M Cheng, M Pengo, G Parati, G Kaltsakas, G Rafferty, J Steier

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10.30am-11.30am
Rutherford, 4th floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Specialty Trainee

10.30am-11.30am
Albert, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Tuberculosis

10.30am-11.30am
Victoria, 2nd floor
BTS SPECIALIST ADVISORY GROUP OPEN MEETING
Occupational and Environmental Lung Disease

12.00pm-2.00pm
Pickwick, 1st floor and Whittle & Fleming, 3rd floor
LUNCH (cash catering only)
Exhibition closes at 2.00pm

12.30pm-1.15pm
Churchill, Ground floor
THE BTS GRAND CHALLENGE LECTURE
Science during the pandemic

Guest Lecturer: Dr Soumya Swaminathan (WHO)

Introduced by: Professor Onn Min Kon (London)

1.30pm-3.00pm
Churchill, Ground floor
SYMPOSIUM

Air pollution and children's health – the need for urgent action

Chaired by: Dr Suzanne Bartington (Birmingham) and Professor Jonathan Grigg (London)

1.35pm The early life damage caused by air pollution
Professor Cathy Thornton (Swansea)

1.50pm Component-specific air pollutant drivers of disease risk in early to midlife
Dr Ian Mudway (London)

2.05pm Tackling air pollution at school (TAPAS)
Dr Henry Burridge (London)

2.20pm The application of hyperlocal air quality monitoring to help decision making by local communities
David Green (EarthSense)

2.35pm For the sake of our children, the imperative to clean up the air we breathe
Jemima Hartshorn ("Mums for Lungs")

2.50pm Panel discussion

Learning objectives

- *Understand the importance of early life exposure to air pollutants for future health.*
- *Gain insight into gene/environment interactions driving air pollution's contribution to NCDs across the life course.*
- *Appreciate the importance of schools and other places where children concentrate as sources of air pollution and the need for change.*

1.30pm-3.00pm
Mountbatten, 6th floor
SYMPOSIUM

Precision medicine for bronchiectasis

Chaired by: Dr Holly Keir (Dundee) and Dr Anita Sullivan (Birmingham)

1.30pm Microbiome-host interactions in bronchiectasis
Professor Sanjay Chotirmall (Singapore)

2.00pm Airway clearance: how do we measure benefit?

Professor Judy Bradley (Belfast)

2.30pm New developments with inhaled antibiotics

Dr Charles Haworth (Cambridge)

Learning objectives

- *To understand the role of bacteria, fungi and viruses and how their interactions affect endotype and precision medicine approaches in bronchiectasis.*
- *To discuss the latest evidence for airway clearance in bronchiectasis and how to measure outcomes in bronchiectasis trials.*
- *To discuss how recent clinical trials affect the place of inhaled antibiotics in management of patients with bronchiectasis.*

1.30pm-3.00pm
Windsor, 5th floor
SYMPOSIUM

Getting a good night's sleep: improving sleep and brain outcomes for our patients

Chaired by: Dr Sonya Craig (Liverpool) and Dr Alanna Hare (London)

1.30pm Neuroinflammation and OSA: the importance of sleep to brain health

Dr Ivana Rosenzweig (London)

2.00pm Insomnia in our hospital patients and how to improve it

Dr Kirstie Anderson (Newcastle upon Tyne)

2.30pm The Optimal Sleep Pathway – an NHS England initiative

Dr Martin Allen (Stoke-on-Trent)

Learning objectives

- *To improve basic science knowledge of how sleep disorders such as OSA disrupt brain mechanisms and pathways.*
- *To increase understanding of how poor sleep environments affect all hospital inpatients and how we can improve this.*
- *To gain knowledge on how we can improve our diagnostic pathways for sleep medicine in the UK.*

1.30pm-2.55pm
St James, 4th floor
POSTER DISCUSSION: P149-P159

"Die Hard II" – Antibiotic resistance and challenges in TB

Chaired by: Dr Hazel Morrison (Oxford) and Dr Jamilah Meghji (Liverpool)

P149 Routine monitoring of rifampicin levels reveals subtherapeutic levels in 76% of patients with fully sensitive TB

A Holden, S Dhadda, N Obisi, K French, K Thickett, R Carter

P150 Can we be more specific about targets for starting tuberculosis treatment?

TT Gorsuch, SO Brij

P151 Intervening with a Manualised Package to AChieve treatment adherence in people with Tuberculosis (IMPACT): feasibility of collecting cost and quality of life data from records and patients

J Weng, ASK Jones, AJ Copas, HR Stagg, EF Walker, CNJ Campbell, R Horne, Z Moon, A Kilic, P Costello, M Darvell, RM Hunter, K Kielmann, M Mandelbaum, I Abubakar, A Story, M Lipman, CS Clarke

P152 Increase in weight during TB treatment: 3 year survey

SO Brij, R Noonan, T Gorsuch

P153 Tuberculosis-associated immune reconstitution inflammatory syndrome management

D David, M Dedicoat

P154 Complexities in tuberculosis care in seasonal farm workers in Scotland

EM Ward, DW Connell, M Allam, M Ramsay, D Chandler, D Watson , M Wilkie

P155 A high rate of tuberculosis transmission in a food (meat processing) factory setting? Investigation into a long running tuberculosis cluster in the UK and the interventions deployed in response

A Trindall, A Popay, J Heywood, T Sutton, S Sharman, T Cotter, H Mahgoub, D Edwards

P156 London based pilot study screening new starters of dialysis for latent tuberculosis infection (LTBI)

J Korolewicz, K Manalan, N Duncan, M Coleman, R Charif, OM Kon

P157 A nurse-led new entrant latent TB infection screening clinic – the Croydon experience

MMI Gasmelseed, M Scott, MR Soobratty, J Booysen, J Camara, J Lacle, S Chaudhry, Y Raste

P158 A nurse-led model for tuberculosis services delivers safe and effective care

B Anderson, L Fowler, C Stott, L Gregory, R Ahmed

P159 – Withdrawn Patients and healthcare professionals' descriptions of the factors determining non-adherence to anti-TB medication: a qualitative study

EF Walker, HR Stagg, KL Fielding, MCI Lipman, AJ Rodger, K Kielmann

1.30pm-2.55pm
Moore, 4th floor
POSTER DISCUSSION: P160-P170

"Infinity War" – Ongoing clinical challenges in COVID-19

Chaired by: Dr Anand Shah (London) and Dr Mark Toshner (Cambridge)

P160 Utility of continuous positive airway pressure (CPAP) in avoiding mechanical ventilation in COVID-19 patients

B Jones, R O'Neill, J Reece, SL Tan, A Lal

P161 Utility of continuous positive airway pressure (CPAP) in COVID pneumonitis patients not suitable for mechanical ventilation

J Reece, B Jones, R O'Neill, A Lal, SL Tan

P162 Comparison of mortality and radiological changes during the first two COVID-19 waves within a UK district general hospital

JLT Tong, KD Dewan, SS Soman

P163 Staff experience of routine breathlessness assessment on a virtual COVID ward

K Rhatigan, M Koulopoulou, J Fenton, S Ramos-Smyth, M Ford-Adams, A Patel, PSP Cho, I Patel, SS Birring, CJ Jolley

P164 Using artificial intelligence to interrogate multi-national imaging datasets to determine the mechanism of COVID-19 pneumothorax

IA Selby, D Driggs, V Majcher, M Roberts, L Escudero Sanchez, JHF Rudd, E Sala, C Bibiane-Schönlieb, SJ Marciniak, J Babar

P165 Association between vitamin D deficiency and extended duration of COVID-19 symptoms

SA Roberts, ST Lugg, AA Faniyi, SE Faustini, C Faniyi, J Duffy, M Hewison, A Shields, AG Richter, D Parekh, A Scott, DR Thickett

P166 An evaluation of the clinical characteristics of an Anti-SARS-CoV-2 IgG Enzyme-linked immunosorbent assay

J Moore, L Robertson, T Ferguson, E Cain, J Goodman, C Colley, M Orr, T Moore

P167 'Stay alert, control the virus, save lives'. Do neutralising monoclonal antibodies really live up to the hype?

D Barber, S Sibley, S Pilsworth, E Rickards, E Hoodless, L Ascough, D Kadar, D Wat

P168 Remdesivir in the treatment of children 28 days to < 18 years of age hospitalised with COVID-19 in the CARAVAN study

A Ahmed, P Rojo, A Agwu, D Kimberlin, J Deville, A Mendez-Echevarria, P Sue, L Galli, R Humeniuk, K Juneja, B Barret, A Jones, C Hedskog, C O'Connor, S Crowe, K Kersey, A Osinusi, W Muller, F Munoz

P169 Non-generalisability of biomarkers for mortality in SARS-CoV-2

N Veale, ER Shuvo, M Schwiening, F Soares, O Feng, S Abreu, W Thomas, R Thompson, RJ Samworth, NW Morrell, SJ Marciniak, E Soon

P170 Humoral immune responses to COVID-19 vaccines are reduced in patients with severe asthma

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

1.30pm-3.00pm
Abbey, 4th floor
POSTER DISCUSSION: P171-P182

"Cool Runnings" – Innovations in pulmonary rehabilitation

Chaired by: Ms Suhani Patel (London) and Dr Thomas Ward (Leicester)

P171 Effects of pharmacological and non-pharmacological interventions on physical activity outcomes in chronic respiratory diseases: a systematic review and meta-analysis

D Megaritis, E Hume, N Chynkiamis, C Buckley, AM Polhemus, H Watz, T Troosters, I Vogiatzis

P172 "It's really just been a learning experience": a qualitative study to explore the experiences of people with chronic obstructive pulmonary disease (COPD) using activity monitors

LJ Wilde, C Clark, C Percy, G Ward, PA Wark, L Sewell

P173 "It's definitely the future": healthcare practitioners' views and experiences of activity monitors to support people with chronic obstructive pulmonary disease (COPD)

LJ Wilde, C Clark, C Percy, G Ward, PA Wark, L Sewell

P174 An investigation of physical activity in chronic obstructive pulmonary disease (COPD) to promote physical activity (PA) in Saudi

R Alruwaili, A Albarrati, U Jones, N Gale

P175 Comparing exertional desaturation between the 6-minute walk test (6MWT) and 1-minute sit to stand test (1MSTST) in those prescribed ambulatory oxygen (AO)

L Wakeham, L McDonnell, G Brown, B Watling, L Osman

P176 Pulmonary rehabilitation online: current status and availability in 2022

J Ellis, GL Gilworth, K Harris, T Morgan, P White

P177 The futures bright the futures digital

S Pilsworth, S Taylor, M Coleiro, R Hughes, D Barber

P178 Development and implementation of a novel centralised virtual pulmonary rehabilitation service across an integrated care system

M Brook, P Crisp, N Webster

P179 The impact of a 6-week COVID-19 rehabilitation programme on dyspnoea post COVID-19

M Harrison, O Revitt, L Houchen- Wolloff, SJ Singh, E Daynes

P180 Physicians' attitudes, beliefs and barriers to pulmonary rehabilitation for COPD patients in Saudi Arabia: a cross-sectional study

M Alalhareth, M Madkhali, E Salwa, Z Shubili, H Trad, M Omeish, M Halaw, A Aldhahir

P181 Proof-of-concept study using non-invasive electrical muscle stimulation for engagement of respiratory muscles

M Sheth, M Malik

P182 Describing long-term outcomes and the association with both receiving a diagnosis and time to diagnosis in adults presenting with breathlessness: a UK retrospective study using electronic healthcare records

U Karsanji, CA Lawson, A Bottle, G Doe, K Khunti, JK Quint, E Petherick, MC Steiner, RA Evans

1.30pm-3.15pm
Westminster, 4th floor
POSTER DISCUSSION: P183-P196

"Catch Me If You Can" – Opportunities to improve care in airways disease

Chaired by: Alison Hughes (Portsmouth) and Professor John Hurst (London)

P183 COPD patients are able to use DPI successfully, regardless of age and severity of airflow limitation

M Anderson, VA Vartiainen, W Mazur, H Hisinger-Mölkänen, F Lavorini, C Janson, A Kainu

P184 "Smart inhaler" in routine clinic practise: is there a role in mild and moderate asthma management?

Y See, E Chow, M Crooks, M Robinson, K Watkins, F Turner, J Thompson, S Faruqi

P185 Comprehensive assessment of inhaler prescribing and adherence in patients admitted to hospital with acute severe asthma may improve management

Y Ahmed, KM Neale, KL Jackson, Z Anjum, O Umerah, A Murphy, RH Green

P186 Facilitators to recruiting COPD patients to an adherence intervention 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, S Davis, E Vijaykumar, D Price

P187 Can pharmacy staff better support smoking cessation: as referrers and case managers?

A Piwko, G Absalom, N Holman, K Kendall, G d'Ancona

P188 Missed opportunities for chronic lung disease in deep end general practices in socioeconomically deprived areas

S Jayasooriya, K Fryer, C Mitchell, J Hurst

P189 Small airways obstruction and lifetime occupational exposure in the UK Biobank cohort

V Quintero Santofimio, J Feary, AFS Amaral

P190 Harm reduction in treating smokers: real world data from secondary care

HW Poole, C Einon, S Emery, S Link

P191 Improved smoking cessation quit rates using health psychology behaviour change interventions in COPD patients

M Grim, N Muchtaq

P192 Behavioural change support: early integration in a hospital smoking cessation service may improve patient outcomes and quit rates

K Roy, E Doran, M Grimm, K Louison, A Putzolu, D Glastonbury

P193 Quantifying the unmet need in severe asthma: an analysis of the number of untreated biologic eligible patients in the UK

H Dhruve, M Haigh, AM Nanzer, DJ Jackson

P194 Assessing variation in severe asthma care in England: a national benchmarking study

J Rose, S Gadhia, M Lepetyukh, H Rupani, G d'Ancona

P195 Updated Cochrane systematic review: no evidence that vitamin D reduces asthma exacerbations or improves asthma control

AE Williamson, CJ Griffiths, A Sheikh, AR Martineau

P196 Work-related asthma in stainless steel welders, irritant or allergy?

VC Moore, CC Huntley, AS Robertson, GI Walters

2.45pm-3.45pm
Britten, 3rd floor
COFFEE/TEA BREAK

3.15pm-4.45pm
Churchill, Ground floor
SYMPOSIUM

Tobacco dependency: current treatments to future eradication

Chaired by: Dr Zaheer Mangera (London) and Wendy Preston (Royal College of Nursing)

3.15pm A call to arms in tobacco control policy: what will it take to achieve smoke-free by 2030?

Deborah Arnott (Action on Smoking & Health)

3.35pm Role of vaping in preventing harms from tobacco addiction

Professor Jamie Brown (London)

3.55pm E-cigarettes as an opportunistic smoking cessation intervention in emergency departments: an RCT

Professor Caitlin Notley (Norwich)

4.15pm Cytisine and other new kids on the block in the treatment of tobacco dependency

Dr Matthew Evison (Manchester)

Learning objectives

- *To set out the current landscape relating to the harms of tobacco use in the UK and the steps required from a regulatory perspective to achieve Smoke-Free by 2030.*

• *To understand the benefits of vaping as an important intervention to reduce harm from tobacco addiction.*

• *To be aware of the current data and trials looking at the use of vaping in helping people to quit smoking and the role vaping has in a hospital-based patient population.*

• *To learn about the potential use of Cytisine and other pharmacotherapy treatments of tobacco dependency.*

3.15pm-4.45pm
Mountbatten, 6th floor
SYMPOSIUM

BTS AUDIT AND QUALITY IMPROVEMENT

Chaired by: Dr Mark Juniper (Swindon)

3.15pm	BTS QI and Audit Programme: introduction and future plans Dr Mark Juniper (Swindon)
3.25pm	BTS Outpatient Management of Pulmonary Embolism Audit 2021 Dr Robin Condliffe (Sheffield)
3.50pm	Respiratory Support Unit Pilot Audit 2021 Dr Michael Davies (Cambridge)
4.15pm	Model of care for Specialised Weaning Units Dr Ben Messer (Newcastle upon Tyne)
4.40pm	Closing comments Dr Mark Juniper (Swindon)

Learning objectives

• *To disseminate audit results from the BTS 2021/2022 Audit Programme.*

• *To provide an insight to the future direction of the BTS Quality Improvement Programme.*

• *To be aware of the new model of care for Specialised Weaning Units.*

• *To understand the variations of practice for respiratory support outside of critical care units, as found by the Respiratory Support Pilot.*

3.15pm-4.30pm
Moore, 4th floor
POSTER DISCUSSION: P197-P206

"WALL-E" – The future of digital healthcare delivery

Chaired by: Dr Phyllis Murphie (Edinburgh) and Professor Sally Singh (Leicester)

P197	Remote consultation; the clinician's perspective AD Armstrong, C Randell, H Williams
P198	Service evaluation of home spirometry following lung transplantation BHN Chow, K Iyer, G Ridings, L Webster, H Clowes, K Santhanakrishnan, J Blaikley
P199	Sustained patient use and improved outcomes with a COPD digital service AJ Taylor, A Cushing, M Dow, J Anderson, G McDowell, S Lua, M Manthe, S Padmanabhan, S Burns, P McGinness, DJ Lowe, C Carlin
P200	A virtual age? Evaluating the patient and healthcare worker perspective on virtual clinic delivery for patients with cystic fibrosis (CF) and non-CF bronchiectasis (nCFB) at a specialist cardio-thoracic hospital CF Denny, U Hill
P201	A Zoom with a view: service user views on a digital information resource to support remote speech and language therapy (SLT) for inducible laryngeal obstruction (ILO) C Slinger, K Prior, H Lever, R Slinger
P202	Effect of a technology-enabled multidisciplinary respiratory in-reach service on people admitted with airways disease exacerbations in an acute general hospital A AlHelou, B Vilcinskaite, K Russell, K Jones, T Abu-Abed, A Watson, R Mukherjee
P203	Assessing the concordance between patient-reported ICS adherence and objective e-monitoring of ICS therapy G d'Ancona, N Stewart-Kelcher, A Patel, N Holman, L Green, J Lam, L Thompson, A Nanzer, DJ Jackson, J Holmes, A Propeller Health, LG Heaney, J Dhariwal
P204	Digital interventions to improve adherence to maintenance medication in asthma: a Cochrane systematic review

A Chan, A De Simoni, V Wileman, L Holliday, CJ Newby, C Chisari, S Ali, N Zhu, P Padakanti, V Pinprachanan, V Ting, CJ Griffiths

P205 The measurement of adherence to inhaled corticosteroids in asthma using electronic monitoring devices: a systematic review and meta-analysis

I Adejumo, CV Chalitsios, DE Shaw, TM McKeever

P206 Impact of digital interventions on quality of life in patients with asthma: a systematic literature review and meta-analysis

B Singh, S Attri, G Kaur

3.15pm-4.35pm
Windsor, 5th floor
SPOKEN SESSION: S126-S130

"Finding Neverland" – T2 inflammation and its absence

Chaired by: Dr Jonathan Baker (London) and Dr Hitasha Rupani (Southampton)

3.20pm **S126**

Dupilumab efficacy in children with uncontrolled type 2 asthma analysed by baseline high or medium ICS dose: LIBERTY ASTHMA VOYAGE study

JF Maspero, MA Antila, N Jean, A Deschildre, LB Bacharier, A Altincatal, T Rimington, E Laws, B Akinlade, A Radwan, JA Jacob-Nara, Y Deniz, PJ Rowe, DJ Lederer, M Hardin

3.35pm **S127**

Relation between change in type 2 biomarker levels and efficacy outcomes in patients with asthma treated with dupilumab

ID Pavord, Y Deniz, T Casale, J Corren, JM FitzGerald, A Altincatal, R Gall, N Pandit-Abid, A Radwan, JA Jacob-Nara, PJ Rowe, WW Busse

3.50pm **S128**

Baseline characteristics of patients with asthma treated with dupilumab in a real-world setting: results from the RAPID registry

NL Lugogo, X Soler, A Menzies-Gow, AT Peters, A Cote, O Hilberg, C Xia, T Rimington, Y Zhang, L de Prado Gomez, PJ Rowe, A Radwan, JA Jacob-Nara, Y Deniz

4.05pm **S129**

Change in FeNO as a biomarker of response to anti-IL5/5R therapies in severe asthma

AP Hearn, JE Kavanagh, J Dhariwal, AM Nanzer, DJ Jackson

4.20pm **S130**

Multicomponent and longitudinal analysis of patients with difficult-to-treat asthma and severe asthma reveal near absence of T2-low status

H Rupani, A Kyyaly, A Azim, C Barber, PH Howarth, HM Haitchi, RJ Kurukulaaratchy

3.15pm-4.40pm
St James, 4th floor
POSTER DISCUSSION: P207-P217

"Into the Woods" – Managing co-morbidities in airways disease

Chaired by: Dr Anna Freeman (Southampton) and Dr Neil Greening (Leicester)

P207 The influence of obesity on the clinical outcome of benralizumab treatment in severe eosinophilic asthma a subgroup analysis from the BPAP study

DJ Jackson, A Nanzer, H Burhan, A Menzies-Gow, H Rupani, P Pfeffer, I Clifton, S Faruqi, J Dhariwal, T Morris, J Lipworth, M Watt

P208 – Withdrawn Literature review to help dietitians manage patients with chronic obstructive pulmonary disease (COPD) and obesity

MC Oliver, E Holmes

P209 A total diet replacement weight management programme for difficult-to-treat asthma associated with obesity: a randomised controlled trial

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

P210 The impact of introducing anti-IL-5/5R biologic therapies on weight and BMI in prednisolone-dependent patients with severe asthma

VM Taylor, T Patrick, AP Hearn, JE Kavanagh, LA Thomson, JL Lam, LM Green, M Fernandes, C Roxas, G d'Anacona, J Dhariwal, DJ Jackson, AM Nanzer

P211 Asthma in pregnancy: how are we doing? A service evaluation across general asthma and severe asthma clinics in a tertiary hospital

A Thomas, H Durrington, LJ Holmes

P212 – Withdrawn Gastro-oesophageal reflux disease in pregnant asthmatics

AM Sandar, SL Paterson, ER Bradley, WA Khan

P213 Real-world effectiveness of benralizumab in patients with eosinophilic granulomatosis with polyangiitis (EGPA)

V Alam, S Agarwal, C Hopkins, D D'cruz, MMA Fernando, TF Ismail, J Dhariwal, AM Nanzer, DJ Jackson

P214 Oral corticosteroid-related healthcare resource utilisation in patients with COPD

G Tse, C Ariti, M Bafadhel, A Papi, V Carter, J Zhou, D Skinner, X Xu, H Müllerová, B Emmanuel, D Price

P215 A systematic literature review of factors related to mortality in patients with COPD

D Gibson, MK Siddiqui, JR Hurst, D Stolz, M Verma, S Sharma, U Holmgren

P216 Effect of structured cardiac assessment on survival without readmission after hospitalisation with exacerbation of chronic obstructive pulmonary disease (COPD)

JCT Kibbler, DP Ripley, SC Bourke, J Steer

P217 Experience with tumour necrosis factor-alpha inhibitors for the treatment of cardiac sarcoidosis in a UK medical centre

R Ahmed, J Okafor, R Shi, A Azzu, K Wechalekar, J Baksi, D Pennell, P Collins, A Wells, R Khattar, R Sharma, V Kouranos

3.30pm-5.05pm
Westminster, 4th floor
POSTER DISCUSSION: P218-P230

"Endgame" – Long term impacts of COVID-19

Chaired by: Lizzie Grillo (London) and Dr Anne-Marie Russell (Exeter)

P218 The needs of long COVID service users in Hampshire and Isle of Wight ICS: a prospective mixed methods evaluation

RE Barker, A Sibley, R Wheeler, R Russell

P219 Evaluation of the utility of the breathing pattern assessment tool in a post-COVID syndrome MDT assessment clinic

L Grillo, J Turnbull, JS Lee, L Froome, J Maxwell, L Webber, L Weatherly, A Curtis, L Osman

P220 Thoracic mobilisation techniques combined with stretches improves thoracic compliance and respiratory rate in long COVID

D Boiskin, G Jayasekera

P221 Does virtual group breathing pattern retraining improve symptoms of breathlessness in patients with breathing pattern disorder following COVID-19 infection?

R Gore, L Williamson, T Elliott-Cooper, K Roze, M Heightman, T Hillman, R Livingston

P222 Health-related quality of life symptom burden after COVID-19

F Knight, N McLeod, T Akinola, F Kamal

P223 "I never felt like this before". Clinical presentations of patients referred to a tertiary airways service following COVID-19 infection

C Slinger, K Derbyshire, K Prior, R Slinger, H Lever

P224 Using the sit to stand tests to assess functional status and oxygen desaturations following COVID-19

E Dickerson, O Revitt, L Houchen-Wolloff, SJ Singh, E Daynes

P225 Pulmonary rehabilitation in long COVID – the impact of social deprivation and treatment delay on outcomes

J Gallois, N McWirter, A Windith, D Barber, S Pilsworth, D Wat

P226 DYNAMO COVID-19. DYNamic Assessment of Multi Organ level dysfunction in patients recovering from COVID-19: insulin resistance and metabolic flexibility

A Gutpa, R Nicholas, JJ McGing, O Mougin, CR Bradley, AV Nixon, JE Mallinson, J Bonnington, TM McKeever, IP Hall, JM Lord, RA Evans, PL Greenhaff, ST Francis, CE Bolton

P227 Reduced respiratory muscle strength, lung function, and functional status and symptomology in patients referred to long COVID clinics, an observational cohort analysis

MA Faghy, REM Ashton, R Owen, J Yates, C Thomas, T Maden-Wilkinson, S Kumar, R Gururaj, C Ozemek, R Arena, T Bewick

P228 Comparing cardiometabolic risk indicators between adults post-hospitalisation with COVID-19 and healthy controls

M Bakali, T Yates, MC Steiner, RA Evans

P229 Cardiopulmonary exercise testing in patients with long COVID

SB Mistry, AK Banerjee

P230 Assessment of cardio-pulmonary function in children and adolescents with suspected long COVID

RJ Langley, PD Burns, PL Davies, C Presslie

SPEAKERS' BIOGRAPHICAL DETAILS

Rob Aarnoutse, PharmD, PhD, is Professor, hospital pharmacist and clinical pharmacologist, working at the Department of Pharmacy at Radboud University Medical Centre, Nijmegen, The Netherlands. His research is focused on drug treatment of tuberculosis (TB). The central concept in his work is that efficacy and toxicity of drugs are dependent on drug concentrations achieved either systemically or locally. His research portfolio reaches from molecular pharmacological research to murine pharmacological studies, to pharmacokinetic studies in humans and clinical trials. He headed the Pharmacokinetic and Therapeutic Drug Monitoring Laboratory at Radboud University Medical Centre for several years, is a member of the Chief Investigator Group of the PanACEA TB Consortium, and developed international proficiency testing programmes for bio-analysis of TB drugs and antiretroviral drugs.

Dr Martin Allen is a Respiratory Physician at University Hospital of North Staffordshire. In the past he has had interests in a variety of respiratory diseases including TB, COPD, ventilatory support/weaning and sleep medicine originating from his research into sleep and physiological changes.
He has fulfilled a variety of management and transformational roles within the hospital, including CD and Medicine Divisional Head. Dr Allen holds a variety of national roles including: chairing the Expert Working Group on Coding for NHSE; sitting on the Respiratory CRG; contributing to the Respiratory Long-Term Plan, where he leads on pneumonia; works with the West Midlands AHSN in a variety of roles; is the GIRFT National Clinical Lead for Respiratory Medicine and the NSA for Physiological Science.

Dr David Arnold is an NIHR Academic Clinical Lecturer in Respiratory Medicine at the University of Bristol and a Respiratory Registrar at North Bristol NHS Trust. His research interests include respiratory infection, specifically pleural infection, COVID-19 and pneumonia, and malignant pleural disease including mesothelioma. His PhD, funded by the NIHR Doctoral Research Fellowship Programme, focused on novel management of pleural infection to reduce the burden on patients and the health system.
Dr Arnold chairs the South-West Respiratory Registrar Research Network, which was the first regional research network for respiratory trainees in the UK, and sits on the UK Pleural Society Committee.

Dr Huda Badri FRCP, is a Consultant Respiratory Physician at Manchester University NHS Foundation Trust and an Honorary Senior Lecturer at the University of Manchester (Division of Infection, Immunity and Respiratory Medicine). Her subspeciality interests include occupational lung disease, chronic cough and severe asthma. Since completing her PhD in neural mechanisms of chronic cough at the University of Manchester, Dr Badri was awarded the Pickering Fellowship (2018-2022) and more recently the Perera Fellowship (2022-present) to pursue her research into the effects of occupational and environmental exposures on airway reflexes. Her research is performed at the NIHR CRF Manchester.

Professor Mona Bafadhel, MBChB, FRCP, PhD, is the Chair of Respiratory Medicine at King's College London (KCL), Director for the King's Centre for Lung Health and a Consultant Respiratory Physician at Guy's and St Thomas' NHS Foundation Trust. She is also Professor of Asthma + Lung UK. Mona is a clinical academic researcher with research interests in the field of airways disease, particularly the investigation of the mechanisms underlying exacerbations of COPD. Mona is on the editorial board for *Thorax, Chest, European Respiratory Journal* and *The International Journal of COPD*.

Dr Lucy Baker is a Consultant Respiratory Physician at Lewisham and Greenwich NHS Trust, leading the TB and NTM services, and the adult cystic fibrosis service. She is an Honorary Senior Clinical Lecturer at King's College London. She graduated from Oxford University. As a British Lung Foundation Research Fellow, she undertook her MD research at the UK National Mycobacterial Reference Unit into multilocus analysis of molecular variation in candidate drug resistance genes in Mycobacterium tuberculosis. She leads the LGT MDRTB service and is appointed a clinical service advisor to the BTS MDRTB Clinical Advice Service.

Dr Suzanne Bartington is a Clinical Research Fellow (University of Birmingham), Honorary Consultant in Public Health (UK Health Security Agency) and Fellow of the Faculty of Public Health. Her research interests include assessing health impacts of ambient and indoor air pollution and environmental public policy formulation and evaluation. In summer 2022, she was appointed as a UK Clean Air Champion,

SPEAKERS' BIOGRAPHICAL DETAILS

working with national and international stakeholders to maximise impact and legacy arising from the UK Clean Air Programme, provided through the UKRI Strategic Priorities Fund.

Sarah Beale is an epidemiologist with the NIHR and MRC-funded Virus Watch Study – a large prospective cohort study investigating SARS-CoV-2 community transmission in England and Wales – and a doctoral candidate in epidemiology and public health at University College London. Her research focuses on how social and occupational factors shape acute respiratory infection risk, and the mechanisms underlying these inequalities. As part of the Partnership for Research in Occupational, Transport and Environmental COVID Transmission, she has been investigating occupational transmission of COVID-19 and workplace mitigation methods during the pandemic.

Dr Eihab Bedawi is a recently appointed Consultant Respiratory and Pleural Physician at Sheffield Teaching Hospitals. He began his respiratory training in South Yorkshire in 2014 before moving to Oxford in 2018 as a Clinical and then Research Fellow, where he underwent four years of sub-specialist training and research in pleural disease. His PhD thesis focused on outcome prediction and early intervention in pleural infection, including the MIST-3 study; a multicentre, randomised controlled feasibility trial of early combination fibrinolytic/enzyme therapy versus early surgery. He co-chaired the recent ERS Pleural Infection Taskforce and is a member of the BTS Pleural Specialist Advisory Group.

Dr Amsalu Bekele Binegdie, MD, is Internist and Pulmonologist, Associate Professor and Consultant Pulmonologist at College of Health Sciences, Addis Ababa University, Ethiopia. He is a dedicated clinician, academic and researcher. His area of research interest is TB and post TB lung diseases, asthma and other airway diseases. He has published more than 40 articles in reputable local and international journals. He served as Deputy Head of the Department of Internal Medicine from 2010-2012 GC and Head of the Chest Unit, which later developed into the Division of Pulmonary and Critical Care Medicine from 2008-2017 GC. He has been Director of Research at the Division of Pulmonary and Critical Care Medicine, Department of Internal Medicine, College of Health Sciences, Addis Ababa University, since 2017 GC. He is the Founder and President of the Ethiopian Thoracic Society for two terms from 2014-2019 GC and Executive member of the Pan-African Thoracic Society (PATS) and a member of other international societies, such as ATS, ERS and IUATLD.

Professor Charlotte Bolton is Professor of Respiratory Medicine at the University of Nottingham. Her clinical focus is COPD and her research has been on the extrapulmonary manifestations of chronic respiratory disease and pulmonary rehabilitation. In addition, she is interested in the long-term respiratory sequelae of being born preterm, recovery after COVID-19 and also global lung health challenges. She chairs the BTS COPD Specialist Advisory Group and sits on the Lung Taskforce Diagnostic Group and the NACAP COPD Advisory Group.

Chris Brightling is a Fellow of the Academy of Medical Sciences, National Institute for Health Research Senior Investigator, Respiratory Theme Lead for Leicester NIHR Biomedical Research Centre, Director Institute for Lung Health, Director of the Institute for Precision Health and Honorary Consultant Respiratory Physician, Leicester, UK. He is Coordinator of the MRC Molecular Pathology Node EMBER, PHOSP-COVID and Respiratory Lead for the IMI 3TR. Professor Brightling's main research focus is on improving the clinical management and understanding the immunopathogenesis of asthma, chronic cough, COPD and long-COVID. He is a member of the Global INitiative for Asthma - GINA scientific committee.

Professor Jamie Brown is Director of the UCL Tobacco and Alcohol Research Group and leads a CRUK programme of research to i) provide insights from the Smoking Toolkit Study into population-wide influences on smoking and cessation and ii) advance the scientific foundation, and further the development of, potentially wide-reach digital behaviour change technologies. In over 270 publications, a particular focus has been on real-world monitoring and evaluation of national tobacco and alcohol policies and events. He is a co-author of *Theory of Addiction* (second edition) and *ABC of Behaviour Change Theories*, Deputy Regional Editor at the journal *Addiction* and an Editor of the *Cochrane Tobacco Addiction Group*.

Jen Butler is the Clinical Lead Speech and Language Therapist for Upper Airway Disorders in Northumbria. She specialises in the assessment and management of inducible laryngeal obstruction (ILO) and chronic cough. She is a Guest Lecturer at Newcastle University and contributed to the RCSLT position paper for Upper Airway Disorders.

In 2020, Jen completed a Master's in Public Health and Health Service Research, and has since established a working party of patients and the public who guide her research. Her current projects include exploring healthcare utilisation of people with ILO, and exploring how we can better communicate and share information about upper airway disorders.

Adam Byrne, PhD, completed his undergraduate studies in chemistry at University College Dublin and subsequently undertook a PhD in medicinal chemistry at Trinity College Dublin. After a period in industry, he carried out postdoctoral work at Northwestern University, Chicago and then at the Kennedy Institute of Rheumatology, University of Oxford. He currently holds the post of Reader in Respiratory Immunology at the National Heart and Lung Institute, Imperial College London. His laboratory explores molecular mechanisms that dictate innate immune responses in the lung during chronic lung diseases (such as asthma and idiopathic pulmonary fibrosis).

Professor James Chalmers is Asthma + Lung UK Chair of Respiratory Research at the University of Dundee and an Honorary Consultant Respiratory Physician at Ninewells Hospital. His clinical and research interests are in difficult respiratory infections, particularly bronchiectasis, COPD and pneumonia. He is current Chair of the Science and Research Committee of the British Thoracic Society. He chairs the European Bronchiectasis Registry, EMBARC, and has chaired international guideline panels in bronchiectasis, COPD and COVID-19. He is Chief Editor of the *European Respiratory Journal.*

Professor Rekha Chaudhuri leads the Asthma/ COPD Clinical Research Centre in Glasgow and has a major interest in new developments in severe asthma and COPD. She is an Honorary Professor with the University of Glasgow and Associate Specialist in Respiratory Medicine, working in Gartnavel General Hospital, Glasgow. She is involved in several national and international trials of new therapies in asthma and COPD and has over 100 publications in this field.

A/Professor Sanjay Chotirmall is an internationally recognized clinician-scientist with an established translational respiratory research group at the Lee Kong Chian School of Medicine, NTU Singapore and is a Consultant Respiratory Physician at Tan Tock Seng Hospital, Singapore.
To date, he has performed key work on endophenotyping pulmonary infection, including the use of next generation sequencing in the context of chronic inflammatory respiratory diseases such as COPD and bronchiectasis. He has been appointed Provost's Chair in Molecular Medicine at NTU Singapore since 2019, Assistant Dean (Faculty Affairs) since 2021 and leads "The Academic Respiratory Initiative for Pulmonary Health (TARIPH)", an interdisciplinary national academic initiative that aligns strategic academic expertise across Singapore to benefit Singaporeans with lung disease through research. He currently serves as Deputy Editor at the *American Journal of Respiratory and Critical Care Medicine (AJRCCM*).

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.
Dr Church 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 management of venous thromboembolic disease in the Queen Elizabeth University Hospital and is the secretary of the Glasgow and Clyde Thrombosis Committee. He is Chair of the British Thoracic Society Pulmonary Vascular Disease Specialist Advisory Group.

Dr JP Clancy is a Paediatric Pulmonologist and the Senior Vice President of Clinical Research for the Cystic Fibrosis Foundation (CFF). Previously he served as the Division Director of Paediatric Pulmonology at the University of Alabama at Birmingham (2003-2010) and the Director of Research for the Pulmonary Medicine Division at Cincinnati Children's Hospital Medical Centre (2011-2018). His CFF role is to oversee multi-center clinical research conducted by the CFF Therapeutic Development Network and investigator-initiated clinical research. His primary research interests include advancing novel CF therapeutics and understanding of CF pathophysiology. He also is deeply involved in the

SPEAKERS' BIOGRAPHICAL DETAILS

education and training of physician-scientists and career development in CF.

Matthew Clark is the National Speciality Advisor for Children and Young People, a General Paediatrician at East Sussex Healthcare NHS Trust and Deputy Chief of Division, Women, Children, Sexual Health and Audiology, East Sussex Healthcare NHS Trust. Matthew has been working with colleagues to develop the National Bundle of Care for Children and Young People with Asthma. The National Bundle of Care for Children and Young People with Asthma is phase one of a plan to support integrated care systems to deliver high quality asthma care.

Dr Andrea Collins is a Senior Clinical Lecturer in Respiratory Infection at the Liverpool School of Tropical Medicine and Honorary NHS Respiratory Consultant at Liverpool University Hospitals Foundation Trust. Her research focuses on human respiratory challenge models, respiratory vaccine development, bronchiectasis and bronchoalveolar lavage. Her passions are collaborative working, developing affordable, effective respiratory infection vaccines and therapeutics for the world and pretty much everything about bronchiectasis!
Andrea's group's unique award-winning global first human pneumococcal challenge model is used for vaccine testing and uses pneumococcal nasal colonisation as a surrogate end point rather than clinical disease, thus allowing new vaccines to be safely and rapidly assessed reducing both time and cost of early-stage vaccine candidate validation without compromising on safety. Liverpool's new purpose-built in-patient Human Challenge Facility will mean her portfolio can expand into RSV, influenza, COVID and TB Challenge amongst others.
She is also co-lead for Respiratory in NIHR North-West Coast, a keen BTS member and founding member of the UK's Central Vaccine Network (CVN).

Dr Robin Condliffe is a Consultant in the Sheffield Pulmonary Vascular Disease Unit. He is a member of BTS Council and the past chair of the BTS Pulmonary Vascular Disease Specialist Advisory Group. He chaired the BTS Quality Standards for Outpatient PE Management and also led the recent BTS National Audit of Outpatient PE Management. He has published extensively across a wide spectrum of pulmonary vascular disease and was a member of the 5th World PH Symposium. Robin was the lead author for the highly-accessed BTS guidance on COVID-related VTE.

Dr Bronwen Connolly is a Critical Care Physiotherapist, and Senior Lecturer in Critical Care at Queen's University Belfast, UK. She is the recipient of three previous NIHR Fellowships (Doctoral, Postdoctoral, Clinical Trials), and her research interests focus on acute respiratory and rehabilitation physiotherapy, the recovery, long-term outcome, and survivorship of post critical illness patients, and clinical trial methodology around complex rehabilitation interventions.
Bronwen currently leads a multi-professional team delivering an NIHR HTA programme-funded, multi-centre randomised controlled trial investigating the effectiveness of muco-active drugs in acute respiratory failure (MARCH), and the development of a core outcome set for trials of physical rehabilitation in critical illness (PRACTICE). Bronwen sits on the NIHR Critical Care Specialty Group and the UK Critical Care Research Group.

Professor Brendan G Cooper, MSc, PhD, CBiol, FRSB, FERS, works at the Department of Lung Function and Sleep, Queen Elizabeth Hospital Birmingham and the University of Birmingham, UK. He is Consultant Clinical Scientist in Respiratory Physiology at University Hospitals Birmingham and Honorary Professor at the University of Birmingham. He has over 39 years' experience in both clinical and research practice in the UK. He has published over 180 peer-reviewed papers in respiratory physiology and is passionate about quality diagnostic lung function testing. Brendan has been a member of several recent ATS/ERS Technical Standards Task Forces on lung function and is currently Co-Chair of the Global Lung Initiative for Lung Function Reference Values. He was awarded NHS England CSO Awards Healthcare Scientist of the Year in 2020.

Dr Sonya Craig is a Sleep and Respiratory Physician working at University Hospital Aintree, Liverpool where she is Lead Clinician for Sleep Medicine. She trained at Cambridge University and the Royal Brompton Hospital, London before completing an MD investigating cardiovascular risk and obstructive sleep apnoea (MOSAIC trial) with Professor John Stradling in Oxford. Her main research interests are vascular risk in OSA and the delivery of sleep medicine and care effectively and efficiently within the NHS. She is Chair of the BTS Sleep Apnoea Specialist Advisory Group, has chaired the digital group for the Optimal Sleep Pathway Taskforce for NHSE and is a member of the OSA Alliance. Her most recent publications are the

results of the MERGE study published in *Lancet Respiratory* and a review of residual sleepiness in OSA (ERR 2022).

Dr Anjali Crawshaw, DPhil, FHEA, FRCP, qualified from the University of Oxford, subsequently completing a research MSc in Medical Education at UCL. She was awarded a Wellcome Trust Clinical Training Fellowship and subsequently a DPhil from Oxford in 2014 for research examining immune dysregulation in sarcoidosis. She was appointed as a Consultant Respiratory Physician at University Hospitals Birmingham NHS Foundation Trust in 2017 and as an Honorary Senior Clinical Lecturer at the University of Birmingham shortly after. She leads the Birmingham ILD Unit and the Midlands Regional Multidisciplinary Sarcoidosis Service. She is actively involved in research at the Birmingham Respiratory Clinical Trials Unit.

Paul Cullinan holds a chair in Occupational Respiratory Diseases at Imperial College London, and an honorary consultant post at Royal Brompton Hospital. His particular interests lie in the distributions, determinants and prevention of lung diseases that are acquired in the workplace, both in the UK and further afield. He is a member of the HSE's Workplace and Health Expert Committee, and of the Independent Medical Expert Group at the MoD.

Dr Michael Davies is a Consultant Respiratory Physician and Clinical Director for Thoracic Services, Royal Papworth Hospital Cambridge. He has specialist interest in NIV, complex home ventilation, and weaning from prolonged invasive ventilation. He is Clinical Lead for the British Thoracic Society's Respiratory Support Unit Audit Programme.

Dr Rachel Davies, PhD, FRCP, is a Consultant Pulmonologist in the National Pulmonary Hypertension Service, Hammersmith Hospital, London and Honorary Senior Lecturer at Imperial College. She has particular responsibility for running the genetics, transplant and pregnancy arms of this Service. She also has a keen interest in medical education and has been the Training Programme Director of the NW Thames Respiratory Medicine Specialty Programme since 2012. Dr Davies is Vice Chair of the JRCPTB Respiratory SAC. She is actively involved in teaching as well as being an author of the best-selling revision guide for MRCP, *Cases for Paces*. She is also a member of the BTS, serving on Council, QI and Nominations Committees and the Pulmonary Vascular Specialist Advisory Group.

Frederic de Blay is pulmonologist and allergist at the University Hospital of Strasbourg and Professor of Pulmonology at the Faculty of Medicine at the Strasbourg University (France). He is Head of the Department of Chest Diseases at the University Hospital of Strasbourg.
For several years, his research has been focused on respiratory allergy and indoor, outdoor and occupational environments. He is currently working on pathophysiology of occupational asthma and allergic rhinitis. In 2017, an Environmental Exposure Chamber (ALYATEC) was built inside the New University Hospital of Strasbourg close to the Division of Allergy, to study new anti-asthmatic drugs as well as treatment in rhinitis or conjunctivitis.
Professor de Blay has created a new occupation called Medical Indoor Environment Counsellor. There are 250 in France, Belgium and Switzerland. He has been involved in regulation of Name Patient Product (allergenic extract) at French and European level. He was President of the French Society of Allergology from 2008-2010 and is currently President of the French Federation of Allergology. He was President of the 6.2 group "occupational and environment health" at the ERS from 2011 to 2014.
Professor de Blay is the author of 328 international articles and book chapters. He has been Chair of the Research Committee of the University Hospital of Strasbourg and the Research Committee of the North East part of France which comprises five university hospitals (Besançon, Dijon, Reims, Nancy and Strasbourg) and 20 non-university hospitals.

Professor Anthony de-Soyza is Professor of Pulmonary Medicine at Newcastle University. As an Academic Clinician/Physician-Researcher and an Honorary Consultant Physician at Newcastle upon Tyne Hospitals NHS Foundation Trust, he aims to incorporate research into daily clinical practice. His particular interests are in bronchiectasis, COPD and COVID.
He has undertaken UK Chief Investigator roles and recently started international lead investigator roles. He is lucky enough to lead the NIHR Specialty Group for Respiratory in the Comprehensive Research Network. He is National Specialty Lead for the NIHR National Respiratory Group working for the UK National Institute for Health Research Clinical Trials Network (NIHR CRN) where he played a role in the

SPEAKERS' BIOGRAPHICAL DETAILS

COVID Urgent Public Health Panel. He is also NIHR Health Technology Assessment Prioritization Panel Chair for Hospital Based Care. Linking these two posts has led to a highly successful HTA-CRN exercise where a number of new national calls in respiratory have been published. Professor de-Soyza is hugely grateful to the wider respiratory research community and their patients for feeding into this and agreeing to help through participating.

Dr Maaike de Vries works as Assistant Professor at the Department of Epidemiology of the University Medical Centre Groningen. Her research focuses on elucidating the aetiology of COPD, with a specific interest in the individual susceptibility and contribution of both (epi)genetic and environmental factors in the development of COPD. She combines studies on the identification of genes in human population studies that play a role in the development of COPD with functional studies using *in vitro* models, aiming to find novel approaches to treat or prevent COPD in the near future.

Louise Donnelly is Professor of Respiratory Cell Biology within the National Heart and Lung Institute, Imperial College London. Her background is in respiratory cell biology and pharmacology focussing on regulation of inflammatory cells in COPD and the investigation of novel therapeutic strategies. She has established a number of human primary cell systems to investigate mechanisms of aberrant inflammation. She has published extensively and has presented both nationally and internationally and is an Associate Editor for the *American Journal of Respiratory Cell and Molecular Biology*, and previously *Thorax, Respiratory Research* and *Experimental Lung Research*. Professor Donnelly is a past chair of the British Association of Lung Research and served on the British Lung Foundation Scientific Committee and was the European Respiratory Society Fellowship and Awards Director, 2019-2022.

Susan E Dorman MD, is an infectious diseases trained physician and Professor of Medicine in the Division of Infectious Disease at the Medical University of South Carolina, USA. Dr Dorman's research focuses on tuberculosis and non-tuberculous mycobacterial infections, with an emphasis on diagnostics development and clinical trials of novel therapeutic strategies. She serves as Medical Consultant to the South Carolina Department of Health TB Programme and provides clinical care for people with NTM infections.

Dr David Drummond is an assistant professor at the Université Paris-Cité and a paediatric pulmonologist at the Department of Paediatric Pulmonology at the University Hospital Necker-Enfants Malades in Paris, France. As an early-career researcher, he studies the implementation of eHealth in chronic respiratory diseases of children such as asthma or chronic respiratory failure (https://team.inria.fr/heka/fr/team-members/drummond/). He is the principal investigator of several studies using connected inhalers (NCT04810169) or social robots (NCT04942639), and was elected in January 2022 as Secretary of the mHealth/eHealth Group of the European Respiratory Society.

Jamie Duckers qualified from University of Wales College of Medicine in 2000 and was appointed as Consultant Respiratory Physician in 2009 at Cardiff and Vale University Health Board. He is the Research Lead for the All Wales Adult Cystic Fibrosis Service, Health and Care Research Wales Respiratory Speciality Lead and National Clinical Lead for Rare Disease in Wales. Jamie sits on the BTS Cystic Fibrosis Specialist Advisory Group, UK CF Registry Steering Committee and UK CF Transplant Group.
Jamie leads the Cardiff and Vale University Bronchiectasis Service and is an Honorary Lecturer at Cardiff University. He completed his MD (Cardiff University in 2010/11), researching the systemic co-morbidities of chronic respiratory diseases.

Dr Liesbeth Duijts is a Paediatrician-Pulmonologist/Epidemiologist at the Erasmus MC Sophia Children's Hospital, University Medical Centre Rotterdam, The Netherlands. Her patient care responsibilities comprise tertiary care of children with respiratory diseases across the full spectrum. She founded and chairs the Rotterdam Expertise Centre for Bronchopulmonary Dysplasia. Her line of research is focused on the 'Early origins of asthma'. She received a European Respiratory Society (ERS)/Marie Curie Research Fellow grant and worked for one year at the University of Bristol, UK (with the late Professor AJ Henderson). Within EU Framework-7/Horizon 2020 funded research programmes, Dr Duijts participates in the Principal Investigator team (LifeCycle), is work package leader (ALPHABET, LifeCycle, CHICOS, EUCAN-Connect), and conducts large-scale respiratory meta-analyses. She was chair of the ERS Paediatric Respiratory Epidemiology Group and a member of the ERS Scientific Committee. To translate research findings, she has led the ERS Task Force on the

guideline 'Long-term Management of Bronchopulmonary Dysplasia', is Vice Chair of the Dutch Paediatric Respiratory Society, and is a member of the Science Committee for the Global Initiative for Asthma (GINA). In 2021, she was honoured with the ERS Mid-Career Gold Medal Award in Paediatrics.

Heather Elphick is Consultant in Paediatric Respiratory and Sleep Medicine at Sheffield Children's Hospital, having trained at Alder Hey and Melbourne Children's Hospitals. She leads the sleep service in Sheffield, managing a comprehensive range of sleep disorders and the five-bedroomed Sheffield Sleep House. Heather holds an Honorary Chair with the University of Sheffield, in recognition of her collaborative work in the field of technological solutions for children with long-term conditions and is the NIHR Children and Young People's Medtech Respiratory, Sleep and Ventilation Theme Lead. Heather has led a number of nationally funded research and innovation projects, including the NIHR-funded "COMFORT" project that seeks to develop a clinical service for the production of custom-made masks for children using NIV.

Professor Ruth Endacott was appointed inaugural Director of Nursing and Midwifery at the NIHR in May 2021. In this newly created post, Ruth has responsibility for providing professional leadership for nurses and midwives who are supporting, delivering or leading research, promoting nursing and midwifery within the NIHR and beyond, and encouraging more professionals to become involved in research. Ruth is Emeritus Professor at Monash University, Melbourne and Trustee/Director at the Intensive Care National Audit and Research Centre (ICNARC).

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 Louise Fleming, MB ChB, MRCP, FRCPCH, MD, is a Reader in Respiratory Paediatrics at the National Heart and Lung Institute and Consultant Respiratory Paediatrician at the Royal Brompton Hospital. She is a member of the GINA (Global Initiative for Asthma) Science Committee. She is the academic representative for the British Paediatric Respiratory Society (BPRS). Her research interests include monitoring asthma, with a focus on adherence, phenotyping severe asthma and preschool wheeze and use of biomarkers.

Lucy Gardiner, MSc, PGCHE, FHEA, MCSP, is currently a Wellcome Trust Doctoral Research Fellow on the Leicestershire Health Inequalities Improvement Programme (University of Leicester). She is an Assistant Professor in Physiotherapy in her substantive post at the University of Birmingham. Having completed the University College London Cardiorespiratory Physiotherapy MSc programme in 2019, Lucy has continued to pursue her research interests in pulmonary rehabilitation, multimorbidity, and health inequalities. Her PhD focuses on the impact of long COVID in the multimorbid individual. She is a co-opted member of the ACPRC committee and a previous member of the BTS Pulmonary Rehabilitation Specialist Advisory Group.

Christopher Green works in both the NHS and the University of Birmingham. During the COVID pandemic he worked on the evolving hospitals disease epidemiology that fed into key modelling work, clinical trials of non-invasive ventilation and the related risks to healthcare workers when using these devices, and the experimental drugs used in the RECOVERY trial. However, his main interest has always been with vaccines. His DPhil at the Oxford Vaccine Group was in developing viral-vectored vaccine technology for another respiratory RNA virus (RSV), which was invaluable experience for many accelerated COVID-19 vaccine trials that were needed to safely alter the pandemic.

David Green is Senior Business Development Manager at EarthSense Systems Ltd. He has worked in air quality monitoring for 10 years, studying health related air-borne pollutants. He supports public sector and academic clients, helping them identify pollution sources and high-risk exposure areas, so that they can establish suitable mitigation strategies.

Hans Michael Haitchi, MD, MMed(INT), PhD, PD, MRCP(London), FHEA, PGcert, is Associate Professor in Respiratory Medicine and Clinician Scientist within the Faculty of Medicine, University of Southampton, and Honorary Consultant Physician in the University Hospital Southampton (UHS) NHS Foundation Trust. He works in the difficult asthma clinic and leads the

transitional asthma service in UHS.
His research interests are in the asthma susceptibility gene ADAM33 and the Maternal Environment in Pregnancy (MEP) and Wessex AsThma CoHort (WATCH) studies. A related interest is developing novel Anti-ADAM33 agents as potential disease modifying asthma therapy. Dr Haitchi is principal investigator and Clinical Studies Forum lead in the NIHR Southampton Biomedical Research Centre and trustee of the Medical Research Foundation.
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Dr Alanna Hare is a Consultant in Sleep and Respiratory Failure at the Royal Brompton Hospital in London. She graduated from Selwyn College, University of Cambridge in 1999, and completed her postgraduate training at Imperial College London in 2002. She is Chair of the British Thoracic Society Education and Training Committee and Treasurer of the British Sleep Society. She sits on the Board of the Sleep Council. She was made Honorary Clinical Senior Lecturer at NHLI in 2018.

Jemima Hartshorn founded Mums for Lungs, a grassroots network of parents and other campaigners against air pollution and for children's health across the UK, whilst on maternity leave in 2017. Mums for Lungs campaign against traffic and wood burning pollution and collaborate with and advise other local groups to leverage change. Jemima previously worked as a human rights lawyer in the UK and Belgium and holds an LL. M from the University of London. In 2019, she was named by the Evening Standard as one of the most influential environmental activists in London.

Charles Haworth is a Respiratory Consultant working within the Cambridge Centre for Lung Infection at Royal Papworth Hospital, where he specialises in treating adults with cystic fibrosis, bronchiectasis and non-tuberculous mycobacterial (NTM) infections. He was senior author of the International Cystic Fibrosis NTM Guidelines published in 2015 and first author of the British Thoracic Society NTM Guidelines published in 2017. He also co-authored the BTS Bronchiectasis and European Respiratory Society Bronchiectasis Guidelines published in 2017 and 2019, respectively. He has been chief investigator of three international clinical trial programmes evaluating new treatments for people with bronchiectasis.

Liam Heaney is Professor of Respiratory Medicine at Queen's University Belfast and Director of the Northern Ireland Regional Difficult Asthma Service, which delivers multi-disciplinary systematic assessment, with a particular interest in the identification and management of poor adherence to treatment. He has chaired the British Thoracic Society Specialist Advisory Group for Asthma and the initial Evidence Review Group for Difficult Asthma for the BTS/SIGN Guideline on Asthma Management. He coordinates the UK Severe Asthma Registry and was Academic Lead for the Medical Research Council UK Refractory Stratification Programme (http://www.rasp.org.uk) and has published extensively on the clinical assessment and management of difficult to control asthma in adults.

Dr Andrew Hearn qualified from King's College Medical School in 2010. He is a respiratory registrar, approaching the end of training in South London. He is currently the Asthma Fellow at Guy's Severe Asthma Service, where he is also undertaking a PhD in immunology at King's College London.

Eric A Hoffman, PhD, is a Professor of Radiology, Medicine and Biomedical Engineering at the University of Iowa. His PhD was obtained in Physiology at the University of Minnesota-Mayo Clinic. Dr Hoffman is a member of the Fleischner Society, a Fellow of the European Respiratory Society and the American Thoracic Society and he has received numerous awards for his lifetime efforts in establishing X-ray computed tomography methodologies to assess lung structure and function. He has applied these technologies to the phenotyping of severe asthma and smoking/environmental associated lung disease with a goal of defining underlying etiologies.

Linzy Houchen-Wolloff, PhD, is Senior Research Physiotherapist, Centre for Exercise and Rehabilitation Science (CERS), University Hospitals of Leicester NHS Trust and Honorary Senior Lecturer, University of Leicester.
She has worked in the field of rehabilitation for almost 16 years. Linzy graduated from Coventry University in 2006 with a first-class honour's degree in Physiotherapy. She was successfully awarded her PhD in 2012 with the thesis entitled 'The effects of resistance training and protein ingestion on skeletal muscle function in COPD'. Her areas of interest include exercise testing in patients with COPD, pulmonary rehabilitation, improving access to rehabilitation, self-management and maintenance.

SPEAKERS' BIOGRAPHICAL DETAILS

Dr James Hull is a Consultant Respiratory Physician and Clinical Lead for Respiratory Physiology at the Royal Brompton Hospital and Honorary Professor at the Institute of Sport, Exercise and Health (UCL).

Professor Marc Humbert, MD, PhD, FERS, President of the European Respiratory Society (2021-2022), Professor of Respiratory Medicine at the Université Paris-Saclay and Director of the Department of Respiratory and Intensive Care Medicine, French Pulmonary Hypertension Reference Centre, Hôpital Bicêtre, Assistance Publique Hôpitaux de Paris, France. He was the Chief Editor of the *European Respiratory Journal* and he is currently Section Editor in charge of *Pulmonary Vascular Medicine*. Since 2018, Clarivate Analytics has listed Professor Humbert as one of the world's highly cited researchers in the field of Clinical Medicine.

Matt Inada-Kim is an acute physician and visiting professor at Hampshire Hospitals and University of Southampton and Clinical Director for Digital Innovation at Wessex AHSN. His roles at NHS England are as National Clinical Director for Infection Management/Sepsis, AMR and Deterioration; for COVID Pathways/Oximetry@Home/Virtual Wards and Lead for the Deterioration and Sepsis CQUINs. He developed/led on national COVID clinical pathways in all settings/policy/evidence, disseminating the home monitoring strategy across 18 countries during the pandemic.
He is currently developing community based, acute respiratory infection assessment hubs nationally, regionally and locally.

Professor David J Jackson is Professor of Respiratory Medicine at the Centre for Lung Health, King's College London and Clinical Lead of the Regional Severe Asthma and Eosinophilic Lung Disease Service at Guy's and St Thomas' Hospitals in London. He leads a research group that focusses on exploring subphenotypes of type 2 inflammation in asthma and EGPA, the role of the eosinophil in airways disease, as well as other clinical aspects of unmet need in asthma. He is the chief investigator on several clinical trials of biologic agents in asthma and EGPA, is an Associate Editor at the journals *Thorax* and *Allergy*, and co-edited the ERS Monograph on Eosinophilic Lung Diseases.

Professor Gisli Jenkins is an NIHR Research Professor and holds the Margaret Turner-Warwick Chair of Thoracic Medicine at Imperial College London. He is based at the Guy Scadding Building at the Brompton Campus where he is Head of the Margaret Turner-Warwick Centre for Fibrosing Lung Diseases at the National Heart and Lung Institute. He also holds Honorary contracts with the Royal Brompton and Harefield NHS Foundation Trust and with the Imperial College Healthcare NHS Trust.
Professor Jenkins' research focuses on interstitial lung diseases, and pulmonary fibrosis in particular. His team works to understand the biological basis for the development of pulmonary fibrosis and aims to translate this understanding into improved outcomes for patients. He is the Principal Investigator of a number of longitudinal observational studies including the PROFILE study, the INJUSTIS Study, the UKILD Post COVID ILD study, as well as the DEMISTIFI Multi-Morbidity consortium. He is the Pulmonary Fibrosis Working Group Lead for the Genomics England Clinical Interpretation Partnership in Respiratory Medicine, the PHOSP-COVID study and the HEAL COVID platform study.
Professor Jenkins was awarded the ERS Gold Medal in Interstitial Lung Disease in 2020. In 2022 he became a Fellow of the European Respiratory Society, and was appointed President of Action for Pulmonary Fibrosis.

Alison John earned her undergraduate degree in Physiology and Pharmacology at the University of Sheffield and her PhD at Sheffield Children's Hospital. She completed research fellowships at the University of Michigan and the University of Oxford where she was awarded the Chemocentryx Fellowship in Chemokine Biology before conducting post-doctoral research at University of Nottingham. Her most recent research focused on preclinical evaluation of novel inhaled and oral $\alpha v\beta 6$ inhibitors for use in the treatment of lung fibrosis and developing SPECT-CT imaging modalities as non-invasive methods for assessing alveolar $\alpha v\beta 6$ integrin expression. In 2021 she joined the National Heart and Lung Institute at Imperial College as an Advanced Research Fellow within the Margaret Turner Warwick Centre for Fibrosing Lung Disease.

Mark Juniper is a respiratory consultant in Swindon and the current Chair of the BTS Quality Improvement Committee. He has spent a lot of the last ten years working in quality improvement, running an improvement programme in his own hospital as well as having roles at the West of England Academic Health Science Network (WEAHSN) and the National Confidential Enquiry into Patient Outcome and Death (NCEPOD).

SPEAKERS' BIOGRAPHICAL DETAILS

Dr Renata Jurkowska, is Senior Lecturer, School of Biosciences, Cardiff University, UK. She is a molecular biologist with general interests in epigenetics, stem cells and lung biology. She obtained her MSc degree in Biotechnology at Warsaw University (Poland) and went on to complete her PhD and two postdocs in Germany before joining BioMed X Innovation Centre (Germany), where she worked at the interface between academia and industry, leading a biomedical preclinical project in the field of respiratory medicine. In 2019 she was appointed Senior Lecturer at the School of Biosciences at Cardiff University.
Her long-term research interests are to understand how epigenetic regulation drives cellular identity in a healthy lung and how dysregulation of epigenetic processes contributes to the development of lung diseases. Her group employs genome-wide epigenomic assays and single-cell -omics approaches in combination with molecular biology tools and 3D organoid models, to advance the biological understanding of lung cell differentiation and identify epigenetic biomarkers and novel therapeutic strategies for chronic respiratory diseases.

Nikolaos I Kanellakis, PhD, is a Career Development Fellow in the China Oxford Institute, Nuffield Department of Medicine, University of Oxford and Lecturer at University College, University of Oxford. His scientific interests include respiratory translational research, clinical trials, and the development of laboratory models of respiratory disease. He is currently working with Professor Najib M Rahman and Professor Tao Dong to unveil the interactions between cancer and stroma cells in MPE; and bacteria and host in pleural infection.

Dr Holly Keir is a post-doctoral researcher in respiratory medicine at the University of Dundee. Her research interests centre on inflammation and the lung microbiome in COPD and bronchiectasis. Dr Keir is currently an Early Career Member Representative at the European Respiratory Society, a member of the American Thoracic Society's Early Career Professionals and PhD and Research Science working groups, and a Mentee on the COMET Programme.

Professor Frank J Kelly, PhD, FRSB, FRSC, FKC, FMedSci, holds the Humphrey Battcock Chair in Community Health and Policy at Imperial College London, where he is Director of the Environmental Research Group, Director of the NIHR Health Protection Research Unit on Environment and Health and Deputy Director of the MRC-PHE Centre for Environment and Health. Professor Kelly leads a substantial research activity which spans all aspects of air pollution research from toxicology to science policy. He is past Chairman of the British Association for Lung Research and COMEAP, the UK's Department of Health and Social Care Expert Committee on the Medical Effects of Air Pollutants. He provides policy support to the WHO on air pollution issues and he is a member of the US Health Effects Institute Review Committee.

Dr FA (Erik) Klok is a board-certified specialist in Internal Medicine, with a specialty in vascular medicine in the Leiden University Medical Centre, Leiden, The Netherlands, and holds a position as visiting scientist at the Centre for Thrombosis and Haemostasis in Mainz, Germany. This allows him to combine clinical work with scientific activities. His research interests include the diagnosis, treatment and long-term complications of venous thromboembolism.

Professor Onn Min Kon is a Respiratory Physician and Head of Service of the TB Service at Imperial College Healthcare NHS Trust. He is the incoming President of the British Thoracic Society and Chair of the British Thoracic Society Joint Tuberculosis Committee and the National MDR-TB Clinical Advice Service. He is Professor of Respiratory Medicine at Imperial College with an interest in respiratory infections, the clinical and immuno-diagnosis of TB, the delivery of care and management of TB. Professor Kon organises the annual London Advanced TB course.

Tess Kramer is an MD, PhD-student at the Respiratory Department of the Amsterdam University Medical Centers. She is involved in randomised and observational studies on endoscopic interventional techniques to diagnose and treat lung cancer. With a specific focus on needle based imaging techniques, her research aims to improve the bronchoscopic diagnosis of peripheral lung tumours.

Keir Lewis is Professor of Respiratory Medicine in Swansea University and is Clinical Respiratory Lead at Hywel Dda University Health Board, serving around 400,000 people in Wales, UK. He has been a member of various research committees and task forces in the British and European Thoracic Societies and is Medical Director of Respiratory Innovation Wales. His clinical and research interests are COPD, respiratory failure and smoking cessation.
Joining the NHS with local universities and increasingly biotech companies, Professor Lewis has helped attract

over £24M funding. He co-created and Chairs the Charity WORLD.

Dr Kate Lippiett, BA (Hons), MSc, RGN, PhD, is Vice Chair of the Research and Education Committee for the Association of Respiratory Nurse Specialists. In 2020, Kate completed a full-time PhD, identifying and characterising patient experiences of burden of treatment in lung cancer and chronic obstructive pulmonary disease (COPD). Kate is a clinical academic. She works as a Senior Research Fellow at the University of Southampton on a project aiming to provide person-centred care for patients with multiple long-term conditions in primary care. She also leads the treatment programme of work at the Wessex Cancer Alliance.

Professor William Man is Consultant Chest Physician at the Royal Brompton and Harefield Hospitals, Guy's and St Thomas' NHS Foundation Trust and National Heart and Lung Institute, Imperial College. He is Professor of Respiratory Medicine, Faculty of Life Sciences and Medicine, King's College London. Professor Man leads a multi-disciplinary research team focused on health service research in chronic respiratory care including pulmonary rehabilitation, muscle and geriatric syndromes in chronic respiratory disease and the validation of respiratory physiological measures, funded by grants and fellowships from the Medical Research Council, British Lung Foundation (now Asthma + Lung UK) and the National Institute for Health Research. He is the current Honorary President of the Association for Respiratory Technology and Physiology (ARTP).

Zaheer Mangera is Chair of the British Thoracic Society Tobacco Dependency Specialist Advisory Group and former lead of the BTS Smoking Cessation audit. He works as a chest physician at North Middlesex Hospital with a special interest in lung cancer and is the Academic Lead for Year 6 at UCL Medical School.

Dr Paul Marsden is a Consultant in Respiratory Medicine at the North West Lung Centre, Manchester University NHS Foundation Trust and Honorary Senior Lecturer at the University of Manchester. He is Clinical Lead for the Manchester Cough Service and also the Lancashire/South Cumbria Cough Service at the Royal Preston Hospital. He co-founded the North West Cough Network, bringing together clinicians in NW England to improve care for patients with this condition. He completed his PhD in Asthma and Chronic Cough in 2010, has remained an active researcher and is PI/CI on several academic studies/clinical trials in the field of chronic cough. Dr Marsden is a member of the BTS Chronic Cough Clinical Statement Group.

Dr Rocio T Martinez-Nunez is a Senior Lecturer in the Department of Infectious Diseases at King's College London. She is a molecular biologist specialised in RNA biology of inflammation and infection in the context of asthma. Rocio has a BSc in Biology from the University Complutense in Madrid (Spain) and did her PhD at the University of Southampton (UK). She is also an Instructor within The Carpentries and has recently joined the new Centre for Lung Health at King's College London. During the first two years of the COVID-19 pandemic, she led the installation of open-source automation in multiple hospitals in Spain and led King's College London's COVID-19 testing programme. Her focus is now discovering new RNA pathways of intervention in respiratory disease.

Professor Refiloe Masekela is a Paediatric Pulmonologist and Head of the Department of Paediatrics and Child Health, at the University of KwaZulu Natal, Durban, South Africa. She is an Honorary Visiting Associate Professor at the Queen Mary University London, UK. Her research interests are asthma in African children and she is a Steering Committee member and incoming Co-Chair of the Global Asthma Network. She is the Vice-Chair of the Adult and Child Lung Health Section of the International Union of Tuberculosis and Lung Disease (The Union) and the Vice President of the Pan African Thoracic Society.

Dr Ann McMurray, PhD, is an Asthma Nurse Specialist at the Royal Hospital for Children and Young People in Edinburgh. She has worked as an asthma nurse specialist for the last 20 years. More recently Ann has completed her PhD at the University of Edinburgh/AUKCAR working on a study entitled '*Parent and patient perspective of fatal and near fatal asthma*'. As part of a study team, she is currently working on a surveillance study looking at the incidence of near fatal asthma in children in the UK and Ireland.
Ann is actively involved with the Asthma UK Centre for Applied Research (AUKCAR) as a collaborator and is interested in patient public involvement (PPI) especially working with the young people's group, @speakasthma. Ann has written for publication and is also a peer reviewer for medical and nursing journals.

SPEAKERS' BIOGRAPHICAL DETAILS

Ann was the Chair of the National Paediatric Respiratory and Allergy Nurses Group for the past four years.

Dr Ben Messer is a Consultant in Long-Term Ventilation and Intensive Care Medicine at the Royal Victoria Infirmary in Newcastle upon Tyne and the Clinical Lead of the North East Assisted Ventilation Service. His main critical care interest is acute non-invasive respiratory support. He also has interests in tracheostomy ventilation, upper airway dysfunction and secretion management in MND, and the respiratory and perioperative care of neuromuscular patients.

Professor Eleanor Mishra is a respiratory consultant and Pleural Lead at the Norfolk and Norwich Pleural Unit. She is also Associate Professor in Translational and Clinical Medicine at the University of East Anglia. Her research interests are in malignant pleural disease and lung cancer. She is currently Chief Investigator for the REPEAT study, an NIHR funded cohort study, aiming to develop a clinical score to improve initial management of malignant pleural effusions.

Dr Ed Moran is a Consultant Physician and Head of Infectious Disease at Southmead Hospital in Bristol. He has previously worked in Birmingham, South Africa and Oxford, completing a PhD in the immunology of dengue fever in the latter. His more recent interests include persistent SAR-CoV2 infection in the immunocompromised and the use of health data to guide antibiotic selection.

Professor Julie Morrissey is a Professor in Microbial Genetics and the Director of the Leicester Microbial Sciences and Infectious Diseases Research Centre at the University of Leicester. Julie's primary research interests are the molecular mechanisms important for respiratory bacteria adaptation to air and metal pollution, and how this impacts host-pathogen interaction and antibiotic resistance. Air pollution is the single largest environmental health risk. Our team has shown that particulate pollutants, a major component of air pollution, directly alter bacterial cell communication to increase bacterial colonisation of human epithelial and respiratory tract of murine infection models, potentiating respiratory infection.

Kevin Mortimer is a Professor of Respiratory Medicine at Liverpool University Hospitals NHS Foundation Trust and Director of Lung Health for the International Union Against Tuberculosis and Lung Disease (The Union). He is also Deputy Director of the Pan African Thoracic Society Methods in Epidemiologic, Clinical and Operations Research (MECOR) Programme and Chair of the British Thoracic Society Global Lung Health Specialist Advisory Group. He is interested in developing solutions to the lung health needs of the world's poor including tackling global inequalities in access to basic effective care for chronic lung diseases.

Rachael Moses is a Consultant Respiratory Physiotherapist with interests including complex ventilation, airway clearance techniques and advanced care planning for people with long term conditions. Rachael is currently Head of Clinical Leadership Development at NHS England and is National Clinical Advisor for Respiratory with the Personalised Care Team at NHSE. She is passionate about raising awareness regarding equity, diversity and inclusion and showcasing the huge value of multi-professional working and personalised care.
Rachael is very proud to be the first non-medic BTS President (2021-2022) and hopes this encourages others to apply for such roles. She is also fortunate to sit on a number of national organisations and Co-Chairs the National HMV-UK Committee. In her spare time Rachael is a humanitarian aid worker and currently supports Medical Aid for Palestinians as a Placement Co-ordinator.
In 2021 Rachael was awarded an OBE in the Queen's Birthday Honours list and in 2022 was awarded an Honorary Doctorate from the University of Hertfordshire for work in the field of Physiotherapy and Allied Health Professionals.

Dr Ian Mudway is a Senior Lecturer at the School of Population Health and Environmental Sciences at King's College London and a member of the MRC-PHE Centre for Environment and Health; MRC and Asthma UK Centre in Allergic Mechanisms of Asthma and NIHR-PHE Health Protection Research Unit in Health Impact of Environmental Hazards. He is also the current Gresham College Visiting Professor of Environmental Health.
Dr Mudway has over 25 years of experience researching the impacts of air pollution on human health and in the development of assays to quantify the toxicity of the chemical cocktails that pollute the air we breathe. Over this period, he has published over 120 research papers, reports and book chapters on

these topics, as well as providing advice to local, national and international governments and NGOs. Dr Mudway is passionate about the communication of science to lay audiences and has worked extensively with artists and educationalist to promote the public understanding of the risks associated with environmental pollutants. Currently his work is focused on understanding the impacts of air pollution across the life course and the identification of biomarkers of long-term exposures.

Steven D Nathan, MD, FCCP, is Medical Director of the Advanced Lung Disease and Lung Transplant Programme at Inova Fairfax Hospital and is a Professor at the University of Virginia. Dr Nathan received his medical degree from the University of the Witwatersrand in Johannesburg, South Africa. He trained at Long Island Jewish Medical Centre in New York, and at Cedars-Sinai Medical Centre in Los Angeles. He has authored more than 750 publications, including original research manuscripts, abstracts, reviews, book chapters, and three books on idiopathic pulmonary fibrosis. His main areas of research interest include interstitial lung disease, pulmonary hypertension, and lung transplantation.

Dr Neal Navani, MA (Cantab), MSc, PhD, FRCP, is Consultant Respiratory Physician, University College London Hospital and Honorary Associate Professor, University College London. He qualified in Medicine from Cambridge and UCL in 2000 with distinction and several university prizes. He trained in Respiratory Medicine at the Brompton and Hammersmith Hospitals before winning a Medical Research Council Fellowship in 2008 and completing his PhD at UCL in 2011. He has also completed an MSc in Clinical Trials and Biostatistics at the London School of Hygiene and Tropical Medicine.
Dr Navani is Lead Clinician for the Lung Cancer Service at UCLH, Senior Clinical Lead of the UK National Lung Cancer Audit and is the respiratory representative on the current NICE Lung Cancer Guideline and Quality Standards. He is also Clinical Director for the Centre for Cancer Outcomes for the North Central London Cancer Alliance. He is on the steering group of the British Thoracic Oncology Group, UK Lung Cancer Coalition and Thoracic Oncology Board of the American Thoracic Society. Dr Navani is also appointed to the Lung Cancer Clinical Expert Group.
Dr Navani is an Associate Professor at UCL. He is a co-applicant on >£3m of grant funding and holds a CRUK grant for the early diagnosis of lung cancer and a separate CRUK grant for developing novel methods for cancer data collection. In 2020, Dr Navani won a prestigious MRC/NIHR fellowship to research predictors of cancer in lung nodules.
@LungConsultant
Selected publications: https://www.ncbi.nlm.nih.gov/myncbi/neal.navani.1/bibliography/public/

Marko Nikolic is an MRC Clinician Scientist Fellow at UCL Respiratory, 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 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. His current fellowship aims to delineate late foetal lung and immune maturation.

Dr Claire Nolan is a Lecturer in Physiotherapy, Brunel University London and Senior Research Physiotherapist, Harefield Respiratory Research Group. Her main research interests are pulmonary rehabilitation, novel rehabilitation strategies and outcome measures in chronic respiratory disease, in particular idiopathic pulmonary fibrosis and COPD. She is currently working on trials investigating different rehabilitation and rehabilitation maintenance strategies and is developing a home-based rehabilitation intervention for people with ILD. Dr Nolan is co-chair of the British Thoracic Society Pulmonary Rehabilitation Specialist Advisory Group and a member of the British Thoracic Society Pulmonary Rehabilitation Clinical Statement working group.

Professor Caitlin Notley is lead of the Addiction Research Group at the University of East Anglia and Director of the Faculty of Medicine and Health Citizens Academy. Her programme of research, funded by the National Institute for Health Research, focuses on smoking cessation and tobacco harm reduction. She is currently co-leading the Cessation of Smoking Trial in hospital emergency departments, leading the Babybreathe relapse prevention trial, and is the East of England lead for a smoking cessation trial recruiting people experiencing homelessness. Professor Notley has over 20 years' experience in addictions research and is a respected public engagement lead.

SPEAKERS' BIOGRAPHICAL DETAILS

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, funded by the Roy Castle Lung Cancer Foundation. Her research interests are lung cancer screening, early diagnosis and epidemiology 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.

Dr Gabriel Okello is a Research Associate in the Institute for Sustainability Leadership, University of Cambridge. Gabriel is a research active expert interested in human exposure science with specific interests in the health effects of air pollution and interventions relating to household emissions, automobile exhaust emissions and emissions from industries. Gabriel is currently applying a multidisciplinary co-design approach to generate evidence-based strategies to tackle air pollution in Africa and promote citizen science to foster advocacy for clean air in all settings.
Gabriel is co-founder of the African Centre for Clean Air: a research and policy centre, which applies a multidisciplinary co-design approach in collaboration with multiple international, regional and local partners to develop African-based capacity to tackle the causes of air pollution, foster advocacy skills, and provide evidence for policy changes to protect health.

Dr Sean Parker trained in Oxford and Newcastle and completed an MD looking at airway epithelial senescence. 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 novel antitussives. He is the current Chair of the BTS Cough Specialist Advisory Group and co-chairs the group currently producing the BTS Clinical Statement on Cough.

Dr Paul Pfeffer is a Consultant Respiratory Physician and Honorary Senior Lecturer at Barts Health NHS Trust, London, UK, and Queen Mary University of London, and is lead of the North Central and East London Severe Asthma Service. His clinical interest is in asthma and in particular how treatment plans that are personalised to the patient, both in terms of individual disease immunology and individual health beliefs, can improve asthma control and quality of life. His research interest, initially at the MRC-Asthma UK Centre in Allergic Mechanisms of Asthma, King's College London, and subsequently with collaborators across London, is in the capacity of environmental factors such as vitamin D, air pollution and airways infections to subvert immune responses in the lung resulting in airway pathology.

Dr Katy Pike is Consultant in Paediatric Respiratory Medicine at Bristol Royal Hospital for Children and ICS Lead for Paediatric Asthma Bristol, North Somerset and South Gloucestershire. Clinical and research interests in paediatric asthma include early life risk factors for developing asthma, asthma biomarkers and clinical trials of asthma management.

Professor Celeste Porsbjerg PhD, is Professor of Severe Asthma in the Department of Respiratory Medicine at Bispebjerg Hospital, Copenhagen, where she heads the severe asthma clinic, and chairs the Respiratory Research Unit.
Her research revolves around solving key clinical issues in difficult asthma, understanding disease mechanisms with a focus on immune drivers in acute exacerbations of asthma – as well as personalising asthma management.
Professor Porsbjerg chairs the Danish Severe Asthma Registry (DSAR), the NORDSTAR Asthma Research Consortium, and the IMI 3TR-ABC study. Furthermore, she co-chairs the ERS CRC SHARP, and she is the national representative for Denmark in the Global Severe Asthma Registry ISAR.

Wendy Preston is Head of Nursing Practice at the Royal College of Nursing. Since qualifying as RGN in 1992, Wendy has continued studies, achieving MSc in Respiratory Care with post graduate certificates in prescribing and higher education. She continues to practice clinically as an Advanced Nurse Practitioner in out of hours primary care and is an Honorary Respiratory Consultant Nurse.
Previous teams include Nursing Times 'Team of the Year' 2014 (acute medical unit/ambulatory care) and Senior Lecturer at Coventry University.
Wendy is involved with policy and clinical practice leadership at a national and international level and co-edited a respiratory book published in 2016. Her work was acknowledged in 2014 by being recognised as an HSJ Rising Star. Her current role at the Royal College of Nursing includes leading the nursing practice team as well as responsibility for the Nursing Workforce Standards, advancing practice and developing the first UK overarching professional framework for nursing. Wendy also chairs the

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European Federation of Nursing Associations Advanced Practice Working Group.

Dr Samantha Quaife, PhD, CPsychol, is a Senior Lecturer in Behavioural Science, Cancer Research UK Population Research Fellow, and Chartered Psychologist, based at Queen Mary University of London. Her research interests primarily concern the psychological and behavioural aspects of early detection of lung cancer, and how to understand and intervene to improve the equity, acceptability, implementation, and impact of lung cancer screening. She is the lead Behavioural Scientist on two major lung screening implementation studies (the SUMMIT Study and the Yorkshire Lung Screening Trial) and an expert advisor to NHS England's Targeted Lung Health Check Programme.

Dr Sanjay Ramakrishnan is Clinical Research Fellow in the Respiratory Medicine Unit, NDM – Experimental Medicine at the University of Oxford, and is a Thames Valley and South Midlands CRN Fellow at the National Institute of Health Research.

Dr Fanny Rancière is an Associate Professor at the Université Paris Cité. Trained as a pharmacist, she holds a Master's in public health and environment (2009) and a PhD in epidemiology (2013). Her main research interest is the epidemiology of asthma and allergy. She has been particularly interested in the identification of phenotypes and trajectories of respiratory/allergic symptoms throughout childhood using unsupervised approaches. Her research work also seeks to improve understanding of the role of environmental factors in the etiology of asthma and allergy in children and adolescents. She is involved in the follow-up of the PARIS birth cohort.

Robert Rintoul is Professor of Thoracic Oncology in the Department of Oncology, University of Cambridge and Honorary Consultant Respiratory Physician, Royal Papworth Hospital, Cambridge. He trained in respiratory medicine in London and Edinburgh receiving his doctorate from the University of Edinburgh for work investigating mechanisms underlying resistance to chemotherapy in small cell lung cancer. Professor Rintoul is Lead Clinician for Cancer at Royal Papworth Hospital and Director of the Papworth Trials Unit Collaboration. He is co-lead for the CRUK Cambridge Centre Thoracic Cancer Programme, co-ordinating thoracic oncology research across Cambridge. In 2021 he was appointed Chair of the Clinical Advisory Group for the UK Lung Cancer Coalition.
Professor Rintoul's research is focused on clinical trials, translational research and tissue banking in malignant mesothelioma and the early detection of lung cancer. In 2014 he founded MesobanK, the UK national bioresource for malignant mesothelioma (www.mesobank.com) which supplies many research groups nationally and internationally.
His work is funded by the Cambridge NIHR Biomedical Research Centre, Cancer Research UK, National Institute for Health Research and Asthma and Lung UK.

Dr Nicola Roberts is an Associate Professor in the School of Health and Social Care at Edinburgh Napier University. She is a health services researcher; her research focuses on the evaluation of the delivery of care to those with respiratory illnesses. This includes the evaluation of service developments such as education in, and referrals to pulmonary rehabilitation, integration of respiratory healthcare, telephone and digital consultations, improving patient-HCP communication and improving the way nurses and HCPs are taught about respiratory care. She has a particular interest in improving consultations considering areas such as health literacy and patient activation to improve comprehension and patient reported outcomes. More recently her work has looked at the experiences of nurses working in respiratory areas during the pandemic.

Nicola Robinson is a Clinical Research Fellow working at the Centre for Inflammation Research in the University of Edinburgh. She is also a Specialty Trainee in Respiratory Medicine based in South East Scotland and her current clinical work is with the Scottish Adult CF Unit in Edinburgh. Her research interests are in CF airway regeneration and CFTR modulators in clinical practice.

Dr Ivana Rosenzweig, MD, PhD (Cantab), FRCPsych, heads the Sleep and Brain Plasticity Centre at King's College London with the major research mission to generate new understanding of mechanisms behind serious neurological and psychiatric disorders. Her research group works to propose treatment and prevention through utilisation of sleep neurobiology. Her passion for sleep, its brain rhythms and its physiology, has followed her all through her early years as a medical student at the prestigious University of Zagreb, and through her years as a Trinity College scholar, during which she undertook her doctoral studies at the University of Cambridge's Physiological Laboratory. Ivana is also an active clinician and works

SPEAKERS' BIOGRAPHICAL DETAILS

as a Consultant in Sleep Medicine and as a Consultant Neuropsychiatrist at the Guy's and St Thomas' Hospital in London.

Florence Roufosse, MD, PhD, is Professor of Medicine, Internist and Clinical Immunologist at CUB-Hôpital Erasme, Brussels, and is President of the International Eosinophil Society. She is in charge of a specialised consultation dedicated to diagnosing and treating eosinophil-related conditions, that is integrated in the European Reference Network: EuroBloodNet. She also manages patients with systemic auto-immune and auto-inflammatory conditions.
Besides these clinical activities, Dr Roufosse leads translational research projects to improve understanding and treatment of lymphocytic variant hypereosinophilic syndrome (HES), and participates in international research efforts to better delineate disease course and treatment responses of HES. She is involved in the design and conduct of international clinical trials evaluating efficacy of novel treatment options in patients with HES and eosinophilic granulomatosis with polyangiitis (EGPA), as well as sub-studies that aim to identify biomarkers and/or disease variants predicting treatment responses.

Hitasha Rupani is a Consultant Respiratory Physician at University Hospital Southampton NHS Foundation Trust and has a specialist interest in severe asthma. She is Chair of the British Thoracic Society Specialist Advisory Group for Asthma and is the Clinical Lead for the Accelerated Access Collaboration for Asthma Biologics. She has a PhD from the University of Southampton and continues to actively engage in asthma research.

Sejal Saglani is Professor of Paediatric Respiratory Medicine, Imperial College London and Honorary Consultant, Royal Brompton Hospital, London. Her research focusses on mechanisms underlying the inception of severe asthma and preschool wheeze in children, finding novel therapies to improve control, reduce exacerbations and to achieve disease modification. Combined investigations using her neonatal mouse model, paediatric bronchoscopic airway samples, and translation to clinical trials has led to a research programme with the ultimate aim of identifying disease modifying therapies for preschool wheeze and childhood severe asthma.

Joanna Shakespeare is Consultant Clinical Scientist and Scientific Lead in the Department of Respiratory and Sleep Sciences at University Hospitals Coventry and Warwickshire. Prior to this, she was Clinical Scientist/Service Manager of the Respiratory Physiology and Sleep Department at the University Hospitals Coventry and Warwickshire.
She has recently completed the Higher Specialist Scientific Training (HSST) programme achieving her DClinSci award in 2022 (2016-2022).
Joanna is Vice Chair of the Association for Respiratory Technology and Physiology (ARTP), having served in various other capacities for ARTP. She was Lead Editor for the NSHCS STP Curriculum Review (Respiratory and Sleep). She is a full member of the Health Professions Council (HCPC), ARTP, European Respiratory Society and the British Thoracic Society. Joanna has received several awards including in 2020, the CSO Award Winner, Excellence in Healthcare Science Workforce Transformation Award.

Dominick Shaw is a Professor of Respiratory Medicine at the University of Nottingham and Honorary Consultant at Nottingham University Hospitals NHS Trust. His main research area is difficult asthma. Other interests include cystic lung disease (he works as part of the National Cystic Lung Disease Network), medical technologies and pragmatic clinical studies. He captains the Nottingham Leander water polo team.

Claire Slinger is Consultant Respiratory Speech and Language Therapist and Service Lead, Lancashire and Cumbria Airways Multidisciplinary Team, Lancashire Chest Centre at the Royal Preston Hospital, Lancashire Teaching Hospitals Trust. She is also Professional Advisor to the Royal College of Speech and Language Therapists. She is co-author of the RCSLT Position Paper Upper Airway Disorders (2021), and of the upper airway section of the ERS Monograph in Complex Breathlessness (2022). Claire is a member of the BTS Cough Specialist Advisory Group.
Her areas of interest include assessment and management of chronic cough and inducible laryngeal obstruction (ILO), and MDT upper airway assessment for patients who have upper airway issues and difficulty tolerating mechanical insufflation-exsufflation and/or non-invasive ventilation. Currently, she is undertaking pilot research into non-invasive methods of laryngeal assessment.

Jacky Smith is a Professor of Respiratory Medicine at the University of Manchester, an Honorary Consultant in Respiratory Medicine at Manchester University NHS Foundation Trust and the Director of the Manchester NIHR Clinical Research Facility. She set up and runs a

multi-disciplinary team translating neurophysiological mechanisms in cough and facilitating the development of novel therapies. Her research is funded by a Wellcome Investigator Award, UKRI and the Manchester Biomedical Research Centre. She led the development of a cough monitoring system that has been commercialised and changed the standards by which cough medicines are evaluated. She also collaborates with the pharmaceutical industry on the development of new treatments for chronic coughing.

Dr Karl Staples is an Associate Professor at the University of Southampton Faculty of Medicine and is the NIHR Southampton BRC Respiratory and Critical Care 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.

Robert Tarran, PhD, is based in the Department of Cell Biology and Physiology at the University of North Carolina at Chapel Hill. Professor Tarran's current research is focused on the how the Orai1 Ca^{2+} channel regulates lung inflammation in CF and ARDS. He also studies the effects of e-cigarettes and other tobacco products on the lung, and previously served as the director of UNC's Tobacco Centre of Regulatory Science Programme. Professor Tarran is also the founder of Eldec Pharmaceuticals, which is in pre-clinical development with novel immunomodulators for the treatment of lung inflammation.

Purushothama Rao Tata (Tata), PhD, is an Assistant Professor of Cell Biology at Duke University. Tata received his PhD from the University of Ulm, Germany and then moved to Massachusetts General Hospital and Harvard Medical School in Boston for his postdoctoral training. During his time in Boston, Tata uncovered novel communication between stem and progenitors and the cellular plasticity mechanisms that are operant in tissue homeostasis, regeneration and tumorigenesis. Currently, the Tata lab in the Department of Cell Biology at Duke University School of Medicine is focusing on understanding the cellular ensembles in the context of homeostasis, regeneration and diseases in diverse epithelial tissues including lung. Tata received the Whitehead Scholar Award, NIH Pathways to Independence Award, and the Rising Star Award from the International Society for Regenerative Biology.

Amanda Tatler is a Principal Research Fellow/ Associate Professor within the Centre for Respiratory Research, NIHR BRC, University of Nottingham. She undertook post-doctoral training at UCSF and Harvard Medical School as part of fellowships funded by the Royal Society, NC3Rs and Asthma UK/Medical Research Foundation. Her research aims to understand tissue remodelling in respiratory diseases including asthma, pulmonary fibrosis, bronchopulmonary dysplasia. She has expertise in molecular and cellular biology, and ex vivo and in vivo disease models, including a keen interest in 3D models that mimic cell-matrix interactions. Amanda is Treasurer of the British Association for Lung Research, and sits on the editorial board of *Frontiers in Allergy* and *Pharmacology and Therapeutics*.

Dr Jennifer Taylor-Cousar is a tenured Professor of Adult and Paediatric Pulmonary Medicine at National Jewish Health, where she serves as the Medical Director of Clinical Research Services, Medical Staff President-elect, and Co-director of the Adult CF Programme/Director of the CF Therapeutics Development Network Centre. She received her undergraduate degree in human biology from Stanford University (1993), and completed her doctorate in medicine (1998), combined residency in internal medicine and paediatrics (2002), and her combined fellowship in adult and pediatric pulmonary medicine (2006) at Duke University Medical Centre. She obtained her Master of Clinical Science from the University of Colorado (2015).

Cathy Thornton is Professor of Human Immunology and Head of Swansea University Medical School. Her research focus is antenatal determinants of immune function that encompasses the immunology of pregnancy and early childhood. This includes basic science and translation studies around the maternal environment during pregnancy and fetal programming. Cathy is internationally recognised for her expertise in the early life origins of immune mediated diseases and her work is funded by NERC, MRC, BBSRC, and Diabetes UK. She leads the Clean Air Programme Consortium Project RESPIRE, studying the effects of air pollution exposures in pregnancy on child health outcomes.

SPEAKERS' BIOGRAPHICAL DETAILS

Owen Tomlinson, PhD, is an Associate Lecturer in Biomedical Science at the University of Exeter Medical School, whose predominant area of research is on exercise testing in chronic lung disease, focusing on mechanisms of exercise intolerance and strategies to improve exercise function via training and physical activity promotion. He is also the Meetings Secretary of the British Association for Lung Research and sits on the European Cystic Fibrosis Society Exercise Working Group.

Jonathan Van-Tam Kt, MBE, FMedSci, is a public health specialist with a clinical background in emergency medicine, anaesthesia and infectious diseases. He is an expert on respiratory virus pandemics and Pro Vice-Chancellor, Faculty of Medicine and Health Sciences, University of Nottingham. His career has also taken him to Public Health England, the World Health Organisation, and the pharmaceutical and vaccine industries. Jonathan was seconded to the Department of Health and Social Care in 2017-2022 as Deputy Chief Medical Officer. He is well-known for his leadership role during the COVID-19 pandemic, particularly the acquisition and rollout of vaccines and antiviral drugs.

Professor Louise Wain is a non-clinical GSK/Asthma + Lung UK Chair in Respiratory Research in the Department of Health Sciences at the University of Leicester, UK. She has a keen research interest in utilising large-scale genetic epidemiological studies to drive mechanistic understanding of disease to underpin drug target discovery. Louise has led some of the largest genetic association studies of idiopathic pulmonary fibrosis and lung function to date, and enjoys multiple national and international multi-disciplinary collaborations to translate the findings. Louise sits on boards and funding panels for MRC and Asthma + Lung UK, is an Associate Editor for the *European Respiratory Journal* and leads PhD training programmes.

Dr Paul Walker is a Consultant Respiratory Physician in Liverpool University Hospitals Foundation NHS Trust and Sefton Community Respiratory Team. He is current Chair of the British Thoracic Society, having previously been Honorary Treasurer and Chair of the Education and Training Committee for the BTS. He is Diagnostics Lead for Mersey and Cheshire Respiratory ICB. Dr Walker's clinical interests are COPD, bronchiectasis, pulmonary physiology and pulmonary rehabilitation and he has published research in all these areas. He has a long-standing interest in health inequality and the impact of social deprivation on health access and outcomes. He has led work looking at the presence of COPD and asthma in heroin smokers and examining access to and engagement with healthcare in these populations.

Gareth Walters is an NHS Consultant in Occupational and Interstitial Lung Diseases. He leads the Supra-Regional Occupational Lung Disease Service in Birmingham, and is an Honorary Senior Research Fellow at University of Birmingham. He is a past member of the BTS Specialist Advisory Group on Occupational and Environmental Lung Diseases, and current member of the Industrial Injuries Advisory Council.

Richard Ward is a TB Nurse in the Department of Respiratory Medicine at the Homerton Hospital, London. He trained in Adult General Nursing at the Royal London Hospital in 1990, qualifying in 1993. He subsequently worked as a staff nurse before moving to the Royal Free in 1997 and spent 10 years working in intensive care and as a charge nurse in Critical Care Outreach. In 2007, he left to work at the Homerton Hospital in Hackney as a TB Nurse Specialist managing a caseload of patients. Richard's particular interests are under-served groups and access to health care for them, including outreach. He is the nurse member of the BTS Tuberculosis Specialist Advisory Group.

Dr Jane S Watson is a Respiratory Nurse Consultant at St George's NHS Trust, London. She has worked across many respiratory healthcare settings, including teaching in HEI. She completed her PhD in 2022 on the barriers and enablers to pulmonary rehabilitation for patients with COPD from primary care. Dr Watson's clinical interests relate to COPD, specifically improving health outcomes for those living with COPD and supporting health care professionals that care for this population. She is interested in empowering others and mobilising evidence into practice. She supports these passions through her consultant nurse post and as research lead for the Primary Care Respiratory Society.

Michael E Wechsler MD, MMSc, is Professor of Medicine in the Division of Pulmonary, Critical Care and Sleep Medicine at National Jewish Health (NJH) in Denver, Director of the NJH/Cohen Family Asthma Institute and Associate Vice President for Innovation and Industry Relations at NJH.

In addition to clinical work in pulmonary and critical care medicine, Professor Wechsler's research focuses on clinical and translational asthma with emphasis on clinical trials in asthma, novel asthma therapies, bronchial thermoplasty, asthma pharmacogenomics, and management of eosinophilic granulomatosis with polyangiitis (ie Churg-Strauss Syndrome, CSS). He has led studies focusing on novel biologic agents for asthma and related diseases, including benralizumab, dupilumab, mepolizumab, reslizumab, tezepelumab, and itepekimab. He has published more than 250 peer-reviewed manuscripts relating to asthma, EGPA and eosinophilic lung diseases. A member of the American Society of Clinical Investigation and the Association of American Physicians, he is also currently Associate Editor of the journal *Chest*.

Dr Lindsay Welch has just joined the Wessex Academic Health Science Network to support strategic innovation programmes with digital disadvantage and health inequalities. Lindsay has previously worked in academia for three years (Solent University and University of Southampton), during this time she taught Global and Public Health and developed her post-doctoral work in respiratory digital innovations and digital disadvantage. Her PhD focused on self-management support through social networks, as an online/offline intervention for people with COPD.

Lindsay still works clinically as a respiratory specialist nurse with Solent NHS Trust in the Integrated COPD service, supporting pulmonary rehabilitation.

EXHIBITORS' INFORMATION

Action for Pulmonary Fibrosis (APF) **Stand R**

Action for Pulmonary Fibrosis (APF) is a growing community of patients, families, researchers and healthcare professionals striving to find a cure for pulmonary fibrosis so everyone affected by the disease has a better future. We provide personalised support to patients and families and raise awareness of pulmonary fibrosis through campaigning, fundraising and education. We are also committed to funding research to improve the quality of life for people living with pulmonary fibrosis today and tomorrow.

Tel: +44 (0) 1733 475 642
Email: Support@actionpf.org
Website: www.actionpf.org

Adherium **Stand number 12**

Adherium's Hailie® is the world's most clinically supported asthma and COPD medication adherence solution. Comprised of Hailie® secure cloud-based platform, Hailie® App and Bluetooth® sensor to provide real-time feedback to patients and to clinicians. Monitoring inhaled medication adherence/compliance with timely intervention, supports the reduction in severity and frequency of exacerbations and the associated hospital admissions, improving outcomes and quality of life, while reducing the resource burden and health system costs in managing these patient populations.

NEW: Physiologic parameters are captured, peak inspiratory flow, inspired volume etc. allowing clinicians to confirm the correct technique is being utilised.

Tel: +44 (0) 7868 671 605 (Francis White)
Email: francisw@adherium.com
Website: www.adherium.com

Air Liquide Healthcare **Stand number 28**

Air Liquide Healthcare is a leading healthcare provider to patients with long term respiratory and diabetes conditions, having treated over 25,000 patients over 15 years in the UK alone. Following a long history of providing oxygen services to patients in the hospital and at home we are launching our range of respiratory devices and consumables used extensively globally.

Air Liquide has a focus on advanced home mechanical ventilation, secretion management, NIV consumables and masks and a full CPAP therapy and diagnostic offering. We aim to provide our new devices in a variety of ways and services. Managed service, rental, patient support, remote data management are all ways we can help your respiratory service utilising our team of respiratory therapy technicians and nurses. For further information:

Email: garry.milner@airliquide.com
Website: https://www.airliquidehealthcare.co.uk/ventilation-service/our-solutions

Ambu **Stand number 31**

A HISTORY OF BREAKTHROUGH IDEAS

Ambu has been delivering the solutions of the future since 1937. 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.

The manifestations of our efforts include early innovations like the Ambu® Bag™ resuscitator. Then 12 ago, we launched our landmark aScope™, the world's 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.

Moreover, we continuously look to the future to innovate quality products that positively impact your work.

Ambu – Forever Forward

Email: uksales@ambu.com
Website: https://www.ambu.co.uk/endoscopy/pulmonology

APR Medtech **Stand number 11**

APR Medtech is a specialist independent medical technology company supplying high quality medical devices and support services to the NHS and private healthcare sector. Since our inception in 2014 we are proud to have introduced several new and innovative 'medtech' products into the UK. This year we are delighted to present the Passio Pump Drainage System; the world's first digital handheld drainage system used for the home management of recurrent pleural effusions. Passio has been designed to provide reliable low-level suction without the need to use pre-evacuated drainage bottles. We are delighted to be exhibiting at the BTS Winter Meeting 2022.

Tel: +44 (0) 7539 111 342 / +44 (0) 1844 340 620 (Michael Pichel)
Email: michael.pichel@aprmedtech.com
Website: www.aprmedtech.com

The Association for Respiratory Technology & Physiology (ARTP) Stand J

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 the 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://www.artp.org.uk

The Association of Chartered Physiotherapists in Respiratory Care (ACPRC) Stand F

The Association of Chartered Physiotherapists in Respiratory Care (ACPRC) 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 2023, 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: www.acprc.org.uk

The Association of Respiratory Nurse Specialists (ARNS) Stand I

The Association of Respiratory Nurse Specialists (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.**

Tel: +44 (0) 1543 442 198
Email: info@arns.co.uk
Website: https://arns.co.uk/

AstraZeneca Stand number 2

AstraZeneca is a global, science-led biopharmaceutical company that focuses on the discovery, development and commercialisation of prescription medicines, primarily for the treatment of diseases in three therapy areas – Oncology, Cardiovascular, Renal & Metabolism and Respiratory. For more information, please visit our website.

Email: Info@Astrazeneca.com
Website: www.astrazeneca.co.uk.

BD Stand number 20

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 70,000 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: www.bd.com

The British Association for Lung Research (BALR) Stand G

The British Association for Lung Research (BALR) provides a focus for exchange of ideas between all manner of respiratory researchers, basic scientists and clinicians and promotes respiratory research throughout the UK. We aim to ferment collaboration and interest in experimental research relating to

normal lung function and the mechanisms of lung disease, to facilitate interchange of ideas between workers in this field including at our annual BALR scientific meeting and to encourage the exchange of materials and techniques between laboratories, for their mutual assistance and as a means of standardisation in appropriate areas of research. We are also a registered charity (SC010151).

Email: admin@balr.co.uk
Website: https://www.balr.co.uk/

Broncus Medical Inc / Uptake Medical **Stand number 13**

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.

Tel: +1 650 428 1600
Email: sales@broncus.com
Website: www.broncus.com

Chiesi Limited **Stand number 3**

Chiesi Limited is headquartered in Manchester and employs over 400 people. Based in Parma, Italy, Chiesi Farmaceutici is an international research-focused group with over 85 years' experience in the pharmaceutical sector operating in 30 countries, employing around 6,000 people. To achieve its mission of improving people's quality of life by acting responsibly towards society and the environment, Chiesi researches, develops and markets drugs in its three therapeutic areas: AIR (respiration, from new-born to adult populations), RARE (rare and ultra-rare diseases) and CARE (special care and consumer-facing self-care). Chiesi, since 2019, is the world's largest B Corp certified pharmaceutical group.

Tel: +44 (0) 161 488 5555
Email: Info.uk@chiesi.com
Website: www.chiesi.uk.com

Creo Medical **Stand number 9**

Creo Medical is transforming patients' lives through the delivery of minimally invasive devices, bringing advanced energy and technology to the fields of therapeutic Bronchoscopy, Endoscopy, Gastroenterology and Urology. Offering a range of disposable bronchoscopes, EBUS FNA/FNB needles and airway stents.

Creo Medical's pioneering products are used worldwide, providing:

- Patients with improved treatment options, focused on enhancing quality of life
- Healthcare professionals with access to advanced technology and techniques
- Hospitals with optimized patient pathways and efficiency

Please visit our website for more information.

Tel: +44 (0) 7872 500 386 (Neil Bottomley)
+44 (0) 1904 786 888 (Customer Careline)
Email: Neil.Bottomley@creomedical.com
Website: www.creomedical.com

CSL Vifor **Stand number 16**

CSL Vifor is a global partner of choice for pharmaceuticals and innovative, leading therapies in iron deficiency, dialysis and nephrology and 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 our website.

Website: www.cslvifor.com

Gilead Sciences **Stand number 7**

Gilead Sciences, Inc. is a biopharmaceutical company that has pursued and achieved breakthroughs in medicine for more than three decades, with the goal of creating a healthier world for all people. The company is committed to advancing innovative medicines to prevent and treat life-threatening diseases, including HIV, viral hepatitis and cancer. Gilead operates in more

than 35 countries worldwide, with headquarters in Foster City, California.
Website: https://www.gilead.co.uk/

IMPROVE: Improving completion of Pulmonary Rehabilitation **Stand E**
IMPROVE is an NIHR-funded, national randomised controlled trial that aims to improve rates of uptake and completion of pulmonary rehabilitation (PR) using PR-buddies. This is a national cluster randomised trial. The PR-buddies will be volunteers, who have successfully completed PR, trained in communication skills and the use of behaviour change techniques, to help patients overcome the obstacles that could stop them from doing PR. We are seeking expressions of interest from PR services interested in becoming a trial site.
Email: toby.morgan@kcl.ac.uk (Trial Manager)
patrick.white@kcl.ac.uk (Chief Investigator)
Website: www.improvetrial.co.uk

Insmed **Stand number 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.
Email: chris.annis@insmed.com
Website: www.insmed.com

INSPIRE, the INtegrated reSPIratory REsearch collaborative **Stand 37**
INSPIRE is the UK's research network for trainees and early career researchers including AHPs in respiratory medicine. INSPIRE encourages and supports engagement in clinical research by early career clinicians in respiratory medicine. We aid the development of high-quality research and facilitate delivery at national scale. Our first two studies are opening in late 2022, and applications for the next round of studies is soon. To get involved with INSPIRE please see the website below or contact us for more information.
Email: inspire.resp.research@gmail.com
Website: www.inspirerespiratory.co.uk
Twitter: @INSPIREresp_uk

Inspire Medical Systems **Stand number 19**
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 over 40,000 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
email: markchambers@inspiresleep.com
Website: https://www.inspiresleep.com/

It's Interventional **Stand number 34**
It's Interventional (formerly UK Medical) is 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 introduce our brand-new IPC to the BTS. The Aspira™ Drainage System is a long-term indwelling catheter designed for palliative management of recurrent pleural effusion/malignant ascites. Aspira™ is IPC evolved, with new methods of catheter implant, designed for easier adoption and a cleaner procedure, as well as improved drainage options designed to maximise patient comfort/convenience during home care.
Please visit us at stand no: 34 or visit our website for more information on Aspira™.
Tel: +44 (0) 114 268 8880
Email: hello@itsinterventional.com
Website: www.itsinterventional.com

Janssen **Stand number 33**
Our goal is to give people with PH a manageable condition.
At Janssen, we are spearheading a new era for PH, working to transform the disease into a long-term manageable condition, so that patients can live a normal life. Supported by Actelion's 20-year heritage of pioneering innovation, we are working to reach more patients and aim to help tackle the diagnosis gap that is delaying access to the care that patients need.

EXHIBITORS' INFORMATION

We're focused not only on how we treat PH but on a broader spectrum of goals for the PH community. That includes enhancing patient care, as well as advocating and educating to facilitate faster diagnosis.
EM-107352
Date of Preparation 8th August 2022
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Website: https://www.janssen.com/uk/our-focus/pulmonary-hypertension

LifeArc **Stand D**

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Email: info@lifearc.org
Website: www.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.
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Website: www.lasag.org.uk
Social media: https://www.facebook.com/LondonAsbestosSupportAwarenessGroup
https://twitter.com/LASAG_UK
https://www.linkedin.com/company/london-asbestos-support-awareness-group
https://www.instagram.com/londonasbestossupportgroup/

Mesothelioma UK **Stand S**

Mesothelioma UK is the national charity for anyone affected by mesothelioma. We exist to support people with mesothelioma to live better and longer and to prevent mesothelioma happening to future generations. We will do this by advocating for better treatment and care, enhancing quality of life, supporting research and amplifying the patient's voice.
Our focus is to provide access to specialist nurses in local hospitals across the UK. Mesothelioma Clinical Nurse Specialists provide specialist expertise, increased access to clinical trials, increased number of patients accessing treatment, fewer unplanned admissions, better management of symptoms and an overall increase in patients' quality of life.
We also provide a support line, specialist benefits advisors, travel grants for the cost of accessing clinical trials, a dedicated research centre at Sheffield University and a comprehensive information service.
Tel: +44 (0) 800 169 2409
Email: info@mesothelioma.uk.com
Website: www.mesothelioma.uk.com

National Asthma and Chronic Obstructive Pulmonary Disease (COPD) Audit Programme (NACAP) **Stand B**

More than 9 million people are living with a diagnosis of asthma or COPD in the UK and the NACAP aims

to improve the quality of their care, services and clinical outcomes. It does this by supporting and training clinicians, empowering people living with asthma and COPD, and their carers, and informing policy. The NACAP has a track record of delivery and is critical to assessing progress against the NHS Long Term Plan. To find out more about the NACAP visit our website.

Website: https://www.rcp.ac.uk/nacap

NuvoAir **Stand number 6**

With offices in Boston, MA and Stockholm, Sweden, NuvoAir is a leading digital health company for chronic disease management and decentralized clinical trials. The NuvoAir Home platform blends connected devices with high-touch care coordination and coaching services to enable patients and their providers to proactively manage chronic conditions, resulting in better outcomes and lower costs.

NuvoAir Home currently supports thousands of patients worldwide with COPD, cystic fibrosis, asthma, IPF, ALS, and muscular dystrophy.

NuvoAir's decentralized clinical trial solution has been used in over 30 studies globally across all phases of drug development.

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Olympus **Stand number 14**

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The Olympus Respiratory Business Unit 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 financial solutions that comply with the toughest industry standards with our aim of making people's lives healthier, safer and more fulfilling around the world.

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Website: https://www.olympus.co.uk/medical/en/Home/

Orion Pharma (UK) Ltd **Stand number 10**

Orion Pharma (UK) Ltd is a subsidiary of Orion Corporation, pharmaceutical company based in Finland. Orion carries out extensive research with a goal of introducing new treatments into global markets. The core therapy areas of Orion are neurological disorders, oncology and respiratory disease.

August 2022/CORP-233(1)

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Website: www.orionpharma.co.uk

PARI Medical Ltd **Stand number 40**

PARI Medical Ltd is part of the global network of PARI companies.

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PARI's mission is to improve the lives of those affected by respiratory diseases and those who provide care to them.

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Pentax Medical **Stand number 22**

Welcome to the World of Intelligence with PENTAX Medical. A leading provider of flexible endoscopy products and accessories, designed to meet an extensive spectrum of clinical specialties including Gastroenterology, Pulmonology, Urology and ENT.

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Website: https://www.pentaxmedical.com
YouTube: https://www.youtube.com/channel/UCn2Ge1Wr7YsPZQiZ25nCkuA?app=desktop&cbrd=1&ucbcb=1

EXHIBITORS' INFORMATION

LinkedIn: https://uk.linkedin.com/company/pentax-europe-gmbh?trk=top_nav_home

Pulmonary Rehabilitation Services Accreditation Scheme (PRSAS), Royal College of Physicians **Stand C**

The Pulmonary Rehabilitation Services Accreditation Scheme (PRSAS) accreditation programme was launched in April 2018 with the aim to improve the quality of pulmonary rehabilitation (PR) services throughout the UK. Accreditation provides a quality assurance mechanism that reassures patients and commissioners that service provision meets national standards. The PRSAS accreditation programme aligns with the pulmonary rehabilitation audit, part of the National Asthma and COPD Audit Programme (NACAP) commissioned by the Healthcare Quality Improvement Partnership (HQIP). PRSAS and NACAP supports PR services to measure and improve the quality and outcomes of the care they provide to patients. Both programmes are managed and delivered by the Royal College of Physicians (RCP).

Tel: +44 (0) 20 3075 1407
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Website: https://www.prsas.org
Twitter: https://twitter.com/PRaccreditation

Rocket Medical **Stand number 36**

Rocket Medical is a proud UK manufacturer, with a commitment to improving patients' lives. For over 50 years we have dedicated our approach to the innovation of devices for the management of pleural disease. Additionally, we have supported increasing amounts of independent prospective research and in partnership with our clinicians we have created an unrivalled suite of evidence based, products and a revolutionary patient homecare support platform and team ensuring our position as UK partner of choice.

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Website: https://www.sandoz.uk.com/

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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.

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Trudell Medical International **Stand number 29**

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Instagram: https://www.instagram.com/trudellmed/?hl=en
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Vertex **Stand number 5**

Vertex is a global biotechnology company that invests in scientific innovation to create transformative medicines for people with serious diseases.

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Vygon **Stand number 35**

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Joint BTS/BALR/A+L UK Early Career Investigator Symposium

T1 GENETIC OVERLAP STUDY BETWEEN ACUTE RESPIRATORY DISTRESS SYNDROME AND IDIOPATHIC PULMONARY FIBROSIS

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10.1136/thorax-2022-BTSabstracts.1

Introduction and Objective Acute respiratory distress syndrome (ARDS) is a critical lung condition induced by a systemic inflammatory response. A subset of ARDS patients can also develop pulmonary fibrosis (i.e. lung scarring). Idiopathic pulmonary fibrosis (IPF) is the most common cause of pulmonary fibrosis in the general population. Genome-wide association studies (GWAS) of IPF and post-sepsis ARDS suggest that these phenotypes could share genetic risk factors. Here we performed the first genetic overlap study between IPF and ARDS to identify shared genetic risk loci that might be informative about development of lung fibrosis after ARDS.
Methods We used summary statistics from large meta-GWASs of IPF risk (4,125 cases, 20,464 controls) and post-sepsis ARDS (716 cases, 4,399 controls), as well as individual-level data from a subset of individuals from the ARDS GWAS (321 cases, 3,249 controls). We performed polygenic risk score (PRS) analyses to assess if IPF GWAS variants could be used to predict ARDS risk. We constructed PRSs as the weighted sum of variants reaching different *p*-value thresholds in the IPF meta-GWAS, and tested their association with ARDS risk, whilst adjusting for age, sex and population stratification. We also assessed individual genetic signals to identify variants shared between both traits. We conducted colocalisation analyses to determine whether the same causal variant was driving both phenotypes, and studied the association of overlapping variants with gene expression.
Results The PRS calculated from IPF variants that passed the best *p*-value threshold (i.e. $p=0.0011$) predicted ARDS risk ($p=4.07\text{x}10^{-04}$, OR[95%CI]=1.24[1.10, 1.39]). We also found that the ARDS protective allele at *HLA-DQA2* was associated with IPF risk ($p=1.28\text{x}10^{-04}$) and that the IPF risk allele at *ATP11A* conferred protection from post-sepsis ARDS ($p=0.003$). The latter was associated with protection from severe COVID-19 in previous studies. Colocalisation analyses were inconclusive, likely due to the limited ARDS sample size.
Conclusions Our risk score analyses suggest that there may be shared biological processes underlying IPF and ARDS risk. However, we note opposite directions of effect on IPF and ARDS risk for some loci. Further studies are needed to assess if these results are also informative about fibrotic sequelae of ARDS.

Please refer to page A208 for declarations of interest related to this abstract.

T2 SUBPHENOTYPES IN PATIENTS WITH SEVERE ACUTE RESPIRATORY FAILURE REQUIRING EXTRACORPOREAL MEMBRANE OXYGENATION

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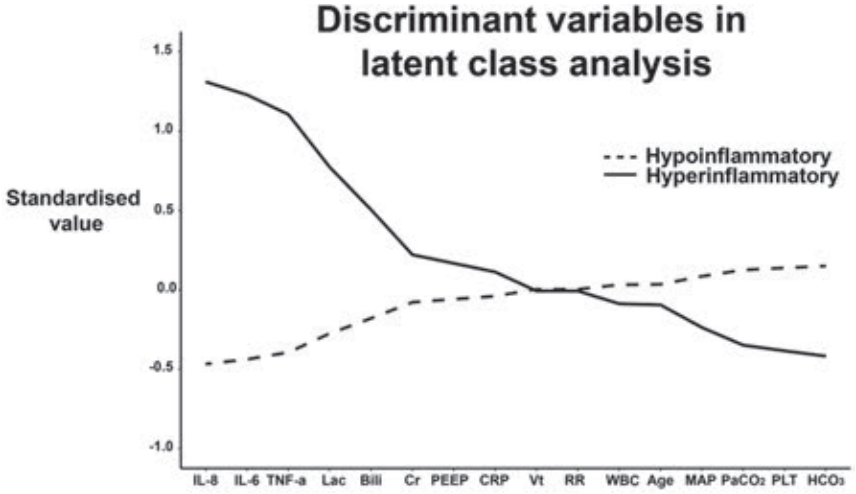
10.1136/thorax-2022-BTSabstracts.2

Introduction and Objectives Hyperinflammatory and hypoinflammatory subphenotypes have been identified in patients with the acute respiratory distress syndrome (ARDS) which



Abstract T2 Figure 1 Differences in the standardized values of each variable by subphenotype on the y-axis, with discriminant continuous variables along the x-axis. Variables are sorted based on degree of separation between classes from a maximum positive separation on the left (hyperinflammatory greater than hypoinflammatory) to a maximum negative separation on the right (hypoinflammatory greater than hyperinflammatory)

consistently have different clinical characteristics, biomarker profiles and outcomes. These subphenotypes may not be specific to ARDS. Patients on veno-venous extracorporeal membrane oxygenation (VV ECMO) represent a distinct population in which subphenotypes have not been previously identified. The aim of this research was to identify if subphenotypes are present in a mixed cohort of patients with severe acute respiratory failure requiring VV ECMO.

Methods Adult patients requiring VV ECMO from a single centre in Regensburg, Germany were included. Clinical and ventilation data were recorded immediately prior to initiation of ECMO and on the first day thereafter. The inflammatory cytokines interleukin-6 (IL-6), interleukin-8 (IL-8), and tumour necrosis factor alpha (TNF-a) were measured by ELISA from plasma samples taken immediately prior to initiation of ECMO. Latent class analysis (LCA) was used to identify subphenotypes and included both clinical and biomarker variables. Subphenotype association with hospital mortality was assessed.

Results 437 patients initiated on VV ECMO were included. The most common indications for ECMO were viral infection (15%), bacterial infection (41%), and post-operative (16%). Using LCA, a two-class model was a better fit for the cohort than a one-class model ($p < 0.001$). There were 322 (74%) patients in Class 1 and 115 patients in Class 2 (26%). Class 2 was characterised higher cytokine concentrations, more metabolic acidosis, and more non-pulmonary organ failure, consistent with the ARDS hyperinflammatory subphenotype. Patients with the hyperinflammatory subphenotype (Class 2) had worse hospital mortality (49% vs. 31%, $p = 0.001$) than those with the hypoinflammatory subphenotype (Class 1). Discriminant variables in the LCA model are detailed in figure 1.

Conclusions Two subphenotypes were identified in patients with severe acute respiratory failure requiring ECMO, with characteristics similar to those previously identified in data from non-ECMO ARDS patients, including worse outcomes in the hyperinflammatory subphenotype. These subphenotypes could be targeted with precision medicine treatments in future trials of patients on VV ECMO.

T3 ALTERED NEUTROPHIL PROTEOMES IN COVID19 PATIENTS 29-DAYS POST HOSPITAL ADMISSION ARE ASSOCIATED WITH DELAYED RECOVERY: RESULTS FROM THE PREDICT-COVID19 STUDY

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10.1136/thorax-2022-BTSabstracts.3

Introduction and Objectives Neutrophils are increasingly recognised for a role in acute COVID19, contributing to hyperinflammatory responses, immunothrombosis and tissue damage. However, less is known about the cellular changes occurring within neutrophils in acute disease, as well as neutrophil function in patients recovering from COVID19. Mass spectrometry-based proteomics of neutrophils from hospitalised COVID19 patients sampled longitudinally was utilised to characterise these cells in both acute and long COVID19 (i.e. symptoms for $\geq$4 weeks).

Methods Prospective observational study of hospitalised patients with PCR-confirmed SARS-CoV-2 infection (May 2020–December 2020). Patients were enrolled within 96 hours of admission, with longitudinal sampling up to day 29. Control groups comprised hospitalised patients with non-COVID19 acute respiratory infection and age-matched non-infected controls. Neutrophils isolated from peripheral blood were processed for mass spectrometry. COVID19 severity was defined using the WHO 7-point ordinal scale.

Results 84 COVID19 patients were included (mean age±SD 65.5±14.6 years; 52.4% male), 91 non-COVID19 respiratory infection patients (age 65.7±16.7 years; 49.5% male) and 42 non-infected controls (age 58.5±17.9; 40% male). 1,748 proteins were significantly different (q-value≤0.05) in COVID19 neutrophils compared to those of non-infected controls. Major differences included a robust interferon response at baseline, with markers of neutrophil immaturity (CD10, CD71), increased neutrophil activation (CD64), and changes in metabolism which associated with COVID19 disease severity. Delayed recovery (WHO score 2–3) at day 29 was associated with significant changes in 1,107 proteins compared to the control population. Features of non-recovery included significantly reduced abundance of migratory receptors (e.g. C3AR1, LTB4R), integrins (CD11b, CD18), inhibitory molecules (e.g. SHP-1, SHIP-1) and indications of increased activation (CD64). Overall, ficolin and specific granule content was decreased in COVID19 patient neutrophils at day 29 compared with controls, however, comparing those who had recovered and those who had not, granule content was found to be significantly lower in the non-recovery group.

Conclusion Neutrophils undergo significant changes in acute COVID19 associated with disease severity. Neutrophil proteomics revealed that these cells may have an ongoing role in non-recovered patients, including profiles associated with increased potential for neutrophil activation and reduced migratory capacity, highlighting neutrophils as potential therapeutic targets in long COVID19.

T4 NOVEL LUNG ORGANOID MODEL REVEALS CRUCIAL ROLE OF LUNG RESIDENT MESENCHYMAL STROMAL CELLS IN COPD PATHOGENESIS

[1]DM Butler, [2]I Heijink, [1]AD Krasnodembskaya. *[1]Queens University Belfast, Belfast, UK; [2]University of Groningen, Groningen, Netherlands*

10.1136/thorax-2022-BTSabstracts.4

Introduction Despite impressive progress in development of human pulmonary organoid models, majority of these models are comprised predominantly of epithelial cells, with just a few reporting presence of supporting mesenchymal cells. These organoids do not yet recapitulate the complex structure and cellular interactions of the highly vascularized alveolar region. Therefore, more complex models utilizing the entirety of the lung architecture are required.

Objective Here we aimed to develop an organoid model representative of human distal lung tissue comprised of primary human pulmonary epithelial, mesenchymal and endothelial cells.

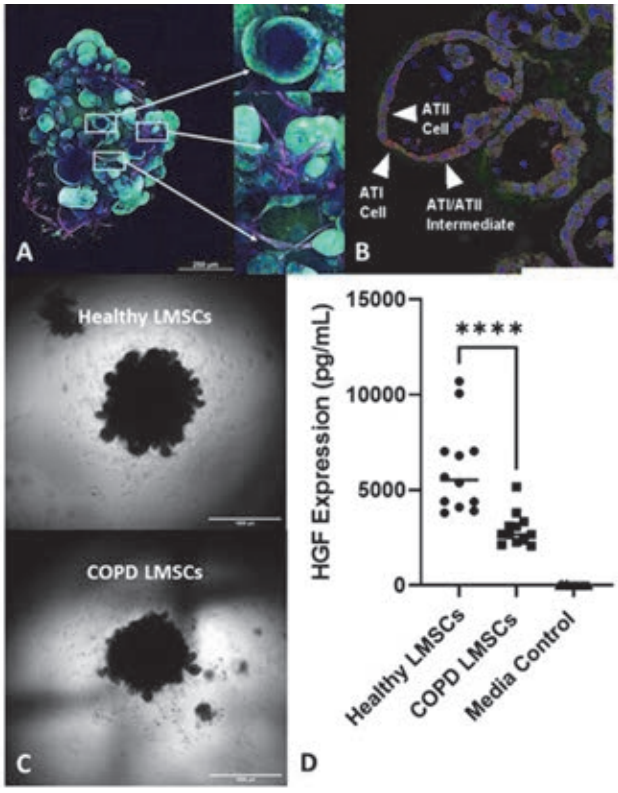
Methods Primary human distal lung epithelial (Promocell), endothelial (Promocell) and lung mesenchymal stromal cells (MSCs) directly isolated from human lung tissue were co-cultured in Matrigel for 21 day. The morphology, size and cellular composition of the resultant structures were assessed by confocal and transmission electron microscopy. We compared organoids seeded with MSCs isolated from healthy and COPD donor lungs. Secretion levels of hepatocyte growth factor (HGF) were assessed by ELISA.

Results At 21 days organoids reach 1000 μm in size and develop multiple budding spherical structures with a lumen approx. 150–200 μm diameter. These structures are composed of alveolar epithelial cells (SPC^+ ATII-like, $AQP5^+$ ATI-like, and SPC^+AQP5^+ cells indicating intermediate phenotype). Presence of $Krt5^+$, $p63^+$ and $MUC5^+$ epithelial cells is also observed. Interconnected network of endothelial cells is observed throughout the organoid (figure 1). Presence of endothelial cells is critical for organoid reaching 1000 μm size, while presence of lung MSCs is critical for structural symmetry. Organoids seeded with MSCs derived from COPD lungs are characterised by non-symmetrical morphology and smaller size compared to organoids seeded with MSCs isolated from lungs of healthy donors and were unable to support endothelial cells, recapitulating loss of vasculature in emphysema. Both COPD lung MSCs and COPD organoids had lower levels of HGF secretion expression compared to their healthy lung counterparts.

Conclusion Condensation of primary pulmonary cells provides a physiologically relevant distal lung organoid model that features endothelial cell presence. COPD lung MSCs are not able to support growth of endothelial cells and induce irregular spatial organisation of alveolar epithelial cells.

Funding MRC UK MR/S009426/1 to Dr. Anna Krasnodembskaya

Please refer to page A208 for declarations of interest related to this abstract.



Abstract T4 Figure 1 Cellular condensation of primary distal lung cells; epithelial, endothelial, and mesenchymal stromal cells in Matrigel results in a large multicellular structure that matures over a period of 21 d to resemble the normal human alveoli. A Whole organoid imaging reveleas protruding bulbous structures projecting away from the main organoid body, are composed of SPC+ epithelial cells and are connected by a basic network of CD31+endothelial cells. Scale bar: 250 μm. Blue: DAPI, Green: SPC, Magenta: CD31. B Alveolar-like spheres are composed of SPC+ (green) and AQP5+ (red)cells. Scale bar: 100 μm. Blue: DAPI, Green: SPC, Red: AQP5. C Organoids formed with the seeding of MSCs isolated from healthy lungs (top) and MSCs isolated from lungs of COPD (bottom). Replacement of healthy MSCs with COPD MSCs results in loss of organoid symmetry and reduced size. Scale bar 1000 μm D HGF secretion levels are significantly lower in the organoids formed with COPD MSCs compared to organoids with healthy MSCs ($P<0.05$, Kurskal-Wallis)

T5 POINT OF CARE BLOOD EOSINOPHIL GUIDED ORAL PREDNISOLONE FOR COPD EXACERBATIONS: A MULTI-CENTRE DOUBLE BLIND RANDOMISED CONTROLLED TRIAL (THE STARR2 TRIAL)

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10.1136/thorax-2022-BTSabstracts.5

Introduction and Objectives Prednisolone for COPD exacerbation treatment leads to more patient harm than benefit. Previous work showed that blood eosinophil count directed oral prednisolone was safe and trended towards fewer treatment failures at 28 days after exacerbation. This study aimed to evaluate the efficacy of blood-eosinophil directed corticosteroid therapy using near-patient testing, compared to current standard practice during an exacerbation of COPD in a multicentre primary care study.

Methods Patients with a COPD exacerbation were recruited from 14 general practices in the Thames Valley. Participants were randomly allocated to receive intervention with eosinophil-biomarker guided matched prednisolone or placebo or standard care (matched prednisolone 30 mg) for 14 days. Participants in the intervention arm with a blood eosinophil count of <2% on point of care testing were treated with blinded placebo. Participants were followed up at day 14, 30 and 90 after randomisation. The primary outcome was the rate of treatment failure, defined as any need for antibiotics and/or steroids at 30 days. Key secondary outcomes include change in COPD assessment test, FEV_1 and visual analogue scale of COPD exacerbation symptoms.

Results 203 exacerbations were randomised to eosinophil-biomarker guided (n=102) or standard care (n=101) for management of the exacerbation. There were 25% current smokers

(n=50) and 40% were women (n=80) equally distributed between the two study arms. The mean age (range) was 71 (46 to 90). One third of exacerbations (n=34) in the eosinophil-biomarker guided arm were treated with placebo. Intention to treat analysis at day 30 showed that treatment failure occurred in 28 and 34 patients in the eosinophil-biomarker guided and standard care arms respectively (RR 0.82 95% CI 0.54 – 1.23, p=0.34). There were no statistically or clinically meaningful difference in the COPD assessment test, forced expiratory volume in 1 second and the symptom visual analogue scales between participants in the eosinophil-biomarker guided and standard care arms

Conclusion Reduction of prednisolone therapy, using near-patient testing can be safely performed using an eosinophil-biomarker guided approach in primary care for treatment of an exacerbation of COPD. This should become part of clinical practice.

Trial Registration NCT04458636

Please refer to page A208 for declarations of interest related to this abstract.

T6 ELEVATED SERUM CATHEPSIN K IS ASSOCIATED WITH DISEASE ACTIVITY IN LYMPHANGIOLEIOMYOMATOSIS AND CATHEPSIN K INHIBITION IS BENEFICIAL IN VITRO AND IN VIVO

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10.1136/thorax-2022-BTSabstracts.6

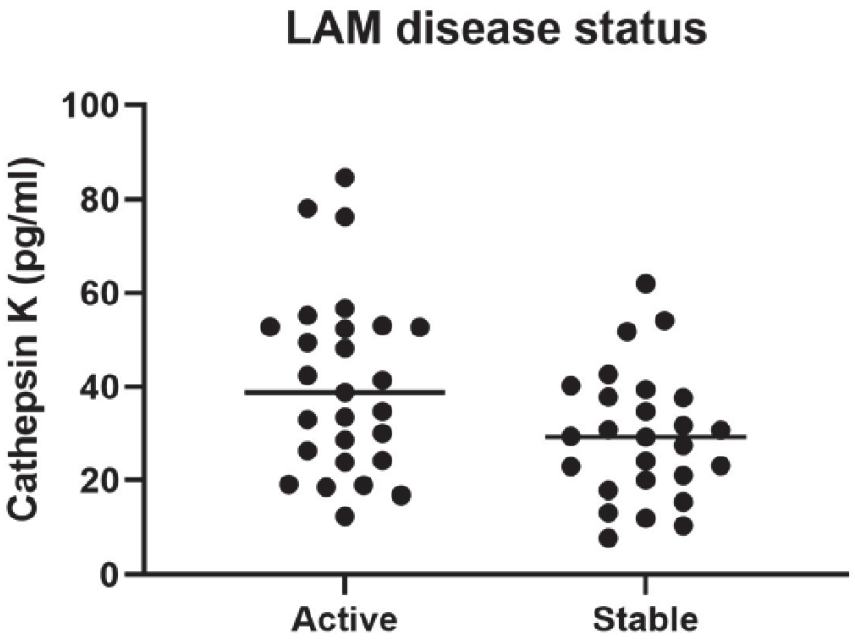
Introduction and Objectives Lymphangioleiomyomatosis (LAM) is a rare multisystem disease of women characterised by lung cysts, lymphatic abnormalities and angiomyolipomas. 'LAM' cells present in the lungs harbour mutations in either *TSC1* or *TSC2* genes giving rise to constituitive mTOR pathway activation. Lung damage in LAM is thought to result from aberrant protease activation. We previously showed the cysteine protease Cathepsin K (CTSK) was the most strongly expressed protease in LAM compared to control lung, increased with worsening disease and could be activated in LAM lung tissue. Here, we evaluate the inhibition of Cathepsin K in cell and murine models of LAM, and assess levels of CTSK in the sera of patients from a UK cohort of LAM.

Methods TSC2-null cells were treated with the Cathepsin K inhibitor Odanacatib, viability and proliferation assessed. An immunocompetent TSC2-null murine model of LAM was treated with Odanacatib, rapamycin or both, tumour burden and cell proliferation were assessed. Cathepsin K activity was quantified in mouse lung tissue and BAL by Cathepsin K activity assay and ELISA. Serum Cathepsin K was measured in 53 women with LAM with linked phenotype and lung function data.

Results Odanacatib inhibited the proliferation of murine TSC2-null TTJ cells in vitro (IC_{50}=0.68 nMol, p=0.01). In a murine model of LAM over 6 weeks, Odanacatib reduced Cathepsin K activity in both BAL and lung (p=0.005), decreased the size of lung nodules (p<0.0001), reduced Ki67 immunopositivity in TSC2 null nodules (p=0.01) and tended to be synergistic with rapamycin. Serum Cathepsin K levels in 53 women with LAM were 7.8–84.7 pg/ml (35.3±17.5). Cathepsin K was higher in 27 patients with active LAM (12.4–84.7pg/ml, 40.8±19.0) compared to 26 with stable disease (7.8–62.1, 29.5±13.5), p=0.034 (figure 1). A trend was observed for higher levels of Cathepsin K in patients with lower FEV1 (p=0.067) but Cathepsin K was not associated with serum VEGFD (p=0.13).

Conclusions Our findings suggest that Cathepsin K may be involved in lung damage in LAM and inhibition of Cathepsin K should be investigated further as a treatment for LAM.

Please refer to page A208 for declarations of interest related to this abstract.



Abstract T6 Figure 1

'Scar face' – the burden of fibrosis

S1 PROGRESSIVE PULMONARY FIBROSIS: TOP TEN RESEARCH PRIORITIES

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10.1136/thorax-2022-BTSabstracts.7

Introduction and Objectives The term progressive pulmonary fibrosis (PPF) encompasses a group of diseases affecting more than 35,000 people in the United Kingdom.[1] PPF is characterised by fibrotic remodelling of the lung parenchyma, leading to relentless progression and poor prognosis. No cure is available.

This study aimed to identify stakeholders' research priorities regarding diagnosis, treatment, and management of PPF patients, to inform research funders and national policymakers in their strategies to support funding priorities in PPF.

Methods A James Lind Alliance Priority Setting Partnership (PSP) for PPF was convened in 2020. A steering group of patients, carers, and healthcare professionals (HCPs) with expertise in PPF met 11 times over two years and led the PSP. Stakeholders' questions and uncertainties about PPF were gathered through an open online survey, advertised on social media and postal services through the support groups network, and word of mouth. Following thematic analysis, responses were coded to identify overarching themes, from which summary research questions were generated. A comparative literature review identified unanswered research questions, which were shortlisted by stakeholders through a second online survey. Subsequently, the 15 highly top-rated questions were ranked during a 2-day online workshop to select the top 10. Workshop participants were purposively selected to represent the different stakeholders and guarantee adequate expertise and geographical distribution.

Results The initial online survey had 638 responses, generating 2542 single statements that were distilled into 48 thematic research questions. Participants were represented by 57% people living with PPF, 25% carers, and 15% HCPs. After evidence review, 44 questions were included in the second survey and shortlisted by 834 stakeholders (51.4% people living with PPF, 32.7% carers, and 15.8% HCPs). After three rounds of discussions, workshop participants ranked and defined the top 10 priority list (table 1).

Conclusions Stakeholders consider that early diagnosis, new treatment, symptom management, and quality of life are key priority areas that require prioritisation of funding and research.

Abstract S1 Table 1 Top ten research questions

Rank	Question
1	How can the diagnosis of PPF be improved in terms of accuracy and the time taken (screening programme, early signs and symptoms that could be detected in primary care, blood markers, imaging, biopsy, artificial intelligence, etc.)?
2	Can new treatments other than pirfenidone and nintedanib slow, halt or reverse the progression of PPF?
3	What can be done to improve the speed and accuracy of PPF diagnosis in primary care (e.g. training, integration of case-based studies in GP training, awareness campaigns)?
4	What is the best time for drug and non-drug interventions (pulmonary rehab, oxygen therapy, psychological support) to start to preserve quality and length of life for patients with PPF?
5	What are the best ways (drug, non-drug and aids) to treat cough in PPF?
6	Would early treatment delay progression, lung function decline, and improve survival in PPF?
7	Which therapies will improve survival in PPF?
8	What treatments (drug, non-drug and aids) can reduce breathlessness and phlegm production in PPF?
9	To what extent do different interventions (pulmonary rehab, oxygen therapy, psychological support) impact length of life in patients with PPF?
10	Can new treatments for PPF be developed with reduced side effects? Does how the drug is delivered (e.g. oral, nebulised, through a vein) affect potential side effects of the drug in PPF?

REFERENCE

1. Snell N, *et al.* P272 Epidemiology of idiopathic pulmonary fibrosis in the UK: findings from the British lung foundation's 'respiratory health of the nation' project. *Thorax* 2016;**71**:A236-A236.

S2 NOCTURNAL HYPOXAEMIA RATHER THAN OBSTRUCTIVE SLEEP APNOEA IS ASSOCIATED WITH PROGRESSIVE DETERIORATION IN QUALITY OF LIFE IN PATIENTS WITH FIBROTIC INTERSTITIAL LUNG DISEASE

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10.1136/thorax-2022-BTSabstracts.8

Introduction and Objectives Both nocturnal hypoxaemia (NH) and obstructive sleep apnoea (OSA) are common in patients with interstitial lung disease (ILD) and may impact on quality of life. We prospectively examined the relationship between sleep breathing characteristics and disease-specific quality of life measures.

Methods We performed a prospective observational study of patients with an MDT diagnosis of a fibrotic ILD, who did not have resting hypoxaemia. All underwent a home sleep study at enrolment and completed a King's Brief Interstitial Lung Disease (KBILD) questionnaire at 6 and 12 months. NH was defined as >10% of sleep with SpO2 <90%. OSA was defined as an apnoea-hypopnea index of >15 events/hr. A change in KBILD score of >4 was considered of clinical relevance. Two-way ANOVA was used to examine relationships between NH and OSA and quality of life over time.

Results Among 102 (male 74.5%; age 73.0±8.7 years; FVC 2.74±0.78L; 91.1% idiopathic pulmonary fibrosis) participants, 20 (19.6%) demonstrated prolonged nocturnal hypoxaemia (NH), and 32 (31.4%) had obstructive sleep apnoea (OSA). There were no significant differences between those with and without NH or OSA at baseline. Despite this, NH was associated with a more rapid decline in both quality of life as measured by the KBILD (-16.9 ± 10.2 in the NH group compared with -4.8 ± 9.6 in the group without, p = 0.005). OSA in the absence of NH was not associated with

greater deteriorations in KBILD score (-10.2 ±10.8 in the OSA group compared with – 6.6 ± 12.4 in the group without, p=0.46). Moreover, the presence of NH also predicted increased likelihood of death over 12 months of follow up (hazard ratio 2.78; 95% confidence interval, 0.85–9.12, p=0.19).

Conclusions NH, but not OSA, predicted a more rapid decline in disease related quality of life over time in patients with fibrotic ILD. This supports further work to investigate interventions in sleep to improve patients' quality of life.

S3 CHARACTERISING COUGH BURDEN IN HYPERSENSITIVITY PNEUMONITIS

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10.1136/thorax-2022-BTSabstracts.9

Introduction Cough is a common symptom in patients with interstitial lung disease. Studies have previously focused on the burden of cough in idiopathic pulmonary fibrosis (IPF) and research is lacking in patients with hypersensitivity pneumonitis (HP). We aimed to investigate reported cough severity in subjects with HP, using an IPF cohort as disease controls.

Methods We recruited incident cases of IPF and HP into a prospective observational study. Cough visual analogue scales (VAS, range 0–100 mm) and Leicester Cough Questionnaires (LCQ, range 3–21) were collected at baseline. Demographic details, lung function and bronchoalveolar lavage (BAL) cell differentials were collected.

Results A total of 207 IPF and 35 HP patients were recruited. Demographic data is summarised in table 1. All subjects with IPF had never received antifibrotic therapy. Only 6/35 patients with HP had received prior steroid treatment. Median cough VAS was 29 mm in IPF and 29.5 mm in HP (Mann-Whitney U, p = 0.732). Median LCQ was 16.1 in IPF and 15.1 in HP (Mann-Whitney U, p = 0.138). FVC and TLco negatively correlated with cough VAS in both IPF and HP subgroups. While TLco positively correlated with LCQ in IPF, neither lung function parameters derived correlation with LCQ in HP. BAL percentage lymphocyte fraction was available for 46 IPF and 28 HP patients (mean 11.2% and 33.2% respectively). In the cohort as a whole an elevated BAL lymphocyte count was associated with higher cough VAS (r = 0.313; p = 0.007). To establish independent predictors of cough within our combined cohort a general linear model analysis was conducted for cough VAS and LCQ. The variables assessed in this model included smoking history, age, sex, reflux, FVC and TLco. FVC (p = 0.002) and sex (p = 0.049) were predictive of cough VAS. However, none of the independent variables were predictive of LCQ.

Conclusion Cough burden in HP is similar to IPF, with poorer FVC seemingly a factor in predicting reported cough severity. The association between BAL lymphocytosis and cough VAS support the theory that inflammation is linked to cough.

Abstract S3 Table 1 Baseline demographic data for IPF and HP cohorts. Comparison between categorical data was conducted using χ-squared test. Parametric data was compared with independent samples t-test
*data available for 160 subjects

Variable	IPF	HP	P - value
N	207	35	
Age (years) (SD)	74 (7.3)	64 (11.4)	< 0.001
Male sex (%)	171 (83)	16 (46)	< 0.001
Ever smoked (%)	141 (68)	18 (51)	0.054
Symptomatic reflux (%) *	39 (24)	6 (18)	0.399
FVC% predicted (SD)	78 (14.9)	84 (19.2)	0.071
TLco% predicted (SD)	47 (13.4)	54 (16.6)	0.012

S4 PULMONARY FUNCTION DECLINE AND SURVIVAL IN SILICOSIS: A RETROSPECTIVE LONGITUDINAL STUDY

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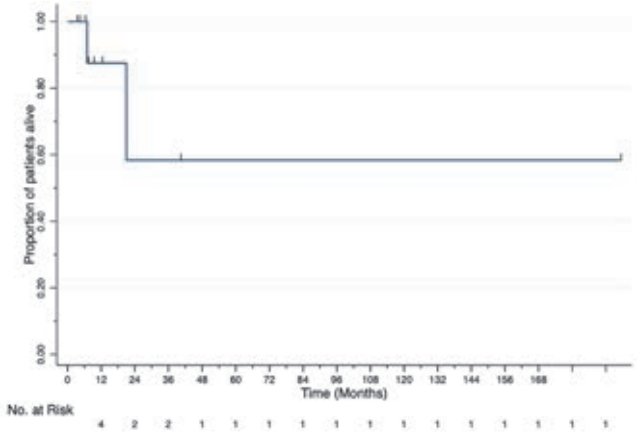
10.1136/thorax-2022-BTSabstracts.10

Background An increase in the number of diagnosed cases of silicosis is anticipated in the UK following the introduction of silica workplace respiratory health surveillance. However, upon diagnosing silicosis, the medium and long-term clinical outcomes remain unclear.

Aim To describe clinical outcomes, pulmonary function change over time and survival following a diagnosis of silicosis.

Methods A retrospective longitudinal study of all types of silicosis diagnosed at the Birmingham Regional NHS Occupational Lung Disease service since 2000. Eligible participants were identified from a local pre-existing clinical database. Clinical data (including pulmonary function tests) were extracted from medical records, as was ongoing silica exposure after despite a diagnosis of silicosis. Physiological decline was assessed applying a GLS random effects model. Kaplan Meier Survival Estimates of all-cause mortality were performed using STATA v17.

Results 37 patients were diagnosed with silicosis (1 acute, 32 chronic simple and 4 progressive massive fibrosis). 97.3% were male and mean (SD) age at diagnosis was 61.6 (11.7) years. 32.4% had ongoing silica exposure after receiving a



Abstract S4 Figure 1 Kaplan Meier survival estimate of silicosis from the day of diagnosis

silicosis diagnosis. Further silica exposure after silicosis diagnosis was not predictive of FEV1, FVC or TLco ($p>0.05$) decline. Percent predicted values of FEV1, FVC and TLco deteriorated annually (all $p<0.001$) - FEV1 (0.77%/year), FVC (0.52%/year), TLco (1.42%/year). Figure 1 demonstrates all-cause mortality of approximately 40% at 2 years. Connective tissue disease was diagnosed in 2 patients and mycobacterial infection diagnosed in 2 patients after silicosis diagnosis.

Discussion Silicosis is a slowly progressive disease – whilst% predicted value annual change was small, often it is diagnosed in patients of working age and is likely to contribute to morbidity and mortality after diagnosis. Approximately 40% of patients died within 2 years of a diagnosis of silicosis.

'Flushed away' – what's new in pleural disease?

S5 BACTERIAL ISOLATES FROM INFECTED AND NON-INFECTED INDWELLING PLEURAL CATHETERS

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10.1136/thorax-2022-BTSabstracts.11

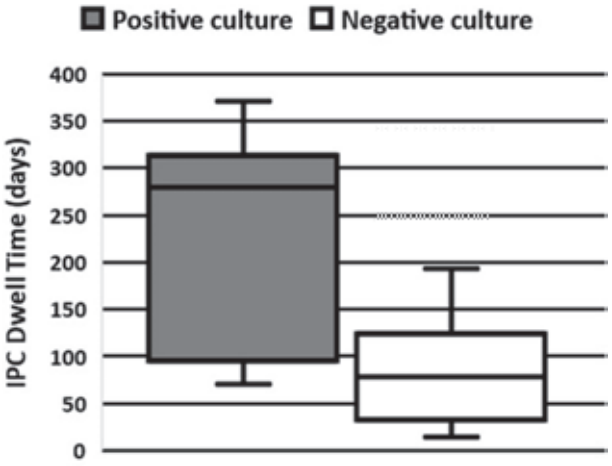
Introduction Indwelling pleural catheters (IPCs) are used to manage pleural effusions. Approximately 5% are complicated by infection, diagnosed with positive pleural fluid cultures and clinical signs of infection. We hypothesise IPCs undergo bacterial colonisation prior to the development of infection.

Objectives To culture bacteria from infected and non-infected IPCs.

Methods IPCs removed for clinical purposes were collected a large tertiary centre (ethical approval: UEA REC 2020/21-126). IPCs were divided into four 1 cm segments from cuff to tip. Segments were vortexed in 1 mL of phosphate-buffered saline for one-minute. 20 uL were streaked onto 5% Columbia blood agar plates and incubated for 24-hours at 37°C. Isolates were stored at -80°C in 40% glycerol, prior to whole-genome sequencing. Patient characteristics were recorded, including: age, IPC dwell time, effusion characteristics and whether the IPC was infected (defined by clinician-initiated antibiotic treatment for an IPC-associated infection).

Results To date, 15 IPCs have been collected from patients with 12 malignant and 3 benign effusions. Median age was 73 (IQR: 61–80) and median IPC dwell time was 102 days (66–278.5). Bacterial isolates were collected from 7 patients' IPCs, including all 4 with an IPC-associated infection and from 3 without. IPC segment culture had full agreement with a clinical diagnosis of an IPC-associated infection and identified three cases of colonisation. IPCs with positive cultures had been in-situ for a mean of 220 days (N=7, SD=129. Median 280 days, IQR 96–313) compared with 100 days for those without (N=8, SD=92. Median 78.5 days, IQR 32.75–124.75). This difference was not statistically significant (Two-tail T-test, p=0.056). Figure 1 compares median and interquartile range for either group.

Conclusions This exploratory study of IPC infection demonstrates that bacteria can be isolated from infected and non-infected IPCs. This supports our hypothesis that some IPCs become colonised with bacteria in the absence of infection.



Abstract S5 Figure 1 Median, interquartile range and minimum/maximum duration of IPC dwell time for IPCs with positive and negative cultures

IPC dwell time may be associated with risk of colonisation and infection. Findings are limited by sample size, though IPC collection is ongoing with further centres beginning enrolment. Whole-genome sequencing of isolates is providing insights into bacterial factors associated with infection and colonisation.

S6 TIMING OF PNEUMOTHORAX POST-CT-GUIDED THORACIC BIOPSY IN A TERTIARY REFERRAL CENTRE: IMPLICATIONS FOR THE AMBULATORY PNEUMOTHORAX PATHWAY

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10.1136/thorax-2022-BTSabstracts.12

CT-guided percutaneous biopsy (CTGB) is an important diagnostic modality in thoracic disease, and carries a 25% risk of pneumothorax.[1] Ambulatory pneumothorax management with early discharge is increasingly endorsed post-iatrogenic pneumothorax. This study aims to determine whether observation for 2 hours after CTGB is needed, by looking at the incidence of 'delayed' pneumothorax requiring intervention in a tertiary centre performing complex procedures.

Method Online records were used to recruit all patients undergoing CTGB in Glenfield Hospital, Leicester, a tertiary centre staffed by a team of specialist thoracic radiologists, from 15/03/2017–15/03/2021. Records were analysed for demographic data, size and location of biopsy target, timing of post-procedure pneumothorax as delineated on CTGB report or post-procedure chest X-ray (CXR), and intervention required. Delayed pneumothorax was defined as any pneumothorax diagnosed at 2 hours or later following CTGB.

Results 641 patients underwent CTGB during the 4-year study period. Characteristics are summarised in table 1. Of these, 223 (34.8%) developed post-procedure pneumothorax. Of the 223, 83.4% were diagnosed during the procedure, and 37 (16.6%) were delayed-onset. No patients were admitted with

Abstract S6 Table 1 Study population characteristics

		n	%
Total number of procedures		641	-
Male		371	57.9%
Female		270	42.1%
Median age (years)		71.0	-
Lesion site	*RUL*	177	27.61%
	RML	22	3.43%
	RLL	109	17.00%
	LUL	151	23.56%
	LLL	104	16.22%
	Anterior mediastinal	29	4.52%
	Pleural	40	6.24%
	Chest wall	9	1.40%
Median lesion size (mm)		41	-
Total pneumothorax incidence		223	34.8%
Timing of pneumothorax	*T = 0 hours*	186	83.41%
	T = 0-2 hours	37	16.59%
	T = 2 hours - 7 days	0	0.00%
Pneumothorax management(% of n=223)	*Conservative*	144	64.57%
	Aspiration	47	21.08%
	Chest drain	31	13.90%
	Pleural vent	1	0.45%
Total pneumothorax needing intervention (% of n=223)		79	35.43%
Immediate pneumothorax management (% of n=186)	*Conservative*	111	59.68%
	Aspiration	46	24.73%
	Chest drain	28	15.05%
	Pleural vent	1	0.54%
Immediate pneumothorax needing intervention (% of n=186)		75	33.63%
Delayed pneumothorax management (% of n=37)	*Conservative*	33	89.19%
	Aspiration	1	2.70%
	Chest drain	3	8.11%
	Pleural vent	0	0.00%
Delayed pneumothorax needing intervention (% of n=37)		4	10.81%

a diagnosis of pneumothorax after a negative 2-hour check CXR.

79/223 (35%) of all pneumothoraces required intervention. 33.63% of immediate-onset pneumothoraces required intervention, the majority of which was on-table aspiration, compared to 10.8% of the delayed-onset group. The number of delayed-onset pneumothorax patients requiring intervention totalled 0.6% of the total study population.

Conclusions This study demonstrates that the incidence of delayed-onset pneumothorax requiring intervention is low in a tertiary centre setting. The optimal time for patient observation post-CTGB remains unknown. The authors acknowledge a high incidence of pneumothorax in the study cohort, which they postulate may be due to a higher volume of complex procedures in a tertiary setting, higher sensitivity of CT for reporting trivial post-biopsy pneumothorax, and the diversion of more complex lung cancer patients to the CTGB route during the COVID pandemic to avoid aerosol-generating procedures.

REFERENCE

1. Heerink WJ, de Bock GH, de Jonge GJ, Groen HJ, Vliegenthart R, Oudkerk M. Complication rates of CT-guided transthoracic lung biopsy: meta-analysis. *Eur Radiol* 2017;Jan;**27**(1):138–148.

S7 SINGLE-CENTRE 14-YEAR RETROSPECTIVE ANALYSIS OF PATIENTS WITH POST-THORACOSCOPY DIAGNOSIS OF NON-SPECIFIC PLEURITIS

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10.1136/thorax-2022-BTSabstracts.13

Introduction and Objectives Nonspecific pleuritis (NSP) is defined as a fibrinous or inflammatory pleuritis with an incidence of up to 30% following medical thoracoscopy (MT). 5–25% of patients with NSP subsequently develop malignancy. This study aims to compare the characteristics of patients diagnosed with NSP who had a benign disease (BD) course with those who developed malignant disease (MD).

Abstract S7 Table 1

Demographics	Malignant disease (17)	Benign disease (93)	P value
Age	75	70	
Male	12(70.5%)	67 (72%)	1
Smoking Status	14 (82.4%)	71 (76.3%)	0.84
Asbestos Exposure	5 (29.4%)	31 (33.3%)	1
Comorbidities			
Cardiovascular	5 (29.4%)	46 (49%)	
Respiratory	-	7 (7.5%)	
Gastrointestinal	-	6 (6.4%)	
Endocrine	4 (23.5%)	24 (26%)	
Renal	-	8 (8.6%)	
Other	-	15 (16.1%)	
	4 (23.5%)		
History of Malignancy	5 (29.4%)	19 (20.4%)	0.54
Skin	1	1	
Breast	1	4	
Gastrointestinal	-	5	
Urological	1	7	
Gynaecological	1	1	
Haematological	1	6	
CT Findings			
Lung nodules/mass	5 (29.4%)	4 (4.3%)	0.01
Mediastinal thickening	5 (29.4%)	19 (20.4%)	0.54
Pleural Nodularity	4 (23.5%)	3 (3.2%)	0.005
Plaques	5 (29.4%)	9 (9.7%)	0.12
Pleural effusion	17	93	
Further invasive procedure	9 (52.9%)	18 (19.4%)	0.05
VATS	5	16	
EBUS	1	-	
Lymph node biopsy	2	1	
US/CT guided biopsy	1	-	
Thoracotomy	-	1	
Subsequent Cancers	17		
Mesothelioma	6		
Thoracic cancers			
Adenocarcinoma	3		
Squamous cell	1		
Extra thoracic cancers			
Ovarian	1		
Renal	1		
Spindle cell	1		
Malignant Melanoma	1		
Breast	1		
Prostate	1		
Fibrous tumour	1		

Methods A retrospective analysis was conducted of 596 MT performed at a regional pleural centre from January 2006 - June 2020 to allow for 2 years follow-up. Data on age, gender, smoking history, asbestos exposure, history of malignancy, CT findings, co-morbidities and subsequent malignancy was collected from electronic medical records.
Results NSP was diagnosed in 120/596 patients (20%). 10 patients were excluded due to incomplete data. Both BD & MD groups had similar demographics including age, sex, smoking history and asbestos exposure (see table 1). The median follow-up for all cases was 17.5 months.

15.5% (17/110) patients developed MD during the course of their follow-up. The median time course for diagnosing MD was 21 days.

Pre-thoracoscopy CT findings of lung parenchymal nodules/masses (MD 5/17 v BD 4/93, p-value 0.01) and pleural nodularity (MD 4/17 v BD 3/93, p-value 0.001) reached statistical significance for subsequently developing malignancy.

The MD group were more likely to have further invasive procedures than the BD group (MD 9/17 v BD 18/93, p-value 0.05) with a median time to procedure of 24 days (MD 15 v BD 34). Further procedures in the BD group concluded a benign aetiology. VATS was the next most common procedure undertaken.

In the MD group mesothelioma was the most common malignancy (35%). In the BD group the most common co-morbidities were cardiovascular (49%) and endocrine (26%).
Conclusion Majority of NSP cases follow a benign course but a significant proportion develop malignancy. Pre-thoracoscopy CT findings are important in identifying this cohort and require closer monitoring. In patients with a high pre-test probability further investigation for malignancy should not be delayed.

REFERENCE

1. Janssen J, Maldonado F, Metintas M. What is the significance of non-specific pleuritis? A trick question. *Clin Respir J* 2018;**12**(9):2407–2410. doi:10.1111/crj.12940

S8 DO PHYSICAL ACTIVITY LEVELS AND PROMS IMPROVE FOLLOWING THERAPEUTIC ASPIRATION OF PLEURAL EFFUSIONS?

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10.1136/thorax-2022-BTSabstracts.14

Patients with symptomatic pleural effusions frequently report improvement in breathlessness following therapeutic thoracocentesis (TT). The predominant patient reported outcome measure (PROM) is Visual Analogue Score for Dyspnoea (VASD). Dsypnoea-12 (D12) and Multidimensional Dyspnoea Profile (MDP) have been developed to assess multidimensional aspects of dyspnoea but remain unevaluated in pleural effusion. Objective symptom measurement in this cohort is challenging but physical activity (PA) monitoring may provide insight into patient experience.
Aims To assess D12 and MDP and record PA levels in patients with symptomatic pleural effusion before and after TT.
Methods Patients were recruited from the pleural admission avoidance clinic at North Bristol NHS Trust. Eligible patients were assessed in hospital or at home before clinic review. Baseline VASD, D12 and MDP were completed and a wrist-worn Actigraph wGT3X-BT (Actigraph Corp USA) attached then worn continuously for 5–7 days. Patients attended clinic within 48 hours and underwent TT. PROMs were repeated post-TT, and 3 days later.
Results Data has been collected on 11 patients. Mean patient age was 74.6 (SD10.7) and 64% were male. Mean pleural fluid volume removed was 1129 ml (253.7). Mean VASD difference observed was 21.3 mm (33.1) (MCID 16 mm), mean D12 score difference was 8.6 (SD 8.4) (proposed MCID 3) and mean total MDP score difference was 25.7 (SD 24.2) (mean perception score 18.0 (13.7) and mean emotion score 7.2 (12.6)). No meaningful change was observed in mean minutes spent in sedentary, light or moderate PA. However, vector magnitudes (VM) demonstrated difference between groups (pre-TT mean 846750/24 hr, post-TT mean 1308036/24 hr, two tailed t-test $p=0.00027$) with three patients showing clearly increased VM levels post-TT.
Conclusions In this dataset, PA monitoring showed a moderate increase in mean VM post-TT however patients remained predominantly sedentary, suggesting other factors may influence PA. VASD, D12 and MDP all report a score reduction greater than MCID following TT.

The already well established VASD is a reliable tool for assessing breathlessness following pleural interventions.

Further work is required to elucidate the true value of PA monitoring in pleural effusion. The D12 and MDP scores show potential for providing further insight into patient experience in this cohort.

Please refer to page A208 for declarations of interest related to this abstract.

S9 OUTPATIENT CT GUIDED LUNG BIOPSY SERVICE WITH CONSERVATIVE MANAGEMENT OF PNEUMOTHORAX

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10.1136/thorax-2022-BTSabstracts.15

Introduction The majority of CT-guided lung biopsies (CTGB) are currently performed on a day-case basis and often require a bed for short recovery. We initiated a novel outpatient CTGB service integrated with our existing conservative pneumothorax pathway aiming to improve capacity, as the CTGB service was often limited by bed availability.
Method All patients undergoing CTGB present to the registration area in CT interventional suite prior to procedure. Post-procedure they are observed in the same area and have their vitals monitored every 15 minutes, followed by a CXR at 1 hour. For normal CXR/small pneumothoraces otherwise stable, the patients were discharged home, with advice to ring our Pleural Team if they develop symptoms. For large pneumothoraces, they were observed for 4 hours and a CXR was repeated. Patients who remained stable according to the following criteria: SPO2 >90% on air, Respiratory Rate<30, Systolic BP>90 mmHg, WHO Performance Status (PS) ≤ 2, able to selfcare (or support available at home), pain controlled with regular analgesics, were discharged without any intervention on the conservative pneumothorax pathway and managed by our Pleural Team. These patients were followed up in ambulatory care setting with repeat CXRs at 24–48 hours, 1 week, 3 weeks, and 7 weeks post-procedure, or until the pneumothorax has largely resolved.
Results From March 2021 till June 2022, 112 out of 118 patients underwent CTGB. 6 patients did not have the biopsy

Abstract S9 Table 1

	Patients
Total Patients	118
Did not have procedure	6
Patients who had CTGB	112
Total No. Of Pneumothoraces	24
Mean Age (S.D.) of patients with Pneumothorax	68.75 (8.37)
Gender (N=24)	
Male	7
Female	17
Pneumothorax Size (n=24)	
Small	20
Large	4
WHO Performance status	
PS 0	15
PS 1	6
PS 2	1
PS 3	2

due to resolving lesions. 24 patients developed pneumothoraces, of which 22 qualified for conservative management and followed our conservative pathway. The 2 patients with WHO PS 3 received inpatient care as they did not meet criteria. Of the 22 patients managed conservatively, only 1 required intervention with pleural aspiration, to speed up lung reexpansion prior to thoracic surgery for lung cancer. The biopsy procedure was completed in 23 of the 24 patients who developed pneumothorax and abandoned in one patient due to breathlessness. The pathway allowed us to safely manage patients without the need of any intervention or inpatient care, and the need for a booked recovery bed was avoided entirely.

Conclusion Post-CTGB iatrogenic pneumothoraces could potentially be managed conservatively without the need for any intervention nor admission.

'Chariots of fire' – Interventions and assessment in respiratory physiotherapy

S10 THE EFFECT OF INSPIRATORY MUSCLE TRAINING IN OLDER ADULTS: A RANDOMISED-CONTROLLED TRIAL

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10.1136/thorax-2022-BTSabstracts.16

Objectives We investigated the effect of inspiratory muscle training (IMT) on inspiratory muscle strength, functional capacity and respiratory muscle kinematics during exercise in older adults.

Methods 24 older adults (age: 68.3±2.5 years) were evenly randomised into an experimental (IMT) or control (SHAM-IMT) group. Both groups performed 30 breaths, twice daily, for 8 weeks, with the IMT group training at an intensity of ~50% maximal inspiratory pressure (PImax) and the SHAM-IMT group training at an intensity of <15% PImax. Measurements of PImax, breathing discomfort (Borg scale ratings) during a bout of IMT at 50% PImax, 6MWT, accelerometry-assessed physical activity levels, and balance (mini-BEST), were assessed pre- and post-intervention. Furthermore, respiratory muscle kinematics were assessed via optoelectronic plethysmography (OEP) during constant work rate cycling at the same absolute intensity (75% predicted peak work rate) before and after training. Participant views towards the intervention were explored via interviews.

Results Inspiratory muscle strength (reflected by an increased PImax) was significantly improved in the IMT group (by 20.0 ±11.9 cmH_2O; p=0.001) but not in the SHAM-IMT group (by 2.24±9.3 cmH_2O). Breathing discomfort ratings significantly decreased (from 3.5±0.9 to 1.7±0.8) following IMT but did not change (3.6±1.0 to 3.3±1.2) in SHAM-IMT. The 6MWD increased by 18.8±28.4 m (p=0.042) in the IMT group with no change (-0.4±29.0 m) in SHAM-IMT. Sedentary time was decreased following IMT (by 28.0±39.8 min; p=0.042), and the reactive component within the mini-BEST balance was improved (by 1.2±0.8; p<0.001) in the IMT group only. OEP measures showed a significantly greater contribution of the pulmonary and abdominal rib cage compartments to the total tidal volume (V_T) expansion only in the IMT group. Older adults reported positive experiences with IMT, highlighting facilitators such as ease of use and sessions not being time-consuming.

Conclusions IMT significantly improved inspiratory muscle strength, IMT-induced breathing discomfort, and functional capacity in this population. Observations of respiratory muscle kinematics during exercise suggest greater expansion of the rib cage compartment following IMT, potentially due to a greater contribution of intercostal muscles and the diaphragm. Qualitative measures revealed that IMT is well-tolerated in healthy older adults.

S11 IMPROVEMENT OF INSPIRATORY MUSCLE AND ONE MINUTE SIT TO STAND FUNCTION ASSOCIATED WITH INTERSTITIAL LUNG DISEASES PULMONARY REHABILITATION

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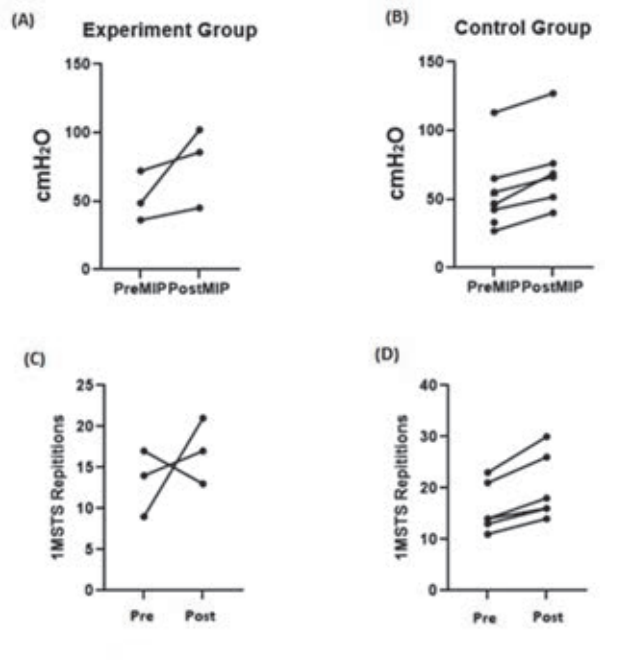
10.1136/thorax-2022-BTSabstracts.17

Introduction Inspiratory Muscle Training (IMT) have shown benefit in terms of dyspnea, quality of life, and inspiratory muscle function in patients with COPD, studies evaluating its effectiveness and role in patients with Interstitial Lung Diseases (ILD) are scant. This study aimed to evaluate the feasibility and effectiveness of IMT as part of a pulmonary rehabilitation program in patients with ILD.

Methods A feasibility study with a randomized controlled trial design. Patients with the diagnosis of ILD were randomized to either an intervention group receiving IMT with POWERBreathe® and 8 weeks of pulmonary rehabilitation program, or to a control group receiving pulmonary rehabilitation program only. The pulmonary rehabilitation program consisted of Exercise training and education sessions. The exercise training included warming up, aerobic exercises, strength training, and cooling down. Twice a week home exercises and 4 days/week walking were also prescribed. Maximum Inspiratory Pressure (MIP), One Minute Sit to Stand Test (1MSTS), The King's Brief Interstitial Lung Disease Questionnaire (K-BILD), and Fatigue Severity Scale (FSS) data were collected.



Abstract S11 Figure 1

Results A total of 14 participants with ILD, 64% male with mean (SD) age 68 years (9.39) were enrolled into this study. The pulmonary rehabilitation program had an attendance and completion rates of 86.81% and 81.82% respectively. No adverse events have been recorded. The MIP improved in all participants in the intervention and the control group. Preliminary data analysis with Mann-Whitney test indicated that there was no statistically significant difference between the intervention and control group in MIP after 8 weeks. The MIP of intervention group median (Mdn=85.7) was higher than that of the control group (Mdn=67.35), p=0.714. The 1MSTS improved in (2 out 3) and (6 out 6) in the intervention and control group respectively. A statistically significant improvement was found between pre and post 1MSTS in the control group with a median difference of (Mdn=3.5), p=0.03.There were no statistically significant difference in K-BILD and FSS.
Conclusion Pulmonary rehabilitation for patients with ILD is feasible and is associated with improved maximal inspiratory pressure and functional exercise capacity immediately after pulmonary rehabilitation program with no adverse events.

S12 EFFICACY OF A PHYSICAL ACTIVITY BEHAVIOURAL MODIFICATION TELE-COACHING INTERVENTION IN LUNG TRANSPLANT RECIPIENTS: AN INTERIM ANALYSIS

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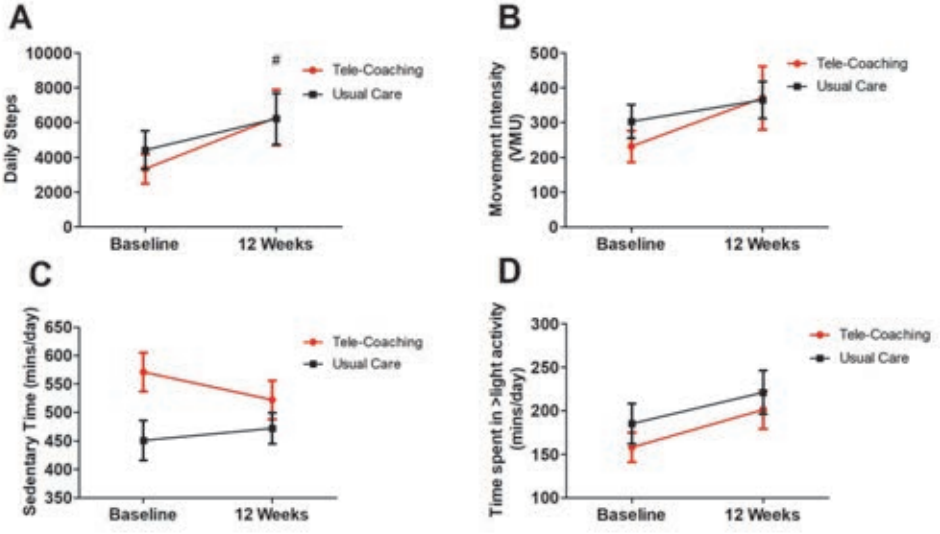
10.1136/thorax-2022-BTSabstracts.18

Introduction Despite improvements in pulmonary function following lung transplantation (LTx), physical activity levels remain significantly lower than the general population. To date, there is little research investigating interventions to improve daily physical activity in LTx recipients.
Objective To determine the potential efficacy of a novel, 12-week behavioural modification tele-coaching (TC) intervention to enhance physical activity and HRQoL in LTx recipients.
Methods In this pilot RCT, 19 LTx recipients were randomised (1:1) to TC or usual care (UC) and 17 completed (65% male; mean±SD age; 56±10 years; COPD n=5, ILD n=9, CF n=2, PH n=1): TC (n=10) and UC (n=7). TC consists of a pedometer and smartphone app, allowing transmission of activity data to a platform (Linkcare v2) that provides feedback, activity goals, education, and contact with the researcher as required. Remote assessment pre- and post-intervention includes physical activity using accelerometry (Actigraph GT3X), HADS and SF-36 questionnaire.



Abstract S12 Figure 1 A) Daily steps, B) Movement Intensity, C) Sedentary time, D) Time spent in at least light intensity activity at baseline (hospital discharge) and 12 weeks for lung transplant recipients assigned to Tele-Coaching (n=10) and Usual Care (n=7). Data are mean±SEM. #Clinically important difference between groups

Results After 12 weeks, both TC and UC groups showed significant improvements in daily steps (by 2945±3056 and 1790±1349 steps/day, respectively; $p<0.05$), however the improvement in TC exceeded UC (1155±1240 steps/day) by clinically important margins *(Demeyer et al, 2016)*. Only TC displayed significant improvements in movement intensity (by 138±148 VMU; $p=0.023$ and time spent in at least light intensity activity (by 43±28 mins/day; $p=0.002$) over 12 weeks (figure 1). Both TC and UC displayed clinically important improvements in SF-36 physical component summary scores (by 9.9±13.9 and 6.0±9.4 points, respectively), however only TC improved significantly ($p=0.031$). Additionally, there were clinically important improvements in HADS anxiety scores in the TC group (by -2±4 points), but not UC (by 0±2 points). There were no changes in SF-36 mental component summary or HADS depression scores in either group.

Conclusion LTx recipients display a degree of natural recovery in physical activity and HRQoL following LTx, however telecoaching appears to optimise improvements in these outcomes and is a promising intervention to support patients' recovery remotely.

REFERENCE

1. Demeyer, *et al*. The minimal important difference in physical activity in patients with COPD. *PLoS ONE* 2016;**11**(4):e0154587.

S13 THE VALIDITY AND RELIABILITY OF THE BREATHING VIGILANCE QUESTIONNAIRE (BREATHE-VQ)

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10.1136/thorax-2022-BTSabstracts.19

Introduction and Objectives Dysfunctional breathing (DB) is common among people with and without primary respiratory pathology. While anxiety is known to contribute to DB, the underpinning mechanisms are unclear. One likely explanation is that anxiety induces excessive conscious monitoring of breathing, which disrupts 'automatic' breathing mechanics. We aimed to validate a new patient-reported outcome measure that allows quantification of such breathing-related 'hypervigilance': the Breathing Vigilance Questionnaire (Breathe-VQ).

Methods Three-hundred-and-forty healthy adults (Mean age =27.3 years, range: 18–71; 161 men) were recruited online. The initial Breathe-VQ (11 items, 1–5 Likert scale) was adapted from the Pain Vigilance and Awareness Scale based on feedback from people with and without DB, and expert clinicians and researchers. At baseline all participants completed the Breathe-VQ, background questions, Nijmegen Questionnaire (NQ), Movement Specific Reinvestment Scale and State-Trait Anxiety Inventory (form 2). To assess test-retest reliability, two weeks later 83 people completed the Breathe-VQ again. Validation involved screening of individual items' behaviour and factor analyses, after which we estimated (retest-)reliability, measurement error, and concurrent/discriminant validity of the finalised Breathe-VQ scale.

Results We removed five items based on item-level and factor analyses. The final six-item Breathe-VQ questionnaire (score range: 6–30) showed excellent internal consistency (ICC=.810) and test-retest reliability (alpha=.892). Minimal detectable change was 6.5 on an individual level, and there were no floor or ceiling effects. Concurrent validity was excellent with significant moderate correlations with measures of general trait anxiety(*r*'s=.35-.46). Participants at high-risk of

Breathing Vigilance Questionnaire (Breathe-VQ)

Please read the sentences below and choose a number between 1 (never) and 5 (always) that best describes how you typically feel in relation to your breathing.

	Never		Sometimes		Always
1. I closely monitor how difficult my breathing feels	1	2	3	4	5
2. I become alarmed when I experience breathlessness or tightness in my chest	1	2	3	4	5
3. I am highly aware of small changes in how my breathing feels	1	2	3	4	5
4. I feel as if I am more aware of my breathing than other people	1	2	3	4	5
5. When something happens that affects my breathing, I am anxious to work out how breathless I am	1	2	3	4	5
6. I worry about fluctuations in my breathing	1	2	3	4	5

NB: Item scores are summed to yield a total score ranging from 6-30 points, with higher scores suggesting greater breathing vigilance.

Abstract S13 Figure 1

having DB (NQ>23; N=76) had significantly higher total scores on the Breathe-VQ (M=19.1, SD=5.4) than low-risk peers (N=225; M=13.8, SD=5.0) p<.001. Further, within this 'high-risk' group, Breathe-VQ scores were significantly associated with NQ-scores. Figure 1 shows the final validated Breathe-VQ.

Conclusion The Breathe-VQ is a valid and reliable tool to measure vigilance of breathing. Our data suggest that breathing vigilance may be a contributing factor in DB, and could represent a therapeutic target. Further research is now warranted using the Breathe-VQ in clinical populations of individuals with DB, chronic respiratory disease and COVID-19. Further research could assess the effects of breathing re-training, pulmonary rehabilitation and arts-in-health interventions on vigilance of breathing.

S14 PHYSIOTHERAPISTS' OPINIONS OF THE PHYSIOTHERAPY ASSESSMENT OF BREATHING PATTERN DYSFUNCTION: A QUALITATIVE STUDY

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10.1136/thorax-2022-BTSabstracts.20

Introduction Breathing Pattern Dysfunction (BPD) describes individuals whose breathing pattern is not aligned with their respiratory or metabolic requirements, resulting in breathlessness, air hunger and reduced quality of life.[1] Physiotherapy assessment is essential to ensure that patients can access effective therapy. Currently, there are no best practice guidelines to inform physiotherapists of the essential components for BPD assessments.[2]

Objectives

1. Evaluate clinicians' preferred descriptors for BPD
2. Describe the components frequently included in a patient assessment
3. Explore physiotherapists' understanding of the assessment of BPD

Methods A 24-item survey was developed and distributed via social media and emailed to UK specialist physiotherapy interest groups. Two semi-structured focus groups, including open-ended discussion points, were subsequently completed with 15 specialist physiotherapists. Survey information was collated as percentages and focus groups transcribed verbatim before a thematic analysis was completed.

Results 103 physiotherapists completed the survey, which identified a lack of consensus in how to define BPD, but some agreement on the components to include in assessment (figure 1). Three main themes resulted from the focus groups. Participants expressed frustration with inconsistency of terms used to describe the condition (1. Nomenclature and Language) and felt that BPD sat within the broader concept of breathlessness as an important component of breathlessness assessment (2. BPD and Breathlessness). The importance of physiotherapy assessment was discussed as being an important part of the therapy and recovery itself (3. Value of assessment). Assessment of BPD was discussed as a specialist skill, and important in patients' validation of their symptoms. However, there was lack of agreement of the assessment methods and importance of diaphragm assessment.

Conclusion This novel qualitative clinician-focused investigation of BPD assessment provides valuable insights into physiotherapists' assessment preferences and will be important when designing clinical practice guidance for BPD Assessment. Patient perceptions will provide a deeper understanding of BPD and its assessment.

Abstract S14 Table 1 Survey results for the preferred term to describe this condition

Term	Percentage %
Breathing Pattern Disorder	43%
Dysfunctional Breathing	39%
Breathing Pattern Dysfunction	14%
Hyperventilation	4%

REFERENCES

1. Vidotto LS, Carvalho CRF de, Harvey A, Jones M. Dysfunctional breathing: what do we know? *Jornal Brasileiro de Pneumologia* 2019;**45**(1).
2. Todd S, Walsted ES, Grillo L *et al*. Novel assessment tool to detect BPD in patients with refractory asthma. *Respirology* 2018;**23**(3).

'Hot shots!' – what's hot in cough?

S15 EFFICACY OF ORAL NALBUPHINE EXTENDED RELEASE FOR THE TREATMENT OF CHRONIC COUGH IN IDIOPATHIC PULMONARY FIBROSIS: ANALYSIS OF A PHASE 2 STUDY

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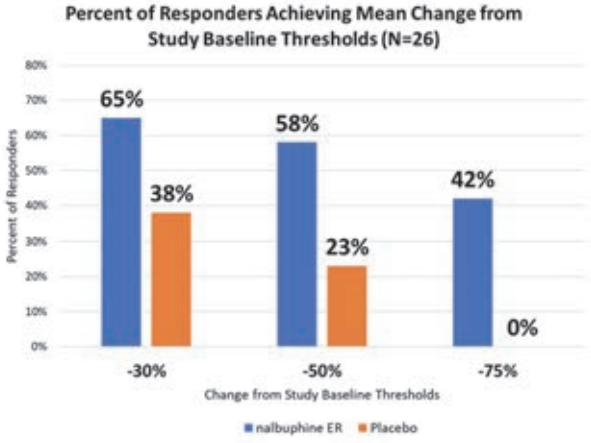
10.1136/thorax-2022-BTSabstracts.21

Introduction and Objective Most patients with idiopathic pulmonary fibrosis (IPF) are affected by chronic cough causing physical, emotional, and psychological stress. Cough has also been hypothesised as potential driver of the underlying fibrotic process. Currently, no effective treatment for cough in IPF exists. Mixed opioid agonists/antagonists may reduce chronic cough by pharmacologically acting on the opioid system at both the peripheral and central nervous system level. We



Abstract S15 Figure 1

report the interim analysis of a phase 2 study of an extended-release (ER) oral formulation of the dual-acting κ-opioid receptor agonist/μ-opioid receptor antagonist nalbuphine (NAL) for IPF-related chronic cough (NCT04030026).

Methods The study was a randomised, double-blind, placebo-controlled crossover trial comprising two 22-day treatment periods (Period 1: NAL ER-placebo; Period 2: placebo-NAL ER) separated by a 2-week washout. Adult patients diagnosed with IPF and chronic cough (duration >8 weeks) were enrolled. Eligible patients were randomised to either NAL ER or placebo. The starting dose of NAL ER 27 mg once daily was titrated to NAL ER 162 mg twice daily at Day 16. The primary endpoint was the mean percent change from baseline in daytime hourly cough frequency as measured by an objective digital monitor (VitaloJAK®) and analysed with a mixed-effects model. A patient-reported outcome instrument (EXACT2) was used to assess daily cough frequency.

Results 45 patients were screened, and 32 were enrolled/randomised; the Period 1 full analysis set comprised 26 patients. Patients were primarily male, mean age 72 years, and with daytime cough frequency of 31/hour. Reduction in hourly cough frequency from baseline to Day 22 was 77.3% with NAL ER vs 25.7% for placebo (51.6% placebo-adjusted difference; $p<0.0001$). Overall, 42% of NAL ER-treated patients (vs 0% for placebo) achieved a 75% reduction in cough frequency (figure 1). Preliminary analysis of EXACT2 shows patient-reported cough frequency to be consistent with VitaloJAK® data, and indicates early improvement with NAL ER vs placebo. No new safety signals related to nalbuphine were identified when compared to previous human clinical trial data.

Conclusions In this interim analysis of phase 2 data, NAL ER shows a significant reduction in IPF-related hourly daytime chronic cough frequency vs placebo.

Please refer to page A208 for declarations of interest related to this abstract.

S16 REMOTE CONTROL: REAL WORLD EFFECTIVENESS OF VIRTUAL, GROUP-DELIVERED SPEECH AND LANGUAGE THERAPY FOR CHRONIC REFRACTORY COUGH

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10.1136/thorax-2022-BTSabstracts.22

Introduction Specialist speech and language therapy (SLT) has an established role in the treatment of chronic refractory cough. Therapy delivered in a group format has been shown previously to reduce cough severity1. Attendance in person, however, was interrupted by the coronavirus pandemic. This work reports the effectiveness of a virtual, SLT-led cough therapy group (VCTG).

Method Eligible patients referred between January-June 2022 from two specialist cough clinics were invited to join VCTG. The group comprised of four sessions at weekly intervals, with a review at week 10. Group size ranged from 3–8 patients; sessions were run via Microsoft Teams. Patients were asked to complete a visual analogue scale (VAS) for cough severity (anchored by 'no cough' to 'worst cough ever') and self-belief in controlling their symptoms ('no self-belief' to 'complete self-belief') and the Leicester Cough Questionnaire (LCQ) at weeks 1, 4 and 10. Patients had the opportunity to provide qualitative feedback on their experience in the group.

Results Twenty-eight patients ($n=24$ female, 85.7%) aged between 29 and 78 ($M=55$) attended VCTG. Fifteen patients completed all outcome measures at weeks 1 and 4; data from week 10 are pending. From weeks 1 to 4, there was a reduction in mean cough severity (63.2% to 36.6%), an increase in mean self-belief (37.3% to 60.2%), and an increase in LCQ scores (9.6 to 12) following group attendance. The predominant theme from qualitative feedback was the value of meeting other people with CRC and not feeling alone.

Conclusions Online delivery of group SLT sessions is effective in improving symptoms of CRC and in facilitating valuable support between group members. Patients felt better equipped to control their cough with reductions in cough severity and in the impact on psychosocial and physical wellbeing. Future work is needed to optimise completion of outcome measures and to examine long-term maintenance of improved symptom control.

REFERENCES

1. Selby J, Bailey E, Gillies F, Hull JH. Time to re-group: a novel approach to the delivery of speech and language therapy for chronic refractory cough. *Thorax* 2017;**72**:A141.

S17 A RELEVANT DEFINITION OF COUGH BOUTS

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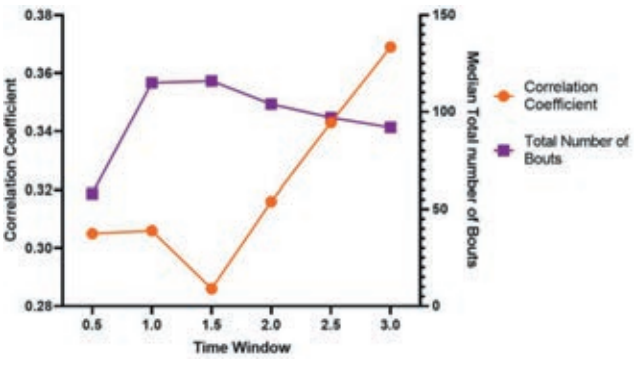
10.1136/thorax-2022-BTSabstracts.23

Introduction and Objectives Patients identify coughing 'fits' or 'bouts' as a key component of cough severity along with cough frequency, intensity and disruption of daily activities. Cough bouts have previously arbitrarily been defined as sequential coughs, each occurring within a 2-second window of the previous cough. With patterns of coughing potentially important in the interpretation of cough frequency data, a definition of bouts with clinical relevance is needed.

Methods A previously collected dataset of 24 hr recordings from refractory chronic cough patients with cough positions marked was re-analysed. Using a validated custom-written algorithm, cough bouts (≥2 coughs) were quantified using a range of increasing time intervals (0.5s, 1.0s, 1.5s, 2.0s, 2.5s and 3.0s) to define bouts within the individual datasets. The total number of bouts under each condition was then correlated with a cough severity visual analogue score (VAS), collected from the participant at the time of the recording, using a Spearman's Rank Correlation. Single coughs were not



Abstract S17 Figure 1 Correlation coefficient of total bouts and VAS, and median number of bouts calculated at each time window

included in the total number of bouts, but the influence of including these was assessed.

Results Cough data from 47 chronic cough patients was analysed. The correlation between the median number of individual cough sounds and VAS was r=0.31, p=0.04. The median number of bouts, and the correlation coefficient with the VAS are shown in figure 1. All correlations were significant (p<0.05), aside from the 1.5s window (p=0.06). The 3s window gave the best correlation coefficient (0.369, p=0.014). The inclusion of single coughs (added to the number of bouts) weakened the correlations for all cough bout definitions (all p>0.05).

Conclusions These data suggest that total cough bouts defined by longer time windows better reflect patient perceived cough severity. The commonly used 2s window may not be optimal if the goal is to reflect the impact of cough bouts on patients and further analysis of longer windows is required.

S18 DESCRIBING THE TRIGGERS AND SENSATIONS ASSOCIATED WITH COUGHING ACROSS DIFFERENT DISEASE GROUPS

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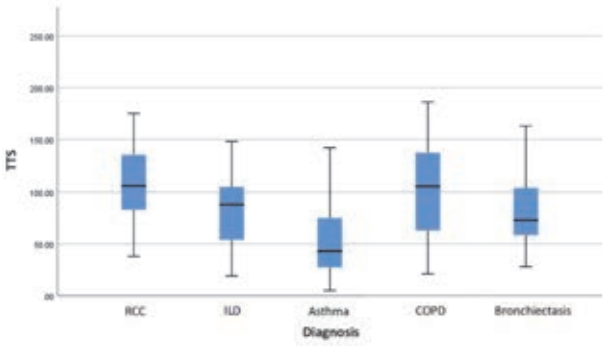
10.1136/thorax-2022-BTSabstracts.24

Introduction Patients with Refractory Chronic Cough (RCC) frequently describe somatic sensations which trigger coughing. However, there are no current tools to quantify or aid description of these sensations and their response to antitussive therapy. The Sensations Provoking Cough (TOPIC) questionnaire quantifies the sensations and triggers of cough.

Objectives To report the pattern of cough sensations and provocations across a variety of respiratory conditions through total TOPIC score (TTS), to design a shorter novel questionnaire with potential diagnostic significance.

Method Adult patients with RCC, interstitial lung disease (ILD), asthma, chronic obstructive pulmonary disease (COPD) and bronchiectasis were recruited to complete the TOPIC questionnaire (49 items,0–5 score range), St George's Respiratory Questionnaire (SGRQ) and Cough Severity Diary (CSD). A subset of patients completed repeat TOPIC questionnaires 5–7 days later with a Global Rating of Change to assess repeatability.

Results 167 patients (median age 62 years [range 19–88], 55.1% female) were enrolled (n=49 RCC, n=46 ILD, n=45 asthma, n=12 COPD, n=15 bronchiectasis). Patients with RCC had significantly higher median TTS than patients with ILD (106 vs 88, p=0.015) and asthma (106 vs 43, p<0.001), and a non-statistically significant higher median TTS than patients with bronchiectasis (106 vs 73, p=0.71; figure 1). TTS correlated with CSD across all groups (RCC R=0.539, p=0.001, ILD R=0.684, p<0.001, asthma R=0.608 p<0.001, COPD R=0.641, p=0.025, bronchiectasis R=0.597, p=0.031). TTS negatively correlated with forced vital capacity (%) in the ILD (R=-0.39, p=0.02) and bronchiectasis (R=-0.68, p=0.042) groups and forced expiratory volume (FEV1%) in the COPD group (R=-0.81, p=0.05). Intraclass correlation was significant for repeat TTS (Cronbach's Alpha=0.947, p<0.001).



Abstract S18 Figure 1 Box and Whisker plot demonstrating median (IQR) TTS results by disease group

Conclusions Our data suggests patients with RCC have higher levels of somatic sensations than cough associated with ILD and asthma. Higher than expected TTS in this COPD cohort was likely due to high rates of current smokers (n=7/12) and disease severity (median FEV1% 53.5 [IQR 33–59]). Differences in TTS between groups suggest that somatic sensations may vary according to pathophysiological mechanisms. The TOPIC questionnaire is highly repeatable. Further sub-analysis of TTS between groups will assist item reduction to create a novel questionnaire with potential diagnostic significance.

S19 USE OF SPUTUM EOSINOPHILS TO HELP GUIDE MANAGEMENT IN A TERTIARY REFERRAL COUGH CENTRE

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10.1136/thorax-2022-BTSabstracts.25

Introduction Patients suffering from refractory chronic cough often present with symptoms attributable to co-morbidities including asthma, Gastro-Oesophageal Reflux Disease, Intermittent Laryngeal Obstruction, eosinophilic bronchitis. Teasing out respective contribution takes several months and sometimes requires bronchoscopy with associated risk to patients and cost implications. Inflammation and infection are treatable traits in chronic cough. Sputum assessment including differential cell count (DCC) might help tailor management for those patients with normal FeNO, blood eosinophils count and in whom bronchoscopy is not indicated.

Aims To assess if sputum eosinophils and neutrophils measurement leads to a change in clinical management of cough patients.

Methods Patients with refractory chronic cough for whom bronchoscopy was not indicated, and who were able to produce sputum (spontaneously or by induction) were referred for airway inflammation assessment. Clinical diagnosis, medication, blood eosinophils, FeNO, IgE, sputum DCC, cough scores (0–10: 0=no cough; 10=worst possible cough) and outcome of clinical management post DCC were recorded.

Results Fourteen patients provided sputum samples (1 induced), one of which provided a follow-up sample (table 1). Half of the patients referred for sputum DCC had a clinical contra-indication to bronchoscopy (high blood pressure (n=3), myocardial infarction (n=1), airways collapsibility (n=1), allergy to lidocaine (n=1).

Abstract S19 Table 1 Patients demographics and results of clinical investigations including sputum DCC

	Unit	*n*	median or mean	IQR(Q1-Q3) or SD
Gender	% Female	14	79	-
Smoking status	% Never/ex/current	14	64/36/0	-
BMI	kg/m^2	10	26	24 - 31
Pre-DCC cough score	(0: no cough 10: worst cough)	12	7	1.9
Blood Eosinophils	10^9 cells/L	7	0.18	0.12 - 0.30
FeNO	ppb	8	20	14.5 - 24.5
IgE	kU/L	8	36.15	19.9 - 324
FEV1	L	12	2.41	1.05
Predicted FEV1	Percentage	12	94.3	23.3
FEV1/FCV ratio	percentage	12	75	63.5 - 77.0
Sputum Neutrophils	% DCC	15	64.5	53 - 70.5
Sputum Eosinophils	% DCC	15	1.75	0 - 6.75

(BMI: Body Mass Index, DCC: Differential Cell Count, SD: Standard Deviation; FeNO: Fractionated Exhaled Nitric Oxide, IgE: Immunoglobulin E; FEV1: Forced Expiratory Volume in 1 second, FVC: Forced Vital Capacity; IQR: Interquartile range: Q1: first quartile, Q3: third quartile)

Sputum DCC supported a change in diagnosis and/or management in all patients: Clinical diagnosis was changed for 6 patients (Eosinophilic bronchitis added (3), ILD and ILO added (1 each), asthma ruled out (1)), one patient was discharged. Ninety-three percent of sputum DCC (14/15) resulted in a change in therapy (ICS/OCS (n=4), azithromycin (n=9), Hypertonic saline (n=1)). Over half (n=7) of the 13 patients who rated/scored their cough post DCC reported an improvement in cough symptoms following a change in therapy supported by sputum assessment.

Conclusions Clinical management or diagnosis was adjusted for 100% patients post DCC with cough improvement for half of them.

Sputum DCC investigation should be considered in addition to routine culture in patients with refractory chronic cough where inflammation is suspected and can provide a useful alternative when bronchoscopy is not indicated.

S20 SUICIDAL IDEATION, DEPRESSION AND ANXIETY IN CHRONIC COUGH

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10.1136/thorax-2022-BTSabstracts.26

Introduction Chronic cough is associated with significant psychosocial co-morbidities. We investigated the prevalence of suicidal ideation, depression and anxiety and their relationship with cough severity.

Methods Consecutive patients with chronic cough at a specialist clinic prospectively completed Patient Health Questionnaire (PHQ9) for depression and suicidal ideation, Generalised Anxiety Disorder Assessment (GAD7), cough severity and intensity visual analogue scales (VAS), Leicester Cough Questionnaire (LCQ), Patient Global Impression of Severity (PGIS) of cough, and objective cough frequency (CF) assessed with Leicester Cough Monitor. Suicidal ideation was defined as score >0 on item 9 of PHQ9. Case notes were reviewed for clinical characteristics.

Results 339 participants completed the assessments; 104 (31%) and 69 (21%) reported symptoms of at least moderate severity of depression and anxiety (PHQ9 and GAD7 $\geq$10) respectively. Suicidal ideation was reported in 36 (11%) and was associated with younger age, worse cough severity and intensity VAS, LCQ, PGIS, total PHQ9 and total GAD7 scores (table 1).

Depression and anxiety symptoms were associated with cough severity VAS (r=0.41; r=0.31) and LCQ (r=-0.58; r=-0.46) all p<0.0001 respectively, but not with sex, diagnosis, cough duration or objective CF (all p>0.16). Female patients had worse LCQ, VAS and PGIS scores, and higher CF than males (all p<0.017). There was no difference in total PHQ9, GAD7 or suicidal ideation (all p>0.44) between the sexes.

Conclusion Suicidal ideation and symptoms of depression and anxiety are common in chronic cough, and are associated with cough severity and cough-specific health status. Further studies should investigate the direction of the relationship between psychological morbidity and chronic cough, and effective therapies.

Abstract S20 Table 1 Clinical characteristics of chronic cough patients with and without self-reported suicidal ideation

	Total (n=339)	No Suicidal Ideation (n=303, 89%)	Suicidal Ideation (n=36, 11%)	p-value*
Age, years	57 (45–67)	58 (46–68)	52 (34–61)	**0.014**
Female	249 (73)	223 (90)	26 (10)	0.44[#]
Duration, months	48 (24–120)	48 (24–120)	31 (12–120)	0.13
BMI	28 (24–32)	27 (24–32)	29 (25–32)	0.27
Diagnosis				
Refractory Chronic Cough	140 (41)	121 (86)	19 (14)	0.39[^]
Unexplained Chronic Cough	146 (43)	131 (90)	15 (10)	0.39[^]
Other Respiratory Condition	22 (6)	20 (91)	2 (9)	
Resolved Cough	31 (9)	31 (100)	0	
Cough outcomes				
Severity VAS, mm	51 (31–73)	51 (31–72)	70 (43–81)	**0.024**
Intensity VAS, mm	52 (31–74)	51 (31–71)	67 (40–84)	**0.036**
LCQ	11.4 (8.6–14.6)	11.64 (9–15)	8.6 (6–11)	**<0.0001**
Objective CF, coughs·hr^{-1} [§]	18 (2.1)	18 (2.2)	18 (2.1)	0.91
Cough PGIS	3 (3–4)	3 (2–4)	4 (3–4)	**0.0005**
Depression and Anxiety				
PHQ9	5 (2–11)	4 (2–9)	17 (14–21)	**<0.0001**
GAD7, n= 327	3 (0–8)	2 (0–6)	11 (6–16)	**<0.0001**

Values expressed as n(%) or median (IQR), unless specified otherwise;
* p-values compare suicidal ideation vs not, unless specified otherwise
[#] Male vs female suicidal ideation
[^] Refractory vs Unexplained cough suicidal ideation
[§] Values expressed as geometric mean (SD), n=59

'Edge of tomorrow' – Optimising thoracic cancer diagnosis and follow up

S21 TARGETED LUNG HEALTH CHECK ASSOCIATED LUNG CANCER FAST TRACK CLINIC DATA ANALYSIS FROM A MAJOR TEACHING HOSPITAL IN NORTHWEST UK

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10.1136/thorax-2022-BTSabstracts.27

Introduction The new revolutionary Targeted Lung Health Checks (TLHC) program in England is aimed at improving early diagnosis and survival for those diagnosed with cancer. National Lung Screening Trial in the United States showed that screening was associated with a 20% reduction in mortality from lung cancer among people with a history of heavy smoking.[1]

Objectives and Methodology Individuals who have ever smoked and are between ages 55 to 75 years were initially invited for a free lung check and those assessed as high risk were offered a low dose computerised tomography (LDCT) scan based on which they were further referred to the fast track clinic (FTC). We analysed the data of participants referred to our FTC between August 2021 to January 2022.

Results 2499 individuals completed lung health checks between Aug 2021 and Jan 2022 out of which 1295 underwent LDCT out of which 59 were suspicious of malignancy and referred to our FTC. 32 (54.23%) were diagnosed to have malignancy. Of these 28 had pathology proven lung cancer of which 15 (55.56%) were adenocarcinoma. 1 had lung metastasis from other primary and 3 were clinically considered for (SABR) treatment (1 was deemed unfit and 2 refused surgical intervention).

Analysis noted a male predominance (61%) but cancer detection rate of 73.91% in females. 76.27% patients were above 65 years age. 69% had performance status of zero. 71.42% cases were early stage (1 and 2) cancers. 15.25% were found not to have malignancy. 15 (25.42%) are under CT surveillance for lung nodules. There have been 3 deaths, two due to advanced malignancy and one due to stroke. The average time from FTC to diagnosis was 58.75 days, with minimum being 5 days.

Conclusion Our preliminary evaluation of the cases showed encouraging signs towards reaching the NHS long term plan target of 75% of cancers to be diagnosed in the early stages 1 and 2. Currently it is only 27% leading to a 10 year survival rate of only 10%.[2] Further periodic evaluation is ongoing.

REFERENCES

1. *N Engl J Med* 2011; **365**:395–409 DOI: 10.1056/nejmoa1102873
2. https://crukcancerintelligence.shinyapps.io/EarlyDiagnosis/

S22 THE INCIDENCE OF MALIGNANCY IN A PROSPECTIVE OBSERVATIONAL STUDY ON INCIDENTAL PULMONARY NODULES (IDEAL STUDY)

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10.1136/thorax-2022-BTSabstracts.28

Introduction and Objectives Lung cancer remains the leading cause of cancer mortality worldwide, with a known reduced mortality when diagnosed at an early stage. Approximately 2–4% of pulmonary nodules identified on CT as part of Lung Cancer Screening (LCS) programmes are due to lung cancer.

Our prospective observational study, *Artificial Intelligence and Big Data for Early Lung Cancer Diagnosis Prospective Study (Phase 2) – IDEAL study*, aimed to test the use of an Artificial Intelligence (AI) algorithm, the Lung Cancer Prediction Convolutional Neural Network (LCP-CNN) model incorporated into a clinical risk model to better characterise incidental pulmonary nodules. Here we are reporting on the incidence of malignant nodules discovered incidentally on CT in the UK performed outside of a LCS programme.

Methods Participants aged 18 years or older with new 5–15 mm solid or predominantly solid pulmonary nodules reported on CT were recruited from four NHS hospital trusts between August 2018 and March 2021. Patients with a known history of extra-thoracic malignancy and ground-glass opacities were excluded. The clinical management of the nodules was determined according to the BTS Pulmonary Nodule Guidelines and the Brock Risk Model calculator, with the nodules categorised into:

Group 1 – Benign requiring no further follow up

Group 2 – Indeterminate requiring further CT follow up

Group 3 – Potentially malignant being referred to lung MDT

The final diagnosis was Benign - if categorised as Group 1, or no growth at 2 years, or Malignant – if proven histologically, or following determination at a Lung Cancer MDT using the Herder risk if a PET-CT had been performed.

Results 1102 patients with 1685 nodules were included in this analysis. 40/1102 (3.63%) patients had malignant nodules with one patient having two synchronous malignant nodules. Of the malignant nodules 41/1685 (2.43%), 39 were primary lung cancers, with adenocarcinoma being the most common histological type. 11/1685 (0.65%) of the nodules were diagnosed as malignant on their presentation CT, with 30/1685 (1.78%) being diagnosed as malignant on subsequent follow-up scans.

Conclusions The rate of malignancy in incidental CT-identified pulmonary nodules in IDEAL, and investigated according to the BTS Guidelines, is approximately 2.5%, of which 93% are early-stage lung cancers.

Abstract S22 Table 1 Characteristics of the 41 malignant nodules

Mean participants' age (Range)	71.8 (50 – 90)	Type of cancer	
No. of current/ex-smokers	33	Adenocarcinoma	14 (34.2%)
		Squamous cell carcinoma	7 (17.1%)
No. of male participants	24 (58.5%)	Carcinoid	2 (4.9%)
No of female participants	17 (41.5%)	Neuroendocrine	1 (2.4%)
		Metastasis from extra-thoracic	2 (4.9%)
Cancer diagnosis on initial presentation	11 (26.8%)	MDT diagnosis of lung cancer without histology	15 (36.6%)
Cancer diagnosis on follow up	30 (73.2%)		
		Lung cancer-related death	1 (2.4%)

S23 EFFECTIVENESS OF A RISK-STRATIFIED CLINICAL & IMAGING SURVEILLANCE PROTOCOL (LNC-PATH) FOLLOWING SURGICAL RESECTION OF LUNG CANCER

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10.1136/thorax-2022-BTSabstracts.29

Introduction Greater Manchester (GM) has implemented a standardised, risk-stratified follow-up protocol after surgical resection of lung cancer (LNC-PATH protocol) which de-intensifies surveillance in low-risk patients and intensifies surveillance in high-risk patients.[1] This evaluation assessed the clinical effectiveness of this protocol.

Methods A prospective analysis of the LNC-PATH protocol at a single centre physician-led survivorship service. Clinical effectiveness was assessed by the overall proportion of disease recurrences, proportion of disease recurrences detected through the standardised protocol, the pattern of disease recurrence and the subsequent treatment delivered stratified by risk category in the period between 01/01/2016 and 31/12/2019. We also analysed the site of disease recurrence identified outside the protocol.

Results 250 patients under risk stratified surveillance in the study period; 70% (176/250) of patients were low-risk, 22% (54/250) moderate-risk and 8% (20/250) high-risk (table 1). Overall, 15% (38/250) of patients were diagnosed with disease recurrence within the first two years of surgical resection; 8% (14/176) in the low-risk, 24% (13/54) in the moderate-risk and 55% in the high-risk group (11/20). The LNC-PATH protocol identified 71% (27/38) of disease recurrences through routine surveillance; 57% (8/14) in the low-risk, 69% (9/13) in the moderate-risk and 91% (10/11) in the high-risk groups. 56% (15/27) of patients with disease recurrence detected via LNC-PATH had isolated local or thoracic lymph node recurrence. A total of 56% (15/27) patients underwent curative-intent treatment of disease recurrence and 78% (21/27) of patients underwent any treatment for anti-cancer therapy. In the 11 patients (6/11, 4/11 and 1/11 in low, moderate and high-risk groups respectively) that presented with symptomatic disease recurrence outside of the LNC-PATH protocol, 55% (6/11) were intra-cranial recurrence and 45% (5/11) were visible on a CT chest and upper abdomen.

Discussion The LNC-PATH protocol appears to accurately stratify patients into different categories of risk for disease recurrence allowing an appropriate de-intensification or intensification of surveillance and maximising the efficiency of healthcare utilisation. The protocol also appears to identify a high proportion of disease recurrence prior to symptomatic onset and facilitates access to anti-cancer treatment including curative-intent treatment.

REFERENCE

1. https://gmcancer.org.uk/wp-content/uploads/2021/10/greater-manchester-risk-stratified-follow-up-after-lung-cancer-surgery-p....pdf

S24 OPTIMISING THE RADIOLOGICAL SURVEILLANCE OF LUNG CANCER FOLLOWING SURGICAL RESECTION

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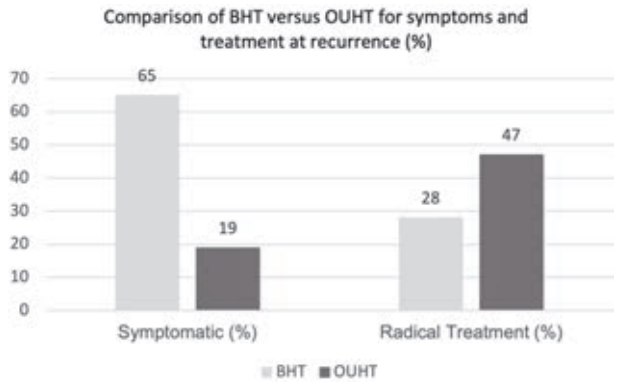
10.1136/thorax-2022-BTSabstracts.30

Introduction Patients undergoing surgical resection of primary lung cancer require surveillance, as they are at risk of recurrence. There are no national guidelines on optimal surveillance for these patients. The BTS and NICE advise trusts to follow local protocols. The Buckinghamshire Healthcare Trust (BHT) surveillance protocol encompasses a chest x-ray 6 monthly for 5 years, and 12, 24 and 60 month CT scans. The Oxford University Healthcare Trust (OUHT) protocol outlines exclusive CT chest at 6, 12, 18, 24, 36, 48 and 60 months. We compared the patient outcomes from the two protocols with an aim to identifying the optimal method for surveillance.

Methods Retrospective data was collected from 227 Buckinghamshire lung cancer patients post-surgical resection between 01/01/2015 and 30/06/2021. Data collection included: time from surgery to recurrence, symptomatic Vs asymptomatic recurrence and initial treatment given. Mitchell et al, 2020[1]

Abstract S23 Table 1 Clinical outcomes for patients undergoing risk-stratified follow-up after lung cancer resection using the LNC-PATH protocol

			Low risk LNC-PATH	Moderate risk LNC-PATH	High Risk LNC-PATH
Number of patients			176/250 (70%)	54/250 (22%)	20/250 (8%)
Recurrence rate			14/176 (8%)	13/54 (24%)	11/20 (55%)
Recurrence detected via risk stratified protocol			8/14 (57%)	9/13 (69%)	10/11 (91%)
Recurrence detected outside of risk stratified protocol			6/14 (43%)	4/13 (31%)	1/11 (9%)
Recurrence detected via routine surveillance	Pattern of recurrence	Local recurrence	1/8 (12.5%)	2/9 (22%)	3/10 (30%)
		Nodal Recurrence	3/8 (37.5%)	3/9 (33%)	3/10 (30%)
		Distant recurrence	4/8 (50%)	4/9 (44%)	4/10 (40%)
	Treatment of recurrence	Curative-intent treatment	5/8 (63%)	6/9 (67%)	4/10 (40%)
		Palliative-intent treatment	2/8 (25%)	1/9 (11%)	3/10 (30%)
		Best supportive care	1/8 (12%)	2/9 (22%)	3/10 (30%)
Recurrence detected outside of protocol	Pattern of recurrence	Local recurrence	2/6 (33%)	2/4 (50%)	0/1 (100%)
		Nodal Recurrence	0/6 (0%)	0/4 (0%)	0/1 (100%)
		Distant recurrence	4/6 (67%)	2/4 (50%)	1/1 (100%)
	Treatment of recurrence	Curative-intent treatment	3/6 (50%)	2/4 (50%)	1/1 (100%)
		Palliative-intent cancer therapy	2/6 (33%)	0/4 (0%)	0/1 (0%)
		Best Supportive Care	1/6 (17%)	2/4 (50%)	0/1 (0%)



Abstract S24 Figure 1

published data on 331 Oxford lung cancer patients with surgical resection between 01/01/2013 and 31/03/2017. This retrospective study reviews and compares patient outcomes from the two surveillance protocols.

Results Recurrence was detected in 37% of BHT and 22% of OUHT patients. Recurrence was symptomatic in 65% of BHT patients and only 19% of OUHT. In both groups, asymptomatic patients were more likely to be offered radical treatment, implying that symptoms at recurrence indicate more advanced disease. The OUHT protocol was more effective at detecting recurrence at an asymptomatic stage which suggests that exclusive CT surveillance detects recurrence sooner. Radical treatment was offered to 47% in OUHT and 28% in BHT, suggesting CT exclusive surveillance provides better treatment options at recurrence.

Conclusion This retrospective study reviews two approaches to surveillance. We conclude that CT exclusive surveillance detects cancer recurrence earlier, where more patients are asymptomatic and have more curative treatment options. On this basis, the BTS/NICE should develop national guidance advocating the use of CT surveillance.

REFERENCE

1. Mitchell J, Benamore R, Gleeson F, Belcher E. Computed tomography follow-up identifies radically treatable new primaries after resection for lung cancer. *European Journal of Cardio-Thoracic Surgery*. doi:10.1093/ejcts/ezz284

S25 REFLECTING REAL-WORLD PATIENTS IN MESOTHELIOMA RESEARCH: A PRE-SPECIFIED INTERIM REPORT FROM THE PRAGMATIC, PROSPECTIVE, OBSERVATIONAL ASSESS-MESO COHORT

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10.1136/thorax-2022-BTSabstracts.31

Introduction & Objectives Mesothelioma is a heterogenous disease with variable phenotype and survival. Clinical trials are often affected by selection bias, which can reduce generalisability. ASSESS-meso is a UK, multi-centre, prospective, longitudinal, mesothelioma cohort study (ISRCTN61861764). This pre-specified interim analysis, conducted when recruitment reached 25% of target, summarised participant characteristics and evaluated external validity through comparison with real-world and clinical trial cohorts.

Methods The study took place at 14 hospitals across the UK. People with mesothelioma at any anatomical site whose diagnosis had been confirmed at MDT were eligible. Clinical, radiological and biochemical data were collected at enrolment, alongside patient-reported symptom scores. The primary outcome for the overall study is survival. In this interim report,

Abstract S25 Table 1 Characteristics of ASSESS-meso cohort compared with patients from the National Mesothelioma Audit 2020 report, and two recent front-line clinical trial populations

	ASSESS-meso	National Mesothelioma Audit	MAPS	CHECKMATE -743
Number of participants	244	6,950[†]	448	605
Age – yrs, median (IQR)	74.0 (70.0–79.0)	76.0 (70.0–82.0)	65.7 (61.3–70.2)	69.0 (64.0–75.0)
Sex – n (%)				
Male	195 (79.9)	5,790 (83.3)	338 (75.4)	467 (77.2)
Female	49 (20.1)	1,160 (16.7)	110 (24.6)	138 (22.8)
Performance status – n(%)				
0	53 (21.7)	1,055 (15.2)	433 (96.7)*	242 (40.0)
1	108 (44.3)	2,518 (36.2)		362 (60.0)
2	28 (11.5)	1,093 (15.7)	15 (3.3)	0
3	5 (2.0)	785 (11.3)	0	0
4	0	151 (2.2)	0	0
Missing/ Unknown	50 (20.5)	1,347 (19.4)	0	0
Smoking –%				
Smoker (Ex/ Current)	77 (31.6)	-	254 (56.7)	344 (56.9)
Never	53 (21.7)	-	194 (43.3)	261 (41.2)
Unknown/ Missing	114 (46.7)	-	0	2.0
Site –%				
Pleural	233 (95.1)	6,950 (96.4)[§]	448 (100)	605 (100)
Non-pleural	11 (4.9)	260 (3.6)[§]	0	0
Missing	0	0[§]	0	0
Histology –%				
Epithelioid (inc cytological)	182 (74.6)	2,954 (42.5)	361 (80.6)	456 (75.4)
Sarcomatoid/ Desmoplastic	25 (10.2)	688 (9.9)		71 (11.7)
Biphasic	16 (6.6)	-	87 (19.4)**	78 (12.9)
Mesothelioma NOS	5 (2.0)	3,259 (46.9)	0	0
Unknown/ Missing	16 (6.5)	49 (0.7)	0	0
Stage				
1	87 (35.6)	1,206 (17.4)	-	32 (5.3)
2	17 (7.0)	456 (6.6)	-	45 (7.4)
3	66 (27.0)	1,450 (20.9)	-	209 (34.5)
4	21 (8.6)	1,433 (20.6)	-	309 (51.1)
Non-pleural disease	11 (4.5)	-	-	-
Unknown/Not staged	42 (17.2)	2,405 (34.6)	-	10 (1.7)

*PS0–1 reported combined
**sarcomatoid and biphasic reported combined
[†]Demographics reported for pleural mesothelioma
[§]Total n=7,210, including peritoneal mesothelioma

baseline patient, tumour and disease characteristics were described and explored for associations with survival. The external validity of the cohort population was investigated through comparison with data from the 2020 UK National Mesothelioma Audit (real-world cohort), CHECKMATE-743 and MAPS trials (clinical trial cohorts).

Results Between 07/04/2017–01/03/2022, 244 patients enrolled. The cohort was predominantly male (195/244; 80%) with median age of 74. Pleural disease and epithelioid sub-types were most prevalent, consistent with established data. Higher performance status, non-epithelioid histology and neutrophil-lymphocyte ratio were associated with shorter survival in the adjusted analysis. Brims score predicted prognostic group. When compared with other populations, ASSESS-meso participants were closer in similarity to the real-world population with regards age, performance status, disease site and stage than clinical trial population were. ASSESS-meso participants were more likely to be formally staged and less likely to have undifferentiated histology compared with the real-world cohort, which may reflect the high rates of discussion of ASSESS-meso participants at regional mesothelioma MDTs.

Conclusion ASSESS-meso is representative of the UK mesothelioma population. Future outputs from the cohort will help characterise the different mesothelioma phenotypes with high external validity. Stored biological samples provide an opportunity to explore biomarkers of response and progression, and enhance understanding of tumour biology.

Please refer to page A208 for declarations of interest related to this abstract.

'Transformers' – Transformational treatments and technologies in CF

S26 UNTARGETED SPUTUM PROTEOMICS REVEALS ANTI-INFLAMMATORY EFFECTS OF CFTR MODULATION

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Background Global proteomics methodologies identifies disease pathways and protein biomarkers with translational potential by capturing the proteome, an entire set of proteins within biological samples. These techniques were applied to a cystic fibrosis (CF) cohort commencing the cystic fibrosis conductance regulator (CFTR) modulator elexacaftor/tezacaftor/ivacaftor (ETI), which partially restores CFTR function with dramatic improvements in lung function. The sputum proteome differs between CF and healthy controls with increased neutrophilic inflammation and differences in protease/anti-protease and oxidant/antioxidant states, and differences become more pronounced with lung disease severity. We hypothesised that ETI would shift the proteome, so it more closely resembled healthy controls.

Methods Spontaneous sputa were collected pre- and post-therapy (n=25) and compared to stored healthy control induced samples (n=15). Samples were analysed by liquid chromatography mass spectrometry. Run alignment and peak picking was by Progenesis QI and proteins identified from the UniProt database. Clinical data was from medical records.

Results Mean absolute increase in FEV1 was 15% (SD 7.8). Obvious sputum proteome changes were seen with ETI using principal component analysis and hierarchical clustering, with the proteome post-therapy more closely resembling healthy controls. From the 441 proteins identified in sputum samples (≥2 unique peptides and false discovery rate <1%) 115 changed significantly (adjusted p value <0.05): 25 decreased and 90 increased post-therapy. Using Gene Ontology these changes appear driven by reductions in neutrophil activity and counterregulatory responses. The changes in proteome showed weak correlation with change in FEV1% (R^2=0.32, p-value = 0.0029) but not BMI (R^2=0.037, p-value = ns). Most subjects did not achieve a 'normal' proteome even after therapy.

Conclusions Reduction in neutrophilic airway inflammation may contribute to the clinical response seen with CFTR modulation. Proteome changes are largely independent of lung function and most CF subjects do not achieve the protein levels observed in healthy controls. This suggests a role for inflammatory biomarkers to complement existing clinical measures to assess CFTR modulation response or more broadly in clinical care. Our data also suggests a possible role for anti-inflammatory therapies for patients ineligible but also those receiving ETI as evidenced by the lack of full resolution of neutrophilic inflammation.

S27 SUSTAINED ANTI-INFLAMMATORY EFFECTS OF LUMACAFTOR-IVACAFTOR IN SPUTUM AND PERIPHERAL BLOOD SAMPLES OF ADULT CYSTIC FIBROSIS PATIENTS- AN OBSERVATIONAL STUDY

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Introduction Previous studies showed that the combination of CFTR corrector and potentiator, lumacaftor-ivacaftor (LUMA-IVA) provides meaningful clinical benefits in patients with cystic fibrosis (PWCF) who are homozygous for the Phe508del CFTR mutation. However, little is known about the effect of LUMA-IVA on proinflammatory cytokines (PICs). We sought to investigate the impact of lumacaftor-ivacaftor CFTR modulation on circulatory and airway cytokines before and after 12 months of lumacaftor-ivacaftor treatment in a real world setting.

Methods In this study, we assessed both plasma and sputum proinflammatory cytokines, as well as standard clinical outcomes including FEV1%, BMI, sweat chloride and pulmonary exacerbations at baseline and prospectively for one-year post commencement of LUMA-IVA in forty -four patients with CF aged sixteen years and older with homozygous for the Phe508del CFTR mutation.

Results Significant reduction in plasma IL-8 (p<0.001), TNF-□ (p<0.001), IL-1ß (p<0.001) levels and in sputum IL-6 (p<0.05), IL-8 (p<0.01) and TNF-□ (p<0.001) levels were observed after lumacaftor -ivacaftor therapy. Clinically significant improvements in FEV1% predicted (mean +3.38%, p=0.002), BMI (mean +0.8 kg/m2, p<0.001), sweat chloride (mean -19 mmol/l, p<0.001), as well as in intravenous antibiotics usage (mean -0.70, p<0.001) and hospitalization (mean-0.38, p=0.002) were observed after initiation of lumacaftor-ivacaftor therapy.

Conclusions This real -world study demonstrates that lumacaftor-ivacaftor has significant and sustained beneficial effects on both circulatory and airway inflammation. Our findings show that lumacaftor-ivacaftor results in anti-inflammatory changes in addition to its ability to stimulate CFTR function, which could contribute to improve standard clinical outcomes.

S28 PAWS FOR THOUGHT: SNIFFER DOGS FOR INFECTION SURVEILLANCE IN NON-SPUTUM PRODUCING PEOPLE WITH CF

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Background Prompt detection of *Pseudomonas aeruginosa* (Pa) may prevent chronic infection in CF but challenges exist.

Cough swabs are insensitive compared with sputum; young patients and many adults on CFTR modulators cannot expectorate sputum; standard culture intervals may miss infection and costs preclude frequent surveillance.

Medical Detection Dogs demonstrated excellent sensitivity and specificity in detecting Pa in culture broths (Davies JC; Eur Respir J, 2019. 54(5)).

We are developing a method suitable for frequent home screening. Gauze loaded into a mouthpiece provides a large surface area onto which the subject 'huffs'; this is then rapidly screened for Pa by trained dogs.

Methods 10 clinical Pa & 30 non-Pa (negative control) isolates were cultured in triplicate, adjusted by optical density and diluted to generate high, medium and low concentrations.

20 µl drops of these (~1,000,000, 1000 & 10–100 CFU respectively) were placed on the gauze (n=30 Pa, n=90 neg) mimicking a 'huff'. Sterile gauze (n=45) served as blanks. Gauze was incubated overnight in Pa-selective broth (cetrimide).

Samples were presented to 3 trained dogs in randomised, double-blind study. Dogs indicate positive response by standing still; immediate trainer unblinding allowed rewards for correct responses. Data are means (95%CI).

Clinical pilot recruited 20 adults with CF, 10 chronic Pa and 10 with other/no chronic infection, who can reliably produce sputum. Three huff samples (n=60) and one comparative sputum (n=20) are collected over one week.

Results In the laboratory-model, dogs ignored 99.3 (95.9,100)% blanks and 90.0 (85.8,93.0)% negative controls. They correctly identified Pa in 100 (95.9,100)% high, 97.8(92.3,99.4)% medium and 63.3 (53.0,72.6)% low starting concentration samples.

In initial clinical pilot, cetrimide proved insufficiently supportive of the very low bacterial numbers produced. However, subsequent laboratory-model trial of non-selective broth (Luria broth) showed persistence of high specificity/sensitivity. A repeat clinical pilot with Luria broth is underway.

Discussion Trained dogs rapidly identify Pa from gauzes after overnight enrichment even from very low bacterial numbers, showing potential for large scale, home screening for Pa in non-sputum producers. Samples from current clinical pilot will be presented to the dogs in a randomized, double blind test and results presented at conference.

Please refer to page A208 for declarations of interest related to this abstract.

S29 IMMUNOLOGICAL RESPONSE TO AIRWAY ASPERGILLUS IN CF IS REDUCED FOLLOWING TREATMENT WITH THE CFTR MODULATOR ELEXACAFOR-TEZACAFTOR-IVACAFTOR

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Objectives *Aspergillus fumigatus* is the most frequently cultured fungal pathogen in sputum from cystic fibrosis (CF) patients. Elexacaftor-tezacaftor-ivacaftor (ETI) is a CFTR modulator which results in significant improvements in lung function. We aimed to investigate the effect of ETI therapy on the serological response to *Aspergillus* in adult CF patients prescribed ETI.

Methods Data from 275 patients with at least one *Phe508del* mutation were included. Aspergillus IgG, Aspergillus IgE, total IgE and blood eosinophil count were collected annually 3 years prior to ETI initiation, at baseline (initiation of therapy) and at 3-monthly intervals for the first 12 months of ETI treatment. FEV_1 was compared at baseline and at 3 months as a marker of treatment response.

Results There was a significant relative increase in median FEV_1 values of 22% at 3 months following ETI initiation ($p<0.0001$). In the year prior to ETI initiation, there was a significant decrease in total IgE (from 59.3 to 57.5, median change -1.8, $p=0.007$) and Asp-IgE (from 0.39 to 0.30, median change -0.09, $p<0.0001$) but not Asp-IgG. In the first 3 months following ETI, there was a significant reduction in all markers (median total IgE 53.6 to 32.9 $p<0.001$, median Asp-IgE 0.27 to 0.17, $p<0.001$ and Asp-IgG from 60.0 to 50.5, $p<0.001$). Asp-IgG continued to decline over the 12 month period post ETI. Asp-IgE however did not change from 3 to 6 months and appeared to increase between 3 and 9 months post ETI. Similarly, total IgE displayed an acute drop but appeared to plateau thereafter. Using suggested clinical ULN for CF, the proportion of patients with significant rises in Asp-IgE declined by 19.1% and Asp-IgG declined by 45%.

Conclusions ETI therapy resulted in an acute, clinically relevant increase in lung function. In the same time frame, we noted an acute reduction in markers of immunological response to *Aspergillus fumigatus*. This may be due to reduced airway fungal burden, direct effects on immunological response or potentially reduced pathogen exposure as many patients were shielding during the COVID pandemic. Further longitudinal data is required to establish if these changes will be maintained.

S30 LONGITUDINAL MONITORING OF LCI IN PATIENTS WITH CF: WHAT REPRESENTS A CLINICALLY RELEVANT CHANGE?

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Introduction Advances in cystic fibrosis (CF) therapies mean that there is a growing need for reliable measures of assessing lung function in clinical practice that are more sensitive

than spirometry. Multiple breath washout (MBW) is well placed to do this, and is widely used in CF research. Clinical application has been restricted by practical and methodological concerns. The aim of this analysis was to define the limits of biological variability in stable CF patients, and contrast this with the changes seen in those who are unwell.

Methods Longitudinal lung clearance index (LCI) data were collected routinely at clinic reviews from two paediatric and one adult CF centre over three years during the LCI-SEARCH study. Clinical outcome was assessed by the reviewing clinician and standardised by them as (1) stable, (2) requiring oral antibiotics, or (3) requiring intravenous antibiotics. Patients completed symptom questionnaires which were used along with FEV_1 to sense-check clinician outcomes. LCI at each visit was compared to that patients own baseline (defined as mean of patient's stable LCI) and expressed as percent deviation from baseline LCI.

Results This analysis includes data from 95 CF patients, 60% children, median age 14.9 yrs (IQR 8.6–23.4 yrs). Patients had mild CF with median $FEV_1$85% predicted (IQR 77.1–96.8%), while only three had chronic *Pseudomonas aeruginosa*. LCI assessments were completed in 432 clinically stable visits: median within-patient change in LCI from baseline was -0.5%, and 95% of all values were within +/-15% baseline. Median and spread of data were unchanged when stricter definitions of stability were applied including patient symptom scores. LCI was more variable in those who were unwell: for those prescribed oral antibiotics (n=116 visits) or IV antibiotics (n=33), median LCI change was 3.6% and 3.8% respectively, and 28% or 15% respectively were outside repeatability limits of +/-15%.

Conclusion 95% of LCI measurements in clinically stable CF patients should be within 15% of their baseline LCI. Changes >15% are likely to represent an exacerbation and should prompt further review or investigations. Longitudinal LCI measurements are however more likely to be used for tracking longer term progression in disease than identifying acute changes.

'Toy story I' – Hot topics in childhood asthma

S31 THE PREVALENCE, SEVERITY, AND RISK FACTORS FOR ASTHMA IN SCHOOL-GOING ADOLESCENTS IN KWAZULU NATAL, SOUTH AFRICA

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Background and Objectives Asthma is one of the most common chronic respiratory diseases across the life course and remains highly prevalent, with more severe symptoms in low- to middle-income countries (LMICs). Identifying risk factors for severe asthma symptoms can assist in improving asthma care. We aimed to determine the prevalence, severity and risk factors for asthma in adolescents in an LMIC.

Methods A cross-sectional survey using the Global Asthma Network (GAN) written and video questionnaire was done in adolescents aged 13 and 14 from randomly selected schools in

Abstract S31 Table 1 A univariate and multivariate logistic regression analysis revealing factors in adolescents that were independently associated with severe asthma

Risk Factor	Severe wheeze		No severe wheeze		Univariate analysis				Multivariate analysis			
						95% CI		p value		95% CI		p value
	N=361	%	N=3596	%	OR	Lower	Upper	Sign.	AOR	Lower	Upper	Sign.
Urban Setting	122	33.8	818	22.7	0.577	0.458	0.727	0.000	1.215	0.919	1.606	0.171
Fee paying Quintile	**302**	**83.7**	**2482**	**69.0**	**2.297**	**1.723**	**3.064**	**0.000**	**1.775**	**1.271**	**2.479**	**0.001**
Sex (female)	212	59.1	1841	51.5	1.359	1.090	1.694	0.006	0.853	0.664	1.097	0.216
BMIzscore Obese	24	6.7	125	3.5	2.181	1.376	3.457	0.001	1.524	0.904	2.570	0.114
BMIzscore Overweight	**69**	**19.3**	**436**	**12.2**	**1.798**	**1.342**	**2.409**	**0.000**	**1.597**	**1.148**	**2.223**	**0.005**
BMIzscore Thin	67	18.8	771	21.6	0.987	0.739	1.318	0.930				
Western diet	167	46.3	1906	53.0	1.311	1.055	1.629	0.014	0.945	0.739	1.210	0.655
Exercise according to WHO	**81**	**22.7**	**487**	**13.6**	**1.859**	**1.426**	**2.424**	**0.000**	**1.521**	**1.123**	**2.060**	**0.007**
Sedentary television watching	**135**	**37.6**	**792**	**22.1**	**2.119**	**1.687**	**2.660**	**0.000**	**1.422**	**1.077**	**1.878**	**0.013**
Sedentary computer use	109	30.7	745	20.9	1.675	1.319	2.129	0.000	1.118	0.835	1.497	0.453
Current tobacco smoking	**22**	**6.2**	**95**	**2.7**	**2.418**	**1.501**	**3.897**	**0.000**	**2.059**	**1.152**	**3.679**	**0.015**
Other types of smoking	39	11.1	241	6.8	1.710	1.196	2.446	0.003	0.898	0.578	1.394	0.630
Traffic pollution	**167**	**47.3**	**1260**	**35.6**	**1.628**	**1.306**	**2.028**	**0.000**	**1.423**	**1.111**	**1.822**	**0.005**
Pets	219	61.2	1950	54.8	1.298	1.039	1.622	0.021	1.253	0.978	1.606	0.074
Paracetamol >1/month in last 12 month	**162**	**44.9**	**911**	**25.3**	**2.469**	**1.977**	**3.084**	**0.000**	**1.615**	**1.253**	**2.081**	**0.000**
Older sibling	254	70.4	2772	77	0.815	0.621	1.069	0.139				
Younger sibling	256	75.5	2610	75.1	0.976	0.753	1.265	0.854				
Rhinoconjunctivitis	**171**	**47.4**	**549**	**15.3**	**4.995**	**3.986**	**6.260**	**0.000**	**3.618**	**2.804**	**4.669**	**0.000**
Eczema	**70**	**19.4**	**210**	**5.8**	**3.879**	**2.885**	**5.214**	**0.000**	**2.236**	**1.591**	**3.143**	**0.000**

Durban, KwaZulu Natal, South Africa, between June 2019 and June 2021.

Results A total of 3957 adolescents (52.2% female) were included. The lifetime, current, and severe asthma prevalence was 24.6%, 13.7%, and 9.1%, respectively. Of those with current and severe asthma symptoms, 38.9% and 40.7% had doctor-diagnosed asthma, respectively. Only 8.1% of the population reported inhaled medication use, with 1.1% on inhaled corticosteroids (ICS), 1.2% on combination treatment and 6.5% on short-acting beta-agonists (SABA). The majority used oral medication in the form of SABA (7.7%), theophylline (2.5%), mast cell stabilizers (2.7%), and prednisone (1.9%) to treat asthma symptoms. Those on a Western diet had more emergency room visits (6.3 vs 4.1%, p-value <0.001) and hospital admissions (8.2 vs 5.4%; p-value <0.001) compared to those on a Mediterranean diet. Severe asthma was associated with fee-paying school quintile (adjusted odds ratio [confidence interval]: 1.78[1.27–2.48], overweight (1.60 [1.15 - 2.22], sedentary television watching (1.42 –[1.08–1.88]), exposure to traffic pollution (1.42 [1.11 -1.82], tobacco smoking (2.06 [1.15 - 3.68]), rhinoconjunctivitis (3.62 [2.80 - 4.67] and eczema (2.24 [1.59 - 3.14], all p <0.01. (table 1)

Conclusion Asthma prevalence in this population is similar to the global average. Although common, severe asthma symptoms are underdiagnosed and associated with atopy, environmental, and lifestyle factors. The majority use oral asthma medications. There is a need to improve access and education around essential inhaled medicines to address the disproportionate burden of asthma in this setting.

S32 CHARACTERISING SCHOOL-AGE CHILDREN WITH ASTHMA: ENGLISH POPULATION-COHORT STUDY

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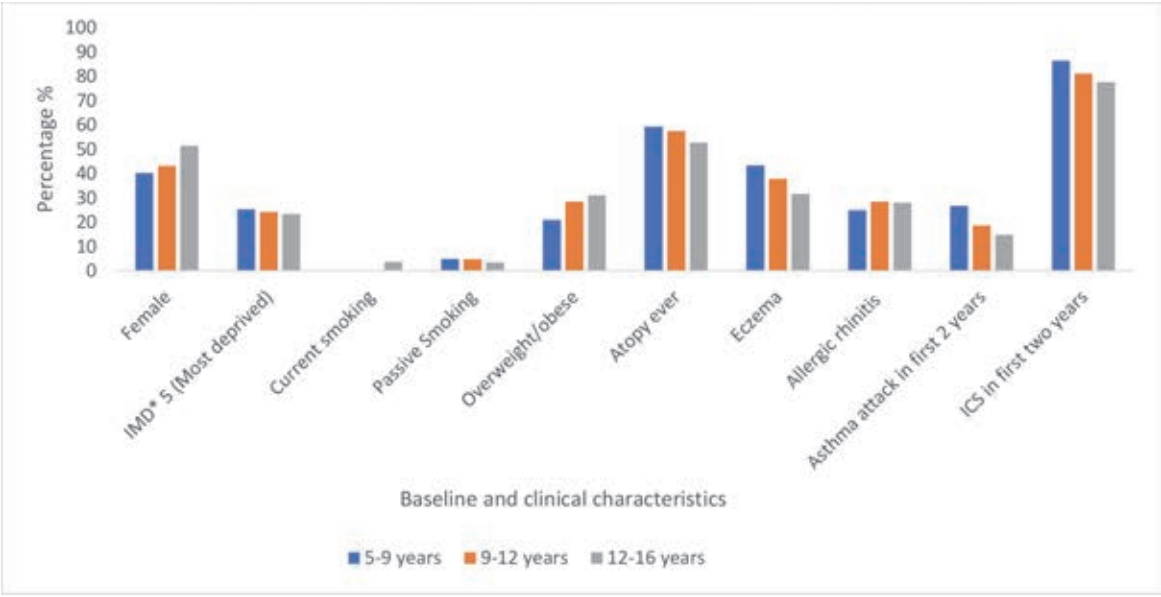
10.1136/thorax-2022-BTSabstracts.38

Introduction and Objectives There is currently little information regarding the clinical characteristics of English school-aged children at the time of their asthma diagnosis. We conducted a nationwide study to determine and compare baseline characteristics, subsequent asthma management and incidence of asthma attacks, by age of diagnosis.

Methods Descriptive analysis was performed using primary care electronic healthcare records (Clinical Practice Research Datalink) linked to Hospital Episode Statistics. The study population included children, aged 5–16 years with ≥2 asthma codes, 2004 to 2021. Children were categorised by age at diagnosis: 5–9, 9–12 and 12–16 years.

Results There were 166,578 eligible children (83,164 in 5–9 years, 45,330 in 9–12 years, 38,085 in 12–16 years). Of whom 59.7% males in 5–9 years compared to 48.5% in 12–16 years. Atopy was common in all age groups (57.3% of all children). Younger children had more eczema and older children had more allergic rhinitis (figure 1). Within the first two years of diagnosis, most children were prescribed an inhaled corticosteroid (ICS), the highest proportion in the youngest children (86.4% of 5–9 years, 81.2% of 9–12 years, 77.6% of 12–16 years). The oldest age group received the highest proportion of reliever prescription alone (12.8% in 5–9 years, 18.2% in 9–12 years, 21.6% in 12–16 years). 11.4% of children received medium or high dose ICS, 58.2% of whom received this dose as their first ever ICS prescription. Within the first two years after diagnosis, 21.7% of all children had an asthma attack. The youngest children were most likely to have attacks and within the shortest time from diagnosis (25% had an attack by (years): 1.8=6–9 years, 3.7=9–12 years, 4.8=12–16 years).

Conclusion Boys were more likely to have asthma until around 12 years old, whereafter girls were more likely to. Just under half of the oldest children were overweight/obese. More than half of all children had atopy. Approximately 1 in 5 children had an asthma attack within 2 years of diagnosis, this was highest in children diagnosed between 5–9 years, despite highest ICS prescription rates. Inappropriate management on reliever alone was also prevalent, occurring in approximately 20% of children.



Abstract S32 Figure 1 Baseline and clinical characteristics for each age group
*IMD: Index Multiple Deprivation

S33 DURATION AND NATURE OF SYMPTOMS PRIOR TO ASTHMA DIAGNOSTIC TESTING IN A PAEDIATRIC POPULATION

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Background Asthma is very common in UK children. It involves hyperresponsiveness of airways, leading to symptoms such as cough, breathlessness, chest tightness and wheeze. However, there is little evidence on the specific prevalence and duration of symptoms in children prior to consideration for asthma diagnostic testing.
Aim To investigate the prevalence and duration of symptoms in children who are being referred for asthma diagnostic testing and to identify whether this varied according to subsequent diagnosis.
Method Treatment naïve children (age 5–16 yrs) with suspected asthma, were referred by primary care physicians in south Manchester to the Rapid Access Diagnostics for Asthma (RADicA) study for assessment including clinical history followed by extensive investigation (spirometry, bronchodilator reversibility, FeNO, peak flow variability, eosinophils and bronchial challenge) before and after a trial of inhaled corticosteroid treatment. Asthma diagnosis was confirmed or refuted after evaluating all available data from all visits.
Results Of the 68 participants (mean (SD) age 9.95(3.1) years; 50% male), 47 (69%) were given a diagnosis of asthma. Patients had symptoms for a median of 18 months (IQR 42) before being referred for asthma diagnostic tests. Cough was the most common symptom, occurring in 61 children (90%), 43 (63%) had wheeze, 59 (87%) breathlessness and chest tightness was least common at 37 (54%). There was no significant difference in duration of symptoms in those with asthma (median (IQR) months; 12(41.5)) and those without (18(54); p=0.81). Similarly, there was no significant difference in frequency of symptoms in those with asthma (cough 41/47(87%); chest tightness 26/47(55%); breathlessness 41/47(87%)) compared with those without asthma (cough (20/21(95%), p=0.42; chest tightness 11/21 (52%), p=0.82; breathlessness 18/21(85%), p=0.82). There was a trend towards wheeze being more common in children with asthma (33/47(70%) compared to without asthma (10/21(48%), p=0.07).
Conclusion Children had symptoms suggestive of asthma, before treatment, for a median of 18 months prior to being referred for diagnostic testing, resulting in potentially high levels of morbidity. Although no single symptom was able to predict the final diagnosis of asthma, children experiencing wheeze maybe more likely to have asthma and perhaps testing should be considered earlier in such patients.

S34 SUPPORTING SELF-MANAGEMENT OF INDOOR ASTHMA TRIGGERS AND ALLERGENS IN CHILDREN & TEENS WITH SEVERE ASTHMA: WHAT DO FAMILIES VALUE AND WHAT FURTHER INFORMATION DO THEY NEED?

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10.1136/thorax-2022-BTSabstracts.40

Introduction Families of children and young people (CYP) with asthma are tasked with asthma trigger and indoor allergen avoidance as part of supported self-management. However, multiple triggers exist, and CYP are often poly-sensitised to allergens, complicating identification of asthma triggers and decisions regarding remediation. A scoping review identified very limited evidence regarding determinants of family uptake of trigger and allergen remediations.
Aims To understand the determinants of trigger and allergen avoidance from perspectives of families of CYPs with severe asthma and allergic sensitisation to indoor environmental allergens, to provide insight for future interventions to increase avoidance uptake.
Methods In-depth qualitative interviews with CYP aged 11–16-years, with severe asthma and allergic sensitisation to pets and/or house dust mites, and CYPs' parents were conducted. Grounded theory methodology guided study design and analyses.
Results 21 individuals (11 mothers and 10 CYP) participated. Multiple factors affect families' decisions about trigger and allergen avoidance, including perceived asthma severity, observable response to exposures, and the acceptability of remediation methods. Families value discussion of individualised needs and barriers to avoidance uptake with health professionals. Findings suggest families with sensitised children will employ allergen remediations in response to repeated exacerbations and hospitalisations, but many do not employ methods with the greatest evidence base. Moreover, avoidance uptake was often many years after initial advice was given following allergen testing. Families also struggled to understand the mechanisms linking allergen exposure and asthma control.
Conclusions Families may benefit from educational interventions to enhance understanding of the mechanisms linking allergen and trigger exposures with asthma control. Interventions could aim to explain which allergen reduction methods currently show effectiveness for CYP with asthma. Additionally, interventions addressing the delayed uptake of avoidance could aid self-management.

Please refer to page A208 for declarations of interest related to this abstract.

S35 TREATABLE TRAITS IN SYMPTOMATIC & UNTREATED CHILDREN AND ADULTS WITH SUSPECTED ASTHMA

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Background The concept of treatable traits (TTs) has been applied to severe asthma and chronic obstructive pulmonary disease to facilitate the delivery of precision medicine. We hypothesised that this approach might provide clinical useful insights in patients presenting with symptoms suggestive of asthma. We therefore identified TTs in children and adults with suspected asthma in the RADICA asthma diagnostic study, and investigated any relationship between the prevalence of TTs and symptom control.
Methods Symptomatic and treatment-naïve patients with suspected asthma were recruited. Clinical history and examination were carried out and a wide range of physiological and inflammatory measurements were made. Symptoms were assessed using the Asthma Control Questionnaire, and an asthma diagnosis was confirmed or refuted following 6–8

weeks of inhaled corticosteroids following assessment of all data by an expert panel.
Results Of 172 participants (mean [SD] age 25.9 [16.1] years), 68 (40%) were <18 years old; 59% were female. The prevalence of eczema, gastroesophageal reflux, obesity, cigarette smoke exposure and blood eosinophilia were more common in symptomatic adults than children ($p<0.05$). Pulmonary TTs were more prevalent in asthma than non-asthma in both children and in adults ($p<0.05$). In adults only, atopy and current tobacco use were more prevalent in asthmatics and gastroesophageal reflex was more prevalent in non-asthmatics ($p<0.05$). Breathlessness on exertion was equally prevalent in both asthma and non-asthmatic patients in both adults and children. Obesity, current or former tobacco use and damp in the home were associated with poorer symptom control in adults ($p<0.05$); there was no association with TTs and symptom control in children.
Conclusion Treatable traits are prevalent in both adults and children with suspected asthma. However, different patterns were observed in those with and without asthma, and distinct TTs were associated with increased symptoms, suggesting that personalised management strategy could be offered to symptomatic patients regardless of diagnostic label. Breathlessness on exertion is unlikely to be a useful symptom in the diagnosis of asthma. Further research is needed for the characterisation of TTs in symptomatic patients with uncertain diagnosis in both adults and children.

'Outbreak!' – COVID-19 epidemiology

S36 ACUTE AND LONG-TERM IMPACTS OF COVID-19 ON ECONOMIC VULNERABILITY: A POPULATION-BASED LONGITUDINAL STUDY IN 16,910 ADULTS

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10.1136/thorax-2022-BTSabstracts.42

Introduction Socio-economic deprivation is a well-recognised risk factor for COVID-19 and other respiratory infections. However, the impact of COVID-19 infection on economic vulnerability has not previously been characterised.
Objectives To determine whether COVID-19 has a significant impact on household income and work absence due to sickness, both at onset of illness (acutely) and subsequently (long-term).
Methods Multivariate regression analysis of self-reported data from monthly online questionnaires completed by participants in the COVIDENCE UK population-based longitudinal study (n=16,910) from 1st May 2020 to 28th October 2021, adjusting for baseline characteristics including age, sex, economic status and health.
Results Incident COVID-19 was independently associated with increased odds of participants reporting household income as being inadequate to meet their basic needs acutely (adjusted odds ratio [aOR] 1.39, 95% confidence interval [CI] 1.12 to 1.73) though this did not persist in the long-term (aOR 1.00, 95% CI 0.86 to 1.16).

Exploratory analysis revealed a stronger acute association amongst those who reported 'long COVID', defined as the presence of symptoms lasting more than 4 weeks after the acute episode, than those reporting COVID-19 without 'long COVID' (p for trend 0.002).

Incident COVID-19 associated with increased odds of reporting sickness absence from work in the long-term (aOR 4.73, 95% CI 2.47 to 9.06) but not acutely (aOR 1.34, 95% CI 0.52 to 3.49).
Conclusions We demonstrate an independent association between COVID-19 and increased risk of economic vulnerability amongst COVIDENCE participants, measured by both household income sufficiency and sickness absence from work.

Since socio-economic deprivation also increases risk of COVID-19, our findings suggest a bidirectional relationship between COVID-19 and poverty. This may generate a 'vicious cycle' of increased vulnerability, impaired health, and poor economic outcomes.

Please refer to page A208 for declarations of interest related to this abstract.

S37 RISK FACTORS FOR BREAKTHROUGH COVID-19 IN 14,713 UK ADULTS AFTER PRIMARY AND BOOSTER DOSES OF SARS-COV-2 VACCINES

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10.1136/thorax-2022-BTSabstracts.43

Introduction and Objectives Little is known about how demographic, behavioural, and vaccine-related factors affect risk of post-vaccination SARS-CoV-2 infection. We aimed to identify risk factors for SARS-CoV-2 infection after primary and booster vaccinations.
Methods This prospective, population-based, UK study in adults (≥16 years) vaccinated against SARS-CoV-2 assessed risk of breakthrough SARS-CoV-2 infection up to February, 2022, for participants who completed a primary vaccination course (ChAdOx1 nCoV-19 or BNT1262b2) and those who received a booster dose (BNT1262b2 or mRNA-1273). Cox regression models explored associations between sociodemographic, behavioural, clinical, pharmacological, and nutritional factors and test-positive breakthrough infection, adjusted for local weekly SARS-CoV-2 incidence and testing behaviours.
Results 1051 (7.1%) of 14,713 post-primary participants and 1009 (9.4%) of 10,665 post-booster participants reported breakthrough infection, over a median follow-up of 203 days (IQR 195–216) and 85 days (66–103), respectively. Primary vaccination with ChAdOx1 (*vs* BNT182b2) was associated with higher risk of infection in both post-primary analysis (adjusted hazard ratio 1.63, 95% CI 1.41–1.88) and after an mRNA-1273 booster (1.26 [1.00–1.57] *vs* BNT162b2 primary and booster). Lower risk of infection was associated with older age (post-primary: 0.97 [0.96–0.97] per year; post-booster: 0.97 [0.97–0.98]), whereas higher risk of infection was associated with lower educational attainment (post-primary: 1.78 [1.44–2.20] for primary or secondary *vs* postgraduate; post-booster: 1.46 [1.16–1.83]) and at least three weekly visits to indoor public places (post-primary: 1.36 [1.13–1.63] *vs* none; post-booster: 1.29 [1.07–1.56]).

Conclusions Vaccine type, socioeconomic status, age, and behaviours affect risk of breakthrough infection after primary and booster vaccinations. These findings can inform public health messaging and prioritisation for future vaccinations.

Please refer to page A208 for declarations of interest related to this abstract.

S38 OMICRON (B.1.1.529) SARS-COV-2 INFECTION RESULTS IN LESS SEVERE DISEASE THAN INFECTION WITH DELTA (B.1.1.617.2) VARIANT AMONG HOSPITALISED ADULTS: A PROSPECTIVE COHORT STUDY

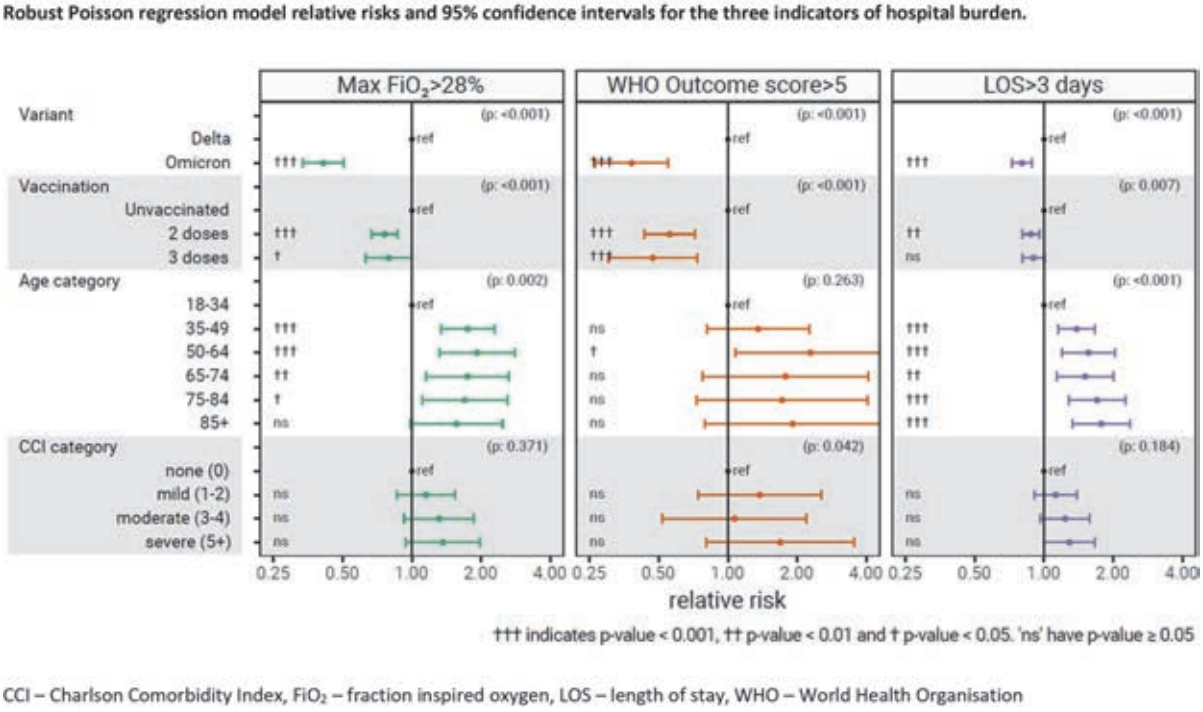
[1]C Hyams, [2]R Challen, [1]R Marlow, [3]JL Nguyen, [3]E Begier, [3]J Southern, [4]A Morley, [1]J King, [1]J Kinney, [1]M Clout, [1]J Oliver, [3]G Ellsbury, [4]N Maskell, [3]L Jodar, [3]BD Gessner, [3]JM McLaughlin, [2]L Danon, [1]A Finn. *[1]Bristol Vaccine Centre, University of Bristol, Bristol, UK; [2]Engineering Mathematics, University of Bristol, Bristol, UK; [3]Vaccines Medical Development, Scientific and Clinical Affairs, Pfizer Inc, USA; [4]Academic Respiratory Unit, University of Bristol, Bristol, UK*

10.1136/thorax-2022-BTSabstracts.44

Background Limited data exist assessing severity of disease in adults hospitalised with Omicron SARS-CoV-2 variant infection, and to what extent patient-factors, including vaccination and pre-existing disease, affect variant-dependent disease severity. Understanding disease severity and treatment requirements of new variants is important for hospital service and public health planning.
Methods This prospective cohort study of adults (≥18 y) hospitalised with acute respiratory illness in secondary care in Bristol, UK during June 2021–March 2022 assessed disease severity following admission with Omicron or Delta infection using three different measures: FiO_2>28%, World Health Organization (WHO) outcome score >5, and hospital length of stay (LOS) >3 days. Multivariable Poisson regression models with robust error variance adjusted for patient demographics, clinical characteristics, and calendar time were used to estimate the relative risk (RR) of each outcome.
Results Patients hospitalised with Omicron infection (n=748) were significantly older than those with Delta (n=1190) infection (median: 70·6 y *vs* 57·7 y; $P<0.001$) and had a higher median Charlson Comorbidity Index (4 *vs* 2; $P<0{\cdot}001$). Independent of other variables, including COVID-19 vaccination, Omicron infection was associated with significantly lower severity compared to Delta across all three severity scores (58% lower for FiO_2 [RR = 0·42 (95% CI: 0·34–0·52)], 67% lower for WHO score [RR = 0·33 (0·21–0·50)], and 16% lower for LOS [RR = 0·84 (0·76–0·92)].

In analyses stratified by vaccination status, infection with Omicron relative to Delta was associated with lower severity across all three severity measures for both vaccinated and unvaccinated patients. Compared to unvaccinated patients, vaccinated (two doses) individuals were less likely to require FiO_2 >28% [RR=0·78 (0·68–0·89)], positive-pressure ventilatory support or increased critical care [RR=0·56 (0·43–0·73)], and to have LOS>3 days [RR=0.90 (0·84–0·98)].
Conclusions Omicron infection was associated with less severe illness compared to Delta infection across three separate measures of severity. COVID-19 vaccination was independently associated with lower in-hospital disease severity, regardless of variant. Lower severity of Omicron combined with the ability of vaccine to further reduce severity may result in reduced pressure on healthcare services; however, the increased transmissibility of Omicron and potential for higher numbers of infections, particularly in elderly patients, may mitigate these benefits.

Please refer to page A208 for declarations of interest related to this abstract.



Abstract S38 Figure 1

S39 COVID-19 INCIDENCE AND HOSPITALISATION IN ROUTINE CLINICAL PRACTICE AMONG ASTHMA PATIENTS IN ENGLAND IN 2020

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10.1136/thorax-2022-BTSabstracts.45

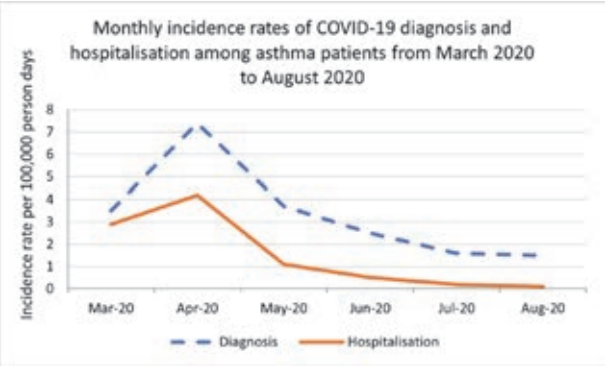
Introduction/Objectives Evidence regarding the risk of severe COVID-19 illness among individuals with asthma is limited with some studies reporting an increased risk of severe illness among patients with asthma, and others finding no difference in the risk of severe illness between patients with asthma and those without. This study described the changes over time in COVID-19 diagnosis and hospitalisations due to COVID-19 among patients with asthma in England.

Methods This was a retrospective dynamic cohort study of English asthma patients aged ≥18 years, observed from March–August 2020, using the Clinical Practice Research Datalink Aurum database linked to Hospital Episode Statistics datasets. Monthly incidence rates of COVID-19 diagnosis and inpatient hospitalisations due to COVID-19 were described for all patients and stratified by 2019 GINA treatment step at baseline.

Results In total, 823,645 incident and prevalent asthma patients (mean [SD] age: 51.4 [17.7] years, 58.1% females) were included; 21.3%, 3.9%, 23.6%, 12.7%, 3.1% and 35.4% of patients were in GINA step 1/2, GINA step 2, GINA step 3, GINA step 4, GINA step 5 treatment step and in the unclassifiable group, respectively, at baseline. Monthly rates of COVID-19 diagnosis and hospitalisation due to COVID-19 are shown in figure 1.

The incidence rate (95% CI) of COVID-19 hospitalisation per 100,000 person-days for the March–August 2020 period by GINA treatment step was: GINA step 1/2 (1.0 [0.9, 1.2]); GINA step 2 (1.3 [1.0, 1.6]); GINA step 3 (1.6 [1.5, 1.7]); GINA step 4 (2.8 [2.6, 3.1]); and GINA step 5 (2.9 [2.4, 3.5]).

Conclusion Among patients with asthma, COVID-19 diagnosis rates peaked in April 2020, declined steeply to June 2020 and remained low through to August 2020. COVID-19 hospitalisation rates were substantially higher in patients with more severe asthma and highest among patients in GINA step 5 treatment group. Future studies on the long-term impact of COVID-19 in asthma are warranted.



Abstract S39 Figure 1

Please refer to page A209 for declarations of interest related to this abstract.

S40 IMPACT OF STATIN THERAPY ON MORTALITY AND MORBIDITY IN PATIENTS WITH COVID-19

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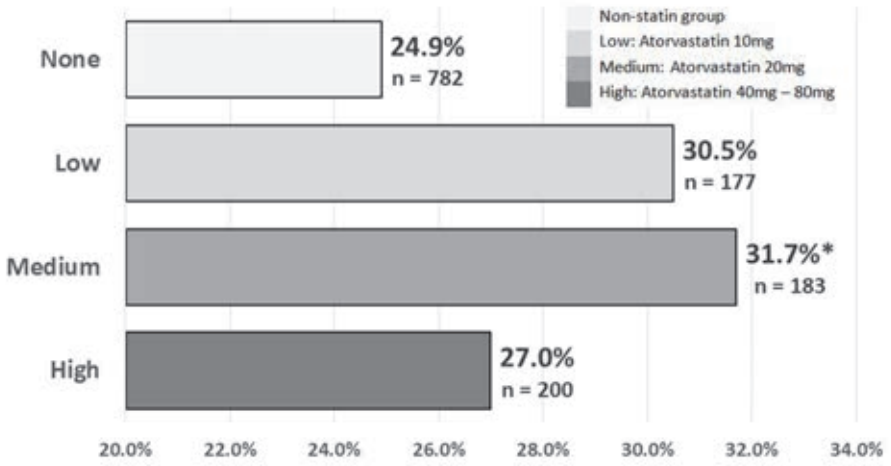
10.1136/thorax-2022-BTSabstracts.46

Background There remains an unmet need to identify further pharmacological interventions for COVID-19. Observational studies have highlighted in-hospital use of statins improved mortality in COVID-19 patients[1], relating to antithrombotic, immunomodulatory and anti-inflammatory properties. Here, we assess the relationship between the antecedent use of statins and their doses with COVID-19 morbidity and mortality.

Methods We retrospectively analysed 1342 patients (44.6% females; mean age 68.8; 26.9% overall mortality) with RT-PCR positive COVID-19 admitted between 1stNovember 2020 and 28th February 2021 to a District General Hospital during the second UK SARS-CoV-2 pandemic wave. Morbidity was defined by length-of-stay and intensive care (ITU) admission. Mortality encompassed the admission timeframe until 28 days post-discharge. Independent correlation was assessed with multilinear regression analyses adjusting for demographics and comorbidities. Statin prescriptions were converted to Atorvastatin equivalent[2] to define high-, medium-, and low-dose groups [figure 1].

Results 41.7% (n=560) of patients were prescribed an antecedent statin in hospital, who were typically older (mean 75.2 vs. 64.3 years old) and male (60.3% vs. 51.9%). Mortality was greater in patients prescribed a statin (29.7% vs. 24.9%, $p<0.03$), whereas morbidity varied, with higher mean length-of-stay (12.5 vs. 10.4 days, $p<0.05$), but lower requirement for ITU admission (10.5% vs. 13.2%, $p<0.05$). When utilising regression analyses, we found that statins of all doses did not significantly affect mortality ($p=0.543$). In fact, 183 patients prescribed medium-dose statins independently had greater mortality than patients without statins (31.7% vs. 24.9%, $p=0.039$), whilst high- ($p=0.944$) and low- ($p=0.913$) dose groups had comparable mortality.

Conclusion We highlight a cohort of patients who demonstrated greater mortality from COVID-19 when prescribed medium-dose statins, with an otherwise non-significant effect on mortality of statins of all doses when compared to non-statin patients. Medium-dose statin patients may be those at highest risk of cardiovascular sequelae of COVID-19 with multiple comorbidities, but unable to tolerate maximum doses. We advocate caution when prescribing statins with established COVID-19 therapies until specific groups are identified from prospective clinical trials that may benefit from their use.



Abstract S40 Figure 1 Mortality rates of high-, medium- and low-dose statin patient groups, converted to Atorvastatin equivalent[2], and those not prescribed a statin. Medium-dose statin patients featured independent association with greater mortality rates (*p=0.039)

REFERENCES

1. Zhang XJ, *et al. Cell Metab* 2020;**32**(2):176–187.e4. doi:10.1016/j.cmet.2020.06.015
2. Hu D, *et al. Zhonghua Nei Ke Za Zhi* 2015;**54**:467–477

S41 INCIDENCE OF SARS-COV-2 AND NON-SARS-COV-2-ASSOCIATED COMMUNITY ACQUIRED LOWER RESPIRATORY TRACT INFECTIONS IN BRISTOL, UK: A PROSPECTIVE COHORT STUDY

[1]C Hyams, [2]R Challen, [3]E Begier, [3]J Southern, [1]J King, [4]A Morley, [1]Z Szasz-Benczur, [1]M Garcia Gonzalez, [1]J Kinney, [3]J Campling, [3]S Gray, [1]J Oliver, [3]R Hubler, [3]SR Valluri, [3]A Vyse, [3]L Jodar, [3]JM McLaughlin, [3]G Ellsbury, [4]N Maskell, [3]BD Gessner, [2]L Danon, [1]A Finn. *[1]Bristol Vaccine Centre, University of Bristol, Bristol, UK; [2]Engineering Mathematics, University of Bristol, Bristol, UK; [3]Vaccines Medical Development, Scientific and Clinical Affairs, Pfizer Inc, USA; [4]Academic Respiratory Unit, University of Bristol, Bristol, UK*

10.1136/thorax-2022-BTSabstracts.47

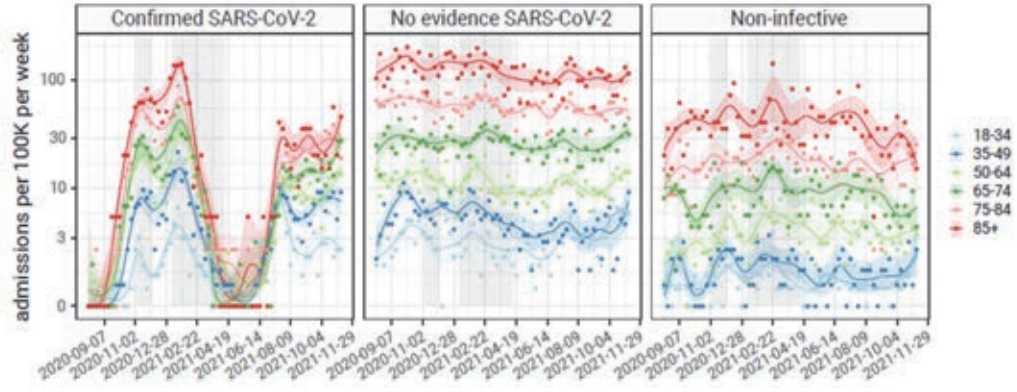
Background The novel pathogen SARS-CoV-2 and associated public health control measures have affected acute lower respiratory tract disease (aLRTD) epidemiology. We sought to compare the incidences of respiratory infection hospitalizations with and without SARS-CoV-2 infection during the pandemic.

Methods We undertook a prospective cohort study of adults (≥18 y) hospitalised at both Bristol secondary care NHS Trusts from August 2020–November 2021, encompassing the end of the first UK wave (ancestral SARS-CoV-2 strain) and subsequent Alpha and Delta waves. Patients with ≥2 of 8 aLRTD signs/symptoms (e.g., cough, pleurisy, dyspnoea) or a clinical or radiological diagnosis consistent with aLRTD (e.g., pneumonia) were included.

Results Among 12557 adult aLRTD hospitalisations, 10087 (80%) had infective aLRTD (i.e., pneumonia or non-pneumonic lower respiratory tract infection [NP-LRTI]), 2161 (17%) had non-infective cause (e.g., COPD/HF exacerbations only), and 306 (2.4%) an undetermined diagnosis. Thirty-two percent (3178/10087) of hospitalized infective aLRTD involved

Incidence per 100,000 population per week by age group for PCR positive SARS-CoV-2 aLRTD, infection with no evidence of SARS-CoV-2 and non-infective aLRTD

Estimates of underlying incidence rates by patient age group, with grey shading indicating when non-pharmaceutical interventions were in place to reduce respiratory infection



Abstract S41 Figure 1

confirmed SARS-CoV-2 infection. Annual pneumonia incidence (per 100,000 adults) was 714·1 (264·2 SARS-CoV-2-associated, 449·9 non-SARS-CoV-2) and NP-LRTI incidence was 346·2 (43·8 SARS-CoV-2-associated, 302·4 non-SARS-CoV-2).

Although SARS-CoV-2-associated aLRTD was more frequent than non-SARS-CoV-2 infective aLRTD during COVID-19 surges, non-SARS-CoV-2 NP-LRTI was more common in all age groups overall, and non-SARS-CoV-2 pneumonia incidence among those aged 65–74, 75–84, and 85+ years was 1.9, 2.8 and 3.8-fold higher than COVID-19-associated pneumonia.

SARS-CoV-2 infection incidence displayed high variability (range: 0–221 cases/week), while other infective aLRTD events' frequency was more stable (range: 71–152 cases/week). Whilst SARS-CoV-2-related hospitalisation trends followed community COVID-19 frequency, non-SARS-CoV-2 respiratory infection admissions showed no association.

Conclusions While SARS-CoV-2 infection was a large component of hospitalised aLRTD, non-SARS-CoV-2 infection caused 56% of respiratory infection hospitalisations overall. Measured incidences of non-SARS-CoV-2 pneumonia and NP-LRTI were higher than pre-pandemic UK estimates. Given public health interventions to reduce all infective aLRTD implemented during this year, these higher estimates likely reflect highly comprehensive surveillance although there may have been a true higher non-SARS-CoV-2 disease incidence. These results demonstrate the significant burden of acute respiratory infection on healthcare systems. Broader efforts to prevent and manage all forms of adult aLRTD should be prioritized in addition to current COVID-19 prevention efforts.

Please refer to page A209 for declarations of interest related to this abstract.

'The fast and the furious' – Clinical studies in COVID-19

S42 VITAMIN D TO PREVENT COVID-19 OR OTHER ACUTE RESPIRATORY INFECTIONS: PHASE 3 RANDOMISED CONTROLLED TRIAL (CORONAVIT)

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10.1136/thorax-2022-BTSabstracts.48

Introduction Vitamin D deficiency associates with susceptibility to COVID-19 and other acute respiratory infections (ARI).

Objective To determine whether a 'test-and-treat' approach to vitamin D replacement in the general population reduces incidence of COVID-19 or other ARI.

Methods We randomly assigned 6200 UK adults to receive an offer of a postal vitamin D test with postal provision of a 6-month supply of higher-dose vitamin D (3200 IU/d, n=1550) or lower-dose vitamin D (800 IU/d, n=1550) to those with 25(OH)D <75 nmol/L vs no offer of vitamin D testing or supplementation (n=3100). The primary outcome was the proportion of participants experiencing at least one test- or doctor-confirmed ARI of any cause at 6 months. Secondary outcomes included incidence of COVID-19.

Results 2958/3100 adults randomised to intervention accepted the offer of testing, of whom 2690 (90.9%) had 25(OH)D <75 nmol/L and received vitamin D supplements (1356 higher-dose, 1334 lower-dose). 72 adults in the higher-dose offer group, 86 in the lower-dose offer group and 132 in the no offer group experienced at least one ARI of any cause during follow-up (odds ratio [OR] for higher-dose vs. no offer 1.05, 95% CI 0.78–1.40; OR for lower-dose vs. no offer 1.27, 0.96–1.68). COVID-19 was diagnosed in 32 adults in the higher-dose offer group, 48 in the lower-dose offer group and 68 in the no offer group (OR for higher-dose vs. no offer 0.90, 0.59–1.37; OR for lower-dose vs. no offer 1.37, 0.94–1.99).

Conclusions In adults with a high baseline prevalence of vitamin D insufficiency, a test-and-treat approach to vitamin D replacement did not reduce risk of all-cause ARI or COVID-19.

Please refer to page A209 for declarations of interest related to this abstract.

S43 RESULTS FROM THE STAR-COVID19 TRIAL, A DOUBLE-BLIND RCT OF STABILISED, SYNTHETIC SULFORAPHANE IN HOSPITALISED PATIENTS WITH SUSPECTED COVID19

[1]MB Long, [1]H Abo-Leyah, [1]YH Giam, [2]T Vadiveloo, [3]RC Hull, [1]HR Keir, [1]T Pembridge, [1]D Alferes de Lima, [4]BJM New, [5]S Inglis, [1]A Gilmour, [1]C Hughes, [1]L Delgado, [2]G MacLennan, [6]AT Dinkova-Kostova, [1]JD Chalmers. *[1]Division of Molecular and Clinical Medicine, University of Dundee, Dundee, UK; [2]Health Services Research Unit, University of Aberdeen, Aberdeen, UK; [3]Department of Infection, Immunity and Cardiovascular Disease, University of Sheffield, Sheffield, UK; [4]NHS Tayside, Dundee, UK; [5]Tayside Clinical Trials Unit, University of Dundee, Dundee, UK; [6]Division of Cellular Medicine, University of Dundee, Dundee, UK*

10.1136/thorax-2022-BTSabstracts.49

Introduction and Objectives The transcription factor, Nrf2, can directly promote beneficial anti-oxidant and anti-inflammatory responses. In the STAR-COVID19 trial, hospitalised patients with confirmed or suspected COVID19 were treated with stabilised, synthetic sulforaphane (S-SFN)—an Nrf2 inducer—to evaluate impact on clinical status and systemic inflammation.

Methods Double-blind, randomised, placebo-controlled trial of S-SFN (300 mg S-SFN or placebo once daily for 14 days; allocation ratio 1:1; EudraCT 2020–003486-19) in Dundee, UK. Inclusion criteria were age ≥18 years, suspected or confirmed COVID19 or pneumonia and CURB65 score ≥1. The primary outcome was the 7-point WHO Clinical Status scale at day 15. Secondary outcomes included time to clinical improvement, length of hospital stay, and mortality. Blood samples were taken on days 1, 8 and 15 for exploratory analyses. To assess Nrf2 activity and inflammation, 45 serum cytokines were measured using the Olink Target48 panel and mRNA sequencing of peripheral blood leukocytes performed. Further, as key immune cells in COVID19 responses, select neutrophil functions such as migration, phagocytosis and extracellular trap formation were evaluated.

Results 133 participants (77.4% PCR-confirmed SARS-CoV-2 infection) were randomized from Nov 2020 to May 2021. 68 received placebo (61.8% male; age 63.6±13.8) and 65 received S-SFN (53.8% male; age 61.6±12.7).

S-SFN treatment did not improve clinical status at day 15 (Intention-to-treat population; adjusted OR 0.87, 95%CI 0.41–1.83, p=0.712) and the trial was terminated due to futility. Time to clinical improvement (adjusted HR 1.02(0.70–1.49)), length of hospital stay (aHR 0.84(0.56–1.26)), or 29-day mortality (aHR 1.45(0.67–3.16)) were not improved with S-SFN treatment.

230 samples in total were utilised for serum cytokine measurement; Nrf2 targets implicated in cytokine storm, including IL6, IL1β and TNFα, were not significantly changed by S-SFN treatment. Interestingly, serum TGFα was significantly increased at day 15 in those receiving S-SFN compared with placebo (p=0.004; linear mixed effects model). S-SFN treatment did not significantly affect neutrophil functions investigated.

Conclusion S-SFN treatment did not improve clinical status at day 15 or modulate key inflammatory cytokines—however, changes in other factors were indicated. Further analyses, including transcriptomics, to delineate drug activity are currently ongoing.

S44 REPAIR OF ACUTE RESPIRATORY DISTRESS SYNDROME IN COVID-19 BY STROMAL CELLS (REALIST-COVID TRIAL): 1 YEAR FOLLOW UP FOR SAFETY AND PULMONARY DYSFUNCTION

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10.1136/thorax-2022-BTSabstracts.50

Introduction and Objectives REALIST-COVID was a UK multicentre, double-blind randomised, allocation concealed, placebo-controlled phase 2 trial, investigating a novel mesenchymal stromal cell (MSC) product (ORBCEL-C cryopreserved, allogeneic, umbilical cord-derived CD362 enriched MSCs) in patients with ARDS due to COVID-19. Here we report follow up of the REALIST-COVID cohort at 1 year, with the aim of further evaluation of ORBCEL-C MSC safety.

Methods 1-year mortality status was recorded from GP and hospital records where possible. Survivors at 1 year were followed up for significant medical events (SMEs) via telephone interview, medical record review, or contact with GP. Interstitial lung disease (ILD) and pulmonary dysfunction on clinically indicated thoracic computerised tomography (CT) and pulmonary function tests (PFTs) was recorded.

Results Mortality at 1-year was 29% (n=8/28) in the ORBCEL-C group and 28% (n=8/29) in the placebo group. One patient in the ORBCEL-C group died between day 90 and 1 year. 41 survivors were followed up at 1 year (20 in ORBCEL-C, 21 in placebo). Significant medical events in survivors were similar in both groups (7 events in 6 patients in the ORBCEL-C group and 11 events in 9 patients in the placebo group). Classification of SMEs is summarised in table 1.

Abstract S44 Table 1 Summary of significant medical events, thoracic computed tomography (CT) and pulmonary function tests (PFTs) in ORBCEL-C and placebo groups at 1 year follow up

	ORBCEL-C	Placebo
Number of patients followed up	20	21
Significant medical events		
Number of patients with SMEs	6/20	9/21
Total SME events	7	11
Classification		
Respiratory,thoracic and mediastinal disorders	4	6
Neoplasm - benign, malignant, unspecified	1	0
Infections and infestations	1	1
Cardiac disorders	1	0
Metabolism and nutrition disorders	0	1
Injury, poisoning and procedural complications	0	1
Renal and urinary disorders	0	1
Gastrointestinal disorders	0	1
Thoracic CT		
Number of CTs available	5	8
Time to CT (Median, IQR)	181 (157–198)	203 (95–233)
Evidence of ILD on CT	4	6
PFTs		
Number of PFTs available	10	8
Time to PFTs (Median, IQR)	184.5 (117.5–292.75)	203.5 (118.25–242.5)
FEV1 (Mean, SD)	84.9 (13.6)	80.5 (13.3)
FEV1 <80% predicted (n,%)	4/10 (44%)	4/8 (50%)
FVC (Mean, SD)	78.4 (13.2)	79.3 (16.5)
FVC <80% predicted (n,%)	5/10 (55%)	5/8 (62.5%)
FEV1/FVC ratio (Mean, SD, n)	0.88 (0.12) N=8	0.76 (0.05) N=5
FEV1/FVC <0.7 (n,%)	0 (0%)	0 (0%)
TLCO (Mean, SD, n)	78.9 (14.8) N=9	61.9 (13.4) N=7
TLCO <80% (n,%)	6/9 (66.7%)	7/7 (100%)

Thoracic CTs were available for 12 participants (ORBCEL-C n=5/20, placebo n=8/21). Median time to CT and results are summarised in table 1). Evidence of ILD was similar in each group.

PFTs were available for 18 participants (ORBCEL-C n=10/20, placebo n=8/21). Median time to PFTs and results are summarised in table 1. FEV1, FVC, FEV1/FVC ratio and TLCO were similar between groups. There was a high rate of impairment of transfer factor (TLCO<80% predicted) in participants from both groups.

Conclusions One year follow up supports the safety of ORBCEL-C MSCs in patients with moderate to severe ARDS due to COVID-19. A similar incidence of pulmonary dysfunction is reported in both groups at long term follow up.

Please refer to page A?? for declarations of interest related to this abstract.

S45 INFLAMMATORY BIOMARKERS AS PREDICTORS OF MORTALITY AND PERSISTENT SYMPTOMS AT FOLLOW-UP IN PATIENTS WITH SEVERE COVID-19

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10.1136/thorax-2022-BTSabstracts.51

Introduction Inflammatory biomarkers such as C-reactive protein (CRP) are an established tool for predicting mortality in COVID-19 patients. The role of biomarkers such as Interleukin-6 (IL-6) have also been studied, with anti-IL-6 therapy now a cornerstone of treatment of COVID-19. Data have also suggested that such biomarkers are persistently elevated in patients with Long-COVID.

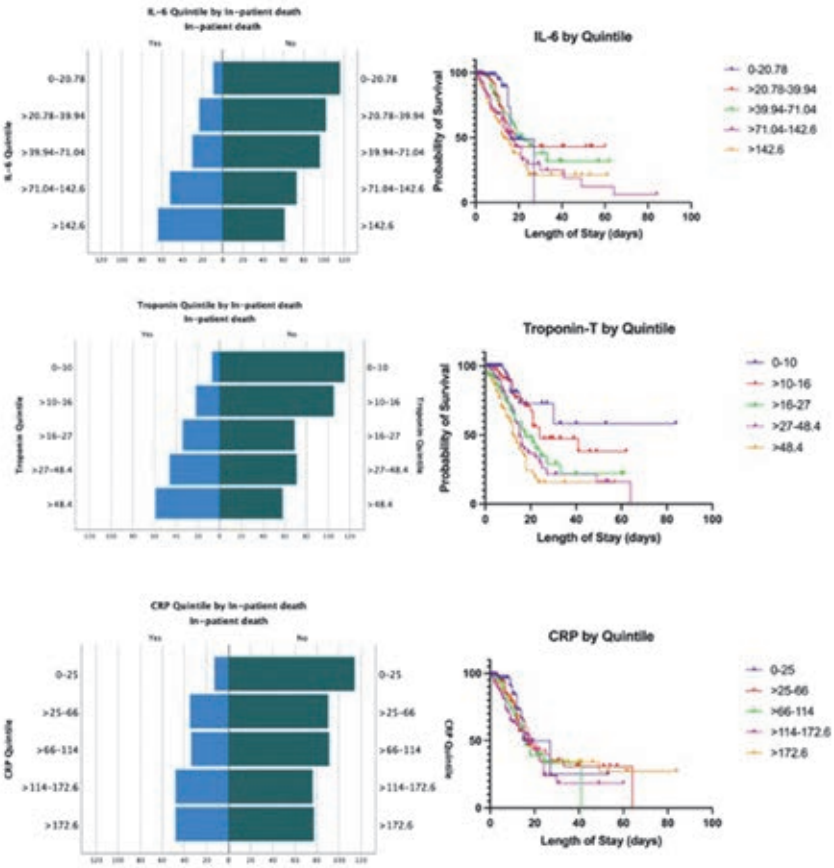
In this study we aimed to assess the relationship between a panel of biomarkers (CRP, IL-6, troponin-T, and ferritin), inpatient mortality, and persistent symptoms post-discharge in COVID-19 survivors.

Methods Data were collected prospectively for all patients with COVID-19 admitted between 1stSeptember 2020 and 10th January 2021 at a single NHS teaching hospital trust. Admission CRP, IL-6, ferritin, and troponin-T (TT) were analysed as part of routine clinical care and collected alongside routinely collected clinical data. A standardised dataset was collected for survivors when they attended clinical follow-up with the local post-hospitalisation COVID-19 follow-up service. The relationship between inflammatory biomarkers and symptoms at follow-up was evaluated post-hoc.

Results A total of 626 patients (mean age 70.1 [SD=15.8], 55% male) had all biomarkers recorded and were included in the analysis. There overall mortality rate in this cohort was 28.4%. Log rank testing revealed higher levels of IL-6 ($p<0.001$) and troponin-T ($p<0.001$) were associated with a significantly higher risk of inpatient mortality. When levels of IL-6 and TT were split into quintiles, those in the highest quintiles had a >50% mortality rate, which was significantly higher than those in the lower quintiles (figure 1).

A total of 144 patients received 3-month follow-up, the commonest reported symptoms were fatigue (54.2%), breathlessness (52.8%), and sleep disturbance (37.5%). There was no association between elevated inflammatory biomarkers at hospital admission and reported symptoms at follow-up. There were no statistically significant associations between levels of inflammatory biomarkers on admission and presence of persistent symptoms at follow-up.

Conclusions Raised levels of IL-6 and TT on admission are associated with a significantly increased risk of inpatient mortality in those hospitalised with COVID-19, however, raised inflammatory markers at the time of hospital admission show no association with residual symptom burden at 3-month follow-up in surviving patients.



Abstract S45 Figure 1 Population pyramids (left) and Kaplan-Meier survival curves (right) for IL-6, Troponin, and CRP by quintile

'Fight club' – Biologics in asthma: RCTs

S46 TEZEPELUMAB REDUCES MUCUS PLUGGING IN PATIENTS WITH UNCONTROLLED, MODERATE-TO-SEVERE ASTHMA: THE PHASE 2 CASCADE STUDY

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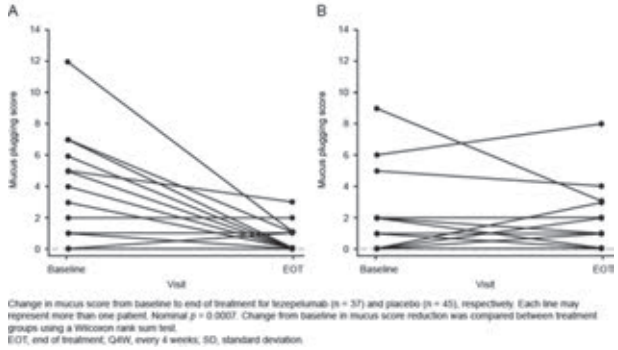
10.1136/thorax-2022-BTSabstracts.52

Background Mucus plugs are associated with airway inflammation and obstruction in patients with asthma. The impact of treatment on mucus plugs has not been investigated in randomized controlled trials (RCTs) of severe asthma.
Objective To assess mucus plugging in the lungs of patients with uncontrolled, moderate-to-severe asthma pre- and post-treatment with tezepelumab, a human monoclonal antibody that blocks thymic stromal lymphopoietin.
Methods CASCADE (NCT03688074) was an exploratory, double-blind, placebo-controlled study. Patients (18–75 years old) were randomized 1:1 to tezepelumab 210 mg or placebo subcutaneously every 4 weeks for at least 28 weeks. Mucus plugging was scored at baseline and end of treatment in 18 lung segments using standardized computed tomography imaging.
Results Mucus plugging scores were reduced in patients receiving tezepelumab (n = 37) versus placebo (n = 45) (nominal p = 0.0007; figure 1). At baseline, mucus score correlated positively with inflammatory markers (blood eosinophils, eosinophil-derived neurotoxin, fractional exhaled nitric oxide, IL-5 and IL-13) and negatively with lung function (FEV_1 and $FEF_{25–75\%}$). Reduction in mucus score with tezepelumab was correlated with improvements in these lung function parameters.
Conclusion Tezepelumab is the first biologic shown to reduce mucus plugging in patients with moderate-to-severe, uncontrolled asthma in an RCT.



Abstract S46 Figure 1 Change in mucus plugging scores from baseline to EOT in patients receiving (A) tezepelumab 210 mg Q4W and (B) placebo

Please refer to page A209 for declarations of interest related to this abstract.

S47 DESTINATION: TEZEPELUMAB LONG-TERM SAFETY AND EFFICACY VERSUS PLACEBO IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA

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10.1136/thorax-2022-BTSabstracts.53

Background Tezepelumab reduced the annualized asthma exacerbation rate (AAER) in patients with severe, uncontrolled asthma in the phase 3 NAVIGATOR (NCT03347279) and SOURCE (NCT03406078) studies.
Objective To assess the safety and efficacy of tezepelumab (210 mg every 4 weeks) over 2 years.
Methods DESTINATION was a phase 3, multicentre, randomized, placebo-controlled, double-blind, extension study (NCT03706079) of patients (12–80 years old) who completed NAVIGATOR or SOURCE. Patients previously randomized to tezepelumab continued treatment. Those previously randomized to placebo were re-randomized 1:1 to placebo or tezepelumab. Exposure-adjusted incidence rates (patients with event/total exposure) of adverse events (AEs) and serious AEs (SAEs) (primary endpoints), AAER (secondary endpoint) and biomarker (blood eosinophils, FeNO and IgE) levels were assessed over 104 weeks in patients who received ≥1 dose of tezepelumab or placebo in the parent studies.
Results In patients who initially received tezepelumab (n=528) or placebo (n=531) in NAVIGATOR, incidence rates per 100 patient years were 49.62 and 62.66 for AEs and 7.85 and 12.45 for SAEs, respectively, over 104 weeks. In those who initially received tezepelumab (n=74) or placebo (n=76) in SOURCE, incidence rates were 47.15 and 69.97 for AEs and 13.14 and 17.99 for SAEs, respectively. Tezepelumab reduced the AAER over 104 weeks versus placebo by 58% (95% CI: 49–65) and 39% (95% CI: 4–62) in NAVIGATOR and SOURCE patients, respectively, and reduced biomarker levels versus placebo.
Conclusion Tezepelumab was well tolerated for up to 2 years and resulted in clinically meaningful reductions in asthma exacerbations.

Please refer to page A209 for declarations of interest related to this abstract.

S48 EFFICACY OF TEZEPELUMAB ACCORDING TO AGE AT ASTHMA ONSET IN NAVIGATOR

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10.1136/thorax-2022-BTSabstracts.54

Background Patient age at asthma onset has been shown to affect response to biologic therapies that target type 2 inflammation. Tezepelumab is a human monoclonal antibody that blocks the activity of thymic stromal lymphopoietin (TSLP).
Objective This pre-specified exploratory analysis assessed the efficacy of tezepelumab in patients with severe, uncontrolled asthma from the phase 3 NAVIGATOR study (NCT03347279), grouped by age at asthma onset.
Methods NAVIGATOR was a multicentre, randomized, double-blind, placebo-controlled study. Patients (12–80 years old) receiving medium- or high-dose inhaled corticosteroids and $\geq$ 1 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. The annualized asthma exacerbation rate (AAER) was assessed in patients grouped by self-reported age at asthma diagnosis: < 18 (childhood onset), 18–40 (adult onset) and > 40 years old (late onset).
Results Of 1059 patients who received treatment, 399, 358 and 302 patients had childhood-, adult- and late-onset asthma, respectively. In the placebo group, the AAER was lower in patients with childhood-onset asthma (1.72) than in those with adult-onset asthma (2.52) or late-onset asthma (2.11). Tezepelumab reduced the AAER versus placebo by 48% (95% CI: 29–62%), 63% (95% CI: 49–73%) and 56% (95% CI: 37–69%) in patients diagnosed with childhood-, adult- and late-onset asthma, respectively.
Conclusion Tezepelumab reduced exacerbations versus placebo irrespective of age at asthma onset. These data further support the efficacy of tezepelumab in a broad population of patients with severe, uncontrolled asthma.

Please refer to page A209 for declarations of interest related to this abstract.

S49 EFFECT OF TEZEPELUMAB ON A COMPOSITE OF SEVERE ASTHMA EXACERBATIONS AND ACUTE WORSENING EVENTS, COMPEX, IN THE PHASE 3 NAVIGATOR STUDY

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10.1136/thorax-2022-BTSabstracts.55

Background CompEx is a composite outcome capturing severe asthma exacerbations, and acute worsening events (based on peak expiratory flow, reliever medication use and asthma symptoms). Tezepelumab, a human monoclonal antibody, targets thymic stromal lymphopoietin (TSLP). In the phase 3 NAVIGATOR study (NCT03347279), tezepelumab reduced the annualized rate of severe exacerbations by 56% versus placebo in patients with severe, uncontrolled asthma.
Objective To evaluate the effect of tezepelumab on CompEx in NAVIGATOR.
Methods In NAVIGATOR, patients (12–80 years old) were randomized 1:1 to receive tezepelumab 210 mg or placebo subcutaneously every 4 weeks for 52 weeks. This pre-specified analysis assessed the annualized rate of CompEx events over 52 weeks.
Results Among 1059 treated patients, the annualized CompEx event rate was reduced by 55% (95% CI: 45–62) with tezepelumab versus placebo (table 1). The number of events and the annualized event rate were greater for CompEx than for severe asthma exacerbations; both were lower with tezepelumab than placebo (table 1).

Abstract S49 Table 1 CompEx events and severe exacerbations in NAVIGATOR

Treatment group	Number of patients	Number of events	Total time atrisk (years)	Annualized event rate (95% CI)	Rate ratio, tezepelumab vs placebo (95% CI)
CompEx events					
Tezepelumab 210 mg	528	718	491.2	1.77 (1.53–2.04)	0.45 (0.38–0.55)
Placebo	531	1358	459.2	3.89 (3.41–4.43)	
Severe exacerbations					
Tezepelumab 210 mg	528	425	504.0	0.93 (0.80–1.07)	0.44 (0.37–0.53)
Placebo	531	878	482.1	2.10 (1.84–2.39)	

CI, confidence interval.

Conclusion Tezepelumab reduced the CompEx event rate, a composite of severe asthma exacerbations and acute worsening events, versus placebo by a similar magnitude to the reduction in the rate of severe exacerbations, further demonstrating the efficacy of tezepelumab in adults and adolescents with severe, uncontrolled asthma.

Please refer to page A210 for declarations of interest related to this abstract.

'Inside Out' – Bronchiectasis diagnostics and mechanisms

S50 PROFILING THE MICROBIOLOGICAL AND PROTEOMIC HETEROGENEITY IN PATIENTS WITH BRONCHIECTASIS AND CHRONIC PSEUDOMONAS AERUGINOSA INFECTION

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10.1136/thorax-2022-BTSabstracts.56

Introduction *Pseudomonas aeruginosa* (PA) infection is associated with worse clinical outcomes and more severe disease in bronchiectasis. Despite this, treatments such as inhaled antibiotics targeting *P. aeruginosa* have shown mixed results. Recent data suggests that even within apparently similar clinical cohorts, different inflammatory and microbial endotypes may be evident. We hypothesised that we would be able to identify endotypes within the PA infected bronchiectasis population.
Methods Sputum samples from patients with bronchiectasis were obtained from two replicate international randomized studies. Samples from baseline (before intervention) were used for analysis to exclude any treatment effects. Sputum protein profiling was performed by LC/MS. 16s sequencing and targeted qPCR were used for microbiome analysis and bacterial load respectively. Targeted measurement of neutrophil elastase (NE) activity was performed.
Results Proteomics identified a high level of heterogeneity within the PA infected population including two previously identified clusters, one with an intense neutrophil extracellular trap (NET) dominated response and another with higher levels of antiproteinases and epithelial proteins. Bacterial load varied from 0 to 9.34 log units/ml using qPCR and higher bacterial load was associated with a more neutrophilic proteome and a higher NE activity. Patients with a higher NET mediated response had worse symptoms (p=0.003) and FEV1 (p<0.001). Major drivers of the more severe cluster included LCP1, Azurocidin-1, calprotectin, CAT and MMP9 while the second cluster was defined by higher levels of SLPI, CST4, PIP and MUC5B. Partial least squares discriminant analysis confirmed this proteome profile was associated with higher bacterial load.

In the randomised ORBIT 4 trial higher bacterial load was associated with enhanced treatment response (prolonged time to first exacerbation (TTFE) (HR 0.34 [0.19–0.62], p<0.001) and reduced frequency of exacerbations (RR 0.38 [0.21–0.70], p=0.002). Reduced neutrophilic inflammation, reflected by a reduction during the trial in NE activity, was also associated with a significant benefit in prolonging TTFE (HR 0.48 [0.24–0.96], p=0.037).
Conclusion Patients with PA infection represent a heterogeneous group of patients with varied bacterial load and host inflammatory response. Our data suggest that biomarkers such as qPCR or host inflammatory biomarkers may be required to select for treatment responders in future RCTs.

S51 HETEROGENEITY OF SPUTUM AND SYSTEMIC INFLAMMATORY MEDIATOR PROFILES IN BRONCHIECTASIS

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10.1136/thorax-2022-BTSabstracts.57

Bronchiectasis is a complex and heterogenous disease. Recent findings have suggested in addition to a neutrophil predominant patient population there may be an eosinophil high bronchiectasis subpopulation.

We hypothesised that more severe bronchiectasis is associated with inflammatory mediator dysregulation with either high levels of TH1 related cytokines and/or allergy/Th2 mediators. We also hypothesised that longitudinal analysis comparing stable state to exacerbation may identify exacerbation related signals.
Methods We analysed serum and PBS-sputum fraction from the BronchUK project (all Newcastle centre samples n = 165) and the Clinimetrics study (baseline samples only from a longitudinal study, and compared to clinical metadata such as age, hospitalisations, lung function, body mass index (BMI), exacerbations, *Pseudomonas* infection status and disease severity; Bronchiectasis severity index (BSI). Data such as FEV1% predicted was analysed as both a continuous variable and a categorical variable (FEV1 <30% predicted or >30% predicted as per BSI scoring). Adjustments were made for multiple comparisons using the Benjamini-Hochberg method and a threshold set at a False Discovery Rate of 0.05.
Results Considering serum and sputum inflammatory mediator levels, no sputum mediator showed statistically significant correlation with its corresponding serum levels. Correlation between different mediators sometimes reached statistical significance however, e.g. Serum IL-6, sputum TNF-Alpha, p adj = 0.001, r = 0.5.

Overall, there were markedly more cytokines detected in sputum compared to serum.

There were significant correlations between serum IL-6 and FEV1 (negative correlation, p adj =0.017, r = -0.3 and a positive correlation with breathlessness/MRCD (p adj =0.039, r = 0.26)

No mediator either in sputum or serum correlated with BSI. Anti-inflammatory mediators such as VEGF and IL-10 were not significantly different in those with milder disease BSI scales.
Conclusions Bronchiectasis is heterogenous in inflammatory mediator profiles. Defining subpopulations and severity index requires further work – sputum sampling is likely required to identify therapeutics for specific subpopulations.

Please refer to page A210 for declarations of interest related to this abstract.

S52 THE INCIDENCE AND IMPACT OF VIRAL RESPIRATORY INFECTIONS IN ADULTS HOSPITALIZED WITH EXACERBATIONS OF BRONCHIECTASIS

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10.1136/thorax-2022-BTSabstracts.58

Background/Aims The importance of viral respiratory infections (VRI) in exacerbations of bronchiectasis is poorly understood. However, they have been proposed as the microbiological 'trigger' for bronchiectasis exacerbations.

The aims of this study were to describe the rate of VRI in patients hospitalized with bronchiectasis exacerbations and evaluate their effects on exacerbation severity.
Methods Adult patients hospitalised with acute respiratory illness to two hospitals in Auckland, New Zealand between 2012–2015 were screened for inclusion in the Southern Hemisphere Influenza and Vaccine Effectiveness Research and Surveillance (SHIVERS) project, a population-based virus surveillance study. Nasopharyngeal sampling was used to test

for respiratory viruses using real-time PCR. Patients with bronchiectasis were identified using ICD-10 code J47, 'bronchiectasis'.

Individual patient data and electronic patient records were reviewed; patients with bronchiectasis due to cystic fibrosis were excluded, as were patients with no clinical evidence of bronchiectasis. Pre-specified parameters were used to describe severity of exacerbation.

Results 526 patients with bronchiectasis experienced 979 admissions with acute respiratory illnesses. Nasopharyngeal sampling for VRI was performed in 429 admissions (43.8%). Of these, 154 (35.9%) tested positive for VRI, including 62 (14.4%) cases of influenza, 59 rhinovirus (13.8%) and 20 RSV (4.7%). 11 patients (2.5%) tested positive for more than one respiratory virus.

Median LOS was longer for patients with VRI (5 [3–7] vs 4 days [2–6] respectively, p=0.032). Patients with VRI were more likely to receive non-invasive ventilation (3.9% vs. 0.8%, p=0.022), and more likely to have a fever (76% vs. 66%, p=0.034). 4.4% of patients died within 30 days of their first recorded admission, and 16.2% died within a year, with no difference between patients testing positive or negative for VRI.

Conclusions To our knowledge, this is the largest study to investigate the role of viral respiratory infection in patients with bronchiectasis exacerbations. VRI is common in exacerbations requiring hospitalisation and is associated with some markers of more severe illness, including longer duration of hospital admission. Influenza was the most common viral infection, highlighting the importance of public health measures against influenza and other viruses, including vaccination and testing, to limit the effects of viral respiratory infection in bronchiectasis.

S53 WHAT SHOULD WE MEASURE IN PHYSIOTHERAPY RESEARCH FOR BRONCHIECTASIS? QUALITATIVE INTERVIEWS TO INFORM THE DEVELOPMENT OF A CORE OUTCOMES SET

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10.1136/thorax-2022-BTSabstracts.59

Introduction Physiotherapy is a recommended treatment for bronchiectasis, but evidence of effectiveness is unclear partly due to variable selection of outcome measures and inconsistent reporting.[1] To address this, the COS-PHyBE study is developing a core outcome set (COS) for physiotherapy research in adults with bronchiectasis.[2] The COS will identify a minimum group of outcomes for use in clinical trials of physiotherapy. The COS should reflect the views of all stakeholders, including patients and clinicians. The qualitative interview study reported here comprises part of the first stage of COS development.

Methods The sample included adult patients diagnosed with bronchiectasis and previously treated with physiotherapy, as well as physiotherapists clinically involved in bronchiectasis care. Participants were recruited online through patient and professional organisations and social media. All interviews were conducted via video conferencing. Semi structured interviews aimed to elicit outcomes important to participants, using interview prompts. Interviews were digitally recorded, transcribed verbatim and thematic analysis used to identify, classify, prioritise, and explain the significance of outcomes.

Abstract S53 Table 1 List of outcome domains identified from interviews

Outcome Domain	Description
Disease activity	Exacerbations, disease progression and change in severity
Clinical and physiological outcomes	Outcomes that reflect function of body systems e.g: Lung function, blood gases, vital signs variability, muscle strength
Sputum	Sputum amount (weight or volume), biophysical characteristics (viscosity, adherence, elasticity etc.), and colour
Patient reported symptoms	Reported symptoms included breathlessness, cough, fatigue, feeling of chest congestion, wheeze and chest rattling, pain, and coughing up blood (haemoptysis)
Physical functioning	General evaluation of ability to function physically, e.g. moving, doing daily activities, walking, sleeping.
Social functioning	Ability to get involved in social functioning activities, e.g. relationship with family and friends, social events, public speech, and travel
Role functioning	Ability to perform according to role in life, e.g. being a spouse, parent, carer, professional.
Emotional functioning and wellbeing	General evaluation of emotional and psychological wellbeing e.g anxiety and depression
Health related quality of life	An overall measure of how a person's health affects their life and general wellbeing
Patient reported experience	Patient's preference and adherence to treatment, perception of usefulness, ease of understanding of instructions, ease of performance, degree of tiredness, and discomfort.
Feasibility and burden of treatment	Evaluation of feasibility or burden of physiotherapy, based on cost, time, and difficulty aspects
Use of healthcare resources	Includes occasions patient needs hospitalisation, ICU, urgent outpatient visits to general practitioner, walk-in clinic, or emergency department
Need for further intervention	Antibiotics and other medical treatments needed during or after physiotherapy treatment
Adverse effects	Adverse effects of physiotherapy treatment
Mortality and survival	Include death from bronchiectasis complications or from any cause

Results A total of 18 interviews were conducted. Participants were from 4 countries and different settings, and with various backgrounds and experiences. A total of 70 outcomes of importance to patients and physiotherapists were elicited through the semi structured qualitative interviews, they were grouped into 15 domains (table 1). Thematic analysis revealed exacerbations, quality of life, use of healthcare resources, patient reported symptoms, physical functioning, and sputum as the prominent themes reported by both groups.

Conclusions This qualitative study highlighted the importance of considering stakeholders perspectives when planning research trials. Outcomes identified in this study will be used to inform the next phase of COS development; the international Delphi consensus study.

REFERENCES

1. Polverino E, Goeminne P, McDonnell M, *et.al*. European Respiratory Society guidelines for the management of adult bronchiectasis. *European Respiratory Journal* 2017;**50** (3)
2. Hamzeh H, Spencer S, Kelly C. Development of a core outcome set and outcome measurement set for physiotherapy trials in adults with Bronchiectasis (COS-PHyBE study): A protocol. *PLOS One* 2022;**17**(2): e0263695.

S54 THE LUNG MICROBIOME IN NONTUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE

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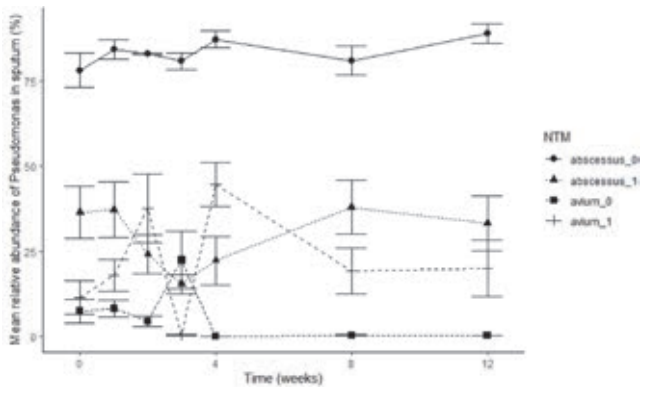
Introduction and Objectives Nontuberculous mycobacterial pulmonary disease (NTM-PD) incidence is rising. 16S rRNA gene sequencing has demonstrated that the lung microbiome has a role in the pathogenesis of pulmonary diseases. Data on the relationship between the lung microbiome and NTM-PD are limited. We aimed to quantify the total pulmonary bacterial burden in NTM-PD patients and characterise changes in their lung microbiome over time.
Methods Sputum samples were acquired longitudinally at baseline, weekly for 4 weeks and then monthly up to 3 months from 37 patients who either had NTM-PD and were starting NTM treatment; had NTM-PD but did not require treatment; or did not have NTM-PD. Sputum DNA was extracted using a hexadecyl-trimethyl-ammonium bromide phenol chloroform protocol. Total bacterial burden was quantified using 16S rRNA gene SYBR green quantitative polymerase chain reaction. 16S rRNA gene sequencing was performed on an Illumina MiSeq™ Next Generation Sequencer. Statistical analysis was performed in R version 4.1.3.
Results At baseline, sputum biomass was higher in *Mycobacterium avium* complex (MAC) pulmonary disease (MAC-PD) patients than *M. abscessus* (MAB) pulmonary disease (MAB-PD) patients ($P<0.05$); there was no significant difference at 3 months. Alpha diversity measures (richness, Shannon index, Simpson index, Pielou's evenness index) were higher among MAC-PD than MAB-PD patients at baseline and at 3 months ($P<0.05$ for all measures). Beta diversity measured using the Bray-Curtis dissimilarity index significantly differed between the MAC-PD, MAB-PD and non-NTM groups at baseline ($P<0.05$) and at 3 months ($P<0.01$). Richness was lower in the MAC-PD treatment group compared to the non-treatment group at 3 months ($P<0.05$); there were no other differences between these groups in diversity or sputum biomass at baseline or 3 months. There was a higher mean abundance of *Pseudomonas* in the MAB-PD non-treatment group compared to the MAB-PD treatment group and the MAC-PD non-treatment or treatment groups across all timepoints (figure 1).
Conclusion Our study demonstrates that the lung microbiome is influenced by the presence of MAC and MAB. This may impact progression and prognosis in NTM-PD. Further investigation will evaluate how lung microbiome perturbations correlate with clinical parameters and identify biomarkers of NTM pathogenicity and treatment response.



Abstract S54 Figure 1 Mean relative abundance of Pseudomonas in the sputum of patients with MAB-PD not requiring treatment ('abscessus_0'), MAB-PD requiring treatment ('abscessus_1'), MAC-PD not requiring treatment ('avium_0') and MAC-PD requiring treatment ('avium_1') over time. Data shown as mean +/- standard error of the mean

Please refer to page A210 for declarations of interest related to this abstract.

'Change in the Air (ways)' – Airway biology

S55 TISSUE RESIDENT MAIT CELL PHENOTYPE IN THE UPPER AIRWAY

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Introduction Mucosal associated invariant T (MAIT) cells are the most abundant anti-bacterial innate T cell subset within humans, enriched at mucosal barrier (≤10% of airway T-cells) and profoundly suppressed in the lower airway by corticosteroids in severe asthma. MAIT cells are activated by riboflavin metabolites presented via MHC-related protein 1 (MR1) and by cytokines. MAIT cells can also express a 'tissue repair' programme conferring immunoregulatory properties. This has been demonstrated in lower airway MAIT cells but nasal cells are yet to be fully characterised. The upper airway is of interest in severe asthma given the burden of sinonasal disease. The nasopharynx is a distinct compartment with unique microbiome – we therefore hypothesise that disruption of local environments with corticosteroid use and airways infection can alter MAIT cell phenotype. This study aims to define nasal MAIT cell phenotype and function in health with the view to extend these approaches to severe asthma.
Methods Nasal brushings were taken from healthy (n=8) and severe asthmatic (n=6) individuals and MAIT cell frequency determined (CD3+Va7.2+CD161+) by flow cytometry. Healthy nasal brushings and paired peripheral blood samples were enriched for lymphocytes by density gradient centrifugation prior to activation with TCR (5-OP-RU 10nM, 6 h) or non-TCR (IL-12/18, 50 ng/ml each, 20 h) directed stimulus. MAIT cell phenotype and cytokine production were characterised by Cytek Aurora spectral analyser.
Results Compared with peripheral blood, nasal MAIT cells possess a tissue resident memory phenotype at steady state (CD103, CD25 and CD69 high, $p<0.01$). These cells constitutively express Granzyme B and IL-17A, which is further induced following TCR dependent or independent stimulation. Conversely, following stimulation, peripheral blood MAIT cells produce an IFN-gamma (IL-12/18, $p<0.05$) and TNF (5OPRU and IL-12/18, $p<0.01$) biased response, alongside upregulation of granzyme B, CD25 and CD69. Within this small cohort to date no significant reduction in nasal MAIT cell frequency was observed in severe asthma.

Conclusions Nasal MAIT cells possess a tissue resident memory phenotype and are skewed towards an immunoregulatory functionality compared with their peripheral blood counterparts. Ongoing work will analyse airway MAIT cell responses in severe asthma through functional assays and transcriptomic analysis.

S56 ZFP36L1 AND ZFP36L2 DEFICIENCY CONTRIBUTE TO STEROID REFRACTORINESS AND EPITHELIAL REMODELLING IN SEVERE ASTHMA

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10.1136/thorax-2022-BTSabstracts.62

Background Asthma is the most common chronic inflammatory disease of the airways. Patients with severe asthma (SA) show poor response to steroid treatment and can be now treated by biologics if eosinophilic. The underlying mechanisms of SA, however, remain poorly understood. Most omics approaches assess changes at the mRNA (transcription) or protein levels, overlooking that not all mRNAs translate into proteins. mRNA-to-protein levels correlate poorly due to post-transcriptional regulation, undertaken by microRNAs and RNA binding proteins (RBPs). There are more RBPs than transcription factors; however, their role in SA and steroid responsiveness remains largely unknown.
Methods Frac-seq (subcellular fractionation and RNA-sequencing) to investigate transcriptional and post-transcriptional mRNA expression, qPCR, siRNA modulation and RNA immunoprecipitation (RIP).
Results The RBPs ZFP36L1 and ZFP36L2 are dysregulated in SA bronchial epithelial cells (BECs) and modulate corticosteroid responses. We employed Frac-seq in primary BECs depleted of L1 and L2 (mimicking SA) vs control and stimulated with dexamethasone. We compared the effects of dexamethasone on gene expression in different subcellular compartments: 'total' (current 'transcriptomics'), 'monosomes' (mRNAs poorly translated) and 'polyribosomes' (mRNAs heavily translated). Dexamethasone modulated mRNA expression distinctively on these three subcellular compartments; thus steroids modulate both mRNA transcription and translation. RIP demonstrated that ZFP36L1/L2 bind to their mRNA targets in a steroid-dependent manner. ZFP36L1/L2 and steroids altered the expression of mRNAs encoding structural proteins, hinting at these RBPS as modulators of epithelial structural changes and steroid poor responsiveness.
Conclusions ZFP36L1/L2 are novel modulators of steroid effects in epithelium and may potentially contribute to steroid refractoriness.

Please refer to page A210 for declarations of interest related to this abstract.

S57 SERINE PROTEASES IN HOUSE DUST MITE EXTRACT MEDIATE PAR-2-ASSOCIATED CALCIUM SIGNALING AND A PRO-INFLAMMATORY RESPONSE IN ASTHMA HUMAN PRIMARY BRONCHIAL EPITHELIAL CELLS

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10.1136/thorax-2022-BTSabstracts.63

Introduction and Objectives Exposure to house dust mites (HDM) is commonly linked with the development and progression of allergic asthma. HDM contain trypsin-like (TLPs) and chymotrypsin-like serine proteases and cysteine proteases which can compete with endogenous enzymes to cleave the extracellular amino terminus of protease-activated receptors (PARs). The newly exposed amino terminal 'tethered ligand' activates the receptor, triggering calcium signalling and a concomitant increase in pro-inflammatory cytokine expression. The objective of this study was to dissect the protease components of HDM extract to assess their activation of PARs and effect on inflammatory mediators, IL-33 and TSLP.
Methods HDM was pre-treated with E-64 and a novel bioactive peptide, PE-BBI (Reihill et al, *Biomolecules* 2020; 10 (4):515) or aprotinin to selectively inhibit cysteine and serine proteases, respectively or was heat-inactivated (HI-HDM) to abolish all protease activity before being added to human primary asthmatic bronchial epithelial cells (hPBECs) in submerged cultures for 2 and 48 hrs. Calcium mobilization was determined by quantification of the fluorescent signal using the Fluo-4 Direct™ Calcium Assay Kit and FlexStation (Molecular Devices). IL-33, TSLP mRNA expression was measured by TaqMan gene expression two step RT-qPCR.
Results No difference was observed in calcium mobilization between HDM and HDM pre-treated with E-64. In contrast, calcium mobilization was reduced by 73% and 76%, when HDM was pre-treated with PE-BBI and aprotinin, respectively. Prior treatment of hPBECs by HDM had little impact on the PAR2 agonist peptide, 2-FLI's ability to induce calcium mobilization. In contrast HDM prevented a further trypsin-induced increase of intracellular calcium levels. Pre-treatment of HDM with PE-BBI however, selectively abolished the impact of HDM on trypsin-induced calcium mobilization, whereas aprotinin prevented both HDM and trypsin from inducing calcium mobilization. An increase in IL-33 or TSLP mRNA expression in the presence of HDM was not observed upon treatment with HI-HDM and was reduced when HDM was pre-treated with aprotinin.
Conclusion Our data showed that HDM serine proteases can induce PAR-2 associated calcium signaling and increased IL-33 and TSLP expression in asthmatic airway cells. These observations contribute to our understanding of HDM-induced inflammation and possibly epithelial barrier dysfunction in asthmatic airways.

S58 UPF1 IS A NOVEL MODULATOR OF ANTIVIRAL RESPONSES AGAINST RHINOVIRUS AND IS DEFICIENT IN PATIENTS WITH SEVERE ASTHMA

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10.1136/thorax-2022-BTSabstracts.64

Background Asthma is the most common chronic inflammatory disease of the airways, with rhinovirus (RV) being the main cause of asthma exacerbations. Patients with severe asthma (SA) present deficient antiviral/interferon responses but the mechanisms underlying this remain poorly understood. RV is a single positive strand RNA virus recognised by RNA sensing helicases, and may also bind to host RNA binding proteins that mediate transcriptome surveillance such as UPF1 within the nonsense mediated decay pathway.

Methods Frac-seq (subcellular fractionation and RNA-sequencing) to investigate transcriptional and post-transcriptional mRNA expression, qPCR, siRNA and CRISRP/Cas9 as well as RNA immunoprecipitation (RIP).
Results UPF1 is dysregulated in SA bronchial epithelial cells. UPF1 directly binds RV RNA and mediates its degradation. On the other hand, RV infection is able to increase UPF1 phosphorylation and activity in a time-dependent manner. Frac-seq allowed us to compare the effects of RV infection on gene expression in different subcellular compartments: 'total' (current 'transcriptomics') 'and 'polyribosomes' (mRNAs heavily translated). RV modulated not only the transcription, but also the translation, of specific mRNA isoforms, pointing towards novel antiviral targets that modulate RV pathophysiology. UPF1 downregulation modulated the antiviral response against RV, at both transcriptional and post-transcriptional levels. Lastly, CRISPR/Cas9 modulation of the archetypical helicases RIG-I and MDA5 showed that UPF1 exerts its effects as a novel helicase within the pathway.
Conclusions UPF1 is a novel modulator of RV pathophysiology in epithelium and its depleted levels in SA may potentially contribute to deficient antiviral immunity in these patients.

S59 EPITHELIAL IMMUNE ACTIVATION AND INTRACELLULAR INVASION BY NON-TYPEABLE HAEMOPHILUS INFLUENZAE

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Background Type-2 low asthma affects 30–50% of patients in severe asthma clinics and includes a phenotype characterised by sputum neutrophilia and resistance to therapeutic corticosteroids. Airways inflammation in such individuals may be driven by persistent bacterial colonisation of the lower airways by organisms such as non-encapsulated strains of the gram-negative bacterium *Haemophilus influenzae* (NTHi). Although considered a pathogen in the lower airways, NTHi is a commensal of the upper airways. It is not known to what extent these strains can invade airway epithelial cells, persist intracellularly and activate epithelial cell production of proinflammatory cytokines, and how this differs between the upper and lower airways.
Methods We studied NTHi infection of primary human bronchial epithelial cells (PBEC), primary nasal epithelial cells (NECs) and epithelial cell lines (Calu-3, RPMI2650, BEAS2-B) from upper and lower airways grown in submerged and air-liquid interface cultures. Bronchoscopies were performed on healthy volunteers according to established SOPs after ethical approval (18/SC/0361 and 08/H0402/189) and written informed consent. Adherent, paracellular and internalised bacteria were enumerated by gentamicin exclusion assays, and confirmed by confocal microscopy. Cytokines and signalling pathways were evaluated by qPCR, and Fluidigm PCR array, whilst cytokine production was confirmed by ELISA.
Results We found NTHi was internalised within PBEC at 6 hours, but live intracellular infection did not persist at 24 h. NTHi strains differed in their propensity for intracellular and paracellular invasion. Confocal microscopy and flow cytometry showed NTHi infected secretory, ciliated and basal PBEC. Infection of PBEC led to induction of CXCL8, interleukin (IL)-1b, IL-6 and TNF. The magnitude of cytokine induction was independent of the degree of intracellular invasion differing by strain-specific propensity to invasion or by cytochalasin D inhibition of endocytosis, with the exception of the inflammasome-induced mediator IL-1b. NTHi-induced activation of TLR2/4, NOD1/2 and NLR inflammasome pathways was significantly stronger in NEC than in PBEC.
Conclusions Together our data suggest that NTHi can be internalised transiently by airway epithelial cells and has capacity to drive inflammation in airway epithelial cells of the lower and upper airway.

Please refer to page A210 for declarations of interest related to this abstract.

'The Day After Tomorrow' – Impact of the carbon footprint in lung health

S60 A NEW MEDICAL PROPELLANT HFO-1234ZE(E): REDUCING THE ENVIRONMENTAL IMPACT OF INHALED MEDICINES

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Introduction and Objectives Pressurised metered dose inhalers (pMDIs) are an essential device option for patients with respiratory disease. However, due to the climate emergency, they face increased scrutiny due to the high global warming potential (GWP) of the propellant. Transition to pMDIs with next generation propellants (NGP) with a significantly lower GWP can provide a solution to support healthcare systems meet their carbon targets. In this work we show the reduction in greenhouse gas (GHG) emissions i.e. carbon footprint of a triple therapy pMDI with budesonide/glycopyrronium/formoterol fumarate dihydrate (BGF) realised by substituting the current propellant (HFA-134a) with candidate options HFA-152a or HFO-1234ze(E).
Methods Cradle to grave life cycle inventory assessments of GHG emissions for this therapy were made using three propellants (HFA-134a, HFA-152a and HFO-1234ze(E)) aligned with ISO standards 14040 and 14044. GHG data were third party assured and considered variations resulting from the country of use, patient behaviour and disposal. In addition, four other key environmental impacts were quantified (freshwater use and ecotoxicity, resource and ozone depletion) and a comprehensive review was completed to understand the fate and effects of the candidate propellants and any transformation products to ensure holistic environmental due diligence.
Results Substitution of HFA-134a with the selected NGP HFO-1234ze(E) would reduce the GWP of the propellant by >99% resulting in a GHG emissions reduction for the whole pMDI device of at least 85%. Furthermore, other environmental impacts are reduced and the atmospheric transformation products are not of concern.
Conclusions A pMDI using HFO-1234ze(E) would have GHG emissions typical of a dry powder inhaler (DPI) on a per dose basis. A change to a new propellant requires substantial investment, safety and clinical studies as well as regulatory approvals. Consequently, we estimate to transition to the new propellant in a portfolio of pMDI products across all markets, will take at least 5 years after the first product launch. However, a next generation of pMDIs with near-zero GWP

Abstract S60 Table 1 GHG footprint ranges of triple therapy BGF pMDI*

	GHG footprint range kg CO_2 eq. (**excluding** prescription collection and delivery)					
Market	UK market			EU markets		
Propellant	HFA-134a	HFA-152a	HFO-1234ze (E)	HFA-134a	HFA-152a	HFO-1234ze (E)
Per device	13.5	2.1	1.1	12.9–14.8	2.0–2.2	1.1
Per dose	0.225	0.035	0.018	0.215–0.247	0.033–0.037	0.018
Per actuation	0.113	0.018	0.009	0.108–0.123	0.017–0.018	0.009

	GHG footprint range kg CO_2 eq. (**including** prescription collection and delivery)					
Market	UK market			EU markets		
Propellant	HFA-134a	HFA-152a	HFO-1234ze (E)	HFA-134a	HFA-152a	HFO-1234ze (E)
Per device	14.5	3.1	2.1	13.9–15.8	3.0–3.2	2.1
Per dose	0.242	0.052	0.035	0.232–0.263	0.050–0.053	0.035
Per actuation	0.121	0.026	0.018	0.116–0.132	0.025–0.027	0.018

*160/7.2/5 µg (budesonide/glycopyrronium/formoterol fumarate dihydrate) inhalation aerosol, 120 actuations, 2 actuations per dose.
Note: Data ranges were 3rd Party assured to the Greenhouse Gas Accounting Sector Guidance for Pharmaceutical Products and Medical Devices, GHG Protocol Product Life Cycle Accounting and Reporting Standard and cover all stages of the product value chain from cradle-to-grave

propellant offers a way to resolve the climate and other environmental impacts posed by these devices without restricting patient choice or compromising clinical outcomes.

S61 REDUCING THE ENVIRONMENTAL IMPACT OF PRESSURIZED METERED DOSE INHALERS: RELATIVE BIOAVAILABILITY OF BUDESONIDE/GLYCOPYRRONIUM/FORMOTEROL FUMARATE DIHYDRATE WITH NOVEL PROPELLANT FORMULATIONS IN HEALTHY SUBJECTS

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10.1136/thorax-2022-BTSabstracts.67

Introduction and Objectives There is value in assessing whether it is possible to formulate metered dose inhaler (MDI) products using novel propellants with lower greenhouse gas potential than, and comparable pharmacokinetic (PK) parameters to, currently marketed MDIs. The objective of this study was to evaluate the relative bioavailabilities of the components in the fixed-dose combination of budesonide, glycopyrronium, and formoterol fumarate dihydrate (BGF) between three different propellant formulations of BGF MDI, 160/7.2/5 µg per actuation.

Methods Healthy subjects aged 18 to 60 years were randomized into a single-blind, three-period, single-dose, single-centre, crossover study (NCT04600505). The study assessed three propellants: hydrofluoroolefin (HFO-1234ze; test), hydrofluorocarbon (HFC-152a; test) and hydrofluoroalkane (HFA-134a; marketed reference product, Trixeo Aerosphere^{TM}). The study included a screening period, three treatment periods and a follow-up. There was a washout period of 3 to 7 days between each dose. The primary PK parameters were the maximum observed plasma concentration (C_{max}) and the area under the plasma concentration curve from time zero to the last quantifiable analyte concentration (AUC_{last}). The study had low statistical power to demonstrate bioequivalence.

Results Twenty-four healthy subjects were evaluable for PK assessments and completed the study. Systemic exposure to budesonide, glycopyrronium and formoterol from the test products, BGF MDI HFO-1234ze and BGF MDI HFC-152a, was comparable to the reference product, BGF MDI HFA-134a, for C_{max} and AUC_{last} (table 1). There were no reported serious adverse events or adverse events that led to treatment discontinuation during this study. No new safety signals were observed.

Conclusions Systemic exposure to all BGF components was similar when delivered with either novel test propellant (HFO-1234ze and HFC-152a) relative to the reference propellant (HFA-134a) used in marketed BGF. The combination of BGF when administered as single doses in three different propellant formulations demonstrated an acceptable safety profile and was well tolerated in the studied population. Both novel, low global warming-potential propellants may be viable for use in a clinical setting; therefore, further investigation in larger studies is warranted.

Please refer to page A210 for declarations of interest related to this abstract.

Abstract S61 Table 1 Relative bioavailabilities of budesonide, glycopyrronium and formoterol in a fixed-dose combination of BGF between three propellant formulations

Propellant comparison	BGF component	PK parameter	GMR,% (90% CI)
HFO-1234ze vs HFA-134a	Budesonide	C_{max}	111.7 (91.0, 137.1)
		AUC_{last}	107.3 (94.5, 121.9)
	Glycopyrronium	C_{max}	108.3 (85.5, 137.3)
		AUC_{last}	106.1 (86.2, 130.6)
	Formoterol	C_{max}	109.1 (97.0, 122.7)
		AUC_{last}	98.1 (86.4, 111.4)
HFC-152a vs HFA-134a	Budesonide	C_{max}	98.8 (78.7, 124.0)
		AUC_{last}	98.8 (84.6, 115.4)
	Glycopyrronium	C_{max}	94.9 (74.7, 120.5)
		AUC_{last}	99.7 (80.8, 123.0)
	Formoterol	C_{max}	100.1 (83.8, 119.5)
		AUC_{last}	107.0 (88.8, 128.9)

AUC_{last}, area under the plasma concentration curve from time zero to the last quantifiable analyte concentration; BGF, budesonide/glycopyrronium/formoterol fumarate dihydrate; CI, confidence interval; C_{max}, maximum observed plasma concentration; GMR, geometric mean ratio; HFA, hydrofluoroalkane; HFC, hydrofluorocarbon; HFO, hydrofluoroolefin; PK, pharmacokinetic.

S62 EXPLORING THE ENVIRONMENTAL IMPACT OF INHALER DISPOSAL AND THE FEASIBILITY OF POSTAL INHALER RECYCLING IN THE UK: RESULTS FROM THE TAKE AIR PILOT, POSTAL INHALER RECYCLING SCHEME

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10.1136/thorax-2022-BTSabstracts.68

Introduction and Objectives All inhalers have an environmental impact. The majority are not recycled, and many are disposed of inappropriately through domestic waste. All pressurised metered-dose inhalers (pMDIs) are manufactured with an overfill of medication; inappropriate disposal of pMDIs with residual propellant releases hydrofluorocarbon (a greenhouse gas) into the environment. To correctly dispose of inhalers, patients are currently required to return them to their community pharmacies; however, there is a lack of awareness and uptake of such schemes. To assess the feasibility of an alternative method for recovering and recycling inhalers, Chiesi Limited set up and funded Take AIR (Action for Inhaler Recycling), a postal recycling scheme.

Methods Take AIR was a pilot, postal inhaler recycling scheme facilitated by community pharmacies across Leicester, Leicestershire and Rutland (LLR) and hospitals in Leicestershire. Patients prescribed inhalers were provided with pre-paid, pre-addressed envelopes that could be used to return inhalers to Grundon Waste Management Limited. All inhaler types could be returned. pMDIs were dismantled, with aluminium canisters crushed for smelting and plastic casings pelletised ahead of recycling. Remaining propellant gas was extracted for reuse in non-pharmaceutical items (e.g. refrigerators, air conditioning units). Using predictive modelling, carbon emission savings from recycled pMDIs were estimated. Other inhaler types were incinerated at an energy-from-waste facility. A qualitative survey of patients involved in Take AIR was also conducted.

Results In the first 12 months, 5258 envelopes containing 20 004 inhalers were returned to the waste management company; most inhalers (77%) were pMDIs. During this time period, Take AIR saved the equivalent of an estimated 117.9 tonnes of carbon dioxide emissions from entering the atmosphere. The scheme has been well received by patients: 73% of respondents (n/N=36/49) stated that they were 'very satisfied' with it.

Conclusion The Take AIR scheme demonstrates the feasibility and effectiveness of a postal inhaler recovery and recycling scheme, albeit from data limited to the LLR region over a relatively short term. This initiative may offer some advantages (e.g. postal collection and recycling and reuse of some inhaler parts) compared with previous schemes.

Please refer to page A210 for declarations of interest related to this abstract.

S63 PARTNERING PATIENTS ON CLIMATE CHANGE; ASSESSING PATIENTS' UNDERSTANDING OF THE CARBON FOOTPRINT OF INHALERS

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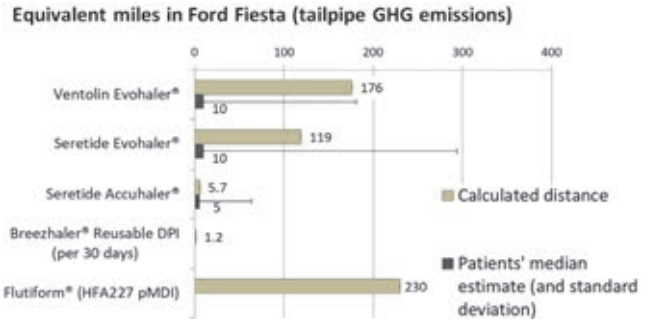
10.1136/thorax-2022-BTSabstracts.69

Introduction Healthcare professionals have a duty to minimise the carbon footprint of treatments. For maximum impact, we must actively partner with patients by informing them about the carbon footprint of their treatments.

Inhalers are mainstays of treatments for asthma and COPD, delivered through pressurised metered-dose inhalers (pMDIs), soft-mist inhalers (SMIs), and dry-powder inhalers (DPIs). pMDIs have a carbon footprint 10–200 times that of DPIs.[1] pMDIs account for 13% of the United Kingdom NHS's total carbon footprint related to the delivery of care.[1]

Methods We surveyed primary care patients with asthma (n=32) and COPD (n=24) through a clinical trials database (Medicines Evaluation Unit, Manchester), asking them to estimate the number of miles travelled in a small car (petrol Ford Fiesta; the most common car in the UK)[2] that would have equivalent tailpipe greenhouse-gas emissions as the carbon footprint of three commonly used inhalers: Ventolin HFC 134a pMDI (28kg CO_2e, equivalent to 176 miles); Seretide® HFC 134a pMDI (19kg CO_2e, equivalent to 119 miles; Seretide® DPI (0.90kg CO_2e, equivalent to 5.6 miles).[1]

Results Patients had highly variable and inaccurate estimates of the carbon footprint of both pMDIs. The median estimate for both pMDIs was 10 miles, versus 5 miles for the DPI. The median patient estimate was 18 times lower than the true amount for Ventolin Evohaler.



Abstract S63 Figure 1 The estimated and calculated carbon footprint of various inhalers, expressed as distance driving a Ford fiesta that has equivalent tailpipe greenhouse gas (GHG) emissions. From Wilkinson *et al*.[1]

Discussion A survey of over 12,000 UK asthma patients found that 60% of pMDI users said they 'would' change their inhaler for environmental reasons, while a further 21% indicated they might.[3] Asthma patients want an active role in their treatment decisions,[1] however they lack simple data to inform that decision. We have found comparisons with the number of miles travelled in a car to be readily understood. Providing this information in a comprehensible way will empower patients to make decisions about the selection, use and disposal of their inhalers, which would minimise their environmental impact without losing control of their asthma.[1]

REFERENCES

1. Wilkinson A, Woodcock A. The environmental impact of inhalers for asthma: A green challenge and a golden opportunity. *Br J Clin Pharmacol* 2021;Oct 31. doi: 10.1111/bcp.15135
2. FORD Fiesta becomes Best-Selling UK Car. https://media.ford.com/content/fordmedia/feu/gb/en/news/2014/07/22/ford-fiesta-becomes-best-selling-uk-car-of-all-time.html

3. D'Ancona G, Cumella A, Renwick L, *et al*. The sustainability agenda and inhaled therapy: what do patients want? ERS international conference. 2021.

Please refer to page A210 for declarations of interest related to this abstract.

S64 IMPACT OF CHOICE OF SALBUTAMOL PMDI AND USE OF SPACER ON DRUG DELIVERY AND EMISSIONS – BEST FOR PATIENT AND ENVIRONMENT

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10.1136/thorax-2022-BTSabstracts.70

Introduction and Objectives MDIs are an important device option for many respiratory patients. The addition of a spacer can improve lung deposition, overcome coordination issues and reduce side effects caused by oropharyngeal deposition. As current MDIs contain hydrofluorocarbon propellants, it would be beneficial to find ways to reduce carbon emissions without compromising patient safety. This lab study investigated a way to optimize the modelled lung dose per actuation while at the same time minimizing the carbon emissions from the MDI.

Methods Two different salbutamol 100 mcg MDIs were investigated, Ventolin (GSK) and Salamol (Teva), both available in the UK market. Each was tested alone and combined with an AeroChamber Plus* Flow-Vu* Spacer (TMI). Fine particle mass (< 4.7 microns), therefore the mass of drug in the size range potentially available for lung delivery, was determined using an abbreviated cascade impactor, performed with no delay following actuation, and HPLC assay. Carbon emissions per actuation were also determined.

Results The carbon emissions per actuation were available for Ventolin and Salamol from a reference source. The results are reported in the table below. The fine particle mass data of the different configurations are also shown in the table. A key point to note is the increase of delivery from 32.5 mcg/actuation for Ventolin alone to 54.4 mcg/actuation for Salamol delivered with the spacer.

Abstract S64 Table 1

	Ventolin alone	Ventolin/ Spacer	Salamol alone	Salamol/ Spacer
Fine Particle Mass (mcg/ actuation), Mean (sd)	32.5 (+/- 4.8)	35.9 (+/- 1.6)	41.3 (+/- 4.2)	54.4 (+/- 3.9)
MDI Carbon emissions per actuation (Kg CO2)	0.141	0.141*	0.060	0.060*

*Note: a conservative assumption was made that no savings are achieved through the spacer retaining any carbon emissions

Conclusions The use of the spacer with a lower carbon emitting salbutamol MDI has the potential to improve lung delivery and reduce carbon emissions. In combination, the selection of the Salamol MDI delivered using the AeroChamber Plus* Flow-Vu* Spacer could potentially reduce the number of actuations required for patient relief of symptoms, which could help contribute to an up to 4 times reduction in the carbon emissions compared to using a Ventolin MDI product alone.

Please refer to page A210 for declarations of interest related to this abstract.

S65 GLOBAL WARMING IMPACT OF INHALERS: THE PATIENT PERSPECTIVE

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10.1136/thorax-2022-BTSabstracts.71

Aims Inhalers contribute 3% of the NHS' carbon emissions. Switching from metered-dose inhalers (MDIs) to dry powder inhalers significantly reduces greenhouse gas emissions, can be cost-effective and result in improved asthma control. There is little available information about how much patients know and what their views are on this issue. We sought to determine the knowledge and attitudes of patients to the global warming impact of inhalers.

Methods Electronic survey of hospital inpatients and outpatients in respiratory clinics and wards at a London NHS Trust.

Results 61 patients were surveyed. Demographic data were available for 50. 56% (28/50) were female, with similar proportions using inhalers for COPD and asthma. 70.5% (43/61) of patients did not know that commonly used inhalers may contain powerful greenhouse gases, with only 8.2% (5/61) of patients stating they knew a lot about this. 85.3% (52/61) of patients felt it was 'quite' (32.8%) or 'very' (52.5%) important for them to reduce their own contribution to climate change. 14.8% (9/61) of patients answered that it was 'not important'.

When asked whether they would want to change to an inhaler that was as safe and effective as their current inhaler, but less harmful to the environment, 59% (36/61) of patients stated they would actively want to change inhalers and 26.2% (16/61) said they wouldn't mind switching. Only 3.3% (2/61) would rather stick to their current inhaler. There was no significant difference in willingness to change inhalers based on age (94.4% of <61 yrs vs 78.1% of >60 yrs, $p = 0.13$) or gender (86.3% of male patients vs 82.1% of female, $p = 0.69$).

Only 10.3% (6/61) of patients reported returning their used inhalers back to their local pharmacy for correct disposal, revealing a need for patient education and available recycling infrastructure.

Conclusions Patient awareness of the climate impact of MDI inhalers is low, but with the appropriate information a majority are motivated to switch to an inhaler with lower global warming potential where this is clinically appropriate. This should reassure both clinicians and policy makers striving to reduce NHS carbon emissions whilst maintaining patient-centred care.

'Back to the Future' – Novel technology of the airways

S66 TOWARDS IMPLEMENTATION OF LIVE AI-BASED PROGNOSTIC RISK-PREDICTION SCORES IN A COPD MDT

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10.1136/thorax-2022-BTSabstracts.72

Introduction COPD is a common, progressive, preventable and treatable respiratory disorder effecting approximately 1.2

million people in the UK. It is estimated to become the third leading cause of death worldwide by 2030. Accurately identifying high-risk patients in a live clinical setting is essential for proactive care re-orientation and prioritisation.

Aims and Objectives Machine Learning (ML) models were developed using clinical data to predict risk in COPD patients with the aim to optimise care and improve patient outcomes. This AI is being operationalised in live patient care as part of a feasibility study.

Methods We used de-identified demographics, hospital admissions, diagnosis, prescribing and labs data from 60,000 patients to develop risk prediction models. We focused on risk of mortality, respiratory-related hospital readmission, and exacerbation prediction. 15% of all patients were held out for a final test set. All sets were checked to ensure they were drawn from a sample representative of the full population. An 80:20 split of the remaining 85% of patients, and cross validation methods, were used for model training and validation. The 12-month mortality prediction model was tested on the hold-out test dataset. Patients who were recruited to our RECEIVER COPD digital service trial (support.nhscopd.scot) had been omitted from model training and validation. We were therefore able to undertake a further retrospective evaluation on this trial data, running synthetic AI-MDTs with the model applied at patient onboarding and at monthly intervals for the following 6 months, with comparison of model predictions to events over the subsequent 12 months.

Results The model performed well achieving an averaged ROC-AUC of 0.83 (0.76–0.92) and an averaged PR-AUC of 0.57 (0.38–0.76) averaged over the 7 runs. Local explainability for each patient prediction was also calculated using SHAP. The feasibility study using live AI models within our COPD MDT is ongoing.

Conclusions Our 12-month mortality prediction model performed well and is ready for live adoption in the AI insights app and propspective evaluation in the DYNAMIC-AI trial. The other two models are at advanced development stage. The ongoing feasibility study will demonstrate how AI can be used as part of live patient care.

S67 SYMMETRIC PROJECTION ATTRACTOR RECONSTRUCTION (SPAR): ADVANCED RESPIRATORY PATTERN ANALYSIS PROVIDES ADDITIONAL BIOMARKERS OF COPD

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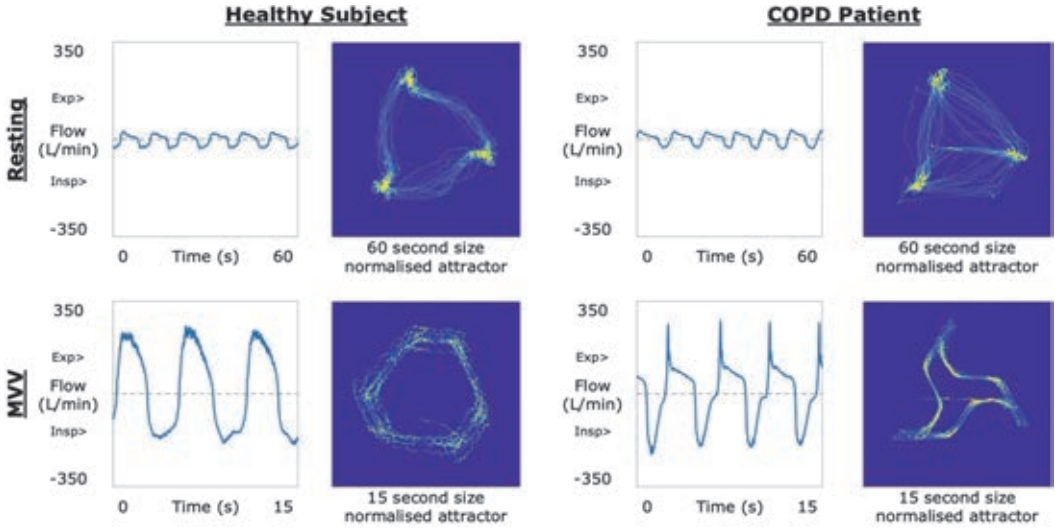
10.1136/thorax-2022-BTSabstracts.73

Background Respiratory pattern analysis is conventionally reduced to simplified metrics, such as respiratory rate (RR), tidal volume (Vt) or respiratory rate variability (RRV). Respiratory waveforms are nonetheless complex and generally sampled with high fidelity. A novel mathematical method, Symmetric Projection Attractor Reconstruction (SPAR), analyses waveforms without discarding any of this high-fidelity data, focusing on subtle changes in morphology and variability. SPAR creates a simpler visual representation of waveforms (attractor) which can be qualitatively and quantitatively analysed.

Aim To investigate whether SPAR attractors can provide additional physiological biomarkers of pathophysiological respiratory changes in COPD patients.

Methods Pneumotachograph airflow waveform data, recorded during resting tidal breathing and maximum voluntary ventilation (MVV), were analysed conventionally and using SPAR. Data from 56 healthy subjects (43.5 years median age, 7% female) and 10 COPD patients (68.5 years median age, 10% female, 39% median%predicted FEV1) were compared. Receiver operating characteristics area under the curve (ROC AUC) was used to ascertain sensitivity and specificity of classifying changes between healthy and COPD subjects (arbitrary threshold > 0.7).

Results During resting tidal breathing, RR, Vt and attractor morphology metrics were not notably different between the two groups (ROC AUC = 0.70, 0.58, 0.50). RRV was higher in COPD patients (ROC AUC = 0.74) but more sensitively measured using attractor variability metrics which map wave-to-wave variability (ROC AUC = 0.86). During MVV, RR did



Abstract S67 Figure 1 Exemplar resting and MVV breathing patterns and SPAR attractors of healthy and COPD subjects. Exp = expiration, Insp = inspiration

not change (ROC AUC = 0.58). Vt was lower in COPD patients (ROC AUC = 0.95). Clear morphological differences were seen between the groups where COPD attractors were 'pinched' corresponding to a flattening of the expiratory trace (ROC AUC = 0.95). RRV was not different (ROC AUC = 0.54), but attractor variability was decreased in the COPD group (ROC AUC = 0.72) (figure 1).

Conclusions SPAR provides a new 'at-a glance' representation of waveform morphology and variability. SPAR differentiated COPD patients from healthy subjects by highlighting changes in the non-spirometric, resting and MVV airflow waveforms. The morphological change of MVV attractors most likely reflects expiratory airflow limitation. Further work is needed to explore the use of SPAR to facilitate respiratory diagnostics and disease monitoring.

S68 ASSESSING PULMONARY VENTILATION AND TREATMENT RESPONSE IN PATIENTS WITH ASTHMA AND COPD USING 19F-MRI: RESULTS FROM THE LIFT STUDY

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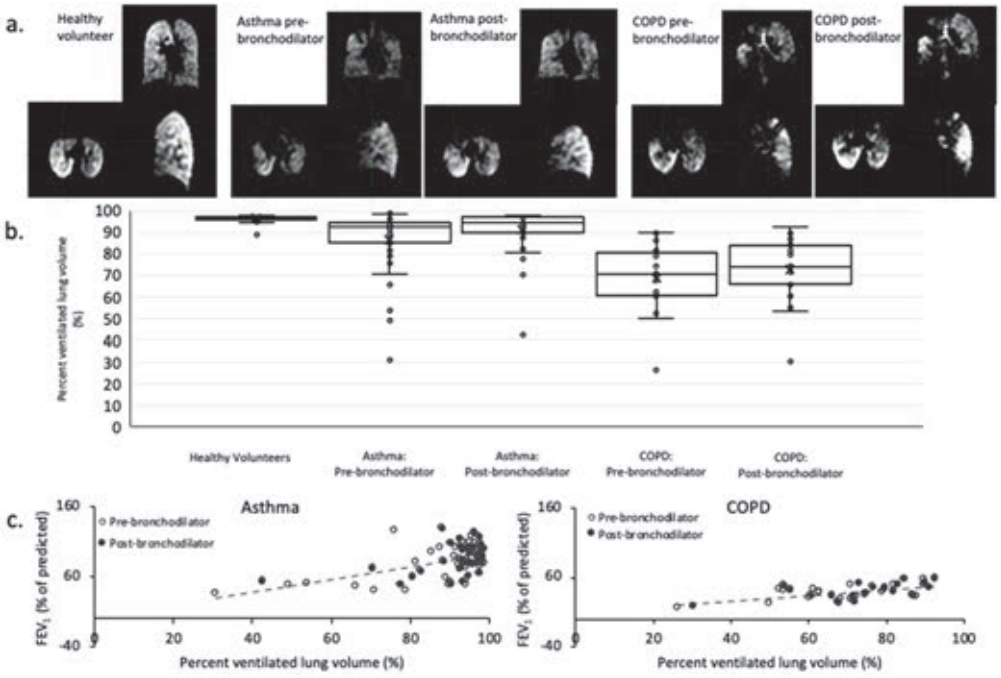
10.1136/thorax-2022-BTSabstracts.74

Introduction Pulmonary ventilation reflects lung physiology, offering insight regarding structural and functional changes associated with respiratory disease. However, in routine clinical practice, such information may only be derived from multiple tests. Here, we demonstrate the utility of ^{19}F-MRI of inhaled perfluoropropane (PFP) to directly visualise and measure ventilated lung volumes in patients with asthma and COPD, offering 3D whole-lung imaging without the requirement for ionising radiation or hyperpolarised tracer gases.

Methods 35 patients with a physician diagnosis of asthma (BTS/SIGN guideline[1] Step 3 or above), and 20 patients with COPD (GOLD stage 3 or 4), provided written informed consent and were screened for study eligibility across two UK sites. Participants underwent a single MRI scan session involving inhalation of a 79% PFP/21% oxygen gas mixture, after withholding bronchodilator (BD) medication for 12–24 hours. Inhalation sessions comprised 3 deep breaths of gas followed by a maximal-inspiratory breath-hold, during which ^{19}F-MR ventilation images were acquired. ^{19}F-MRI and spirometry were performed before and after administration of 2.5 mg nebulised salbutamol. The percentage ventilated lung volume (%VV) was calculated for all ^{19}F-MR images.

Results Paired samples *t*-tests revealed a significant difference between pre- and post-BD%VV measurements in patients with asthma ($mean_{pre\text{-}BD}$=86.7%, SD=15.3%; $mean_{post\text{-}BD}$=91.5%, SD=10.6%; p=0.002) and patients with COPD ($mean_{pre\text{-}BD}$=69.4%, SD=15.9%; $mean_{post\text{-}BD}$=73.2%, SD=15.1%; p=0.01), respectively (see figure 1a, 1b). Comparison of%VV with spirometrically-derived FEV_1 measurements revealed a strong positive correlation for patients with asthma (r=0.502, p<0.001) and patients with COPD (r=0.58, p<0.001), as shown in figure 1c.

Conclusions We have demonstrated that ^{19}F MRI may be successfully utilised to assess treatment response in patients with respiratory disease, providing regional information on pulmonary ventilation without the requirement for hyperpolarised-gas MRI. The reproducibility of this technique has previously been established in healthy volunteers[1]. This work builds on



Abstract S68 Figure 1 Showing **a)** representative exmples of 19F MR images after inhaled PFP in a healthy volunteer, a patient with asthma and a patient with COPD. Pre- and post- bronchodilator images shown for patients **b)** %VV in healthy volunteers compared with asthma cohort and COPD cohort both pre and post bronchodilator treatment **c)** correlation between FEV1 and %VV in asthma and COPD cohorts

the potential of ^{19}F MRI as an attractive clinical tool for monitoring disease progression and response to therapeutic intervention, which may aid diagnosis and treatment options for patients with a variety of respiratory diseases.

REFERENCES

1. Pippard BJ, *et al*. Reproducibility of ^{19} F-MR ventilation imaging in healthy volunteers. *Magn Reson Med* 2021;Jun;**85**(6):3343–3352.

S69 POINT OF CARE (POC) BREATH TEST TO ACCURATELY PREDICT ASTHMA EXACERBATIONS

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Introduction and Objectives Volatile organic compounds (VOCs) in exhaled breath are affected by airway inflammation and have been shown to predict asthma exacerbations.[1] Our objective is to develop a new point of care (POC) breath test for early detection of asthma exacerbations, that will be revolutionary for asthma management, using deep neural network (DNN) and nanosensor technology.

Methods We collected VOC biomarkers, capnographic waveforms, asthma control test scores and clinical lung function parameters, over 2 years from 20 patients. 14 adults developed a total of 34 exacerbations. End-tidal breath samples were collected, and 13 different parameters were measured using nanosensors. Principal component analysis was used to identify parameters whose values will control the algorithm's learning (figure 1: A). A 13-layer multiclass classification DNN with 3 outcomes (1 well-, 2 poorly-, 3 un- controlled asthma), was trained with 1290 data points containing the patient data, biomarkers and lung function parameter ranges to achieve a big data approach. The model was used around 50–100 times per day for 3 months by different users with 95% efficiency.

Results Our model predicts asthma exacerbations with 93% accuracy up to 3 days ahead following daily monitoring over 5 days through further validation for personalisation and area under the curve (AUC) receiver operating characteristic of 0.90 (figure 1: B).

Conclusions Our model could accurately predict asthma exacerbations 3 days in advance and can be transformative to early detection and subsequently early life-saving interventions for asthma exacerbations.

REFERENCE

1. Dobroes CM, van Berkel JJ, Jobsis Q, van Schooten FJ, Dallinga JW, Wouters EF, Dompeling E. *Eur Respir J* 2013;**42**:98–106.

'Inception' – Embracing complexity in lung science

S70 COLLAGEN DEPOSITION BY FIBROBLASTS COULD CONTRIBUTE TO DISEASE PROGRESSION IN LYMPHANGIOLEIOMYOMATOSIS

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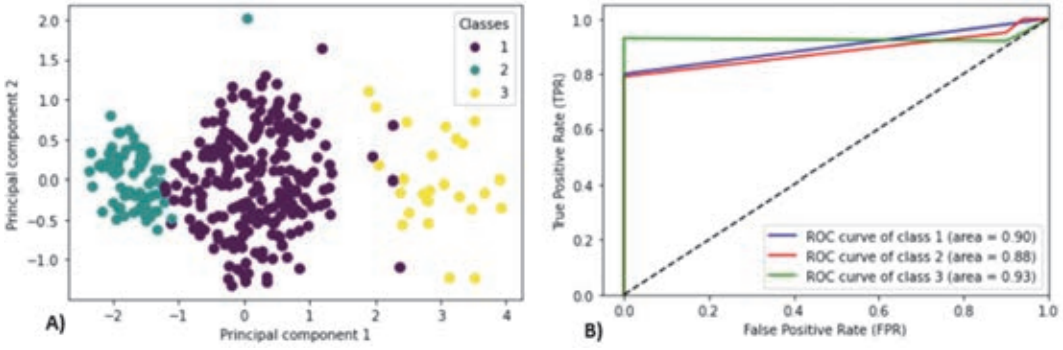
10.1136/thorax-2022-BTSabstracts.76

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. We aimed to quantify ECM deposition in LAM, investigate its association with disease severity and study the effect of LAF deposited matrix on LAM cell behaviour *in vitro*.

Methods Collagen neoepitopes were measured in sera from 96 LAM patients and 22 controls using Nordic Bioscience assays. Collagen deposition in paraffin sections of LAM lung tissue was assayed by picrosirius red (PSR) staining and immunohistochemistry from 19 lung samples with linked clinical data. *In vitro* assays were performed on TSC2$^{-/-}$ cells grown on cell-free LAF-derived ECM.

Results Serum markers of collagen, but not elastin turnover tended to be greater in women with LAM than controls (C6M, p=0.057). Quantification of PSR staining revealed trends toward ECM accumulation with increasing disease duration (r=0.62, p=0.060) and reducing DLCO (r=-0.55, p=0.057). LAF-derived ECM increased proliferation (p<0.0001) and reduced the anti-proliferative effect of rapamycin in TSC2$^{-/-}$ cells (p=0.0004) *in vitro*.

Conclusion Collagen deposition can be observed in LAM lesions. LAF-derived ECM enhances TSC2$^{-/-}$ cell proliferation



Abstract S69 Figure 1 A) Principal component analysis of biomarkers of (1) well-, (2) poorly- and (3) uncontrolled asthma. B) Receiver operating characteristic of DNN model's results

in vitro and may contribute to disease progression by providing a pro-proliferative microenvironment for LAM cells *in vivo*. This may reduce response to rapamycin in some patients. These data support the investigation of anti-fibrotic therapies for LAM patients who respond poorly to rapamycin.

S71 MESENCHYMAL CELL SENESCENCE INFLUENCES ATII CELL VIABILITY IN LAM

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10.1136/thorax-2022-BTSabstracts.77

Background Lymphangioleiomyomatosis (LAM) is a destructive monogenic disease in which clonal mTOR dysregulated mesenchymal 'LAM cells' recruit fibroblasts and immune cells forming discreet lung parenchymal nodules resulting in protease activation, lung cysts and respiratory failure. We hypothesised that mTOR driven senescence in LAM cells, induces senescence in adjacent LAM associated fibroblasts (LAF) in turn impairing ATII cell mediated repair of protease induced lung injury.
Methods We examined LAM cell interactions using scRNAseq, laser microdissection, dual label immunohistochemistry, primary cell co-cultures and a TSC null murine homograft model.
Results p21 and to a lesser extent, p16 proteins were increased in human LAM lung. Within LAM nodules p21 co-localised with both PNL2 (LAM cells) and PNL2 negative cells. Outside nodules, p21 co-localised with SPC (ATII cells). In immunocompetent LAM homograft models, senescence associated beta-galactosidase activity increased with time and was greater 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/epithelial co-cultures show that SA-beta-galactosidase activity and 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 A210 for declarations of interest related to this abstract.

S72 TOWARDS A MURINE MODEL OF PULMONARY VENO-OCCLUSIVE DISEASE

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10.1136/thorax-2022-BTSabstracts.78

Introduction Pulmonary veno-occlusive disease (PVOD) is an incurable condition characterised by the progressive remodelling and narrowing of small pulmonary veins, venules and capillaries. This leads to right ventricular hypertrophy, pulmonary hypertension, and death within 1–2 years if untreated. In 2014, homozygous mutations in the stress sensing kinase GCN2 were shown to be the main genetic cause of PVOD. GCN2 is activated by amino acid starvation and phosphorylates the alpha subunit of eIF2 which reduces global translation while increasing the translation of cytoprotective transcripts such as activating transcription factor 4.
Methods and Results We modelled PVOD using mice with a homozygous deletion in *gcn2*. *Gcn2*$^{-/-}$ mice spontaneously develop increased right ventricular systolic pressure compared to wild-type controls (28.1[SD 3.4] *vs*. 24.7[SD 3.7] mmHg, $p = 0.04$) mimicking human disease. Both left and right ventricles are hypertrophied in *gcn2*$^{-/-}$ mice, but left ventricular systolic pressures remain normal at baseline. We have previously observed inflammation in other forms of pulmonary hypertension and so measured serum cytokines levels and lung cytokine transcription in *gcn2*$^{-/-}$ mice. Inflammatory cytokines are raised in *gcn2*$^{-/-}$ mice at baseline in both serum and lung, and this is exaggerated after a pro-inflammatory stimulus (LPS). To gain mechanistic insight, we generated single cell suspensions from *gcn2*$^{-/-}$ mouse lungs and wild-type littermates and performed droplet-based single cell RNA sequencing. This revealed that GCN2 loss significantly perturbs the transcriptomes of neutrophils and B cells. These data are enabling us to identify disease-relevant signalling pathways and cell types.

S73 THE INFLAMMATORY RESPONSE OF AIRWAY EPITHELIAL CELLS TO SOLUBLE MEDIATORS OBTAINED FROM H. INFLUENZAE INFECTED MACROPHAGES

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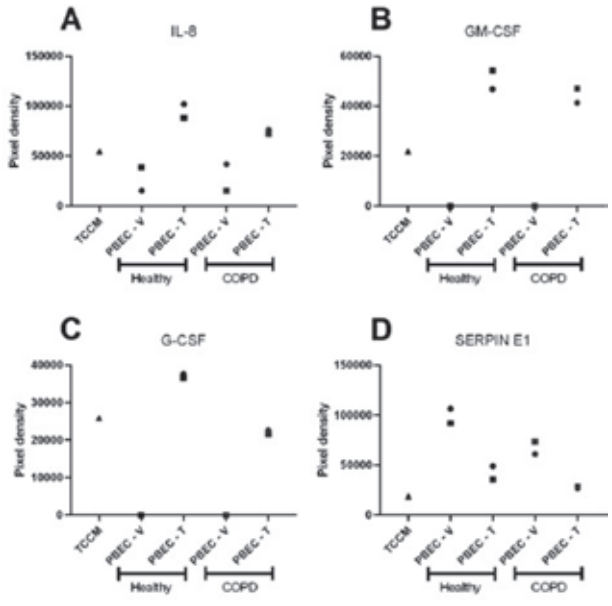
10.1136/thorax-2022-BTSabstracts.79

Introduction and Objectives Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are often associated with infections from respiratory pathogens including *Haemophilus influenzae*. There is however, an incomplete understanding of the inflammatory response which involves complex interactions between pathogens, airway epithelial cells and immune cells. The aim of this study was to investigate the effect of pathogen-associated immune cell stimulus on airway epithelial cell responses.
Methods Differentiated THP-1 cells (a macrophage-like cell line) were infected with *H. influenzae*. The sterile-filtered THP-1 cell-conditioned media (TCCM), containing soluble mediators, was used to treat airway epithelial cells including the cell line 16HBE14o- (HBE) and primary bronchial epithelial cells (PBEC) from 2 healthy and 2 COPD donors. Changes in inflammatory mediators produced by airway epithelial cells were screened using a Proteome Profiler Human Cytokine Antibody Array and key targets validated by qPCR and ELISA.
Results TCCM treatment of HBE cells led to a significant increase in IL-8 levels ($p<0.01$) which was higher than that observed after direct *H. influenzae* infection of HBE cells. The Proteome Profiler screen identified changes in the levels of 13 inflammatory mediators in the cell-conditioned media of PBEC following TCCM treatment with 4 results of interest detailed in figure 1. TCCM stimulated levels of IL-8, GM-CSF and G-CSF in PBEC from all donors, although for the latter a more blunted response was observed with the



Abstract S73 Figure 1 Graphs showing pixel density of (A) IL-8, (B) GM-CSF, (C) G-CSF and (D) SERPIN E1 determined using the Proteome Profiler Human Cytokine Antibody Array on sterile-filtered cell-conditioned media from the differentiated THP-1 cells (TCCM) and from cell-conditioned media (CCM) from PBEC from healthy and COPD donors, treated with 20% (v/v) sterile-filtered RPMI 1640 medium, acting as a vehicle control (PBEC-V) or treated with 20% (v/v) sterile-filtered cell-conditioned media from differentiated THP-1 cells, infected for 24 hours with *H. influenzae* at MOI 50 (PBEC-T). *N*=1 experimental repeat carried out PBEC-CCM from 2 healthy and 2 COPD donors

COPD donors compared to the healthy PBEC; relatively lower levels of gene expression were also determined by qPCR. SERPIN E1, also known as plasminogen activator inhibitor-1, was present at a higher level in PBEC cell-conditioned media from all donors compared to the TCCM however, upon treatment of the PBEC with TCCM, SERPIN E1 levels were reduced by over 50% in all cases, which was also confirmed by qPCR.

Conclusions The results of this study showed TCCM stimulation led to increased IL-8 levels from HBE cells above the levels seen from direct immunopathogenic stimulation of HBE cells. TCCM stimulated pro-inflammatory mediator production and expression within PBEC from healthy and COPD donors with G-CSF and SERPIN E1 identified as targets of interest for future work.

Please refer to page A211 for declarations of interest related to this abstract.

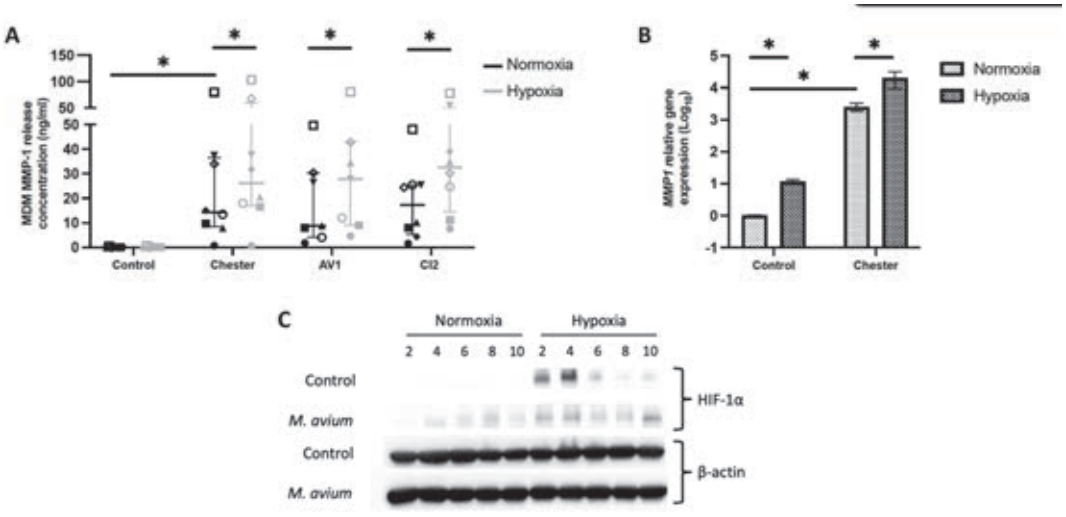
S74 THE EFFECT OF HYPOXIA ON MMP-1 PRODUCTION IN M. AVIUM LUNG DISEASE

SM Tandel, DP Brazil, GN Schroeder, CM O'Kane. *Queen's University Belfast, Belfast, UK*

10.1136/thorax-2022-BTSabstracts.80

Introduction *Mycobacterium avium* complex (MAC), the leading cause of NTM pulmonary disease (NTM-PD), is associated with cavitation and bronchiectasis. However, the underlying mechanisms of lung tissue destruction in MAC infections are unknown. Matrix metalloproteinases (MMPs), endopeptidases which degrade the extracellular matrix, are implicated in lung destruction in tuberculosis. We hypothesise that *M. avium* similarly drives MMP-1 production in response to MAC infection and that this is enhanced in hypoxia, a complicating factor in patients with underlying chronic lung disease.

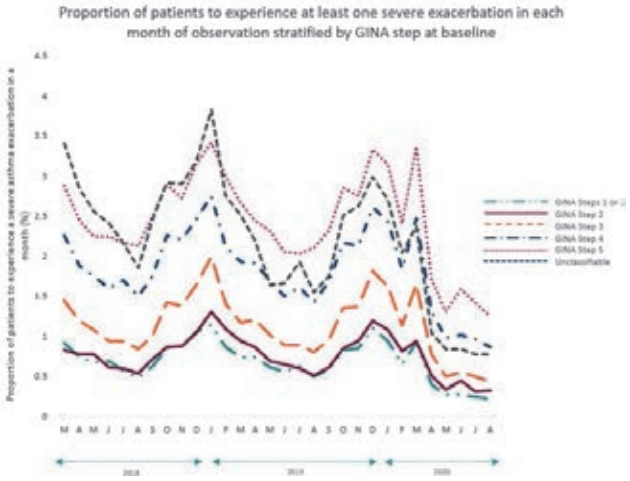
Methods Primary human monocytes were isolated from buffy coat of healthy blood donors and differentiated into monocyte-derived macrophages (MDMs) by incubation with GM-CSF for 7 days. MDMs were infected with different strains of *M. avium* (reference Chester strain ATCC 25291 and two clinical isolates from patients with NTM-PD) at MOI 100, before incubation in normoxia (21% O_2) or hypoxia (1% O_2). Protease (MMP-1; collagenase) and anti-protease (TIMP-1) secretion were measured by ELISA and gene expression analysed by RT-qPCR. Intracellular HIF-1α was determined by Western Blot analysis of whole cell lysate.



Abstract S74 Figure 1 Hypoxia induces MMP-1 secretion and gene expression in infected MDMs. (A) MMP-1 secretion is significantly higher in with *M. avium*-infected MDMs (MOI 100) at 48 hours in hypoxia compared to normoxia for the laboratory reference strain (Chester) and two clinical isolates (AV1 and C12). p<0.05; n=7–8. (B) *MMP1* gene expression at 24 hours post-infection with Chester strain is significantly higher in hypoxic cells compared to normoxic cells. p<0.02, n=3. (C) Western blot analysis shows stabilisation of HIF-1α in normoxic cells infected with *M. avium* (Chester strain)

Results *M. avium* Chester strain increased MMP-1 secretion by 190-fold at 48 hours compared with uninfected cells, $p<0.0001$. This was accompanied by increased MMP-1 gene expression which peaked at 24 hours over a 48-hour period. Hypoxia further increased the gene expression and secretion of MMP-1 (figure 1 A & B). This pattern was reproduced with two clinical isolates. Net MMP-1/TIMP-1 ratio was increased in response to both infection and hypoxia compared to infection alone (1.95 vs 0.63; $p=0.02$ for Chester strain). Hypoxia stabilised the transcription regulator HIF-1α, and interestingly infection with *M. avium* alone (in the absence of hypoxia) stabilised HIF-1α (figure 1C).

Conclusion Data suggests synergistic effects of *M. avium* infection and hypoxia drive MMP-1 expression and secretion from infected macrophages during NTM infection. Understanding the pathways regulating MMP-1 secretion in infected macrophages may lead to opportunities for adjuvant therapies to prevent collagen destruction in airways and lung parenchyma in MAC infection.



Abstract S75 Figure 1

'The World is Not Enough' – The epidemiological picture in airways disease

S75 ASTHMA EXACERBATIONS IN ROUTINE CLINICAL PRACTICE DURING COVID-19 IN ENGLAND IN 2020

[1]KJ Rothnie, [2]T Tritton, [3]X Han, [2]T Holbrook, [1]B Numbere, [2]AF Ford, [2]L Massey, [3]Q Fu, [4]FM Hutchinson, [1]HJ Birch, [5]D Leather, [1]R Sharma, [1]C Compton, [3,6]AS Ismaila. *[1]Value Evidence and Outcomes, R & D Global Medical, GSK, Brentford, UK; [2]Adelphi Real World, Bollington, UK; [3]Value Evidence and Outcomes, R & D Global Medical, GSK, Collegeville, USA; [4]Country Medical Office – UK and Ireland, GSK, Brentford, UK; [5]Global Medical Affairs, GSK, London, UK; [6]Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Canada*

10.1136/thorax-2022-BTSabstracts.81

Introduction/Objectives The COVID-19 pandemic is recent and ongoing and there is limited evidence of the impact of COVID-19 on the burden associated with patients with respiratory diseases. This study evaluated the impact of the COVID-19 in the early part of the pandemic on this patient population. The study objective was to describe changes over time in asthma exacerbation frequency stratified by disease severity.

Methods This was a retrospective dynamic cohort study of English asthma patients aged ≥18 years, for the period from Mar 2018 until Aug 2020 using the Clinical Practice Research Datalink Aurum linked to Hospital Episode Statistics datasets.

The proportion of patients experiencing a severe asthma exacerbation, which was defined as a hospital admission for an exacerbation, was described monthly stratified by 2019 GINA treatment step at baseline.

Results In total, 823,645 incident and prevalent asthma patients (mean [SD] age: 51.4 [17.7] years, 58.1% females) were included; 21.3%, 3.9%, 23.6%, 12.7%, 3.1% and 35.4% of patients were in GINA step 1/2, GINA step 2, GINA step 3, GINA step 4, GINA step 5 treatment step and the unclassifiable group respectively, at index. The proportion of patients to experience a severe exacerbation over time, stratified by GINA treatment step at baseline, is shown in figure 1.

The proportion of patients to experience a severe exacerbation in each GINA step subgroup showed seasonal peaks in January 2019 and December 2019, and a peak in March 2020 before declining steeply to May 2020 and remaining low until August 2020.

Conclusion Among patients with asthma, the frequency of severe exacerbations declined steeply between March 2020 and May 2020 for all stratification groups and remained low through to August 2020. When comparing GINA step at baseline, a higher proportion of patients in GINA steps 4 and step 5 experienced a severe exacerbation compared with patients in GINA steps 1/2, step 2 and step 3 throughout the observation period. Further research on the long-term impact of COVID-19 on asthma exacerbations in routine clinical practice in England is warranted.

Please refer to page A211 for declarations of interest related to this abstract.

S76 INCREASED RISK OF CARDIOVASCULAR DISEASE IN ASTHMA

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10.1136/thorax-2022-BTSabstracts.82

Introduction and Objectives Several studies have found asthma to be associated with an increased risk of cardiovascular disease (CVD) and mortality. Underlying mechanisms may be related to shared risk factors including smoking and chronic inflammation. However, findings are not consistent and studies to date have been limited by sample size and bias, including unmeasured confounding and recall bias. This study explores the association between asthma and CVD in a large nationally representative cohort of patients in England, using electronic healthcare records (EHR).

Methods A cohort of adult asthma patients, January 2004 to January 2019, were matched 1:1 to the general population by gender and age, using primary care EHR (Clinical Practice Research Datalink) linked to hospital records (Hospital Episode Statistics) and mortality data (Office for National Statistics). Cardiovascular events were defined as a composite of hospitalisations and mortality due to myocardial infarction, tachyarrhythmia, ischaemic cerebrovascular events and heart failure. Cox-proportional-hazards models were fit adjusting for sociodemographic characteristics, body composition measures, health behaviours and comorbidities.

Abstract S76 Table 1 Association between asthma and composite outcome of cardiovascular events

Adjustment	Adjusted HR	P-value	95% CI
Asthma	1.18	<0.001	1.12–1.25
Socioeconomic deprivation (IMD)			
1 (reference)			
2	1.10	0.10	0.98–1.23
3	1.18	<0.01	1.04–1.33
4	1.18	<0.01	1.03–1.34
5 (most deprived)	1.41	<0.001	1.22–1.63
Body mass index category			
Normal weight (reference)			
Underweight	1.19	0.17	0.92–1.54
Overweight	1.10	<0.05	1.01–1.20
Obese	1.47	<0.001	1.33–1.62
Smoking history			
Never smoker (reference)			
Ex-smoker	1.25	<0.001	1.14–1.37
Smoker	1.82	<0.001	1.66–2.01
Atopy	0.94	0.19	0.87–1.03
Diabetes	1.42	<0.001	1.20–1.69
Hyperlipidaemia	1.06	0.37	0.93–1.20
Chronic renal failure	1.20	0.47	0.73–1.98
Chronic liver disease	1.21	<0.001	1.07–1.36
Anxiety	1.03	0.66	0.90–1.17
Depression	1.11	0.09	0.99–1.25
Obstructive sleep apnoea	0.73	0.40	0.35–1.52

Results The cohort included 1,265,900 individuals (56% female) with a mean age of 34 years (SD=13.8) and median follow-up of 4.2 years (IQR 1.7–9.9). Compared with the general population at baseline, there was a higher proportion in the asthma patients of atopy (43.3% vs. 19.9%), obesity (18.5% vs. 11.2%), smoking, (28.8% vs. 25.7%), obstructive sleep apnoea (0.2% vs 0.1%), diabetes (2.3% vs 1.8%) and hyperlipidaemia (3.1% vs 2.3%). The number of composite events was higher in asthma patients than the general population (rates per 1,000 person years: asthma = 1.63, 95% CI 1.59–1.66, general population = 2.00, 95% CI 1.96–2.05). Patients with asthma had an 18% higher risk of an incident CVD event compared to the general population, adjusted hazard ratio 1.18, 95% CI 1.12–1.25 (see table 1).

Conclusions In a large nationally representative cohort, asthma was found to be significantly associated with an increased risk of cardiovascular disease as compared to the general population, even after adjusting for major known risk factors.

S77 A POPULATION HEALTH MANAGEMENT APPROACH TO IDENTIFYING PATIENTS WITH POORLY CONTROLLED ASTHMA

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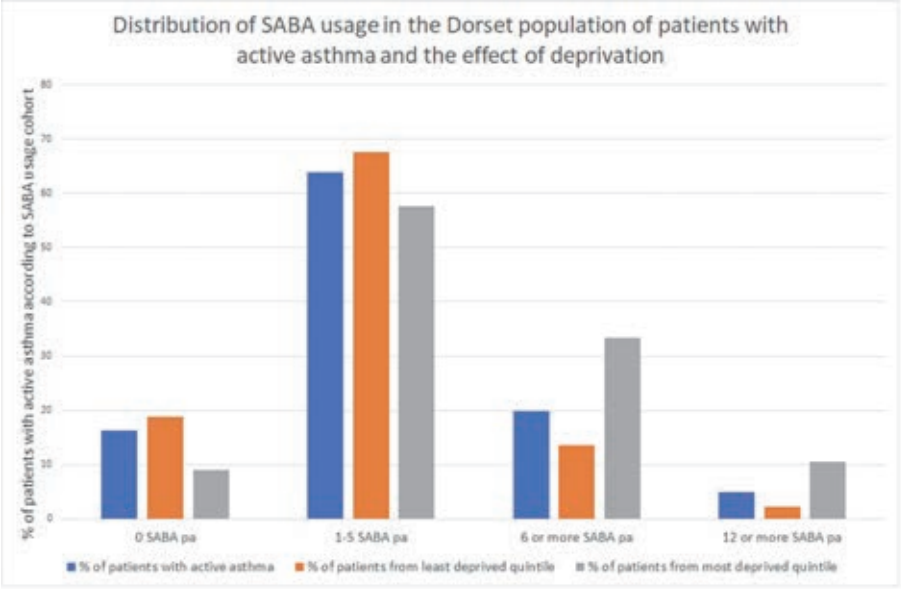
10.1136/thorax-2022-BTSabstracts.83

Poorly controlled asthma, evidenced by over-reliance on short acting B2 agonists (SABA) or by recurrent exacerbations, is associated with poor outcomes and can be treated with a range of interventions, from inhaled corticosteroids (ICS) to biologic agents. Our Integrated Care System has adopted a population health management approach (PHM) to the management of chronic conditions since 2019, with the creation of a database of information from multiple sources. The clinical and demographic characteristics of the population of 103,013 patients with an asthma coding can be viewed at the primary care network (PCN), GP practice and individual patient level (pseudonymised). The database was searched according to annualised SABA use, ICS use, prednisolone courses, deprivation index and eosinophil counts.

Out of the 103,013 patients with an asthma coding in the county, 43,780 have not had any SABA or ICS in the last 12 months, suggesting either quiescent asthma or an erroneous diagnosis. The figure 1 shows that deprivation is associated



Abstract S77 Figure 1

with higher SABA usage, with 9% of those in the least deprived quintile using 12 or more SABA per annum versus 18% of the most deprived. ICS usage was higher in the most deprived quintile. Greater SABA usage was associated with higher exacerbation rates and respiratory admissions. Amongst those with 2 or more prednisolone courses per annum or a respiratory admission, 13% used 12 or more SABA per annum and 23% had had 12 or more ICS prescriptions in the previous year, demonstrating potential to improve preventative care to this cohort.

Examining one PCN of 70,000 population, 6444 patients had active asthma. 10.3% needed 2 or more prednisolone prescriptions in the previous year and 2.9% were also using 12 or more ICS per annum. Of these 189 patients, 60 (0.9% of the overall cohort) had an eosinophil count of 0.3 or greater in the last 12 months. These patients may be suitable for a biologic agent.

A PHM approach has demonstrated that SABA overuse is associated with greater deprivation and may be used to identify potential candidates for enhanced asthma care including biologic therapy.

S78 BIOLOGIC THERAPY PRACTICES IN SEVERE ASTHMA; OUTCOMES FROM THE UK SEVERE ASTHMA REGISTRY AND SURVEY OF SPECIALIST OPINION

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10.1136/thorax-2022-BTSabstracts.84

Introduction and Objectives several biological treatments have become available for management of severe asthma. There is a significant overlap in the indication of these treatments with lack of consensus on the first-line biologic choice and switching practice in event of treatment failure. Herein we evaluate outcomes of biologic treatments through analysis of the UK Severe Asthma Registry (UKSAR), and survey of the UK severe asthma specialists' opinion.

Methods records of patients registered in the UKSAR database and treated with biologics for severe asthma from January 2014 to August 2021 were analysed to explore biologic treatments practice. This was complemented by survey of opinion of severe asthma specialists.

Results a total of 2,490 patients from 10 severe asthma centres were included in the study (mean age 51.3 years, 61.1% female, mean BMI 30.9kg/m^2). Biologics use included mepolizumab 1,115 (44.8%), benralizumab 925 (37.1%), omalizumab 432 (17.3%), dupilumab 13 (0.5%), and reslizumab 5 (0.2%). The majority of patients (77.6%) achieved good clinical response and continued beyond the first year of treatment. Those on benralizumab were more likely to continue treatment longterm (93.9%) than those on mepolizumab (80%) or omalizumab (69.6%). Patients on omalizumab were younger and had earlier age of onset asthma than those prescribed mepolizumab or benralizumab. Patients prescribed mepolizumab and benralizumab had similar clinical characteristics. The first choice biologic differed between centres and changed over the study time period (figure). Experts' opinion also diverged in terms of biologic initiation choice and switching practice.

Conclusion We observed overall good clinical responses to biologics in severe asthma but with the caveat of significant variation in the prescribing choices amongst centres and experts necessitating further research and practice standardisation.

S79 COPD EXACERBATIONS IN ROUTINE CLINICAL PRACTICE DURING COVID-19 IN ENGLAND IN 2020

[1]KJ Rothnie, [2]T Tritton, [3]X Han, [2]T Holbrook, [1]B Numbere, [2]AF Ford, [2]L Massey, [3]Q Fu, [4]FM Hutchinson, [1]HJ Birch, [5]D Leather, [1]R Sharma, [1]C Compton, [3,6]AS Ismaila. *[1]Value Evidence and Outcomes, R & D Global Medical, GSK, London, UK; [2]Adelphi Real World, Bollington, Cheshire; [3]Value Evidence and Outcomes, R & D Global Medical, GSK, Collegeville, USA; [4]Country Medical Office – UK and Ireland, GSK, Brentford, UK; [5]Global Medical Affairs, GSK, London, UK; [6]Department of Health Research Methods, Evidence and Impact, McMaster University, Hamilton, Canada*

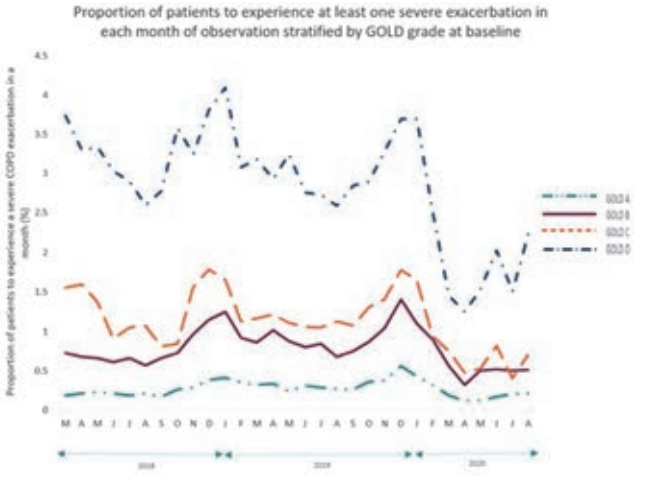
10.1136/thorax-2022-BTSabstracts.85

Introduction/Objectives During the UK COVID-19 pandemic, patients with severe chronic obstructive pulmonary disease (COPD) were considered 'clinically extremely vulnerable' and were instructed to reduce social contact to only essential contact (termed 'shielding') for periods of high coronavirus prevalence. There is limited evidence of the impact of COVID-19 on the burden associated with patients with respiratory diseases. This study describes the changes over time in COPD exacerbation frequency stratified by disease severity.

Methods This was a retrospective dynamic cohort study of English COPD patients (FEV_1/FVC <0.7) aged ≥35 years, for the period from Mar 2018 until Aug 2020 using the Clinical Practice Research Datalink Aurum linked to Hospital Episode Statistics datasets.

Monthly proportions of patients to experience a moderate or severe COPD exacerbation were described by GOLD 2019 disease grade.

Results In total, 119,512 incident and prevalent COPD patients (mean [SD] age: 69.6 [10.6] years, 54.1% males) were included; 41.0%, 27.1%, 4.6%, 7.1% and 20.2% of patients were classified as GOLD A, GOLD B, GOLD C, and GOLD D disease grade groups and the unclassifiable group,



Abstract S79 Figure 1

respectively, in the 12-month baseline period. Severe exacerbations over time, stratified by GOLD grade at baseline, are shown in figure 1.

The proportion of patients with COPD experiencing a moderate exacerbation in January 2020 (stratified by GOLD grade at baseline) was 3.33% (GOLD A), 4.62% (GOLD B), 8.01% (GOLD C) and 8.82% (GOLD D); these proportions decreased to 1.04% (GOLD A), 1.90% (GOLD B), 3.65% (GOLD C) and 4.71% (GOLD D) by April 2020.

Conclusion Among patients with COPD in routine clinical practice in England, the frequency of moderate and severe exacerbations declined between January 2020 and April 2020 for most stratification groups and remained low through to August 2020. When comparing GOLD grade at baseline, the proportion of patients to experience an exacerbation increased with increasing disease severity grade.

Please refer to page A211 for declarations of interest related to this abstract.

'Die Hard I' – Resistance, screening and best management in TB

S80 A CLUSTER-RANDOMISED EVALUATION OF A THEORY-BASED INTERVENTION TO HELP PEOPLE WITH TB DISEASE GET THE MOST FROM THEIR TREATMENT AND CARE: THE IMPACT FEASIBILITY STUDY

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10.1136/thorax-2022-BTSabstracts.86

Introduction and Objectives Treatment for tuberculosis (TB) with multiple, potentially toxic, drugs lasts months but will cure >90% with drug sensitive TB, if taken as prescribed. Non-adherence inevitably occurs, and most methods to improve adherence use medication 'reminders' or supervised treatment that may not take into account the broader psychosocial and structural issues affecting adherence. We developed a theory-based manualised intervention including an enhanced structured needs assessment and risk management plan, educational videos, and an interactive patient booklet, to support adherence during anti-TB treatment. We report the intervention's acceptability to patients and its ability to influence perceptions and behaviour when compared to standard care.

Methods Adult TB patients were recruited from four London TB centres within a pilot cluster-randomised controlled trial. Assessments included a process evaluation (to determine acceptability), the Beliefs about Medicines Questionnaire (BMQ) administered at 2 weeks, 3 and 6 months from baseline (measuring patient perception), and treatment monitoring boxes recording medication use (reflecting patient behaviour, measured as the proportion of doses taken at 168 days from treatment start).

Results 80 patients were recruited to the study (37 intervention, 43 control). Ethnicity and gender were evenly split between arms, age ranged from 18–81 years, with the largest group 28–38 years. The intervention had a positive effect on perceptions of treatment necessity compared to controls from 2 weeks to 3 months (p=.05) (medium to large effect size). Patients regarded all elements of the intervention as helpful, with mean helpfulness ratings (min0-max100) of 86 (patient booklet), 82 (needs assessment), 77 (medication diary/plan) and 72 (videos). The unadjusted mean proportion of doses taken over 168 days in the control arm was 0.88 compared to 0.81 in the intervention arm (estimated mean difference of -0.07, p= 0.23, CI -0.41–0.27). Adjusted estimates were similar.

Conclusions The IMPACT intervention is acceptable to patients and may change their perceptions of anti-TB treatment, though this was not reflected in increased total adherence. Measures to sustain the intervention's effect throughout treatment should be investigated in future work.

Please refer to page A211 for declarations of interest related to this abstract.

S81 CHRONIC DISEASES AND TB RISK FACTORS AMONG TB HOUSEHOLD CONTACTS IN SOUTHERN AFRICA

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10.1136/thorax-2022-BTSabstracts.87

Background TB-affected communities are often highly vulnerable, with social, economic and biological factors increasing their risk of both TB and chronic diseases whilst impeding healthcare access. In the context of an urgent need to innovate in and upscale TB screening, and improve diagnosis and management of non-communicable diseases (NCDs) in Africa, we are evaluating the potential benefits of integrating household contact tracing for TB with screening for other conditions.

Methods Embedded in a TB household contact screening study (ERASE-TB; Mozambique, Tanzania and Zimbabwe), we are screening for HIV, TB (WHO symptom screen and chest X-ray), diabetes (HbA1c), hypertension, undernutrition/obesity (body mass index), anaemia and chronic lung disease (spirometry; Global Lung Function Initiative reference standards).

Results Here we present results for the first 449 TB household contacts (366 in Zimbabwe, 83 in Mozambique). 129 were children/adolescents (age ≥10 years), 320 were adults. 62% were female, 13% had ever smoked and 12% scored positive on alcohol (AUDIT-C) screening. 8% of people were underweight, whilst 39% adults were overweight or obese. TB screening was positive in 21% (of whom 5% Xpert positive). HIV prevalence was 16% (among whom 4% newly diagnosed); diabetes prevalence was 9% (64% newly diagnosed) and 19% of people were anaemic. 24% had elevated blood pressure (a new finding in 56%). 28% had any spirometric abnormality; 7% had obstructive lung disease (all newly diagnosed). 43% of people had at least one condition (13% had multimorbidity), 73% of whom had at least one condition diagnosed by screening.

Conclusion Our findings demonstrate the 'double burden' caused by the colliding epidemics of infectious diseases and nutritional disorders, with that of NCDs. The vast majority of

NCDs were previously undiagnosed (in contrast to HIV where most people knew their status) highlighting the need to strengthen diagnosis and care for NCDs. Integrating TB and chronic disease screening may improve detection of NCDs, promoting overall health and reducing risk of progression to TB disease among exposed household members.

Please refer to page A211 for declarations of interest related to this abstract.

S82 THE BRITISH THORACIC SOCIETY MULTI DRUG RESISTANT TB CLINICAL ADVICE SERVICE ACTIVITY: 2018–2022 SUMMARY

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10.1136/thorax-2022-BTSabstracts.88

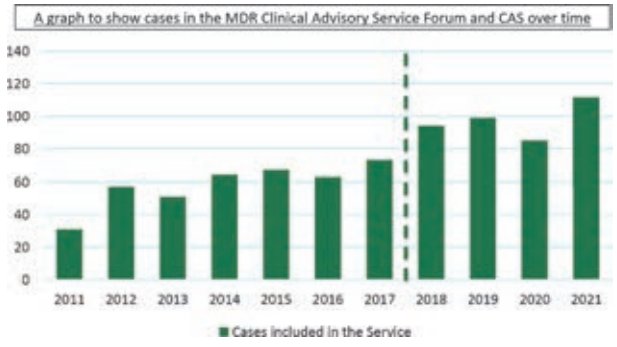
Background The UK BTS MDRTB CAS provides an on-line forum and a monthly virtual multi-disciplinary meeting of TB experts to provide advice for drug-resistant or complex cases of TB but also encompassing detailed WGS information and public health advice. This service also ratifies use of high cost MDR therapies. We report on activity from January 2018 to June 2022.

Methods Data was extracted from a template capturing information on patients and disease. Cases submitted are categorised into: A) XDR-TB, MDR-TB, suspected MDR-TB, B) drug resistant non-MDR TB, complex sensitive TB, other complex TB and C) Non-Tuberculous Mycobacteria (reported elsewhere).

Results There have been 441 patients discussed in this period. Pulmonary involvement was the commonest site of disease in category A and B (71% and 89%).

Category A: 231 cases: 11.3% XDR-TB, 62.8% MDR-TB and 26% suspected MDR-TB. Most individuals are non-UK born (84%) The Indian subcontinent is the most frequent area of origin (26.4%). 13% had documented social risk factors including alcohol misuse 50%, drug use 23.1%, prison history 30.8% and homelessness 15.4%.

The most frequently reported symptoms are cough (63%), weight loss (33%) and fever (51%). Prior to referral symptom durations ranged from one week to > 1 year with 65% having symptoms for ≤ three months. In the last year 13.7% have had previous active TB and 18.8% had known contact with an MDR case. Rapid PCR/GeneXpert confirmed rifampicin resistance in 128/141 (90.8%) of cases.



Abstract S82 Figure 1

Category B: 125 individuals were referred. 36.8% had non-MDR drug resistance, 44.0% complex sensitive TB and 19.2% other complex TB. Within this cohort most are UK born 46.4%. The majority (78%) have clinical risk factors including immunosuppressant use, diabetes, smoking, renal disease or liver disease.

Feedback from 2020 demonstrated 92.9% of users reported the advice as clinically useful and 96% would use the service in the future.

Conclusions This data indicate there is an increasing demand for national expert advice for these most complex cases in a low incidence country and that the BTS MDR CAS provides additional support to local MDTs to improve patient management.

S83 GENETIC DIAGNOSIS OF BEDAQUILINE RESISTANCE – AN INDIVIDUAL ISOLATE META-ANALYSIS

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10.1136/thorax-2022-BTSabstracts.89

Introduction Bedaquiline is an important treatment for drug-resistant tuberculosis. The main bedaquiline resistance mechanism is Rv0678 mutations. Many individually rare mutations are reported, with many having a variable relationship to phenotypic resistance - causing small minimum inhibitory concentration (MIC) increases to at/near the critical concentration (CC). Sequencing approaches could diagnose resistance if genotypic-phenotypic correlations can be established. However, the WHO mutation catalogue does not contain any bedaquiline resistance-associated variants (RAVs). Here, we collate all genotypic and phenotypic resistance reported from clinical isolates to assess effectiveness of sequencing resistance-associated genes.

Methods We screened public databases for articles published up until June 2022. Studies were included if they performed whole genome sequencing of clinically-sourced isolates with bedaquiline resistance and measured MIC by MGIT, 7H11, broth microdilution. Candidate resistance genes were Rv0678, atpE, pepQ, and atpB. We deemed isolates with MICs>CC to be resistant, those with MICs=CC to be intermediate, and those with MICs<CC to be susceptible. To calculate the association of individual mutations with resistance, we used previously established methods on a combination of all extracted isolates from included studies and the 'reuse' Cryptic study dataset.

Results Twelve studies were included yielding 896 isolates containing ≥1 potential RAV, with 277 (30.9%) phenotypically intermediate/resistant. 261 intermediate/resistant isolates were identified with no candidate gene mutations. 943/1175 (80.3%) of all isolates were derived from Cryptic. Sensitivities and positive predictive value of taking an 'any mutation' approach in candidate genes (assuming all mutations may cause resistance) are shown (table 1). Twenty mutations had a significant association with an intermediate/resistant MIC ($p<0.05$) (Table). All were strong associations (OR >10),

Abstract S83 Table 1

Any mutation in	Intermediate or resistant	Resistant only
Sensitivity		
Rv0678	235/519 (45.4%)	139/229 (60.7%)
Rv0678 / atpE / atpB / pepQ	257/519 (49.6%)	146/229 (63.8%)
Positive predictive value		
Rv0678	173/385 (44.9%)	74/385 (19.2%)
atpE	5/14 (35.7%)	4/14 (28.6%)
Rv0678 / atpE / atpB / pepQ	195/813 (24.0%)	81/732 (10.0%)
Specificity		
Rv0678	11719/12002 (98.2%)	11912/12232 (97.4%)
Rv0678 / atpE / atpB / pepQ	11313/11932 (94.9%)	11491/12232 (93.9%)
Negative predictive value		
Rv0678	11719/12002 (97.6%)	11912/12002 (99.3%)
Rv0678 / atpE / atpB / pepQ	11313/11574 (97.7%)	11491/11574 (99.3%)
Mutations with an association with MICs		
Intermediate/resistant	132_indel, 136_indel, 137_indel, 138_indel, 139_indel, 140_indel, 141_indel, 144_indel, 192_indel, 198_indel, 211_indel, 274_indel, all_del*, R50Q, Q51R, I67S, N70D, R90C, F93S, L117R	
Resistant	136_indel, 137_indel, 138_indel, 139_indel, 141_indel, 144_indel, 192_indel, 198_indel, R50Q, I67S, N70D	

*all_del denotes whole gene deletion

except 192_indel (OR=8.8). When considering only resistant MICs, 11 mutations had a significant association, all a strong except 192_indel (OR=4.6).

Conclusions The any candidate gene mutation approach has limited sensitivity for identifying bedaquiline resistance (45–63%) but high specificity and negative predictive value (>97%) in this cohort with a high prevalence of drug resistance (61% rifampicin-resistant). We identify 20 mutations that had a strong association with intermediate/resistant MICs (13 resistant), not included in the current mutation catalogue. Genetic methods to identify bedaquiline resistance are unlikely to be sufficient in isolation.

S84 HOW GOOD IS XPERT MTB/XDR IN DRUG RESISTANT TB?

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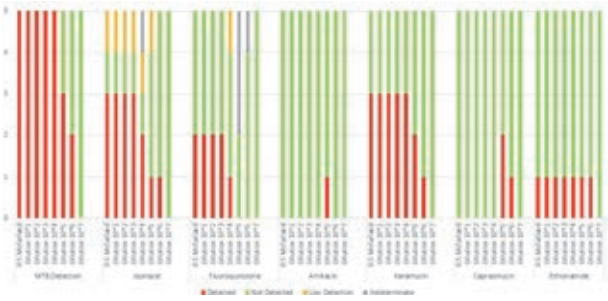
10.1136/thorax-2022-BTSabstracts.90

Background Drug resistant TB is a growing concern with 11.6% of laboratory confirmed cases being resistant to at least one first-line drug in England. Currently whole genome sequencing (WGS) still requires a positive culture before providing drug susceptibilities hence potentially introducing a delay of weeks. Xpert MTB/XDR (Cepheid, USA) is a rapid PCR test for identification of drug resistant TB including resistance to INH, fluoroquinolones, ethionamide and 2nd line injectables. This may provide an initial rapid result pending WGS to allow initiation of DR or MDR regimes.

Aims To establish the limit of detection (LoD) of Xpert MTB/XDR using frozen MTB cultures with known resistance patterns.

Methods This retrospective study in London used resistant clinical MTB cultures which were sub-cultured in 7H9 media and incubated for 7 days. 500µl of the culture positive broth



Abstract S84 Figure 1 Xpert MTB/XDR results for MTB detection and drug resistance patterns for 5 drug resistant strains with seven serial ten-fold dilutions

for each strain was tested using Xpert MTB/XDR following the Cepheid GeneXpert SOP. Resistance patterns for each stain were compared to the genotypic susceptibilities using PhyRes SE, an online software for WGS analysis.

Five strains were used to establish the LoD on Xpert MTB/XDR by performing seven ten-fold serial dilutions from 0.5 McFarland measured on a densitometer to a dilution of 10^7.

Results Fourteen clinical strains were verified on Xpert MTB/XDR and the same resistance patterns were correctly identified in 13 stains (93%) when compared to WGS. A discrepant result was found with fluoroquinolone resistance where low detection was identified on Xpert MTB/XDR but not on WGS. All INH resistance were correctly identified. The LoD across 5 strains using Xpert MTB/XDR varied between a four-fold (10^4) to six-fold (10^6) dilutions. Fluoroquinolone sensitivity patterns were an issue from a dilution of 10^4 onwards with results reading 'indeterminate' or 'low detected' (figure 1).

Conclusions Xpert MTB/XDR could be used as a tool to rapidly identify TB and drug susceptibilities. It identified all INH resistant cases and may be useful in PCR positive samples awaiting culture and WGS, allowing for the appropriate WHO regimens being started earlier for INH/MDR TB. Care must be taken with regards to indeterminate fluoroquinolone results as this may provide a false positive reading.

S85 LEUCINE-RICH 2 GLYCOPROTEIN-1 UPREGULATION IN PLASMA OF PATIENTS WITH ACTIVE TUBERCULOSIS

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10.1136/thorax-2022-BTSabstracts.91

Background Tuberculosis (TB) is responsible for more than 1.2 million deaths annually. Neutrophils have a central role in driving both morbidity and mortality in patients, but the exact mechanisms involved remain unclear. Leucine-rich 2 glycoprotein-1 (LRG1) was proposed as a novel biomarker for active TB, but its cellular source and role in TB pathogenesis in patients are unknown. We investigated whether neutrophils are key regulators of LRG1 secretion during TB.

Methods Serum LRG1 was measured by ELISA in a cohort of Peruvian TB patients (n=64, healthy controls n=51) at

diagnosis and after 45 days of treatment. LRG1 expression was assessed in lymph node biopsies from patients with TB. For cellular studies, human peripheral neutrophils from healthy donors were infected for 4 h with *Mycobacterium tuberculosis* (*Mtb)* at a multiplicity of infection of 1 or stimulated with conditioned media from *Mtb*-infected monocytes (CoMTb). CoMTb was also used to stimulate primary human bronchial epithelial cells. Secreted LRG1 concentrations were quantified by ELISA.

Results We found significantly increased serum LRG1 concentrations in TB patients compared to healthy controls (61.6 ±34.8 vs. 20.5±14.1 μg/ml resp., $p<0.0001$), which decreased significantly after 45 days of anti-mycobacterial treatment (mean difference = -37.06±5.7 μg/ml, $p<0.0001$) in patients with drug-sensitive disease. Addtionally, LRG1 was detected in granulomas in lymph node tissue from TB patients by immunohistochemistry. Neutrophils from healthy donors infected with *Mtb in vitro* secreted significant amounts of LRG1 compared to uninfected controls (1.3 vs. 0.24 ng/ml, $p=0.0159$). Similarly, stimulation with CoMTb resulted in significant increase in LRG1 secretion compared to control-stimulated neutrophils (2.23 vs. 0.53 ng/ml, $p=0.0121$) and bronchial epithelial cells (2.1 vs. 0.7 ng/ml, $p=0.0003$).

Conclusion We confirm that serum LRG1 concentrations are elevated in TB patients and decrease significantly during anti-mycobacterial therapy. We have also identified two cellular sources of LRG1 in TB infection: neutrophils and bronchial epithelial cells, which secrete LRG1 during direct *Mtb* infection or in a monocyte-dependent network of TB infection. This indicates, that those cell types may be key secretors of LRG1 in TB disease. Moreover, serum LRG1 concentrations represents a clinical biomarker of active TB disease.

'Mission (Im)possible II' – Improving outcomes in COPD

S86 A SINGLE-BLIND, MULTICENTRE, MULTINATIONAL, RANDOMISED CONTROLLED TRIAL OF ONLINE SINGING FOR LUNG HEALTH (SLH) VS USUAL CARE FOR PEOPLE WITH COPD: THE SINGING FOR HEALTH, IMPROVING EXPERIENCES OF LUNG DISEASE (SHIELD) TRIAL

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10.1136/thorax-2022-BTSabstracts.92

Background Singing for Lung Health (SLH) is an arts-based non-pharmacological intervention for people with long-term respiratory conditions that aims to improve symptoms and quality of life (QOL). Current research suggests face-to-face SLH can improve aspects of QOL and physical performance. There is interest in online, remotely delivered SLH, however no previous studies have assessed its impact.

Methods A single blind randomised controlled trial comparing the impact of 12 weeks of once-weekly online SLH to usual care (UC) on health related quality of life (HRQoL) (RAND SF-36 Mental (MHC) and Physical (PHC) health composite scores). Secondary outcome measures were breathlessness (MRC dyspnoea scale and Dyspnoea-12), physical activity (daily step-count and PROactive cPACC), balance confidence (ABC score), anxiety (GAD-7), depression (PHQ-19) and COPD symptoms (CAT score).

Results 115 participants with stable COPD were recruited and allocated into well-matched study arms. Median (IQR) age of 69 (62–74); 56.5% female; 87.8% White British ethnicity; 80% previously participated in pulmonary rehabilitation; MRC dyspnoea scale median (IQR) 4 (3–4); FEV1% predicted 49 (35 to 63); 13.0% current smokers, mean (SD) packyears 33.5 (20.3), BMI 25.7 (6.3); 10.4% were using supplementary oxygen therapy.

50 participants in each arm completed the study. Compared with UC, SLH participation was associated with preferable changes to the RAND SF-36 PHC (regression coefficient 1.77 [95%CI 0.11 - 3.44]; p=0.037)) but not MHC. No statistically significant between groups differences were observed in secondary outcome measures in the prespecified intention to treat analyses. In a prespecified responder analysis based on achieving a 10% improvement from baseline, the response rate for PHC was 32% of the SLH arm and 12.7% of UC (p=0.024). A statistically significant between group difference was not found in relation to a 10% improvement from baseline for the SF-36 MHC. More adverse events were reported in the UC(n=22) than SLH (n=16) arm.

Discussion & Conclusion Our findings suggest that a 12-week online SLH intervention can improve the physical component of HRQoL for people with COPD. Online SLH may be a useful addition to COPD management for selected individuals.

Trial Registration ClinicalTrials.gov NCT04034212

S87 GREATER EXERCISE TOLERANCE IN COPD DURING ACUTE INTERMITTENT COMPARED TO ENDURANCE SHUTTLE WALKING PROTOCOLS: A PROOF-OF-CONCEPT STUDY

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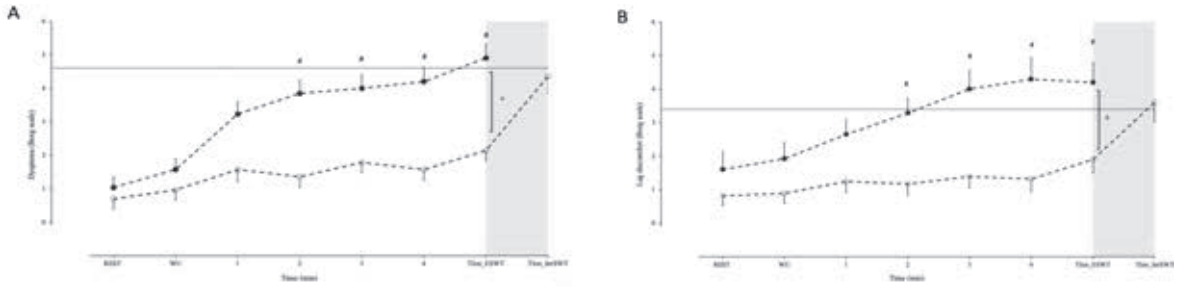
10.1136/thorax-2022-BTSabstracts.93

Introduction Ground-based walking is a simple training modality which would suit pulmonary rehabilitation (PR) settings with limited access to specialist equipment. Patients with advanced COPD are, however, unable to walk uninterruptedly at a relatively fast walking pace to optimise training benefits.

Objective To compare walking distance and circulatory responses between an intermittent (IntSWT) and an endurance shuttle walking (ESWT) protocol.

Methods In this cross-sectional study we measured in 14 COPD patients (mean±SD FEV_1: 45±21% predicted), walking distance, cardiac output (CO), heart rate (HR), arterial oxygen saturation (SpO_2), and symptoms during (a) IntSWT, consisting of 1-min walking alternating with 1-min rest, and (b) ESWT, both sustained at 85% of peak VO_2 predicted to the limit of tolerance (Tlim).



Abstract S87 Figure 1 A. Dysponea, and B. Leg discomfort at rest, warm up (WU), the first 4 minutes of walking and at Tlim for each walking protocol (Tlim ESWT and Tlim IntSWT). + denotes significant differences between ESWT and IntSWT. # denotes significant differences between ESWT and IntSWT at specific time points. Horizontal lines indicate peak values during the incremental shuttle walk test (SWT), Values are mean±SEM

Results Median (IQR) distance and endurance time were greater (p=0.001) during IntSWT [735 (375–1107) m and 19.61 (19.0–28.8) min, respectively] compared to ESWT [190 (117–360) m and 3.23 (2.32–5.75) min, respectively]. At iso-distance (distance at Tlim during ESWT) IntSWT compared to ESWT was associated with lower CO (8.6±2.6 versus 10.3 ±3.7 L/min; p=0.013), HR (96±14 versus 103±13 beats/min; p=0.001), greater SpO_2 (92±6 versus 90±7 %; p=0.002), and lower symptoms of dyspnoea (2.8±1.3 versus 4.9±1.4; p=0.001) and leg discomfort (2.3±1.7 versus 4.2 ±2.2; p=0.001). Furthermore, throughout the walking tests, IntSWT compared to ESWT was associated with lower symptoms of dyspnoea (p=0.001), and leg discomfort (p=0.03) (figure 1). However, at Tlim symptoms of dyspnoea and leg discomfort were not different between IntSWT and ESWT, suggesting that the major reasons for limiting walking endurance in both modalities were having reached comparable intensity of symptoms, which took longer during IntSWT compared to ESWT.

Conclusion IntSWT may provide important clinical benefits in the PR settings because it is sustained with lower symptoms, thereby allowing greater work outputs compared to ESWT.

S88 ADVERSE OUTCOMES FOLLOWING INITIATION OF ORAL CORTICOSTEROIDS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE: LONG-TERM OBSERVATIONAL STUDY

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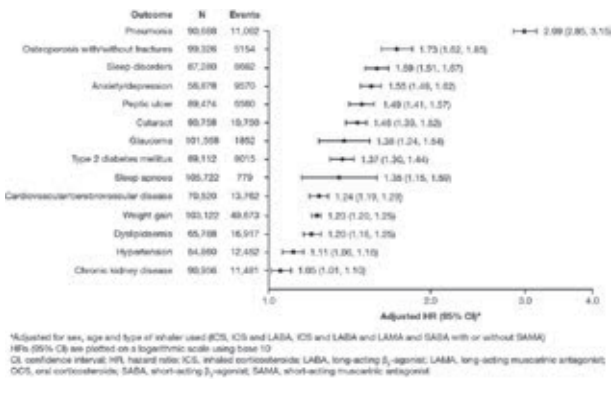
10.1136/thorax-2022-BTSabstracts.94

Introduction and Objectives Oral corticosteroids (OCS) are often used in patients with chronic obstructive pulmonary disease (COPD) experiencing exacerbations, but can result in short- and long-term adverse outcomes. Here, we evaluated associations between COPD-related OCS exposure and adverse outcome incidence.

Methods This observational, individually matched historical cohort study used electronic medical records (1987–2019) from the UK Clinical Practice Research Datalink with Hospital Episode Statistics (HES) linkage to compare patients with COPD who used OCS (OCS cohort) or never used OCS (non-OCS cohort) during the observational period. Patients had a COPD diagnosis or monitoring/review on or after 1 April 2003 (per introduction of the Quality and Outcomes Framework), and continuous practice records for ≥1 year prior to index date (OCS cohort: first COPD-related OCS prescription; non-OCS cohort: nearest primary care practice visit to matched-case index date). Cohorts were individually matched by index date, age, sex, HES linkage availability and smoking status. OCS exposure was measured from index date to incidence of each adverse outcome or end of observation. Multivariable Cox proportional hazard regressions, adjusting for confounders, assessed adverse outcome risk in the OCS versus non-OCS cohorts and within the OCS cohort by cumulative dose (<0.5 g, 0.5–<1.0 g, 1.0–<2.5 g, 2.5–<5.0 g, 5.0–<10.0 g, ≥10.0 g), treating cumulative dose as a time-varying measure.

Results In total, 106,775 patients received COPD-related OCS prescriptions; 53,299 pairs were matched in the OCS and non-OCS cohorts (mean ± SD age, 64.6±12.5 years; 59.8% male). The OCS cohort had significantly increased risk versus the non-OCS cohort for all adverse outcomes (figure 1), with the highest risk observed for pneumonia, osteoporosis with/without fractures, sleep disorders and anxiety/depression. Within the OCS cohort, cumulative OCS exposure ≥0.5 g was associated with increased hazard ratios (95% CIs) for multiple adverse outcomes, including osteoporosis with/without fractures (0.5–<1.0 g, 1.45 [1.30, 1.62]; 1.0–<2.5 g, 1.89 [1.70, 2.11]; 2.5–<5.0 g, 2.92 [2.58, 3.30]; 5.0–<10.0 g, 4.27 [3.74, 4.86]; ≥10.0 g, 6.39 [5.56, 7.35]) and type 2



Abstract S88 Figure 1 HRs comparing adverse outcome risk for the OCS vs non-OCS cohorts (multivariable Cox regression)

diabetes mellitus (0.5–<1.0 g, 1.20 [1.10, 1.30]; 1.0–<2.5 g, 1.40 [1.29, 1.52]; 2.5–<5.0 g, 1.47 [1.32, 1.63]; 5.0–<10.0 g, 1.75 [1.54, 1.98]; ≥10.0 g, 2.23 [1.95, 2.54]).
Conclusions OCS use was associated with increased risk of adverse outcomes, with risk increasing as cumulative exposure increased.

Please refer to page A211 for declarations of interest related to this abstract.

S89 WITHDRAWAL OF INHALED CORTICOSTEROIDS FROM COPD PATIENTS WITH MILD OR MODERATE AIRFLOW LIMITATION IN PRIMARY CARE: A FEASIBILITY RANDOMISED TRIAL

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10.1136/thorax-2022-BTSabstracts.95

Introduction and Objectives Inhaled corticosteroids (ICS) are frequently prescribed outside guidelines to COPD patients with mild/moderate airflow limitation and low exacerbation risk. This primary care trial explored the feasibility of identifying mild/moderate COPD patients taking ICS, and the acceptability of ICS withdrawal.
Methods Open feasibility trial. Outcome measures included prevalence of suitable participants, feasibility of their identification, their willingness to accept open randomisation to ICS withdrawal or continuation over six months follow-up.
Results 392 (13%) of 2967 COPD patients from 20 practices (209,618 population) identified as eligible for ICS withdrawal by electronic search algorithm. After individual patient record review, 243 (62%) were excluded because of: severe airflow limitation (65, 17%); ≥one severe or two moderate COPD exacerbations in previous year (86, 22%); asthma (15, 4%); severe co-morbidities (77, 20%). 149 invited to participate. 61 agreed to randomisation. At clinical assessment 10 patients exhibited undocumented airflow reversibility (FEV_1 reversibility >12% and >200 ml), two had suffered ≥2 undocumented, moderate exacerbations in previous year, seven had severe airflow limitation, two had normal spirometry. 40 were randomised. One patient died and one was lost to follow-up. 18 (45%) of the 38 (10 withdrawal, 8 usual care) exhibited previously undocumented FEV_1 variability suggestive of asthma, supported in the withdrawal group by significant associations with elevated fractional exhaled nitric oxide (p=0.04), elevated symptom score (p=0.04), poorer quality of life (p=0.04), atopic status (p=0.01).
Conclusions Identifying primary care mild/moderate COPD patients suitable for ICS withdrawal is feasible but requires real-time verification because of unreliable recording of exacerbations and lung function. Suitable patients accepted randomisation to ICS withdrawal or continuation for the purposes of future studies. Follow-up compliance was high. Nearly 50% of participants with a diagnosis of mild/moderate COPD demonstrated previously undocumented FEV_1 variability during follow-up, mandating monitoring for at least six months following withdrawal to exclude undiagnosed asthma.

'The Sixth Sense' – Prognostication in pulmonary vascular disease

S90 RIGHT VENTRICULAR REMODELLING ASSESSED USING CARDIAC MAGNETIC RESONANCE PREDICTS SURVIVAL AND TREATMENT RESPONSE IN PULMONARY ARTERIAL HYPERTENSION

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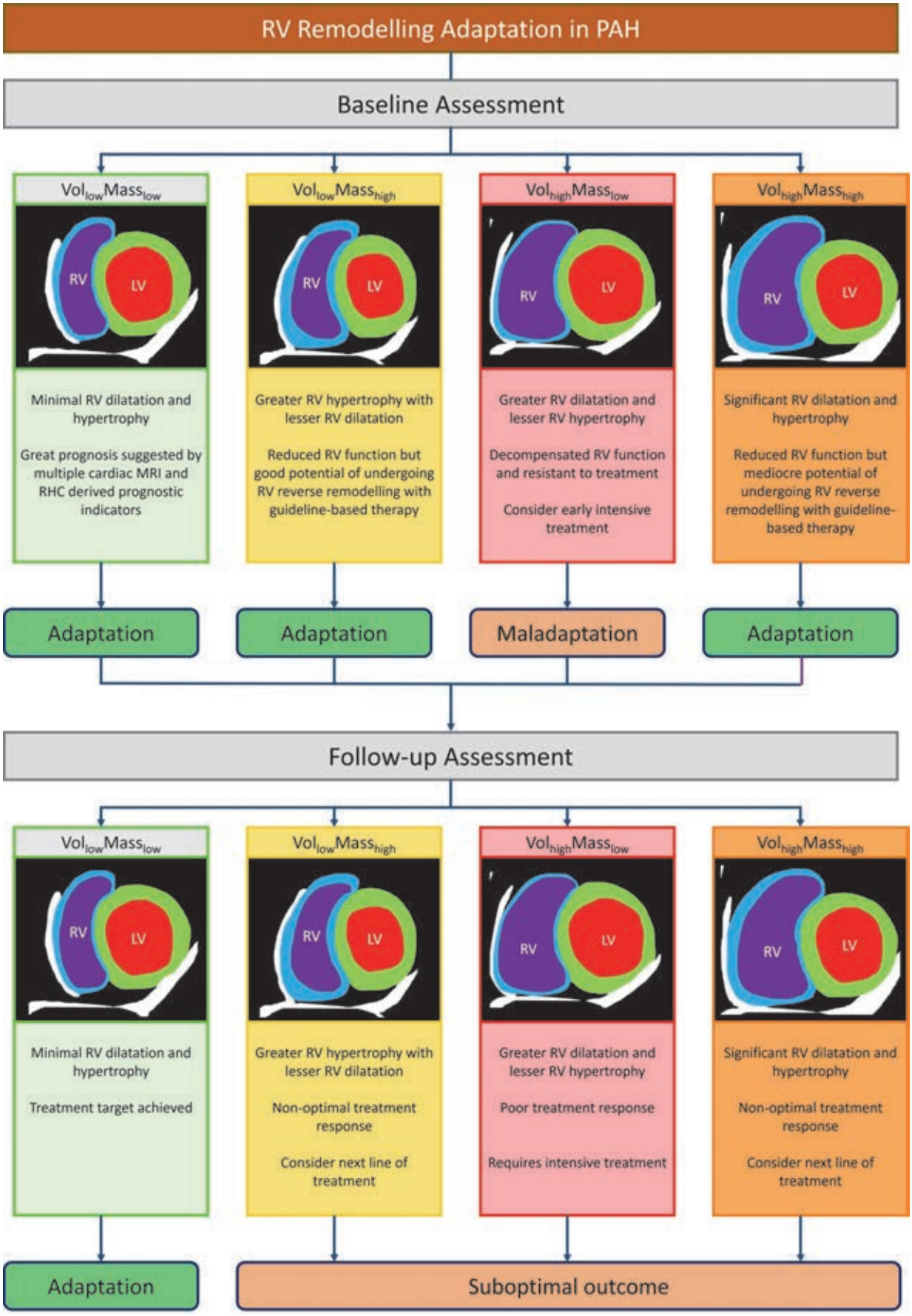
10.1136/thorax-2022-BTSabstracts.96

Objectives To determine the prognostic value of patterns of right ventricular (RV) adaptation in patients with pulmonary arterial hypertension (PAH), assessed using cardiac magnetic resonance (CMR) imaging at baseline and follow-up.
Methods Consecutive patients with PAH from the ASPIRE registry were included in the baseline cohort. Patients who received PAH therapy and had follow-up CMR assessment were included in the follow-up cohort. A right ventricular end-systolic volume index adjusted for age and sex ($RVESVI_{\%pred}$) threshold of 227% and ventricular mass index (VMI) threshold of 0.53 were used to stratify patients into four different volume/mass groups: $Vol_{low}Mass_{low}$ (low $RVESVI_{\%pred}$ and VMI), $Vol_{low}Mass_{high}$ (low $RVESVI_{\%pred}$ and high VMI), $Vol_{high}Mass_{low}$ (high $RVESVI_{\%pred}$ and low VMI) and $Vol_{high}Mass_{high}$ (high $RVESVI_{\%pred}$ and VMI). At the baseline assessment, One-way ANOVA test and Chi-squared tests were used to compare the variables of the groups. Transition of the groups from baseline to follow-up assessment were studied and illustrated using alluvial graph. At follow-up, the prognoses of the groups were compared using Kaplan-Meier plots.
Results A total of 564 patients with PAH were identified, 250 (44.0%) died during follow-up (median 4.85 years, interquartile range 4.05). At baseline assessment, $Vol_{low}Mass_{low}$ was associated with CMR and right heart catheterisation metrics predictive of improved prognosis. There were 126 patients who underwent follow up CMR (median 1.11 years, interquartile range 0.78). At both baseline and follow-up assessments, $Vol_{high}Mass_{low}$ group had worse prognosis than the $Vol_{low}Mass_{low}$ group (p<0.001). At follow-up, patients with $Vol_{low}Mass_{low}$ had lower mortality than $Vol_{low}Mass_{high}$, $Vol_{high}Mass_{low}$ and $Vol_{high}Mass_{high}$ (p<0.001). With PAH therapy, 73.5% of $Vol_{low}Mass_{low}$ remained in this group, whereas 56.5% and 29.0% of $Vol_{low}Mass_{high}$ and $Vol_{high}Mass_{high}$patients transitioned into $Vol_{low}Mass_{low}$, respectively. In contrast, only 17.4% of $Vol_{high}Mass_{low}$ transitioned into $Vol_{low}Mass_{low}$.
Conclusions CMR can be used to assess for RV adaptation in patients with PAH and has prognostic value at baseline and follow-up. Patients with evidence of maladaptive remodelling ($Vol_{high}Mass_{low}$) are at high risk of treatment failure with PAH therapies and should be considered for early intensification of treatment and lung transplantation. Presence of significant RV reverse remodelling ($Vol_{low}Mass_{low}$) at follow-up on CMR indicates good prognosis and effective treatment.



Abstract S90 Figure 1

S91 REMOTE MONITORED PHYSICAL ACTIVITY IS RELATED TO ESTABLISHED MEASURES OF CLINICAL RISK IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

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Background In patients with pulmonary arterial hypertension (PAH), hospital-based field walk testing is used as a clinical study endpoint and to estimate risk and guide treatment. The relationships between indicators of clinical risk and remote monitored physical activity is unknown. Here we report the relationship between baseline parameters that indicate clinical risk and remote monitored cardiac and physical activity measures.

Methods 80 patients were recruited to the arrhythmia substudy of the United Kingdom National cohort study of Heritable and Idiopathic PAH (NCT01907295), and implanted with an insertable cardiac monitor (LinQ, Medtronic) and remote monitoring established through a regulatory approved system. Daily physical activity, heart rate, and heart rate variability was related to baseline World Health Organisation functional class (WHO-FC); N-terminal-Pro B-type natriuretic peptide (NTProBNP) and COMPERA 2.0 risk score.

Results Daily physical activity was reduced with a high WHO-FC (WHO-FC 1 vrs 3&4, P<0.001, figure 1), increased NTProBNP (P<0.001), and increased COMPERA 2.0 risk score (P<0.001), and correlated with incremental shuttle walk test (p<0.01). Indicators of cardiopulmonary function including heart rate variability and night heart rate were also related to WHO-FC, NTproBNP and COMPERA 2.0 risk (P<0.01).

Conclusion Daily, remote measured physical activity, heart rate variability, and night heart rate are related to established measures of clinical risk in patients with PAH.

S92 REMOTE MONITORING ENABLED EVALUATION OF RISK AND PHYSIOLOGICAL RESPONSE TO THERAPEUTIC ESCALATION AND CLINICAL WORSENING IN PATIENTS WITH PULMONARY HYPERTENSION

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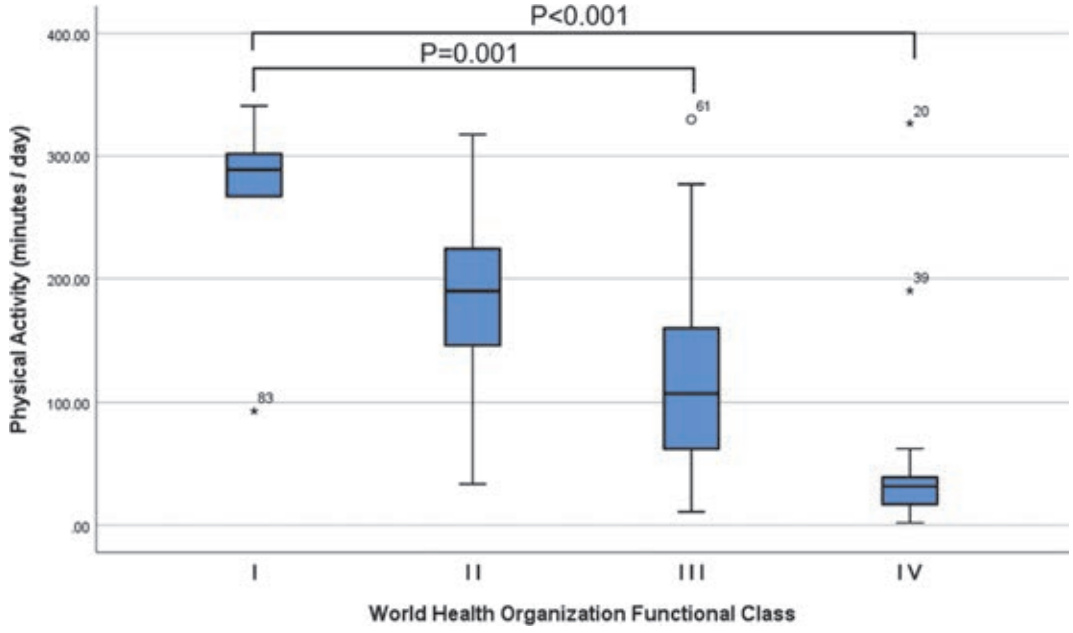
10.1136/thorax-2022-BTSabstracts.98

Background In patients with pulmonary arterial hypertension (PAH) hospital-based risk stratification is used to aid decision making and guide treatment. Risk stratification based on remote monitored parameters may facilitate early evaluation of clinical efficacy following treatment change or indicate clinical stability/deterioration, thereby permitting early intervention.

Methods Patients with pulmonary hypertension were identified from the ASPIRE database (6/YH/0352). Univariate Cox Regression and stepwise forward multivariate analysis were undertaken in a derivation cohort (n=3832) to identify parameters associated with mortality. Mortality weighted z-scores of age, incremental shuttle walk test (ISWT), heart rate (HR) and total pulmonary resistance (TPR) were summed to give an individual remote risk score value and LOESS regression used to determine risk thresholds. Patients enrolled in

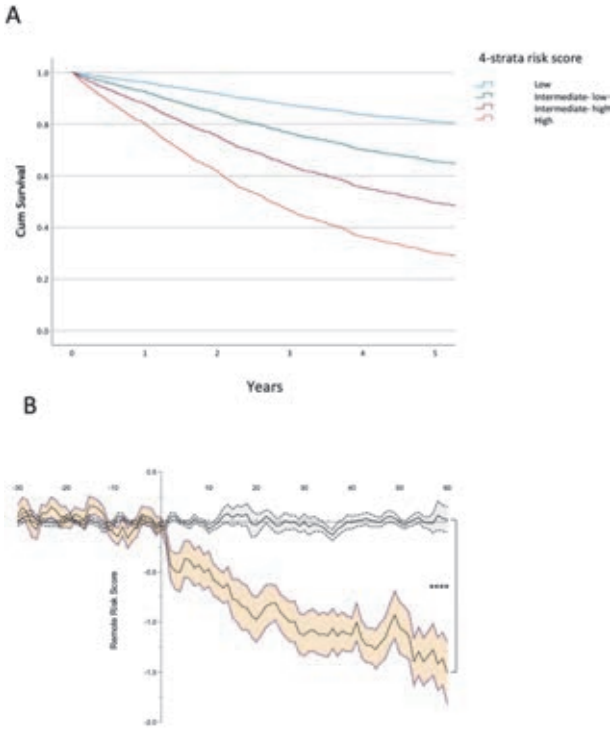


Abstract S91 Figure 1 Physical activity (minutes/day) stratified by baseline World Health Organization (WHO) functional class. WHO Functional Class I (median: 288.8; IQR: 267.1 – 301.8). II (median: 189.9; IQR: 144.4 – 224.6). III (median: 107.1; IQR: 62.1 – 160.4), and IV (median: 31.6: IQR: 17.0 – 38.9). ANOVA with Dunnett's t-test; WHO functional classes I and III (P<0.001); WHO functional classes I and IV (P<0.001)

FIT-PH (NCT04078243) were implanted with a pulmonary artery pressure (CardioMEMS, Abbott) and insertable cardiac monitors (LinQ, Medtronic) and remote monitored physiology observed following clinically indicated therapeutic escalation (TE) and clinical worsening events (CWE).

Results Multivariate analysis of the derivation cohort demonstrated that ISWT, HR and TPR had statistically significant relationships to mortality. Survival analysis demonstrated increased mortality with each decile of baseline risk score ($p<0.01$). In the validation cohort of patients with PAH (n=590), remote risk score thresholds identified low-, intermediate-low-, intermediate-high- and high-risk groups with Kaplan-Meier estimated 1-year mortality of 4.4%, 8.0%, 10.3% and 17.8% respectively ($p<0.001$ for between group comparisons, figure 1A) that were consistent COMPERA 2.0 risk stratification (Cohen's weighted Kappa 0.61). In patients with remote monitoring devices implanted, following TE, mean pulmonary artery pressure and TPR were reduced and cardiac output (CO) and physical activity increased compared to baseline at days 7, 4, 22 and 42 respectively ($p<0.05$). The developed remote risk score was improved following TE ($p<0.0001$, figure 1B) and worsened at the time of a CWE ($p<0.05$) consistent with established measures of risk (WHO FC, right ventricular ejection fraction, ISWT and NTpro-BNP).

Conclusion A remote risk score of mortality-associated parameters accurately categorised patients as low-, intermediate-low-, intermediate-high- and high-risk. Implementation of this score, to daily remote monitored data, identified improvement following TE and deterioration with CWE.



Abstract S92 Figure 1 A. Risk stratification of patients with pulmonary arterial hypertension by baseline remote risk score, B. Effects of clinically indicated therapeutic escalation on remote PAH risk score A. Kaplan-Meier analysis of mortality stratified by baseline 4-strata remote risk score. Kaplan-Meier estimated survival rates 1, 3 and 5 years after diagnosis for the low-risk group were 95.6%, 85.8% and 80.0%, respectively; for the intermediate-low risk group, 92.0%, 75.8% and 60.3%, respectively; for the intermediate-high risk group, 89.7%, 60.2% and 42.6%, respectively; and for the high-risk group, 82.2%, 44.6% and 28.0%, respectively ($p<0.001$ for between group comparisons). B. Individual risk scores were calculated by summation of the mortality weighted z-score for age, resting heart rate, total pulmonary resistance, and physical activity. Data is presented with therapeutic escalation (TE) at day 0 with days -30 to day -1 as days preceding (left of the Y-axis), and days +1 to day +30 as days following TE (right of the Y-axis). Control group comprises 60-day periods from patients with no TE. TE n=18, control n=24, mean +/- SEM, one-way ANOVA with Dunnetts's correction, ****$p<0.0001$)

S93 SYSTEMATIC FOLLOW-UP OF PATIENTS FOLLOWING ACUTE PULMONARY EMBOLISM IS ASSOCIATED WITH AN INCREASED INCIDENCE OF CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION AND LESS SEVERE DISEASE

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10.1136/thorax-2022-BTSabstracts.99

Introduction There are limited data on the incidence of chronic thromboembolic pulmonary hypertension (CTEPH). The Sheffield Pulmonary Vascular Disease Unit (SPVDU) serves a population of 15 million. In Sheffield (population 600,000) a pulmonary embolism (PE) follow-up clinic was established in 2010. The study aim was to assess the impact of a PE follow-up clinic on the diagnostic rate and severity of CTEPH.

Methods Patients diagnosed with CTEPH (2010–2020) included Sheffield patients referred from the PE clinic (Group A), those not referred through the PE clinic (Group B), and patients with suspected PH referred from outside Sheffield (Group C). CTEPH was defined according to the recommendations of the 6th World Symposium on pulmonary hypertension and required supportive imaging, a mean pulmonary artery pressure (mPAP) $\geq$20 mmHg at right heart catheterisation, with other causes of PH excluded.

Results Over the 10-year period, 854 patients were diagnosed with CTEPH by the SPVDU. Of 1944 patients evaluated over the same time period in the PE-follow-up clinic, 32 were diagnosed with CTEPH with a cumulative incidence at 2 years of 1.3%. There were 73 Sheffield patients with CTEPH (Groups A and B) giving a diagnostic rate of 12.2/million/year based on a referral population of 600,000, compared to 5.2/million/year for 781 patients with CTEPH referred from outside of Sheffield. Haemodynamic evaluation (mean pulmonary arterial pressure (mPAP) and pulmonary vascular resistance (PVR)) at initial right heart catheterisation and incremental shuttle walking test (ISWT) were compared across the three groups and displayed in table 1.

Conclusion The introduction of an acute PE follow-up clinic identifies patients with CTEPH with less severe haemodynamic disease and increased functional ability as demonstrated by an ISWT. Introduction of a clinic to evaluate patients following PE, in combination with current UK

Abstract S93 Table 1

Origin of referral to Sheffield PVDU	Total number of CTEPH cases	mPAP (mmHg)	PVR (dynes/sec/cm^{-5})	ISWT (m)
Group A	32	**36**± 9.6	**350.8**± 177.5	**315**± 241.4
Group B	41	**41.7** ± 13.3	**588**± 472$^{\$}$	**232**± 192
Group C	781	**45.3**± 11.4*	**651**± 364.6*	**201.2**± 189.3*

*P Value<0.05 A vs. C, $ P Value<0.05 A vs. B

approaches to the assessment of suspected pulmonary hypertension, can achieve diagnostic rates for CTEPH of 12.2/million/year.

'The Terminator' – Neutrophils in respiratory disease

S94 DYSFUNCTIONAL NEUTROPHIL RESPONSE IN COVID-19 INFECTION VARY BY SUBTYPE

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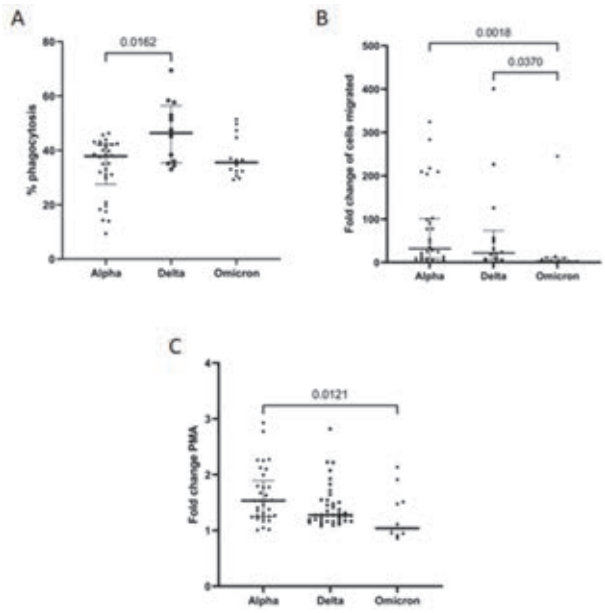
10.1136/thorax-2022-BTSabstracts.100

Background The global COVID-19 pandemic has significantly evolved since first identified in November 2019. Viral antigenic shift has seen the emergence of several new strains leading to spikes in infection. Transmissibility has increased with each emerging strain, corresponding with a decrease in overall mortality. We have previously demonstrated dysfunctional neutrophil responses in COVID-19 patients compared to community acquired pneumonia control.[1] Here we aimed to correlate strain severity with change in underlying neutrophil function.

Methods Patients were recruited between January 2021 to May 2022 from the Queen Elizabeth Hospital Birmingham. Patients were recruited if not admitted to the ITU. 33 patients presented infection with alpha COVID-19, 13 delta COVID-19 and 14 omicron COVID-19 infections. Neutrophils were isolated from whole blood. Phagocytosis of labelled *Streptococcus pneumoniae*, transwell migration towards IL-8, neutrophil extracellular trap (NETosis) formation and surface extracellular marker expression were analysed.

Results There were no significant differences in demographics between patients recruited for different variants. Patients infected with the alpha variant had significantly raised CRP compared to omicron patients (p=0.0427). Phagocytosis was significantly increased between alpha and delta variants (figure 1A). Transwell migration was significantly reduced in omicron patients compared to the other variants (figure 1B). There was reduction in neutrophil extracellular trap in omicron patients compared to alpha variant patients (figure 1C). Compared to alpha patients, neutrophils from omicron patients had reduced expression of CD10 (p=0.0004), CD54 (p=0.0015), CD62L (p=0.0013) and CD11c (p<0.0001). CXCR2 expression was higher in neutrophils from omicron patients (p=0.0001), while there was no difference in CD11b, CXCR4, PD-L1 and CD66b expression.



Abstract S94 Figure 1 Comparison of neutrophil effector functions between COVID-19 variants (alpha n=33, delta n=13, omicron n-14). **A**.% change in phagocytosis significantly increased between alpha and delta patients (p=0.0162). **B**. Fold change in cells migrated through a transwell pore to IL8 compared to vehicle control significantly reduced in omicron patients compared alpha and delta (vs alpha p=0.0018, vs delta p=0.0370). **C**. Neutrophil extracellular trap production after stimulation with PMA compared to vehicle control significantly reduced in omicron patients compared to alpha (p=0.0396)

Discussion Our results showing changes in neutrophil function and phenotype differ between variants of COVID-19 infection, potentially reflect viral evolution. This change in neutrophil function may contribute to the evolving clinical phenotype observed in patients. Our population of ward-based COVID-19 patients represents the majority of inpatient hospital burden where early intervention may prevent clinical deterioration. Targeting neutrophil function may be an effective way of improving infection outcome in the future.

REFERENCE

1. Belchamber K, *et al*. Altered neutrophil phenotype and function in non-ICU hospitalised COVID-19 patients correlated with disease severity. medRxiv, 2021: p. 2021.06.08.21258535.

S95 PROLONGED NEUTROPHIL DYSFUNCTION AND PHENOTYPE IN ELDERLY HOSPITALISED COMMUNITY ACQUIRED PNEUMONIA PATIENTS

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10.1136/thorax-2022-BTSabstracts.101

Background Community acquired pneumonia (CAP) is a leading cause of morbidity and mortality in older patients. Neutrophils from elderly CAP patients have an activated phenotype and migrate inaccurately towards IL-8. We have

previously demonstrated that the dysfunctional chemotaxis of neutrophils in elderly CAP patients persists, despite patient recovery from the initial episode (Sapey et al., 2017; PMID: 28657793). This change in neutrophil phenotype and functional paralysis is not fully understood but can make patients more susceptible to a secondary CAP episode. We hypothesise that neutrophil phenotype in CAP persists and contributes to long term dysfunction.

Methods CAP patients admitted to the Queen Elizabeth Hospital, Birmingham, confirmed negative for COVID-19 (n=16) over 50 years old were recruited. From this cohort, 5 patients were followed up after a minimum of 6 weeks (table 1). Peripheral Neutrophils were isolated by Percoll density centrifugation at baseline and follow up. Chemotaxis towards IL-8, phagocytosis of *Streptococcus pneumoniae* and expression of cell surface markers were assessed.

Results There was no difference in the speed of migration (p=0.483), accuracy of migration (p=0.432) or chemotactic index (p=0.870) of neutrophils from CAP patients at baseline and follow up. Phagocytosis of *S. pneumoniae* was also similar at baseline and follow up (p=0.438). The median fluorescence intensity (MFI) of CD10 (p=0.188), CD16 (p=0.625), CXCR4 (p=0.625), CD62L (p=0.813), CD11b (p=0.438), CD66b (p=0.313), PD-L1 (p=0.813) and CD11c (p=0.313) were also unchanged at follow up. However, there was a reduction in MFI of CD54 (p=0.063) and CXCR2 (p=0.063), and an increase in the percentage of CXCR4+ cells (p=0.063) at follow up, although these were not significant.

Abstract S95 Table 1 Demographics of elderly community acquired pneumonia (CAP) patients followed up after 6 weeks

	CAP
Number of patients	5
Mean Age (years)	82.4
Sex	
Male	3 (60%)
Female	2 (40%)
Comorbidities	
Cardiovascular	2 (40%)
Type 2 diabetes	3 (60%)
Chronic kidney disease	2 (40%)
Thyroid disease	2 (40%)
Patients with 2 or more comorbidities	4 (80%)

Conclusion In this cohort of elderly CAP patients, we have confirmed that the key effector neutrophil function of migration does not improve or worsen after clinical recovery. There is also no improvement in phagocytosis. In addition, surface expression of most neutrophil markers was unchanged at follow up. The reduction in MFI of CD54 and CXCR2 and increase in percentage of CXCR4+ cells suggest a change in phenotype from reverse transmigration and upregulation of IL-8 receptor to a senescent phenotype. However, these will require validation in a larger cohort.

Please refer to page A211 for declarations of interest related to this abstract.

S96 NEUTROPHIL METABOLISM IS REPROGRAMMED IN PATIENTS WITH ACUTE RESPIRATORY DISTRESS SYNDROME

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10.1136/thorax-2022-BTSabstracts.102

Introduction and Objectives Acute Respiratory Distress Syndrome (ARDS) arises from diverse intra- and extra-pulmonary insults and contributes to a substantial proportion of the global intensive care burden. Dysregulated neutrophilic inflammation underpins the subsequent acute lung injury central to this disease process.

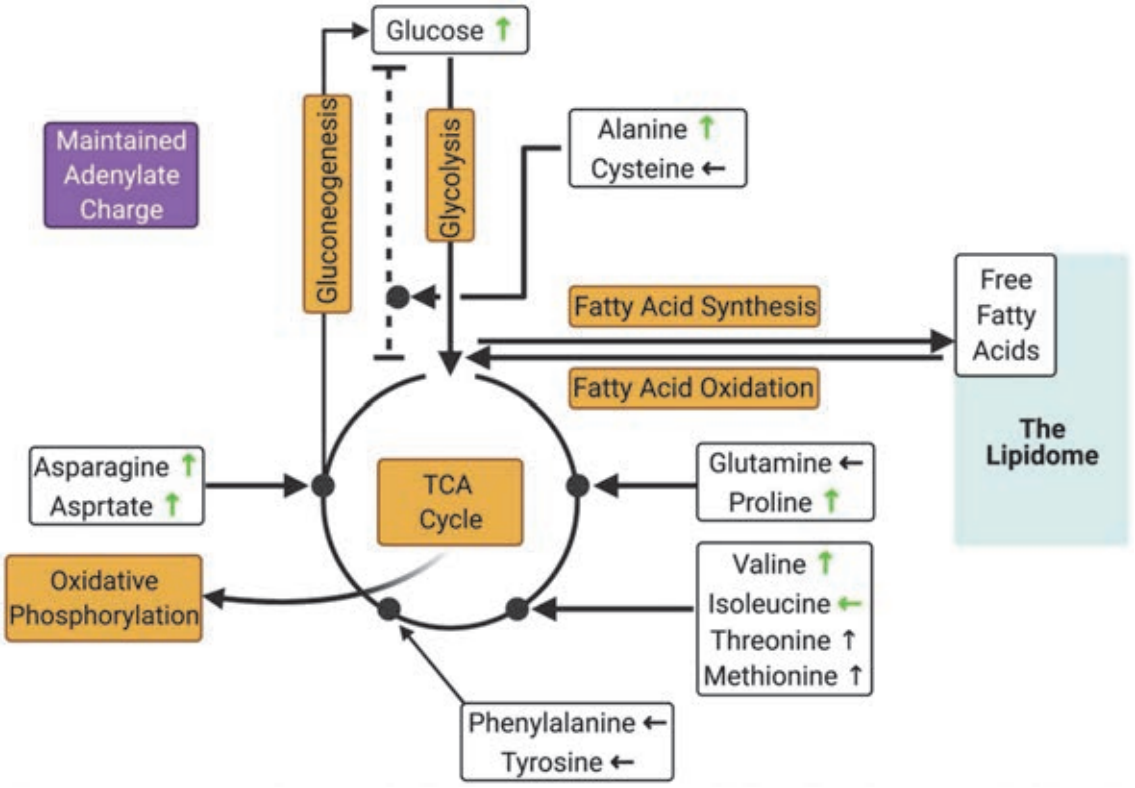
Recent work in our laboratory has demonstrated that, despite their adaption to function in nutrient and oxygen deplete inflammatory microenvironments, neutrophils respond to hypoxaemia and tissue hypoxia through global rewiring of inflammatory processes.[1] We showed that this results in a novel neutrophilic inflammatory phenotype, characterised by promotion and prolongation within the active neutrophil compartment, and which drives the immunopathogenesis of ARDS.[1]

We now hypothesise that within ARDS patients' circulating pools of inactive neutrophils, there is a metabolic phenotype that correlated the observed functional signature. To test this, we sought to perform targeted metabolomic and proteomic analyses of inactive blood neutrophils from healthy volunteers and ARDS patients.

Methods Twenty patients (n=15 moderate-severe ARDS patients and n=5 healthy controls) were recruited to a single-centre cross-sectional study undertaken between 04/2020- 01/2021. Neutrophils were isolated from participants' whole venous blood. High-performance liquid chromatography and mass spectroscopy (HPLC-MS) was performed, enabling chemometric metabolomic and proteomic analyses.

Results In ARDS neutrophils, relative to healthy control cell samples, metabolite abundances and protein expression levels were indicative of elevated glycolytic, gluconeogenic, fatty acid oxidative and synthetic activity. Additionally, our findings were consistent with upregulated glucogenic amino acid catabolism and the remodelling of the tricarboxylate cycle. Furthermore, despite their preserved energy status, we also observed an increased capacity for oxidative phosphorylation. These findings are summarised in figure 1.

Conclusions We identified a signature of profound energetic reprogramming within the circulating neutrophil compartment in ARDS patients, relative to healthy control individuals, supporting our hypothesis that increased neutrophil biosynthetic capacity underlies the functional remodelling of neutrophil inflammation seen in systemic hypoxaemia and tissue hypoxia. Future research will seek to understand how this altered phenotype arises and contributes to the aberrant neutrophilic inflammation observed in ARDS.



Abstract S96 Figure 1 Summary of Research Findings: Elevated metabolite abundances are indicated by green up-arrows; while maintained abundances are indicated by horizontal arrows. Emboldened process arrows indicate upregulation of a specific pathway. Findings were indicative of increased glycolysis, fatty acid oxidation and synthesis and oxidative phosphorylation, with altered tricarboxylate acid (TCA) cycle intermediaries and increased glucogenic amino acid entry to the TCA characteristic of remodelling rather than specific metabolic up-/down-regulation

REFERENCE

1. Mirchandani AS, *et al*. Hypoxia shapes the immune landscape in lung injury and promotes the persistence of inflammation. *Nat Immunol* 2022. https://doi.org/10.1038/s41590-022-01216-z

S97 NEUTROPHIL EPIGENETIC SIGNATURES IN THE CONTEXT OF ACUTE RESPIRATORY DISTRESS SYNDROME

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10.1136/thorax-2022-BTSabstracts.103

Introduction Neutrophils drive acute respiratory distress syndrome (ARDS) pathogenesis, which is characterised by profound hypoxia. Hypoxia exposure acutely alters neutrophils metabolisms and functions.[1] Hypoxic reprogramming of chromatin accessibility has previously been reported in other cell types.[2] We questioned whether blood neutrophils from patients with systemic hypoxaemia in the context of ARDS had evidence of altered expression of histone modification enzymes and regulatory proteins.

Methods Peripheral blood neutrophils of patients meeting the Berlin Definition of ARDS were studied acutely (n = 13), alongside samples from age-and-sex matched healthy volunteers (n = 4). Histone modification enzymes and accessory proteins were measured by high-performance liquid chromatography-mass spectrometry.

Results ARDS blood neutrophils acutely altered the abundances of histone modifying enzymes and regulatory proteins impacting histone 3 lysine 4, 9, 27 methylation and histone 3 lysine 27 acetylation. We observed increased abundances of components of complex proteins associated with SET1 (COMPASS), switch/sucrose non-fermentable (SWI/SNF) chromatin remodelling complex, polycomb repressive complex 2 (PRC2), C-terminal binding protein complex (CtBP), corepressor for element-1-silencing transcription factor complex (CoREST), nucleosome remodelling and deacetylation complex (NuRD) and transcriptional repressor complex mSin3A.

Conclusions Blood neutrophils isolated from patients with ARDS demonstrated altered expression of enzymes important for histone modifications. Future work is required to understand whether there are longer term consequences to these changes in enzyme expression for key neutrophil effector functions that are consequent upon systemic hypoxaemia.

REFERENCES

1. Thompson AAR, Dickinson RS, Murphy F, Thomson JP, Marriott HM, Tavares A, *et al*. Hypoxia determines survival outcomes of bacterial infection through HIF-1 alpha-dependent reprogramming of leukocyte metabolism. *Science Immunology* 2017;**2**(8):12.
2. Batie M, Frost J, Frost M, Wilson JW, Schofield P, Rocha S. Hypoxia induces rapid changes to histone methylation and reprograms chromatin. *Science* 2019;**363**(6432):1222–6.

'Gone with the Wind' – Measuring breathlessness and airway obstruction

S98 UNEXPLAINED BREATHLESSNESS: THE DEMOGRAPHICS OF PATIENTS WITH INCONCLUSIVE CARDIOPULMONARY EXERCISE TESTS (CPET) AND THEIR FUTURE OUTLOOK

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10.1136/thorax-2022-BTSabstracts.104

Introduction Cardiopulmonary exercise testing (CPET) uses a progressive exercise challenge to elicit cardiovascular, pulmonary, and pulmonary vascular pathology. CPET testing is used when resting investigations (spirometry, ECHO, CXR or CT scan) have failed to demonstrate a cause for a patient's breathlessness. Though much has been written about CPET'S role in ruling in pathology, the outlook for breathless patients with inconclusive tests has not been extensively investigated. With CPET testing regularly marking the end of the diagnostic pathway for patients with unexplained breathlessness, we sought to identify the clinical characteristics of patients receiving an inconclusive test and document prognosis over a 10-year follow-up.

Methods The clinical records of 73 patients undergoing CPET were examined to determine the demographic and clinical features of the patients with conclusive (n=27) and inconclusive (n=46) test results. Additionally, the clinical records of a retrospective cohort of 38 patients that underwent CPET testing in 2012 were also examined to assess the outcomes of these patients in the following decade. Analysis was performed using R version 4.0.1.

Results Patients having inconclusive CPETs (defined as not finding cardiovascular, pulmonary, or pulmonary vascular pathology) had a lower mean age (53.1) than patients with a positive exercise test (64.6). They had a lower number of key comorbidities including COPD, heart failure, lung cancer and atrial fibrillation. 92.3% of patients who had an inconclusive CPET were still alive after 10 years, versus 66.7% of those patients with a positive CPET. Following an inconclusive CPET, only 15.4% of patients received a diagnosis in the subsequent decade. Some causes of exercise intolerance that were later diagnosed included inducible laryngeal obstruction, anaemia, and heart failure. Despite few patients with an inconclusive test going on to a diagnosis, 50% were re-referred over the following decade for further investigation of breathlessness.

Conclusions The 10-year mortality outlook for patients in this cohort with inconclusive CPET is more favourable than those with conclusive test results. Though a small proportion of patients with inconclusive tests did go onto receive a diagnosis, the majority remained undiagnosed in the subsequent decade. Half of those with inconclusive tests were re-referred for further investigation.

Abstract S98 Table 1 Outcome summary for patients with conclusive (defined as finding cardiovascular, pulmonary, or pulmonary vascular pathology) against inconclusive cardiopulmonary exercise tests with 10 years of follow-up

Outcome	Conclusive (n=12)	Inconclusive (n=26)	P Value	Statistical Significance
Percentage males	41.2	42.3	0.970	No
Mean age	65.2	52.0	0.008	Yes
Percentage patient living	66.7	92.3	0.044	Yes
Percentage of patients with diagnosis	83.3	15.4	<0.001	Yes
Percentage breathlessness ongoing	83.3	50.0	0.050	No

S99 THE IMPACT OF WEARING FACE MASKS ON NEURAL RESPIRATORY DRIVE AND BREATHLESSNESS IN HEALTHY SUBJECTS

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10.1136/thorax-2022-BTSabstracts.105

Introduction and Objectives Surgical face masks (SM) and FFP3 respirator masks have been mandated in clinical settings to mitigate against transmission of SARS-CoV-2 during the COVID-19 pandemic. Wearing face masks can provoke respiratory discomfort in some individuals. Neural respiratory drive (NRD) is closely related to breathlessness and can be quantified using second intercostal space electromyography to measure the surface parasternal intercostal muscle electromyogram (sEMGpara). Our objective was to investigate the impact of wearing SM and FFP3 respirators on NRD and breathlessness in healthy subjects. We hypothesised that sEMGpara and

Abstract S99 Table 1 SpO_2%, sEMGpara%max, respiratory pattern, respiratory rate and Multidimensional Dyspnea Profile scores wearing no mask, a Type IIR surgical face mask and an FFP3 respirator mask. Data are presented as median (interquartile range). * indicates p<0.05 vs 'no mask'

	No mask	Surgical mask	FFP3 respirator
SpO_2% (%)	97 (95 – 98)	97 (95 – 98)	96 (95 – 97)
Respiratory Rate (breaths/minute)	15.8 (13.4 – 19.1)	15.6 (12.2 – 19.4)	17.1 (13.3 – 19.0)
ti/ttot	0.34 (0.29 – 0.40)	0.38 (0.32 – 0.43)	0.39 (0.35 – 0.47) *
Thoracic expansion (respiratory belt, mV)	2.4 (1.2 – 2.7)	2.2 (1.4 – 3.6)	2.9 (1.4 – 3.8)
sEMGpara%max (%)	3.4 (2.1 – 4.4)	3.9 (2.3 – 5.5) *	4.1 (3.1 – 6.8) *
MDP A1 Breathing Discomfort (0 – 10)	0 (0 – 0.5)	0 (0 – 3)	1 (1 – 4) *
MDP Immediate Perception Subdomain Score (0 – 60)	0 (0 – 2.5)	2 (0.5 - 6)	4 (1.5 - 19.5) *
MDP Emotional Response Subdomain Score (0 – 50)	0 (0 – 0)	0 (0 – 0.5)	0 (0 – 2)
MDP Total Score (0 – 110)	0 (0 – 2.5)	2 (0.5 - 6)	4 (2 – 21) *

Abbreviations: ti/ttot = the ratio of inspiratory time to total breathing cycle time. sEMGpara%max = neutral respiratory drive quantified using second intercostal space electromyography to measure the surface parasternal intercostal muscle electromyogram, normalised to volitional maximum. MDP = Multidimensional Dyspnea Profile. MDP A1 Breathing Discomfort is measured on a 0 – 10 Scale. MDP Immediate Perception Subdomain Score is the sum of the A1 score and five SQ intensities (SQ1 muscle work/effort, SQ2 air hunger, SQ3 chest tightness, SQ4 mental effort, SQ5 breathing a lot). MDP Emotional Response Subdomain Score is the sum of the five A2 (0–10) emotional response scores (E1 depressed, E2 anxious, E3 frustrated, E4 angry, E5 afraid). MDP Total Score is the sum of A1 Breathing Discomfort and intensities for the five SQs and five emotional responses

breathlessness would be highest wearing an FFP3 than wearing a SM or no mask (NM).

Methods A cross-over study was conducted in 9 healthy participants (median (IQR) age 22 (21 – 22.5) years, 6 female). Participants were studied during 10 minutes of seated resting breathing under three conditions in random order: no mask (NM), wearing a Type IIR surgical face mask (SM) and wearing an FFP3 respirator mask (FFP3). SpO_2% and sEMGpara were recorded continuously. sEMGpara signals were converted to root mean square and expressed as a proportion of volitional maximum (sEMGpara%max). Respiratory pattern (ti/ttot) and respiratory rate were derived from thoracic expansion measured using a respiratory belt. Breathlessness and respiratory discomfort were assessed using the Multidimensional Dyspnea Profile (MDP). Within-subject differences between mask conditions were analysed using Friedman's ANOVA.

Results MDP breathing discomfort, immediate perception and total score were higher during FFP3 compared to NM (Table 1). MDP Emotional Response scores were similar under all three conditions. sEMGpara%max was significantly higher during SM and FFP3 compared to NM, but the absolute difference in sEMGpara%max was small (table 1).

Conclusions Wearing a SM or FFP3 respirator was associated with small increases in NRD, and an increase in respiratory discomfort when wearing a FFP3 compared to the 'no mask' condition. SM and FFP3 respirators did not provoke significant emotional distress, suggesting that the increase in NRD reflects an increase in respiratory effort rather than anxiety or fear.

S100 NEURAL RESPIRATORY DRIVE AMONG PATIENTS WITH COPD WITH MILD OR MODERATE AIRFLOW LIMITATION: CONSISTENCY, RELIABILITY, AND ASSOCIATION WITH OTHER BIOMARKERS

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Introduction and Objectives Neural respiratory drive (NRD) is central control of breathing maintained through the respiratory muscles, particularly diaphragm and intercostals. It is closely correlated to the subjective measurement of breathlessness in asthmatic and COPD patients (stable state and during exacerbation). NRD has been measured by surface electromyography (EMG) of the second intercostal space parasternal muscles (EMG_{para}) predominantly among those COPD patients with severe or very severe airflow limitation. It has not previously been assessed in ambulatory 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 stability of NRD across a group of COPD patients with mild or moderate airflow limitation (FEV_1 (forced expiratory volume in one second) $\geq$50% predicted) in primary care who were receiving treatment with inhaled corticosteroids (ICS). Relationships between NRD and changes in quality of life, lung function and breathlessness were assessed.

Methods Patients with stable mild or moderate COPD were recruited from general practices. Parasternal NRD (EMG root mean squared (rms) max; NRDI), spirometry, measures of breathlessness and QoL (CRQ-SAS, mBorg, CAT, mMRC) were recorded at baseline, 3 and 6-months. Patients were randomised to withdrawal or continuation of ICS therapy. Intraclass correlation coefficients calculated for each variable and Bland-Altman plots generated.

Results 40 patients with mild or moderate COPD were recruited. There was high intra-rater and inter-rater agreement in each of the NRD measures, including EMG rms max & NRDI (ICC > 0.9). There were correlations between EMG rms max 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). No consistent correlations were seen between EMG rms max or NRDI and any of CAT, CRQ domains, mBorg, or mMRC scores.

Conclusions NRD is an additional measure of breathlessness which has a relationship with FEV1% predicted. It is a reliable measure, distinct from other measures of breathlessness. NRD measurements are reproducible by trained primary care clinical staff. It may be a useful objective measure of breathlessness with a role, at present undefined, in interventional studies.

S101 COMPARING THE PATIENT ACCEPTABILITY, SENSITIVITY AND SPECIFICITY OF METHACHOLINE AND MANNITOL BRONCHIAL CHALLENGE TESTS IN ASTHMA DIAGNOSIS

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Introduction Bronchial hyperresponsiveness (BHR) is a key feature of asthma, and different types of bronchial challenge tests (BCT) are used to assist asthma diagnosis. We aimed to compare the sensitivity and specificity, side-effect profile and patient acceptability of methacholine (MethBCT) and Mannitol (MannBCT) challenge tests.

Methods Participants were recruited from the Rapid Access to Diagnostics of Asthma Study (RADicA). RADicA is a prospective cohort study of 3–69-year-olds with suspected asthma. Participants undertake comprehensive clinical assessment and lung function testing, including spirometry, bronchodilator reversibility (BDR), BCTs, Peak expiratory flow variability (PEFv) and exhaled nitric oxide (FeNO).

MethBCT is a core part of the study offered to all participants. MannBCT is an optional visit.

Participants who attempted both BCTs were asked to complete an acceptability questionnaire. Reasons for stopping a challenge test early were noted but these participants were not included in further analysis. Participants were asked: 1. To report side effects experienced during testing; 2. To rate the effort of the BCT; 3. To rate acceptability of the length of BCT (both using a five-point scale); 4. Whether they would be happy to repeat the BCT; and 5. To state their preferred challenge.

For sensitivity and specificity of BCT analysis asthma was defined as $\geq$2 positive tests using the tests and cut offs from NICE guideline (NG80): FEV1:FVC $\leq$70% or LLN, BDR $\geq$12%, PEFv $\geq$ 20%, FENO $\geq$35/40ppm.

Results 50 participants attempted both challenges; early termination occurred in 1 MethBCT and 6 MannBCT, 3 participants did not complete a questionnaire. 40 paired questionnaire responses were analysed (45% male; mean(SD): age 30(15.7) yrs; BMI 25.8(5.5) kg/m^2).

Results are shown in table 1.

Abstract S101 Table 1 Comparison of acceptability, sensitivity and specificity of methacholine and mannitol BCTs

	Methacholine n=40	Mannitol n=40	P value
No. Participants reporting SEs	39 (97.5%)	40 (100%)	1.0
No. SEs reported/participant	3 [2–4]	4[2–5]	0.06
Most commonly reported SE:			
Cough	22 (55%)	38 (95%)	**0.00**
SOB	24 (60%)	19 (47.5%)	0.37
Chest tightness	27 (67.5%)	22 (55%)	0.28
Throat Irritation	8 (20%)	23 (57.5%)	**0.00**
Acceptability of length*	1[1–2]	1.5[1–2]	0.34
Rating of effort required**	3[2–4]	3[2–3]	0.49
Would they perform the test again	33 (82.5%)	33 (82.5%)	0.95
Preferred challenge	19 (47.5%)	18 (45%)	0.869
Sensitivity	85.7%	71.4%	*N/A*
Specificity	88.5%	80.8%	*N/A*

SE= Side effects, values reported indicate n (%) with chi square or median [IQR] with Mann Whitney U. *Response to question 'I feel the length of the challenge was acceptable', 1= strongly agree to 5= strongly disagree, **Response to question 'I feel the effort required for this test is...', 1=very low to 5=very high.

Conclusions Nearly all patients reported side effects when undertaking BCT, with a trend towards more per challenge for MannBCTs. Sensitivity and specificity was slightly higher in MethBCT than MannBCT. Perhaps methacholine is more useful and better tolerated than mannitol but further assessment in a larger study cohort is needed.

S102 ASSESSMENT OF TWO OSCILLATING POSITIVE EXPIRATORY PRESSURE (OPEP) DEVICES: HOW DO THE DIFFERING MECHANISMS OF ACTION IMPACT LAB PERFORMANCE

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Rationale OPEP devices are often used therapeutically in order to aid airway clearance where excess mucus is a challenge, such as in bronchiectasis, CF and COPD. Ease of use, ability to clean and adaptability to use with nebulizers are real world differentiators for different types of OPEP device, however the mechanism of device action can also differ. This laboratory study compared an established, clinically supported OPEP device with a recently introduced one that is based on older technology. Key in-vitro performance parameters were compared.

Methods Aerobika* (Trudell Medical International, Canada) and AirPhysio (AirPhysio, Australia) OPEP devices (n=3) were assessed at steady expiratory flows of 10–30L/min using a flow generator (Resmed VPAP III), flow meter (TSI 4000), pressure tap and computer for data collection and analysis. Average positive pressure, pulse amplitude and pulse frequency were determined for each device.

Results As each device can be operated at different resistances, the values at medium resistance are reported in figure 1.

Discussion/Conclusions For effective performance, frequency is typically desired to be in the 10–15 Hz range, mean pressure ideally between 10–20 cm H2O, and pulse amplitude as large as possible. The results for the two devices show that although mean pressures are similar across the range of flow rates, the amplitudes are higher for the Aerobika* OPEP device and the frequencies are more often in the desired range. The observed differences are probably due to the fact that each device operates according to a different mechanical principle.

What is clear from these results is that, in addition to real world usability assessments, it is important to understand that each OPEP device can perform differently mechanically. Hence, when selecting an OPEP device for a patient, the existence of clinical evidence supporting efficacy, as well as patient preference, should be considered. All devices will not perform the same.

Please refer to page A211 for declarations of interest related to this abstract.

S103 THE ASSOCIATION OF SMALL AIRWAYS OBSTRUCTION WITH RESPIRATORY SYMPTOMS, CARDIOMETABOLIC DISEASE, AND QUALITY OF LIFE: RESULTS FROM THE BURDEN OF OBSTRUCTIVE LUNG DISEASE (BOLD) STUDY

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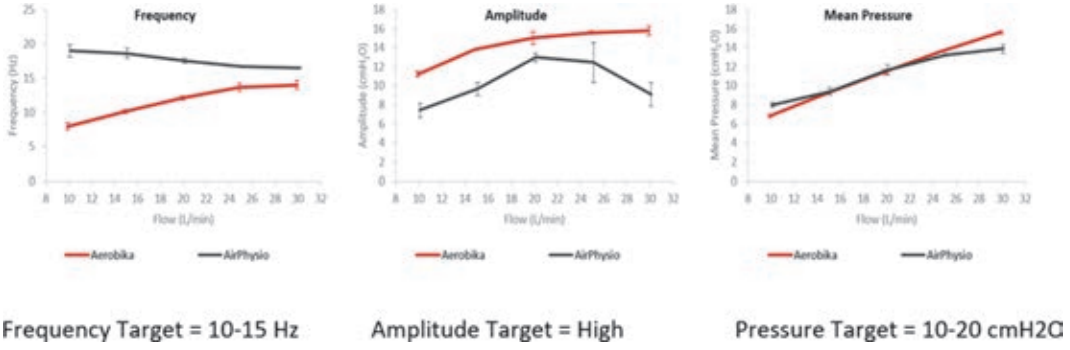
Introduction and Objectives Spirometric small airways obstruction (SAO) has an estimated prevalence of 7.5%-45.9% in the general population. With similar risk factors to COPD, it is



Abstract S102 Figure 1

unknown whether SAO is also associated with respiratory symptoms, cardiometabolic disease, and quality of life (QoL). We aimed to investigate these associations using data from the multinational BOLD study.

Methods We used two spirometry parameters to identify SAO in the BOLD study general population (N=21,594, from 41 sites): 1) the mean forced expiratory flow rate between 25% and 75% of the forced vital capacity ($FEF_{25–75}$); and 2) the forced expiratory volume in three seconds as a ratio of the forced vital capacity (FEV_3/FVC). We defined SAO separately for $FEF_{25–75}$ and FEV_3/FVC if a result was below the lower limit of normal. We collected data on chronic cough, chronic phlegm, wheeze, and dyspnoea, as well as cardiovascular disease (CVD), hypertension, and diabetes. QoL was measured using the SF-12 questionnaire. We used multivariable logistic regression to assess the association of SAO with respiratory symptoms and cardiometabolic disease. To assess the association with QoL, we used linear regression. We pooled site estimates using random effects meta-analysis. We conducted the same analyses for isolated SAO (i.e. with FEV_1/FVC $\geq$ LLN).

Results 18.9% of the study population had SAO for $FEF_{25–75}$ and 17.0% for FEV_3/FVC. By region, the Americas had the highest prevalence of respiratory symptoms and cardiometabolic disease and Africa the lowest. Physical QoL was highest in Southeast Asia and lowest in Africa, while mental QoL was highest in Southeast Asia and lowest in Europe. Using $FEF_{25–75}$, SAO was associated with increased odds of dyspnoea (OR: 2.16, 95%CI 1.77, 2.70), chronic cough (OR=2.56, 95%CI 2.08–3.15), chronic phlegm (OR=2.29, 95%CI 1.77–4.05), wheeze (OR=2.87, 95%CI 2.50–3.40), and CVD (OR=1.30, 95%CI 1.11–1.52) but not hypertension or diabetes. SAO was also associated with significantly worse physical and mental QoL. The same associations were seen using FEV_3/FVC. Isolated SAO shows the same associations, except for QoL.

Conclusions SAO is associated with respiratory symptoms, CVD and QoL. Consideration should be given to the measurement of $FEF_{25–75}$ and FEV_3/FVC, in addition to traditional spirometry parameters.

'Beyond the Matrix' – Fibroblast biology

S104 COMMUNICATION BETWEEN INFECTION EXPERIENCED LUNG STROMAL CELL SUBSETS AND RESIDENT IMMUNE CELLS IS ALTERED IN THE INFLUENZA VIRUS INFECTED LUNG

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10.1136/thorax-2022-BTSabstracts.110

Introduction and Objectives Influenza A virus (IAV) infections are a significant cause of mortality worldwide. The concept that stromal cells are permanently altered by insults is termed trained immunity. Whether these cells contribute to protection or pathology is unclear. We hypothesise that trained stromal cells may participate in protective immune responses by rapidly reactivating local memory T cells.

Methods C57BL/6 mice were infected intranasally with IAV (WSN, 150PFU) for 30 days and subsequently re-challenged with IAV (X31, 200PFU) for either 2 or 5 days. Mice were sacrificed at day 0, 2, 5, 30, 32, 35 post infection. To detect infected cells, *ex vivo*, IAV-Nucleoprotein (NP) expression was measured using flow cytometry and the location of NP+ stromal cells was determined using immunofluorescence. Further phenotyping of infection experienced stromal cell subsets was conducted using RNA-scope, immunohistochemistry, and qPCR. To assess the consequences of T cell depletion on NP expression by lung stromal cells following IAV re-challenge, anti-CD4/CD8 blockade was performed during the memory phase of infection.

Results Following influenza virus infection, NP+ epithelial cells were detected at primary (day 2, 5) and to a lesser extent at recall timepoints (day 32, 35). Importantly, NP+ epithelial cells expressed more MHCII compared to NP-negative cells, suggesting enhanced capability to communicate with T cells *via* enhanced antigen processing/presentation. Using RNAscope, SpiB, a transcription factor that regulates genes involved in antigen processing/presentation, was detected in lung epithelial cells of infected mice. SpiB+ cells were in close proximity to immune cells that form dense clusters containing a mixture of T/B cells and myeloid populations. Interestingly, these microenvironmental changes were dependent on viral replication. Increased frequencies of Ki67+ lung fibroblasts coincided with significant increases in interferon-responsive fibroblasts at early timepoints post infection, compared to naive controls. These two fibroblasts populations did not express NP. Following IAV re-challenge both fibroblast subsets were reduced compared to primary timepoints, suggesting high numbers of infected cells may be required to promote their expansion post infection.

Conclusions Infection experienced stromal cell subsets may promote immune protection upon re-infection, through antigen presentation to T cells and/or alteration of the local lung microenvironment.

Please refer to page A211 for declarations of interest related to this abstract.

S105 PULMONARY FIBROBLASTS DISPLAY CONSERVED DAMAGE RESPONSE PHENOTYPES FOLLOWING STERILE AND VIRAL INJURY

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Introduction and Objectives Pulmonary fibroblasts respond to environmental signals triggered by injury or infections, shaping subsequent responses in the lung. Fibroblasts may contribute to enhanced immune protection, or chronic pathogenic inflammation and fibrosis. We hypothesise that molecules upregulated by lung fibroblasts early following influenza A virus (IAV) infection and bleomycin-induced injury persist, in order to generate/maintain immune memory, *via* altered stromal-immune cell communication.

Methods To address this, we performed RNA-seq on FACS sorted lung fibroblasts from naïve animals and at early (day 10) and late time points (day 40) following intranasal IAV infection. Transcriptional changes were compared with the bleomycin model of early lung injury (publicly available RNA-seq). The functional profile and location of injury altered lung stromal and immune cells was determined using flow cytometry and immunohistochemistry.

Results Analysis of differentially expressed genes demonstrated an enrichment in cell cycle and extracellular matrix genes at day 10 post IAV infection (FDR < 0.05), consistent with fibroblast activation profiles in the bleomycin-injured lung. Three distinct lung fibroblast populations were identified using flow cytometry: damage-responsive (DRF), interferon-responsive (IRF), and antigen-presenting fibroblasts (APF). DRF were significantly elevated in both models at day 10 post injury, while IRF were only detectable in the IAV lung. Interestingly, APF were reduced in the bleomycin lung compared to naïve controls. Furthermore, immunohistochemistry demonstrated that expression of the immunomodulatory molecule, podoplanin, was found in close proximity to immune cell infiltrates in the lung in both models.
Conclusions These data have important implications for understanding the altered communications between immune and stromal cells during and following subsequent lung infections and injury/fibrotic responses.

S106 FIBROBLAST GαQ/11 CONTROLS LUNG REPAIR VIA REGULATION OF LUNG EXTRACELLULAR MATRIX PROPERTIES

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10.1136/thorax-2022-BTSabstracts.112

Introduction Lung repair requires controlled transforming growth factor-β (TGFβ) signalling and extracellular matrix (ECM) production. We previously demonstrated that constitutive and adulthood-induced mesenchymal $G_{\alpha q/11}$ knockout alters lung ECM properties, including lung elastin and TGFβ2 deposition, causing abnormal lung development and emphysema, respectively.[1] However, the role of the $G_{\alpha q/11}$-deficient fibroblast-generated ECM in these phenotypes is unclear.
Aim Understand how wild-type and $G_{\alpha q/11}^{-/-}$ fibroblast-deposited ECM influence lung repair.
Methods Wild-type (WT) and $Gnaq^{-/-}$;$Gna11^{-/-}$ ($G_{\alpha q/11}^{-/-}$) murine embryonic fibroblasts (MEFs) were cultured on ECM generated by WT or $G_{\alpha q/11}^{-/-}$ MEFs. Wound healing and TGFβ signalling were assessed using scratch wound and conditioned media-stimulated transformed mink lung cell (TMLC) assays.

WT and $G_{\alpha q/11}$-knockout MEFs were stimulated with 2 ng/ml TGFβ2, and elastin, TGFβ2, and platelet-derived growth factor (PDGF) signalling component expression assessed.
Results WT MEFs exhibited lower TGFβ signalling and wound healing when cultured on $G_{\alpha q/11}^{-/-}$ ECM than on WT ECM (0.53 relative TMLC luciferase activity (RLA); 31.7% vs 46.4% 8 hour healing). Conversely, $G_{\alpha q/11}^{-/-}$ MEFs activated more TGFβ on WT ECM than on $G_{\alpha q/11}^{-/-}$ ECM (1.8 RLA). When cultured on ECM alone, TMLC TGFβ signalling was reduced on $G_{\alpha q/11}^{-/-}$ ECM (0.44 RLA), suggesting that $G_{\alpha q/11}^{-/-}$ fibroblast-deposited ECM itself alters repair.

$G_{\alpha q/11}^{-/-}$ MEFs had lower ECM component (*Col3a1*, *Col1a1*, *Eln*) and growth factor (*Pdgfa*, *Pdgfb*, *Pdgfd*) mRNA expression than WT MEFs. $G_{\alpha q/11}^{-/-}$ MEFs stimulated with TGFβ2 had a time-dependent increase in *Eln* and *Pdgfa* mRNA expression, (15.8- and 3.6-fold increases, respectively), and elastin protein approached near WT levels by 48 hours. Wound healing was slower in $G_{\alpha q/11}^{-/-}$ than WT MEFs (33.2% vs 58.1% 8 hour healing), and was enhanced by exogenous TGFβ2 (to 38.6% and 73.3% healing, respectively). However, TGFβ2 did not restore $G_{\alpha q/11}^{-/-}$ MEF healing to WT levels.
Conclusion Fibroblast $G_{\alpha q/11}$ regulates ECM production, and ECM generated by $G_{\alpha q/11}^{-/-}$ cells is less supportive of repair than WT ECM. Reduced TGFβ2 content of $G_{\alpha q/11}^{-/-}$ ECM may further alter ECM generation, but restoration of TGFβ2 signalling does not fully re-establish repair. A greater understanding of these mechanisms may identify methods of manipulating lung repair to therapeutic potential.

Please refer to page A211 for declarations of interest related to this abstract.

REFERENCE

1. Goodwin AT *et al*. BioRxiv doi: https://doi.org/10.1101/2020.09.06.284778).

S107 SOX9 REGULATES ALVEOLAR DAMAGE AND EXTRACELLULAR MATRIX SECRETION BY FIBROBLASTS IN IDIOPATHIC PULMONARY FIBROSIS: DOWNSTREAM SECRETED PROTEINS ARE PROMISING BIOMARKERS

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Introduction SOX9 (SRY-box transcription factor 9) controls extracellular matrix (ECM) deposition in chondrogenesis, and epithelial differentiation in alveologenesis. We hypothesised that SOX9 drives lung fibrosis progression by regulates ECM and alveolar epithelial injury and can provide downstream biomarkers for idiopathic pulmonary fibrosis (IPF).
Methods We used a *Wild type (WT)* time-course bleomycin model to study spatio-temporal expression of SOX9, where lungs were harvested at regular intervals (1–28 days) after injury. For functional studies we induced lung fibrosis using bleomycin in inducible global *Sox9 Knockout (Sox9KO,* $Sox9^{fl/fl}$;$ROSACreER^{+/-}$) and *Control* ($Sox9^{fl/fl}$;$ROSACreER^{-/-}$) mice. Fibrosis was assessed at 14 days, using immunohistochemistry (IHC), qPCR, Western blot and hydroxyproline assays (HPA). Bronchoalveolar lavage (BAL) was analysed by flow cytometry and proteomics. Healthy and IPF human tissue were analysed by IHC. Serum from healthy controls and IPF patients was analysed by luminex assay.
Results Using *WT* bleomycin time-course model we observed, using IHC, that SOX9 is upregulated in stroma during the fibroproliferative and fibrotic period (days 7–28). SOX9 co-localised to SFTPC and recently discovered KRT17 expressing profibrotic epithelium. *Sox9KO* reduced fibrosis severity (HPA and COL1 expression) and reduced KRT17 epithelial cell expression (IHC). *Sox9* SiRNA treatment *in vitro* reduced MRC-5 fibroblast SOX9, α-SMA and COL1 expression. Western blot showed *in vitro* SOX9 expression was upregulated in TGF-β1 and PDGF-DD treated MRC-5 fibroblasts. In human IPF lung, SOX9 co-localised to SFTPC and KRT17 as well as α-SMA, PDGFR-β and COL1. Overall findings are consistent with SOX9 regulating a fibrotic phenotype in both fibrotic epithelium and fibroblasts.

K-means cluster analysis of mouse BAL proteomics identified known promising (SPP1, IGFBP-2) and novel (BM1, biomarker 1) fibrosis biomarkers. In human IPF serum (n=12) BM1, OPN and IGFBP-2 were upregulated ($p<0.05$) compared to controls (n=8). BM1 was significantly ($p<0.05$)

lower in patients with stable rather than progressive IPF, indicated by lung function and radiology.

Conclusion SOX9 co-localises with, and regulates *in vivo*, critical components of the fibrotic niche: 1) myofibroblasts and ECM secretion; 2) recently discovered KRT17 epithelial cells that have a fibrotic gene signature. Identification of downstream known, and novel, promising predictive biomarkers highlight the translational importance of SOX9.

Please refer to page A211 for declarations of interest related to this abstract.

S108 USING FORWARD GENETIC SCREENS AND NOVEL HUMAN ALVEOLAR ORGANOID MODELS TO STUDY SURFACTANT PROTEIN C TRAFFICKING IN HEATH AND DISEASE

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10.1136/thorax-2022-BTSabstracts.114

Introduction Idiopathic pulmonary fibrosis (IPF) is a fatal disease of lung parenchymal scarring triggered by alveolar epithelial cell dysfunction. Inherited forms of pulmonary fibrosis, including those caused by mutant forms of surfactant protein C (SFTPC), offer an opportunity to study early pathogenic events which remain poorly understood.

Objectives We wished to interrogate specific factors involved in SFTPC trafficking to understand the pathological mistrafficking phenotype caused by the commonest pathogenic mutant, SFTPC-I73T, which aberrantly localises to the plasma membrane.

Methods CRISPR-Cas9 forward genetic screens were employed in an immortalised cell model system to interrogate SFTPC processing and trafficking and a FACS-based readout used to identify altered SFTPC localisation. Alveolar organoids derived from human embryonic lung tissue were transduced with an inducible CRISPRi system for the validation of screen hits.

Results We identified several novel targets including candidate proteases and ubiquitin ligases in addition to validating core complexes suspected to be involved in SFTPC trafficking. Of particular note is the E3 ligase ITCH which, when depleted, altered SFTPC localisation in a manner that phenocopies the pathogenic I73T mutant. Further validation is underway using genetic manipulation of a novel human embryonic alveolar organoid system.

Conclusions A cell line model of SFTPC trafficking has allowed us to identify important factors in SFTPC trafficking using forward genetic screens which we can test in a physiological system to understand SFTPC handling in health and disease.

S109 GENOME-WIDE ANALYSIS OF LONGITUDINAL LUNG FUNCTION AND GAS TRANSFER IN INDIVIDUALS WITH IDIOPATHIC PULMONARY FIBROSIS

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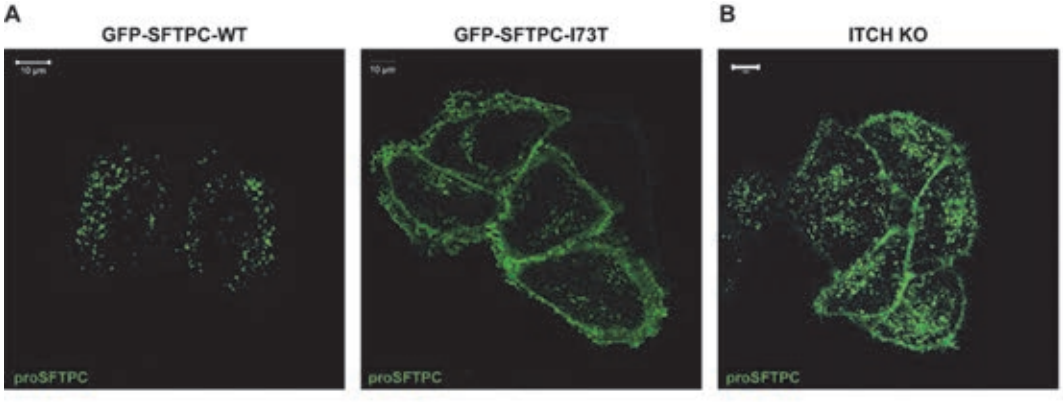
Background Idiopathic pulmonary fibrosis (IPF) is a progressive disease where the lungs become progressively scarred,



Abstract S108 Figure 1 ITCH depletion results in redistribution of SFTPC to the plasma membrane. (A) Subcellular localisation of GFP-SFTPC WT and I73T expressed in HeLa cells. (B) GFP-SFTPC localises at the plasma membrane in ITCH knockout HeLa cells

reducing lung capacity and impairing gas transfer. Genome-wide association studies (GWAS) have identified a number of genetic loci associated with risk of IPF.
Aim To identify genetic loci associated with declining lung capacity or declining gas transfer.
Methods We performed a GWAS of longitudinal measures of forced vital capacity (FVC, a measure of lung capacity) and diffusing capacity for lung of carbon monoxide (DLco, a measure of gas transfer) using a linear mixed effects model. This was performed in individuals diagnosed with IPF across three studies and identified variants for further follow-up in an additional independent study. Variants were defined as significantly associated if they had $p<5\times10^{-8}$ in a meta-analysis of all four studies, had consistent direction of effects across and were nominally significant ($p<0.05$) in each study.
Results 1,048 individuals with measures of longitudinal FVC and 729 individuals with longitudinal measures of DLco passed quality control. In total, 4,560 measures of FVC and 2,795 measures of DLco and over 7 million genetic variants were included in the analysis. One variant located in an anti-sense RNA gene for Protein Kinase N2 (*PKN2*) showed a genome-wide significant association with FVC decline (−140 ml/year per risk allele, 95% CI [−180, −100], $p=9.14\times10^{-12}$) with consistent effects across all four studies.
Conclusion These results identify a possible druggable target involved in promoting IPF disease progression.

Please refer to page A211 for declarations of interest related to this abstract.

'The Winter Soldier' – Pneumonia epidemiology and impact

S110 INCREASED MORTALITY OF HOSPITALISED COMMUNITY ACQUIRED PNEUMONIA IN WINTER 2020/21 COMPARED TO 2019/20

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10.1136/thorax-2022-BTSabstracts.116

Introduction Community acquired pneumonia is a leading cause of admission to hospital during the winter months. In the winter of 2020–21 the United Kingdom remained under social distancing measures to limit transmission of COVID-19. These measures should also limit transmission of other respiratory pathogens and therefore reduce admission to hospital. Work to date has demonstrated reduced hospital attendances. We aimed to investigate whether hospitalised cases of non-COVID-19 community acquired pneumonia differed between winter 2019–20 and winter 2020–21.
Methods Community acquired pneumonia hospital admissions were compared between 01/09/2019–31/01/2020 and 01/09/2020–31/01/2021 using Pioneer the Health Data Research Hub in Acute Care. Data were collected to compare demographics, severity, complications, and outcomes. Cases were identified using ICD coding. For the winter 20–21 cohort, all cases had a negative COVID PCR on admission to hospital.
Results Admissions fell by 16% in the 20/21 time period with 2073 admissions in 19/20 and 1757 in 20/21. The median age of cases was similar across both timepoints (74 in 19/20 and 72 in 20/21). Length of stay was similar between the two timepoints. However, mortality significantly increased from 13.5% in 19/20 to 21.6% in 20/21 ($p<0.001$). Admission to ICU did not change significantly during the time periods (21.2 vs. 24.6%).
Conclusion We demonstrate that changes in social distancing guidance impacts non COVID CAP in keeping with other studies. The increased mortality seen in winter 20/21 is likely multi-factorial but may be related to perceived reduced access to healthcare by patients resulting in delayed treatment. Additionally, we show that intensive care admission was unchanged despite the increased mortality and therefore severity of cases, suggesting that accessing critical care may have been more challenging in the winter of 20/21 than previous years. Further analyses to characterise the difference in cases and understand increase in mortality are underway.

S111 ADULT HOSPITALISED COMMUNITY ACQUIRED PNEUMONIA INCIDENCE IN BRISTOL: COMPARISON OF RETROSPECTIVE ICD-10 BASED ANALYSIS AND PROSPECTIVE STUDY DATA

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10.1136/thorax-2022-BTSabstracts.117

Introduction Robust estimates of adult hospitalised community-acquired pneumonia (CAP) incidence are critical for evidence-based public health decisions. Historically, the Hospital Episodes Statistics (HES) database which uses ICD-10 diagnosis codes, has been criticised as unreliable for estimating hospitalised CAP incidence. A recently published study reported 2019/20 CAP incidence from one large Bristol hospital based on ICD-10 data and an annualised 21-day prospective survey. Both approaches had similar results which were substantially higher than previous UK estimates. To further validate this past ICD-code-based analysis, we compared pneumonia incidence from a new ongoing prospective hospital study in Bristol with HES data over one year.
Methods Pneumonia event data (01Aug2020–31Jul2021) were extracted from HES for adults (≥18 years) in the same manner as the prior Bristol incidence study (i.e., ICD-10 codes J12–J18 in positions 1–5). Results were compared to incidence estimates from AvonCAP, an ongoing prospective study in two large Bristol hospitals designed to determine acute lower respiratory tract disease incidence. AvonCAP excludes hospital-acquired infections, and final clinical diagnoses, including pneumonia, are abstracted via chart review. Annual incidence (per 100,000) stratified by age was calculated using pneumonia admission numbers and previously established population denominators.
Results 1-year incidence estimates from AvonCAP and HES, stratified by age group, were: 103 vs 102 (18–34 y), 304 vs 317 (35–49 y), 698 vs 738 (50–64 y), 1245 vs 1448 (65–74 y), 2627 vs 2979 (75–84 y), 5502 vs 6657 (≥85 y) and 714 vs 802 (≥18 y) (table 1). The Pearson Correlation Coefficient between the incidence ranges was high ($R=0.9996$; $P=0.0004$). The HES versus prospective study incidence ratio increased with age (Range: 0.99 [18–34 years] to 1.21 [≥85 years]).
Conclusion This analysis showed a high correlation between CAP incidence estimates derived from HES and AvonCAP,

Abstract S111 Table 1 Comparison of all-cause adult pneumonia incidence in Bristol, England, from prospective study and ICD-10 code-based Hospital Epsiode Statistics (HES) analysis, 01 Aug 2020–31 Jul 2021

	All-Cause Pneumonia Incidence Per 100,000		
Age Group (years)	Prospective Study*	ICD-10/HES*	Incidence Ratio: HES/Prospective
18-34	103	102	0.99
35-49	304	317	1.04
50-64	698	738	1.06
65-74	1245	1448	1.16
75-84	2627	2979	1.13
≥85	5502	6657	1.21
≥18	714	802	1.12
≥65	2287	2671	1.17

*Pearson Correlation Coefficient between two incidence ranges is R=0.9996. P= 0.0004.

validating the accuracy of HES coding for hospitalised CAP in Bristol. The trend towards higher incidence in older ages in the HES versus prospective estimates may be due to incomplete exclusion of hospital-acquired pneumonia from HES estimates. The conduct of audits, such as the National Adult BTS CAP audit, may result in coding accuracy improvements, thereby improving the reliability of HES in supporting adult hospitalised CAP incidence estimates.

Please refer to page A212 for declarations of interest related to this abstract.

S112 A COMPARISON OF WEEKEND AND WEEKDAY HOSPITAL ADMISSIONS DUE TO COMMUNITY ACQUIRED PNEUMONIA IN THE NORTH WEST OF ENGLAND: AN ANALYSIS OF THE ADVANCING QUALITY PNEUMONIA PROGRAM DATASET

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10.1136/thorax-2022-BTSabstracts.118

Background The BTS national audit on Community Acquired Pneumonia (CAP) reported no differences in outcome when comparing weekend and weekday admissions due to CAP (Lawrence et al *Thorax* 2020;**75**:594–596). We wished to compare weekend and weekday hospitalisations due to CAP within the Advancing Quality (AQ) dataset encompassing a 12-year period to see if these mirror the findings from the BTS audit.

Methodology An analysis was performed of CAP admissions in the AQ Pneumonia Program from May 2010–2022. For submission, the diagnosis of CAP must be made by a consultant physician within 24 hours of hospital admission along with compatible CXR findings. Comorbidity was measured using the Charlson Comorbidity Index (CCI)

Results 117,953 admissions with CAP (mean age 72 (16) years, 44% female; CCI 1.69 (1.68)) were analysed with a length of stay (LOS) of 9.64 (SD 12.57) days and in-hospital mortality of 12.5% (see table). 26% of admissions (n=30,378) occurred at weekends with weekend admission not associated with elevated mortality. A greater proportion were admitted with severe CAP (CURB 65 score 3–5) during weekends (29.4% v 28.3%; p=0.01) but no significant difference in age or CCI was observed between weekdays and weekends. Despite this, the overall LOS was significantly lower in the weekend admissions compared to the weekdays (9.43 (12.78) v 9.71 (12.49) days; p<0.001). Whilst those admissions receiving a CXR within 4 hours of admission did not differ overall between weekdays and weekends, significantly more patients received antibiotics within 4 hours of admission in the weekends compared to weekdays (54% v 50.7%; p<0.001). A greater proportion of patients presenting with severe CAP received antibiotics within 4 hours of admission (69.4% v 60.6%; p<0.001) and the CCI was also greater in this group (1.85 (1.66) v 1.51 (1.67); p<0.001).

Conclusion Community Acquired Pneumonia admitted during the weekend was associated with increased severity at presentation but not linked to delays in treatment and worse outcomes when compared to weekdays. Further analysis is needed examining longitudinal trends in this data if we are to truly understand the impact of changes in national policy and practice and to shape future therapy goals.

Abstract S112 Table 1 Study population comparing weekend and weekday admissions

	Weekday admissions n=86,804	Weekend admissions n=31,149	P value
Age	72 (16)	72 (16)	0.40
Mortality	12.5% (27,261)	12.5% (3888)	0.91
Length of stay	9.71 (12.46)	9.45 (12.90)	0.02
Charlson Comorbidity Index	1.69 (1.68)	1.69 (1.68)	0.37
Pneumonia severity breakdown (CURB-65 score recorded in 55,120)	0–2 (non-severe): 29,176 (71.7%) 3–5 (severe): 11,501 (28.3%)	0–2 (non-severe): 10,203 (70.6%) 3–5 (severe): 4,240 (29.4%)	0.01
Timing of CXR (Recorded in 10,234)	Within 4 hours of admission: 6610 (86.7%) Beyond 4 hours of admission: 1014 (13.3%)	Within 4 hours of admission: 2288 (87.7%) Beyond 4 hours of admission: 322 (12.3%)	0.20
Timing of antibiotics (n=115,175)	Within 4 hours of admission: 42,956 (50.7%) Beyond 4 hours of admission: 41,841 (54%)	Within 4 hours of admission: 16.401 (49.3%) Beyond 4 hours of admission: 13,977 (46%)	<0.001

S113 THE RISK OF PNEUMONIA IN COPD PATIENTS WITH CONCOMITANT BRONCHIECTASIS USING INHALED CORTICOSTEROIDS: A UK CASE-CONTROL STUDY

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10.1136/thorax-2022-BTSabstracts.119

Introduction and Objectives Inhaled corticosteroids (ICS) are commonly prescribed in COPD to reduce the risk of exacerbations. However, their use is associated with community acquired pneumonia (CAP) and recent guidance suggests that their prescription should be confined to those with frequent exacerbations and raised eosinophils. Patients with COPD and concomitant bronchiectasis are a group in which the risk-benefit ratio of ICS use is poorly defined. Given the high frequency of lower airways colonisation associated with bronchiectasis, we hypothesised that ICS use would be associated with increased risk of CAP in these individuals.

Methods Population-based case-control study, 2004 to 2019, using nationwide electronic healthcare records (Clinical Practice Research Datalink). Cases and controls were nested from a cohort of COPD patients with no ICS use at the start of follow-up. Cases were hospitalised for CAP (identified using Hospital Episode Statistics admission data), controls were matched on the same day (index day), ratio 1:4 by age and gender. Multivariable conditional logistic regression was used to determine effect estimates. Likelihood ratio test assessed bronchiectasis as an effect modifier.

Results From 187,277 in the COPD cohort, we identified 20,195 cases hospitalised with CAP and 61,121 controls. Use of ICS was associated with 26% increased odds of CAP (AOR=1.26, 95% CI 1.19–1.32). More recent ICS use was more strongly associated with pneumonia, such that there was no increased risk from ICS used between 180 and 365 days before the index date (table 1).

Concomitant bronchiectasis was found to significantly interact with the association between ICS and CAP in COPD patients ($p<0.01$). In those with concomitant bronchiectasis, ICS was not significantly associated with hospitalised CAP (AOR=1.01, 95% CI 0.8–1.28), however, in COPD patients without bronchiectasis, there was 27% increased odds of CAP (AOR=1.27, 95% CI, 1.20–1.34).

Conclusions Whilst bronchiectasis is known to confer an increased risk of hospitalised CAP in COPD, the use of ICS does not confer a further increased risk. To our knowledge this is the first study to provide data to support the latest European Respiratory Society adult bronchiectasis guidelines that ICS should not be withdrawn from patients with established COPD-bronchiectasis overlap.

Abstract S113 Table 1 Association between hospitalised community acquired pneumonia and ICS and time since last ICS prescription. Interaction effects of concomitant bronchiectasis on the association between ICS and community acquired pneumonia

	Adjusted OR	p-value	95% CI
ICS use in past year			
No		Reference	
Yes	1.26	<0.001	1.19–1.32
Time since last ICS			
No ICS		Reference	
0–30 days	1.27	<0.001	1.20–1.35
30–90 days	1.32	<0.001	1.22–1.42
90–180 days	1.14	<0.05	1.00–1.29
180–365 days	1.05	0.530	0.90–1.22
INTERACTION ANALYSIS			
Concomitant bronchiectasis			
ICS in past year			
No		Reference	
Yes	1.01	0.93	0.80–1.28
No bronchiectasis			
ICS in past year			
No		Reference	
Yes	1.27	<0.001	1.20–1.34

* Adjusted for socioeconomic deprivation, body mass index, GOLD status, MRC dyspnoea score, smoking history, history of pneumonia, lower respiratory tract infections, hospital exacerbations in the past year, courses of oral corticosteroids in the past year, bronchiectasis, lung cancer, asthma, interstitial lung disease, diabetes mellitus, cerebrovascular accidents, depression, pneumonia vaccine (ever) and influenza vaccine (year prior). ICS = inhaled corticosteroids

S114 USE OF FRONT-DOOR THORACIC ULTRASOUND TO PREDICT AND IMPROVE OUTCOMES IN PLEURAL INFECTION IN PATIENTS WITH COMMUNITY-ACQUIRED PNEUMONIA

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10.1136/thorax-2022-BTSabstracts.120

Introduction The incidence of parapneumonic effusions (PPE) in patients with community acquired pneumonia (CAP) is 20–57%, of which 5–10% develop into pleural infection. The role of early identification of PPE by thoracic ultrasound (TUS) and other presenting features in prediction of subsequent pleural infection is not clear. We explored the use of TUS in the front-door assessment of patients with CAP, particularly if this aided earlier identification of pleural infection.

Methods Consecutive patients admitted with CAP underwent TUS within 24 hours of admission. Appropriate sampling was performed in patients with effusions >2 cm depth. Final outcome including any subsequent development/worsening of effusion was recorded. CAP was defined as an 'acute respiratory febrile illness with new consolidation on Chest X-Ray (CXR) or CT scan and not attributed to COVID-19'.

Results Over a 4-week period, 39 patients with CAP were admitted, age range 40 to 90, median 74. 25/39 (64%) had a detectable pleural effusion on TUS, of which 19 (48.7%) had no visible effusion on the corresponding CXR. Most of these effusions were not amenable to sampling. Of the 6/39 (15.3%) patients who had a visible effusion on CXR, 3 were sampled, 1 of which was proven to be pleural infection. 2 patients that had a detectable effusion on TUS but not on CXR at admission subsequently developed an effusion visible on CXR. Of these, 1 patient was very unwell and died prior

to sampling of pleural fluid whilst the other was discharged home without sampling.

Conclusions The incidence of PPEs may be higher than previously estimated from previous cohorts where TUS was not used in routine assessment. The characteristics of this cohort which are associated with either resolution or development of pleural infection are not understood and warrant further evaluation. Our data from this small pilot evaluation did not identify any particular TUS features that predict development of pleural infection. A detailed prospective evaluation of the use of TUS in patients with pneumonia to further characterise the natural history of PPEs is required.

S115 WASTEWATER-BASED EPIDEMIOLOGY (WBE) FOR THE DETECTION AND PREDICTION OF RESPIRATORY SYNCYTIAL VIRUS (RSV) OUTBREAKS

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10.1136/thorax-2022-BTSabstracts.121

Wastewater-based epidemiology (WBE) has the capacity to provide effective surveillance of entire communities by determining levels of health-associated biomarkers, viruses, and bacteria. WBE has been used globally as a key metric in determining prevalence of SARS-CoV-2 in the community. However, the application of WBE for the surveillance of other respiratory viruses has been poorly studied. Respiratory syncytial virus (RSV) is a seasonal outbreak disease that can cause severe infections in infants, immunocompromised or elderly individuals. Currently, the administration of RSV immunoprophylaxis products for high-risk patients relies on pre-emptively determining when an outbreak of RSV may occur in the community. However, in 2021 unexpected seasonal RSV outbreaks were reported which were likely due to the relaxation of Covid-19 regulations (social distancing, face coverings etc.) posing challenges over when to initiate the supply of immunoprophylaxis. The aims of this study were to monitor the circulation of RSV in wastewater (WW), investigate if increasing detection of RSV in WW precedes the onset of clinical cases and determine the molecular epidemiology of RSV A and B genotypes. Untreated WW samples from 20 WW inlet treatment sites across Northern Ireland (NI) were collected between August 2021 and July 2022 and concentrated. Viral nucleic acid was amplified and quantified using an RSV specific RT-qPCR assay. The gene copies/L were normalised based on the rainfall flow rate and population size and then compared to the clinical case rate. For a selection of WW sites, the glycoprotein G gene was sequenced, and phylogenetic analysis was carried out. RSV concentration in wastewater mirrored the rise in clinical cases, with WW surveillance leading clinical diagnostic testing by ~1 week. WW surveillance is a valuable tool to detect and monitor outbreaks of circulating and clinically relevant respiratory viruses. Therefore, WBE has the potential to establish guidelines for diagnostic testing and preventative measures and to assist with clinical resource planning.

'Home Alone' – Remote monitoring in lung disease

S116 MYCARE24 COPD: MEASURING THE INITIAL IMPACT OF A NEW LARGE SCALE REMOTE MONITORING SERVICE FOR COPD

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10.1136/thorax-2022-BTSabstracts.122

Introduction and Objectives MyCare24 COPD is a new service for patients with moderate-very severe COPD in Bradford District and Craven started in 2021. Patients are identified from the spirometry or MRC score recorded in their electronic patient record (EPR) or through ED attendance or hospital admissions. They are provided with 24/7 remote clinical support alongside self management and remote monitoring using a locally designed app or paper-based equivalent. They are given a pulse oximeter. The service currently has 2000 patients on-boarded with 6000 referrals, on-boarding is ongoing. The aim of this study is to determine the impact of the service on ED attendance, emergency admissions, respiratory admissions, COPD admissions, and COPD related hospital bed days.

Methods The data of all 465 patients on-boarded December 2021 to February 2022 is included and data for all impact measures was analysed in the 90 days before and 90 days after onboarding for December, 59 days before and after onboarding for January, and 31 days before and after on boarding for February. Data was collected retrospectively from the shared EPR.

Results Prior to being on-boarded there were 121 ED attendances, and 85 emergency admissions (50 respiratory, 43 COPD). COPD admissions accounted for 161 hospital bed days. After on-boarding there were 97 ED attendances (20% reduction), 50 emergency admissions (41% reduction), 21 respiratory admissions (58% reduction), and 13 COPD admissions (70% reduction). COPD admissions accounted for 36 hospital bed days (78% reduction).

Conclusion This early data indicates that MyCare24 COPD significantly reduced ED attendances, emergency admissions, COPD admissions, and hospital bed days across the study period. We have considered the potential confounding factors and plan to compare on-boarded patients with a matched control group when the full cohort of 6000 patients have been on-boarded. However, it is noticeable that respiratory and COPD related hospital admissions in particular have reduced most and we wonder if this is indicative of the targeted monitoring and self-management provided for this condition. If data continues to show positive results, the model can be extended to other respiratory conditions and the app can be adapted for use in other lung conditions.

S117 POOR ADHERENCE IN EXACERBATING COPD PATIENTS: MAGNITUDE AND RELATED FACTORS AT BASELINE IN THE MAGNIFY PRAGMATIC TRIAL

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10.1136/thorax-2022-BTSabstracts.123

Introduction and Objectives Maintenance inhaled therapies can stabilise COPD symptoms and reduce the risk of exacerbations, but inhaler adherence is often poor. Patients experiencing frequent exacerbations represent a specific high-risk population in need of further intervention. Little data exist regarding inhaled medication adherence amongst exacerbating COPD patients. The MAGNIFY cluster randomised trial is investigating the effect of a technologically-supported adherence package for exacerbating COPD patients in primary care. Using baseline data from this trial, we explore inhaler adherence and compare characteristics of exacerbating COPD patients, stratified by adherence to inhaled maintenance therapy.

Methods Algorithms run on electronic medical records (EMR) of 137 GP practices identified COPD patients aged ≥40 years, with ≥2 moderate/severe exacerbations in the last two years. EMR-based patient adherence was based on the 12 months prior to 1st March 2020, if ever prescribed inhaled maintenance therapy.

Results Of those with available data, 41.2% of COPD patients (10882/26411) had ≥2 moderate/severe exacerbations in the last two years. Almost two thirds (6929/10882, 63.7%) of the patient sample were prescribed triple therapy, with LABA/ICS

Abstract S117 Table 1 Demographic and clinical characteristics of exacerbating COPD patients

	Adherence ≤50%	Adherence >50%	Test; p value
No. patients; n (%)	4168 (38.3)	6714 (61.7)	
Demographics			
Age; mean (SD)	71.8 (10.6)	71.9 (10.4)	-0.7; 0.47
BMI; mean (SD)	28.0 (7.5)	28.0 (6.9)	0.4; 0.66
Sex; n (%) male	1956 (46.9)	3147 (46.9)	0.003; 0.95
Ever-smoker; n (%)	3976 (95.4)	6336 (94.4)	5.4; <0.05
Clinical history			
No. exacerbations in last 2yrs; mean (SD)	4.4 (3.1)	4.4 (3.2)	1.1; 0.27
Health care contact in last 1yr pre-covid; mean (SD)	21.2 (14.9)	19.6 (13.7)	5.6; <0.001
Days since last inhaler review; mean (SD)	733.0 (772.1)	743.2 (752.8)	-0.7; 0.51
MRC score; n (%) MRC 3-5	2704 (65.8)	3865 (58.8)	51.9; <0.001
Influenza vaccination in last 1yr; n (%)	647 (15.5)	1259 (18.8)	18.6; <0.001
Inhaler technique			
Good technique; n (%)	2443 (81.1)	4058 (83.8)	10.4; <0.01
Moderate technique; n (%)	408 (13.5)	572 (11.8)	
Poor technique; n (%)	162 (5.4)	210 (4.3)	
Therapy type by adherence			
ICS; n (%)	34 (0.8)	125 (1.9)	231.6; <0.001
LABA; n (%)	35 (0.8)	48 (0.7)	
LAMA; n (%)	196 (4.7)	428 (6.4)	
LABA/ICS; n (%)	472 (11.3)	1227 (18.3)	
LAMA/ICS; n (%)	27 (0.7)	41 (0.6)	
LABA/LAMA; n (%)	392 (9.4)	928 (13.8)	
LABA/LAMA/ICS; n (%)	3012 (72.3)	3917 (58.3)	
Adherence by therapy type			
ICS; n (%)	34 (21.4)	125 (78.6)	19.5; <0.001
LABA; n (%)	35 (42.2)	48 (57.8)	0.5; 0.47
LAMA; n (%)	196 (31.4)	428 (68.6)	13.3; <0.001
LABA/ICS; n (%)	472 (27.8)	1227 (72.2)	94.3; <0.001
LAMA/ICS; n (%)	27 (39.7)	41 (60.3)	0.06; 0.81
LABA/LAMA; n (%)	392 (29.7)	928 (70.3)	47.1; <0.001
LABA/LAMA/ICS; n (%)	3012 (43.5)	3917 (56.5)	215.6; <0.001

being the second most common therapy (1699/10882, 15.6%) (table 1). Over a third of patients (4168/10882, 38.3%) were ≤50% adherent on at least one therapy. Patients with ≤50% adherence had more health care contacts in the 12 months prior to 1st March 2022, worse dyspnoea and inhaler technique, and proportionally higher prescriptions for triple therapy. Furthermore, patients on triple therapy were more likely to have ≤50% adherence compared to any other therapy type (43.5% vs 31.4% or lower).

Conclusions Poor adherence was common amongst exacerbating COPD patients, and was associated with more health care contacts, and worse respiratory symptoms and inhaler technique. Triple therapy was the most common inhaled maintenance therapy in this patient population, but it also had substantially lower adherence compared to other therapies. Adherence was worse amongst patients on dual and triple therapies, indicating that future adherence support interventions should be targeted at these subgroups. Analyses comparing adherence to open/closed inhaled therapies will be presented at the conference.

S118 DIGITAL PEAK FLOW MONITORING CAN PREDICT NEXT-DAY PEAK FLOW MEASUREMENTS

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10.1136/thorax-2022-BTSabstracts.124

Introduction Mobile health is increasingly empowering patients to monitor their disease. Commercially-available digital peak flow meters are used by asthma patients to self-monitor their condition and claim to predict deteriorations in peak flow measurements. Thus, evaluation of their ability to provide accurate peak flow predictions is essential.

Aim The aim of this study was to assess the accuracy of a digital peak flow meter in predicting next-day peak flow measurements.

Methods The digital peak flow meter connects to the patient's smartphone, allowing the patient to upload their peak flow measurements to a mobile application (figure 1). Peak flow measurements are divided into three zones: 'Green' (>80% of the patient's best peak flow measurement), 'Yellow' (60–80%) and 'Red' (<60%). The mobile application uses deep learning neural networks to analyse the patient's peak flow measurements over the last 2 weeks, to predict which peak flow zone the patient will be in tomorrow. Peak flow measurements and predictions for a random 2-month period were analysed.

Results Between February-April 2022, 23,485 peak flow zone predictions were made. The average patient age was 26.1 years and 51.5% (13,646/26,485) of the peak flow measurements were performed by females. Patients originated from 24 countries. 92.0% (21,655/23,485) of next-day peak flow zone predictions were correct. The algorithm's average forecasted probability of predicting the correct peak flow zone was 94.0 ± 8.6%. The average peak flow measurement was 93.3 ± 17.6% of the patient's personal best.

Conclusions Digital peak flow monitoring using machine learning algorithms can predict next-day peak flow measurements with high accuracy, thus alerting patients to impending deteriorations in their asthma control. Further work is needed to assess whether patients tailor their asthma self-management based on these predictions. Patient perspective on digital peak flow monitoring should also be explored to determine whether digital peak flow monitoring can be an acceptable alternative to traditional peak flow monitoring.

Abstract S118 Figure 1 Screenshot from the mobile application's clinician dashboard, showing the patient data which can be uploaded to the mobile application and reviewed by clinicans

Please refer to page A212 for declarations of interest related to this abstract.

S119 DOMICILIARY FRACTIONAL EXHALED NITRIC OXIDE AND SPIROMETRY IN PREDICTING ASTHMA CONTROL AND EXACERBATIONS

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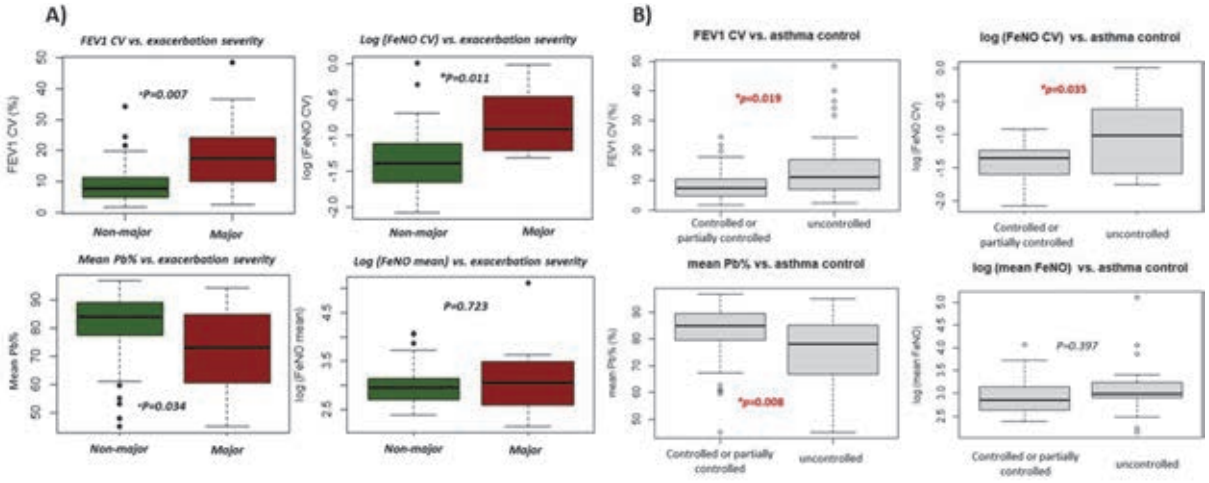
10.1136/thorax-2022-BTSabstracts.125

Introduction Domiciliary measurements of airflow obstruction and inflammation may assist healthcare teams and patients in determining asthma control and facilitate self-management. We report on the analysis of the physiological and behavioural data of domiciliary use of spirometry and fractional exhaled nitric oxide (FeNO) in patients with asthma. We investigated the compliance rate with these measurements, and explored which parameters were predictive of disease-related outcomes during and after the monitoring period.

Method We used data collected from the EU-Horizon 2020 myAirCoach study, which utilised an app-based platform to facilitate data collection. Patients were provided with handheld spirometry and FeNO devices in addition to their usual asthma care, and instructed to perform twice-daily measurements for one month. Daily symptoms and medication change were reported through the mobile health system. The Asthma Control Questionnaire was completed at the end of the monitoring period.

Results One hundred patients were provided with home-spirometry equipment, and 60 of these were also given FeNO devices. Compliance rates for twice-daily measurements were low (median [IQR]: 43 (25–62)% for spirometry; 30 [3–48]% for FeNO); 15% of patients rarely took measurements for spirometry and 40% for FeNO (defined as ≤7 data points over a month). The compliance rate was not



Abstract S119 Figure 1 A) Increased FEV_1 CV and FeNO CV and decreased mean Pb% were observed in patients with major exacerbations. B) The differences in test parameters between ACQ-6 defined asthma control categories. Log (FeNO mean) and log(FeNO CV) were used for better visualisation

associated with patient factors such as gender, internet-experience, education or general health. Despite the heterogeneity of compliance rate and missing data, the coefficient of variation (CV) in FEV_1 and FeNO were higher, and the mean% personal best FEV_1 lower in those who had major exacerbations during monitoring period compared to those without ($p<0.05$) (figure 1). FeNO CV and FEV_1 CV were associated with asthma exacerbation during the monitoring period (AUROCC: 0.79 and 0.74, respectively) and FeNO CV was predictive of poor asthma control (AUROCC: 0.71) at the end of the monitoring period.

Conclusion Compliance with domiciliary spirometry and FeNO varied widely amongst patients even in the setting of a research study. However, despite significant missing data, FeNO and FEV_1 predicted asthma exacerbations and control during and following monitoring periods, making these measurements potentially clinically valuable if used.

S120 ADHERENCE AND QUALITY OF HOME-BASED SPIROMETRY IN PATIENTS WITH ILD USING A DIGITAL HEALTH PLATFORM DURING A 6-MONTH PERIOD: DATA FROM THE RALPMH STUDY

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10.1136/thorax-2022-BTSabstracts.126

Introduction Daily home-based spirometry has been suggested as a solution to detect lung function decline and disease progression in patients with ILD. However, quality and adherence of spirometry testing remain essential for successful adaptation in research and clinical practice.

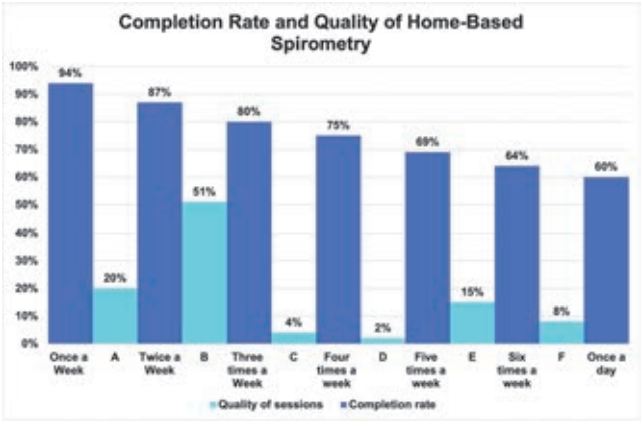
Aim This study reports on adherence and unsupervised test quality using a real-time monitoring approach over six months.

Methods This data is from the prospective cohort study - Remote Assessment of Lung Disease and Impact on Physical and Mental Health (RALPMH). Patients received a package that includes a NuvoAir Air Next, Bluetooth wireless handheld spirometry. Patients were requested to download the NuvoAir mobile application and received virtual and/or face-to-face training to perform spirometry. Patients recorded up to three unsupervised tests daily for up to 183 days. They received a daily reminder via the RADAR questionnaire app to perform spirometry.

Results Twenty patients with ILD were recruited for the study (mean age and standard deviation 60.9±11.7 years. Of those, 11 (55%) were females. Patients recorded three unsupervised spirometry tests over up to 183 days. Adherence was defined by the number of home-based tests divided by the number of days enrolled in the study. Adherence to spirometry at least once a week was 94%, two tests a week 87%, and three sessions a week 80%. Adherence to at least one daily test session was 60% (figure 1).

In total, patients performed (2332; 64%) of the overall unsupervised sessions requested, 2154(92%) were of acceptable quality according to ATS grading: the majority were grade A (461; 20%) and B (1196; 51%). Other grades were C (88; 4%), D (55; 2%) and E (354; 15%). Only 178 (8%) were unacceptable (figure 1).

Conclusion This study confirms the high quality and adherence to the use of unsupervised home-based spirometry in patients with ILD. These findings highlight the need for



Abstract S120 Figure 1

further research on home-based spirometry to assess whether this tool provides a meaningful assessment to detect lung function decline and progression in patients with ILD.

'I, Robot' – Advances in sleep and ventilation

S121 MANDIBULAR MOVEMENT MONITOR FOR THE DIAGNOSIS OF OBSTRUCTIVE SLEEP APNOEA: CLINICAL APPLICATION

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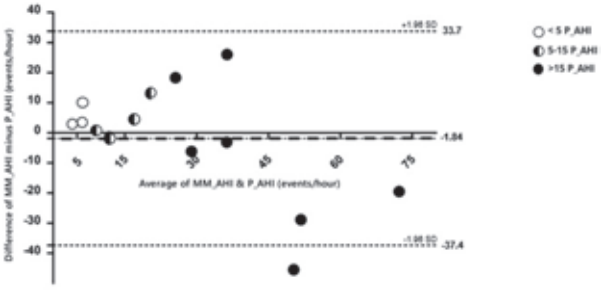
10.1136/thorax-2022-BTSabstracts.127

Introduction and Objectives Mandibular movement (MM) monitoring with automated analysis has been shown to be a convenient home diagnostic test for obstructive sleep apnoea (OSA), comparable to both in-lab and home polysomnography.[1] [2] We aimed to evaluate the performance of a MM monitoring system (Sunrise) against polygraphy in two UK clinical settings: a geographically dispersed region- Highlands of Scotland and a densely populated region- inner London. We present an interim analysis from this study (SOSAT trial; NCT05204004).

Methods An ongoing prospective, randomised, blinded pilot study comparing MM monitoring and home polygraphy in adults undergoing investigation for suspected OSA. Forty patients will be recruited with a body mass index (BMI)>28kg/m^2 and Epworth sleepiness scale (ESS)>12. Participants wear MM monitoring (Sunrise, Sunrise SA, Belgium) and polygraphy (Apnoea-link-Air, ResMed, Australia) simultaneously overnight. MM analysis is automated; polygraphy is manually reviewed. Primary outcome of the SOSAT trial is time to treatment decision. Secondary outcomes include accuracy of MM monitoring and agreement of the treatment decisions based on each device. In this interim analysis we have compared the apnoea-hypopnoea indices (AHI) from both devices using Bland-Altman analysis.

Results 17 participants have completed the trial to date, including one technical failure (both devices in the same participant). Data are, therefore, presented for n=16 participants (57% male, mean ± SD age 41.6 ± 9.7 years, BMI 39.2 ± 8.2 kg/m^2, ESS 15.5 ± 3.8). Bland Altman analysis showed that MM monitoring underestimated AHI, compared to polygraphy (mean bias: -1.84 (95%CI -37.4 to +33.7) events/hour, figure 1). The variance was greater with higher AHIs (>15 events/hour). However, in 15 of 16 participants, the clinical treatment decision was the same irrespective of the diagnostic device used.



Abstract S121 Figure 1 Bland-Altman plot of the difference (Mandibular Movement estimated AHI minus Polygraphy AHI) vs average AHI of both devices (N=15). The dotted black line in the middle indicates the mean bias 1.84 (SD 18.1) events/hour. The 95% limits of agreement are marked by the upper and lower dotted lines. Shapes are based on the Polygraphy AHI thresholds; no OSA (< 5 events/hr), mild OSA (5–15) and moderate-severe OSA (>15 events/hr)

Conclusions This interim analysis indicates that MM monitoring can be used for the clinical diagnosis of OSA. This novel diagnostic monitor could improve access to diagnosis in different geographical clinical settings.

REFERENCES

1. Pépin JL, *et al*. Assessment of mandibular movement monitoring with machine learning analysis for the diagnosis of OSA. *JAMA NetwOpen* 2020;**3**(1): e1919657.
2. Kelly JL, *et al*. Diagnosis of sleep apnoea using a mandibular monitor and machine learning analysis: one-night agreement compared to in-home polysomnography. *FrontNeurosci* 2022;**16**:726880.

Please refer to page A212 for declarations of interest related to this abstract.

S122 MATHEMATICALLY ARTERIALISED VENOUS BLOOD GAS SAMPLING IN THE MANAGEMENT OF PATIENTS WITH HYPERCAPNIC RESPIRATORY FAILURE

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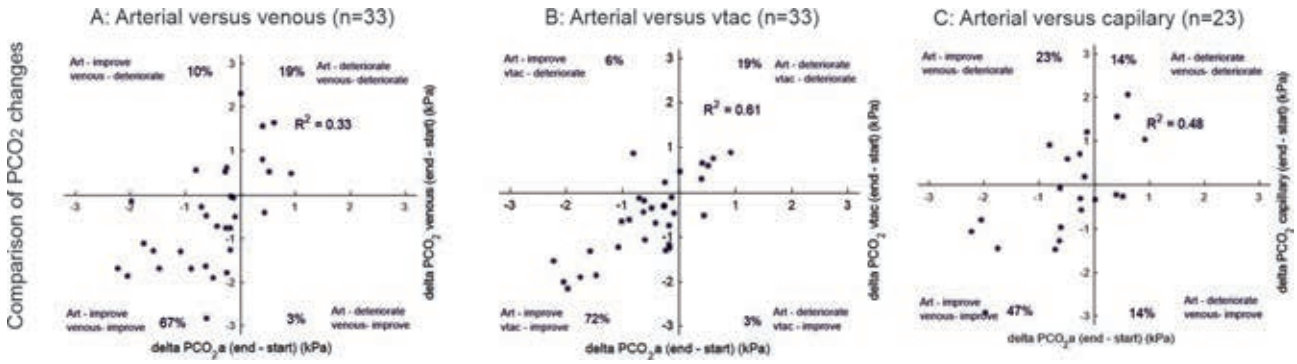
10.1136/thorax-2022-BTSabstracts.128

Introduction Arterial blood gas (ABG) sampling is a key aspect of non-invasive ventilation (NIV) therapy. Sampling is painful, though local anaesthesia is rarely used in UK ward-based practice. Capillary (CBG) and venous (VBG) are alternative methods, though limited by reliability and accuracy concerns. National audits show that missed or delayed blood gas sampling can have an adverse impact on patient outcome. A newer method (v-TAC, Roche) is available, based on VBG measurements combined with SpO_2. It has shown close agreement for pH and PCO_2 for all ranges, and for PO_2 values less than 10 kPa. Within an NIV treatment pathway, we have compared ABG sampling with v-TAC, CBG, and VBG.

Methods Time-matched serial ABG, v-TAC, CBG, and VBG samples in adult patients with known or suspected hypercapnic respiratory failure. Bland-Altman agreements, comparing ABG to CBG, VBG, and v-TAC, were performed for individual sampling episodes. The primary outcome was the reliability of the differing methods to detect changes in $PaCO_2$ in response to NIV.

Results 119 time-matched samples were available for analysis. First-time sampling success was 88% for VBG/v-TAC, 67% for ABG, and 55% for CBG. Bland-Altman analysis for PCO_2 and pH showed close agreement for v-TAC with ABG, but not for CBG or VBG. Mean PCO_2 bias (SD) was; -0.01 (0.50) kPa for v-TAC, -0.75 (0.69) kPa for CBG (i.e. CBG reads lower) and +1.00 (0.90) kPa for VBG. Pre and post NIV sampling comparisons were available for 32 subjects for v-TAC, and 23 for CBG. $PaCO_2$ responses to NIV were similar for ABG (0.53kPa), v-TAC (0.55kPa) and VBG (0.49kPa), but lower for CBG (0.16kPa). v-TAC classified the post-NIV improvement or deterioration in PCO_2 most accurately (91%, R^2= 0.61, figure 1). ABGs were



Abstract S122 Figure 1

painful; post-hoc analysis suggested that 15% of samples showed a transient change in ventilation at the time of sampling.
Conclusions $PaCO_2$ and pH results were interchangeable between v-TAC and ABG, whereas CBG and VBG showed poor agreement with ABG. These findings challenge some common UK ward-based practices, including use of repeated ABG sampling and CBG sampling as an acceptable surrogate.

Please refer to page A212 for declarations of interest related to this abstract.

S123 DE-VENTILATION DYSPNOEA AMONG PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE USING HOME NON-INVASIVE VENTILATION: PREVALENCE AND ASSOCIATIONS

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10.1136/thorax-2022-BTSabstracts.129

Background Some patients with COPD who use home non-invasive ventilation (hNIV) experience acute breathlessness after termination of NIV. This has been described as de-ventilation dyspnoea (DvD). However, DvD has not been well defined and little is known about its prevalence.
Aims To establish the prevalence of DvD and examine its characteristics and potential clinical significance.
Methods Observational cross-sectional study of patients with moderate to severe COPD established on hNIV. Data related to DvD were collected prospectively via postal survey. DvD was defined as breathlessness immediately after stopping NIV that is worse than breathlessness experienced before and during NIV, based on at least one point change in a 0–10-point numerical scale.
Results 150 patients were included. 18.7% of all patients were diagnosed with DvD. Their median breathlessness scores prior to NIV application, during NIV treatment, and following NIV mask removal were: 4±3.8, 2±3, 7±2, respectively (p=0.000). There was no difference between people with and without DvD in NIV usage (7.23±2.95 hrs/night vs 7.3±2.7 hrs/night, p=0.89), NIV settings (IPAP: 26.96 ±4.47 cmH2O vs 28.35±5.72 cmH2O, p=0.24; EPAP: 6.0±2.12 cmH2O vs 6.07±1.83 cmH2O, p=0.86) and the severity of airflow obstruction (predicted FEV1: 36.13±17.60% vs 36.16 ±14.75%, p=0.99). However, patients with DvD had worse markers of ventilatory failure control (pCO2: 6.53±0.80kPa vs 6.06±0.84kPa, p=0.009; bicarbonate: 31.77±3.67 mmol/L vs 29.90±3.20 mmol/L, p=0.009) and reported worse sleep quality (PSQI: 11±7 vs 5±6, p=0.001) and quality of life (SRI: 42.3±27 vs 51±33, p=0.041). They also had a higher burden of other NIV side effects (e.g. stomach bloating: 2±4 vs 0±3, p=0.016, congested nose: 2±4 vs 1±2, p=0.027, difficulty synchronising with the ventilator: 2±2 vs 0.0 ±1, p=0.01, based on 0–5 numerical scale).
Conclusions DvD is fairly common in COPD patients using hNIV and it is associated with less well controlled ventilatory failure and worse sleep quality and quality of life. A higher burden of other NIV side effects among patients with DvD indicates poor general tolerance of NIV, despite excellent concordance to it. Gastric distension, which was more severe in those patients, may be a potential mechanism of DvD which has not been previously investigated. In clinical practice, identification of DvD should prompt further attempts of NIV optimisation.

S124 CARDIOPROTECTIVE MEDICATION IN DUCHENNE MUSCULAR DYSTROPHY: A SINGLE-CENTRE COHORT STUDY

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10.1136/thorax-2022-BTSabstracts.130

Introduction and Objectives Duchenne's muscular dystrophy (DMD) is a neuromuscular disorder characterised by progressive muscle wasting impacting mobility, ventilation and cardiac function. Home mechanical ventilation (HMV) has led to improved respiratory outcomes, while the associated neuromuscular cardiomyopathy remains a major cause of morbidity and mortality. We investigated the effects of cardioprotective medications (ACE-inhibitors, ACE-I, and beta-blockers) on clinical outcomes in patients with DMD.
Methods This was a retrospective cohort study (reference:2021/12469) of DMD patients at a tertiary referral centre analysing service data between 1993–2001 and screening the electronic patient records for demographics, comorbidities, medication, disease specific features, echocardiography, hospitalisations, and ventilator use. Data were reported as mean (standard deviation) if normally distributed. The level of significance was defined as $p<0.05$.
Results 68 patients were identified aged 27.4(6.6) years, of which 52 were still alive. There was a reduced body mass index in survivors compared to deceased patients (23.8(5.9)

vs 19.9(3.8)kg/m^2; p=0.03). HMV was required for hypercapnic respiratory failure in 89.7% of the patients after a follow up period of 94 (79) months. There were no differences in ventilator settings between the survivors and deceased patients. 85% of the cohort had DMD associated cardiomyopathy. About 2/3 of all hospitalisations during the observation period were secondary to cardiopulmonary causes. At the time of the review, all patients were non-ambulatory, 69% used a mechanical insufflator:exsufflator device (MIE), 45% had feeding tubes (PEG), and 40% had spinal surgery. The left ventricular ejection fraction (LVEF) at initial presentation was 44.8(10.6)% and declined by -3.3(95% Confidence Interval (CI) 0.4 to -7)% over the follow up period (p=0.002). 61 patients were established on ACE-I for 75.9 (35.1)% of the time, and 62 were on beta-blockers for 73.6 (33.5)% of the follow up period. There was a significant decline in the LVEF in those who took ACE-I for limited periods only compared to those who remained permanently on ACE-I (p=0.002); a similar effect was recorded with beta-blockers (p=0.02).

Conclusion Continuous long-term use of ACE-I and beta-blockers is associated with a reduced decline in LVEF in patients with DMD and may be protective of adverse cardiovascular ill health.

S125 THE EFFECT OF TRANSCUTANEOUS SUBMENTAL ELECTRICAL STIMULATION ON THE BLOOD PRESSURE RESPONSE IN HEALTHY VOLUNTEERS

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10.1136/thorax-2022-BTSabstracts.131

Background Transcutaneous electrical stimulation (TES) has been recently introduced to treat patients with sleep-disordered breathing (SDB). There are, however, few data on the effects of submental electrical stimulation on the cardiovascular system. We studied the effect of TES on the cardiovascular responses in healthy volunteers during head-down-tilt (HDT) induced baroreceptor loading.

Method Cardiorespiratory parameters were recorded for 5 mins while seated and supine, and during 10 mins HDT (50°) under normoxic, hypercapnic ($FiCO_2$5%) and poikilocapnic hypoxic ($FiO_2$12%) conditions. Blood pressure (BP) and was measured continuously using a Finapres device, and the average reported for the final 2 minutes of each condition. All participants were studied twice, once without and once with TES and gas conditions applied in random order. Submental TES (30Hz, pulse width 250 μs, bipolar current) was individually titrated to skin sensation. Data are presented as mean (SD), with a level of significance at **p<0.05** and analysed using two-way ANOVA with Tukey's correction for multiple comparisons. The 95% confidence interval (CI) was reported for the difference (Δ) with TES.

Results We studied 13 healthy subjects (age 29 (12) years, 6 female, BMI 23 (1.6) kg/m^2). With TES (current 8(2) mA), diastolic BP decreased significantly during hypoxia when supine (Δ-17.8 (13.6) mmHg, (*95% CI*, -30.5 to -5.1), p=0.005) and during HDT (Δ-22.0 (15.7) mmHg, (*95% CI*, -36.7 to -7.3), p=0.003). Systolic BP also decreased with hypoxia when HDT (Δ-21.0 (20.0) mmHg, (*95% CI*, -39.6 to -2.3), p=0.025). Mean arterial BP decreased during hypoxia when supine (Δ-19.1 (15.8) mmHg, (*95% CI*, -33.9 to -4.4), p=0.009) and during HDT (Δ-20.6 (15.5) mmHg, (*95% CI*, -35.0 to -6.1), p=0.005). There was no associated change in the heart rate with TES (p=ns), but a trend towards increased minute ventilation when seated and breathing room air (p=0.060).

Conclusion Submental electrical stimulation appears to sensitise baro- and chemoreceptor function, leading to substantially reduced blood pressure while exposed to hypoxic conditions in supine posture in healthy subject. These findings have implications for the cardiorespiratory control of patients with hypertension and those with sleep-disordered breathing.

'Finding Neverland' – T2 inflammation and its absence

S126 DUPILUMAB EFFICACY IN CHILDREN WITH UNCONTROLLED TYPE 2 ASTHMA ANALYZED BY BASELINE HIGH OR MEDIUM ICS DOSE: LIBERTY ASTHMA VOYAGE STUDY

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Introduction and Objectives Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for interleukin (IL) 4 and IL-13, key and central drivers of type 2 (T2) inflammation, and demonstrated an acceptable safety profile and clinical efficacy in children aged 6–11 with uncontrolled moderate-to-severe asthma in VOYAGE (NCT02948959). This post-hoc analysis assessed dupilumab efficacy in children with T2 asthma analyzed by baseline inhaled corticosteroid (ICS) dose in children with T2 asthma (baseline blood eosinophils ≥150 cells/μL or baseline fractional exhaled nitric oxide ≥20 ppb).

Methods Children received weight-based dupilumab 100/200 mg every 2 weeks or placebo and were stratified by medium (n=195) or high (n=152) baseline ICS dose per GINA 2015 guidelines. In a prespecified, multiplicity-controlled analysis, annualized severe asthma exacerbation rates (AER) over the 52-week treatment period in the high ICS group were evaluated. Other prespecified analyses were AER in the medium ICS group, and, in both groups, changes from baseline in pre-bronchodilator (BD) percentage predicted (pp) FEV_1 and interviewer-administered 7-Item Asthma Control Questionnaire (ACQ-7-IA) score.

Results Baseline AER in dupilumab/placebo patients were 3.04/2.56 in the high and 2.27/1.88 in the medium ICS groups. Dupilumab vs placebo significantly reduced AER by 63% (*P*=0.0004) and 59% (*P*=0.0028) in the high and medium

ICS groups, respectively. Dupilumab improved pre-BD ppFEV$_1$ in both high (LS mean difference, 5.70 [0.99, 10.40]; P=0.0180) and medium (9.35 [4.38, 14.33]; P=0.0003) ICS groups at Week 52. Reductions from baseline in ACQ-7-IA scores at Week 12 were significantly greater with dupilumab vs placebo in the high ICS group (-0.58 [−0.84, −0.33]; P<0.0001) and numerically greater in the medium ICS group (−0.18 [−0.41, 0.05]; P=0.1317) at Week 12. By Week 52 significant improvements in ACQ-7-IA were seen with dupilumab vs placebo in both the high (−0.53 [−0.75, −0.31]; P<0.0001) and medium (−0.40 [−0.60, −0.20]; P=0.0001) ICS groups.

Conclusion Dupilumab demonstrated clinical efficacy in children with uncontrolled moderate-to-severe type 2 asthma regardless of ICS dose at baseline, with significant reductions in exacerbations as well as significant improvements in lung function and asthma control by end of treatment.

Please refer to page A212 for declarations of interest related to this abstract.

S127 RELATION BETWEEN CHANGE IN TYPE 2 BIOMARKER LEVELS AND EFFICACY OUTCOMES IN PATIENTS WITH ASTHMA TREATED WITH DUPILUMAB

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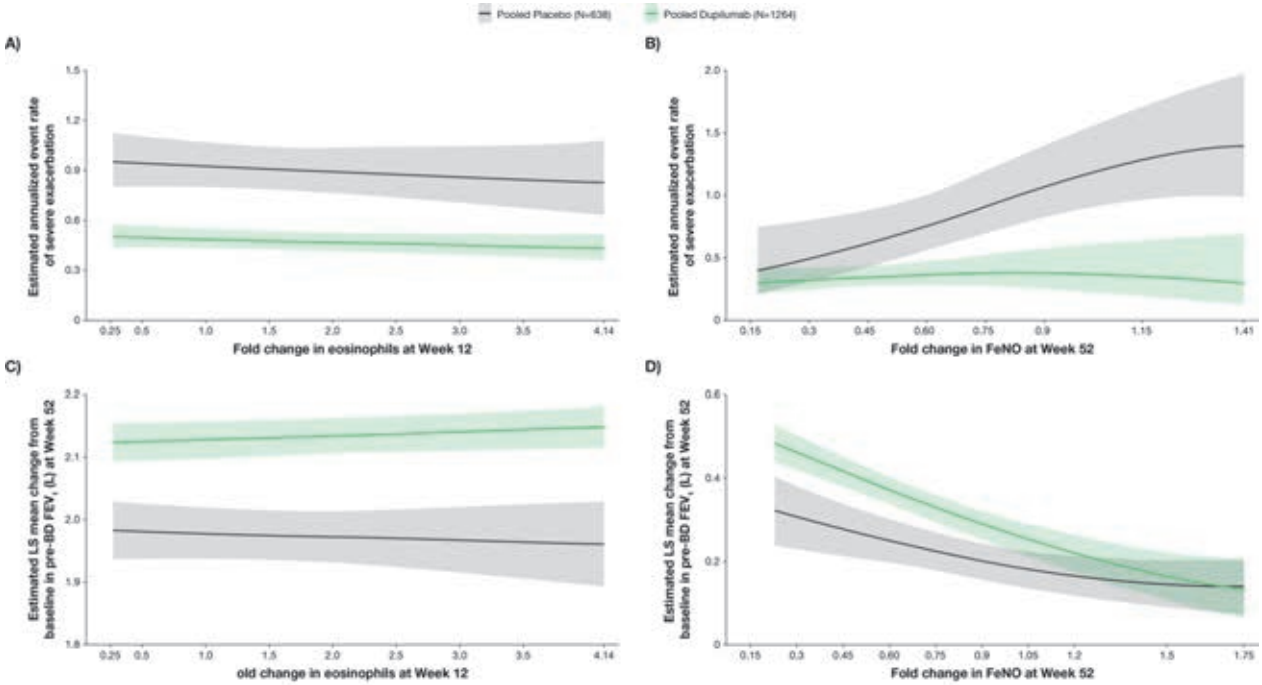
10.1136/thorax-2022-BTSabstracts.133

Background Type 2 inflammation is associated with elevated levels in biomarkers including, among others, fractional exhaled nitric oxide (FeNO) and blood eosinophils. Dupilumab, a fully human monoclonal antibody, blocks the shared receptor component for IL-4 and IL-13, key and central drivers of type 2 inflammation. In the QUEST study (NCT02414854), add-on dupilumab 200 mg and 300 mg every 2 weeks, versus matched placebo, significantly reduced severe asthma exacerbations and improved pre-bronchodilator forced expiratory volume in 1 second (FEV$_1$) in patients with uncontrolled, moderate-to-severe asthma. Effects were greater in patients with elevated type 2 biomarkers at baseline. This post hoc analysis evaluated the relationship between changes from baseline in blood eosinophil and FeNO levels, and efficacy endpoints in the intention-to-treat (ITT) population of the QUEST study.

Methods Annualized rate of severe exacerbations (AER) during the 52-week treatment period and change from baseline in pre-bronchodilator FEV$_1$ at Week 52 were derived as functions of fold change in blood eosinophils at Week 12 and FeNO levels at Week 52, using penalized regression spline models.

Results The dupilumab group showed lower AERs compared with the placebo group across all fold change values of blood eosinophils and FeNO change examined, and a higher pre-bronchodilator FEV$_1$ than the placebo group across all values of eosinophils fold change (figure 1). Greater reductions in FeNO levels correlated with greater improvements in pre-bronchodilator FEV$_1$ at Week 52 (figure 1).

Conclusions In patients with uncontrolled, moderate-to-severe asthma, dupilumab lowered the AER compared with placebo regardless of the magnitude of eosinophil and FeNO reduction, and improved FEV$_1$ regardless of the magnitude of eosinophil change. Greater reductions in FeNO levels at Week 52



Abstract S127 Figure 1

were associated with greater improvements in pre-bronchodilator FEV_1 with dupilumab compared to placebo by end of treatment, which points to the utility of FeNO to predict responsiveness to dupilumab.

Please refer to page A212 for declarations of interest related to this abstract.

S128 BASELINE CHARACTERISTICS OF PATIENTS WITH ASTHMA TREATED WITH DUPILUMAB IN A REAL-WORLD SETTING: RESULTS FROM THE RAPID REGISTRY

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Background Up to 58% of patients with severe asthma still have uncontrolled symptoms, despite receiving recommended treatment. Dupilumab is a human monoclonal antibody that blocks interleukin (IL)-4 and IL-13, key and central drivers of type 2 inflammation. In phase 3 QUEST (NCT02414854), add-on dupilumab vs placebo significantly reduced exacerbations and improved pre-bronchodilator (pre-BD) forced expiratory volume in 1 second (FEV_1) in patients with uncontrolled, moderate-to-severe asthma and elevated type 2 biomarkers (baseline blood eosinophils or fractional exhaled nitric oxide [FeNO]). Dupilumab was generally well tolerated. RAPID (NCT04287621) is a global, prospective registry aimed at characterizing patients with asthma initiating dupilumab therapy in real-world clinical practice, including demographics, asthma control, lung function, and disease severity. We report baseline characteristics of patients enrolled during the first 6 months.

Methods The RAPID registry enrols patients aged ≥12 years who initiate dupilumab treatment for the primary indication of asthma according to country-specific prescribing information. Signed consent was obtained (for minors, from parent or legal guardian).

Results During the first 6 months, 205 patients were enrolled. Baseline characteristics included: mean age 50.10 years (±17.41); female (65.4%); body mass index 30.67 (±7.96); 74.1% were White (including individuals of Hispanic origin) and 13.2% were Black or African-American (table 1). 86.8% had moderate-to-severe disease – according to GINA steps 3 to 5, while 6.3% were GINA 1/2. 24.4% were current or former smokers. Patients had 4.10 (±6.30) severe asthma exacerbations in the previous year. Baseline lung function was: pre-BD FEV_1, 2.29 L (±1.14) and pre-BD percent predicted FEV_1, 70.34% (±20.30). The 6-item Asthma Control Questionnaire score was 2.40 (±1.18) and Asthma Quality-of-Life Questionnaire score was 4.10 (±1.31). In the year before enrolment, 9.3% and 18.5% of patients were hospitalized or visited the emergency room due to asthma, respectively. FeNO was 42.2 ppb (±34.83).

Conclusions In this initial sample from the RAPID study, patients prior to initiating dupilumab had uncontrolled asthma

Abstract S128 Table 1 Baseline characteristics of patients enrolled in RAPID (n = 205)

Baseline characteristics	Population (n = 205)
Demographics	
Age, mean ± SD, years	50.1 ± 17.41
Female, n (%)	134 (65.4)
Race, n (%)	
White	152 (74.1)
Black or African-American	27 (13.2)
Asian	2 (1.0)
Multiple	2 (1.0)
Other	6 (2.9)
Not reported	15 (7.3)
Missing	1 (0.5)
BMI, mean ± SD, kg/m^2 (n = 194)	30.7 ± 8.0
Smoking history, n (%)	
Current	9 (4.4)
Former	41 (20.0)
Age of asthma onset, years, n (%)	
<18	73 (35.6)
≥18 to ≤40	54 (26.3)
>40	78 (38.0)
Global Initiative for Asthma (GINA) severity score, n (%)	
1	5 (2.4)
2	8 (3.9)
3	29 (14.1)
4	49 (23.9)
5	100 (48.8)
Missing score	14 (6.8)
Disease characteristics	
Severe asthma exacerbationsin the year prior to the screening visit, mean ± SD (n=84)	4.10 ± 6.30
Pre-BD FEV_1, mean ± SD, L (n = 89)	2.29 ± 1.14
Percent predicted pre-BD FEV_1, mean ± SD,% (n = 100)	70.34 ± 20.30
Forced vital capacity, L (n = 89)	3.09 ± 1.08
Peak expiratory flow, L/min (n = 68)	356.88 ± 169.83
ACQ-6 score, mean ± SD (n = 193)	2.40 ± 1.18
AQLQ global score, mean ± SD (n = 192)	4.10 ± 1.31
Healthcare resource utilization related to asthma	
Hospitalization in the year prior to the screening visit	
Mean ± SD	0.20 ± 0.81
n (%)	19 (9.3)
Emergency room visit in the year prior to the screening visit, n (%)	38 (18.5)
Biomarkers	
FeNO, mean ± SD, ppb (n = 61)	42.2 ± 34.83
Baseline FeNO level, n (%)	
<25 ppb	22 (10.7)
≥25 ppb	39 (19.0)
≥50 ppb	20 (9.8)
Missing	144 (70.2)

ACQ-6, 6-item Asthma Control Questionnaire; AQLQ, Asthma Quality-of-life Questionnaire; BD, bronchodilator; BMI, body mass index; FeNO, fractional exhaled nitric oxide; FEV_1, forced expiratory volume in 1 second; ppb, parts per billion; SD, standard deviation.

and some had a history of smoking. Patients had a high number of exacerbations in the past year, impaired lung function, and poor asthma control and quality of life, suggesting a population with a high disease burden despite standard-of-care treatment.

Please refer to page A212 for declarations of interest related to this abstract.

S129 CHANGE IN FENO AS A BIOMARKER OF RESPONSE TO ANTI-IL5/5R THERAPIES IN SEVERE ASTHMA

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10.1136/thorax-2022-BTSabstracts.135

Introduction Biologic therapies targeting interleukin 5 (IL5) or its receptor (IL5R) lead to improvements across a range of clinical outcomes in severe asthma. However, response varies between individuals and there is a need for early biomarkers of treatment response. We have previously reported that in some patients, FeNO falls with anti-IL5/5R therapy presumably in relation to a reduction in eosinophil-derived IL-13.[1] However, it remains unknown whether a change in FeNO following initiation of anti-IL5/5R relates to clinical response.

Methods We conducted a retrospective review of 229 patients treated with the anti-IL5/5R therapies (mepolizumab, n=99; benralizumab, n=130). The baseline characteristics and clinical outcomes of this cohort have previously been reported.[2,3] The magnitude of change in FeNO (ppb) at 4 weeks and at 1 year was divided into quartiles and related to change in annual exacerbation rate (AER) and asthma control (ACQ6) at 1 year. A subgroup analysis according to whether patients were on maintenance (m)OCS at baseline was performed.

Results Across the cohort (n=229), median (IQR) change in FeNO from baseline to 4 weeks was -3ppb (-16 to 11) and at 1 year was 0ppb (-14 to 10). In patients not on mOCS at baseline (n=87), the median (IQR) change in FeNO at 1 year was 0ppb (-7 to 5). ANOVA analysis revealed significant differences across the delta FeNO quartiles for changes in AER (upper FeNO quartile: 5.43±2.5 vs lower FeNO quartile: 3.99±2.67, p<0.001) and ACQ-6 (upper FeNO quartile -1.33 ±1.07 vs lower FeNO quartile: -0.46±1.14, p=0.012) at one year. No significant relationship between change in FeNO at 4 weeks and clinical outcome at 1 year was seen, or for patients on mOCS at baseline.

Conclusion A larger reduction in FeNO from baseline to 1 year is associated with better clinical outcomes to anti-IL5/5R therapies in patients not requiring mOCS. However, this relationship was not evident at 4 weeks limiting its utility as a very early biomarker of response.

REFERENCES

1. Hearn AP, *et al. JACI-IP* 2021;**9**(5):2093–2096
2. Kavanagh JE, *et al. Chest* 2021;**159**(2):496–506
3. Kavanagh JE, *et al. Chest* 2020;**158**(2):491–500.

S130 MULTICOMPONENT AND LONGITUDINAL ANALYSIS OF PATIENTS WITH DIFFICULT-TO-TREAT ASTHMA AND SEVERE ASTHMA REVEAL NEAR ABSENCE OF T2-LOW STATUS

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Background Airway inflammation in asthma is heterogenous and frequently described as type 2-inflammation (T2) high or T2-low. The identification of T2-high disease is important as it has prognostic and therapeutic implications but its prevalence in patients with difficult-to-treat and severe asthma (SA) is unclear.

Aims Understand the prevalence of T2-high asthma in this group of patients using a multicomponent definition that includes blood and exhaled biomarkers and incorporates longitudinal peripheral blood eosinophil (PBE) measurements.

Methods 388 biologic naïve patients from the Wessex Asthma Cohort of difficult asthma (WATCH)[1] study were evaluated. T2-high asthma was defined as FeNO≥20ppb and/or PBE ≥150 cells/ul and/or need for maintenance OCS (mOCS) and/or clinically allergy driven asthma (skin prick test positive alongside symptoms with exposure).[2]

Results T2-high asthma was identified in 93% (360/388) of patients using the multicomponent assessment: 53% had raised FeNO, 66% had raised PBE, 30% were on mOCS (only 7 patients identified solely based on this criteria) and 51% had clinically allergen driven symptoms. BMI (median 29.6 vs 29.3), ICS dose (1500 mcg BDP vs 1500 mcg BDP, [IQR 2000]), exacerbations (requiring OCS treatment and/or hospital admission) and presence of comorbidities commonly associated with asthma (GORD, rhinitis, breathing pattern disorder, anxiety) were similar in patients classified as T2-high or T2-low. T2-high patients had worse airflow limitation compared to T2-low patients (FEV_1/FVC 65.9% vs 74.6% p=0.04). Of the 7% (28/388) patients who did not fit criteria for T2-high asthma, 21 patients (75%) had evidence of raised PBE within the preceding 10 years- leaving only 7 patients overall (1.8%) who did not have a current or historical T2-signal. Incorporation of sputum eosinophilia ≥2% into the multicomponent definition in a subset of 117 patients with induced sputum data found, similarly, that 96% (112/117) met criteria for T2-high asthma (69/117, 59% had sputum eosinophils ≥2%).

Conclusion Almost all patients with difficult-to-treat and SA have T2-high disease with <2% of patients displaying absence of any current or historical T2-defining criteria.

REFERENCES

1. Azim A, *et al. BMC Pulm Med* 2019
2. Global Initiative for Asthma 2021.

'For Your Eyes Only' – What's hot in infection?

P1 COMMUNITY ACQUIRED PNEUMONIA (CAP) & THE ADVENT OF VIRTUAL HOSPITAL WARDS: HOW USEFUL IS THE CURB-65 CRITERIA FOR RISK STRATIFICATION IN 2022?

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10.1136/thorax-2022-BTSabstracts.137

Introduction Since the CURB-65 criteria was developed in 2003[1] our population demographics have changed considerably. In particular, there has been a shift to an older patient population resulting in a higher prevalence of comorbidities and frailty. There is increased demand for acute inpatient beds, with pressure to identify those suitable for discharge and to develop alternatives such as virtual wards. Due to the significant mortality rate associated with CAP, well informed decision making is vital for safe care. Emphasis is placed on the use of 'clinical judgement' when interpreting the score.

Aim To determine whether the CURB-65 criteria still correlates with mortality in our patient cohort and investigate other metrics that could be used for risk stratification.

Methods Patients admitted between January and March 2022 were identified retrospectively from coding data. Radiology reports were reviewed to determine if infective changes were present on CXR and the history reviewed to ensure the patient had clear diagnosis of CAP. Covid positive patients were excluded.

Results 105 patients (52 female) with mean age 68.4 yrs were identified as having confirmed CAP to be included in data collection. The mortality rates, both in-hospital and at 30 days were reviewed based on the CURB 65 score, CRP, whether hypoxic at triage and clinical frailty score (CFS).

Conclusion The CURB-65 criteria still broadly correlates with mortality, however a more comprehensive risk analysis could help to predict complications and facilitate informed decision making. Other predictors of severity have been identified eg CRP >100, hypoxia at triage and clinical frailty score. Further computer based analysis of patient data is likely to identify other predictors of severity and a more personalised, evidence based assessment could be key to the effective and safe operation of virtual wards.

Abstract P1 Table 1 Mortality in patients admitted with CAP

	In-hospital mortality	30 day mortality
CRP < 100	7.00%	10.50%
CRP > 100	14.60%	18.75%
Not hypoxic	6.25%	6.25%
Hypoxia	13.70%	17.80%
CFS <4	0.00%	0.00%
CFS 4–5	6.50%	15.20%
CFS >5	27.60%	27.60%
CURB65 = 0	0%	0%
CURB65 = 1	5.60%	5.60%
CURB65 = 2	0.00%	11.50%
CURB65 = 3	33.30%	38.10%
CURB65 = 4	33%	33.3%

REFERENCES

1. Lim WS, van der Eerden MM, Laing R, *et al*. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. *Thorax*. 2003. **58** (5): 377–82.
2. Chalmers JD, Singanayagam A, Hill AT. C-reactive protein is an independent predictor of severity in community-acquired pneumonia. *Am J Med*. 2008 Mar;**121** (3):219–25

P2 MOUTH CARE AND PNEUMONIA: A CLINICIAN'S INSIGHT

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10.1136/thorax-2022-BTSabstracts.138

Introduction Oral health is an important aspect of general health and well-being. Studies confirm a significant link between poor oral health and the risk of developing community acquired pneumonia and demonstrate that implementation of oral care protocols on wards can reduce the likelihood of hospital acquired pneumonia.

Embedding good oral care into patient care pathways is essential; in this review, we assessed clinicians' awareness of mouth care.

Methods An online survey was sent to 39 medical consultants working at an acute Manchester Hospital reviewing current knowledge and utilisation of the oral assessment tool (OAT) and mouth care plan (MCP). All in-patients have an OAT completed on admission/transfer to the ward and every 7 days thereafter, triggering a patient-centred MCP which is signed off daily in the patients notes.

Results 25 consultants completed the survey. 76% confirmed they were aware of the association between poor mouth care and the risk of developing pneumonia, but only 36% routinely inspected a patient's mouth as part of their daily clinical examination. 12% were aware of the OAT and 24% of the MCP. One fifth of consultants routinely checked whether daily mouth care had been received and only 3 checked whether the patient had a toothbrush or toothpaste.

At the time of discharge for patients admitted with pneumonia, whilst a significant number reviewed smoking status (88%), pneumococcal (48%) and flu vaccination status (52%), only 1 individual reviewed whether patients were able to independently perform mouth care.

Conclusion Despite awareness of links between poor mouth care and pneumonia, senior clinicians are not utilising available tools to assess care. Poor mouth care amongst hospitalised patients increases the risk of nosocomial pneumonia with significant impact on length of stay and mortality. Failure to identify those at risk who are unable to independently perform mouth care at the time of discharge, can lead to recurrent episodes of pneumonia, and needs to be a focus for secondary prevention particularly in vulnerable groups with frailty and learning difficulties where mortality rates remain unacceptably high. Pathways championing oral care need to be considered as part of pneumonia quality improvement measures.

P3 ECBS STUDY: EXACERBATION OF CHRONIC BRONCHIAL SEPSIS – UTILITY OF A NOVEL RAPID MOLECULAR DIAGNOSTIC TEST (MBLA) TO DETECT AND QUANTIFY VIABLE BACTERIA

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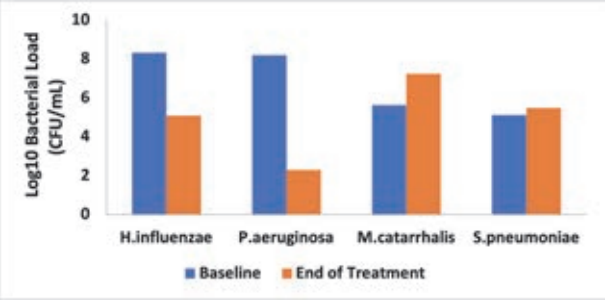
10.1136/thorax-2022-BTSabstracts.139

Introduction and Objectives The significant overlap of clinical features of patients with bronchiectasis and those with COPD and frequent infections has led to the term 'chronic bronchial sepsis' (CBS). Culture-dependent techniques lack sensitivity, are time-consuming and rarely helpful in acute exacerbations. We have developed a novel rapid sputum diagnostic test, the molecular bacterial load assay (MBLA), a ribosomal RNA-based qPCR assay able to provide both diagnostic and quantitative data on viable bacteria. After successful lab development, we sought to provide proof-of-concept data for the CBS-MBLA in clinical practice.

Methods The Exacerbation of CBS (ECBS) study is a prospective observational study of patients with a history of CBS (confirmed bronchiectasis or COPD with positive sputum bacteriology) presenting to hospital with acute severe exacerbation. Sputum was processed alongside standard care. The CBS-MBLA identifies commonly identified bacteria in CBS: *P.aeruginosa, H.influenzae, S.pneumoniae, S.aureus, M.catarrhalis, K. pneumoniae*. The primary outcome was MBLA performance compared to sputum culture. Secondary outcomes included longitudinal assessment of bacterial loads over time and quality of life (QoL).

Results 26 patients with 29 exacerbation-admissions were enrolled and tracked over 8-months with the following baseline features: median age 72 (49–89); 1.9 female:1 male; COPD 59%, bronchiectasis 41%; ever-smokers 68%; BMI 21.9kg/m^2 (13.8–36.7); CAT score 30 (5–40); inhaled steroids 26%; admission blood results CRP 52 g/l (1.6–210.3), neutrophils 8.8 x 10^9(2.9–20.5). Compared to culture, CBS-MBLA showed higher diagnostic yields from day 1 sputum (14/27 (52%) vs 10/27 (37%)) and when all day 1–3 sputum was included (24/27 (89%) vs 12/29 (41%)). *H.influenzae* (17) and *P.aeruginosa* (12) were the most commonly identified bacteria by MBLA. Of 3 negative MBLA results, 1 cultured *S.pseudopneumoniae* and 2 remained culture-negative. MBLA-bacterial loads did not consistently fall during clinical recovery, either between different patient-pathways or within the same patient (figure 1). High QoL scores at presentation reduced significantly with treatment, however, the sample size precluded sufficient correlation with MBLA values.



Abstract P3 Figure 1

Conclusions We have shown proof-of-concept of the CBS-MBLA in clinical practice in acute exacerbations. We show 89% sensitivity despite antibiotic use and consistent performance on quantitative viable bacterial loads. CBS-MBLA offers significant potential value in clinical practice and in our understanding of CBS.

P4 NEBULISED MEDICATIONS IN SECONDARY CARE: RISING TO THE CHALLENGE

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10.1136/thorax-2022-BTSabstracts.140

Introduction Nebulised challenges for respiratory patients are typically completed with inpatients in secondary care. Since 2017 the local physiotherapy team has completed nebulised challenges on outpatients in 6 local health centres and a local hospital. 38 patients completed 3%, 6% or 7% Hypertonic Saline challenges, 17 patients completed challenges for Colomycin, Tobramycin, Meropenem or Gentamycin. Spirometry was completed pre, post and 15 minutes after completion. Auscultation was also completed pre and post, SpO2 was monitored and patients' symptomatic responses reviewed. All patients had COPD, Bronchiectasis, Asthma or a combination of these diseases.

Aim To retrospectively review the adverse effects on patients in order to review the safety of completing nebulised challenges in a primary care setting.

Methods Patient data was collected for audit including pre and post spirometry values, and symptomatic responses.

Results Of 61 patients referred, 55 completed challenges. In all but 3 cases pre-bronchodilator medications were recorded as having been administered. In 37 (67%) of the cases where the challenge was completed the appropriate nebulised antibiotic or Hypertonic Saline was subsequently prescribed. None of the patients who experienced drops in FEV1 over 15% or who experienced adverse effects required admission to secondary care.

Conclusion Nebulised challenges can be safely completed in primary care settings with patients who have chronic respiratory diseases.

P5 INCREASING NTM CASELOAD WITHIN THE BTS MDR TB NATIONAL CLINICAL ADVICE SERVICE: THE TIP OF AN ICEBERG?

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Introduction and Objectives The BTS Multidrug Resistant (MDR) Tuberculosis (TB) Clinical Advice Service (CAS) provides an electronic forum to review, discuss and record formal feedback through an MDT delivered by national experts for cases of MDR and complex TB, submitted by local managing clinicians. This process provides specialist peer-review to support clinical requests for the use of new or high-cost drugs.

The service also receives requests for advice on Non-Tuberculous Mycobacteria (NTM). Here we report CAS activity for referred NTM cases posted January 2018-June 2022.

Methods NTM cases submitted to the service during this period were extracted from the CAS data platform using a reporting template developed to capture data on TB patients and their illness – with the first records representing the start of the current CAS.

Results 85 patients with NTM were referred to the CAS (49% pulmonary disease). This comprised 18% of all CAS cases – making it the largest group discussed that were not known or suspected MDR/XDR TB. The percentage increased from 8.7% in 2018 to 31% in 2022 (p=0.001, test for trend). The median age was 52.7 years (IQR 34.5), 60% were male and 80% were UK-born, with a similar proportion of white ethnicity. Underlying clinical risk factors for NTM were noted in >95% and ranged from COPD or bronchiectasis to immunosuppression in 1/3rd. No cases with underlying Cystic fibrosis were reported. The commonest organisms were *M. avium* complex and *M. abscessus*. Referrals were generally for advice on treatment. 85% were discussed at the MDT, with 73% discussed once. 24 cases requested support for bedaquiline use – and 13 (54%) were approved. Additionally, there were 5 cases where the panel recommended bedaquiline, though the managing clinician had not requested it.

Conclusions The data indicate there is considerable and increasing demand for expert advice to manage patients with NTM. This appears to be in non-CF NTM, implying other networks may provide similar support for CF patients. The case-mix argues for regional NTM networks that could manage most current referrals – enabling a national group to focus on highly complex patients being considered for new and/or high-cost therapies.

The authors have produced this abstract on behalf of the BTS MDR TB CAS, London, UK.

P6 WHAT GUIDELINES SAY AND WHAT ACTUALLY HAPPENS: A SURVEY OF UK PHYSIOTHERAPY PRACTICE IN THE MANAGEMENT OF NON-TUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE

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10.1136/thorax-2022-BTSabstracts.142

Introduction and Objectives Physiotherapy review including advice on sputum clearance and lifestyle management are guideline-recommended approaches to managing Non-Tuberculous Mycobacterial pulmonary disease (NMT-PD). Despite this, a recent national survey found less than half of clinicians treating NTM-PD had access to physiotherapy input for their patients. There are currently no UK data on clinical physiotherapy practices for patients with NTM-PD; we investigated this using an online survey.

Methods A physiotherapy specific national survey was developed and distributed electronically by NTM Network UK, Physiotherapy Interest Group via the professional physiotherapy societies ACPRC and ACPCF to respiratory physiotherapists with potential involvement in the management of paediatric and/or adults with NTM-PD. It asked about NTM-PD services provided, sputum microbiology surveillance, delivery of airway clearance provision/advice and current physiotherapy patient-management.

Results Of 53 responses, 80% were from university hospitals or CF units and 20% District General hospitals. Two-thirds treated adults, and almost half had a speciality interest in bronchiectasis or CF. 60% were referred NTM-PD patients, with the commonest indications being sputum clearance (90–98% inpatients and outpatients respectively), nebuliser trials (62–76%), sputum induction (55–58%) and advice on mobility & exercise (54–68%).

Physiotherapy outpatient review was scheduled every 1–3 months for around 40% of new NTM-PD patients; whilst 60% of stable NTM-PD patients were reviewed every 1–12 months. One third of new patients and 40% of established NTM-PD diagnoses had no routine physiotherapy review.

The selection of airway clearance techniques or device provision frequently depended on funding and experience of the physiotherapist.

Sputum surveillance was performed routinely by 75% of respondents, which included 2–3 mycobacterial cultures plus bacteriology.

Where standards of care or guidelines (including Infection Prevention & Control) were reported as available, these were predominantly extrapolated from CF management.

Conclusions Service provision for people with NTM-PD is variable across the UK. Many of our survey respondents had considerable experience managing NTM-PD due to their engagement in CF centre care, possibly generating better than average results. Through the NTM Network we are developing national quality standards for physiotherapy which are intended to enable patients with NTM-PD to access high-quality services wherever they are managed.

P7 TESTING AT-RISK PATIENTS FOR NTM-PD IN CURRENT CLINICAL PRACTICE: RESULTS OF AN INTERNATIONAL SURVEY

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Introduction and Objectives Non-tuberculous mycobacterial pulmonary disease (NTM-PD) is a rare pulmonary disease associated with reduced lung function and increased morbidity. An online survey was developed to explore triggers for NTM testing in clinical practice with respect to clinical symptoms, underlying respiratory diseases, and medication use.

Methods The 10-minute online survey was fielded with physicians (n=455) from across a range of clinical specialties in Europe, North America, Australasia and Japan.

Results Respondents' caseloads varied with 42% having >10, 28% having 6–10 and 29% having 1–5 new NTM-PD patients every year. Persistent cough, weight loss and haemoptysis were most likely to prompt NTM testing, while gastroesophageal reflux disease was least likely. Respondents were most likely to test patients with non-cystic fibrosis bronchiectasis (NCFBE) (mean 90%) or those with chronic obstructive pulmonary disease (64%) based on clinical symptoms and radiological changes, and those using immunosuppressants (64%); however, there were large inter-country differences. Only a minority tested NCFBE patients at clinical presentation (24%), or when initiating macrolide therapy (15%) despite guideline recommendations. In patients with cystic fibrosis, 60% of respondents tested for NTM and 50%

of these tested all adults. Medication use as a prompt to test for NTM showed that steroid use was the most common prompt for testing (66%) whilst few tested patients in receipt of anticancer agents and anti-tumour necrosis factor alpha inhibitors (19% and 10%, respectively). The most common symptom combinations prompting testing were persistent cough with weight loss or fatigue or bronchiectasis. Other symptoms (e.g., purulent sputum, exacerbations) prompted testing among clinicians with larger NTM patient caseloads, but for most only a combination of both NTM symptoms and underlying disease prompted testing (means 4.8 risk factors).

Conclusion Testing for NTM is influenced by underlying disease and presence of clinical/radiological symptoms. However, context is key, and the decision to test for NTM depend on patient profile overall, not individual symptoms. Clinical practice varies considerably across geographies and is not always aligned with the existing recommendations for NTM testing in certain patient subgroups. International expert recommendations on which patients should be screened for NTM are warranted.

Please refer to page A213 for declarations of interest related to this abstract.

P8 A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS OF PATIENT RISK FACTORS FOR NON-TUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE (NTM-PD)

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10.1136/thorax-2022-BTSabstracts.144

Introduction and Objectives Non-tuberculous mycobacterial pulmonary disease (NTM-PD) is associated with reduced lung function and increased morbidity. NTM-PD is often diagnosed when the disease has become established, making it difficult to treat. Understanding risk factors for NTM-PD can prompt testing and initiation of early, effective treatment. Results from a systematic literature review (SLR) and meta-analysis of the identified risk factors are reported.

Methods Electronic searches on Medline and EMBASE were performed in July 2021 to identify publications (2011–2021) reporting attributable risk factors for NTM-PD. Systematic screening of 7,246 citations against agreed inclusion and exclusion criteria identified 99 publications for inclusion in the SLR and were subjected to full data extraction. Of these, 24 publications contained data on attributed risk factors that could be included in the meta-analysis. Patient demographics, NTM species, symptoms identified, risk factors and co-morbidities were recorded, and results were analysed. Due to high heterogeneity in the data, random effect modelling was used for meta-analysis which was performed using R based meta package.

Results Underlying lung disease was associated with NTM-PD, notably non-cystic fibrosis bronchiectasis, chronic obstructive pulmonary disease, asthma, and a history of tuberculosis (table 1). Use of inhaled corticosteroids and

Abstract P8 Table 1 Meta-analysis of identified attributable risk factors

Identified risk factor	No. of studies (n)	Baseline population	Combined OR	95% CI	I^2 (%)
NCFBE	4	General population Symptoms of TB	21.43	5.90, 77.82	95
History of TB	7	General population Symptoms of TB Rheumatoid arthritis COPD	12.69	2.39, 67.26	99
Interstitial lung disease	4	General population Rheumatoid arthritis COPD	6.39	2.65, 15.37	97
COPD	8	General population Symptoms of TB Rheumatoid arthritis	6.10	3.96, 9.40	90
Pneumonia	5	General population COPD CF	5.54	2.72, 11.26	95
Solid tumours	3	General population COPD	4.66	1.04, 20.94	89
Inhaled corticosteroids	4	General population Pulmonary disease	4.46	2.13, 9.35	97
Asthma	4	General population Symptoms of TB	3.73	2.21, 6.27	89
Solid organ transplant	2	Lung transplant Solid organ transplant	3.69	0.31, 44.12	92
Oral corticosteroids	3	General population Rheumatoid arthritis	3.37	0.82, 13.75	96
Low BMI (<18 kg/m^2)	2	General population COPD	3.04	1.95, 4.73	88
Infection with *Staphylococcus aureus*	2	CF	2.42	0.55, 10.63	84
Immunosuppression (all drugs)	10	General population CF Rheumatoid arthritis Pulmonary disease Transplant	2.26	1.53, 3.33	88
Immune disorders	4	General population TB	2.36	0.98, 5.64	84
Use of anti-TNFα treatment	2	Rheumatoid arthritis	2.13	1.24, 3.65	0
Radiological findings	2	TB	2.05	0.92, 4.59	66
CVD	2	Rheumatoid arthritis General population	1.73	1.01, 2.97	50
Sex (female)	5	NCFBE CF Solid organ transplant TB	1.70	1.01, 2.86	87
Renal disease	5	General population Rheumatoid arthritis Transplant TB	1.62	0.87, 3.03	82
Cancer (all)	6	General population Solid organ transplant TB CF	1.37	0.70, 2.68	85

Infection with *Pseudomonas aeruginosa*	5	General population COPD CF	1.12	0.87, 1.44	95
Sex (male)	4	CF TB	1.10	0.95, 1.28	0
Diabetes	6	General population Rheumatoid arthritis Solid organ transplant TB	1.04	0.63, 1.72	88
FEV1% of predicted	3	CF	1.01	0.97, 1.05	97
Higher BMI (>24 kg/m^2)	3	General population NCFBE	0.73	0.58, 0.97	91
Macrolide use	3	CF	0.80	0.47, 1.39	96

BMI, body mass index; CF, cystic fibrosis; CI, confidence interval; COPD, chronic obstructive pulmonary disease; CVD, cardiovascular disease; FEV1, forced expiratory volume in one second; NCFBE, non-cystic fibrosis bronchiectasis; OR, odds ratio; TB, tuberculosis; TNFα, tumour necrosis factor alpha.

immunosuppressive drugs, specifically anti-tumour necrosis factor alpha, were also positively associated as was infection with *P. aeruginosa*. Low body mass index was positively associated with risk of NTM-PD and cardiovascular disease was marginally associated. In this analysis lung function (FEV1) as well as macrolide use were not statistically significantly associated with NTM-PD.

Conclusion These data explore a comprehensive range of factors predisposing patients to NTM-PD, including underlying lung disease, specific medications, and other disease processes. These meta-analysis data are limited by a paucity of published data regarding attributable risk factors for NTM-PD and a high degree of heterogeneity across studies compared. Similarly, some studies are performed in defined patient groups which may not be reflective of data in a more general population. Understanding risk factors, as explored in this meta-analysis, may identify patients for NTM testing and further treatment if appropriate.

Please refer to page A213 for declarations of interest related to this abstract.

P9 OUTCOMES OF NON-TUBERCULOUS PULMONARY DISEASE IN AN EAST LONDON REFERRAL CENTRE

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Introduction Non-tuberculous mycobacterial pulmonary disease (NTM-PD) is increasingly prevalent and presents significant disability burden and cost. The diagnosis and treatment of NTM-PD is challenging as clinical and radiological presentation is diverse. Prolonged treatment with multiple agents frequently induces intolerable side effects in the older and frailer populations more often affected by NTM-PD. We present clinical and radiological features and outcome data on 60 individuals with NTM-PD at a tertiary referral centre over six years.

Methods This retrospective observational study was endorsed by the trust local authority. We included individuals aged 18 or over with NTM-PD defined according to the ATS definition. This comprises clinically or radiologically suggestive features, plus two or more positive and consistent sputum isolates, a bronchoalveolar lavage sample or biopsy. Individuals with Cystic Fibrosis were excluded. Outcomes are defined according to the 2018 NTM-NET consensus statement.

Results The cohort was 53% female with a median age of 67 and median BMI of 21.9. COPD was an underlying diagnosis in 32% and 58% were current or ex-smokers. The commonest symptoms were cough, weight loss and haemoptysis, recorded in 87%, 36% and 33% respectively. Mycobacterium avium was the predominant species occurring in 43% followed by M. chimerae in 23% and M. abscessus and M. Kansasii in 15% each. The commonest CT finding was nodularity occurring in 72%, with bronchiectasis, tree-in-bud opacity and cavitation occurring in 58%, 35% and 28% respectively. Treatment was attempted in 82% of cases overall, with culture conversion or cure having occurred in 41% of these to date (treatment continues in 35% of patients commenced). Treatment was halted in 18%, with nausea and vomiting being the commonest reasons. Two previously cured individuals experienced relapse and six of the cohort died, with NTM-PD being the cause in four of these. The rate of cure or culture conversion among those treated was similar in individuals with M. avium (42%) compared to other species (37%).

Conclusions Our outcomes are comparable to those reported in an Italian cohort and reflect the challenges of NTM-PD treatment. The standardisation of outcome terminology is essential for clinical trials and observational studies into NTM-PD.

P10 MILIARY TUBERCULOSIS: A RETROSPECTIVE REVIEW OF CASES PRESENTING TO A UK TEACHING HOSPITAL

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Background Miliary tuberculosis (TB) is one of the severest forms of TB and accounts for only 4% of all cases of TB in the UK. Despite effective treatment it continues to have a high mortality rate which is likely to be a consequence of the dissemination of Mycobacterium tuberculosis bacilli via the lymph and blood to the tissues.

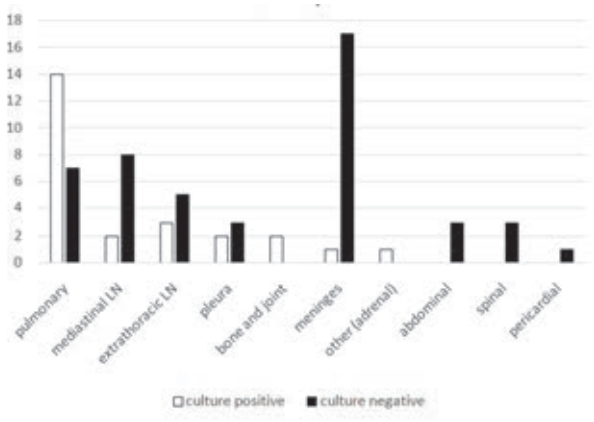
Aim To review the epidemiology, management and outcome of all cases of miliary TB diagnosed in our population since 2005.

Methods A retrospective review of all of the cases of miliary TB diagnosed and treated locally between 2005 and 2021 was undertaken.

Results 38 cases miliary TB were identified: (male gender 71%; median age 36 years (IQR 28–53); non-UK born 95% and 75% diagnosed within 10 years of arrival in the UK). One patient was co-infected with HIV.

The most common symptoms at presentation were cough (50%), weight loss (39%) and sweats (52%). Miliary shadowing on chest x-ray and/or CT scan present 78%.

Multiple sites (mean 1.7; mode 2; range 0–4) were sampled in order to obtain microbiological confirmation (figure 1). Majority (36; 95%) had sputum or lavage samples of which 15 (42%) culture positive. Overall, culture positivity was 66%. Cerebrospinal fluid sampling was undertaken in 18/38 (47%) to assess CNS involvement (lymphocytosis) although only 1 case cultured TB. Likewise, there was no culture positivity identified in early morning urine samples. 2 cases each of Isoniazid and Pyrazinamde resistance and 1 case MDR-TB were identified.



Abstract P10 Figure 1 Site of sampling for TB culture and sensitivity

36 patients were treated successfully for the intended duration of therapy. Extended therapy (>6 months) in 20, the commonest reasons being CNS involvement (7), drug resistance (5) and disease severity (3).

Conclusion Miliary TB continues to be a rare condition and is associated with significant mortality. If persons do not have pulmonary involvement it may be difficult to obtain microbiological confirmation of infection. CSF sampling is good for exclusion of CNS TB but poor for obtaining culture and sensitivity to guide treatment.

Deciphering 'The Da Vinci Code' – Biomarkers in airways disease

P11 CHARACTERISTICS AND LONG-TERM REAL-WORLD OUTCOMES OF SEVERE ASTHMA PATIENTS TREATED WITH BENRALIZUMAB IN THE UNITED KINGDOM; THE BPAP STUDY

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Introduction and Objectives Benralizumab is indicated as an add-on maintenance treatment in adult patients with severe eosinophilic asthma (SEA) that is inadequately controlled despite high-dose inhaled corticosteroids plus long-acting β-agonists. Real-world clinical outcomes following 1-year of treatment with benralizumab in the United Kingdom (UK) have been previously described in the Benralizumab Patient Access Programme (BPAP) study; however, longer-term outcomes are unknown. Herein we report results from an extended follow-up period of two years for the BPAP study cohort.

Methods The BPAP study is a multi-centre, retrospective, observational study of patients with SEA from eight UK centres. Data were collected between May 2019 and October 2021 from the medical records of patients receiving their first benralizumab dose between April 2018 and November 2019. Outcomes were assessed using descriptive statistics at baseline, 1 year and 2 years post-benralizumab initiation.

Results A total of 276 patients were included: 62% (171/276) were female and mean (SD) age at asthma onset was 31.4 (18.5) years. In total, 49% (134/276) of patients had atopic asthma, 75% (104/138) had adult-onset asthma, and 21% (57/276) had nasal polyposis. At baseline, the median (IQR) FeNO count was 65.0 (36.0–99.0) ppb and the median (IQR) peak EOS count was 500.0 (300.0–800.0) cells/mcL. The mean (95%CI) annualised exacerbation rate (AER) reduced from baseline by 79% from 5.3 (4.8–5.7) to 1.1 (0.9–1.2) exacerbations/patient/year, with 34% (72/209) of patients totally exacerbation-free at 2 years. At baseline, 63% (174/276) of patients were on maintenance oral corticosteroids (mOCS) for asthma. Of these, 55% (70/127) were mOCS-free at 2 years. Mean (SD) asthma control (ACQ-6) improved from 3.0 (1.5) to 1.6 (1.5) at 2 years with 70% (89/128) achieving the MCID of 0.5. Quality of life [AQLQ] improved from a mean (SD) of 3.4 (1.4) to 4.8 (1.5) at 2 years with 72% of patients achieving the MCID of 0.5 or more. 76% of patients remained on benralizumab at 2 years. Key results are summarised in table 1.

Abstract P11 Table 1 Key results: Annualised exacerbation rate (AER), maintenance oral corticosteroid (mOCS) use and patient-reported outcome data (asthma control [ACQ-6] and asthma-related quality of life [AQLQ])

AER	***Baseline***	***1 year***	***2 years***
Mean (95%CI) AER [a]	5.3 (4.8–5.7), N=273	1.1 (0.9–1.3), N=245	1.1 (0.9–1.2), N=209
mOCS use	***Baseline***	***1 year***	***2 years***
mOCS use in overall cohort, n (%) [a]	174/276 (63)	88/244 (36)	63/208 (30)
mOCS use in patients on mOCS at baseline, n (%)[b]	-	78/156 (50)	57/127 (45)
mOCS dose (mg/day) in patients on mOCS at baseline, median (IQR)[b]	10.0 (5.0–20.0), N=174	2.5 (0.0–7.5), N=156	0.0 (0.0–5.0), N=127
ACQ-6	***Baseline***	***1 year***	***2 years***
Mean (SD) ACQ-6 score [a]	3.0 (1.5), N=257	2.1 (1.5), N=186	1.6 (1.5), N=134
Total patients with an improvement of at least 0.5 units for AQC-6 from baseline (minimal clinically important difference [MCID]), n (%)[a]	-	109/182 (60)	89/128 (70)
AQLQ	***Baseline***	***1 year***	***2 years***
Mean (SD) AQLQ score[a]	3.4 (1.4), N=219	4.4 (1.6), N=154	4.8 (1.5), N=20
Total patients with an improvement from baseline of at least 0.5 units for AQLQ(s)+12 (MCID), n (%)[a]	-	81/147 (55)	13/18 (72)

[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

Conclusions Clinical outcomes up to 2 years post-benralizumab treatment suggest a sustained improvement in all clinical measures including exacerbations, mOCS use, asthma control and health-related quality of life.

Please refer to page A213 for declarations of interest related to this abstract.

P12 A FENO-BASED STRATEGY TO GUIDE ORAL CORTICOSTEROID INITIATION IN PATIENTS WITH SEVERE ASTHMA EXPERIENCING AN EXACERBATION WHILST ON TREATMENT WITH ANTI-IL5/5R THERAPY

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Background Oral corticosteroids (OCS) have a poor adverse effect profile and their effectiveness relates to the presence of T2 inflammation in asthma. In patients treated with an anti-IL5/5R biologic, FeNO remains a useful biomarker of T2 inflammation and has the potential to guide OCS use. Results of the MEX study[1] support this, highlighting that in patients on Mepolizumab, a low FeNO identifies a non-eosinophilic exacerbation.

The Nurse-led Rapid Access Review (RAR) service at our tertiary asthma centre routinely uses FeNO to guide OCS use in anti-IL5/5R treated patients. Specifically, OCS is largely withheld in the absence of a rise in FeNO above the patient's baseline level. Here we report on the outcome and safety of this approach.

Methods A retrospective analysis of all anti-IL5/5R treated patients presenting to the RAR clinic with an exacerbation of respiratory symptoms between June 2021 and June 2022 was performed.

Clinical data including FeNO, blood eosinophil count, FEV1, ACQ-6, CRP and microbiological results was analysed. Any OCS use in the 7 days following the RAR visit was also documented.

Results Over the 1-year period, 49 patients (Benralizumab n= 37 Mepolizumab n= 12) established on anti-IL5/5R therapy attended our RAR service with symptoms consistent with an asthma exacerbation. At review, the mean (SD) ACQ6 was 3.5 (1.0), the median (IQR) blood eosinophil count was $0x10^9$(0–0.04) and median FeNO was 58ppb (37–114). 25/49 (51%) patients were treated with an acute course of OCS following assessment. The median FeNO of those treated was 102ppb (38–135) compared to 48ppb (37–64) in those not advised to commence OCS. Mean CRP was 16.2 mg/L (48.7) in the OCS treated patients, and 16.0 mg/L (34.6) in the non-OCS treated patients. 6/25 were prescribed antibiotics instead of OCS. None of the 25 patients in whom OCS was withheld went on to require OCS in the 7 days post follow-up.

Conclusion A FeNO-based strategy to guide acute OCS prescription in patients on anti-IL/5R therapies is a safe and effective means of minimising unnecessary systemic steroid exposure in patients experiencing exacerbations of airway symptoms. A randomised prospective study is now warranted to further evaluate this approach.

REFERENCES

1. McDowell PJ, Diver S, Yang F, Borg C, Busby J, Brown V, *et al. Lancet Respir Med*. 2021 Oct;**9**(10):1174–1184.

P13 T2 BIOMARKER-GUIDED ORAL CORTICOSTEROID WEANING IN ASTHMA

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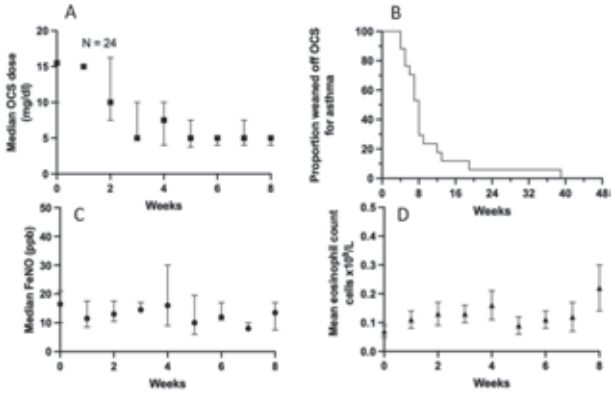
Introduction It has been recognised for several decades that oral corticosteroids (OCS) offer little benefit in the absence of eosinophilic/T2 airways inflammation, yet guidelines continue to suggest a symptom-based rather than biomarker-based approach to asthma treatment leading to many patients inappropriately escalated to maintenance (m)OCS for symptoms that relate to co-morbid pulmonary and/or extrapulmonary conditions. Our tertiary asthma unit runs a nurse-led clinic specifically for patients referred on mOCS lacking any objective evidence of T2 inflammation to guide OCS-weaning according to T2 biomarkers and prevent ongoing avoidable harm due to the adverse effects of systemic steroids.

Methods We conducted a retrospective review of patients referred on mOCS without evidence of T2 airways inflammation (FeNO<25ppb AND blood eosinophils<0.3) to report the outcome of a biomarker-led rather than symptom-led OCS weaning approach. Patients were seen every 1–4 weeks with FeNO, blood eosinophil count, spirometry, and ACQ6 recorded at each visit. OCS dose was progressively weaned if the biomarkers remained in the normal range.

Results Twenty-four patients (mean age 45, 83% female) were identified who had been referred on long-standing mOCS (median duration 54 months [IQR 24–150]) despite an absence of objective T2 inflammation. The median OCS dose was 15.5 mg (IQR 10–25 mg) prednisolone. 13/24 (54%) were obese with a mean BMI of 38. 11/24 (45.8%) had a dysfunctional breathing pattern, 9/24 (37.5%) had severe GORD and 9/25 (37.5%) had laryngeal dysfunction (37.5%). 70% of patients were able to wean off mOCS for their asthma by 8 weeks, and 90% by 12 weeks. ACQ-6 did not differ significantly from baseline (3.16 ± 1.09) to week 8 (mean 3.36 ± 1.08). 17/24 (71%) did not have any evidence of T2 inflammation once off mOCS for their asthma. The remaining 7/24 patients did subsequently develop evidence of T2 airways inflammation despite high dose ICS. There were no adverse outcomes related to the OCS wean.



Abstract P13 Figure 1

Conclusion Many patients are inappropriately treated with mOCS for symptoms driven by extrapulmonary co-morbidities. Our results demonstrate that such patients can be safely weaned off mOCS using a T2 biomarker-based rather than symptom-based approach reducing avoidable steroid-related harm to patients.

P14 EARLY PREDICTIVE MARKERS OF CLINICAL RESPONSE TO MEPOLIZUMAB- A CLINICAL, BIOCHEMICAL AND IMMUNOGENIC PERSPECTIVE

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Introduction Severe asthma is a debilitating condition affecting 4–10%[1] of all patients with asthma in the UK. Over the last few years monoclonal antibodies targeting interleukin 5 (IL-5) and eosinophilic inflammation have been more widely used, however the response to drugs such as Mepolizumab is heterogeneous and approximately 30% of patients do not respond to treatment after 12 months[2]. The delivery of anti-IL5 therapies is costly, and requires subcutaneous injection. A robust early predictor of response is needed.

We describe the clinical, biochemical and immunological markers of treatment response to Mepolizumab from a single centre prospective study.

Methods This was a prospective observational cohort study at a single tertiary asthma centre in the UK. Patients meeting NICE endorsement criteria for Mepolizumab were invited to participate. 42 patients were recruited with 37 patients completing the study. Clinical demographics, serum samples and patient-reported outcome measures were obtained at baseline (pre-initiation) and 12 weeks after commencing Mepolizumab. Responder status at 12 months was determined by NICE guidelines and validated by blinded physicians.

Serum cytokine levels representing Type 1, 2, and 17 inflammation were measured using Luminex. Immunogenicity testing to Mepolizumab was outsourced.

Results 24 patients were classified as responder and 13 as non-responders. Improvement in the Severe Asthma Questionnaire (SAQ) score by the minimally clinically important difference (0.50) in the first 12 weeks of treatment led to a 6-fold increase in odds of responding to Mepolizumab (OR 6.75, CI: 1.51–30.16, p=0.012).

Serum cytokine levels at baseline or 12 weeks did not predict treatment response to Mepolizumab.

Prognostic modelling from anti-Mepolizumab antibody levels was not feasible as only one patient had antibodies identified by the assay.

Conclusion SAQ was identified as a potential tool to guide treatment decisions. Further validation to establish its sensitivity and specificity in the UK severe asthma cohort initiating Mepolizumab is needed.

REFERENCES

1. Holgate ST, Polosa R. The mechanisms, diagnosis, and management of severe asthma in adults. *Lancet*. 2006;**368**(9537):780–93
2. Harrison T, Canonica GW, Chupp G, Lee J, Schleich F, Welte T, *et al*. Real-world Mepolizumab in the prospective severe asthma REALITI-A study: initial analysis. *Eur Respir J*. 2020;**56**(4).

P15 CLINICAL CHARACTERISTICS OF RESPONDERS AND NON-RESPONDERS: EXPERIENCE OF FIVE YEARS OF MEPOLIZUMAB THERAPY IN THE LIVERPOOL SEVERE ASTHMA SERVICE

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Introduction and Objectives Mepolizumab, a monoclonal antibody (mAb) targeting IL-5, was approved for severe eosinophilic asthma (SEA) in the UK in 2016. Data on its long-term outcomes is emerging, focussing on differentiating responders from non-responders. We describe characteristics and outcomes of patients started on Mepolizumab in 2017 at our centre.

Methods We identified patients who started Mepolizumab January-December 2017. Responder/non-responder grouping was based on decisions regarding continuation of therapy, with responders on Mepoluzimab at time of evaluation (June 2022). Data was collected on baseline characteristics, physiological parameters, and results of Asthma Control Questionnaires (ACQ) and Asthma Quality of Life Questionnaire (AQLQ).

Results Of 28 patients started on Mepolizumab in 2017: 17 were deemed to have ongoing response to treatmentand continued administration to June 2022 (Responders); 11 had treatment discontinued due to poor efficacy (Non-Responders). Baseline demographics and starting measurements (EC, FeNO, FEV1, Quality of Life [QoL] questionnaires) were not statistically different between groups. However, non-responders were more likely to have Breathing Pattern Disorder (BPD) or Inducible Laryngeal Obstruction (ILO) (table 1).

Time on treatment for non-responders varied: four completed <12 months, three 1–2 years, two 2–3 years, and two 4–5 years. Changes in variables from baseline to present (for responders) or to treatment cessation (for non-responders)

Abstract P15 Table 1 Baseline demographics, comorbidities, and changes from baseline to present/treatment cessation for responders vs non-responders

	Responders (n=17)	Non-Responders (n=11)	p-Value
Baseline Demographics			
Age (SD)	54.0 (12.5)	47.1 (14.3)	0.251
Sex (F/M)	13/4	7/4	0.180
BMI (SD)	32.9 (6.9)	31.4 (5.7)	0.485
Pack Years (SD)	2.9 (8.4)	2.7 (9.4)	0.980
Comorbidities (%)			
Rhinitis	9 (53%)	4 (36%)	0.158
Nasal Polyps	3 (18%)	1 (9%)	0.197
ILO	1 (6%)	4 (36%)	0.021 *
BPD	1 (6%)	2 (18%)	0.021 *
Change from baseline to present/treatment cessation			
FeNO (SD)	+13.0 (64.3)	+5.4 (12.0)	0.978
EC (SD)	-0.68 (0.41)	-0.66 (0.41)	0.910
FEV1 % Pred. (SD)	-1.4 (12.9)	-0.2 (8.4)	0.800
AQLQ (SD)	+1.43 (1.61)	-0.16 (1.12)	0.010 *
ACQ (SD)	-0.99 (1.45)	+0.32 (1.42)	0.032 *
Exacerbations/year (SD)	-4.35 (3.9)	+0.73 (3.79)	0.003 *
Reduction in daily OCS (SD)	-70.5% (45.5)	-15.2% (71.6)	0.023 *

were measured. While there were no significant changes in physiological parameters, responders reported significant improvement in QoL questionnaires, reduced exacerbation rate, and lower maintenance oral corticosteroid (OCS) dose. 9 non-responders were trialled on a second mAb; the majority did not respond to second-line treatment. There were no safety concerns for responders at 5 years.

Conclusion Our data confirms responders to Mepoluzimab have reduced exacerbation rate and improved QOL, indicated by ACQ and AQLQ. This is in line with NICE recommendations on continuation of Mepolizumab, requiring reduction in steroid use whilst maintaining asthma control. While there were no significant differences in demographic or baseline characteristics between the groups, non-responders were more likely to have co-existing diagnoses of BPD and ILO. This should prompt multidisciplinary team review of non-response to mAbs to allow for re-assessment of these conditions.

P16 PAST SMOKING DOES NOT INFLUENCE RESPONSE TO BIOLOGIC THERAPY IN PATIENTS WITH SEVERE ASTHMA

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Background Many patients with severe asthma (SA) have a smoking history. Clinical trials for asthma biologics/monoclonal antibodies excluded current smokers (CS) and ex-smokers (ES) with a significant smoking history. The effect of past smoking on biologic outcome in asthma is unclear.

Aims To determine whether smoking history impacts biologic therapy response in SA.

Methods SA patients started on omalizumab (n=101), mepolizumab (n=93) and benralizumab (n=50) before 2021 were retrospectively reviewed. ES were split into <20 pack years (PY) and ≥20PY. A positive response to biologic was defined as >50% reduction in exacerbations needing oral steroids or maintenance steroid dose at 12 months, or, for omalizumab clinical improvement at 4 months. All patients were from a single centre.

Results Of 252 patients, 134 were NS (53%), 72 ES with <20PY (29%), 38 ES with ≥20PY (15%) and 8 CS (3%). 96/110 (87%) had stopped smoking >5 years ago. Past smoking did not affect response to biologic: positive response in 113/134 (84%) NS, 62/72 (86%) ES <20PY and 28/38 (74%) ES ≥20PY. Asthma Control Questionnaire (ACQ) score improved significantly with biologic therapy in NS (2.5 to 1.6, p<0.0001), ES <20PY (2.8 to 2.0, p=0.0008) and ES ≥20PY (2.8 to 2.0, p=0.02) and there was no clinical or statistical difference in 12-month ACQ between the 3 groups. ES with ≥20PY (but not ES with <20PY) had worse lung function compared to NS (post-bronchodilator FEV1/FVC 68% NS, 66% ES <20PY, 56% ES ≥20PY, p=0.0017). Numbers of CS were low but significantly fewer had a positive response to biologic: 2/8 (25%, p=0.002).

Conclusion Almost 50% of SA patients on biologics in our centre had a smoking history. Past smoking history did not impact clinical response to biologics in patients with SA.

P17 ASSOCIATION BETWEEN AZITHROMYCIN USE AND STABLE STATE BLOOD EOSINOPHILS IN COPD PATIENTS

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10.1136/thorax-2022-BTSabstracts.153

Introduction Stable-state blood eosinophil counts (BEC) are important in guiding inhaled corticosteroid (ICS) treatment in COPD. The Blood eosinophils in COPD (BECCOPD IRAS: 285200) study is an observational, cohort study assessing whether the highest of at least three BEC within the previous 24 months is a suitable surrogate for stable-state BEC.

Stable state blood eosinophil counts show variability over time and multiple factors may influence BEC including bacterial load. In this sub-group analysis of the BECCOPD study participants, we investigated the association between azithromycin therapy and stable state blood eosinophils.

Methods Patients, recruited into BECCOPD, who had received azithromycin therapy for at least six months, were identified. BEC over 10 years prior to, and 1 year after enrolment were reviewed. BEC during moderate or severe exacerbations, ascertained from hospital and GP records, were excluded. Mean BEC for each patient was calculated for up to two consecutive years before and after treatment initiation and for the total study period. Paired t tests were used to compare the mean BEC.

Results 37/158 patients (23.4%) received azithromycin therapy for a minimum of nine months. Mean (SD) age 71 (6) years; mean FEV1 (SD) 48.9% (19.3); 54% male. 35 patients had BEC both before and after starting azithromycin therapy. 33/208 (15.9%) stable state BEC were <0.1 on azithromycin treatment, 35/237 (14.8%) off treatment.

Abstract P17 Table 1 Mean BEC for patients on and off azithromycin therapy during total study period and 2 years on and off treatment

	Mean BEC on azithromycin therapy	Mean BEC off azithromycin therapy	Difference in mean	p-value
Total study period (n=37)	0.199	0.169	0.03	0.005
2 years on and off treatment (n=35)	0.205	0.174	0.03	0.044

Discussion Patients who were on azithromycin therapy had a higher mean stable state blood counts compared to those who were not on therapy. However, in most cases this was unlikely to influence ICS treatment decisions. Further work on a larger sample size and modelling other factors influencing BEC would be of interest.

P18 RESPIRATORY VIRUSES LEAD TO AIRWAY DYSBIOSIS IN EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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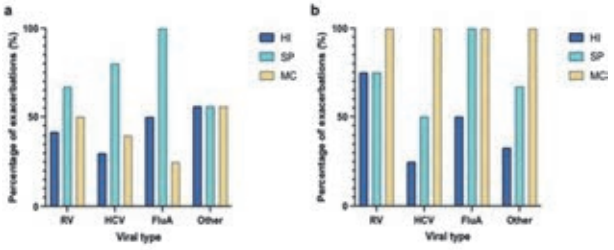
Background Respiratory viruses are important triggers of chronic obstructive pulmonary disease (COPD) exacerbations. Secondary bacterial outgrowth commonly occurs in exacerbations triggered by rhinovirus infection. However, few studies have investigated whether secondary bacterial infection occurs in exacerbations with other respiratory viruses.
Hypothesis We hypothesised that secondary bacterial infection occurs in several common respiratory viruses and associated with worse symptoms, decreased lung function and increased airway inflammation.
Methods Sputum was obtained from participants of the London COPD cohort between 01/01/2017 and 31/12/2020 REC 09/H0720/8. Respiratory viruses respiratory syncytial virus, rhinovirus, influenza A, influenza B, parainfluenza, human metapneumovirus and community coronaviruses were detected by multiplex PCR. Quantitative PCR analysis was performed for detection of *Haemophilus influenzae, Streptococcus pneumoniae* and *Moraxella catarrhalis*. Bacterial load was correlated with symptom data and lung function changes.
Results There were 30 exacerbations with a respiratory virus detected at exacerbation onset. Of these 73% were treated with antibiotics and 63% treated with oral corticosteroids. Bacteria were identified by qPCR in 83% of samples at exacerbation onset The most frequently detected bacterium at exacerbation onset was *S. pneumoniae* (70%), with *H. influenzae* and *M. catarrhalis* both being identified in 43% of sputum samples. At two weeks bacteria were detected by qPCR in 100% of sputum samples. *M. catarrhalis* was the most prevalent bacterium (100%). *S. pneumoniae* and *H. influenzae* were detected in seven (64%) and five (45%) of the two-week samples respectively. There was a significant increase in median bacterial load at two weeks compared to exacerbation onset (p=0.049) There was no relationship between exacerbation severity defined by change in lung function and bacterial load. There was no significant difference in bacterial load at two weeks between patients who received antibiotics or steroids.
Conclusions Secondary bacterial outgrowth occurs in COPD exacerbations caused by a range of respiratory viruses suggesting that viral infection results in microbiome dysbiosis. Bacterial qPCR detected several bacteria that were not identified using standard microbiological culture with a high bacterial load and Moraxella detection at two weeks Bacterial overgrowth may explain why some exacerbations show prolonged recovery.



Abstract P18 Figure 1 The percentage of exacerbations with bacteria detected in sputum by qPCR, according to respiratory virus identified at exacerbation, at a) exacerbation onset (n=30) and at b) two weeks (n=11). HI = H. influenzae, SP = S. pneumoniae, MC = M. catarrhalis. RV = rhinovirus, HCV = human coronaviruses, FluA = influenza A, Other = a combination of the other viral exacerbations

P19 **SYSTEMIC CHANGES IN MONOACYLGLYCEROLS COULD BE AN INDICATOR OF INFLAMMATION IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) PATIENTS**

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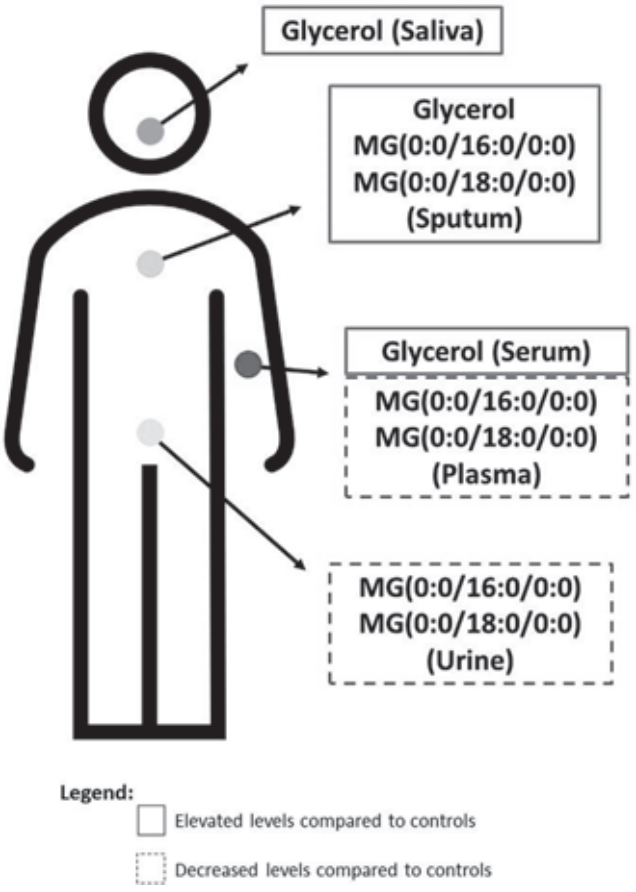
Introduction and Objectives Chronic obstructive pulmonary disease (COPD) is third most common cause of death worldwide with 3.2 million deaths in 2019. Metabolomics can reveal 1000s of biochemical changes and could help understand the inflammation and remodelling seen in the airways in COPD. We conducted a metabolomic assessment of different liquid biopsies from COPD patients to determine systemic body-wide biochemical changes.
Methods We report metabolomic signatures in sputum (n=27), saliva (n=39), urine (n=32), plasma (n=41), and serum (n=39) from 69 people (44 males, age 45–89 y, $FEV_1$30–112; 25 females, age 47–85 y; $FEV_1$25–118) with COPD (GOLD 2022 criteria), attending hospital respiratory clinics, compared to heterogenous non-COPD patient comparators (CON, n=40). Flow Infusion Electrospray mass spectroscopy (FIE-MS) with a QExactive hybrid quadrupole-Orbitrap was used to detect metabolomic signatures in the various patient biofluids (see figure 1). The metabolomes were assessed by multivariate statistics and the major sources of variation assessed



Abstract P19 Figure 1 Metabolites differeing significantly in COPD

using receiver operating characteristic curve – area under the curve (AUC).
Results Metabolites linked to glycerolipid metabolism were consistently found to be a major source of variation in each biofluid (negative ionisation); namely glycerol and types of monoacylglycerols (figure 1). Monoacylglycerols levels were significantly different in COPD and CON patient groups in sputum, plasma, and urine while glycerol was a major source of variation in sputum, saliva, and serum.
Conclusions Monoacylglycerol accumulation have also been shown as important signalling molecules in inflammatory processes. Their different levels in COPD patient biofluids is likely to reflect chronic systemic pro-inflammatory events. Further metabolomic assessment could show that variable levels of specific monoacylglycerols in biofluids are indicators of COPD progression or exacerbation and could help our understanding of the inflammatory processes.

P20 MUCOLYTICS FOR ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Background Hypersecretion of mucous with increased viscosity represents a prevalent, burdensome treatable trait in acute exacerbations of chronic obstructive pulmonary disease (COPD) and has been associated with unfavourable outcomes and disease progression. Mucolytics could facilitate sputum clearance by regulating mucous viscoelastic properties. Therefore, they could potentially improve both the symptoms and outcomes of COPD exacerbations. We conducted a meta-analysis of randomised controlled trials (RCTs) to assess the safety and clinical efficacy of mucolytics for COPD exacerbations.
Methods Based on a preregistered protocol and following standard methods recommended by Cochrane and GRADE, we conducted a systematic review and meta-analysis of RCTs evaluating the addition of mucolytics to standard care for patients with moderate or severe COPD exacerbations. Primary outcomes were treatment success and overall symptom scores, while we also assessed cough, ease of expectoration and the outcomes prioritised in the European Respiratory Society (ERS) COPD Exacerbations Core Outcome Set.
Results We identified 21 eligible RCTs involving 1,411 patients with a moderate or severe COPD exacerbation. All RCTs were at high risk of methodological bias. The most commonly administered mucolytic was N-acetylcysteine (9 RCTs), followed by ambroxol (n=5) and erdosteine (n=4), bromhexine (n=2) and hypertonic saline (n=1). Moderate-certainty evidence suggests mucolytics improve the treatment success rate (RR 1.37, 95% confidence intervals [1.08, 1.73], I^2= 63%) and overall symptom scores post-intervention (SMD 0.91 [1.11, 0.70], I^2= 0%) compared to control. Respondents' analysis suggests with low certainty that mucolytics improve cough (RR 1.93 [1.15, 3.23], I^2= 29%), and ease of expectoration (RR 2.94 [1.68, 5.12], I^2= 0%), but not breathlessness. Mucolytics were also associated with a modest beneficial impact on the partial pressure of oxygen in arterial blood (MD 3.21 [1.51, 4.92], I^2= 38%) and oxygen saturation (MD 0.96 [0.27, 1.66], I^2= 0%).
Conclusions Overall, we found moderate-certainty evidence that mucolytics improve symptoms and treatment success rate in COPD exacerbations. These benefits may be potentiated in patients exerting sputum hypersecretion with increased viscosity; however, we were not able to assess this subgroup in the absence of adequate data.

P21 PREDICTING EXACERBATION FREQUENCY IN PATIENTS WITH COPD USING ESTABLISHED RISK FACTORS

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Introduction and Objectives Exacerbations in COPD significantly affect quality of life and mortality. Predicting which patients are likely to exacerbate most frequently could provide opportunities to introduce treatment strategies to reduce future exacerbations. To determine whether established exacerbation risk factors can predict future exacerbation frequency and to assess the severity of an exacerbation risk factor on exacerbation outcomes.
Methods From the literature we identified risk factors associated with COPD exacerbations and categorised these into 'moderate' and 'severe'. We identified all patients who presented with a severe exacerbation of COPD to our unit from 01 January 2018 to 31 December 2018 and recorded their number of exacerbations over 18 months. Patients were divided into 8 groups based on exacerbation frequency. Standard statistical methods were applied.
Results A total of 213 patients were studied. Across all 8 patient groups there is a positive association between number of exacerbation risk factors and exacerbation frequency. The highest exacerbation frequency group has on average 5.0 severe risk factors compared to 2.3 severe risk factors for the lowest frequency group ($p<0.001$), and 2.7 moderate risk factors compared to 1.8 moderate risk factors for the lowest frequency group ($p<0.05$).
Conclusions The study demonstrates that it is possible to predict future exacerbation frequency amongst patients with COPD. Identifying which patients are at most risk of exacerbations may help clinicians to introduce pre-emptive individualised treatment strategies to reduce future exacerbation frequency.

P22 AIRWAYS OSCILLOMETRY IN ASTHMA DIAGNOSIS IN TREATMENT NAIVE BUT SYMPTOMATIC ADULTS

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There is no single gold standard test to diagnose asthma. Many patients struggle to perform forced expiratory manoeuvres such as spirometry. Airways Oscillometry (AO) is a test of small airway function which can be measured during normal tidal breathing. Although AO has been shown to differentiate between asthma and healthy controls, and between severe

Abstract P22 Table 1 Table of results 110 adults from RADicA study diagnosed with 'asthma' or 'not asthma' with Airways Oscillometry% predicted values for R_5, R_{20} and fres, (geometric mean and 95% CI)

	Not Asthma N = 42	Asthma N = 68	P Value
R_5	114.07 (105.55 – 123.27)	131.79 (123.63 – 140.50)	**0.005**
R_{20}	96.29 (90.31 – 102.67)	109.11 (103.70 – 114.81)	**0.003**
Fres	144.48 (131.96 – 157.00)	158.55 (147.12 – 169.98)	0.11

and mild disease, there is little information whether AO has a role in asthma diagnosis in symptomatic but treatment naïve adults.

Methods Between May 2019 and April 2022, adults with possible asthma (cough, wheeze, breathlessness, and/or chest tightness) were referred to the Rapid Access Diagnostics for Asthma (RADicA) study by GPs across Manchester. Assessment included clinical history, examination, lung physiology (spirometry, reversibility, FeNO, PEFv and bronchial challenge), skin prick testing, serum eosinophils before and after 6–8 weeks of inhaled fluticasone (250µg BD). An expert panel of respiratory clinicians who assigned a diagnosis of 'asthma 'or 'not asthma'. Pre-ICS treatment measurements of AO (R_5, R_{20}, R_5-R_{20}, AX, Fres X_5, X_5in, and X_5ex; THORASYS TremoFlo®), as absolute values and% predicted, were compared between asthma and not asthma.

Results 110 adults completed the study (mean age 36 years; 63.6% female), 68 (62%) asthma and 42 (38%) not asthma. Absolute values of all AO measurements were not different between asthma and not asthma ($p>0.15$). However,% predicted values R_5 and R_{20} were both significantly higher in asthma compared to not asthma.

Conclusion Our findings suggest that R_5 and R_{20} AO results (as% predicted) were higher amongst symptomatic adults who were subsequently diagnosed with asthma, compared to those with symptoms that were not asthma. Further research is needed to evaluate the role of AO in asthma diagnosis, in particular, thresholds.

'Scar Wars' – The pot pourri of ILD

P23 PREDICTORS OF MORTALITY IN PROGRESSIVE FIBROSING INTERSTITIAL LUNG DISEASE PATIENTS TREATED WITH NINTEDANIB: REAL-WORLD DATA FROM A SINGLE ILD SPECIALIST CENTRE

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10.1136/thorax-2022-BTSabstracts.159

Introduction/Objectives Nintedanib is a tyrosine kinase inhibitor demonstrated to slow the rate of progression of fibrotic interstitial lung diseases (ILD). Originally available solely for the treatment of idiopathic pulmonary fibrosis (IPF), access to Nintedanib became available in the UK for those with non-IPF progressive fibrosing ILD (PFILD) in October 2019, on a Named Individual Patient Supply (NIPS) from Boehringer UK. Longitudinal data from this cohort has been limited thus far and predictors of mortality remain unclear. This study aims to identify factors influencing mortality in the PFILD cohort treated with Nintedanib.

Methods 47 PFILD patients receiving Nintedanib on a NIPS were identified from our ILD specialist centre database from November 2019 to January 2021 (treatment start date). All patients had been discussed in our ILD multidisciplinary meeting and met criteria for PFILD according to the INBUILD trial (Flaherty KR, et al. Nintedanib in Progressive Fibrosing Interstitial Lung Diseases. N Engl J Med. 2019 Oct 31:381 (18):1718–1727). Demographic, clinical, lung function, and radiological parameters were collected from the hospital's electronic patient record system. The primary outcome was survival.

Results Of the 47 PFILD patients receiving Nintedanib, 22 (47%) were still alive in June 2022 (table 1). Baseline mean forced vital capacity (FVC) and diffusing capacity for carbon monoxide (DLCO) were higher in this cohort (57.6% predicted and 38.9% predicted, respectively), compared to those who were deceased (48.2% predicted and 28.2% predicted, respectively). Those who were deceased had a higher mean dose of oral Prednisolone (15 mg daily), compared to those who were still alive (10.8 mg daily). There was no significant

Abstract P23 Table 1 Demographic, clinical, functional, radiological and survival characteristics of PFILD patients treated with Nintedanib

Characteristics	Alive (n=22)	Deceased (n=25)	P Value
Demographic			
Age years-old, mean (SD)	58.5 (12.6)	63.8 (10.5)	0.20
Male, n (%)	11 (50.0)	10 (40.0)	0.49
Clinical			
Smoking history, n (%)	11 (50.0)	8 (32.0)	0.21
Chronic obstructive pulmonary disease, n (%)	4 (18.2)	2 (8.0)	0.40
Malignancy, n (%)	5 (22.7)	2 (8.0)	0.23
Pulmonary Hypertension, n (%)	3 (13.6)	8 (33.3)	0.17
Cardiovascular disease, n (%)	7 (31.8)	13 (52.0)	0.16
Anticoagulant treatment, n (%)	1 (4.8)	5 (20.0)	0.20
Diabetes mellitus, n (%)	2 (9.1)	5 (20.0)	0.42
Gastro-oesophageal reflux disease, n (%)	6 (27.3)	6 (24.0)	0.80
Type of PFILD:			0.52
Hypersensitivity Pneumonitis, n (%)	5 (22.7)	9 (36.0)	
Idiopathic NSIP, n (%)	8 (36.4)	6 (24.0)	
CTD-ILD, n (%)	3 (13.6)	6 (24.0)	
Others[@], n (%)	6 (27.3)	4 (16.0)	
PFILD criteria:			0.78
FVC decline ≥10%, n (%)	9 (40.9)	10 (40.0)	
>5% FVC decline <10% AND worsening of symptoms, n (%)	5 (22.7)	9 (36.0)	
>5% FVC decline <10% AND increased fibrosis*, n (%)	1 (4.6)	1 (4.0)	
Worsening of symptoms AND increased fibrosis*, n (%)	7 (31.8)	5 (20.0)	
Oral steroids-Prednisolone, n (%)	19 (86.4)	23 (92.0)	0.65
Prednisolone dose (mg), mean (SD)	10.8 (5.2)	15 (4.8)	**<0.01**
Immunosuppressive therapy:			
Mycophenolate, n (%)	10 (45.5)	11 (44.0)	0.92
Methotrexate, n (%)	1 (4.6)	1 (4.0)	1.00
Azathioprine, n (%)	0 (0.0)	1 (4.0)	1.00
Others, n (%)	1 (4.6)	1 (4.0)	1.00
Oxygen therapy, n (%)	16 (72.7)	23 (92.0)	0.12
Duration of treatment^-months, median (IQR)	20 (7.0)	7 (9.5)	**<0.01**
Nintedanib permanently ceased, n (%)	5 (22.7)	8 (32.0)	0.53
Reason for discontinuation: Nintedanib side effects, n (%)	3 (60.0)	6 (75.0)	1.00
ILD acute exacerbation, n (%)	4 (18.2)	7 (28.0)	0.51
Lung Function			
Prior to initiation of Nintedanib:			
FVC-%, mean (SD)	57.6 (18.7)	48.2 (14.4)	**0.03**
DLCO-%, mean (SD)	38.9 (10.0)	28.2 (8.6)	**0.02**
After at least one year on Nintedanib:			
FVC-%^, mean (SD)	58.7 (16.5)	48.2 (8.9)	0.17
DLCO-%^, mean (SD)	46.7 (10.8)	22.7 (3.5)	**0.02**
Radiological			
Radiological pattern:			0.63
Definite UIP, n (%)	2 (9.1)	0 (0.0)	
Probable UIP, n (%)	4 (18.2)	4 (16.0)	
Indeterminate for UIP, n (%)	11 (50.0)	14 (56.0)	
Inconsistent with UIP/IPF, n (%)	5 (22.7)	7 (28.0)	

SD=standard deviation, IQR=interquartile range (25-75 percentile), PFILD=progressive fibrosing interstitial lung disease, NSIP=non-specific interstitial pneumonia, CTD-ILD=connective tissue disease associated with interstitial lung disease, FVC=forced vital capacity, DLCO=diffusing capacity for carbon monoxide, UIP=usual interstitial pneumonia, IPF=idiopathic pulmonary fibrosis, @Others Unclassifiable ILD (5 patients), Pleuroparenchymal fibroelastosis (2 patients), Sarcoidosis (1 patient), Familial ILD (1 patient), Post COVID-19 ILD (1 patient). *Increased extent of fibrosis on HRCT scan. ^Duration of treatment with Nintedanib. ^Data from only 21 patients. ^Data from only 12 patients.

difference associated with Prednisolone use overall. Longer median duration of Nintedanib administration was also associated with a statistically significant difference in mortality (20 months compared to 7 months, $p<0.01$). There was no statistically significant difference when considering age at commencement, sex, PFILD subtype or diagnostic criteria, smoking status, comorbidities, oxygen therapy, use of concomitant immunosuppression, acute ILD exacerbations, or radiological pattern.

Conclusions In this PFILD cohort, lower baseline FVC and DLCO, higher dose of prednisolone, and shorter duration of treatment with Nintedanib were associated with increased mortality.

P24 A RETROSPECTIVE STUDY EXPLORING GAP INDEX AS A PREDICTOR OF MORTALITY IN PATIENTS WITH COMBINED PULMONARY FIBROSIS AND EMPHYSEMA

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Introduction Combined pulmonary fibrosis and emphysema (CPFE) is a distinct clinical condition characterised by coexisting fibrosis and emphysema. The widely used GAP index and staging system in patients with Idiopathic Pulmonary Fibrosis (IPF) has shown prognostic capability. There is a need to identify prognostic tools in CPFE patients.

Aims Explore GAP index as a prognostic tool in CPFE.

Methods Five year retrospective study of regional Interstitial Lung Diseases clinic database with 3063 patients with ILD. GAP stage was calculated with G for Gender, A for Age, and P for lung Physiology; percentage predicted Forced Vital Capacity (FVC%) and percentage predicted Diffusion Capacity of the lungs for Carbon Monoxide (DLCO%). Modified GAP (mGAP) consisted of Gender, Age, and FVC.

Results 149 CPFE patients were included. Ninety-three (62.4%) had IPF subtype of CPFE, 44 (29.6%) non-IPF CPFE, and 12 (8.1%) missing data. Patients with IPF-CPFE had a median survival time of 2.8 yr while Non-IPF CPFE had median survival of 4.6 yr. Kaplan-Meier analysis showed that in the IPF-CPFE both the GAP and the mGAP stage were significant predictors of mortality with p-value of 0.012 and 0.027 respectively (figure 1). In the smaller non-IPF CPFE group, GAP and mGAP did not predict mortality.

Conclusion GAP index and mGAP were significant predictors of mortality in patients with IPF-CPFE and further study of registry data would be useful.

P25 SWALLOWING SAFETY AND PERFORMANCE IN PATIENTS WITH IDIOPATHIC PULMONARY FIBROSIS: EVIDENCE FROM THE WATER SWALLOW TEST

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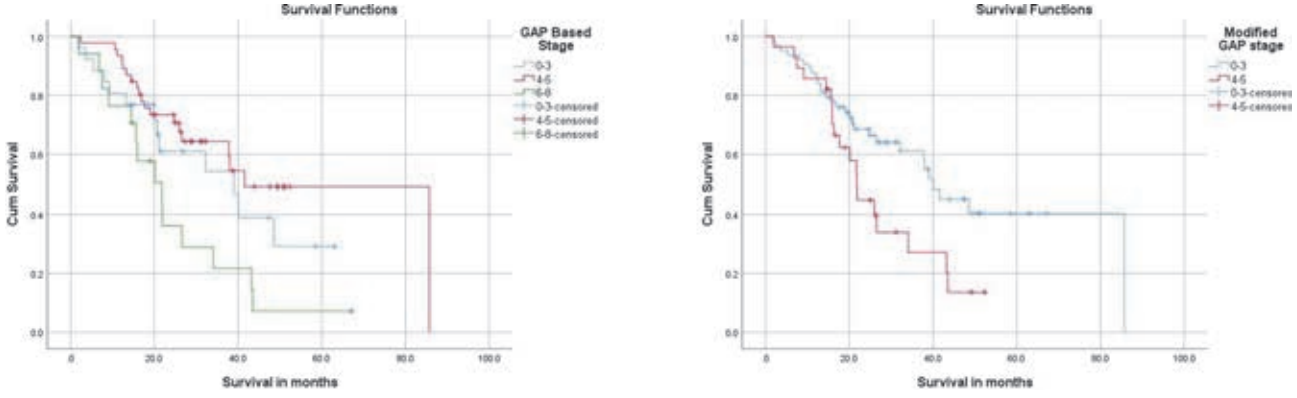
Introduction Awareness of swallowing abnormalities in respiratory conditions such as (COPD) is growing. However, research into swallowing dysfunction in IPF is limited.

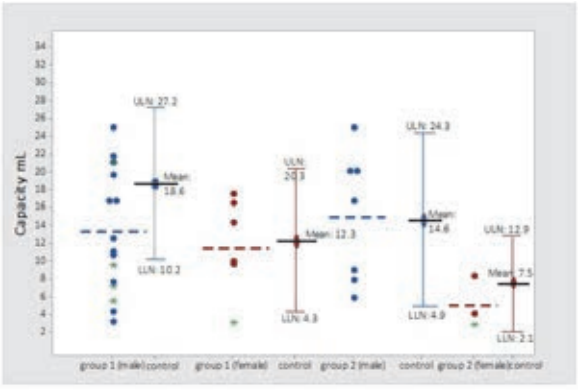
Aim Explore the swallowing safety and performance of the Water Swallow Test (WST) in patients with IPF.

Methods Thirty-four IPF patients were recruited from pulmonary fibrosis support groups around the UK or from the Newcastle Interstitial Lung Disease (ILD) clinic between January and October 2021. The WST was conducted via teleconference call or face-to-face in the ILD clinic. Patients took three volumes of water: 5 mL single-sip, 10 mL single-sip and 100 mL consecutive sips. Signs of penetration or aspiration (airway response and/or wet voice after swallow) indicated a WST fail. Three swallowing performance parameters were calculated: swallow volume (mL per swallow), capacity (mL per second) and speed (time per swallow). Swallowing performance parameters were reported by age, gender and% predicted FVC. The cohort was compared with published healthy controls (Hughes and Wiles, 1996). Patients' HR, RR and SpO2 pre and post WST were obtained.

Results Thirty-three IPF patients (23 M, 10 F) completed the WST, median age 72 (52–92) years. Ten patients (10/33, 30%) were on Long Term Oxygen Therapy (LTOT). IPF patients had poorer swallow performance than the healthy people (figure 1) and six patients (18%, 4 M, 2 F) failed the WST.



Abstract P24 Figure 1



Abstract P25 Figure 1 Performance indicated by swallowing capacity vs. published controls.
IPF patients were divided by gender and age ranges from Hughes and Wiles (1996): 56–74 years (group 1), and 75–92 years (group 2). Six patients failed the WST with signs of penetration or aspiration (green asterisks). In addition, using the lower limit of normal swallow capacity (LLN) in control groups as the cut-off, 7 patients (21%, 6 M, 1 F) had reduced swallow capacity

Post-test SpO2 was higher (p=0.004). Females have lower swallow volume than males (p=0.006, mean rank difference 8.2 mL). However there was no difference for swallow capacity and speed.

Conclusion WST is an effective screening investigation in IPF, including frail patients in remote consultation. IPF patients experienced some signs of swallowing dysfunction during WST. Further work is indicated to fully explore swallowing in this vulnerable group.

REFERENCE

1. Hughes TA, Wiles CM. Clinical measurement of swallowing in health and in neurogenic dysphagia. Qjm 1996;89(2):109–16.

Please refer to page A213 for declarations of interest related to this abstract.

P26 IMPACT OF HIATUS HERNIA IN HYPERSENSITIVITY PNEUMONITIS – EXPERIENCE AT A TERTIARY CENTRE

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10.1136/thorax-2022-BTSabstracts.162

Introduction Hiatus hernias (HH) are present in ~40% of patients with idiopathic pulmonary fibrosis (IPF) and are associated with more rapid lung function decline and increased mortality. The possibility of a similar impact of HH in patients with hypersensitivity pneumonitis (HP) has not been previously investigated. This study explored the prevalence and prognostic impact of HH in HP.

Methods CT scans and clinical data in consecutive patients with HP were retrospectively evaluated. CT studies were evaluated for the presence and size of HH (grades 0/1 [none/smallest] to 4 [largest]) by two consultant observers; a control group of patients without interstitial lung disease (ILD) was also evaluated. The pattern and extent of fibrosis (%), if present, were recorded; CT features suggesting aspiration (consolidation, bronchial wall thickening, tree-in-bud pattern) were noted. The primary outcome measure was the impact of HH on survival. Secondary analyses included impact on lung function trajectory using mixed effects modelling.

Results We studied 141 patients with HP (F=78(55%); mean age=64.2±9.6 yrs) and 175 controls (F=100(57%), mean age=60.7±13.1 yrs). The prevalence of HH was higher in patients with HP than controls (60% *vs* 25%; p<0.001) and there were more HH graded 2–4 than in controls (32% *vs* 3% respectively; p<0.001). There was no association between presence or size of HH and lung function decline, fibrosis extent on CT, body mass index, or mortality. A sub-group with a usual interstitial pneumonia pattern of fibrosis (n=23) had a trend towards worse survival associated with the presence of HH (HR=2.86, 95% CI: 0.91–8.97, p=0.072). CT signs suggesting aspiration were more frequent in patients with larger HH (13% of patients with HH grade 2–4 patients had consolidation vs. 3% of grade 0–1; p=0.021), with an exposure-response relationship.

Conclusions HH is more prevalent in patients with HP than IPF or in a control population without ILD. While HH is not associated with worse outcomes, the high prevalence and linkage between larger HH and CT signs of aspiration may provide insights into disease pathogenesis. Alongside genetic susceptibility and antigen exposure, HH and reflux may play a role in the development and propagation of HP.

P27 BLOOD NEUTROPHIL LEVELS IN IPF PATIENTS ARE SIGNIFICANTLY ASSOCIATED WITH QUANTITATIVE RADIOLOGICAL PROGRESSION OF FIBROSIS

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Background Idiopathic pulmonary fibrosis (IPF) is a progressive fibrotic lung disease with poor prognosis. Large retrospective clinical studies have demonstrated association between blood leukocytes levels and mortality, but correlation with progression of fibrosis has not been fully explored.

Objective Determine if blood leukocyte levels are associated with progression of fibrosis in IPF using automated CT Lung texture analysis.

Methods We performed a retrospective analysis of an IPF cohort (n=164) seen in the Oxford ILD Service between 2016–2021. Non-contrast high resolution computed tomography scans were analysed using the CALIPER (Computer-Aided Lung Informatics for Pathology Evaluation and Rating) CT algorithm. CALIPER total lung fibrosis (TLF) and pulmonary vessel volume (PVV) scores were calculated at baseline and follow-on CT timepoints.

We used Pearson (r) correlation to determine association between blood leukocytes (monocytes, neutrophil and lymphocytes measured <4 months from 1st CT) with baseline CALIPER TLF, CALIPER PVV, and FVC% and TLCO% closest to CT. Leukocyte association with disease progression was explored using a multivariate Cox regression fitting a model around increase in fibrosis >10%/litre of lung.

Abstract P27 Table 1 Multivariate Cox regression analysis in n=71 cases undergoing follow-on HRCT. HR; Hazard ratio, 95%CI; 95% confidence interval, PVV; Pulmonary vessel volume

Model A Outcome: Increase in CALIPER Fibrosis >10%/Litre of lung volume	HR	95%CI	p Value
-Age at CT	0.93	0.84–1.04	0.208
-Male	0.02	0.02–0.46	**0.016**
-% change inLung Volume (measured by CALIPER)	0.82	0.73–0.92	**<0.001**
-Total lung fibrosis (%) on 1st CT	1.13	1.03–1.25	**0.013**
-Total PVV (cm^3)	1.04	1.01–1.07	**0.037**
-Low attenuation areas LAA (%)	1.10	0.97–1.25	0.142
-Monocyte ($x10^3/\mu l$)	2.37	0.09–62.20	0.604
-Neutrophil ($x10^3/\mu l$)	2.66	1.35–5.25	**0.005**
-Lymphocyte($x10^3/\mu l$)	0.30	0.07–1.24	0.096
Harrell's Index of concordance (C Statistic) = 0.93			

Results Mean age of cohort 75.1 SD± 7.9 y, 90% male. Median FVC 76.6% (IQR 66.6–91.2), TLCO 56.9% (49.5–67.0). Neutrophil level correlated with TLF (r=0.208, p=0.007) and PVV (r=0.259, p=0.001). There was significant correlation between neutrophils and upper and middle zone fibrosis and PVV, but weaker correlation with FVC% (r=-0.127, p=0.029) and TLCO% (r=-0.104, p=0.079). Neither monocyte or lymphocyte level correlated with TLF, PVV, FVC % or TLCO%.

71 cases underwent repeat CT; mean time 28.9 m (±16.7) between CTs. In multivariate analysis adjusted for age, gender and% change in CALIPER lung volume, PVV and leukocyte levels, neutrophil count demonstrated significant association with progression of TLF [HR 2.66, 95%CI, 1.35–5.25, p=0.005]. See table 1.

Conclusion In our cohort, neutrophil levels showed stronger correlation with CALIPER fibrosis and PVV scores, and radiological progression of fibrosis (within 3 years). Neutrophil levels could indicate patients at greater risk of progression of fibrosis in IPF.

P28 PROGNOSTIC VALUE OF ROUTINE PERIPHERAL BLOOD MARKERS IN FIBROTIC HYPERSENSITIVITY PNEUMONITIS

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A proportion of patients with fibrotic hypersensitivity pneumonitis (fHP) follow a progressive disease course despite immunosuppressive treatment. We aimed to investigate the impact of routinely measured baseline blood biomarkers on mortality in fHP.

Baseline demographics were recorded for consecutive patients with a diagnosis of fHP; discovery cohort (2010–2014) n=125, validation cohort (2015–2019) n=173. Patients were included if they had full blood count measurements performed within 3 months of first lung function test at our unit (baseline). Cox proportional hazards analyses were performed to test for associations with all-cause mortality. Step-wise backwards elimination was used to identify demographic variables independently associated with survival, for inclusion in the multivariable analysis.

Univariable analysis in the discovery cohort identified age at baseline, ethnicity, disease severity (composite physiological index (CPI), and recent infection as significantly associated with mortality. Age and CPI remained independently associated following step-wise elimination. On multivariable analyses adjusting for age and CPI, monocyte count (HR:4.5 (95%CI: 2.02–10.06), p<0.001), CRP (HR: 1.06 (1.03–1.10), p=0.001), and median total white cell count (HR: 1.92 (1.20–3.05), p=0.006) and neutrophil count (HR: 1.74 (1.10–2.76), p=0.018) were significantly associated with shorter survival. Total white cell count was closely related to neutrophil count (Spearman's rho =0.92, p<0.001). Platelet, lymphocyte, eosinophil, basophil counts, and the neutrophil-to-lymphocyte ratio were not associated with survival.

In the validation cohort, age, gender, smoking history, and CPI were significantly associated with survival on univariable analysis, with age and CPI remaining as independently associated. The associations with CRP (HR: 1.02 (1.00–1.03), p=0.007), median total white cell count (HR:2.00 (1.20–3.34), p=0.008), and neutrophil count (HR:1.95 (1.17–3.24), p=0.01), but not monocyte count, were replicated in the validation cohort on multivariable analysis, adjusting for age and CPI. CRP and median neutrophil count were independently associated with survival when included together in a multivariable analysis along with age and CPI.

All associations remained significant when treatment with corticosteroids and recent infection, at the time of the blood test, were also included in the multivariable analysis along with age and CPI.

Higher baseline CRP levels, and neutrophil counts, are significantly associated with increased mortality in patients with fHP.

P29 DELIVERY OF NINTEDANIB IN PATIENTS WITH PROGRESSIVE FIBROTIC INTERSTITIAL LUNG DISEASE: EXPERIENCE FROM A UK TERTIARY CENTRE

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Introduction Following the results of the INBUILD trial, NICE has recommended nintedanib for the management of progressive fibrotic interstitial lung disease (pfILD) in the UK since February 2022.[1] The most appropriate way of identifying and prescribing to eligible patients whilst minimising impact on service delivery is unknown.

Methods Retrospective data analysis of patients referred to a tertiary ILD service from November 2021 to June 2022; pfILD patients recommended for nintedanib; and key performance indicators.

Results There were 369 new referrals to the ILD service during this time, of whom 9 patients (2.4%) were recommended for nintedanib for the management of pfILD. In addition, 44 patients known to the service were recommended for nintedanib for the management of pfILD; a total of 53 patients (60% female, age 66 ± 12.3 years). 36 of these patients (67.9%) were discussed in MDT to confirm pfILD diagnosis; the most common diagnosis was progressive fibrotic CTD-ILD (49.1%). Number of cases discussed in ILD MDT remained

broadly similar across this time period. Since recommendation, 42 patients have initiated treatment with an average waiting time of 27 days. This is similar to the average waiting time for initiation of nintedanib in IPF, prior to February (29 days). 51 patients (96%) are also prescribed immunosuppression with 28 patients (52.8%) on multiple immunosuppressive agents.

Conclusions Previous local data indicates 7.5% of new referrals could meet nintedanib treatment criteria[2], so our data suggests either a number of eligible patients in whom the clinician decides this treatment is not appropriate, or eligible patients who remain unidentified. CTD-ILD was over-represented compared to previously published data, so there may be other diagnoses we are less good at identifying for this treatment. ILD specialist pharmacist time is unchanged at 1.2 WTE; the addition of 0.5PA consultant time to drug initiation clinics has ensured that decision-to-initiation times remain stable. MDT discussion time has also expanded. Ongoing data collection, including patient outcomes, is planned.

REFERENCES

1. Flaherty *et al*. Nintedanib in pfILD. *NEJM* 2019;**381**:1718–1727
2. Simpson T, West A. The incidence of pfILD treatable with oral-antifibrotic therapy in a UK specialist centre. *ERJ* 2020;**56**:442

P30 REAL-WORLD TOLERABILITY STUDY OF NINTEDANIB IN PATIENTS WITH PROGRESSIVE FIBROSING INTERSTITIAL LUNG DISEASE COMPARED TO PATIENTS WITH IDIOPATHIC PULMONARY FIBROSIS

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Introduction There are no real-world studies looking at tolerability of Nintedanib in patients who have a diagnosis of progressive fibrosing interstitial lung disease (PFILD) being treated with Nintedanib alongside immune suppressant and/or Prednisolone, comparing this to tolerability in idiopathic pulmonary fibrosis (IPF) patients. These patients were excluded from the INBUILD trial[1].

Hypothesis Nintedanib will be less well tolerated in PFILD, compared to IPF due to immunosuppression/corticosteroid co-prescription.

Methods Retrospective study of patients treated with Nintedanib on a Named Individual Patient Supply (NIPS) by Boehringer UK for PFILD at a tertiary referral ILD specialist centre with treatment started between November 2019-January 2021. A cohort of IPF patients from our centre was used for comparison. All data was collected using hospital medical records. Tolerability and concurrent treatment data were collected from initial prescription to June 2022 for the PFILD cohort (maximum follow-up 30 months). Data for the IPF patients was collected from initial prescription until November 2017 (maximum follow-up 31 months).

Results Data from 47 PFILD patients and 51 IPF patients were compared (table 1). In the PFILD cohort, 42 (89.4%) were taking Prednisolone at initiation of Nintedanib, and 26 (55.3%) were taking immunosuppression, with the most common being Mycophenolate (80.8% of patients on immunosuppressive therapy). During the follow-up, immunosuppressant doses were not required to be changed due to side effects other than infections, and 1 case of raised liver function tests. There was no statistical difference between either discontinuation rates for Nintedanib, tolerability (need to reduce the dosage), or side effect profile between both cohorts.

Abstract P30 Table 1 Demographic, clinical, functional, and safety characteristics of PFILD and IPF patients treated with Nintedanib

Characteristics	PFILD (n=47)	IPF (n=51)	P Value
Demographic			
Age years-old, mean (SD)	61.3 (11.7)	69.8 (8.4)	<0.01
Male, n (%)	21 (44.7)	44 (86.3)	<0.01
Clinical			
Smoking history, n (%)	19 (40.4)	36 (76.6)	<0.01
Pack-years of smoking, median (IQR)	17 (20.0)	25 (15.0)	0.41
Gastro-oesophageal reflux disease, n (%)	12 (25.5)	6 (11.8)	0.08
Pulmonary Hypertension, n (%)	11 (23.9)	4 (8.7)	0.08
Cardiovascular disease, n (%)	20 (42.6)	19 (37.3)	0.59
Anticoagulant treatment, n (%)	6 (13.0)	3 (5.9)	0.30
Type of PFILD:			-
Hypersensitivity Pneumonitis, n (% of PFILD)	14 (29.8)	-	
Idiopathic NSIP, n (% of PFILD)	14 (29.8)	-	
CTD-ILD, n (% of PFILD)	9 (19.1)	-	
Others, n (% of PFILD)	10 (21.3)	-	
Oral steroids-Prednisolone, n (%)	42 (89.4)	-	-
Prednisolone dose, mean (SD)	13 (5.4)	-	-
Immunosuppressive therapy:	26 (55.3)	-	-
Mycophenolate, n (% of patients on immunosuppressive therapy)	21 (80.8)	-	
Methotrexate, n (% of patients on immunosuppressive therapy)	2 (7.7)	-	
Azathioprine, n (% of patients on immunosuppressive therapy)	1 (3.8)	-	
Others, n (%of patients on immunosuppressive therapy)	2 (7.7)	-	
Oxygen therapy, n (%)	39 (83.0)	12 (26.1)	<0.01
Lung Function			
FVC-%[a], mean (SD)	52.4 (16.9)	67.8 (11.9)	<0.01
DLCO-%[a], mean (SD)	34.2 (10.7)	44.1 (12.3)	<0.01
Safety			
Nausea and/or vomiting, n (%)	17 (36.2)	23 (45.1)	0.42
Diarrhoea, n (%)	29 (61.7)	29 (56.9)	0.63
Reduced appetite, n (%)	13 (27.7)	8 (15.7)	0.15
Weight loss, n (%)	8 (17.0)	12 (23.5)	0.42
Acute ischaemic heart disease, n (%)	3 (6.4)	0 (0.0)	0.11
Thromboembolic event, n (%)	1 (2.1)	1 (2.0)	1.00
Bleeding, n (%)	3 (6.4)	3 (5.9)	1.00
Hepatotoxicity, n (%)	5 (10.6)	2 (3.9)	0.26
Duration of treatment-months[b], median (IQR)	17 (13.0)	16 (11.0)	0.62
Nintedanib dose reduction, n (%)	13 (27.7)	15 (29.4)	0.85
Nintedanib permanently ceased, n (%)	13 (27.7)	13 (25.5)	0.81
Reason for discontinuation: Nintedanib side effects, n (%)	9 (69.2)	9 (69.2)	1.00

SD=standard deviation, IQR=interquartil range (25-75 percentile), PFILD=progressive fibrosing interstitial lung disease, IPF=idiopathic pulmonary fibrosis, NSIP=non-specific interstitial pneumonia, CTD-ILD=connective tissue disease associated with interstitial lung disease, FVC=forced vital capacity, DLCO=diffusing capacity for carbon monoxide. [a]based pulmonary function test, prior to Nintedanib. [b]PFILD cohort started Nintedanib between November 2019 and January 2021, IPF cohort started Nintedanib between January 2015 and December 2016.

Conclusions This real-world study demonstrated that concurrent immunosuppression therapy did not affect the tolerability of Nintedanib in PFILD patients, therefore concerns over additive side effects may be unfounded. Useful further questions would be to assess whether there is a gender or age contribution to tolerability, whether a larger cohort would show differential hepatotoxicity, and whether the use of different immunosuppressants would have affected tolerability (the majority in this cohort took Mycophenolate).

REFERENCE

1. Flaherty KR, Wells AU, Cottin V, *et al*. Nintedanib in Progressive Fibrosing Interstitial Lung Diseases. *N Engl J Med* 2019; **381**(18):1718–1727.

P31 COMPARISON OF PERCENT PREDICTED AND PERCENTILE VALUES FOR V̇O2MAX IN PEOPLE WITH INTERSTITIAL LUNG DISEASE

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Introduction and Objectives The use of cardiopulmonary exercise tests (CPETs) has been advocated by the European

Respiratory Society (ERS) and the Association for Respiratory Technology and Physiology (ARTP) for diagnosis and treatment of chronic lung conditions. Results from CPETs, especially the maximal oxygen uptake ($\dot{V}O_{2max}$), are of prognostic importance in many conditions, including interstitial lung disease (ILD). However, the ERS and ARTP utilise different methods and equations to determine an 'abnormal' exercise response. The 'percent predicted method' is used by the ERS (using data from Jones *et al* 1985), whereas the ARTP favours a 'percentile method' (using data from Gläser *et al* 2013). However, the use of different reference values/equations and methods makes it difficult to compare studies and it is unknown whether the classifications can be used interchangeably.

Therefore, the aim of this study was to compare the 'percent predicted method' with the percentile-based method for the classification of $\dot{V}O_{2max}$ values obtained through a CPET.

Methods Twenty-four participants (7 females) with ILD, 69.6 ± 7.5 years, completed a total of 67 CPETs as part of a wider feasibility study into CPET for ILD. Attained $\dot{V}O_{2max}$ values were classified according to both the 'percent predicted method' and the 'percentile method'. A $\dot{V}O_{2max}$ was presumed abnormal when it was less than 80% predicted or lower than the 5th percentile.

Results Based on the 'percent predicted method', 48 CPETs (72%) were classified as abnormal. Additionally, 44 CPETs (66%) were classified as abnormal when the 'percentile method' was employed. Both methods were in agreement in only 47 tests (70%). Cohen's Kappa revealed poor agreement for classifying $\dot{V}O_{2max}$ as abnormal between the two methods ($k = 0.31$, $P = 0.01$).

Conclusion The current study showed significant discrepancies between methods recommended by the ERS and ARTP, suggesting that these methods cannot be used interchangeably. In order to make study results more comparable, a standardisation of reference values is recommended.

P32 USING GENETIC INFORMATION TO DEFINE IDIOPATHIC PULMONARY FIBROSIS IN UK BIOBANK

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10.1136/thorax-2022-BTSabstracts.168

Introduction Idiopathic pulmonary fibrosis (IPF) is a complex, heterogeneous fibrotic lung disease with median survival of 3 years. IPF can be defined in population studies, such as UK Biobank, using electronic healthcare records (EHR). However, recent genetic studies of IPF using EHR have shown an attenuation of effect size for known genetic risk factors when compared with clinically-derived datasets, suggesting misclassification of cases.

Method Using various combinations of primary and secondary care EHRs and questionnaire data we defined IPF cases in UK Biobank and evaluated the definitions using association results for the largest genetic risk variant for IPF (rs35705950-T, *MUC5B*). We further evaluated the impact of exclusions based on co-occurring codes for non-IPF pulmonary fibrosis and restricting codes according to changes in diagnostic practice.

Results Odds ratio estimates for rs35705950-T associations with IPF defined using EHR and questionnaire data in UK Biobank were significant and ranged from 2.06 to 3.09, which was lower than those reported using clinically-derived IPF datasets (OR: 4.99 to 5.06). We then evaluated the effect of excluding cases with co-occurring codes that might indicate misclassification, and excluding EHR codes that occurred before the most recent clinical guidelines for diagnosis of IPF. Code-based exclusions of cases and code occurrences gave slightly closer effect estimates to those previously reported, but sample sizes were substantially reduced.

Conclusion We show that when using UK Biobank to identify IPF, the effect size for the association between rs35705950-T and IPF risk is smaller than for clinically-derived IPF datasets. Further code-based exclusions did not lead to effect estimates closer to those expected. Though general population cohorts help to increase study sample size, future IPF research using general population datasets should take these limitations of EHR definitions of IPF into consideration.

P33 WHAT AFFECTS ACCEPTABILITY OF REMOTE DIGITAL MONITORING OF SPIROMETRY IN PATIENTS WITH INTERSTITIAL LUNG DISEASE?

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10.1136/thorax-2022-BTSabstracts.169

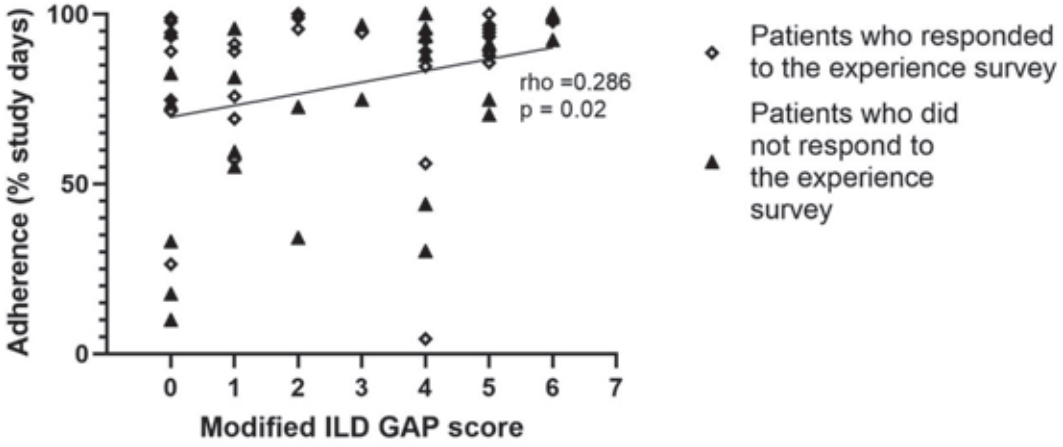
Introduction Remote monitoring of pulse oximetry and spirometry has been proposed as an alternative to hospital based measurements for monitoring patients with interstitial lung disease (ILD). We aimed to understand factors impacting the acceptability of remote monitoring to patients.

Methods Secondary analysis of study NCT04850521: Patients with ILD were asked to record daily spirometry for 91 days. Adherence was defined as the percentage of study days with a spirometry recording. Health related quality of life (HRQoL) was measured using EQ-5D-5L. Patient experience was surveyed at the conclusion. Disease severity was defined by modified ILD-GAP score. Continuous and categorical measures were compared with Spearman's Correlation and Mann Whitney U Test, accordingly. No correction for multiple testing was performed.

Results 60 patients were included in analysis, 70% male, age 67.8 years (± 11.2), baseline FVC 3.09L (±1.12). 33/60 (55%) participants had idiopathic pulmonary fibrosis (IPF), 27/60 (45%) had non-IPF ILD. Median modified ILD-GAP score was 3 (IQR 1–4.75). Median adherence to spirometry was 89%.

Weak positive correlation was observed between disease severity and adherence (rho= 0.299, p=0.02; figure 1), similarly for age and adherence (rho= 0.276, p=0.03). We observed no significant correlation between baseline HRQoL and adherence (rho = 0.20, p= 0.22), change in HRQoL (rho= 0.007, p=0.97), baseline FVC (rho= -0.105, p=0.45) or baseline TLCO (rho= -0.176, p=0.18). No statistical difference was observed in adherence according to ILD subtype diagnosis (IPF median 92%, non-IPF ILD median 85%, p=0.2).

32/60 (53%) patients responded to the experience survey. These patients had higher adherence (0.93 vs 0.81, p=0.02) and lower disease severity (2.5 vs 3 p=0.001) (figure 1). All respondents (32/32) stated home spirometry was easy to perform and



Abstract P33 Figure 1 Severity of disease (modified ILD-GAP score) and adherence to daily spirometry in those who did and did not respond to the experience survey at conclusion of the study

88% (28/32) felt that it was useful. 74% (23/31) of patients wished to continue to monitor their spirometry. Median severity appeared worse in patients who wanted to continue but this did not reach significance (3 vs 1.5, p= 0.16).

Conclusions Remote monitoring is acceptable to most patients with ILD. Patients with more advanced disease may be more engaged with home spirometry, but their experiences may be under represented.

Supported by Innovate UK (ref 66823)

Please refer to page A213 for declarations of interest related to this abstract.

P34 FEASIBILITY OF REMOTE MONITORING WITH DAILY HOME SPIROMETRY AND PULSE OXIMETRY IN AN INTERSTITIAL LUNG DISEASE CLINICAL SERVICE SETTING

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10.1136/thorax-2022-BTSabstracts.170

Introduction Remote monitoring of patient-recorded spirometry & pulse oximetry offers an alternative approach to traditional hospital-based monitoring of interstitial lung disease (ILD), which may support resource optimisation and patient safety. Whilst studies have shown agreement between remote and hospital based spirometry, remote monitoring has not been widely incorporated into clinical practice. We aimed to assess the feasibility of the introduction of remote monitoring into the clinical service.

Methods Prospective, single-arm, observational study recruited across four UK centres (NCT04850521). Criteria included MDT-confirmed ILD diagnosis and ppFVC>50%. Patients were asked to record 1 spirometry & pulse oximetry measurement per day for 91 days, using a digital health application & Bluetooth-linked devices, monitored weekly by their clinicians.

Feasibility of remote monitoring was defined as ≥41 patients with ≥70% adherence to study measurements throughout the observation period. Adherence was calculated as days with measurements/91 days. The co-primary endpoints were estimation of patients providing measurements on ≥ 70% study days and ≥ 3 times/every week during the study.

Results 62 patients consented and 60/62 provided ≥1 spirometry reading and were included in analysis: 42/60 male; age 67.8 years (± 11.2); 33/60 (55%) idiopathic pulmonary fibrosis (IPF), 27/60 (45%) had non-IPF ILD; clinical ppFVC 84.3%(±19.8); clinical ppDL_{CO}53.85% (±18.2); Median modified ILD-GAP score was 3 (IQR 1–4.75). There was one adverse event of a patient who experienced a vasovagal episode during spirometry.

47 patients (78%) maintained adherence to spirometry and 49 patients (82%) maintained adherence to pulse oximetry on ≥70% of study days. 42 patients (70%) recorded spirometry and 43 patients (72%) recorded pulse oximetry ≥3 times/week every week during the study. This increased to 78% and 80% respectively, for recordings at least once a week during the study. Median adherence was 89.0% (IQR 72.2–95.6%) to remote spirometry and 92.3% (IQR 74.5–96.7%) to pulse oximetry.

Conclusion This study demonstrates feasibility of daily recording of home spirometry & pulse oximetry within a clinical service over 3 months. Further analysis is required to understand the impact of introduction of remote monitoring into the clinical service.

Supported by Innovate UK (ref 66823)

Please refer to page A213 for declarations of interest related to this abstract.

'Mission (Im)possible I' – Pulmonary vascular disease

P35 REMOTE EXERCISE TESTING CAN DETECT CLINICAL CHANGE IN PULMONARY HYPERTENSION

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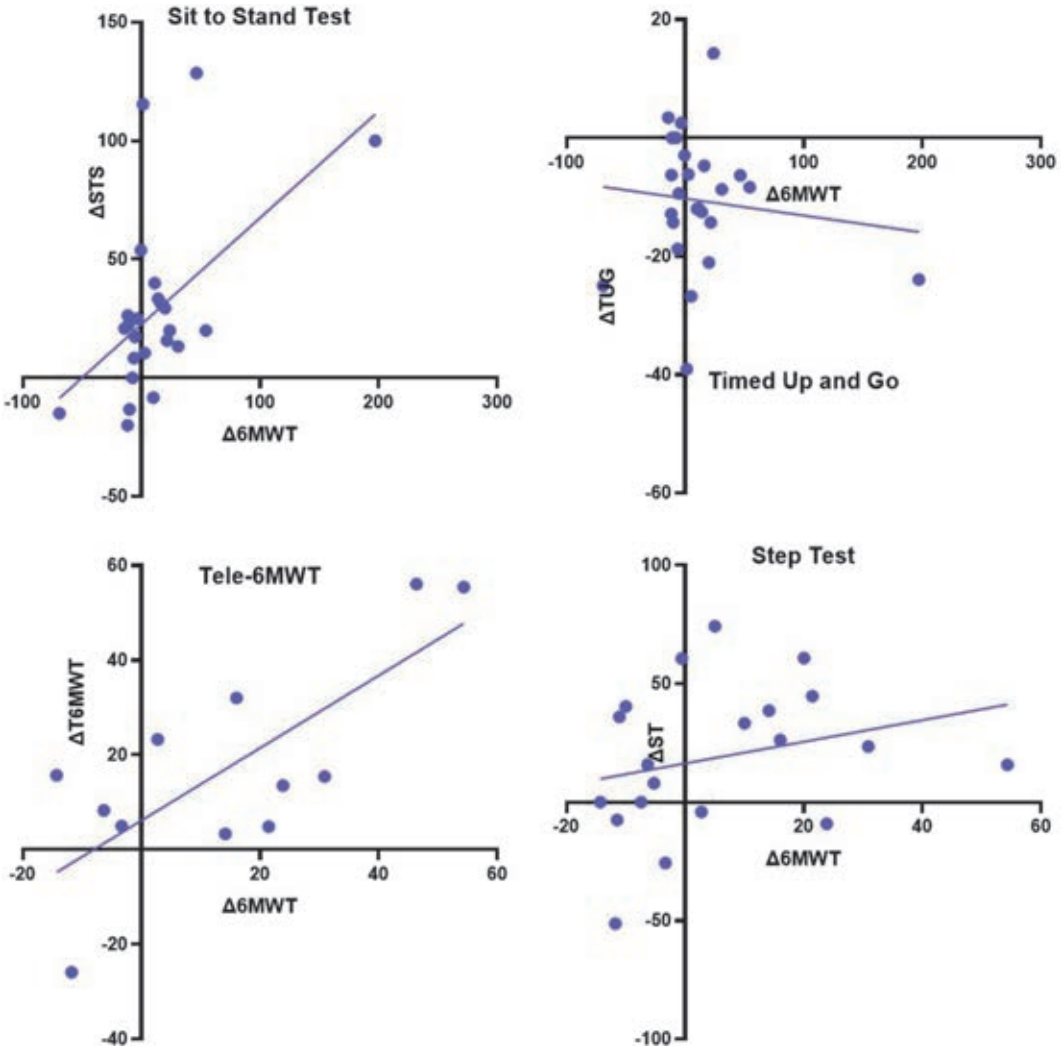
Background The development of a set of remote exercise capacity tests for patients with pulmonary hypertension (PH)



Abstract P35 Figure 1 Proportion and direction of change for each study test when compared to that of the standard six-minute walk test (6MWT)

would improve the telemedicine strategies in this disease and allow remote patient assessment. The PH Remote Exercise Testing (PHRET) study is ongoing, assessing the validity and feasibility of tests when performed by patients at home.

Aims This interim analysis of PHRET data assesses the ability of remote exercise tests to detect clinical change following a period of treatment, as compared to change in the standard six-minute walk test (6MWT).

Methods Participants undergoing diagnostic assessment for PH were included. At baseline (visit 1), patients completed a 6MWT followed by a range of study tests including a Timed Up and Go (TUG) test, a Sit-to-Stand (STS), a Step Test (ST) and a 6MWT performed outside using a GPS-enabled smartphone (T6MWT). Patients performed these tests immediately upon returning home (visit 2) and at first follow-up (visit 3, usually ~3 months following treatment initiation). The proportion of change between visit 1 and visit 3 was compared to the change in the 6MWT.

Results At the time of writing, 49 patients are recruited and 25 have completed study follow up. Between visit 1 and 3 the mean (standard deviation) change in 6MWT distance was 26 m (62). Figure 1 demonstrates the proportion of change in each study test when compared to the 6MWT. Direction of change in the study test agreed with that in the standard 6MWT in 55% of the follow up ST, 63% of the STS, 32% of the TUG and 75% of the T6MWT. All patients were able to complete the study tests at home and no adverse incidents were recorded. Patients were able to record heart rate and finger oxygen saturations at home using pulse oximeters.

Conclusions These data raise the possibility that the T6MWT is the most effective remote measure of exercise capacity in patients with PH. The TUG demonstrated markedly inferior agreement. ST and STS showed less concordance than the T6MWT yet had greater than 50% agreement with the standard 6MWT.

P36 VALIDATING PULMONARY ARTERIAL HYPERTENSION-ASSOCIATED GENOMIC MUTATIONS OF EIF2AK4: WHEN IS A VARIANT PATHOGENIC?

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10.1136/thorax-2022-BTSabstracts.172

Pulmonary arterial hypertension (PAH) is a fatal condition affecting young adults in which aberrant pulmonary vascular

remodelling raises artery pressures causing right heart failure. It is frequently caused by mutations of the type II BMP receptor (BMPR2), however additional modifying factors exist. Mutations in the *EIF2AK4* gene, encoding the kinase GCN2 have also been associated with PAH but the mechanisms remain elusive. In healthy individuals, active GCN2 selectively phosphorylates eIF2α to trigger the Integrated Stress Response (ISR) which temporarily attenuates protein synthesis while rescuing cellular amino acid uptake.

In pulmonary veno-occlusive disease (PVOD), a rare and more aggressive subtype of PAH, biallelic mutations of *EIF2AK4* have been found to be causative. With no effective treatments apart from lung transplantation, death occurs in 72% of patients within the first year after diagnosis. Approximately 70 potentially pathogenic *EIF2AK4* alleles have been reported in patients with PAH. Forty percent of these are missense variants with unknown (if any) effects on GCN2 function and so are variants of uncertain significance (VUS). Confirming the pathogenicity of a VUS is important to families, as it is necessary to cascade genetic testing to potentially at-risk relatives.

Strategies to predict the pathogenicity and severity of genetic variants have been restricted to computational methods. These approaches rely on the degree of evolutionary conservation of the mutated residue or on modelling algorithms that predict differences in folding free energies. Such computational strategies, although useful in prioritising the study of variants, are not foolproof and require experimental validation.

To address this, we developed a protocol for the assessment of *EIF2AK4* VUSs. We express patient-specific variants in GCN2-deleted cells and assay protein stability and activity. In doing so, we can sub-classify variants as non-pathogenic, destabilised or kinase-dead. In addition to providing benefits for genetic testing immediately, this may drive the development of allele-specific personalised therapies.

Please refer to page A213 for declarations of interest related to this abstract.

P37 CORRELATION OF EMPHASIS-10 WITH CLINICAL TESTS: INSIGHTS FROM THE ASPIRE REGISTRY

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10.1136/thorax-2022-BTSabstracts.173

Introduction EmPHasis-10 (E10) assesses health-related quality of life in patients with pulmonary arterial hypertension (PAH) and is an independent prognostic marker. We aimed to assess E10 score correlations with functional capacity, pulmonary hemodynamic, and cardiac MRI parameters (CMR).

Methods Consecutive PAH patients with E10 between 2014 and 2020 were identified from the ASPIRE registry. The correlation between E10 and investigations performed within 30

Abstract P37 Table 1

		All PAH (n=1801)		IPAH (n=444)		CTD (n=641)	
		r	p	r	p	r	p
ISWT walking distance		-.47	<.001	-.56	<.001	-.46	<.001
WHO functional class		.33	<.001	.33	<.001	.29	<.001
TLCO %predicted		-.25	<.001	-.31	<.001	-.28	<.001
NT-proBNP		.39	<.001	.38	.06	.21	.18
Right Heart Catheter	mRAP	.32	<.001	.36	<.001	.34	<.001
	PVR	.31	<.001	.15	.08	.32	<.001
	CI	-.31	<.001	-.23	.01	-.29	<.001
Cardiac MRI	RVEF	-.18	<.001	-.33	<.001	-.27	.01
	RVESV	.19	.01	.25	.03	.27	.01
	RVEDV	.17	.03	.17	.16	.22	.04
	RVEDM	.19	<.001	.32	.01	.27	.02
	RA volume	.28	<.001	.39	<.001	.27	.01

CI; cardiac index, CTD; connective tissue disease, EF; ejection fraction, ESV; end-systolic volume, EDV; end-diastolic volume, EDM; end-diastolic mass, IPAH; idiopathic pulmonary arterial hypertension, ISWT; intermittent shuffle walking test, mRAP; mean right atrial pressure, NT-proBNP: n-terminal pro-b-type natriuretic peptide, PAH; pulmonary arterial hypertension, PVR; pulmonary vascular resistance, RA; right atrium, RV; right ventricular, TLCO; transfer factor for carbon monoxide, WHO; World Health Organisation

days was assessed using Spearman's correlation coefficient. Subgroup analysis was performed in patients with idiopathic PAH (IPAH) and PAH associated with connective tissue disease (PAH-CTD).

Results 1801 patients aged 59±26 years were included, 25% had IPAH and 36% CTD-PAH, 56% were treatment-naive, 70% women, and 80% in WHO functional class 3. The mean E10 score was 29±13. Moderate correlations with incremental shuttle walking test distance (r=-.47, n=1505) and weak correlation with n-terminal pro-b-type natriuretic peptide (r=.39, n=94), WHO functional class (r=.33, n=1792), right heart catheter parameters (pulmonary vascular resistance r=.31, n=442) and percent predicted TLco (r=-.25, n=817) were observed (table 1). CMR parameters demonstrated weak-poor correlations with E10 (r=.15-.26), higher in IPAH and CTD-PAH subgroups than in the overall cohort.

Conclusion Despite being an independent prognostic factor, E10 score correlates only moderately with exercise capacity and weakly with hemodynamics, pulmonary function and CMR parameters. This study further highlights the unique added value of the E10 test considering the lack of a clinical surrogate marker that strongly reflects how a patient feels and how their life is affected by PAH.

P38 ASSESSING THE REPEATABILITY OF NT-PROBNP TESTING USING LABORATORY AND POINT OF CARE TESTING IN PAH (REPEAT-PAH)

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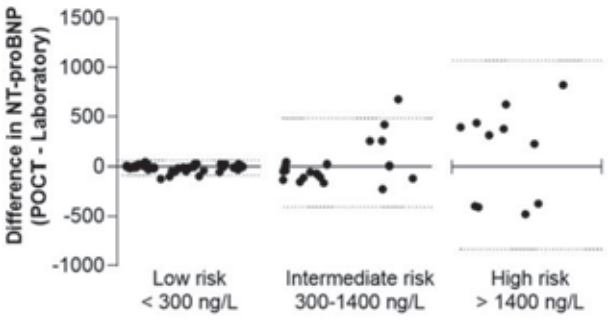
Introduction N-terminal pro brain natriuretic peptide (NT-proBNP) is an important biomarker in the monitoring of patients with pulmonary arterial hypertension (PAH) and is included in multiple risk stratification tools. However, results are rarely available at the time of clinical assessment. We aimed to examine the reliability of point of care testing (POCT), explore its potential role in remote monitoring and the effect exercise may have on NT-proBNP in the context of PAH.

Methods For this prospective study of group 1 PAH, patients attended 2 visits – a 'rest' or an 'exercise' visit including an incremental shuttle walk test. PAH was haemodynamically defined by a mean pulmonary artery pressure >20 mmHg, pulmonary artery wedge pressure ≤15 mmHg and pulmonary vascular resistance > 3 WU. NT-proBNP laboratory and POCT samples were taken pre- and post- either rest or exercise, and a further postal laboratory sample was sent back to the department through the postal service and processed to simulate conditions of remote monitoring.

Results An interim review of 37 patients found a strong correlation between POCT and laboratory NT-proBNP (r^2 0.945, p<0.001) and laboratory and the delayed processed postal NT-proBNP samples ($r^2$0.994 p<0.001). Less agreement was noted between POCT and laboratory NT-proBNP at higher values. This is demonstrated in the figure below, with data stratified by ESC/ERS risk group. There was no significant difference demonstrated between pre- and post- exercise laboratory samples (p=0.88).



Abstract P38 Figure 1 A Bland-Altman plot demonstrating the agreement of POCT NT-proBNP (ng/L) and Laboratory NT-proBNP (ng/L) with reference to the ESC/ERS risk stratification tool for PAH

Conclusion This preliminary analysis suggests that POCT with NT-proBNP provides an alternative to laboratory NT-proBNP analysis in the risk stratification of patients with PAH. Laboratory NT-proBNP was not affected by exercise. Furthermore, delayed analysis of samples delivered by post to the laboratory did not significantly impact results suggesting a role for the use of NT-proBNP in remote monitoring.

Please refer to page A213 for declarations of interest related to this abstract.

P39 ESTABLISHING MINIMALLY IMPORTANT DIFFERENCES FOR CARDIAC MRI ENDPOINTS IN PULMONARY ARTERIAL HYPERTENSION

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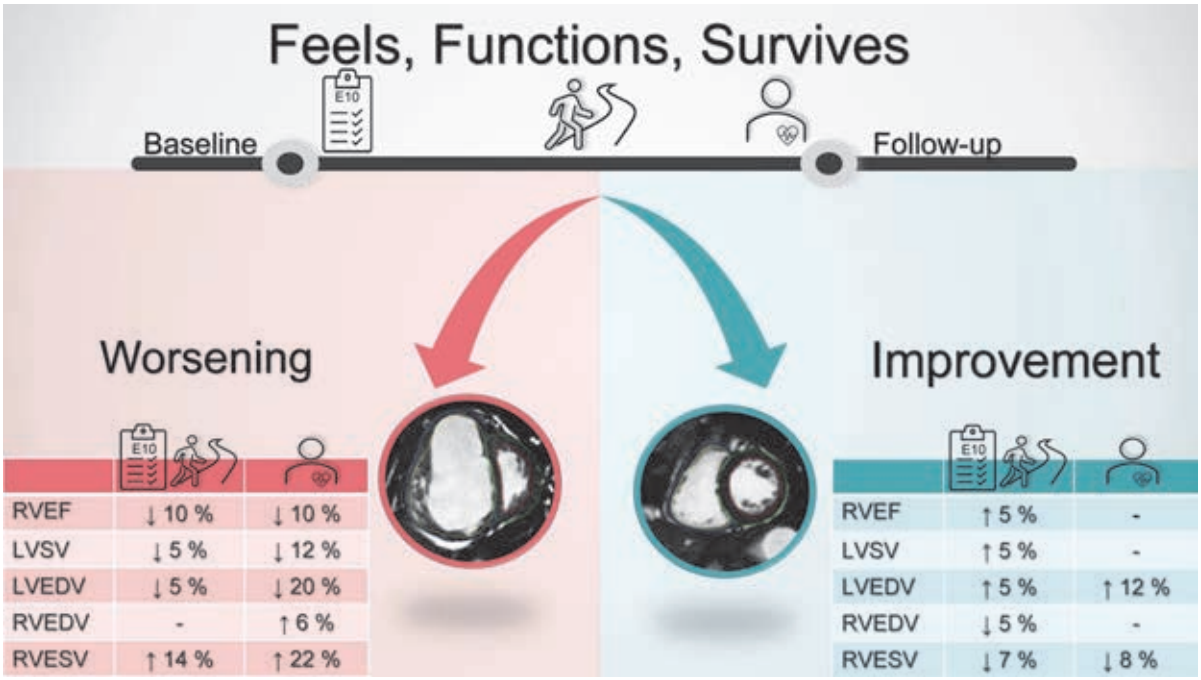
10.1136/thorax-2022-BTSabstracts.175

Introduction Cardiac MRI (CMR) is the gold standard technique to assess bi-ventricular volumes and function and is increasingly being considered as an end-point in clinical studies. Currently, with the exception of right ventricle (RV) stroke volume, there are no minimally important differences (MIDs) reported for CMR metrics. Our study aimed to identify MIDs for CMR metrics based on FDA recommendations for a surrogate end-point that should reflect how a patient feels, functions and survives.

Methods Consecutive treatment-naive patients with PAH between 2010 and 2021 who had two CMR scans (at baseline and at 12 months following treatment) were identified from the ASPIRE registry. All patients were followed up for one additional year after the second scan. The MID in CMR metrics was determined using two methods; (i) an anchor-based method combining how a patient 'feels' (emPHasis-10 questionnaire) and 'functions' (incremental shuttle walking test) and (ii) for 'survives' a distribution-based method for one-year mortality. RV ejection fraction (RVEF) and RV and left ventricle (LV) end-diastolic volume, RV end-systolic volume and LV stroke volume were measured at baseline and follow-up. For each metric, relative difference (ratio of absolute difference to baseline measurement) was compared in a Cox-regression and Kaplan-Meier-analysis.



Abstract P39 Figure 1

Results 239 patients were included. The MIDs ($P<0.05$), for metrics for how a patient 'feels and functions' for i) improvement, were a relative increase in RVEF, LVSV or LVEDV of 5% and a decrease in RVESV or RVEDV of 7% and 5%, respectively and for ii) clinical worsening, were a relative reduction in RVEF of 10%, reduction of LVSV or LVEDV of 5% or an increase in RVESV of 14%. For 'survives' the MID associated with (i) a reduced one-year mortality was an 8% relative reduction in RVESV and a 12% relative increase in LVEDV and (ii) increased one-year mortality were a 10% relative decrease in RVEF, an 22% increase in RVESV, a 6% increase in RVEDV, a 20% reduction in LVEDV and a 12% reduction in LVEDV.

Conclusion This study establishes clinically relevant CMR MIDs for how a patient feels, functions and survives in response to PAH treatment. These findings provide further support for the use of CMR as a clinically relevant surrogate end-point and will aid trial-size calculations for studies using CMR.

P40 THE DISTANCE SATURATION PRODUCT AS AN OUTCOME PREDICTOR IN IDIOPATHIC PULMONARY ARTERIAL HYPERTENSION

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10.1136/thorax-2022-BTSabstracts.176

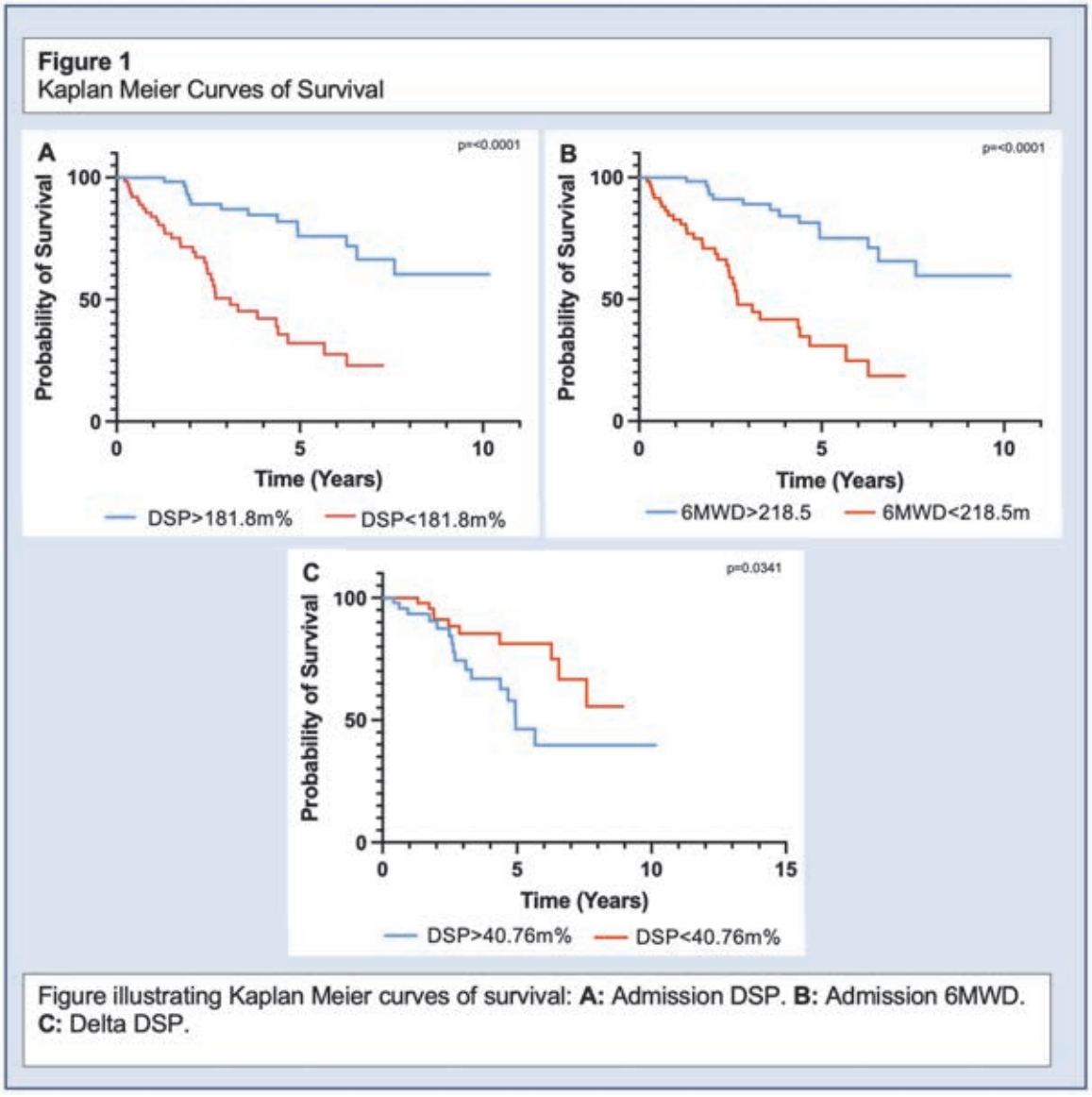
Introduction & Objectives Idiopathic arterial pulmonary hypertension (IPAH) is a chronic, progressive respiratory disease, characterised by elevated pulmonary artery pressure. The disease carries significant mortality and therefore, emphasis is placed on identification of accurate outcome predictors. The Distance saturation Product (DSP) is a novel index that has demonstrated prognostic value in cardio-respiratory diseases. The 'six-minute walk test' (6MWT) is a submaximal-effort exercise test used in diagnosis and ongoing management of patients with IPAH. The DSP is the product of the distance walked and lowest oxygen saturation recorded during the six-minute walk test.

We aimed to evaluate if the DSP could: a) predict outcomes in IPAH; and b) correlate with other clinical parameters.

Methods A retrospective analysis was performed of 146 patients with IPAH attending the pulmonary vascular unit between July 2011 and May 2021. Receiver operating characteristic (ROC) and kaplan meier curves evaluated the ability of the DSP, 6-minute walk distance (6MWD) and DDSP to predict patient mortality. Pearson's correlation coefficient assessed the correlation of the DSP with other clinical parameters.

Results Of the 146 patients analysed, 55(37.7%) were dead at the point of censorship. The mean DSP, 6MWD and DDSP were 224.2m% ± 140.5, 258.1m ± 147.1 and 43.59m% ± 88.67 respectively. Baseline DSP was the strongest predictor of mortality in ROC analysis (AUC=0.7364, p≤0.0001), followed by baseline 6MWD (AUC=0.7198, p≤0.0001) and, lastly, DDSP (AUC=0.5892, p=0.1596). A baseline DSP >181.8m% was associated with 4.4 times increased risk of mortality. The strongest correlation was between DSP and NTproBNP (r=-0.3271, p≤0.0001), followed by Emphasis10 score (r=-0.3851, p≤0.0001) and lastly mixed venous oxygen saturation (r=-0.3571, p≤0.0001).

Conclusion DSP represents a simple tool for predicting survival of patients with IPAH. Patients with a baseline DSP <181.8m% are at significantly increased risk of death. The DSP demonstrated moderate correlations with NTproBNP measurements, Emphasis10 scores and SaO_2 levels. The DSP's potential utility in the evaluation of IPAH patients is supported by its simplicity, ease of calculation and accessibility of



Abstract P40 Figure 1

the 6MWT in clinical settings. To support these preliminary findings, further study is necessary to validate the DSP as an outcome predictor in IPAH.

P41 CT LUNG PARENCHYMAL APPEARANCES IN CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION (CTEPH)

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10.1136/thorax-2022-BTSabstracts.177

Background CT pulmonary angiography (CTPA) is recommended in suspected chronic thromboembolic pulmonary hypertension (CTEPH) and supports therapeutic planning. Mosaic perfusion and lung scarring are common features in CTEPH, but their clinical relevance is less understood. CTEPH is a challenging diagnosis and a commonly overlooked condition that's tough to spot and frequently misinterpreted.

Aim To evaluate the association of mosaic perfusion and lung scarring with prognostic indicators in CTEPH before pulmonary endarterectomy (PEA).

Methods 290 patients with CTEPH who underwent CTPA were identified. PEA-specific CTEPH treatment was administered to 50 (17.2%) of the patients, other patients 240 may go on to have PEA, just at the time of the scan most had not had surgery. Radiological assessment of mosaic perfusion (nil/minor/mild/moderate-severe), lung scarring (nil/minor/mild/moderate-severe) and emboli (proximal/segmental/distal) were scored blinded to clinical parameters. Right heart catheterisation data, pulmonary vascular resistance (PVR) and mixed venous oxygen saturation (SvO2) (n=118) were collected alongside CT cardiac measurements and the transfer factor for carbon monoxide (TLCO)(n=112). The correlation was assessed using Spearman's correlation coefficient. Group comparison was made on dichotomised mosaicism/scarring data (nil/minor vs mild/moderate-severe) using an independent t-test.

Results The mean pre-PEA PVR was (571.22 ± 409.88 dyne. s.cm $^{-5}$). In pre-PEA patients, a significant correlation was

found between both mosaicism and scarring, with PVR and SVO2 (all p≤0.01), whereas no correlation was identified with clot location (p=0.93,0.10). RV: LV ratio correlated with scarring and mosaicism (p≤0.02, p≤0.01). Patients with greater mosaicism had higher PVR and lower SvO2 (all p<0.05) (mean difference 371.5 dyns, 95% confidence interval [CI] 175.6 to 942.3), (-10.9%, CI -18.4 to -3.4), respectively. Patients with greater than minor scarring had lower SvO2 (p≤0.01) (-10.6%, CI -17.9 to -3.3) and lower TLCO (p≤0.04) (-1.78 mmol/min/kPa, CI -3.70 to -0.02).
Conclusion CT lung features in CTEPH relate to prognostic indicators and are important to assess disease severity before and after PEA treatment.

Please refer to page A213 for declarations of interest related to this abstract.

P42 PULMONARY EMBOLISM (PE) TO CHRONIC THROMBOEMBOLIC PULMONARY DISEASE (CTEPD): FINDINGS FROM A SURVEY OF UK PHYSICIANS

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10.1136/thorax-2022-BTSabstracts.178

Introduction CTEPD usually occurs in patients with a prior history of PE and, when associated with pulmonary hypertension (PH), survival is significantly impacted. We conducted a survey of UK physicians to understand the current practices in the follow-up of PE and awareness of CTEPD.
Methods UK pulmonologists, cardiologists, haematologists and internists who managed ≥10 PE cases/year were invited via a market research panel to complete a 20-minute online survey.
Results The target of 175 physicians was reached: 50 each from pulmonology, cardiology, and internal medicine plus 25 haematologists. All participants responded to each question, unless otherwise stated. Overall, 88% were consultants and 82% were based in district general or teaching hospitals, while 18% were from a PH centre or PH shared care centre. Most (89%) participants reported their centre had local guidelines on PE management. Of 127 (65%) participants who reported a dedicated PE follow-up clinic, 87 (69%) indicated a joint clinic and the most common combination was pulmonologists and haematologists (17;20%).

Almost half (47%) considered their centre to have a protocol for the investigation of CTEPD. Despite guidelines recommending patients with non-resolving breathlessness after 3 months of effective anticoagulation should be investigated for CTEPD, only 22% of participants reported this happening in >75% of cases. According to participants, 129 (74%) routinely consider the diagnosis of CTEPD and 97 (55%) routinely investigate for CTEPD, with 76% of those 97 participants investigating in patients who are symptomatic at 3 months and 22% investigating in all patients. The tests used by physicians are shown in figure 1. The most common stimulus for referral to a PH centre was echocardiographic signs of PH (66%).
Conclusion Acknowledging the limitations of this survey, it demonstrates variability in the follow-up of patients presenting with acute PE, in the awareness and approaches to the investigation of suspected CTEPD. Notably, 35% of physicians reported that patients were not followed up in a PE clinic. Our data support the conduct of a national audit to improve our understanding of the treatment and follow-up of acute PE and the barriers to timely detection of CTEPD.

Please refer to page A213 for declarations of interest related to this abstract.

P43 RETROSPECTIVE ANALYSIS ON THE USE OF AGE-ADJUSTED D-DIMER IN PATIENTS WITH SUSPECTED PULMONARY EMBOLISM WITH A LOW CLINICAL PROBABILITY SCORE IN A TERTIARY HOSPITAL

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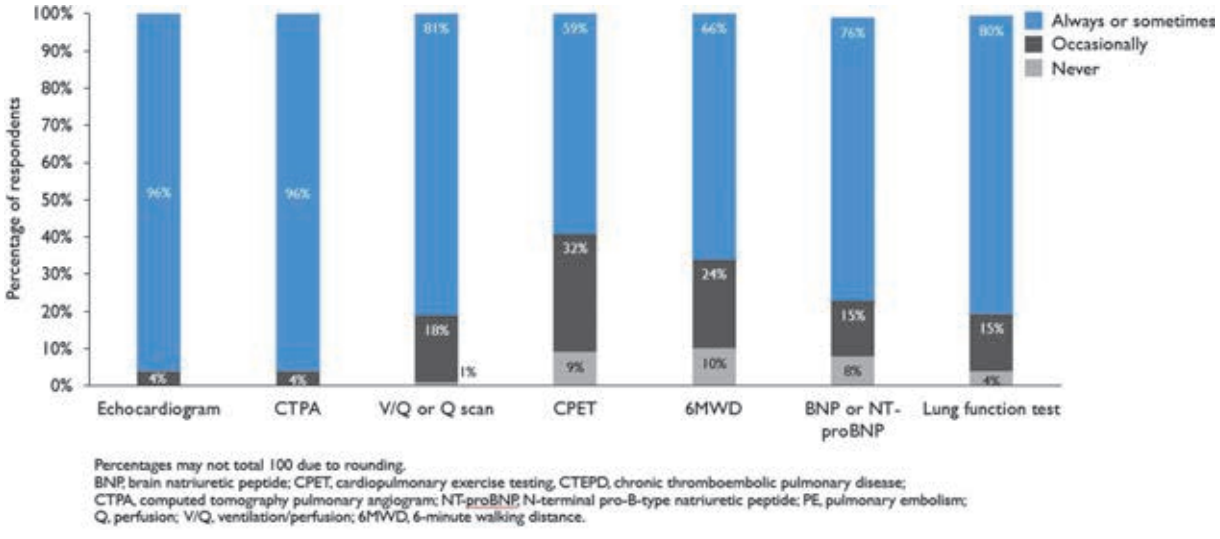
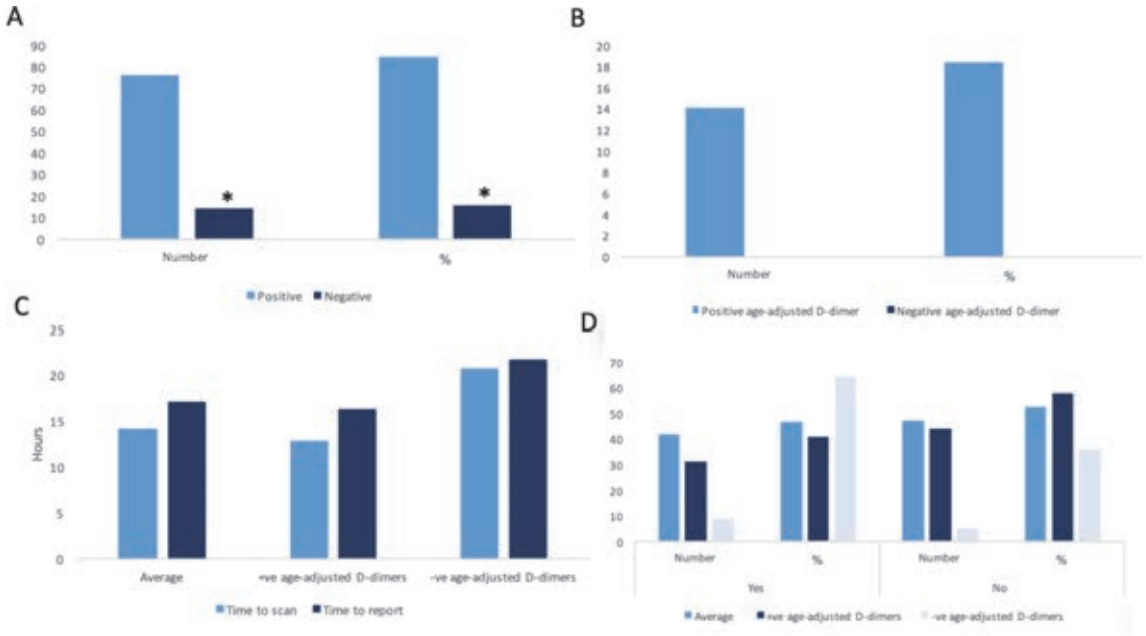
10.1136/thorax-2022-BTSabstracts.179



Abstract P42 Figure 1 Tests used to investigate for CTEPD by physicians who routinely investigate for CTEPD (n=97), as reported in an online survey



Abstract P43 Figure 1 (A) Age-adjusted D-dimer in those with a conventionally positive D-dimer (*p<0.05) (B) Rates of positive CTPA stratified according to the age-adjusted D-dimer values (C) Time taken to perform and report CTPAs stratified according to the age-adjusted D-dimer values (D) Proportion of patients whose discharge was delayed by CTPA based on their age-adjusted D-dimer levels

Introduction Diagnosis of Pulmonary embolism (PE) relies on sequential use of pre-test probability, plasma d-dimer and CTPA. NICE VTE guidance (March 2020) states to consider an age-adjusted D-dimer test threshold for people aged over 50. We did a retrospective analysis to identify the impact of using age-adjusted D-dimer in patients with suspected PE with a low clinical probability score on the number of patients having CTPA and length of hospital stay.

Methods Patients who had their D-dimer levels measured within a 6-month period (July 2021-January 2022) were identified (n=1400). The inclusion criteria: age >50, Wells score ≤4, D-dimer >0.5 mg/mL and had CTPA for suspected PE; and the exclusion criteria: age≤50, known pregnancy or diagnosis of VTE/Covid-19 and on regular anticoagulation. Data from 90 patients was found feasible for inclusion into the analysis. The parameters reviewed were demographic information, D-dimer, CTPA outcomes, time to scan and report, and effect on discharge.

Results The average age in our cohort was 68.3 years with a 1:1 male-to-female ratio. Age-adjusted D-dimer was deemed negative in 14 patients (16%). Whilst 16 patients with a positive age-adjusted D-dimer had a positive CTPA for PE, no CTPA was positive in the group with a negative age-adjusted D-dimer. Although patients with negative age-adjusted d-dimer had a shorter length of stay (3.5 vs 5.6 days) due to clinical stability, we found that there was an adverse impact on both waiting (20.7 vs. 12.9 hrs) and reporting times (21.7 vs. 16.3 hrs) for CTPA in this group and were more likely to have their discharge depending on the results of the CTPA (64% vs. 41%).

Conclusion The use of age-adjusted D-dimer could have avoided an unnecessary CTPA in 14 patients (16%) with a 100% negative predictive value. Moreover, CTPA was more likely to be a rate-limiting step in discharging patients with a negative age-adjusted D-dimer. We would go on to recommend that this is routinely adopted in all centres to reduce the number of CTPAs performed, aid admission avoidance and avoid unnecessary radiation exposure. We are hoping to expand this through TRACHEA network to review multicentre feasibility and prospective analysis.

P44 SENSITIVITY OF THE YEARS DIAGNOSTIC ALGORITHM IN AN UNSELECTED UK COHORT

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10.1136/thorax-2022-BTSabstracts.180

Introduction The YEARS rule, in combination with varying D-dimer thresholds, has been demonstrated to reliably risk stratify patients and identify those requiring further investigation for pulmonary embolism (PE). The strategy has been found to have high diagnostic sensitivity in an Emergency Department (ED) population who have been pre-assessed by a clinician as having a <50% risk of PE and in an outpatient setting. Patients with no YEARS criteria have been considered to have PE excluded if they have a D-dimer <1000 ng/ml. In those with ≥1 YEARS criteria, various D-dimer thresholds have been proposed to reliably exclude PE.[1,2]

We investigated whether this diagnostic algorithm could be applied to a wider cohort of patients with suspected PE and if so, what D-dimer thresholds should be applied.

Methods A retrospective review of all CTPAs performed to investigate acute PE between March 2021 and January 2022 in a UK District General Hospital was undertaken. Clinical details and laboratory results were analysed and a YEARS score was retrospectively assessed. Various D-dimer thresholds were applied to evaluate the sensitivity of different strategies.

Results 739 consecutive CTPAs performed to investigate acute PE were reviewed. 149 PEs were identified (20.2% positivity rate). 9/149 patients presented with haemodynamic instability.

Abstract P44 Table 1

YEARS score and respective D-dimer threshold retrospectively applied	Sensitivity of strategy for identifying PE	Sensitivity of strategy for identifying PE with right heart strain
YEARS score = 0 D-dimer threshold 500 ng/ml YEARS score ≥1 D-dimer threshold 250 ng/ml	96.1%	100%
YEARS score = 0 D-dimer threshold 1000 ng/ml YEARS score ≥1 D-dimer threshold 7 x age for >50 years, 250 ng/ml for ≤50 years	85.0%	96.8%
YEARS score = 0 D-dimer threshold 1000 ng/ml YEARS score ≥1 D-dimer threshold 500 ng/ml[2]	77.1%	87.1%
YEARS score = 0 D-dimer threshold 1000 ng/ml YEARS score ≥1 D-dimer threshold 10 x age for >50 years, 500 ng/ml for those ≤50 years[1]	65.3%	67.7%

A further 13/149 had no D-dimer result. These groups were excluded from analysis.

Of the remaining 127 patients, 33 had CTPA performed via ED. 94 had CTPA either via ambulatory care or as an inpatient investigation.

CT evidence of right heart strain was seen in 31 cases.

Table 1 indicates the sensitivity of applying different D-dimer thresholds.

Conclusion Use of YEARS strategies proposed in previous studies reduces sensitivity when applied to an unselected UK population with acute PE[1,2]. The significance of, and optimal management strategy for small PEs is an area of ongoing research. However, in this series, up to a third of patients with PE associated with right heart strain may have been missed using previously described criteria.

We recommend that further research is needed before this strategy is used clinically in an unselected population.

REFERENCES

1. Freund *et al*. (2021) *JAMA*
2. van der Hulle *et al*. (2017) *Lancet*

P45 ASSESSMENT OF BLEEDING RISK IN PATIENTS DIAGNOSED WITH PULMONARY EMBOLISM AT DIAGNOSIS AND FOLLOW-UP: A SERVICE EVALUATION AT A LARGE REGIONAL HOSPITAL

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10.1136/thorax-2022-BTSabstracts.181

Introduction Bleeding risk assessment in patients anticoagulated for venous thromboembolism (VTE) is important at treatment initiation to guide optimal anticoagulant choice, duration, and dose. Risk stratification of pulmonary embolism (PE) alongside bleeding risk at diagnosis can help personalise management. We evaluated risk stratification of PE and assessment of bleeding risk in a large regional hospital.

Methods We screened all CT Pulmonary Angiograms (CTPA) performed over a 3-month period and included those positive for PE. Data was collected on the number of patients receiving thrombolysis for PE, those anticoagulated (including choice and duration of agent), documented assessment of bleeding risk at initiation and follow up, and any adverse bleeding events. We retrospectively calculated sPESI, VTE-BLEED and HASBLED scores for each patient.

Results Over 3 months, 480 patients underwent CTPA. 87/480 (18%) had PE; age range 18 to 90 years, median 67. 56 had peripheral PE, 27 central and 4 both. 4/87 (4.6%) were thrombolysed (one with half-dose thrombolysis). All thrombolysed patients had an assessment of PE severity performed to aid risk stratification; 2/4 were haemodynamically unstable, 1/4 had sPESI calculated, 3/4 had troponin measured and all four had investigation for RV dysfunction on echocardiography or CTPA prior to receiving thrombolysis. An additional patient was considered for thrombolysis but did not receive this due to contraindications.

All 87 patients received anticoagulation (DOAC 73%, LMWH 17%, warfarin 10%). 58/87 (66%) were not counselled on anticoagulation at treatment initiation. 6/87 patients died during admission and 2 were lost to follow-up. A bleeding risk score was not performed in 85/87 (97%) at treatment initiation and in 79/79 (100%) at follow-up. Four patients had a clinical assessment of bleeding risk at follow-up. Six patients had adverse bleeding events, three were major and three were clinically relevant non-major episodes.

Conclusions Most patients were not counselled at initiation of anticoagulation and did not have bleeding risk assessments at initial or follow-up visits. Bleeding risk scores are an objective, albeit unvalidated, method of assessment and can help individualise management of PE.

P46 SARS-COV-2 – A MAJOR RISK FACTOR FOR PULMONARY EMBOLISM, A RETROSPECTIVE OBSERVATIONAL STUDY FROM A SINGLE TERTIARY CARE HOSPITAL

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Introduction Pulmonary Embolism (PE) is a well-known respiratory complication with incidence around 60–70 per 100,000 globally. During the pandemic, SARS-COV-2 emerged as a substantial risk factor for PE.[1,2]

The objective of this study is to depict the incidence of PE in patients with COVID-19 illness in a tertiary hospital for the period of October-December 2020.

Methods In this retrospective cross-sectional observational study, all patients who presented to the UHL trust between October 2020 and December 2020 with a suspicion of PE were included. Of 1062 CTPA requests, 132 were disregarded, and 930 participants with CTPA were reviewed.

Results Out of 930 Patients (543 female and 519 male), 621 were non-covid while 309 were covid patients. Total incidence of PE in this study was 14.6%(136/930). 13.3%(41/309) of

Abstract P46 Table 1 Incidence of pe by gender and covid status

	COVID POSITIVE (309)	COVID NEGATIVE (621)	TOTAL (930)
PE	41 (13.3%)	95 (15.3%)	136 (14.6%)
Male	28 (9.1%)	52 (8.4%)	80(8.6%)
Female	13(4.2%)	43 (6.9%)	56(6.0%)
No PE	268 (86.7%)	526(84.7%)	794 (85.4%)
Male	161 (52.1%)	218(35.1%)	379 (40.8%)
Female	107 (34.6%)	308(49.6%)	415(44.6%)
Total	309 (100%)	621 (100%)	930(100%)

the covid patients had PE,(25 with positive swab and 16 radiological diagnosis). Along with covid infection, 4 of these patients also had additional risk factors (3 malignancy, 1 recent Endoscopy). Of the 621 non-covid patients, 15.3%(95/621) developed PE. In the PE cohort, none of the patients had recent COVID Vaccination.

Of 41 covid patients with PE, 28 were men and 13 women. 12 patients required higher respiratory assistance (1 death); 5 required ICU admission, 5 required CPAP support and 2 required high flow oxygen. In terms of clot burden, 14 had light burden, 6 had moderate burden, and remaining (21) had a high burden (6 had right heart strain).

Comparing D-dimer values, 2 had readings ≤1 mcg/mL, 5 between 1–2 mcg/mL, 12 between 2–5 mcg/mL, 5 between 5–10 mcg/mL, 3 between 10–20 mcg/mL, 9 had readings ≥20 mcg/mL and remaining (5) were clinically suspected.

Conclusion Covid-19 has been identified as a significant risk factor for PE. These patients must be anti-coagulated in order to avoid various complications, including life-threatening arrhythmias, severe hypoxemia, shock, even death.

REFERENCES

1. Jevnikar M, *et al*. Prevalence of pulmonary embolism in patients with COVID-19 at the time of hospital admission. *European Respiratory Journal* 2021 Jul 1;**58**(1).
2. Katsoularis I, *et al*. Risks of deep vein thrombosis, pulmonary embolism, and bleeding after covid-19: nationwide self-controlled cases series and matched cohort study. *BMJ* 2022 Apr 6;**377**.

P47 RETROSPECTIVE APPLICATION OF THE YEARS ALGORITHM TO AN AMBULATORY PE CLINIC COHORT

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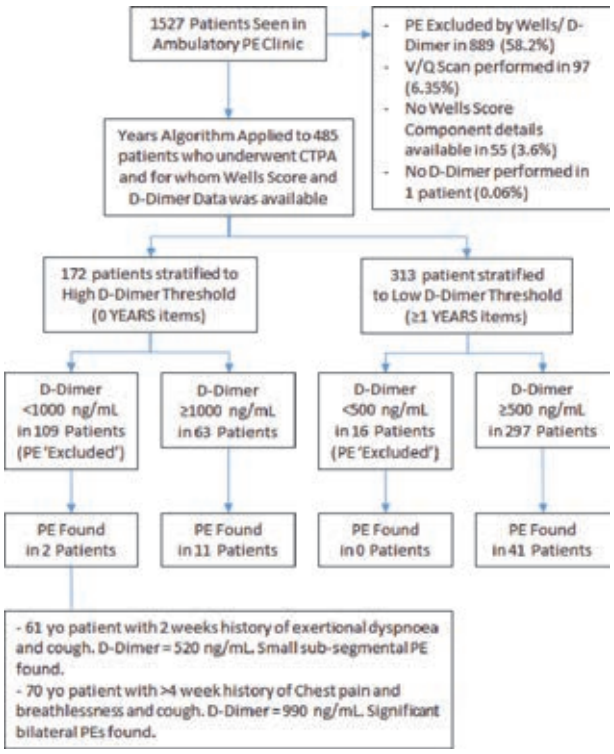
10.1136/thorax-2022-BTSabstracts.183

Background Despite routine use of the Wells score and D-Dimers (DD) high proportions of CTPAs are negative, increasing unnecessary exposure to the risks of CT contrast and radiation. Variable presentation and high perceived risk of missed PEs makes risk stratification complex. The YEARS algorithm offers a more specific tool to reduce the number of CTPAs performed without increased risk.

Methods This audit applied the YEARS algorithm to ambulatory patients who had undergone CTPA for suspected PE, treated based on Wells score and DD. Patients were stratified as either high or low risk by the presence of any one of the YEARS items: clinical signs of DVT, PE the most likely diagnosis, haemoptysis. DD cut offs for ruling out PE were applied: ≤500 ng/mL for high risk and ≤1000 ng/mL for low risk. The outcome measures were the number of positive CTPAs missed and the number of CTPAs avoided.



Abstract P47 Figure 1

Results 1527 events were reviewed with 485 (32%) included in our analysis. Detailed findings are shown in figure 1. Two CTPAs (0.4% of scans) were positive for PE, which may not have been performed using the YEARS algorithm (one sub-segmental PE and one PE with atypical history and borderline DD of 990 ng/mL). Application of the YEARS algorithm would have avoided 121 (25%) of all CTPAs.

Conclusion In this audit, application of the YEARS algorithm potentially reduced CTPAs by 25% without significant increased risk.

'Sleepless in Seattle' – Treatments and monitoring in sleep and ventilation

P48 AN OBSERVATIONAL, CROSS-SECTIONAL STUDY TO INVESTIGATE WHETHER ROOM-AIR VENTILATORS, USED IN THE COMMUNITY SETTING, ARE COLONISED WITH POTENTIAL AIRBORNE PATHOGENS (IPAP STUDY)

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10.1136/thorax-2022-BTSabstracts.184

Introduction Long term ventilation (LTV) is a widely used treatment for the management of patients with chronic respiratory failure. As use increases, it generates further questions about aspects of care. One issue is the potential risk of contamination within the device itself and the potential risk of respiratory tract infections to a subsequent user of the device.

Methods Using an observational cross-sectional study design, the primary objective of this study was to identify whether airborne bacterial and fungal pathogens are present within a NIPPY 3+ room air ventilator following use in the community setting.

Microbiological samples in the form of one single charcoal swab were taken from two specified areas of the device internal airflow pathway.

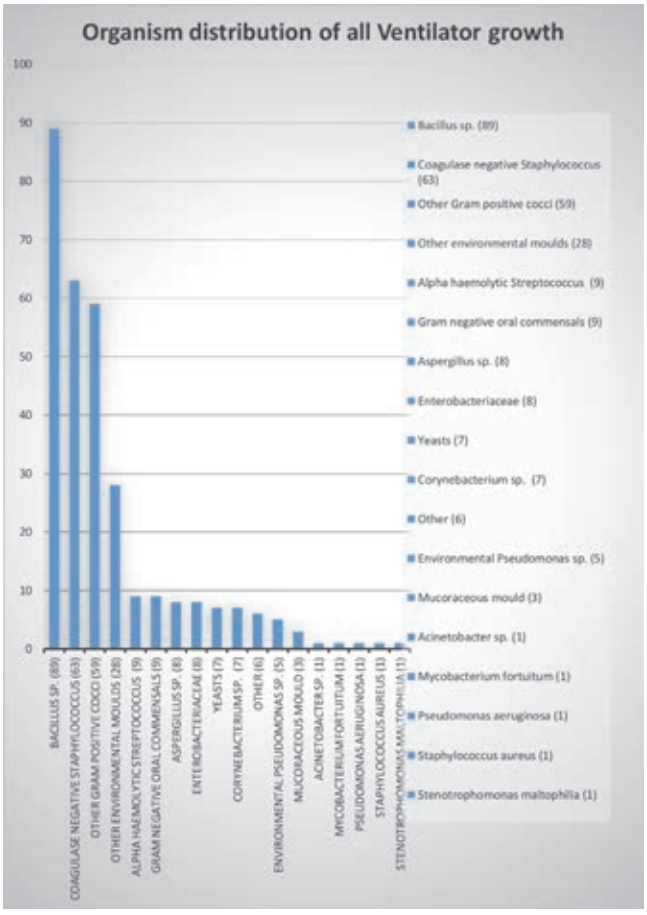
Results A total of 243 ventilators were sampled. 215 with complete data collection were included in the study. 84 (39%) were identified as no growth and 131 (61%) were positive for bacterial and/or fungal growth.

Overall 307 organisms were grown from 131 ventilators ranging from 1 to 6 organisms per swab. Organisms grown are presented in figure 1.

Of the 215 ventilators screened 15 (7%) grew organisms considered to be pathogenic. Of these, 14 grew 1 pathogenic organism and 1 grew 4 distinct pathogens.

Discussion This is the largest study to date exploring the potential presence of airborne pathogens in room air ventilators. We have demonstrated that 61% of these devices were positive for bacterial or fungal growth and 7% of these were pathogenic. Pathogenic organisms included *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Aspergillus* sp. Although growth of pathogenic organisms was relatively rare, there are important potential adverse clinical outcomes in patients with diseases commonly treated by LTV services.[1,2]

Conclusion We have shown that contamination of devices is rare but in 7% there is contamination with potentially pathogenic organisms, which if proven to be transferred between patients could be a cause of worse patient outcomes.



Abstract P48 Figure 1

REFERENCES

1. *Am J Respir Crit Care Med*. 2018 Jun 1;**197**(11):1410–1420.
2. *Ann Am Thorac Soc*. 2015 Nov;**12**(11):1602–11.

Please refer to page A214 for declarations of interest related to this abstract.

P49 CUSTOMISED MANDIBULAR ADVANCEMENT SPLINTS (MAS) THERAPY IN OBSTRUCTIVE SLEEP APNOEA SYNDROME (OSAS) PATIENTS- CLINICAL OUTCOMES AND FOLLOW UP

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Introduction MAS is a non-invasive alternative to CPAP in OSAS patients and the recent NICE guidelines recommends this therapy with an initial follow up at three months to review adjustment, symptom improvement and subsequent follow up as per patient's needs. We have retrospectively evaluated the clinical outcomes and follow up of all MAS referrals from our sleep services over a 2-year period (2018–2019).

Method OSAS patients who were not keen on CPAP or who had CPAP intolerance irrespective of the severity following a satisfactory clinical team led dental assessment were referred for consideration for MAS. Patient demographics, clinical outcomes and follow up schedules were evaluated.

Results 85 patients (Age; 50 ± 10, BMI; 31±6, ESS; 9±5, Neck circumference; 41 ±4 cm, ODI; 17±18, males; 76%, drivers; 67%) were referred to orthodontists for MAS. 86% (n=73) had OSAS (mild- 52%, moderate- 21%, severe- 13%) and 14% (n=12) were sleepy snorers. 51% had a CPAP trial prior to MAS referral. The CPAP compliance during the trial was suboptimal [mean ± SD compliance; 3±2.2 hours, median (IQR) duration; 93 (47–170) days] but with a significant difference in the Epworth Sleepiness Score pre and post CPAP trial (10 ±5 v/s 7±5, mean diff; -2.9, P= 0.007). There was no significant difference in baseline demographics (Age, BMI, ESS, ODI, neck circumference and driving history) between patients who had a CPAP trial and those who did not prior to MAS referrals (table 1). 90% (n=76) were accepted for a MAS, 6% (n=6) were declined due to poor dental status and 4% (n=3) did not attend. 29% (n=22/76) had a follow up at 3 months, (53%, n=40/76) between 3–6 months and the rest 18% (n=14) failed to attend following the first review.

Conclusions Satisfactory evaluation by the clinical team may lead to high acceptance for MAS. Despite a significant improvement in sleepiness, the CPAP compliance is suboptimal

Abstract P49 Table 1

Parameters	No CPAP (49%, n=42)	CPAP (51%, n=43)	P= value
Age	50 ± 9	48 ± 9	0.37
Body Mass Index	32 ± 6	33 ± 8	0.39
Epworth Sleepiness Score	8 ± 5	10 ± 5	0.08
Neck circumference (cm)	41 ± 4	42 ± 5	0.75
Oxygen Desaturation index	13 ± 14	21 ± 22	0.07
Current Drivers	56% (n=24)	67% (n=28)	0.37

in this group of patients. Adhering to NICE follow up guidelines is challenging despite a high number of patients accepted for MAS. This will remain an issue in the post COVID era. A dedicated MAS patient pathway may be helpful.

P50 EFFECTIVENESS OF AN NIV MASK ADAPTATION, IN REDUCING POST-GASTRECTOMY CRITICAL CARE UTILISATION

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10.1136/thorax-2022-BTSabstracts.186

Objective Many patients receiving long term ventilation (LTV) also require long-term nutritional support via a gastrostomy. Though gastrostomy insertion is a safe, and well-tolerated procedure, it can compromise ventilation due to positioning and sedation. General anaesthesia (GA) is high risk in these patients and may require critical care admission post-GA. Nasal non-invasive ventilation (NIV) during the procedure can be challenging due to leaks. To facilitate gastrostomy insertion whilst delivering safe NIV, we used a bronchoscopy elbow for endoscopic access as an adaptation to the NIV mask (adapted face mask). This study reports the development of our service in delivering ventilatory support during gastrostomy placement and to determine if this adaptation helped in reducing the complications.

Method We reviewed the gastrostomy database and electronic records of 77 patients, who had gastrostomy in 2014 – 2022. Since the use of the bronchoscopy elbow was introduced in 2017, the analysis was done for two time periods: 2014 to 2016 (Cohort 1) and 2017–2022 (Cohort 2). We compared the procedures performed during the two time periods.

Results The study population comprised of 26 patients in Cohort 1 and 51 patients in Cohort 2. The diagnoses included Motor Neurone Disease (45), Congenital muscle disease (25), and other (7)

In cohort 1 and 2, 16/26 (62%) and 18/51 (35%) respectively required HDU admission for monitoring. Complications were rare in both cohorts and included: pneumonia (4), malpositioning (1), dislocated jaw (1), failure of procedure (1) and pneumothorax from nasogastric tube placement (1).

Abstract P50 Table 1

	Cohort 1	Cohort 2
NIV-dependence	19%	29%
Interface		
• Adapted face mask	4%	73%
• Full face mask	38%	4%
• Nasal mask	50%	6%
• Tracheostomy	4%	6%
• Other	4%	11%
Gastrostomy Method		
• Percutaneous Endoscopic Gastrostomy	77%	98%
• Radiological inserted gastrostomy	23%	2%
Anaesthetic Technique		
• General Anaesthetic	58%	20%
• Local anaesthetic alone	12%	2%
• Sedation with propofol	31%	78%

Conclusion From this study, we found that by using this simple adaptation, gastrostomy insertion procedures could be performed more commonly with sedation. This has reduced post-procedure HDU use making it more cost-effective.

P51 CPAP TREATMENT OUTCOMES AND PATIENT CHARACTERISTICS IN RELATION TO THE LEVEL OF DIAGNOSTIC SLEEP STUDY

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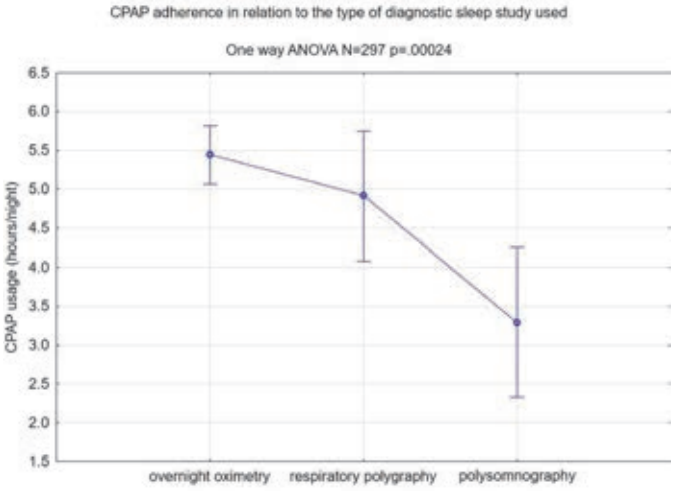
10.1136/thorax-2022-BTSabstracts.187

Introduction and Objectives Home oximetry (HO) or respiratory polygraphy (rPG) are the first line diagnostic sleep tests for people with suspected OSA. NICE guidelines recommend rPG or polysomnography (PSG) in people with negative HO who have significant symptoms suggestive of OSA. We wished to assess whether CPAP treatment outcomes are related to the level of diagnostic sleep study used.

Methods A retrospective study of consecutive patients who started CPAP therapy in 2018 and were initially investigated with HO followed by rPG or PSG if deemed clinically appropriate. Patients who underwent higher level sleep studies to establish the type of SDB picked up on HO and those who were subsequently found to have other sleep disorders contributing to their sleepiness were excluded.

Results 300 patients were included in the analysis. OSA was diagnosed based on HO, rPG and PSG in 73.7%, 15% and 11.3% of patients, respectively. There were no differences between the groups in age (54.3±13.7 years vs 57.0±12.2 years vs 51.5±11.0 years, respectively, p=0.186), gender (p=0.28) and baseline Epworth Sleepiness Scale (ESS) (13.3 ±4.9 vs 13.3±4.1 vs 14.3±4.7, respectively, p=0.539). Patients who were further investigated with rPG and PSG had lower BMI (rPG: 33.0±6.2kg/m2 vs PSG: 30.7±5.8 kg/m2 vs HO: 38.3±8.7kg/m2, p=0.000) and they were found to have less severe disease than those diagnosed on HO (4% ODI/AHI: 22.4±12 (PSG) vs 20.6±11 (rPG) and 39.7±26 (HO), p<0.0001). CPAP usage was lower among patients diagnosed on PSG than in the two other groups (PSG: 3.3±3.2 hrs/nt vs rPG: 4.9±3 hrs/nt vs HO: 5.4±2.8, p=0.000, figure 1)



Abstract P51 Figure 1

and they were also more likely to stop the treatment or never return for a follow up appointment: 31% (PSG) vs 12% (ON and rPG), p=0.002. However, there were no differences between the groups in ESS improvement in patients who continued CPAP treatment (ESS difference; -8.39±5.7 (HO) vs -7.6±4.6 (rPG) vs -7.4±5 (PSG), p=0.55).

Conclusions Patients diagnosed with OSA on PSG are less concordant to CPAP and more likely to withdraw the treatment which indicates that for some of them OSA may be an incidental finding. However, those who choose to continue CPAP report symptomatic improvement that is independent of the diagnostic method.

P52 POSTAL DIAGNOSTICS AND TELECONSULTATION CAN INCREASE ATTENDANCE FOR INVESTIGATION OF SLEEP APNOEA, WITH THE GREATEST IMPACT SEEN IN PEOPLE FROM AREAS OF DEPRIVATION

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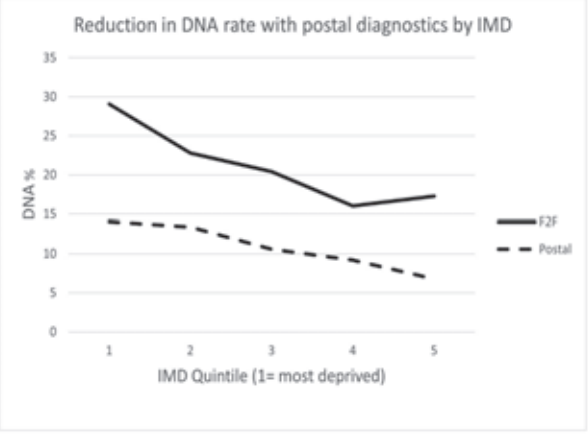
10.1136/thorax-2022-BTSabstracts.188

We have previously shown that people from areas of high deprivation referred to the sleep clinic with possible OSA, who attend, have worse symptoms, are more obese, more often have diabetes and hypertension and have more severe OSA compared to people from areas of low deprivation.[1] They are referred at lower rates and are more likely to fail to attend (DNA). We explored the impact of postal diagnostics and tele consultations on the DNA rates in the clinic according to levels of social deprivation.

To increase the accessibility of our sleep service we have trialled posting oximetry to patients and having a telephone consultation ('post/tele'). Our usual pathway has involved asking patients to collect an oximeter and attend a face-to-face appointment (F2F). We have run the 2 pathways simultaneously with in turn allocation according to capacity. We compared total DNA rates and that between quintiles of the Index of Multiple Deprivation (IMD least deprived = 5, most = 1) according to the person's home postcode. Data were extracted from hospital records for new referrals from East of England to the clinic from May 2021 to May 2022.



Abstract P52 Figure 1

There were 5001 people referred who were offered 5481 appointments. The overall DNA rate was 17.9%. For the people offered F2F appointments the DNA rate was 19.8%. 996 people were offered post/tele appointments and their DNA rate was 10.9% a relative difference of 45%. The largest difference in DNA rates between the 2 pathways was for people living in areas with the highest quintile of deprivation: actual difference 15%, relative difference 52% (Chi Square P = <0.0001) See figure 1.

Minimising difficulties attending appointments can have a major impact on DNA rates to appointments for diagnosis of possible sleep apnoea. The largest benefit in our cohort was seen among people living in the most deprived areas.

REFERENCE

1. Lee K, Adrienko N, Andrienko G, *et al* S129 Social deprivation appears to be a barrier to referral for investigation of obstructive sleep apnoea. *Thorax* 2021;**76**:A77.

P53 CPAP SUPPLY CHALLENGES TO UK SLEEP CENTRES IN 2022

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10.1136/thorax-2022-BTSabstracts.189

Background Continuous Positive Airway Pressure (CPAP) therapy is the standard treatment for patients with Obstructive Sleep Apnoea (OSA). Significant recent challenges have affected CPAP supply worldwide: increased CPAP demand, interrupted logistics during the COVID pandemic, worldwide Field Safety Notice (2021), plus CPAP component shortages.

Methods To understand the issues around CPAP delivery and supply, the OSA Alliance sent an email survey to all UK-based Sleep Centres listed on the Sleep Apnoea Trust database in February and again in June 2022.

Results We received replies from 22 (February) and 15 (June) UK centres, with 8 centres represented in both surveys.

91% (February) and 67% (June) of respondents confirmed ongoing CPAP machine supply shortages. In February, centres were receiving on average 50% usual delivery versus 73% in June. In June, centres described CPAP supply during the past 6 months as: improved 47%, worsened 47%, same in 6%. In free text comments, humidifier shortage was also mentioned by some.

Patients on the waiting list for CPAP varied between UK centres from 0–400 (February) and 0–260 (June). All centres with CPAP shortages were using the BTS Clinical Risk Stratification.[1]

In February, patients with high clinical priority according to the risk stratification requiring urgent CPAP therapy could start this quickly (1–2 weeks) in all centres, but the average wait time to start routine CPAP was 13 weeks (range 2 to 40 weeks). In June, the average wait for routine CPAP was 13.3 weeks (range 2–52 weeks). In both surveys, the majority of centres (86% February and 67% June) said delays were due to CPAP supply, not staff shortages.

Conclusions Ongoing CPAP supply issues have led to self-reported sleep centre delays in treatment for patients with OSA. CPAP supply appears highly variable between centres, meaning centres have searched for alternative suppliers; a time consuming task with teams not being trained on the respective

CPAP models. A humidifier shortage contributes to difficulties that may impact on CPAP adherence. Specific resource allocation towards CPAP provision for patients with OSA is required to address these issues and improve compliance NICE evidence-based therapeutic guidance in the UK.

The authors have produced this abstract on behalf of the OSA Alliance, UK.

REFERENCE

1. https://www.brit-thoracic.org.uk/news/2021/national-patient-safety-alert/

P54 THE IMPACT OF A CLINICAL DECISION SUPPORT SYSTEM IN THE ASSESSMENT OF CPAP COMPLIANCE IN OBSTRUCTIVE SLEEP APNOEA AND IN THE IDENTIFICATION OF RESIDUAL EXCESSIVE DAYTIME SLEEPINESS

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Background We have previously reported on the benefits of using a clinically validated computer guided consultation system i.e. clinical decision support software (CDSS) for the assessment of patients referred with suspected Obstructive Sleep Apnoea (OSA). However, NICE guidance state the importance of formally assessing CPAP compliance following therapy initiation. We aimed to study the impact of introducing a CDSS in our pathway following CPAP initiation and its utility in identifying patient cohorts of clinical importance.

Methodology The CDSS (SleepHealth Solutions Ltd) is an NHS Framework listed digital ecosystem comprising multiple intelligent consultations encompassing the entire OSA pathway acting as an 'end to end' system solution and an Electronic Patient Record. The CPAP 'compliance' consultation takes 10 minutes, has remote capability, contains medical alerts and intelligently directs the operator to ensure that upon completion, patients enter the correct clinical pathway.

Results 1283 patients (see table 1) established on CPAP underwent remote review with the CDSS by paramedical staff. 419 (33%) were deemed CPAP 'compliant' (CPAP usage $\geq$4 hours nightly for $\geq$70% of nights). 5% of those deemed 'compliant' were found to have an AHI$\geq$5 with an ESS>10 and were flagged by the software for CPAP adjustment/review. 15% of those 'deemed compliant (5% in total) were found to have residual Excessive Daytime Sleepiness (EDS; defined as CPAP 'compliant', ESS >10 & AHI<5 on CPAP) flagged by the software as requiring medical review. Prior to the introduction of the CDSS, no patients with residual EDS had been identified post CPAP initiation in the preceding 12 months (McNemar's test; $p<0.001$). 856 patients held a valid driving license of whom 15 (1.7%) specifically described driving related sleepiness as part of the consultation; post CPAP ESS significantly higher in this group (15 (SD 6) v 6 (SD 5)). Prior to the introduction of the CDSS, no patients specifically describing driving related sleepiness had been identified post CPAP initiation in the preceding 12 months (McNemar's test; $p<0.001$).

Conclusions The routine use of a CDSS post CPAP initiation ensures sleep services direct patients to the appropriate clinical pathway including early identification of those with residual EDS.

Please refer to page A214 for declarations of interest related to this abstract.

P55 THE IMPLEMENTATION OF A COMPUTER GUIDED CONSULTATION (CLINICAL DECISION SUPPORT SYSTEM) FOR THE ASSESSMENT OF SUSPECTED OBSTRUCTIVE SLEEP APNOEA IN A LARGE SLEEP SERVICE: A TWELVE MONTH ANALYSIS

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10.1136/thorax-2022-BTSabstracts.191

Background Following pandemic disruptions to sleep services and an increase in obstructive sleep apnoea referrals, we have introduced a novel clinical pathway central to which lies a comprehensive clinical decision support system (CDSS; SleepHealth Solutions Ltd) including a computer-guided consultation for suspected OSA. Previously, every referral letter and sleep

Abstract P54 Table 1 Study subgroup demographics

	Age (years)	Gender	Epworth score	AHI on CPAP	Median Usage (Hours/night)	Mean CPAP pressure (cmH20)
Total number of CPAP 'compliant' patients (n=419)	56 (13)	38% female	6 (SD 5)	4 (SD 5)	6.19 (SD 1.61) hours	9.98 (1.81)
CPAP 'Compliant' & AHI$\geq$5 & ESS>10 i.e. group requiring potential CPAP adjustment (n=21)	60 (SD 12)	33% female	16 (SD 3)	10 (SD 6)	5.24 (SD 1.38)	10.67 (2.18)
CPAP 'Compliant' & AHI<5 & ESS >10 i.e. residual EDS group (n=64)	56 (12)	52% female	15 (SD 3)	2 (SD 1)	5.94 (SD 1.54)	9.87 cm H20 (SD 1.90).
Total number of CPAP 'non-compliant patients (n=864) i.e. group requiring 'Compliance clinic' visit (n=864)	54 (13)	39% female	8 (SD 6)	5 (SD 8)	1.71 (SD 1.78)	9.26 (1.75)

study would be reviewed virtually by a consultant followed by a treatment decision, consultant appointment or discharge. Now, each patient undergoes a computer-guided consultation (termed 'Initial Review'), a sleep study if indicated by the CDSS which then integrates the data generating a 'final diagnosis' and prompts a management plan whilst alerting for 'high risk' patients e.g. sleepy drivers, potential hypoventilation. Sleep physiologists review each completed 'Initial Review' consultation and then proceed to CPAP or request consultant virtual review/clinic appointment supported by the CDSS.

Methods Data from patients attending the Sleep Service with suspected sleep apnoea from 1 March 2022– 10 May 2022 were extracted from the CDSS including history, demographics, diagnosis, investigation and treatment.

Results 1591 patients (mean age 50 (SD 8.76) years, 56% male, BMI 35.2 (SD 14.4), AHI 18.02 (SD 20.1) Epworth Sleep Score 10.4 (SD 5.8)) underwent an 'Initial Review' consultation. 83.8% of patients were diagnosed by the CDSS with obstructive sleep apnoea or possible sleep apnoea, 2.2% with central apnoea and 0.6% with obesity hypoventilation syndrome. 12.6% of patients were not diagnosed with a sleep condition. 52.5% started CPAP, 13.5% underwent further sleep studies, 11.9% were discharged and 4.15% were reviewed further by a physiologist.

6.5% of those patients entering the CDSS pathway required a virtual consultant review compared to over 85% prior to the implementation of the new pathway. 7.2% of patients entering the CDSS pathway required a consultant outpatient clinic appointment compared to 82% historically.

Conclusion The implementation of a clinical pathway using the CDSS improves efficiency, greatly reducing the need for Consultant review while delivering high quality consistent consultations, and maintains patient safety. This releases Consultant resource enabling assessment of complex and high-risk sleep patients.

Please refer to page A214 for declarations of interest related to this abstract.

P56 CPAP COMPLIANCE, SAFETY AND OPTIMAL FOLLOW-UP; A RETROSPECTIVE ANALYSIS

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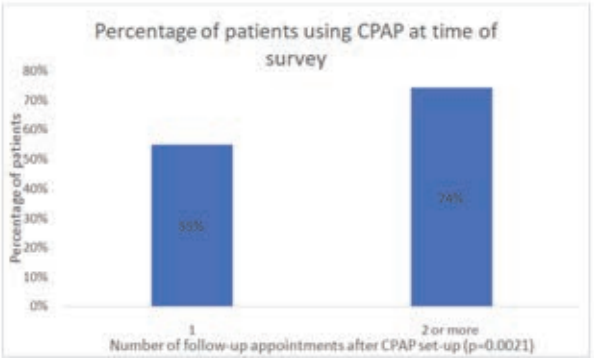
10.1136/thorax-2022-BTSabstracts.192

Introduction OSA affects 5% of the population and while CPAP is an effective therapy, studies have demonstrated that CPAP compliance is poor. The NICE guidelines recommend initial follow-up at one month following CPAP set-up and annual review once optimised. There are no specific guidelines and little published data on how long to continue monitoring for. We aimed to establish the optimal monitoring interval.

Methods We undertook a retrospective analysis of 327 sleep clinic patients who were previously discharged from our service from 2010 to 2015, via telephone survey. Ongoing use of CPAP and reasons for withdrawal, compliance, contacts with the service and somnolence were addressed.

Results 30.5% were male. Overall Mean (SD) age 56.6±11.5 years, BMI 35.8±8.8 kg/m^2, ODI 30.9±24.7 events/hour; 97/327 patients had stopped using CPAP (CPAP0) vs 230/327 continued (CPAP1). Despite mask discomfort accounting for withdrawal in 37%, contacts only occurred 0.3(±0.7) times. Withdrawal rates remained constant at 6%/year for the first 2 years after discharge. In CPAP0, there was an increase in usage after discharge if monitored for greater than 1 year initially (35.0±16.3 vs 27.2±15.0 months; p= 0.0366). CPAP0 were monitored for 12±14.5 vs 25.4±31.8 months in CPAP1 (p=0.0035). There was a numerical improvement in CPAP usage in CPAP0 if seen more promptly: 31±15.4 months for those seen within 4 weeks initially vs 21±18.0 months for those seen at 12–16 weeks(p=0.1585). 55% with a single a single follow-up were CPAP1 vs 74% with 2 or more follow-ups (p=0.0021). A total of 12% of all patients reported somnolence and continued to drive.



Abstract P56 Figure 1 Number of sleep clinic appointments after CPAP set-up and percentage of patients still using CPAP at the time of survey (p=0.0021)

Conclusions Longer time with the sleep service and increased contact improves CPAP usage. The lack of patient initiated contact and ongoing driving despite somnolence supports the need for ongoing regular review of patients once optimised, offering opportunities for motivational support and education to improve compliance and improve safety.

P57 IMPLEMENTING A NOVEL CLINICAL PATHWAY FOR THE ASSESSMENT OF OBSTRUCTIVE SLEEP APNOEA: INTEGRATION OF CLINICAL DECISION SOFTWARE WITH A PRACTICE SUPPORT SERVICE TEAM

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10.1136/thorax-2022-BTSabstracts.193

Background An increase in referrals for suspected Obstructive Sleep Apnoea (OSA) coupled with the impact of the pandemic threatens to overwhelm NHS Sleep services. The Liverpool Sleep service has implemented a novel pathway incorporating a clinical decision support system (CDSS) utilised remotely using a national call centre, the Practice Support Service (PSS) team.

Patient pathway/methodology The CDSS (SleepHealth Solutions Ltd) is an NHS Framework listed digital ecosystem comprising multiple intelligent consultations encompassing the entire OSA pathway acting as an 'end to end' system solution and an Electronic Patient Record. The PSS team operate remotely accessing a specific component of the CDSS (an 'Initial Review' consultation). 'Suspected OSA' referrals are sent to the PSS team who contact the patient arranging to undertake an 'Initial Review' remotely using the CDSS. This 'Initial Review' consultation generates a completed report placed in a

Abstract P57 Table 1 Outcome of patient experience survey

	Yes	No
Were you satisfied with your consultation?	Yes=82% (n=41) Yes, to some extent=18% (n=9)	0%
Was the process easy to follow?	Yes=84% (n=42) Yes, to some extent=12% (n=6)	4% (n=2)
Did you provide all required details using this format, or do you feel anything has been missed by this method of review?	Yes=88% (n=44)	No=12% (n=6)
Was there any information you did not feel comfortable disclosing in this appointment format?	Yes=14% (n=7)	No=86% (n=43)

secure digital portal. If indicated, a sleep study is expedited. The CDSS then integrates the sleep study results with the 'Initial Review' generating a final diagnosis which has clinical oversight.

Results Six hundred referrals were received in March 2022 of which 576 (96%) patients were eligible to undertake a consultation with the PSS team. 474 (82%) patients successfully completed the consultation, 42 (7%) did not respond despite 5 attempts at contact, 55 (10%) declined investigation upon being contacted and 5 (1%) could not be contacted on the scheduled appointment time. The mean time from referral receipt to PSS team contacting the patient was 18 working days (with mean time to consultation completion following first patient contact being 8 working days) which was significantly less than prior to PSS pathway implementation (mean 34 (IQR 19) days; McNemar's test; $p<0.05$) with PSS pathway diagnostic cost savings amounting to £16,200. 50 patients completed a user experience feedback questionnaire (outlined in table 1).

Conclusion The integration of a CDSS within the PSS pathway described here results in timely assessment of suspected OSA, a low 'missed appointment rate', health economic benefit and facilitates remote service delivery whilst resulting in a high level of patient satisfaction. This allows for a scalable community-based model for the assessment of OSA.

P58 SYMPTOMATIC IMPROVEMENT IN PATIENTS WITH EXCESSIVE DYNAMIC AIRWAY COLLAPSE (EDAC) FOLLOWING INITIATION OF POSITIVE AIRWAY PRESSURE THERAPY

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10.1136/thorax-2022-BTSabstracts.194

Excessive dynamic airway collapse (EDAC) leads to exertional and nocturnal supine dyspnoea, chronic cough and poor sleep, and is associated with a impact on quality of life (QoL). We sought to determine the effect of positive airway pressure therapy (PAP) on symptoms.

We included patients with a computerised tomography (CT) or bronchoscopic diagnosis of EDAC who had received PAP (either nocturnal or ambulatory) for greater than three months. Patients were asked to rate symptom burden including breathlessness at rest and on exertion, orthopnoea and cough frequency on a categorical Likert scale (0=none, 10=worst). They also rated sleep quality and QoL (0=worst, 10=best). Patients provided scores prior to and following the initiation of PAP. Data are presented as mean ± standard deviation.

22 patients (4 male) were included. Age at diagnosis was 54±11 yrs, BMI was 36±8kg·m^{-2}. Pulmonary function testing demonstrated FEV_1 1.6±0.5L (64±26%pred), FVC 2.5±0.7L (80±29%pred), FEV_1/FVC 65±17%, peak expiratory flow 4.5 ±1.7L/sec (71±27%pred), total lung capacity 5.3±1.3L (100 ±23%pred), TL_{CO} 6.4±1.5 mmol/min/kPa (82±17%predicted). Eight patients were former smokers. 5/22 patients had previously received bronchoscopic stent insertion as an attempt to treat symptoms, without any improvement. 4% overnight desaturation index was 3±3 evnets/hour. All patients were initiated on nocturnal PAP (adherence 7±2 hrs) and ambulatory continuous PAP with settings of 9±3 cmH_2O. Patients reported an improvement in all symptoms. Symptom scores pre-post PAP initiation: breathlessness at rest (8.4 v 3.8, $p<0.001$), breathlessness on exertion (8.5 v 4.6, $p<0.001$), orthopnoea (7.7 v 3.8, $p=0.001$), cough frequency (8.3 v 3.3, $p=0.001$), sleep quality (2.5 v 6.8, $p=0.002$), QoL (2.3 v 7.5, $p<0.001$). Improvement was reported within days by 75%, weeks by 17% and a year by 8% of patients.

Treatment with PAP in patients with EDAC improves respiratory and sleep symptom burden significantly and enhances quality of life. Current international guidelines do not include EDAC as an indication for PAP. Our data demonstrate that PAP should be considered a first-line treatment for patients suffering from symptomatic EDAC.

P59 CONTINUOUS POSITIVE AIRWAY PRESSURE THERAPY IN PATIENT WITH EXCESSIVE DYNAMIC AIRWAY COLLAPSE: A SINGLE CENTRE EXPERIENCE

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10.1136/thorax-2022-BTSabstracts.195

Background Excessive dynamic airway collapse (EDAC) is a potential cause for unexplained cough, breathlessness, inability to expectorate and frequent infections. Continuous positive airway pressure (CPAP) therapy is a potential treatment in EDAC; however, the evidence for long-term CPAP in adults with EDAC is weak. The aim of this service evaluation project was to assess clinical impact, tolerability, and adherence to CPAP in people with bronchoscopically confirmed (EDAC).

Methods We reviewed the clinical data of 62 patients with EDAC who were set-up on CPAP. Adherence to CPAP was compared to patient demographics and clinical characteristics.

Results Fifty patients (80%) reported improvement in their sleep, 23 patients (29%) reported improvement in their respiratory symptoms following initiation of CPAP. Thirty-eight patients (61%) were fully adherent (at least 4 hours usage on at least 70% of the days) to CPAP. The most common reasons

for non-adherence included mask discomfort, nasal blockage and lack of symptoms improvement. Adherence to CPAP did not relate to demographics, the mode (auto-set or fixed) or the intensity (pressure) of CPAP, the type of interface, humidification, blood or lung function test results. Pre-CPAP sleep studies were available in 30 patients which showed high prevalence of obstructive sleep apnoea (OSA, 80%) in this population.

Discussion CPAP is usually well-tolerated and often beneficial in this group of patients and the adherence to CPAP in similar or even better than of patients with OSA. OSA may be more common in EDAC and should be regularly screened in order to have a better therapeutic response.

P60 PROVISION OF HOME HIGH FLOW THERAPY FOR PEOPLE WITH COPD IS FEASIBLE AND ASSOCIATED WITH POSITIVE PATIENT EXPERIENCE AND REDUCED HOSPITAL ADMISSIONS

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10.1136/thorax-2022-BTSabstracts.196

Background Home high flow therapy (HFT) has emerged as a potentially useful respiratory support modality. NICE MedTech appraisal and NHS Scotland procurement framework provides support for prescription of home HFT in selected circumstances. Implementation experience with home HFT is required to determine feasibility and approach for further clinical trials and scale-up of service provision. Since 2018, we have offered treatment trials with home HFT on a case-by-case basis to patients with severe COPD; typically where there is severe dyspnoea, and/or frequent admissions, and/or evolving respiratory failure despite optimised management, with no indication for an alternative home respiratory support modalities.

Methods/Results A retrospective database and electronic health record review identified 27 patients with COPD who have trialled home HFT. Home HFT setup with either a myAirvo2 (F&P) or LumisHFT (ResMed) device typically required a 60-minute daycase review or clinician demonstration during an inpatient episode. Flow and temperature settings were directed by patient comfort; most patients opted for flow rates between 25–30L/min. Reported utilisation patterns varied between patient from regular overnight use to intermittent as required use during the day. Improvements were noted in the admission profiles of patient with COPD following initiation of home NHF (table 1). The majority of patients noted a positive experience, with ease of use of the therapy and improvement in at least one symptom domain. Five patients discontinued treatment because of comfort issues and perceived lack of benefit.

Abstract P60 Table 1 Improvement in hospital admission profiles of patients with COPD in year following initiation of home HFT

	Year prior to setup of home HFT	Year following setup of home HFT
Mean annual hospital admissions per patient	1.7	1.1
Mean annual occupied bed days per patient	13.7	9.7

16/27 patients with COPD commenced home HFT while using the LenusCOPD patient app, which captures daily patient-reported outcomes (PROs) and other detailed aggregated data, for future evaluations.

Conclusion Provision of home HFT within a breathing support service is feasible, with positive patient user experience and a reduction in hospital admissions noted in this retrospective cohort data review. Expanded use of remote-monitoring systems capturing PROs, connected therapy, physiology and event data will facilitate the required continued implementation-effectiveness evaluations of home HFT.

P61 CLINICAL CHARACTERISTICS OF PATIENTS WITH POSITIONAL OBSTRUCTIVE SLEEP APNOEA

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10.1136/thorax-2022-BTSabstracts.197

Background Positional obstructive sleep apnoea (OSA) is defined as at least two-fold apnoea-hypopnoea index (AHI) in supine compared to non-supine position. Positional OSA is also recognised in the NICE OSA guideline as a treatable trait; however, the clinical burden of positional OSA is not fully understood.

Methods We reviewed the clinical data of 193 patients with no (n=69, AHI<5/hours) or mild (n=124, AHI 5–14.9/hours) OSA who were referred to our service with symptoms suggestive for OSA (snoring, tiredness, witnessed apnoea). The patients were further divided into four groups (g1=no OSA, no positional OSA, n=42; g2=no OSA, but positional OSA, n=27; g3=mild OSA, but no positional OSA, n=50; and g4=mild OSA with positional OSA, n=74). Age, gender, Epworth Sleepiness Scale (ESS), body mass index (BMI) and the percentage of snoring on home respiratory study were compared between the g1 vs. g2 and g3 vs. g4 groups.

Results There was no difference between the g1 and g2 groups in any of the investigated parameters. Interestingly, despite the similar AHI (9.1±2.8/hours vs. 9.9±2.9/hours, p=0.11), patients in the g3 group had significantly higher BMI (35.5±8.5 kg/m^2 vs. 30.3±5.3 kg/m^2, p<0.01) and ESS (11.6±5.4 vs. 9.3±5.8, p=0.03). There was no difference in snoring between the g3 and g4 groups (p=0.84).

Discussion Mild positional OSA is not associated with higher symptoms burden. Patients who would benefit from positional therapy therefore should be carefully selected.

'Training Day' – Learning from CF patients

P62 A DISCRETE CHOICE EXPERIMENT (DCE) TO QUANTIFY THE INFLUENCE OF TRIAL FEATURES ON THE DECISION TO PARTICIPATE IN CYSTIC FIBROSIS (CF) TRIALS

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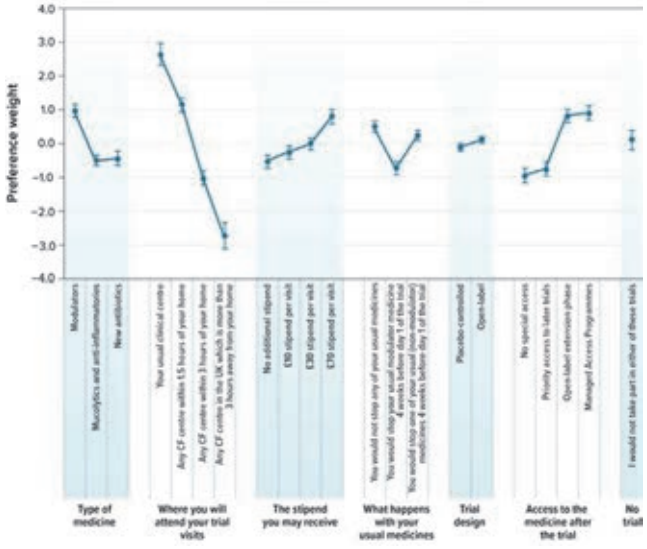
10.1136/thorax-2022-BTSabstracts.198

Background Patient-centred trial designs improve research quality and efficiency, ultimately allowing safe drugs to reach clinic more quickly. Our qualitative work suggests quantifying 6 key trial attributes could define priorities for patient-centred

CF trials: type of medicine, trial design (placebo v open label), washout, stipend, location of visits, and post-trial drug access.

Method Preferences were determined using an online discrete choice experiment. DCEs use experimental design to systematically investigate the value participants place on multiple predefined features when making complex decisions. pwCF age 16 + were recruited through social media. Respondents considered 12 scenarios, choosing between 2 hypothetical trials (or 'no trial') characterised by attribute levels based on current CF trials. Attributes and levels were combined using efficient experimental design. The cross-sectional data were explored using a Random Parameters Logit model.

Responses Oct2020-Jan2021, n= 207. Never participated in a trial: 57%. Attributes are discussed in order of importance. (1) The strongest influence on the decision to participate was ***location of visits,*** pwCF favouring their usual centre and being less likely to participate the greater the travel distance. (2) ***Post-trial drug access*** ranked next. pwCF are less likely to take part if they do not gain access to the drug on completion. Open-Label extension phases or Managed Access Programmes were similarly persuasive in decisions to participate. Priority access to later trials did not encourage participation. (3) With regards to ***medicine type*** pwCF favoured trials of CFTR modulators over other drugs, with no strong preference between antibiotics & anti-inflammatories. (4) A larger ***stipend*** was associated with greater willingness to participate, to a maximum value of £70. (5) pwCF did not favour a ***washout*** period but were more prepared to washout non-modulators than modulators. (6) There was minimal difference in intention to take part in ***placebo vs open-label*** trials. There was a complex interaction between placebos and washouts. Subgroup data will be presented.



Abstract P62 Figure 1

Conclusions We identified factors that are most important to pwCF when deciding whether to join a trial. The European Cystic Fibrosis Society have agreed to incorporate our findings into their review process, meaning our study may realistically inform patient-centred trial design with benefits to recruitment and retention.

P63 LEVELLING THE PLAYING FIELD: IMPROVING ACCESS TO CYSTIC FIBROSIS CLINICAL TRIALS FOR A LARGE, REGIONAL POPULATION. LESSONS LEARNED FROM THE LONDON NETWORK OF THE UK CLINICAL TRIALS ACCELERATOR PLATFORM

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Background The Clinical Trial Accelerator Platform (CTAP) is a UK-wide initiative that brings together 28 Cystic Fibrosis (CF) centres to support patients in gaining access to clinical trials. Despite substantial progress in therapies in the last 10–15 years, there is still no cure for this life-limiting disease. There are dozens of drugs in the development pipeline and multiple clinical trials are being conducted across the globe. CTAP enables more CF centres to run a broader portfolio of clinical trials and increases the portfolio of CF studies in the UK. At the launch of CTAP, four London centres decided to

Abstract P63 Table 1 Results from CTAP London Network Survey

Strengths	Better communication & relationships
	Equity of access for patients
	Shared learning
	Increased experience for less experienced sites
	Attractiveness to sponsors
Weaknesses	Difficult to communicate with large numbers of staff regularly
	Extra work from PIC referrals
	High turnover of CTAP coordinators
	Limited slot allocation for competitive trials
	Variations between centres in R&D processes, costs and patient selection
Suggested improvements	Distribute workload between centres
	Streamline processes & developing SOPs to improve efficiency
	Staff development to encourage progression and retention
	Regular meetings and events
Tips for setting up a network	**Start now**
	Establish how sites will be selected to lead on studies, what is expected of them if they do lead, and what is expected of PICs.
	Agree on clear pathways from the onset for patient referral.
	Ensure relevant R&D representatives are invited to initial meetings.
	Communicate
	Set-up regular meetings from the onset and create open communication channels.
	Ensure there is a wide coverage of the MDT and that all contributing hospitals have a representative
	Discuss how slots will be allocated between sites.
	Build Relationships
	Set out to achieve a communal sense of purpose
	Aim for regular meetings, preferably with a social element
	Develop materials to help colleagues starting their trials experience

form a sub-network in a consortium-style collaboration. The purpose of the network was to ensure equity of access to trials for patients across the UK's capital, and to share experience and knowledge. Since 2017, 26 people with CF have been enrolled to 11 different trials using the Patient Identification Centre (PIC) system of the London Network, and this will grow in the coming months.

Methods The London CTAP Network uses a hub & spokes model to (a) provide cross-site support with knowledge and skill sharing and (b) utilise the inter-site referral system; patients can be referred from one PIC site to another specifically for a clinical trial. Three years into the programme we reviewed the network's practices through working group meetings and an online survey. Investigators, research nurses and research coordinators at each of the London Network sites were invited to give their opinions via Survey Monkey.

Results Findings from the working group, made up of 15 investigators, 5 research coordinators/nurses and 3 CTAP representatives, and survey are presented in table 1.

Conclusions We have identified the London network's strengths and weaknesses for patients, staff and institutions, and suggest next steps for further quality improvement. We share our findings here, as we believe they are relevant to others delivering research in regions outside of London, UK and in other disease areas. CTAP has been a popular programme and the London Network hub and spokes style model may be rolled out to other geographical regions in the UK delivering CF trials.

Abstract P64 Table 1 Themes identified from qualitative responses

What works well?	What could be improved?
Having home delivery	Would prefer not to get medicines from multiple different places
Using local service near to me	Have more of a buffer so I don't run out of my medicines
Easy to order from the team or homecare	Need to find ways to reduce oversupply or excess stock stored at home
With homecare, I don't have to remember, they tell me	Communication with homecare to arrange deliveries
I never run out	Online or app based ordering would be helpful
Well organised and efficient	Getting medicines more locally at my convenience
I can get it delivered to the address I need it to	Process or system issues (e.g. mix-ups)

P64 USING THE CFHEALTHHUB LEARNING HEALTH SYSTEM TO UNDERSTAND THE EXPERIENCES OF ADULTS WITH CYSTIC FIBROSIS OF OBTAINING REPEAT SUPPLIES OF NEBULISED MEDICINES: RESULTS OF A NATIONAL SURVEY

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Introduction CFHealthHub is a digital platform and behaviour change programme for people with cystic fibrosis (CF). We present part of the CFHealthHub Easy Medicines for Burden Reduction and Care Enhancement (EMBRACE) study, which was to understand participant experiences of obtaining repeat supplies of nebulised medicines.

Methods 1191 people who had consented to the CFHealthHub learning health system were emailed an online Qualtrics® survey containing both quantitative and qualitative questions. One reminder was sent after 2 weeks. Completed surveys were analysed using MS Excel® and themes were identified.

Results 203 (17%) surveys were completed (28 were <50% completed and excluded). 175 (14.7%) surveys were analysed. Participants were from 14 different adult centres, aged 16–75 y (mean 39.4 y) and 57.7% were female. Most people (58%) obtained medicines from a combination of routes (e.g., GP and/or hospital). 55% participants received 1+ nebulised medicines prescriptions from the GP. The hospital service differed by centre: dispensed in the hospital pharmacy then collected (49%)/delivered (83%); or a hospital prescription dispensed at a community pharmacy (39%). One third of people only received their nebulised medicines from homecare. Table 1 includes a summary of themes.

Conclusion Many people use more than one route to obtain their medicines, creating a need to manage ordering in different ways depending on the drug. There was a desire for more automation and online or app based ordering, and for all medication to be available from the same place. There is room for improvement in medication ordering systems. CFHealthHub real-time data capture can be used to personalise repeat supplies.

P65 ARE PATIENTS WITH CYSTIC FIBROSIS ATTENDING A VIRTUAL LEISURE CENTRE REPRESENTATIVE OF THE CYSTIC FIBROSIS POPULATION?

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Introduction This abstract compared adult patients with cystic fibrosis (PwCF) who have attended the Virtual Leisure Centre (VLC) with the whole CF population.

Background Exercise is an essential part for PwCF. However, due to the risks of cross-infection, they are not recommended to exercise together which can affect motivation and exercise adherence. Remote exercise might be an alternative solution. A UK adult CF centre has introduced a VLC service to deliver various exercise training through Zoom, thus, allowing PwCF to exercise as a group. The abstract aims to compare PwCF who have attended the VLC and the whole CF population in the CF centre.

Methods Demographic and routine data were collected, including age, gender, body mass index (BMI), most recent lung function before they joined the VLC, genotype, and numbers of intravenous antibiotic therapy per year. Data were compared to the data from the 2020 CF centre annual report.

Results 27 PwCF (12 females, 15 males; mean±SD age 33.5 ±9.4 years; BMI: 23.3±3.06 kg/m^2) started attending the VLC service since 2020. Mean FEV_1 predicted was 58% ±21.6%. Most patient genotypes (63%) were homozygous for

F508del and 29% of patient genotypes were heterozygous for F508del. 38.5% patients had intravenous antibiotics (range 1–7 courses/year, median=1) and 63% patients were on modulator therapy. The mean age of all patients registered with the CF centre (N=240) was 32.2 years, and the mean BMI was 23.4 kg/m^2. The mean FEV_1 predicted was 66.2%. 46.3% of them had had intravenous antibiotics and 80% of patients were on modulator therapy.

Conclusion Participants of the VLC were similar in age, BMI and FEV_1 predicted compared to the whole patients in the CF centre. The percentages of patients who had intravenous antibiotics and who were on modulator therapy were slightly lower in people of the VLC service compared to all patients in the CF centre. Therefore, patients attending the VLC could be representative of the whole CF population.

P66 PATIENT-REPORTED OUTCOMES IN PATIENTS WITH CYSTIC FIBROSIS WITH HOMOZYGOUS FOR THE PHE508DEL CFTR MUTATION ON LUMACAFTOR-IVACAFTOR TREATMENT: RESULTS FROM AN OBSERVATIONAL STUDY

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10.1136/thorax-2022-BTSabstracts.202

Background Previous studies showed that lumacaftor-ivacaftor (LUMA-IVA) provides meaningful clinical benefits in patients with cystic fibrosis who are homozygous for the Phe508del CFTR mutation. However, little is known about the patient perspectives and overall health related quality of life (HRQoL) following lumacaftor-ivacaftor initiation.

Methods Forty -four adult CF patients with homozygous for the Phe508del CFTR mutation were evaluated at baseline and prospectively three monthly for one-year post commencement of lumacaftor-ivacaftor using validated questionnaires assessing fatigue level (Functional Assessment of Chronic Illness Therapy -Fatigue (FACIT-fatigue) scale, sleep quality (Pittsburgh Sleep Quality Index (PSQI) score), sinonasal symptoms (Modified version of Sino-Nasal Outcome Test (SNOT-22), mental health (Patient Health Questionnaire -9 (PHQ-9) and General Anxiety Disorder-7 (GAD-7)) and CF-related quality of life (Cystic Fibrosis Questionnaire Revised (CFQ-R).

Results We observed mean +6.8± 13.0 (p=0.001) improvement in respiratory, mean+4.7±15.7 (p=0.04) improvement in body image and mean +16.1±36.0 (p=0.003) improvement in weight domains of CFQ-R. Mean -0.61 ± 1.9 (p=0.043) reduction in global PSQI score and sustained mean -3.0± 4.3 reduction (p=0.000) in modified SNOT-22 score one year after LUMA-IVA treatment were noted. No change or worsening in anxiety and depression scores (GADS-7 and PHQ-9) were reported.

Conclusion Lumacaftor-ivacaftor combination resulted in significant benefits in rhinologic QoL, sleep quality and respiratory, body image and weight domains of a disease -based tool cystic fibrosis questionnaire -revised (CFQ-R). Patient report outcome from CF patients suggest that LUMA-IVA treatment is associated with improved overall quality of life in PWCF. Multicentre, larger studies are required to further quantify the impact of LUMA-IVA on patient reported health and well being outcomes.

P67 MOVING INTO YEAR 7: A PILOT STUDY TO ASSESS TO THE USEFULNESS OF AN ON-LINE GROUP SESSION TO PREPARE YOUNG PEOPLE WITH CYSTIC FIBROSIS FOR TRANSITIONING TO SECONDARY SCHOOL

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10.1136/thorax-2022-BTSabstracts.203

Introduction Starting secondary school is a big step for any child and their family but particularly so if they have a chronic condition such as cystic fibrosis (CF). Hospital teams can assist with the preparation required for the transition. CF is different from other chronic conditions with respect to holding transition events, as face to face events are not possible due to the risk of cross-infection of different organisms between patients. In order to overcome this, the CF team at Alder Hey Children's Hospital created a virtual event named 'MI7' (Moving Into year 7).

Method Events were held via video conferencing software and questionnaires sent to all participants before the event and afterwards. All patients in year 6 cared for by the Alder Hey CF network were invited to participate with a maximum of 7 young people per group. Packs were sent out beforehand. Sessions consisted of ice-breaker games and CF team led discissions.

Results A pilot event was held in 2019. This was well-received and follow-up from the families was sought after the first term at secondary school. Unfortunately, due to the COVID pandemic, the event could not be held in 2020, but it went ahead in 2021 and 2022.

There was a distinct difference between the event held in 2019 and 2021/22, in that everyone (the hospital team members, and the patients and their families) was much more familiar with participating in a virtual event, due to the way this practice had become commonplace during the COVID pandemic.

Overall 22 people have participated in these events to date. 25% described being worried about going to secondary school. All young people gave at least one thing that they were worried about and the most common finding was getting lost (21%). The most common CF related worry was regarding taking creon and 12% cited this as a concern. Less than 25% of all concerns given related to CF with the remainder being more generic concerns.

All participants stated that they enjoyed the event and most found it useful.

Conclusion Transition events to help this patient population move from primary to secondary school are feasible, enjoyable for young people with CF and useful.

P68 CHANGING DEMOGRAPHICS OF THE CYSTIC FIBROSIS POPULATION WITH AGEING – HOW WILL THIS IMPACT FUTURE PROVISION OF CARE?

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Introduction and Objectives Survival in Cystic Fibrosis (CF) is increasing with advancing therapeutic options. CF patients aged ≥40 years represent a growing, heterogeneous group that constitute a large proportion of the total

patient cohort at our centre. Our objectives were to characterise the demographics of the CF population aged ≥40 years and identify areas that will impact the provision of future CF care.

Methods Retrospective study of CF patients aged ≥40 years attending a large CF centre from August 2018–2021. Data collected included genotype, spirometry, body mass index (BMI), exocrine pancreatic status, predominant respiratory pathogen, CF-related diabetes (CFRD) and renal function.

Results The number of patients aged ≥40 years increased during the 4-year study period, from n=82 to n=92.Within this group the proportion of patients aged >50 years increased from 29% to 46%. *Phe508del/Phe508del* was the most common genotype and >80% of patients were pancreatic insufficient at all measured timepoints (table 1). Median ppFEV$_1$ improved from 49% [34–71%] to 62% [48–82%] (p<0.001) and the number of people with a FEV$_1$ <30% reduced from 11 to 7 (7.6% of cohort in 2020). Median BMI did not change significantly moving from 23.6 [21.9–26.0] to 23.9 [22.5- 26.1] kg/m^2. *P. aeruginosa* was the predominant organism isolated each year. The number of patients with mild renal impairment, with an estimated glomerular filtration rate (eGFR) between 60–89 mL/min/1.73 m^2, increased from 16% in 2018 to 27% in 2021. The number of CF patients aged ≥40 years with a diagnosis of CFRD also increased, n=39 in 2018 versus n=46 in 2021. The number of patients on modulator treatment increased from 27% (n=22) to 82% (n=72).

Conclusion A significant proportion of CF patients with severe CFTR genotypes and classical phenotypic CF, previously associated with poor prognosis, are surviving longer. The proportion of these older patients now taking CFTR modulators is high. They have improved lung function and fewer have severe lung function impairment. Increased longevity is accompanied by complexities of ageing including end organ damage such as renal impairment and CFRD. Further research is required to assess the full impact of newer CFTR modulators on the older population.

Abstract P68 Table 1 Summary of changing demographics of the ageing CF population between 2018–2021

	2018	2019	2020	2021
Number of patients	82	89	92	92
Mean age ≥40 cohort	49 (±7.7)	49 (±7.9)	50 (±8.7)	50 (±8.0)
Phe508del/Phe508del(n)	30 (36.6%)	38 (42.7%)	36 (39.1%)	33 (35.9%)
Predominant organism	*P. Aeruginosa (n=53)*	*P. Aeruginosa (n=51)*	*P. Aeruginosa (n=69)*	*P. Aeruginosa (n=66)*
Median%FEV$_1$ predicted [IQR]	49.0 [34.0-71.0]	48.5 [33.3-71.5]	51.0 [40.0-66.0]	62.0 [48.0-82.0]
Median BMI (kg/m^2) [IQR]	23.6 [21.9-26.0]	23.6 [21.6-25.9]	23.9 [22.2–25.9]	23.9 [22.5-26.1]
Patients with exocrine pancreatic insufficiency	67 (81%)	74(83%)	77(84%)	78(85%)
Number of patients with CFRD	39(48%)	43(48%)	45(49%)	46(50%)
Number of patients with mild renal impairment (eGFR 60–89 mL/min/1.73 m^2)	13(16%)	19(21%)	14(15%)	25(27%)
Number of patients on CFTR modulator treatment	22 (27%)	28 (32%)	71(77%)	75 (82%)

P69 THE IMPACT OF ELEXACAFTOR-TEZACAFTOR-IVACAFTOR (ETI, KAFTRIO) TREATMENT ON THE OPINIONS OF CHILDREN AND YOUNG PEOPLE WITH CYSTIC FIBROSIS ABOUT PHYSIOTHERAPY AND NEBULISED TREATMENT: A QUALITATIVE STUDY

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10.1136/thorax-2022-BTSabstracts.205

Introduction and Objectives Highly-effective CFTR modulators have heralded a new era in cystic fibrosis (CF) care. Randomised studies have demonstrated substantial clinical benefits, but little is known about the lived experience of modulator therapy in young people. This study aimed to explore the experiences of people with CF (pwCF) aged 12–18 years starting on ETI, their parents/carers and health care professionals (HCPs). We focused on their life day-to-day and attitudes towards burdensome treatments (physiotherapy and nebulised treatment).

Methods Semi-structured, in-depth interviews were performed via videocall for pwCF, and their families/carers, and in-person with HCPs. Audio recordings were transcribed, and data coded and analysed using a reflexive thematic approach.

Results Twenty-seven participants were recruited (10 pwCF, 10 HCPs and 7 parents). Under the overarching theme *'I still can't get my head around how three tablets, can do what Kaftrio's done'* four main themes were developed, representing the perspectives of all participants. The first theme centred on the impact of ETI on physical and psychological health. Secondly, participants shared their experiences of the burden of treatment before and after ETI. Simplifying treatment and the balance between hope and fear was the third theme where participants expressed their attitudes about taking this step. The final theme, *'Kaftrio is a game changer'*, denotes the transformation that is occurring in CF clinical practice after ETI.

Conclusions Despite the positive impact of ETI on the health of pwCF, concerns were identified about the long-term outcomes of simplifying physiotherapy and nebulised treatment. The introduction of ETI has prompted a shift in traditional treatment approaches in CF, especially with regard to physiotherapy and nebulised therapy. ETI offers an opportunity to personalise treatment approaches, but it is important that the longer-term effects of simplifying other treatments are studied.

P70 CORRECTOR THERAPIES (WITH OR WITHOUT POTENTIATORS) FOR PEOPLE WITH CYSTIC FIBROSIS WITH CLASS II CFTR GENE VARIANTS (MOST COMMONLY F508DEL)

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Introduction Cystic fibrosis (CF) is caused by abnormal variants of the cystic fibrosis transmembrane conductance regulator (*CFTR*) gene, of which F508del, is the commonest. The F508del protein is degraded before reaching the cell

membrane. Therapy to correct this defect would benefit many people with CF (pwCF).

Objectives To evaluate the effects of CFTR correctors on clinically important outcomes in pwCF of any age with class II CFTR variants.

Methods We searched the Cochrane Cystic Fibrosis and Genetic Disorders Cystic Fibrosis Trials Register, reference lists of relevant articles and online trials registries. The most recent search was conducted on 31st December 2021. We searched for randomised controlled trials (RCTs) of parallel design comparing CFTR correctors to control in pwCF with class II variants and contacted authors for additional data. Two authors then independently extracted data, assessed risk of bias and evidence quality (GRADE).

Results A total of 34 RCTs were included (1754 participants); eight monotherapy RCTs (4PBA, CPX, lumacaftor, cavosonstat and FDL 169), fifteen dual-therapy RCTs (lumacaftor-ivacaftor or tezacaftor-ivacaftor) and eleven triple-therapy RCTs (elexacaftor-tezacaftor-ivacaftor, VX-659- tezacaftor-ivacaftor, VX-440-tezacaftor-ivacaftor and VX-152-tezacaftor-ivacaftor). For monotherapy trials, there were no clinically relevant improvements in quality of life (QoL) or lung function. For the dual therapy data, there were small but significant improvements in QoL and lung function. For lumacaftor-ivacaftor some participants experienced transient dyspnoea and an overall rise in blood pressure was noted. For triple therapy, there were improvements in QoL scores and respiratory function (FEV_1). In 175 participants with F508del/F508del elexacaftor-tezacaftor-ivacaftor improved QoL respiratory scores (MD 15.90 (95% CI 11.74 to 20.06)) and absolute change in FEV_1 (MD 10.20 (95% CI 8.26 to 12.14)) compared to control through six months.

Conclusions There is no evidence to support corrector monotherapy use and limited evidence to support dual therapy. There were significant and clinically relevant differences found across outcomes in the triple therapy studies, with improved safety profile. More research is needed into assessing these therapies in paediatric patients and the longer-term safety profiles of these new therapies, but these early results suggest this will be a transformational intervention for pwCF with class 2 *CFTR* gene variants.

P71 REMOTE RESPIRATORY SAMPLING AND UNUSUAL PSEUDOMONAS GROWTHS IN ADULTS WITH CYSTIC FIBROSIS: IS THERE A LINK?

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10.1136/thorax-2022-BTSabstracts.207

Introduction and Objectives In our adult cystic fibrosis (CF) centre, we anecdotally observed an increasing number of unusual Pseudomonas growths from respiratory samples. This coincided with the introduction of remote (postal) respiratory sampling (cough swabs/sputum) mostly driven by Covid19 pandemic. We aimed to quantify this observation by analysing microbiological trends since the introduction of remote sampling, describe treatment interventions and explore possible reasons for changes identified.

Methods Cough swab and sputum data were collected retrospectively over two 6-month time periods: 2019 and 2021 (Mar-Sep). Additional data were collected on demographics and treatment outcomes for unusual Pseudomonas growths. Any Pseudomonas growth other than *Pseudomonas aeruginosa* was defined as 'unusual'. Culture techniques were unchanged throughout the study period. Processing time = date sample received in lab – date sample requested.

Results 1911 respiratory samples (n=0 remote) were received in the 6-month period in 2019, compared to 966 samples (n=557 [57.7%] remote) in 2021. No statistically significant difference was found in sputum to cough swab ratio in 2019 (85.2%:14.8%) and 2021 (87.4%:12.6%; $p=0.12$). Among 1604 (83.9%) positive samples in 2019, 20 (1.3%) were unusual Pseudomonas growths v. 46 (5.5%) in 844 (87.4%) positive samples in 2021 ($p<0.001$). In 2021, across all samples, unusual Pseudomonas growths occurred after a median (IQR) processing time of 3 (5) days v. 2 (4) for all other positive samples ($p=0.03$). Remote samples were processed at a median of 2 (5) days v. 1 (3) day for non-remote ($p<0.001$).

Characteristics of both cohorts with unusual Pseudomonas growths are summarised in table 1.

Conclusion Despite nearly 50% reduction in respiratory sampling (likely a result of Covid19 and the introduction of the CFTR modulator 'Kaftrio'), our study demonstrated more than a 2-fold increase in growths of unusual Pseudomonas species in 2021. We found an association with longer processing times, which were more common with remote sampling. Mechanisms underlying this, such as contamination, require

Abstract P71 Table 1

	2019 cohort n=20	2021 cohort n=46	p value*
Remote samples	0 (0)	31 (67.4)	-
Age – years, mean (SD)	36.90 (9.65)	36.98 (13.25)	NS
Sex – Female n (%)	14 (70)	28 (60.9)	NS
F508del/F508del mutation n (%)	6 (30)	19 (41)	NS
Maintenance inhaled antibiotic therapy n (%)	13 (65)	27 (58.7)	NS
CFTR modulator therapy n (%)	7 (35)	40 (87)	<0.001
Unusual Pseudomonas species (n)	*Pseudomonas putida* (4) *Pseudomonas fluorescens* (4) *Pseudomonas rhodesiae* (2) *Pseudomonas synxantha* (2) Other (8)	*Pseudomonas putida* (12) *Pseudomonas fluorescens* (11) *Pseudomonas Monteilii* (4) *Pseudomonas libanensis* (3) *Pseudomonas proteolytica* (3) Other (13)	<0.001 (See text)
Clinical intervention n (%)			
Patient symptomatic and new therapy prescribed	5 (25)	10 (21.7%)	NS
Patient well and no action taken	3 (15)	15 (32.6)	NS
Patient well and new therapy prescribed	7 (35)	8 (17.4)	NS
New long-term prophylaxis initiated	0 (0)	4 (8.7)	NS
Incomplete data	5 (25)	13 (28.2)	NS
Regrowth of unusual Pseudomonas species on subsequent samples n (%)	1 (5)	2 (4.3)	NS

*Tests performed = Mann Whitney Test for processing time,t test for mean age, Chi square for ratios (Yates' correction where data size less than 5). NS=not significant

further investigation. Importantly, our data suggest that growths may be transient and treatment not always indicated. Our results suggest caution should be exercised when interpreting samples with long processing times, but further prospective studies are required.

P72 FEASIBILITY OF COMBINED STRUCTURAL AND FUNCTIONAL PROTON LUNG IMAGING IN YOUNG CHILDREN WITH CYSTIC FIBROSIS

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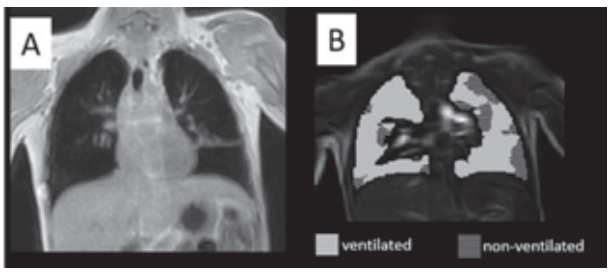
10.1136/thorax-2022-BTSabstracts.208

Introduction Cystic Fibrosis Transmembrane Regulator (CFTR) modulator therapies target multiple organ systems, but chiefly improve lung health. Modulators have maximal benefit when commenced in early childhood. There is a need for sensitive assessment of lung health in children. We have developed an MRI protocol to assess lung structure and function, as part of a multi-organ multimodal MRI CF study in young children. Herein we present the lung imaging feasibility data.

Aims To demonstrate the feasibility of this protocol in children 6–11 years.

Methods Children aged 6 – 11 years with CF, or healthy controls were recruited in a modified version of the GIFT-CF3 protocol (NCT04618185). A fasting gut and liver MRI was followed by a set meal, a gut and lung scan at 240 min immediately followed by a further meal then a gut scan at 300 min. Lung sequences included free-breathing lung Ultra Short Echo (UTE) and free breathing Phase Resolved Functional Lung (PREFUL). No breath holds are required for these scans. Other sequences included small bowel water content, colon volumes and gut motility, MR liver elastography (MRE), fat, and derived portal pressure. Children were distracted by watching a film during the scanning.

Results 17 children (14 CF, 3 controls) were recruited and undertook a scanning day prior to the commencement of elexacaftor-tezacaftor-ivacaftor (ETI). Mean age was 9.0 years (range 6.0 to 11.9). Lung sequences were obtained in 16/17 children. 16/17 children completed the scanning protocol despite a whole day of multiple scans and the young age of the participants. Representative images are shown (figure 1).



Abstract P72 Figure 1 Representative scan from a child with CF aged 6, FEV1 93% predicted, Z score -0.53. (A) Lung UTE structural image and (B) PREFUL fractional ventilation map (ventilation defect percentage = 21%).

Conclusion We have collected baseline pulmonary MRI structural and functional data on 14 children with CF and 3 controls. We plan to collect data on matched controls and further follow up imaging of children with CF after commencing ETI.

Please refer to page A214 for declarations of interest related to this abstract.

P73 A PROSPECTIVE MULTIFACETED EVALUATION OF THE IMPACT OF KAFTRIO IN CHILDREN WITH CYSTIC FIBROSIS

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10.1136/thorax-2022-BTSabstracts.209

Introduction Kaftrio (Elexacaftor-Tezacaftor-Ivacaftor) is a recently introduced CFTR modulator to treat people with Cystic fibrosis (CF) who have at least one copy of the F508del mutation. We have evaluated the wider efficacy of this treatment using the Cystic Fibrosis Questionnaire-Revised (CFQ-R), Warwick-Edinburgh Mental Wellbeing Score (WEMWBS) and a Pancreatic Exocrine Insufficiency Questionnaire (PEI-Q) in children aged over 12 years attending the Southampton Children's Hospital CF service.

Methods Questionnaires were completed before and 6–9 months after starting Kaftrio. The CFQ-R data were obtained using age-appropriate tools for children aged 12–13 years and over 14 years respectively. Data were obtained as a component of routine clinical care either face to face or through semi-structured telephone consultations. Data from participants who completed both sets of questionnaires were analysed using Wilcoxon signed ranked test.

Abstract P73 Table 1 Results from questionnaires. Median values reported.*only assessed in CFQ-R for subjects over 14 years of age (n=12)

Type	Domain	Pre	Post	P value
Median CFQ-R *(n=16)*	Physical	87.5	95.83	0.116
	Emotion	68.75	80	0.124
	Eat	100	100	0.57
	Treatment	72.17	66.67	0.346
	Social	66.67	71.83	0.532
	Body	88.89	88.89	0.811
	Respiratory	83.33	93.06	0.006
	Digestive	83.34	94.45	0.107
	Role*	83.33	91.67	0.084
	Weight*	83.34	100	0.131
	Vitality*	58.33	66.67	0.833
	Health*	66.67	83.34	0.082
Median PEI-Q *(n=16)*	Abdominal symptom score (A)	0.93	0.71	0.38
	Bowel movement score (B)	0.25	0	0.119
	Total symptom score	0.58	0.405	0.018
	Impacts (C)	0	0	0.564
	Total summary score	0.375	0.27	0.02
Median WEMWBS (n=16)		50	51	0.895

Results Twenty-seven children (11 aged 12–13 years, 16 aged over 14 years) completed pre-treatment questionnaires and 22 (7 aged 12–13 years, 15 aged over 14 years) completed post-treatment questionnaires. 16 participants completed both sets of questionnaires. All participants were pancreatic insufficient.

There was a trend towards improvement in all CFQ-R domains and this was significant for respiratory symptoms. There were significant improvements in abdominal symptoms and total summary scores for GI outcomes as measured by the PEI-Q suggesting improvements in symptoms due to pancreatic insufficiency. There was no change in WEMWBS scores.

Conclusion The assessment tools used in this study usefully identified improvements in gastrointestinal and respiratory symptoms. The lack of change in indices of mental well-being is probably a result of relatively good mental health in this age group prior to CFTR modulator treatment and may have been influenced by the impact of the COVID pandemic during which this study was conducted.

'Contagion' – The impact of COVID-19

P74 ASSESSING BURNOUT AND MENTAL HEALTH OF RESPIRATORY HIGH CARE UNIT (RHCU) STAFF TWO YEARS INTO THE COVID-19 PANDEMIC

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10.1136/thorax-2022-BTSabstracts.210

During the pandemic, our hospital established a RHCU to provide level 2 care for patients with severe Covid-19. Mortality rate was 54% over the first year. We designed a questionnaire around Patient Health Questionnaire-9 to assess the emotional impact upon our workforce. We also evaluated burnout, using the Oldenburg Burnout Inventory.

Staff retrospectively rated their pre-pandemic mental health (Feb 2020) and current mental health (Jan 2022). 60 questionnaires were circulated with 83% completed.

Doctors encompassed 28% of respondents, nurses 38%, HCAs 18%, and 16% were other clinical and administrative staff. 62% had worked on RHCU for $\geq$12 months.

72% felt their mental health had deteriorated. 94% reported their physical health had been negatively impacted.

In Jan 2022, 51% reported feeling depressed, 71% anxious, 46% tearful and 69% irritable, half the time or more. All figures had increased $\geq$2 fold compared to pre-pandemic levels.

The pandemic has affected personal life too, showing a 3.6 fold increase in strain on personal relationships compared to pre-pandemic. 70% reported difficulty with sleep pattern.

Worryingly, 71% scored high/very high using the Oldenburg Burnout Inventory. Levels of burnout were notably increased in junior doctors (88%) and staff nurses (89%), demonstrating high/very high levels of burnout. 75% of junior doctors and 56% of staff nurses were unsure or would not continue in their current role. These figures are incredibly concerning, considering that junior doctors and staff nurses make up one third of RHCU staff.

Our results highlight the need for urgent intervention for RHCU staff to prevent further burnout and improve mental health.

P75 EVALUATION OF A COMPLEX HOME VENTILATION POPULATION BEFORE AND AFTER THE ADVENT OF COVID-19 IN THE UK

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10.1136/thorax-2022-BTSabstracts.211

Introduction Although formal patient registries in complex home ventilation have long been recommended[1], recent review found few centres maintain accurate records of activity[2]. However, the ability to identify patient requirements such as dependence on home ventilation is essential for appropriate care and service commissioning[2].

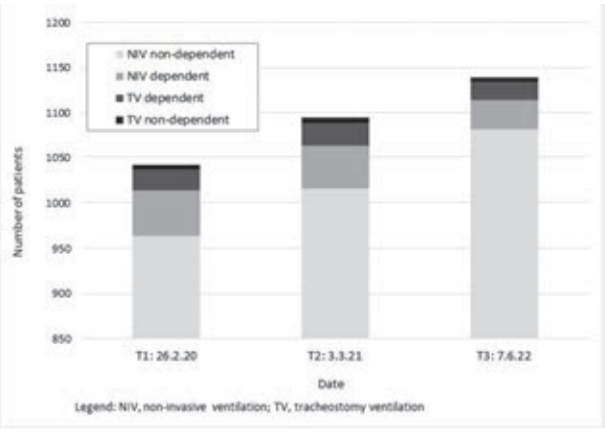
In the local setting, the regional ventilation service established a combined risk assessment and treatment registry in 2018. The Pro-VISO tool was developed with examples from national network. Four aspects of treatment risk were included (ventilation, V; interface, I; secretions, S, and oxygen, O) alongside diagnosis, equipment and settings.

This study aimed to examine the home ventilation registry for possible change in cohort characteristics before and after the advent of COVID-19 in the UK.

Methods Retrospective analysis of patient registry for ventilation method (invasive, non-invasive), ventilator dependence[2] (>14 h/night) and survival was undertaken. Comparison was made of three timepoints, one preceding and two after the first UK wave of COVID-19. Subgroup analysis was performed for mortality amongst non-invasive and invasive users with and without ventilator dependence.

Results Data was available for timepoints T1 (26.2.20), T2 (3.3.21) and T3 (7.6.22). Total caseload at T1, T2 and T3 respectively was n=1042/1094/1139 (figure 1), mean age 59.3 (SD 16.0)/58.9 (SD 16.2)/59.0 (SD 15.8), male 51.7/52.7/52.3%. Dynamic changes to the patient population were seen, with new referrals (T1–2, n=182/T2–3, n=285) and deaths (T1–2, n=132/T2–3, n=234). Subgroup analysis revealed an association between non-invasive ventilator dependence and mortality in T2–3 (n=19/52, 36.5%; p<0.0005). There was no association with mortality for this subgroup at T1–2, or any other group at any time.

Conclusions The apparent association between home non-invasive ventilator dependence and increased mortality in the



Abstract P75 Figure 1 Home ventilation delivery and dependence

second year of COVID-19 in the UK warrants investigation of unmet need in this patient group, compared with the invasively ventilated. Targeted review is planned in the local setting, facilitated by utilisation of home ventilation registry as a method of population surveillance.

REFERENCES

1. Lloyd-Owen SJ, *et al*. Patterns of home mechanical ventilation use in Europe: results from the Eurovent survey. *ERJ* 2005; **25**: 1025–1031.
2. Allen M. *Respiratory Medicine: GIRFT Programme National Specialty Report*. London: GIRFT, 2021.

P76 IMPACT OF THE COVID-19 PANDEMIC ON REFERRAL PROCESSES TO A REGIONAL OCCUPATIONAL LUNG DISEASE SERVICE – A SINGLE CENTRE EXPERIENCE

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10.1136/thorax-2022-BTSabstracts.212

Introduction The Covid-19 pandemic has dramatically impacted on both emergency and elective healthcare. Routine lung function testing in the community and the workplace virtually stopped overnight, working environments changed, with home working and the nationwide 'furlough' scheme. Little is understood about how these factors have impacted on regional Occupational lung disease (OLD) services.

Objective To investigate if and how the Covid-19 pandemic has affected the referrals into a regional OLD clinic, by comparing pre pandemic (2019) and peri/post pandemic (2021) referrals.

Methods All new OLD referrals seen in 2019 and 2021 were included for analysis. Information on primary diagnoses and routes of referrals was gathered from clinic letters.

Results The total numbers of new referrals seen in 2019 and 2021 were 116 and 68 respectively. The commonest route of referral in 2019 was primary care and regional Interstitial Lung Disease (ILD) service in 2021.

There was a substantial drop in patients referred from primary care (n=39, 34% in 2019 vs n=15, 22% in 2021) and workplace based occupational healthcare providers (n=21, 18% in 2019 vs n= 2, 3% in 2021).

Patients with underlying ILD (most commonly asbestosis or idiopathic pulmonary fibrosis) accounted for the commonest diagnosis (n=52, 45% in 2019 vs n=41, 60% in 2021). The number of patients diagnosed with airway diseases, including occupational asthma, halved (n=38, 33% in 2019 vs n=19, 28% in 2021).

Conclusion During the Covid-19 pandemic, we identified a 40% drop in referrals between 2019 and 2021, including a substantial reduction in referrals from workplace based occupational healthcare providers and primary care. Similarly, we diagnosed half as many patients with airway diseases, including occupational asthma.

Our observations are in line with the experience of other regional OLD services, and are most likely explained by: workers being furloughed or working from home, thereby removing harmful workplace exposures; or the cessation of routine workplace surveillance and community spirometry. British Thoracic Society has recently published a clinical statement on occupational asthma which reiterates that delayed diagnosis of occupational asthma has a poorer prognosis, so it is crucial that we ensure patients with suspected occupational asthma are referred early.

P77 OTHER IMPACTS OF COVID: OBSERVATIONS FROM THE FRONTLINE

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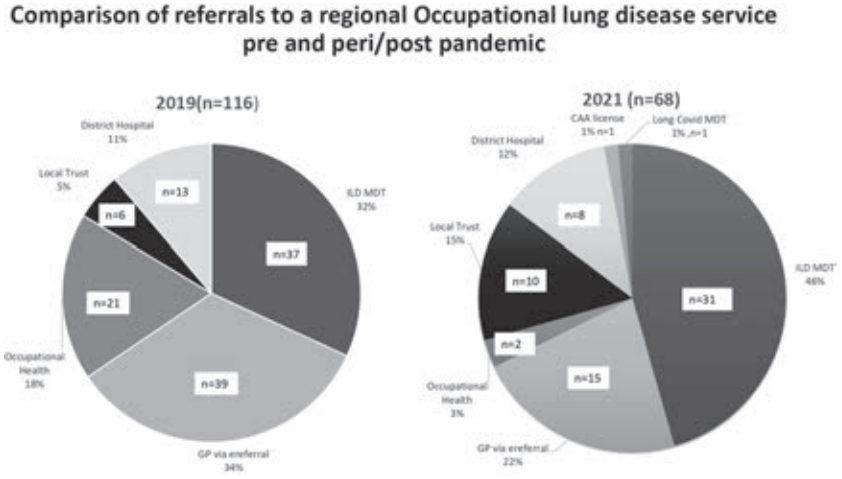
10.1136/thorax-2022-BTSabstracts.213

Background The toll from COVID has been profound; both directly and by the disruption and ongoing impact of resource restrictions on urgent non-COVID conditions like lung cancer. More lung cancer patients presenting with brain metastasis and in more advanced stages of lung cancer are evident. Early data reveals a significant decrease in the number of GP referrals and new cancer diagnoses during the pandemic, however, further high-resolution data is not yet available.

Aim We investigated the effect of the pandemic on lung cancer trends, diagnosis and stage at Darent Valley Hospital.

Methodology Detailed analysis of diagnosis, stage, and type of lung cancers was made from cross-sectional analysis of the months of February and September of each year from 2018 to 2022.



Abstract P76 Figure 1

Abstract P77 Table 1 Point prevalence (in the months of Feb & Sept) 2018 – 2022

Point prevalence (Feb & Sept)	2018	2019	2020	2021	2022 (only Feb 2022)
NSCLC	13	12	10	21	7
SCLC	3	5	1	0	3
Mesothelioma	1	3	3	1	0
Stage 1	27%	24%	29%	31%	28%
Stage 2	4%	12%	0%	3%	6%
Stage 3	14%	24%	06%	16%	17%
Stage 4	55%	40%	65%	50%	50%
M1a	7(35%)	9(45%)	4(28.5%)	5(22.7%)	2(20%)
M1b	3(17.6%)	0 (0%)	2(14.25%)	1(4.5%)	3(30%)
M1c	2(11.7%)	1 (5%)	5 (35.7%)	10 (45.45%)	4(40%)
Metastasis					
Brain	2 (11.7%)	1 (5%)	2 (14.2%)	5 (23%)	1 (10%)
Adrenal	4 (24%)	2 (10%)	1 (7%)	5 (23%)	1 (10%)
Bone	7 (41)	0 (0%)	3 (21%)	8 (36%)	7 (70%)
Liver	6 (35%)	3 (15%)	1 (7%)	7 (32%)	5 (50%)
Total	12 (71%)	10 (50%)	11 (79%)	16 (73%)	7 (70%)

Results Fewer new lung cancers were diagnosed in 2020 (n=157) compared to 2018 (n=206) and 2019 (n=178), but increasing in 2021 (n=175). The percentage of cancers diagnosed without histological confirmation increased in 2020 (34%) and 2021 (32%), compared to 2018 (27%) and 2019 (26%, p=0.09).

Discussion The number of Stage 4 cancers diagnosed during the two months analysed in 2020 (65%) was higher than 2018 (50%) and 2019 (40%). More adenocarcinomas were diagnosed in 2021 (79%) compared to 2019 (39%). In 2021, more patients had brain and bone metastases at time of diagnosis compared to 2018–20 and more M1c cancers were diagnosed in 2021 compared to 2020 (p=0.36) and 2019 (p=0.01).

Conclusion There was a drop in new lung cancer diagnoses and histological confirmation during the pandemic, followed by a trend of increased in numbers and more advanced stage at time of diagnoses in 2022 and statistical significant increase in patients with M1c.

While these findings are from a single centre, they highlight a pressing need to prioritise the analysis and publication of national trends. Understanding these trends and their causes – such as delays in presentation or referrals from primary care, and reduced access to diagnostic procedures – will be key to mitigating morbidity and mortality in Lung cancer in the UK.

P78 IMPACT OF COVID19 PANDEMIC ON THORACOSCOPY SERVICES – CHANGE IN PRACTICE TO DAY-CASE PROCEDURE

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10.1136/thorax-2022-BTSabstracts.214

Background Thoracoscopy under local anaesthesia (LAT) is a well-established diagnostic tool to evaluate patients with suspected malignant pleural effusion. Most centres in the UK admit patients post procedure for overnight monitoring and discharge home the next day. During first wave of COVID19 pandemic, elective procedures in particular aerosol generating were put on hold to mitigate risk of infection. Organising a bed for inpatient elective procedures also proved challenging.

Aim To assess outcomes in patients who were discharged same day post Thoracoscopy – diagnostic accuracy, complications and readmission within 30 days. The data was compared to the preceding year to evaluate the impact of change in practice.

Methods Retrospective review of consecutive LAT procedures in patients with suspected malignant pleural effusions between June 2020 – May 2022 (24 months)

Service was put on hold between March and June 2020.

Results Fifty-eight patients underwent LAT between June 2020 and May 2022.

Mean age 76 years.

Thirty-five patients diagnosed with malignancy – 22 mesothelioma, 11 metastatic adenocarcinoma, one clear cell carcinoma and one non small cell with squamous differentiation. 3 false negative pleural biopsies: 2 confirmed mesothelioma on Video assisted thoracoscopic surgery (VATS) and the other was lymphoma on axillary lymph node biopsy.

23 biopsies were negative for malignancy; 2 confirmed negative on VATS and the remaining confirmed benign by close monitoring. They included infection and organ failure. Overall diagnostic accuracy was 96.5%.

55 (95%) patients were discharged the same day. 40 (69%) of the patients had Indwelling pleural catheter (IPC) implanted.

Of the 95% of the patients only two patients were readmitted within 30 days post procedure due to procedure related chest pain and surgical emphysema.

Of the 3 (5%) admissions post procedure, only 1 had air leak; one was generally unwell and one patient was admitted due to social reasons and discharged within 48 hrs.

COVID19 LAT data was compared to the pre-COVID 12-month period, wherein 35 patients underwent LAT with mean length of stay of 1.91 days and none of the patients were re-admitted within 30 days post procedure.

Conclusion Our review suggests elective LAT can be safely performed as a day-case procedure in a tertiary centre with bed day cost savings. There were no significant immediate or late procedure related complications. Further large studies are required to validate our findings.

P79 ANALYSIS OF ANTIFUNGAL USE FROM 2015 – 2021 IN A TERTIARY CARE CARDIOPULMONARY HOSPITAL: THE IMPACT OF THE COVID-19 PANDEMIC ON ANTIFUNGAL PRESCRIBING PRACTICES

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10.1136/thorax-2022-BTSabstracts.215

Introduction and Objectives Understanding the trends in antifungal prescribing patterns within a hospital is crucial for providing benchmarking data to implement targeted

antifungal stewardship programmes in the future. Currently, there is little reported data on the trends and variations in antifungal prescribing practices within hospital trusts in the UK, particularly on antifungal usage in COVID-19 patients. This study aimed to analyse and compare the trends in antifungal usage from 2015 to 2021 within a cardiopulmonary tertiary care hospital in London, including assessing the impact of the COVID-19 pandemic on antifungal prescribing patterns. In addition, we aimed to assess whether the utilisation of antifungal agents in COVID-19 patients adhered to national guidelines.

Method Antifungal drug consumption data of 41161 patients was retrospectively analysed using 1.5 million electronic health records from a 312-bed tertiary care cardiopulmonary specialist hospital between 2015–2021. All data was administered and analysed using Python 3.0 software.

Results Overall, total systemic antifungal usage between 2015–2021 increased by 55.36% however decreased between 2019–2021 by 19.4% within the COVID-19 pandemic. Antifungal prescribing patterns in COVID-19 patients resembled general antifungal prescribing patterns previously within critical care, with liposomal amphotericin the most utilised antifungal agent differing from national and international management guidelines for COVID-19 associated pulmonary aspergillosis (1). In COVID-19 patients, 45.90% were given antifungals based on positive diagnostic data whereas 20.40% received empirical therapy.

Conclusion Overall, antifungal usage during the COVID-19 pandemic in a specialist cardiorespiratory hospital reduced. Antifungal prescribing patterns within critical care were continued during the COVID-19 pandemic rather than adherence to national guidelines. Use of real-time clinical informatic data can be helpful to tailor antifungal stewardship programmes to help optimise prescribing. Current ongoing work will integrate an additional dataset on antifungal consumption from a second 950-bed tertiary care hospital in London, to analyse the variations in antifungal prescribing patterns between hospitals.

REFERENCE

1. Koehler P, *et al*. Defining and managing COVID-19-associated pulmonary aspergillosis: the 2020 ECMM/ISHAM consensus criteria for research and clinical guidance. *Lancet Infectious Diseases.* 2021;**21**(6):e149–62.

Please refer to page A214 for declarations of interest related to this abstract.

P80 REBOUND IN ASTHMA EXACERBATIONS FOLLOWING RELAXATION OF COVID-19 RESTRICTIONS

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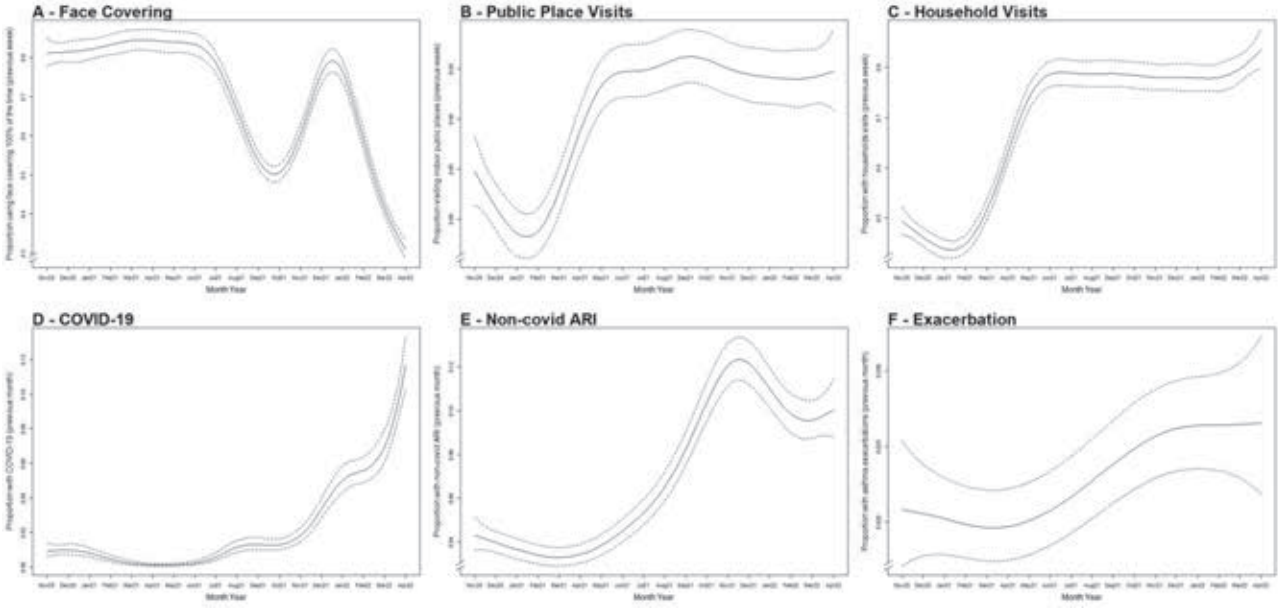
10.1136/thorax-2022-BTSabstracts.216

Introduction The imposition of COVID-19 restrictions in Spring 2020 was followed by a drop in asthma exacerbations in the UK.[1] Temporal trends in asthma exacerbations following relaxation of these restrictions have not yet been described.

Objectives To describe temporal trends in use of face coverings, social mixing, incidence of acute respiratory infections (ARI) and risk of exacerbations in a UK cohort of adults with asthma between November 2020 and April 2022.

Methods Participants (n=2740) were adult UK residents with doctor-diagnosed asthma who took part in a national population-based longitudinal study of COVID-19 (COVIDENCE UK). Details of face covering use, social mixing, and incidence of RT-PCR- or antigen test-confirmed COVID-19, non-COVID ARI (RT-PCR- or antigen test-negative for SARS-CoV-2) and moderate/severe asthma exacerbations (i.e. those requiring treatment with systemic corticosteroids and/or hospitalisation) were collected via monthly on-line questionnaires. Changes in these parameters over time were visualised using generalised additive models. Multivariate mixed logistic regression was used to calculate adjusted odds ratios (aOR) for associations



Abstract P80 Figure 1 Generalised additive models showing trends in behaviours and acute respiratory infections (ARI) from November 2020 to April 2022 in UK adults with asthma. A, visits to indoor public places. B, visits to other households. C, use of face coverings. D, RT-PCR or antigen test-confirmed COVID-19. E, ARI testing negative for SARS-CoV-2 by RT-PCR or antigen test. F, asthma exacerbations requiring treatment with systemic corticosteroids and/or hospitalisation. Dotted lines show 95% confidence intervals

between incident ARI and risk of asthma exacerbations, adjusting for age, sex, ethnicity, sociodemographic factors, self-rated health, asthma severity and asthma exacerbation history prior to enrolment.

Results COVID-19 restrictions were relaxed between April and December 2021. This period coincided with reduced use of face coverings ($p<0.001$), increased frequency of indoor visits to public places and other households ($p<0.001$) and rising incidence of COVID-19 ($p<0.001$), non-COVID ARI ($p<0.001$) and asthma exacerbations ($p=0.006$; figure 1). After adjustment for multiple potential confounders, incident non-COVID ARI associated with an increased risk of asthma exacerbation (aOR 7.04, 95% CI 5.73 to 8.65), as did incident COVID-19, both prior to emergence of the omicron variant of SARS-CoV-2 in December 2021 (aOR 5.56, 95% CI 2.85 to 10.81) and subsequently (aOR 6.73, 95% CI 4.59 to 9.85).

Conclusions Relaxation of COVID-19 restrictions coincided with decreased use of face coverings, increased social mixing and a rebound in ARI and asthma exacerbations. Associations between incident ARI and risk of exacerbation were similar for non-COVID ARI and COVID-19, both before and after emergence of the omicron variant of SARS-CoV-2.

REFERENCE

1. Thorax, 2021. **76**(9): p. 867–873.

Please refer to page A214 for declarations of interest related to this abstract.

P81 EFFECT OF COVID-19 INFECTION AND PREVENTIVE PUBLIC HEALTH MEASURES ON HAEMODYNAMICS, ACTIVITY AND QUALITY OF LIFE IN PATIENTS WITH PULMONARY ARTERIAL HYPERTENSION

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10.1136/thorax-2022-BTSabstracts.217

Introduction & Objectives In patients with pulmonary arterial hypertension (PAH), cardiopulmonary haemodynamics and exercise capacity relates to clinical outcomes, and exercise training improves cardiopulmonary function. Public health measures that limit physical activity have been widely enforced to reduce COVID-19 transmission. COVID-19 infection causes endothelial dysfunction, which is central to the pathophysiology of PAH. Here, we describe the temporal effects of UK government restriction measures on daily activity and quality of life (QoL) in patients with PAH and the effect of COVID-19 infection on cardiopulmonary haemodynamics and physical activity.

Methods Patients were enrolled in FIT-PH (NCT04078243) and implanted with remote monitoring devices that provided mean pulmonary artery pressure (mPAP), cardiac output (CO; CardioMEMS, Abbott), day/night heart rate (DHR/NHR), heart rate variability (HRV), and physical activity (PA; Medtronic LinQ). Data were transmitted and reviewed in accordance with established clinical protocols. Standard questionnaires were administered remotely to assess QoL (EmPHasis-10), anxiety (GAD-7), depression (PHQ-9) and collect dates of COVID-19 infection.

Results Following a lockdown, mean activity was reduced compared to pre-lockdown levels ($p<0.0001$, $n=26$). QoL was reduced ($p<0.01$), whereas anxiety ($p<0.001$) and depression scores increased ($p<0.001$) compared to pre-lockdown levels. During lockdown measures, there was no change in mPAP, CO, DHR, NHR, or HRV. Of the cohort, 7 patients contracted COVID-19, leading to an decreased CO, increased mPAP and total pulmonary resistance. Consistent with observed changes in haemodynamics PA, HRV, DHR were reduced and NHR increased.

Conclusions In this cohort of patients with PAH, protective health measures resulted in reduced daily activity and QoL and were associated with increased anxiety and depression indicators. COVID-19 infection resulted in acute changes to haemodynamics and physical activity.

'Toy Story II' – Paediatric lung disease: pot pourri

P82 IS THE PRESENCE OF BACTERIAL INFECTION IN NASAL BRUSHINGS ASSOCIATED WITH CHALLENGES IN PCD DIAGNOSTICS?

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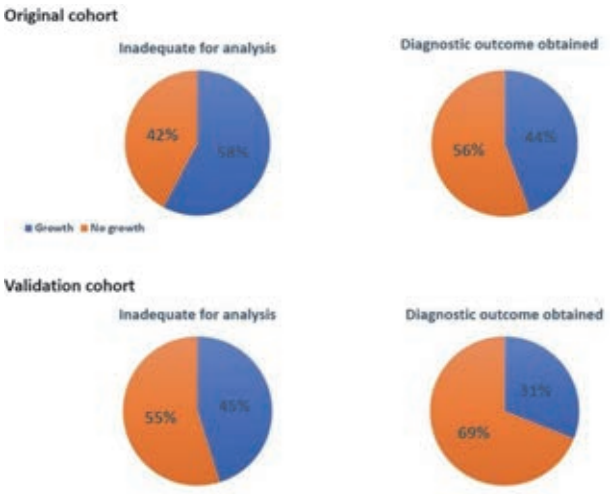
10.1136/thorax-2022-BTSabstracts.218

Introduction & Objectives Primary ciliary dyskinesia (PCD) is a rare inherited disorder caused by an abnormality of ciliary function. Early diagnosis of PCD is crucial to delay lung damage and preserve lung function. There is no gold standard diagnostic test, instead diagnosis requires taking nasal brush biopsies for high-speed video microscopy assessment of cilia motility, transmission electron microscopy of cilia ultrastructure, immunofluorescence to look at localisation of ciliary proteins and genetics to identify pathogenic mutations. Secondary ciliary dysfunction, which can be caused by infection and inflammation, can make this process more challenging. Studies have suggested repeat brushings are needed in up to 25% of patients and some cases will require up to 4 brushings.[1] Our aim to was to investigate the relationship between bacterial growth on nasal brushings and ability to secure a diagnosis.

Methods PCD diagnostic test results were analysed retrospectively, according to microbiology by standard culture techniques from the nasal brushing. Consecutive paediatric patients referred for PCD diagnostics included an original cohort of 526 patients referred between 2014–2017 and a validation cohort of 865 patients (2017–2021).

Results Combined, 39% of patients (46% in the original cohort, 34% in the validation cohort) had bacterial growth in the nasal brushing. We observed a numerically greater proportion of growths in patients with PCD compared to those without PCD in both cohorts, however this was not statistically significant. In the non-PCD group, there was no significant difference in mean (±SD) ciliary beat frequency according to presence (10.33 ± 2.08 Hz) or absence (10.20



Abstract P82 Figure 1 Relationship between nasal brushing microbiology and ability to obtain a diagnostic outcome. In both the original and validation cohorts, samples which were not adequate for analysis had significantly (p=0.047 and p=0.041 respectively) increased proportions with bacterial growths when compared to those in which a diagnostic result was obtained

± 2.18 Hz) of bacterial growth (p=0.428). Samples which were not adequate for analysis had significantly increased proportions of bacterial growths when compared to those in which a diagnostic result was obtained (figure 1).

Conclusion Contrary to much *in-vitro* data, there was no correlation between bacterial infection and ciliary beat frequency. We did however observe an association between the presence of bacteria and failure to reach a diagnosis. We would therefore recommend consideration of antibiotic treatment when repeat nasal brushing is needed.

REFERENCES

1. J Braun *et al*. European Annals of Otorhinolaryngology, *Head and Neck Diseases* 2017. **134** (6):377–382.

P83 CHANGES IN UK PAEDIATRIC LONG-TERM VENTILATION PRACTICE OVER 10 YEARS

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10.1136/thorax-2022-BTSabstracts.219

Introduction Paediatric LTV has grown exponentially over the last few decades in terms of both the number and type of children being ventilated Jardine et al, 1999; Wallis et al, 2011. In the last 10 years, the use of LTV in children has continued to evolve alongside significant improvements in the medical management of children with complex neurological/metabolic conditions and a broadening of the clinical scenarios for which LTV can be beneficial.

Objectives To provide up to date information on the use of LTV in the UK paediatric population and to compare the results with data collected 10 and 20 years previously.

Design A single time-point census was completed for all by LTV centres in the UK for all of the patients using their service, carried out via an on-line survey.

Results Data was collected from 25 LTV centres in the UK. The total study population was 2383 children and young people, representing a 2.5-fold increase in the last ten years. The median age was 9 years (range 0–20 years). Notable changes since 2008 were an increase in the proportion of children with central hypoventilation syndrome using mask ventilation, an increase in overall numbers of children with Spinal Muscular Atrophy (SMA) type 1,chronic lung disease of prematurity and cerebral palsy being ventilated, and a 4.2-fold increase in children using LTV for airway obstruction. The use of 24-hour ventilation, negative pressure ventilation and tracheostomy as an interface had declined. 115 children had received a disease-modifying drug. The use of Ataluren and Myozme did not influence the decision to treat with LTV, but in 35% of the children with SMA type 1 treated with Nusinersin the clinician stated that the use of this drug had or may have influenced their decision to initiate LTV.

Conclusion The results support the need for national database for children and young people using LTV at home to inform future recommendations and assist in resource allocation planning.

P84 'I AM NOT FIXED;' A QUALITATIVE STUDY EXPLORING THE VIEWS ABOUT RESPIRATORY CARE OF PEOPLE BORN WITH OA/TOF

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Introduction and Objectives Approximately 1 in every 4100 people worldwide are born with oesophageal atresia ± tracheo-oesophageal fistula (OA/TOF). Whilst surgical correction is, in most cases, performed within the early years, physiological dysfunction remains. The care of this group of people is disparate with no clear guidance or referral pathways outside of surgical management. With reflux and aspiration being commonly seen, respiratory symptoms are frequently encountered and often misdiagnosed. This qualitative study embedded within the ocelot study (https://tofs.org.uk/ocelot-study/), which seeks to determine a core outcome set for this patient population, explored the experiences of adults and children of living with OA/TOF.

Methods Five focus groups and five individual interviews were conducted via video conferencing software. The groups were facilitated by clinicians, researchers and Tracheo-Oesophageal Fistula Support (TOFS) charity leads. Participants were invited through the national TOFS charity and included individuals born with OA/TOF, or a parent of a person born with OA/TOF. A topic guide shaped the focus group discussion, but the group conversation was open and free. Data were transcribed, coded, themes identified and discussed within the team.

Results Participants included 12 adults with OA/TOF and 6 family members and four children with OA/TOF (aged 7–14). Despite varying ages and backgrounds, similar themes were common throughout.

The participants, regardless of age continued to face daily challenges with respiratory symptoms. They reported a misconception, particularly from general health care services, that they had been 'fixed at birth' and therefore no longer should experience symptoms related to their OA/TOF. Participants' lives were disrupted by having to make alterations to their life to allow for eating difficulties, persistent sleep issues, breathlessness, and chest infections.

Conclusions The level of ongoing disruption to life experienced by these participants was surprising to the clinicians on the team. There are indications that routine follow up beyond the paediatric years and altering the medical terminology, which implies someone has been fixed, may help to recognise the ongoing nature of any of the respiratory symptoms associated with this anatomical abnormality. Further work is required to develop an agreed lifelong standard of care for this group of patients.

Please refer to page A214 for declarations of interest related to this abstract.

P85 OUTCOMES OF SEVERE LIFE THREATENING BRONCHOPULMONARY DYSPLASIA (BPD) – SINGLE CENTRE EXPERIENCE

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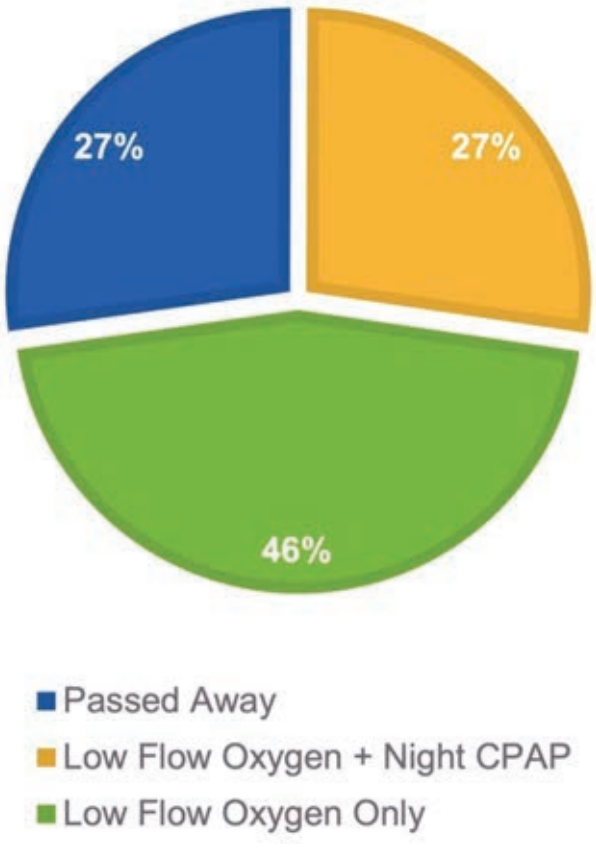
Introduction and Objectives There is increased recognition of the spectrum of post prematurity lung disease, life threatening Bronchopulmonary Dysplasia (BPD) is defined as the need for positive pressure (including high flow humidified oxygen) at 38 weeks corrected gestational age (CGA). A national mortality rate of 16% has been reported (1).

A proportion of babies who survive neonatal care continue to need respiratory support and have significant comorbidities. In this retrospective study, we sought to look at the outcome of babies who were transferred to the tertiary respiratory service for ongoing care.



Abstract P85 Figure 1

Methods Retrospective data analysis was undertaken between January 2013 to December 2021. Data included gestational age at birth and at transfer, length of stay (LoS) to discharge, mode of respiratory support and survival to discharge.

Results Eleven Babies were transferred at median CGA of 47 weeks (range 42–60 weeks). Gestational age at birth was median 26.3 weeks (range 23+6 – 29+0 weeks). All babies required either high flow humified nasal oxygen or nasal CPAP at the time of transfer.

The median LoS was 90 days (range 18 – 336 days) with median stay of 31 days on Paediatric Intensive Care Unit (PICU) (range 3–180 days). Three infants (27%) died and eight survived to discharge. Of those, three (27%) were discharged on non-invasive ventilation, and five (46%) on low flow oxygen. Age post term at discharge was median 5.66 months (range 3.25–9 months)

All surviving infants had a mean of 3 readmissions in the first year after discharge for a median of 41 days (range 0–129 days).

Conclusions Babies with severe BPD have prolonged PICU and hospital stay with a significant mortality risk. Mortality is higher when a definition of life-threatening BPD at 38 weeks is used. This outcome data has been used to inform discussions with staff and parents on our neonatal unit. A joint neonatal-respiratory MDT meetings have since been established to discuss babies at risk of severe BPD to promote effective communication and decision-making between families, neonatal and respiratory teams.

REFERENCE

1. Life threatening BPD a BPSU study. Naples R, *et al. Arch Dis Child Fetal Neonatal Ed* 2021;0:F1–F7.

P86 IS MULTIPLE BREATH WASHOUT A USEFUL TOOL IN OTHER RESPIRATORY CONDITIONS OTHER THAN CYSTIC FIBROSIS IN PAEDIATRICS?

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Introduction Multiple breath washout testing is widely used in the monitoring of Cystic Fibrosis, however, uses elsewhere are not well understood.

Method The use of multiple breath washout in non-CF patients over the course of the last 4 years was analysed. Nitrogen washout was the methodology of choice, using the Exhayzler D (Eco Medics, Switzerland) running software version 3.1.6. The data were collected retrospectively.

Results 17 patients (11 male) attended for multiple breath washout testing with a mean age of 8.8 years (range 2.8 – 16.2). 13 patients were able to successfully complete testing producing valid and reliable results. Mean (SD) LCI was 8.2 (2.4) and mean (SD) FRC was 1.5 (0.6). The indications included; ataxia telengectasia (4), alpha 1 antitrypsin deficiency (2), bronchiectasis and bronchiolitis obliterans (1), mitral valve disorder (1), low IgE (1), RSV positive (1), post bone marrow transplant (1), severe tracheobronchomalacia (1) and OA/TOF (1). Only one patient had an elevated LCI above the ULN which improved in correlation with clinical course.

Conclusion Multiple breath washout has been shown to be useful in monitoring CF disease. Some conditions may find

some benefit in using multiple breath washout especially in early years in detecting and monitoring lung disease. Further research is required to expand numbers within specific disease groups.

P87 ARE BLACK, ASIAN AND MINORITY ETHNIC (BAME) CHILDREN DISADVANTAGED PERFORMING SPIROMETRY?

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Introduction and Objectives Spirometry volumes are known to vary with ethnicity (ERJ2012 40(6) 1324–1345), but there are no studies focussing specifically on the variation in spirometry quality seen in children of different ethnicities. Given the importance of spirometry in monitoring lung health, any barriers to providing good quality spirometry should be addressed for optimal management of children with lung disease. Following earlier audit findings, we hypothesised that non-Caucasian children perform spirometry less well than Caucasian children.
Methods Patients with PCD and CF were selected from Royal Brompton Hospital databases using inclusion criteria. From this, retrospective data, which included patient demographics, relevant medical history, and lung function data, were extracted. Categorical data were analysed using Chi-squared test and continuous data were analysed using Mann Whitney-U test. $P<0.05$ was considered significant.
Results 90 PCD and 29 CF paediatric patients were included for analysis. We found that in the PCD cohort there were more Caucasian children with $\geq$ 2 (95%) and $\geq$ 3 (57%) acceptable spirometry manoeuvres compared to non-Caucasian children with $\geq$ 2 (81%, $p<0.01$) and $\geq$ 3 (53%, $p<0.01$) acceptable spirometry manoeuvres. In the CF cohort, more Caucasian children also had $\geq$ 2 (100%) and $\geq$ 3 (80%) acceptable spirometry manoeuvres compared to non-Caucasian children with $\geq$ 2 (93%) and $\geq$ 3 (50%, $p<0.01$) acceptable spirometry manoeuvres. On further analysis, we observed that FEV_1 and FVC z-scores, learning difficulties, hearing impairment, interpreter requirement and index of multiple deprivation were not significantly associated with these differences.
Discussion and Conclusion We found that non-Caucasian children had fewer acceptable spirometry manoeuvres compared to Caucasian children, which were not directly explained by the potential causal factors we analysed. However, given the retrospective nature of the study, we were unable to assess several factors including health beliefs and socio-economic factors directly. Although we accept the hypothesis, a further prospective study is needed to determine the reasons behind these observed differences, which could be used to inform and improve future healthcare strategies.

P88 AN ASSESSMENT OF SELF-PERFORMED HOME SPIROMETRY IN PAEDIATRIC ASTHMA PATIENTS

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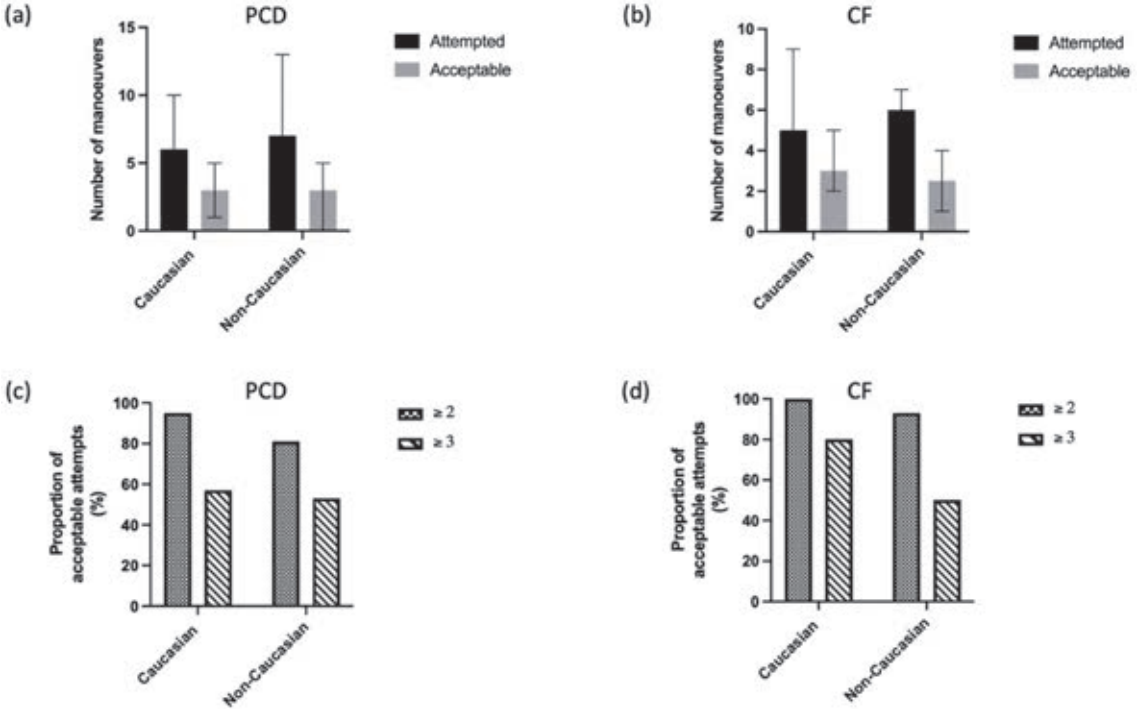
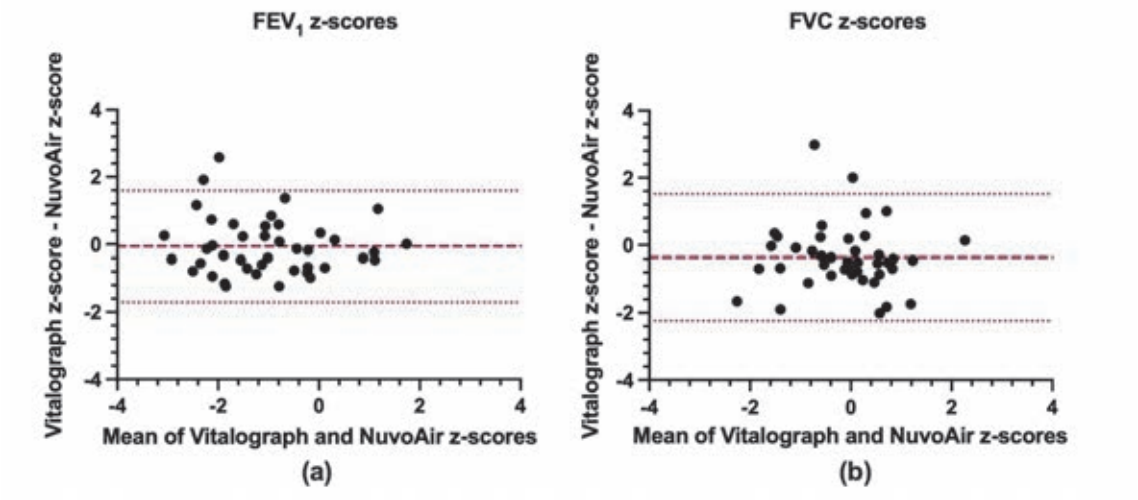
Introduction and Objectives At the start of the COVID-19 pandemic, paediatric asthma patients attending our clinic (Royal Brompton Hospital) were given NuvoAir spirometers



Abstract P87 Figure 1 Graphs showing attempted and acceptable spirometry manoeuvres. (a) Attempted vs acceptable manoeuvres in PCD cohort (b) Attempted vs acceptable manoeuvres in CF cohort (c) patients with $\geq$ 2 and $\geq$ 3 acceptable attempts in PCD cohort (d) patients with $\geq$ 2 and $\geq$ 3 acceptable attempts in CF cohort



Abstract P88 Figure 1 (a) Bland-Altman plot depicting mean and difference in FEV1 z-scores from Vitalograph and NuvoAir spirometers (n=43). The maroon dashed line indicates the estimated bias level, whilst the maroon dotted lines indicate the 95% limits of agreement. (b) Bland-Altman plot depicting mean and difference in FVC z-scores from Vitalograph and NuvoAir spirometers (n=43). The maroon dashed line indicates the estimated bias level, whilst the maroon dotted lines indicate the 95% limits of agreement

to monitor lung function at home. Previous studies have shown good agreement between home and clinic spirometers however these studies were carried out in the hospital setting, with spirometry supported by clinical staff. There have been no studies examining the real-world reliability of this clinical tool. We hypothesised that NuvoAir was a valid alternative to a conventional clinic spirometer (Vitalograph Alphatouch). This study aimed to investigate the technical reliability and validity of NuvoAir spirometer in paediatric asthma patients, in comparison to Vitalograph.

Methods We carried out a retrospective longitudinal study involving 43 patients. Three pre-pandemic Vitalograph sessions and three NuvoAir sessions were recorded for each patient. Spirometry grades were manually assessed according to the American Thoracic Society (ATS)/European Respiratory Society (ERS) guidelines. FEV_1 and FVC measurements were converted to z-scores using the Global Lung Function Initiative equations. The data were normally distributed and consequently analysed using a paired Student's T-test, Pearson's Correlation Coefficient and Bland-Altman plots.

Results Spirometry from 43 patients (mean age 13.9 years) was analysed. NuvoAir spirometry grade distributions were comparable to those from Vitalograph; 70.5% and 79.1% of grades were deemed acceptable according to ATS/ERS guidelines. Mean FEV_1 z-scores (mean ±standard deviation) were -1.05 ±1.39 and -1.11 ±1.34 ($p=0.650$), whilst FVC z-scores were 0.01 ±1.20 and -0.33 ±1.20 ($p=0.019$) for NuvoAir and Vitalograph respectively. Pearson's correlation coefficients were $r=0.78$ ($p<0.0001$) and $r=0.59$ ($p<0.0001$) for FEV_1 and FVC respectively. Bland-Altman 95% limits of agreement were -1.71 to 1.59 for FEV_1 z-scores and -2.24 to 1.52 for FVC z-scores with estimated bias levels at -0.06 and -0.36 respectively.

Conclusion Our real-world study demonstrates that self-performed NuvoAir home spirometry is a reliable clinical tool and produces valid lung function values when compared to clinic spirometry. Home spirometry using the NuvoAir device supports a hybrid model of face-to-face and virtual consultations and is a useful addition to remote monitoring tools as telemedicine continues to evolve.

P89 COMPARISON OF AEROSOL DRUG DELIVERY ACROSS DELIVERY DEVICES IN A SPONTANEOUSLY BREATHING ASTHMATIC PAEDIATRIC PATIENT MODEL

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10.1136/thorax-2022-BTSabstracts.225

Introduction and Objectives Aerosol therapy is often used in the treatment of asthma exacerbations in paediatric patients. Standard dosing regimens differ depending on the type of aerosol generator used. Here, we assess drug delivery using a pressurised metered dose inhaler (pMDI) and a vibrating mesh nebuliser (VMN) in a simulated asthmatic paediatric patient.

Methods The standard dose for a pMDI (TEVA Salamol CFC-Free Inhaler, IRE) is 4 actuations, delivering 400µg of Salbutamol at the start of inhalation. This was delivered through a valved holding chamber/facemask (Monaghan Medical, US). For the VMN, 2500µg Salbutamol (TEVA, IRE) was nebulised in combination with an aerosol chamber and facemask (Aerogen Solo/Ultra, Aerogen, IRE) with a supplemental gas flow of 2 LPM. Both devices were attached to a breathing simulator (ASL 5000, IngMar Medical, US) via a 3D printed paediatric head model (oropharyngeal, 5-year-old male) [2] and capture filter (Respirgard 303, Vyaire, US), that was set to simulate an asthmatic paediatric patient (V_t: 186 mL, 28BPM and I:E: 1:2) [3]. Results were determined using UV-spectroscopy at 276 nm and are expressed as µg of drug delivered. All tests were conducted in quintuplicate.

Results

Abstract P89 Table 1 Average ± standard deviation delivered dose (µg) using a pMDI and VMN. Significance was determined as $p \leq 0.05$

Delivery Device Type	pMDI	VMN
Drug Delivered (µg)	122.121 ± 11.668	521.111 ± 78.139
p-value	0.000	

Conclusions The VMN delivered a significantly larger drug dose (p-value: 0.000). These findings demonstrate that the type of drug delivery device used has a considerable impact on aerosol delivery to a simulated patient and may prevent escalation of care.

REFERENCES

1. The Impact of Head Model Choice on the In Vitro Evaluation of Aerosol Drug Delivery. *Pharmaceutics*. 2021;14.
2. ASL 5000 User Manual, Software 3.6, IngMar Medical, Ltd. 2016. Available from: ASL 5000_User's Manual _SW 3.6 (ingmarmed.com).

P90 ACCEPTABILITY AND FEASIBILITY PILOT OF CO-DESIGNED TELEHEALTH PHYSIOTHERAPY INTERVENTIONS FOR CHILDREN WITH ASTHMA AND DYSFUNCTIONAL BREATHING

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10.1136/thorax-2022-BTSabstracts.226

Introduction Respiratory physiotherapists aim to identify and treat contributory causes of poor asthma control, including dysfunctional breathing which impacts quality-of-life and symptoms. In the post-COVID-19 era new technologies are needed to deliver telemedicine. Before embedding health delivery transformations, it is essential to involve children and young people (CYP) and their carers to gain insight into their priorities in engaging with healthcare.

Objectives To co-design tele-physiotherapy services and online resources in partnership with CYP with asthma; to pilot the acceptability and feasibility of these interventions.

Methods CYP were recruited from a severe asthma clinic. Phase I: Co-design online resources and hybrid physiotherapy clinics. Phase II: Pilot tele-physiotherapy clinics via *Attend Anywhere* video platform and novel resources. Acceptability was assessed using electronic questionnaires and semi-structured interviews to service users and providers. Operational feasibility was analysed using website traffic data and hybrid clinic attendance.

Results Phase I: Eight CYP and their families and 11 team members were recruited to co-design prototype solutions including seven educational online videos and downloadable resources (https://bit.ly/3udKqFU), the development of a new webpage, 'Asthma Kids' on the platform www.beamfeelgood.com including patient and parent blogs, and a live online 12-week program.

Phase II: 25 CYP aged 7–16 were recruited into the pilot. All completed the course with no adverse events. 18/25 (72%) created profiles on Asthma Kids to join live group classes, watch on-demand videos or pre-set physiotherapy programmes. RBHT website videos had 296 views.

Across 32 clinics, 94 physiotherapy consultations took place – 27 in-hospital and 67 virtual. 42% of CYP were not brought to virtual appointments compared to 20% for in-hospital ones. Of those who attended virtually, half experienced technical difficulties on the *Attend Anywhere* platform. Problems included poor signal, difficulties logging in and difficulty seeing patients using mobiles. Questionnaires showed service users and providers all recommended Asthma Kids and RBHT website resources, found hybrid tele-physiotherapy clinics accessible and flexible, however wanted the choice of in-hospital appointments.

Conclusion Co-designed novel telehealth physiotherapy resources are easy for service users and providers to use. Hybrid tele-physiotherapy clinics offer choice, but experiences frequent technical issues and in-hospital appointments remain better attended.

Please refer to page A214 for declarations of interest related to this abstract.

P91 ACCEPTABILITY AND FEASIBILITY OF MEASURING BLOOD EOSINOPHILS USING A POINT-OF-CARE DEVICE IN CHILDREN WITH ASTHMA

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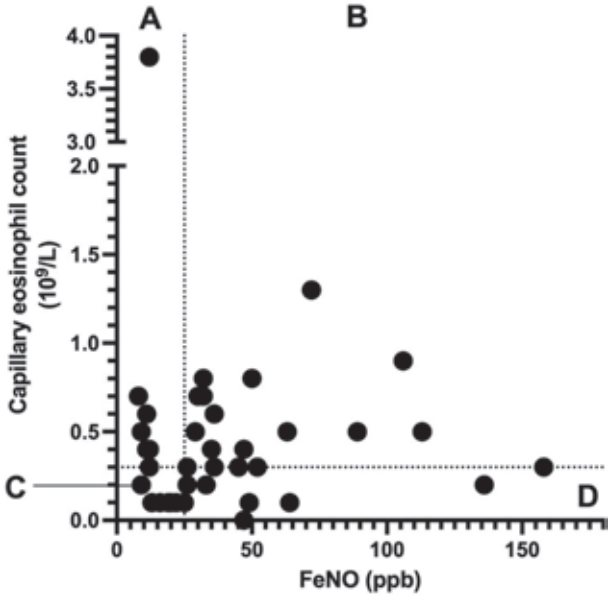
10.1136/thorax-2022-BTSabstracts.227

Introduction and Objectives Adult studies suggest that exhaled nitric oxide (FeNO) and blood eosinophils may be additive in guiding asthma management and predicting attacks.[1] Repeated venepuncture in children is challenging. We therefore aimed to assess if a finger-prick test to measure blood eosinophils using a point-of-care (POC) device is feasible and acceptable in children with asthma and assessed whether blood eosinophils correlate with contemporaneous clinical parameters.

Methods A pilot observational study, including children aged 6–16 years attending Royal Brompton Hospital with a diagnosis of asthma and prescribed maintenance inhaled corticosteroids (ICS). A capillary blood sample was obtained using a microcuvette and analysed by a HemoCue POC device to measure blood eosinophils. Finger-prick test acceptability for children and their parents/carers was assessed using a System Usability scale. The relationships between blood eosinophils



Abstract P91 Figure 1 Relationship between capillary eosinophil counts and FeNO at baseline clinic visit (n=39). Dotted horizontal line at y=0.3 x10^9/L represents the clinical threshold at or above which blood eosinophils are considered elevated. Dotted vertical line at x=25ppb represents the threshold, above which a FeNO is abnormal. Quadrant A = Low FeNO and high capillary eosinophil count (n=7). Quadrant B = High FeNO and high capillary eosinophil count (n=18). Quadrant C = Low FeNO and low capillary eosinophil count (n=7). Quadrant D = High FeNO and low capillary eosinophil count (n=7). FeNO = exhaled nitric oxide; ppb = parts per billion

and clinical parameters were analysed using Spearman's correlation and differences in blood eosinophil counts between groups using Mann-Whitney test.

Results Of 74 children approached (median age 13[range, 7–16] years), 54 were recruited, 20/74 (27%) children refused a finger-prick mostly due to being scared. The median prescribed ICS dose was 550 mcg/day budesonide equivalent (range, 100–2000 micrograms/day). The median blood eosinophil count was $0.3x10^9$L (range,$0.0–3.8x10^9$/L). All parents/carers agreed that the finger-prick test was acceptable; 45/48 (94%) of children found the test acceptable and 44/48 (92%) said it would be acceptable to have it done routinely. No correlation was found between blood eosinophils and FeNO, symptoms (asthma control test), forced expiratory volume in 1 second (FEV_1)%predicted, forced vital capacity (FVC)%predicted, or FEV_1:FVC ratio. 25/39 (64%) children had concordant blood eosinophils and FeNO, 14/39 (36%) were discordant (figure 1). No relationship was found between blood eosinophil counts and the child's atopic status, sex, ethnicity or asthma control.

Conclusion Finger-prick tests are acceptable and feasible in school-aged children in an asthma clinic as a repeatable measure of blood eosinophils. Future studies should investigate the role of longitudinal eosinophil counts and their utility in predicting asthma attacks as an additional biomarker combined with spirometry and FeNO.

REFERENCES

1. Couillard S, *et al. Thorax* 2021;**77**:199–202

'Blade Runner' – Diagnosis and follow up of thoracic malignancy

P92 SHOULD ALL 2WW REFERRALS UNDER GO CT SCANNING? AN EXPLORATION OF SYMPTOMS IN THE CONTEXT OF A NORMAL CHEST RADIOGRAPH

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10.1136/thorax-2022-BTSabstracts.228

Introduction The National Optimal Lung Cancer Pathway (NOLCP) aims for CT imaging within 72 hrs. In our centre, increased referral rates and significant variations in weekly numbers can saturate our pathway. We aimed to scope whether the process could be refined.

Methods Set up in 2018, patients with suspected lung cancer without a chest radiograph (CXR) could be referred directly for a CXR followed by a CT scan if indicated. A patient navigator collected a standardised symptom questionnaire. Symptoms, alone and in combination were assessed pre and post CXR, and outcomes recorded. In addition, a patient with an abnormal CXR could be entered into the pathway to expedite a CT scan. A normal CXR was defined as no radiographical evidence of lung pathology or cancer. The positive and negative predictive values were calculated pre and post the finding of a normal CXR.

Results Over 18 months 1081/1100 patients entering the pathway had complete data. Primary referrals (CXR naive) accounted for 677, while 404 patients were pulled into the pathway following an abnormal CXR. Overall 154 cancers were diagnosed, of which 126 were of thoracic origin. Of the primary referrals 51/677(7.5%) were subsequently diagnosed with cancer, 40 of which were thoracic.

Pre-CXR, the symptoms with the highest positive predictive values (PPV) were haemoptysis (12.1%) and loss of weight (LOW) (11.7%) dropping to 5.1% and 6.5% respectively following a normal CXR. Patients with a normal CXR and cough, chest pain, breathless or fatigue all had a PPV <4%. Thrombocytosis was present in 29/620(5%) patients referred pre-CXR, and in no patients with a normal CXR and susbsequent diagnosis of cancer.

Symptom combinations showed a PPV of >10% in those with Loss of appetite+haemptysis, LOW+ haemoptysis and LOW+hoarse voice after a normal CXR, while a PPV <4% was seen in those with cough plus either haemoptysis, chest pain, breathlessness or fatigue, SOB+chest pain, fatigue+chest pain, and SOB+fatigue – with the PPV ranging from 2.7–3.5%.

Conclusion The use of symptom combinations in the context of a normal CXR may help streamlining CT resources to ensure that those with the greatest risk have immediate access. However, given the overall relative high pre-test probability most patients will require a CT scan.

P93 A NOVEL APPROACH TO REFERRALS WITH URGENT SUSPICION OF CANCER (USOC). TWO-YEAR EVALUATION OF 'VIRTUAL USOC' SERVICE FOR PATIENTS WITH LOW PROBABILITY OF LUNG CANCER

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Introduction and Objectives National campaigns encourage referral of patients with 'red flag' symptoms of possible lung cancer. The risk of lung cancer in many such referrals is low. These low-risk referrals compromise the ability to see patients with higher likelihood of cancer. A new pathway was introduced to assess those referrals where the expectation of cancer is low. We report the experience of the first two years.

Methods Data were collected January 2020 – December 2021 for USOC referrals vetted to a Virtual-USOC clinic including satisfaction of patients (postal questionnaire) and Primary Care (electronic survey) after the management plan was agreed. Patients were vetted to the Virtual-USOC clinic when referrals with 'red flag' symptoms lacked supporting features on chest x-ray. Patients had a telephone consultation with the Advanced

Abstract P93 Table 1

Patient Outcome	2020	2021	Total	%
Discharged to Primary Care	52	76	128	45%
Appointed to a Urgent Respiratory Physician Clinic	22	65	87	30%
Appointed to a Routine Respiratory Physician Clinic	8	34	42	15%
Appointed to a USOC Respiratory Physician Clinic	6	17	23	8%
Admitted to hospital from CT scan for non-cancer problem	3	0	3	1%
Transferred to Pulmonary Nodule Follow-up Clinic	0	1	1	0.3%
Patient declined investigations	0	1	1	0.3%
Patient did not make contact	0	1	1	0.3%
Total	91	195	286	

Nurse Practitioner (ANP) and CT requested. The history and CT scans were reviewed at the respiratory radiology meeting and the outcome agreed.

Results The outcomes can be seen in table 1.

Ten of the 23 patients subsequently appointed to a Physician-Led USOC clinic were diagnosed with lung cancer – 3.5% of USOC referrals where the chest x-ray did not suggest lung cancer. The Virtual-USOC clinic liberated 263 appointments at the Physician-Led USOC Clinic, allowing the Respiratory Physicians to focus on patients with higher probability of malignant or serious illness. The respiratory service took responsibility for further evaluation of selected patients (45% of this group) with symptoms, or non-cancer radiographic abnormalities, through non-cancer clinics.

The patient questionnaire was completed by 48 patients and 22 Primary Care staff with all results being favourable.

Conclusions The Virtual-USOC clinic released capacity at the Physician-Led USOC clinic by evaluating patients with low probability of lung cancer. Only 3.5% were diagnosed with lung cancer and 45% were discharged to their Primary Care Physician with an equal proportion being appointed to non-cancer Respiratory Physician clinic to address symptoms or non-cancer radiographic abnormalities. This new service was effective in addressing the specialist (physician and radiologist) assessment of patients at low risk of having lung cancer and simultaneously taking responsibility for those whose symptoms or CT findings needed specialist assessment.

P94 INCIDENCE OF LUNG CANCER IN PATIENTS WITH HEMOPTYSIS REFERRED THROUGH CANCER PATHWAY IN A DISTRICT GENERAL HOSPITAL

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Introduction and Methods NICE guidelines recommend 2 weeks wait referral to lung cancer clinics if patients (aged 40 years and above) present with unexplained haemoptysis.

We analysed data to assess incidence of lung cancer in 87 patients with unexplained haemoptysis who were referred through suspected lung cancer pathway over a period of 6 months. Retrospectively analysis was performed to assess patient characteristics, results of imaging, investigations and final diagnosis.

Results A data revealed 53(60%) patients were male and 79 (90%) were above 60 years. 35 patients (40%) were current smokers while 23(26%) were ex-smokers. Only 3% had a history of asbestosis exposure. 17 patients (19%) were on antiplatelets and 12(13%) were on anticoagulant therapy. Cough (74%), weight loss (12.6%), dyspnoea (37%), chest pain (17%) were the associated symptoms.

Only 10 (11.4%) patients had suspicious chest x ray and 8 out of 87 (9%) had CT findings suspicious for of malignancy. Approximately 77% of patients had no features of malignancy on imaging (CT/Cxray).

Cancer diagnosis was made only in 6 (6.8%) patients with malignant features on imaging. 3 patients had lung cancer confirmed through EBUS, CT guided biopsy, pleural cytology each and 3 had a radiological diagnosis. No malignancy was detected by bronchoscopy. Haemoptysis was secondary to chest infections 32(36%), bronchiectasis and chronic lung diseases 16(18%), and benign causes in rest.

Conclusion The probability of lung cancer is very low if imaging lacks features of malignancy. Accurate history can provide clues to non-malignant aetiology, thus avoiding inappropriate referrals to lung cancer pathway.

P95 CIRCULATING TISSUE DNA FOR DIAGNOSIS OF NON-SMALL CELL LUNG CANCER IN PATIENTS UNSUITABLE FOR BIOPSY: REAL WORLD EXPERIENCE

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Introduction The International Association for the Study of Lung Cancer state that circulating tissue DNA (ctDNA) can be considered when diagnosing patients suspected of having non-small cell lung cancer (NSCLC) who require molecular profiling, and recommend its use where tissue is scarce, unavailable (including patients deemed unfit for invasive procedures), or a delay of over two weeks obtaining it is likely.[1] With studies reporting sensitivities of over 50% and the advent of generally well tolerated targeted therapies, there has been a local increase in the use of ctDNA in patients for whom an invasive procedure would be high risk or intolerable. There was however concern that this sensitivity was not borne out in practice, so it may not be a cost-effective investigation.

Methods We retrospectively analysed the results of the first 48 ctDNA samples for patients with a clinicoradiological diagnosis of lung cancer or confirmed NSCLC, at our trust between July 2020 and February 2022. The method used was ddPCR for common EGFR mutations (Exon 19 deletions, T790M and L858R).

Results 34 samples were processed for 33 patients who were either unsuitable for biopsy (15/34), or had ctDNA tested either concurrently with (6/34), or following a biopsy that yielded insufficient material for molecular testing (13/34). There were 0/34 positive results. 6/34 samples (18%) were of sub-optimal quality. 62% of patients were stage IV, 21% III, 14% II, and 3% I. The median age was 81. The remaining 14 samples were from patients progressing on treatment with a tissue diagnosis of NSCLC; 3 were positive (21%).

Conclusion While there may be a role for ddPCR in patients progressing on treatment with a tissue diagnosis of NSCLC, our use in the diagnosis of suspected NSCLC added no value, at a cost significantly in excess of £5000 over 18 months (£150 per sample). We therefore do not recommend its use for this purpose unless newer technologies are shown to be more sensitive.

REFERENCE

1. Rolfo C, Mack PC, Scagliotti GV, *et al*. Liquid Biopsy for Advanced Non-Small Cell Lung Cancer (NSCLC): A Statement Paper from the IASLC. *J Thorac Oncol*. 2018 Sep;**13**(9):1248–1268.

P96 NECK ULTRASOUND AND LYMPH NODE BIOPSY BY RESPIRATORY PHYSICIANS IN PATIENTS WITH THORACIC DISEASE

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Background Prevalence of cervical lymph node (LN) involvement in thoracic disease manifesting with mediastinal LN is

not well studied. Neck LN sampling provides less invasive diagnostic procedure and neck LN have prognostic implications particularly in thoracic malignancy.

Aim We aimed to prospectively determine the prevalence of abnormal cervical LNs in patients with suspected thoracic malignancy or with enlarged mediastinal lymph nodes in the setting of a systemic disease. We aimed to assess the yield from cervical LN biopsy of suspicious nodes when conducted by respiratory physicians.

Methods NUS was performed for all patients admitted with undiagnosed lung lesions ± mediastinal lymphadenopathy at a University Hospital by a respiratory trainee who received a period of 3-month of training in focused neck ultrasound and real-time lymph node sampling. Cases with suspicious LNs (rounded shape, size ≥5 mm in shortest diameter, loss of hilum) who were screened by NUS and who were not waiting for results from other diagnostic procedures were referred for sampling of the abnormal LNs. Fine needle aspiration ± core biopsies from were done.

Results Over 24-week period 114 patients were screened (median age 59.5 [50–66] years, 74.6% males). Suspicious LNs were present in 41 cases (prevalence of 35.9%, 95% C! 27.2–45.5%); FNA and core biopsies were conducted in 26 patients. Median short axis diameter of sampled LNs was 10 [8–12.75] mm. 24 (92.3%) of the biopsies were diagnostic. The final diagnosis was lung cancer in 12 cases (9 NSCLC, 3 SCLC), lymphoma in 5 cases, sarcoidosis in 5 cases, extra-thoracic malignancy in 1 case, and TB in 1 case. NUS with LN sampling allowed avoiding 14 EBUS procedures, 4 thoracoscopies, 6 bronchoscopies in the included cohort with average saving in time to diagnostic test of 3–5 working days.

Conclusion training respiratory physicians in routine NUS and LN biopsy is feasible and provides less invasive and timely diagnostic modality in substantial proportion of patients with thoracic disease.

P97 USEFULNESS OF FIBRE-OPTIC BRONCHOSCOPY FOR THE INVESTIGATION OF LUNG CANCER IN PATIENTS WITH NON-MASSIVE HAEMOPTYSIS AND NON-DIAGNOSTIC CT

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Introduction and Objectives The current practice of investigating patients with non-massive haemoptysis includes a chest radiograph followed by CT thorax. It is a common practice to then perform a fibre-optic bronchoscopy to exclude lung malignancy. In the diagnosis of lung cancer, CT thorax has high sensitivity (88.9%) [1] and very low rate of false negatives (92.6% specificity)[1]. Therefore, bronchoscopy as an additional investigation is unlikely to yield a cancer diagnosis.

The aim of this study is to assess the diagnostic rate of bronchoscopy for lung cancer in patients with haemoptysis and normal or non-diagnostic CT scan.

Methods Retrospective review was performed of 274 patients presenting with haemoptysis, from January 2012 to December 2017, who had a CT chest showing findings other than malignancy, or normal and were investigated with fibreoptic bronchoscopy.

These cases were again retrospectively reviewed in January 2022, to assess for development of lung cancer in this timeframe.

Results Clinical and demographic characteristics can be found in table 1.

Abstract P97 Table 1 Clinical and demographic characteristics (n = 274)

	Mean	SD
Age	56	14.8
	n	**%**
Sex		
Male	163	59
Female	111	41
Smoking status (n = 240)		
Non-smoker	70	29
Active or Ex-smoker	171	71
CT thorax findings		
Normal	197	72
Emphysema	27	10
Pulmonary nodules	25	9
Pleural plaques or thickening	14	5
Atelectasis	8	3
Ground glass	1	0.3

Bronchoscopy was normal in 244 patients (89%). Second most common finding was airway inflammation (n=12, 4%), followed by frank blood or contact bleeding (n=8, 3%), vocal cord polyps (n=4, 1.5%), mucoid secretions (n=3, 1%), and one case each of bronchomalacia (<1%) and segmental narrowing (<1%).

Out of 171 bronchial washes sent for cytology, none revealed malignant cells.

On review in January 2022, 36 patients (13%) had passed away, 4 of which because of lung cancer. They all had normal investigations including CT and bronchoscopy on initial presentation. Only 21 patients (8%) had experienced further episodes of haemoptysis. Of these, 1 patient had been found to have lung cancer, 3 years after initial investigations which were normal.

Conclusions Fibre-optic bronchoscopy is extremely unlikely to diagnose lung malignancy in patients with a normal or non-diagnostic CT for lung cancer. We suggest a prospective study to evaluate this further and will help to avoid unnecessary bronchoscopy procedures.

REFERENCES

1. Toyoda Y, Nakayama T, Kusunoki Y, Iso H, Suzuki T. Sensitivity and specificity of lung cancer screening using chest low-dose computed tomography. *Br J Cancer*. 2008 May.

P98 CONSENT AND COMPLICATIONS IN BRONCHOSCOPY: A TRAINEE-LED, REGION-WIDE EVALUATION

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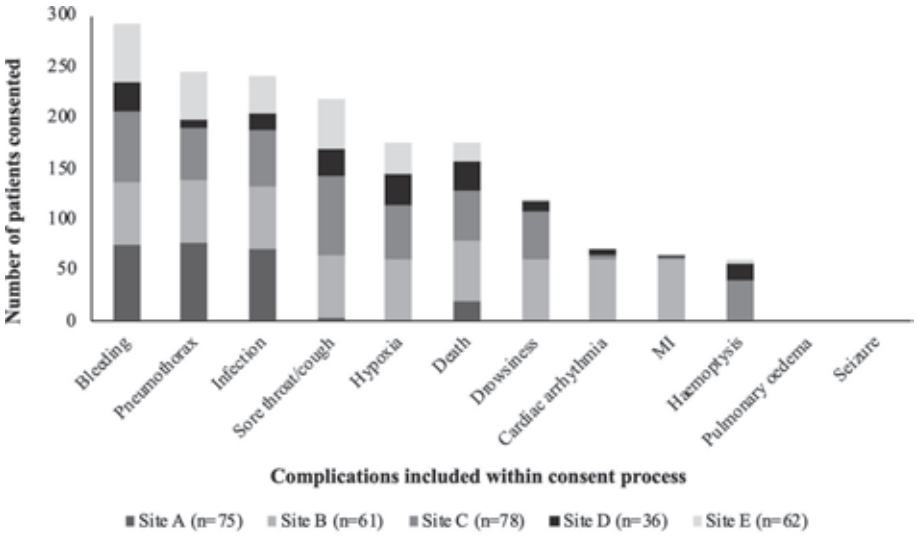
Introduction Flexible bronchoscopy (FB) remains an important tool in the assessment of respiratory disease that is frequently performed within the outpatient setting. While guidelines exist concerning safety standards in FB,[1] individual practice is known to vary, which may extend to patient consent and discussion of potential complications. In this study, we aimed to evaluate consent procedures for patients undergoing FB within



Abstract P98 Figure 1 Number of patients consented across study sites according to listed complications. The total number of patients (n) included at each study site is presented in parentheses. The most frequent complications consented for were: bleeding (291/312, 93%), pneumothorax (245/312, 79%) and infection (241/312, 77%). Substantial variation existed between study sites regarding the specific complications and rates of complication patients were consented for.

one healthcare region, including how this relates to actual complications observed.

Methods A retrospective review of patients undergoing FB between 1stApril 2021 and 30th September 2021 was performed across five hospital sites in the North East of England. Medical records, including patient consent forms and bronchoscopy reports, were examined using a structured proforma (guided by existing BTS standards[1]). Specific areas of consideration included: the person obtaining consent; whether the consent form was pre-populated; the type of complication discussed; and, if any complications were observed.

Results In total, 312 patients were included for analysis across the five hospital sites. Medical records were either incomplete or not available for a further 33 patients. Two hospital sites (A and B) predominantly used pre-populated consent forms; the remaining three sites (C, D and E) used free-text consent forms. Most consent forms (208/312, 67%) were completed by consultants, with the majority (242/312, 78%) occurring on the day of the procedure. All sites differed in the extent of complications patients were consented for (see figure 1). Hypoxia (58/312, 19%) and bleeding (55/312, 18%) were the two most frequently observed complications, but were variably included in the consent process. One death occurred as a direct consequence of bronchoscopy, though was not stated in the consent form for this patient.

Conclusions There is wide variation regarding consent procedures for FB, even within a single healthcare region. This includes the type of consent form used, the timing of consent relative to the procedure, and the specific complications (and rates of complication) consented for. Use of a standardised pre-populated consent form, which could be adopted at a regional – or national – level, would help to reduce this variability in practice.

REFERENCE

1. Du Rand IA *et al. Thorax,* 2013;**68**:i1-i44.

Please refer to page A214 for declarations of interest related to this abstract.

P99 DAY CASE THORACOSCOPY WITH IPC INSERTION- EXPERIENCE FROM 2 DISTRICT GENERAL HOSPITALS

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Background Local anaesthetic thoracoscopy (LAT) used to diagnose unexplained pleural effusions usually involves poudrage for pleurodesis and insertion of a large bore drain with admission. There has been a shift towards performing LAT as a day case procedure with indwelling pleural catheter (IPC) insertion. We sought to determine the feasibility of such a pathway.

Methods All day case LAT procedures with IPC insertion were identified at 2 district general hospitals (Northumbria HealthCare in the North East of England and Victoria Hospital, NHS Fyfe in Scotland). Rapid pleurodesis with talc is not performed. All patients have their LAT in theatre under conscious sedation with a rigid scope. Demographics, clinical and histopathological characteristics were collected.

Results 75 patients underwent day case LAT. The lung did not deflate, not enabling biopsies in 4. The mean age was 72 years (range 34–83). 51 were male and 24 were female. The main diagnoses were 20 lung cancers, 16 mesotheliomas and 28 fibrinous pleuritis (4 underwent VATS and were diagnosed with VATS, 1 was labelled as radiological lung cancer)- overall diagnostic sensitivity was 95%. Other diagnoses were breast, tonsillar, unknown primary cancers and lymphomas. Of the 71 patients who underwent LAT, 65 IPCs were simultaneously placed and due to normal macroscopic appearances in 2 patients, 2 large bore drains were placed and removed within an hour of LAT termination. 67 (89%) patients were discharged on the same day. 7 required admission; 2 for treatment of surgical emphysema, 4 as lived alone, 1 for pain control and 1 for control of a cardiac arrythmia. 10 (13%) developed surgical emphysema post-op, 3 of those required further drains. Within 30 days, there were 5 IPC site infections with 2 resultant empyemas (9%)- there was no

associated mortality with that, 2 patients developed pneumonia requiring admission and 1 patient required admission for pain management. Median number of days the IPCs remained in situ was 78.5 days (IQR 95).

Conclusions Day case LAT with IPC insertion is feasible with this current set up, with a median stay of 0 days and should be widely adopted. Complication rates are The health economics of preventing admission are considerable as our previous analysis showed a median length of stay of 3.96 days (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7823154/), although we are not comparing matched cohorts.

P100 THE UTILITY OF EBUS-TBNA IN TISSUE ACQUISITION FOR NEXT GENERATION SEQUENCING OF NON-SMALL CELL LUNG CANCER (NSCLC)

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Introduction Lung cancer is the most common cause of cancer deaths in the UK and is associated with a poor prognosis. Next Generation Sequencing (NGS) of tumour cells provides more comprehensive information on genetic alterations compared to single gene testing, potentially allowing the use of more efficacious targeted treatment strategies. In 2020, ESMO guidelines recommended the routine use of NGS on tumour samples in advanced non-squamous non-small-cell lung cancer (NSCLC).[1]

Some NGS technologies require greater input and quality of DNA than qPCR. Here, we assess the utility of EBUS-TBNA in tissue acquisition for NGS in patients with NSCLC.

Methods We reviewed specimens obtained via endobronchial ultrasound-guided transbronchial needle aspiration (EBUS-TBNA) using 22G needles and submitted for DNA based NGS analysis following confirmation of a lung cancer diagnosis between 1 January 2018 and 31 December 2020. We assessed the proportion in which NGS was successfully completed and the number in which driver mutations were identified. Demographic and clinical data was also analysed.

Results 153 specimens were reviewed. Rapid EGFR testing was carried out in 10 on account of urgent clinical need, leaving 143 specimens which were submitted for DNA based NGS analysis. Mean patient age at the time of tissue acquisition was 64.8 years and 74 (51.7%) were males. Adenocarcinoma was the most common type of lung cancer (n=128, 89.5%) and at least 65 (45.5%) samples were obtained from patients with stage IV disease (table 1).

DNA based NGS was successfully completed in 129 (90.2%) samples. 45 (34.9%) and 10 (7.8%) of these reported KRAS and EGFR mutations respectively. 14 (9.8%) samples were either unsuitable for processing, or failed DNA-NGS analysis. The mean processing time (from date of sample receipt in the molecular diagnostics laboratory to date of report) was 6.1 working days.

Conclusion EBUS-TBNA is a reliable method of tissue acquisition for DNA based NGS assay processing.

Abstract P100 Table 1 Clinical and demographic background of 143 specimens included in analysis

	NGS successful (n=129)	NGS unsuccessful (n=14)	Total (n=143)
Gender			
Male	68 (52.7%)	6 (42.9%)	74 (51.7%)
Female	61 (47.2%)	8 (57.1%)	69 (48.3%)
Mean age * (SD)			
	64.4 (11.4)	68 (11.5)	64.8 (11.4)
Stage *			
II	3 (2.3%)	0 (0%)	3 (2.1%)
III	45 (34.9%)	6 (42.8%)	51 (35.7%)
IV	59 (45.7%)	6 (42.8%)	65 (45.5%)
Unavailable	22 (17%)	2 (14.3%)	24 (16.8%)
Tumour subtype			
Adenocarcinoma	115 (89.1%)	13 (92.9%)	128 (89.5%)
NSCLC (NOS)	4 (3.1%)	1 (7.1%)	5 (3.5%)
Large cell NEC	5 (3.9%)	0 (0%)	5 (3.5%)
Other	5 (3.9%)	0 (0%)	5 (3.5%)

* Age and stage at time of tissue acquisition

REFERENCES

1. Mosele F, Remon J, Mateo J, *et al*. Recommendations for the use of next-generation sequencing (NGS) for patients with metastatic cancers: a report from the ESMO Precision Medicine Working Group. *Ann Oncol*. 2020 Nov;**31**(11):1491–1505.

P101 PERICARDIAL EFFUSION AND LUNG CANCER: EXPERIENCE FROM NORTHUMBRIA HEALTHCARE

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Introduction Malignant pericardial involvement is present in 20% at post-mortems of cancer patients with up to 50% having a pericardial effusion (PErF). Common causes are lung and breast cancer. Survival of lung cancer and PErF is < 5 months. Positive cytology and tamponade are adverse prognostic signs. We sought to to retrospectively review lung cancer patients with pericardial effusions.

Methods With Caldicott approval, in a search of CT scans from Jan 2011-Aug 2021 for 'lung cancer' AND 'pericardial effusion', 765 reports were found then reduced to 112. Basic demographics were collected. Continuous variables are presented as mean (±range) and categorical variables as percentages where appropriate.

Results Mean age was 70.6(44–91) M:F was 56/56. 7 had no co-morbidities, others all multi-morbid, COPD commonest. Clear previous cancer in 19 patients. Lung cancers: 33 adenocarcinomas, 31 squamous cell, 13 small cell, no pathology in 25, and others [neuroendocrine, spindle cell, undifferentiated] in 11. PErFs were findings on the first CT scan in 52 {Mean days to death was 130d (0–1279), median 70d}; the rest in scans showing disease progression (median time to progression 9 mths). {mean days to death 160 (0–1138), median 64} p value 0.42. 12 effusions were large (>20 mm). 18 echos were done, 5 drains were done for haemodynamic compromise (all at first presentation), 4 fluid cytology sent (all +ve). Mean days to death in those 5 who required intervention was 15.1 (vs 148 days for whole cohort, p 0.037). There was no statistical difference for outcomes between cancer types.

Conclusions PErF is associated with progressive disease and need for intervention with mortality. Incidence is <3%.

P102 THE IMPACT OF A DEDICATED INTERVENTIONAL TEAM IN THE MANAGEMENT AND OUTCOME OF CENTRAL AIRWAYS OBSTRUCTION IN LUNG CANCER PATIENTS

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Introduction The approach to central airways obstruction in lung cancer varies. Having previously established benchmarking in disease prevalence, management and outcomes in 2014, we re-audited our local approach following the introduction of a dedicated interventional service.

Method New lung cancer diagnoses in 2019 were assessed for evidence of central airways disease. Comparisons were made with our previous audit from 2014. Simple descriptive statistics were used. To identify factors associated with death, all data were combined (2014/2015 and 2019/2020). Logistic regression was used to determine the effect of age, gender, tumour type and degree of obstruction to identify independent factors associated with 60-day mortality.

Results No differences were seen in the clinical characteristics of people with CAO presenting in 2014/2015 and 2019. Deaths were high, with 45% of people dying within 90 days of a diagnostic CT. There was no difference in the proportion dying in 2014/2015 and 2019. Over the two time periods the proportion with CAO<50% increased (12/30 [40%] in 2014/2015 versus 18/30 [60%] in 2020; p=0.07).

The proportion of people eligible for intervention and receiving intervention was unchanged between 2014/2015 and 2019 (5/16 [31%] in 2014/2015 and 3/9 [33%] in 2019). However the time to intervention improved (60.5 [interquartile range {IQR} 29.5–120.0] days in 2014/2015 and 7.0 [IQR 6.0–7.0] days in 2019; p=0.03).

Although limited by the number of outcomes, after adjusting for age, gender and degree of obstruction, the odds of death was lower among people with squamous cell carcinoma compared to those with other tumour types (squamous cell cancers 8/36 [22%] vs small cell lung cancer 5/21 [24%] versus other cancers 30/74 [40%]; adjusted odds ratio [aOR] 0.40 [95%CI 0.16–1.02], aOR 0.46 [0.15–1.40]; p=0.09).

Conclusions The impact of the interventional service did not lead to an increase in intervention, however the time to procedure improved significantly. Understanding decision making and identifying those that benefit the greatest from intervention needs further work.

P103 CHARACTERISATION, PREDICTION, AND IMPACT OF READMISSION WITHIN 90 DAYS OF SURGERY FOR NON-SMALL CELL LUNG CANCER

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Introduction Lung Cancer Clinical Outcomes Project publications give a median 90 Day Readmission (90DR) rate of over 40%. The reasons for and impact of 90DR have not been characterised. The aims of the study were to characterise and determine predictors for 90DR and examine its clinical impact.

Methods A retrospective analysis of NSCLC surgery patients between 02/12/2008 and 01/04/2021, referred from a tertiary centre Lung MDT, for whom clinical and Hospital Episode Statistics (HES) data were available. HES diagnostic codes were interrogated for co-morbidities and the reason(s) for 90DR. Three disparate categories for 90DR were derived, based on 13 underlying reasons for 90DR. Correlations were assessed using standard statistical methods and binary logistic regression models predicting 90DR created. The survival impact of the 90DR categories was examined in univariate and multivariate models.

Results After the exclusion of patients referred from other hospitals, 1043 patients remained in the study. 90DR occurred in 302 (28.9%) patients, of which almost half were due to adjuvant chemotherapy administration (46.8%): the most common surgical complication was pulmonary (14.3%). Tumour Related Readmission (TRR), Surgical Related Readmission (SRR) and Unrelated Readmission (UR) occurred in 8.6%, 11.2% and 9.1% of patients respectively. Independent predictors of TRR were tumour stage (T-stage, p = 0.049 and N-stage, p = 0.005), and completeness of resection (p = 0.03). Independent predictors of SRR were the absence of hypertension (p < 0.001), asthma (p = 0.005), and operations converted from VATS to thoracotomy (p = 0.010). Both TRR and SRR were associated with worse survival (median survival 49.6 months (p = 0.013) and 63.4 months (p = 0.016), versus 83.6 months for no 90DR): however, SRR readmission was not an independent predictor of survival (p = 0.45).

Conclusion Whilst prediction of SRR may be possible, SRR may not have lasting clinical impact. However, the methodology of this study could be exploited on national databases to determine whether their multivariate prediction could lead to interventions to reduce the health economic impact of 90DR.

P104 LUNG CANCER WITH CO-EXISTING INTERSTITIAL LUNG DISEASE: INCIDENCE, TREATMENT AND OUTCOMES

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Introduction and Objectives Interstitial lung disease is associated with an increased risk of lung cancer. The diagnosis and management of lung cancer in these patients is challenging due to poor lung function and performance status, as well as increased risk of toxicity/acute exacerbation of ILD with treatment. Little data is available on the toxicity of treatment in European patients. We aimed to assess the prevalence of interstitial lung disease in patients with lung cancer and studied their diagnostic pathway, treatment and clinical outcomes.

Methods 2 large secondary care trusts took part in the study. Patients were identified from the lung cancer registry at each site and their clinic letters and presenting radiology screened for interstitial lung disease. MDT outcomes and case notes were reviewed. Data presented are from 2017.

Results 623 patients were diagnosed with lung cancer in 2017 across the 2 trusts. 43/623 (6.9%) had evidence of interstitial lung disease on presentation, but ILD was previously diagnosed in only 9 of these. CT pattern was recorded in 31/43 (72%) of whom 11 had a UIP pattern. 29(67%) had pathological confirmation, of whom 28(89%) of ILD patients had non-small cell lung cancer on histology. Mean FVC was 88% predicted. 5(11.6%) patients were planned for surgery, 4(9.3%) chemotherapy, 9(20.9%) radiotherapy, 7(16.2%) combined treatments and 17(39.5%) best supportive care. Grade 4 or 5 pulmonary toxicity was recorded in 5 patients: 1 after surgery, 2 post-radiotherapy (20% of those receiving radiotherapy to lung), 2 after chemo/immunotherapy.

Conclusions The prevalence of interstitial lung disease in lung cancer patients was high. Most of these were not previously diagnosed and often not recognised even at MDT. Pulmonary toxicity of treatment was a factor in some cases. Overall rates of anticancer treatment were not different to the standard lung cancer population.

P105 ANTERIOR MEDIASTINAL MASSES: A DIAGNOSTIC AND FOLLOW-UP CHALLENGE

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10.1136/thorax-2022-BTSabstracts.241

Introduction Mediastinal masses represent a small but important minority of cases discussed in the lung cancer MDT. Whilst there are guidelines for the initial investigation of thymic tumours and other mediastinal masses, the evidence base is limited.

Methods Lung Cancer MDT minutes were reviewed between August 2014 and January 2021 to identify patients with mediastinal abnormalities. The initial characteristics of the abnormality, investigations, outcome and follow-up data were collected and compared to ESMO and ITMIG guidance.

Results 40 patients (22 male), average age of 55 (range 20–87). Mean maximum tumour dimension was 61 mm (range 13–170). 14 had PET and 3 had MRI scans as part of initial investigations. 17 patients were felt to have benign changes (5 biopsied). Of these, 10 patients had predominantly CT follow-up, for a mean of 34 months. 5 patients had a diagnosis of lymphoma, and 4 of cancer. 14 patients had a thymoma diagnosis – 3 had metastatic disease and 1 had thymic carcinoma. 8 patients with a thymoma diagnosis had follow-up for a mean of 51 months, predominantly with contrast-CT. No age difference between patients with benign or malignant masses identified. The mean size of thymomas was greater than benign lesions, but did not reach statistical significance.

Conclusions Anterior mediastinal masses present a diagnostic challenge as they may be benign incidental findings or potentially significant malignant disease. The anterior mediastinum is not always simple to image or biopsy. Long-term follow-up of indeterminate lesions can lead to repeated radiation exposures and optimum modalities for imaging are poorly defined. Thymomas are the most common clinically important anterior mediastinal malignancy – reflected in guidelines. ESMO guidelines suggest therapeutic intervention is not often required in lesions <30 mm due to low risk of progression or malignancy, however, in this dataset 4 thymomas and 2 other malignancies were smaller than this.

Our data suggests we need a more standardised approach to anterior mediastinal masses and their follow-up (both post-treatment and when the mass remains indeterminate). Retrospective case series may be the best way to gather evidence to support recommendations, but as anterior mediastinal masses are not common, collaboration is needed.

'Avengers Assemble' – Impact of the MDT in respiratory disease

P106 MULTIDISCIPLINARY ASSESSMENT OF INDUCIBLE LARYNGEAL OBSTRUCTION (ILO) & UPPER AIRWAY SYMPTOMS IN SEVERE ASTHMA. SINGLE CENTRE EXPERIENCE OF SERVICE DEVELOPMENT & OUTCOMES

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10.1136/thorax-2022-BTSabstracts.242

Introduction ILO is an important co-morbidity and mimic of asthma. Patients with ILO have a high symptom burden and are often inappropriately prescribed asthma treatments (including high dose oral corticosteroids) which are ineffective in treating ILO. ILO is diagnosed using Continuous Laryngoscopy with Provocation/Exercise (CLP/E) and can be effectively treated with speech and language therapy (SALT) based interventions.

Method We provide a multidisciplinary, holistic assessment for patients referred to the severe asthma clinic. For patients with upper airway symptoms further assessment, including CLP/E, is arranged. On the day of CLP/E, patients complete objective questionnaires and have a focused clinical history. In addition, we use the Breathing Pattern Assessment Tool, and in those with a high score indicating breathing pattern disorder (BPD), we measure end-tidal CO_2. CLP/E is performed in Respiratory Physiology which is equipped with a treadmill, exercise bike, and a range of inhaled triggers e.g. perfumes/cleaning products. The CLP/E is undertaken by a respiratory doctor and observed by SALT, and physiologist. We use disposable laryngoscopes to avoid infection control issues. Spirometry is performed before and after CLP/E.

Results We have performed 40 CLE/Ps with no significant adverse events. We found 7 cases of ILO (17.5%), 9 cases of BPD (22.5%), 10 of laryngeal hypersensitivity (25%), 3 of dynamic airway collapse (7.5%), 3 of psychological overlay (7.5%), and 1 patient had a tracheal web. Some patients had more than one of these diagnoses. Treatment with SALT is initiated at the time of testing utilising biofeedback.

Conclusion CLP/E plays an essential role in the investigation and management of patients presenting to the severe asthma clinic. It enables diagnosis of co-morbidities that require MDT treatment. CLP/E is a safe procedure that can easily be performed in an appropriate hospital setting by SALT or doctors trained in bronchoscopy.

P107 UK SPEECH AND LANGUAGE THERAPY (SLT) DIAGNOSTIC AND THERAPY SERVICES FOR INDUCIBLE LARYNGEAL OBSTRUCTION

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10.1136/thorax-2022-BTSabstracts.243

Introduction Inducible laryngeal obstruction (ILO) is defined as an inappropriate laryngeal closure causing difficulty breathing. Speech and language therapy (SLT) is the cornerstone of treatment. This survey aimed to gain insight into ILO services within the UK and its treatment and management.
Method The 24-question online survey was completed by 43 speech and language therapists across the UK.
Results All participants had heard of the term 'ILO' and were practicing in a range of adult services; ENT (n=40), respiratory (n=25), head and neck cancer (n=14), acute (n=9), neurology (n=5), gastroenterology (n=7), allergy (n=5), critical care (n=4), rehabilitation (n=7), community (n=12) and other (n=4).

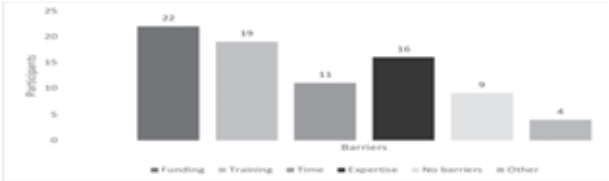
31 participants (74%) were involved in ILO diagnosis, 36 (83%) in treatment, 34 (79%) worked within a multi-disciplinary team (MDT) which included respiratory physicians (n=26), ENT consultants (n=34), SLT (n=36), physiotherapists (n=21), psychologists (n=10), clinical nurse specialists (n=16), dieticians (n=12), gastroenterologist (n=10), nurse (n=2).

15 (36%) have access to local MDT meetings, 5 (12%) regional MDT meetings, 39 (90%) to laryngoscopy and 14 (33%) to provocation laryngoscopy. Laryngoscopy (± provocation) was completed by ENT (n=19), SLT (n=11), respiratory physician (n=3) or other (n=6).

Participants reported patients having a range of co-morbidities including asthma (n=40), breathing pattern disorder (n=35), reflux (n=39), nasal disease (n=25), bronchiectasis (n=22), chronic cough (n=37) and other (n=15) and had access to a range of diagnostic testing.

Therapy was provided either face to face (n=17), virtually (n=2), both (n=17) or neither (n=5). Most therapy was provided one-to-one (94%) with one SLT providing group therapy.

The wait time for diagnosis ranged from less than 3 months (n=9), 3–6 months (n=16), 7–12 months (n=7) and greater than 12 months (n=2). The wait time for therapy ranged from less than 3 months (n=19), 3–6 months (n=14), 7–12 months (n=2). Barriers to treatment and diagnosis are shown in figure 1.
Conclusions Participants felt the greatest barriers to service development were lack of funding, training, and expertise. We hope this survey will identify the need for further service provision and aim for more streamlined services, reducing inequalities depending on geographical location.



Abstract P107 Figure 1 Bar chart showing barriers to service development

P108 MAKING WAVES: EVALUATION OF THE USE OF IMPULSE OSCILLOMETRY IN THE ASSESSMENT OF INDUCIBLE LARYNGEAL OBSTRUCTION (ILO), AND DETERMINING THE PREVALENCE OF ILO WITHIN A UK NORTHWEST RESPIRATORY SERVICE

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10.1136/thorax-2022-BTSabstracts.244

Introduction Inducible laryngeal obstruction (ILO) is an upper airway condition which describes a reversible narrowing of the larynx, leading to breathlessness symptoms. Due to poor recognition and similar presentation to asthma, the diagnosis of ILO can be delayed up to 4.8 years. The current gold standard assessment tool is currently laryngoscopy. However, there are inherent challenges with this invasive method.
Aims To determine the prevalence of ILO in a UK respiratory population.

To evaluate the use of spirometry and impulse oscillometry as diagnostic tools for ILO, and their predictive ability to determine laryngoscopically- confirmed ILO.
Method 98 patients were included in the service evaluation: 68 females (mean ± *SD*: age 54 ± 15.9) and 30 males (mean ± *SD*: age 55 ± 14.2), all of whom had been referred to a Tertiary referral service.

Prevalence calculations were used to determine the prevalence of ILO as well as to establish characteristics displayed in those who had been diagnosed with ILO. Binary logistic regression was also used to examine whether spirometry values (FEV1, FEV1/FVC and ERV) and IOS values (Z5 Hz, R5 Hz, Rin5) were associated with the likelihood of having an ILO diagnosis
Results The model incorporating spirometry parameters was statistically significant (p=0.00), with FEV1/FVC and ERV significantly contributing towards the model. This is suggestive that spirometry values FEV1/FVC and ERV can be potential predictors of diagnosing ILO. However, the model incorporating Z5 Hz, R5 Hz and Rin5 parameters was not statistically significant (p=0.129, p=0.119, p=0.061), and did not therefore significantly contribute towards the model. This is suggestive that the IOS values Z5 Hz, R5 Hz, Rin5 were not found to be potential predictors of diagnosing ILO.
Conclusion This study found spirometry values FEV1/FVC and ERV were significant predictors of a subsequent diagnosis of ILO. However, IOS values Z5 Hz, R5 Hz, Rin5 were not found to be predictors of diagnosing ILO in the model.

Further prospective studies with larger patient groups may be useful to investigate any further value of the use of IOS as a clinical indicator in the assessment of ILO.

P109 TWO BRONCHIECTASIS COUGHS: SLT OR PHYSIO?

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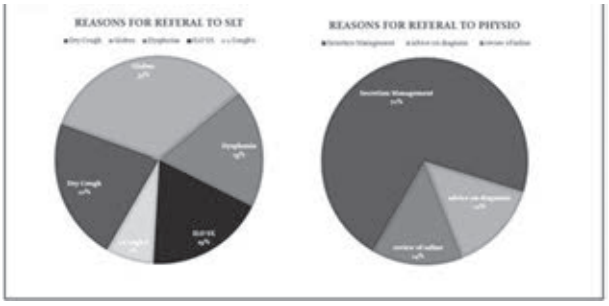
10.1136/thorax-2022-BTSabstracts.245

Introduction Patients with Bronchiectasis generally have a cough, for which suppression is normally not recommended (BTS, 2018)[1]. In clinical practice we noticed an increased referral from our physiotherapy team to Speech & Language



Abstract P109 Figure 1 Reason for referral

Therapy (SLT), for management of chronic cough and upper airway symptoms.

Method We conducted a retrospective review of the referral databases looking at a period of 20 months (April 2020 to January 2022). A cohort of 274 patients were reviewed, who had been referred with a diagnosis of Bronchiectasis. 28 (10%) were identified who had either been referred to SLT or Physiotherapy by the other specialty, or to both from the Consultant team. All patients had bronchiectasis diagnosed by High Resolution CT scan. Further analysis of this group was carried out.

Results The main reasons for referral were isolated. From Physiotherapy this was predominantly an ongoing symptom of globus pharyngeus and dry non-productive cough despite adequate clearance. The referrals from SLT were to ensure adequate secretion management (figure 1).

All the 28 patients had developed a dry and less productive cough which originated at the level of the throat, with or without a separate productive cough. All these patients were suspected to have Inducible Laryngeal Obstruction (ILO) or Cough Hypersensitivity, 19 (68%) have had this confirmed on diagnostic laryngoscopy. The remaining patients have not had this investigation due to a combination of factors.

In general, those referred from Physiotherapy to SLT had a higher BSI (bronchiectasis severity index) median of 5 compared to 2. Infection rates were on average less than 2 per year and all were undertaking effective clearance.

On review of all referral cohorts for those who had attended at least two treatment appointments with SLT (N=16), 31% (N=5) have been discharged with resolved symptoms and a further 44% (N= 7) reported improved control of symptoms.

Conclusion What this cohort shows is that within the management of Bronchiectasis, it is appropriate to consider upper airway cough in those that continue to be symptomatic despite good chest clearance and minimal infections.

REFERENCE

1. British Thoracic Society (2018). British Thoracic Society Guideline for Bronchiectasis in adults.

P110 THE UNTOLD TALE OF DIAPHRAGMATIC PARALYSIS: EPIDEMIOLOGY, NATURAL HISTORY AND DECISION-MAKING FOR SURGICAL REPAIR

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10.1136/thorax-2022-BTSabstracts.246

Introduction A number of series have reported on the use of minimally invasive diaphragmatic plication (MI-DP), but very little is reported on patients with diaphragmatic paralysis who do not undergo surgery. We reviewed all patients referred to us for consideration of MI-DP to gain insight into the epidemiology and natural history of the disease, and how this may influence surgical decision-making.

Methods We retrospectively reviewed all patients referred for consideration of MIS-DP from April 2017 to May 2022 to analyse demographic, clinical and radiographic data. In all cases, before surgery was performed, there was a minimum 18-month observation policy from first documented evidence of paralysis.

Results 58 patients were referred and screened. Demographics, aetiology, symptoms, physiological and radiological aspects are summarised in table 1. Radiological and/or symptomatic evidence of diaphragmatic paralysis was present for a median of 20 months (3–134) from onset to first surgical assessment. 15 patients (26%) underwent MIS-DP (M:F 8:7, median age 56, 22–77); symptomatic improvement was achieved in 14 (98%). 15 patients (26%) remained under review. 28 patients (48%) were rejected for surgery (reasons also reported in table 1). Of these, 8 were rejected due to symptomatic improvement, while 5 showed spontaneous recovery at a later stage after being turned down. In this subgroup (n=13, 22%), median time from onset to recovery was 32 months (21–68). Patients were more predominantly male (84%), younger (median 52), had slightly higher FEV1 (median 74%) and FVC (median 78%). Despite VC drop >15% being more frequent (46%), presence of paradoxical movement was less likely (23% only). The proportion of

Abstract P110 Table 1

Gender	**n (%)**
- Male	41 (71%)
- Female	17 (29%)
Age	**Median (range)**
	60 (22-79)
Side	**n (%)**
- Left	33 (57%)
- Right	25 (43%)
Aetiology	**Frequency**
- Idiopathic	34%
- Iatrogenic	21%
- Post-viral infection	19%
- Musculoskeletal condition	17%
- Trauma	9%
Dyspnoea (% reported)	**100%**
o Severe	21%
o Moderate	48%
o Mild	31%
Other symptoms (% reported)*	
- Postural	79%
- Gastrointestinal	36%
- Sleeping disorders	29%
Pulmonary Function Tests	**Median (Range)**
- FEV1 (% predicted)	62 (32-108)
- FVC (% predicted)	70 (36-109)
- Lying and standing VC drop (%)	-18 (-2 to -52)
- VC drop >15%	n=11 (19%)
Diaphragmatic Height Discrepancy**	**n (%)**
- < 20 %	9 (15%)
- 20 – 40 %	37 (64%)
- > 40 %	12 (21%)
Advanced Imaging	**n (%)**
- Ultrasound	27
(% with paradoxical movement)	(40%)
- Fluoroscopy	15
(% with paradoxical movement)	(75%)
Reasons for surgical rejection*	
- Paucisymptomatic	46%
- High risk/multiple comorbidities	39%
- Improvement	29%
- Patient decision	11%
*some patients had more than one	
** % difference between normal and diseased side on CXR	

patients with severe symptoms was however similar, as it was radiological severity on CXR, laterality and distribution of aetiology.

Conclusion Diaphragmatic paralysis is a complex condition for which spontaneous recovery is not uncommon and surgery is indicated in select cases. A multidimensional assessment is required as no single aspect alone seems able to predict evolution. Our results support the continuation of a judicious 18-month minimum observation policy, which could merit extension for certain patients.

P111 NURSE SPECIALIST LED SLEEP PATHWAY IS CLINICALLY AND COST EFFECTIVE COMPARED TO A PATHWAY DELIVERED BY CONSULTANTS

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10.1136/thorax-2022-BTSabstracts.247

Introduction The merger of two similar hospitals but with very different sleep pathways allowed a comparison, particularly of the use of Clinical Nurse Specialists (CNS) on one of the sites.

Methods A retrospective study was conducted on patients set up on CPAP on the two sites, sampled from August to December 2018; allowing a reasonable follow up period before the covid pandemic started. Data were collected on time from referral to CPAP set up, severity, patient outcomes, and approximate costs of the variable parts of the pathways. A total of 132 episodes were investigated.

Results All patients on the consultant led site saw a consultant at least once and were all given an autoset device. None of the patients on the CNS led site required a consultant appointment, and only one was given an autoset device, the rest receiving a fixed pressure machine. This resulted in significant differences in set up costs between the two sites. The use of CNS significantly reduced waiting times by expanding the number of new appointments available. Compliance hours and change in Epworth score were comparable between the two sites. The number of patient visits on the consultant led site was higher than the CNS led site.

Abstract P111 Table 1 Mean (unless otherwise stated) figures comparing the patients, their outcomes, and the costs of the two pathways

	Consultant led	CNS led
Referral to set up no. days	213.5	56.0 (p<0.01)
Desaturation index	20.5	39.1 (P<0.01)
Body mass index	36.4	35.6 (NS)
Improvement in Epworth	7.19	5.6 (NS)
Compliance Hours	5.36	5.73 (NS)
Proportion of patients compliant	61.9%	67.6%
CPAP Pressure	12.21	10.49 (p<0.01)
Number of patient visits	5.83	4.84
Estimated variable staff costs	£39.73	£27.42
Machine costs	£350.00	£181.89
Total variable costs	£389.73	£209.31

Interestingly severity was significantly higher on the CNS site, however a number of patients on the consultant site were given CPAP on the basis of an essentially normal oximetry, but with compelling symptoms which may explain at least part of this difference. Mean CPAP pressure used was significantly lower on the CNS site, which predominantly relied on fixed pressure machines, however as the compliance hours and change in Epworth sleepiness scale were not significantly different, this does not suggest undertreatment in this group. BMI was not different in the two patient groups, and thus does not explain the differences seen in severity or CPAP pressure.

Conclusions CNS led sleep clinics increase capacity and reduce costs compared to consultant led ones, without negatively impacting patient outcomes. The use of autoset devices did not significantly influence compliance and sleepiness compared to fixed pressure machines in this study.

P112 ABSTRACT WITHDRAWN

P113 ADVANCED CLINICAL PRACTITIONER (ACP) HOT AIRWAYS CLINIC: A 12 MONTH FEASIBILITY STUDY

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10.1136/thorax-2022-BTSabstracts.248

Background Following COVID restrictions for aerosol-generating procedures, spirometry provision both in primary and secondary care has been reduced. Out-patient referrals to clarify airways disease diagnosis increased 205% since 2019. Subsequently, waiting times for out-patient Consultant review with diagnostics were in excess of 16 weeks.

Thus, a HOT Airways Clinic led by a non-Consultant grade was devised and implemented.

Objectives 1) Facilitate rapid specialist assessment for diagnosis/management of airways disease.

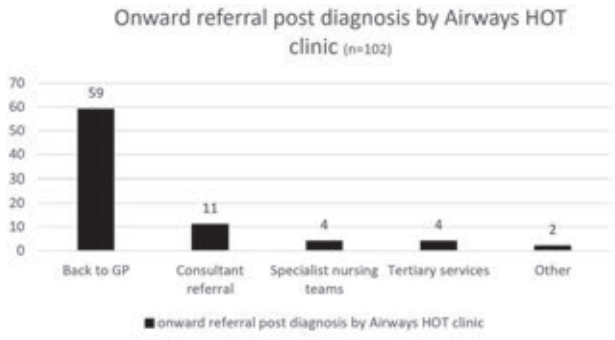
2) Provide patient-centred management plans encompassing pharmaceutical, psychosocial and behavioural therapies.

3) Ensure appropriate follow-up.

Methods Referral criteria for an ACP-led Airways Clinic were agreed (aged over 18; no need for admission; airways disease confirmed or suspected as the primary problem; emergency care provided). Clinics were performed weekly with dedicated access to spirometry (FEV1; FVC; PEFR; reversibility studies and FeNO) as well as and other diagnostics (blood testing and radiology) to facilitate standard care.

Results 102 patient referrals were reviewed: median age 51 years (IQR 36–60); female 49%; BAME 32%; baseline FEV1 63% predicted; current smokers 38%). Referral source: 62% from urgent care; 18% GP referrals; 18% Airways Team and 3% from other Respiratory Consultants. Average waiting time from referral to appointment 2 weeks (range 2–39 days). Referral question: diagnosis 64 (62%); disease optimisation 38 (37%). Of those reviewed a definitive diagnosis was made in 60% (n=50); 40% (n=34) had treatment optimisation with 17% (n=18) non-attendance.

Key interventions included health promotion (smoking cessation referral was offered to all smokers and accepted in 78% of



Abstract P113 Figure 1 Results of discharge from airways HOT clinic

cases); medication education (92%); spirometry and/or full lung function (64%); CT scanning (31%) and novel pharmaceutical intervention (72%). Most patients had 2 out-patient attendances (range 1–4) in the clinic.

Patient satisfaction was favourable very satisfied 72% (n=62) or satisfied 29% (n=23).

Conclusion The ACP-led HOT Airways Clinic has been commissioned and will continue as an integral part of the Airways Clinical Pathway. The ACP-led HOT Airways Clinic is timely and cost-effective with a significant reduction in time taken for diagnostics and onward Consultant referrals.

P114 EVALUATION OF A ONE-STOP RESPIRATORY OUTREACH CLINIC FOR PATIENTS ATTENDING A SUBSTANCE MISUSE SERVICE: ADDRESSING UNDER-DIAGNOSIS AND UNMET NEEDS; ACCEPTABILITY AND IMPACT

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10.1136/thorax-2022-BTSabstracts.249

Introduction and Objectives Patients under the care of substance-misuse services commonly smoke drugs and tobacco; both of which increase the risk of respiratory disease. This patient group does not readily access healthcare so goes undiagnosed and misses out on low-cost high-value respiratory interventions. The aim of this study was to evaluate patient-need, acceptability and impact of a 'one-stop' outreach respiratory clinic offered to high-risk individuals attending a substance-misuse service in North London.

Methods Patients attending substance-misuse services were screened using respiratory case-finding criteria (MRC-breathlessness score >2, smoked drugs and/or tobacco history, and/or oxygen saturation (SaO_2) <97%). Those meeting criteria were offered a respiratory physician review including spirometry, carbon monoxide (CO) reading, explanation of findings with advice, offer of referral for specialist tobacco dependence treatment (TDT) and summary with recommendations for their GP. Impact was assessed by telephone follow-up.

Results See table 1. Between September 2020 and May 2022 126/176 (72%) patients screened met criteria. 46/61 (75%) patients invited for review attended. Mean (range) age was 54 years (M=29;F=17). All reported breathlessness (50% MRC ≥4). 22/46 (48%) had SaO_2 <97% (mean 94; range 88–96)%. Mean (range) FEV_1 was 2.49 (0.56–4.35) L, FVC 4.65 (1.56–5.96) L and ratio 0.63 (0.31–0.85). A new diagnosis of COPD was made in 22/46 (48%) patients. 14/46 (30%) had ever received influenza vaccination. 46/46 (100%) had a history of heroin, crack and/or cannabis smoking. All were tobacco dependent with mean (range) 42 (5–120) pack-years. Mean (range) CO was 25 (6–94) ppm. 39/46 (85%) accepted referral for specialist TDT.

Abstract P114 Table 1 Characteristics, assessment and outcomes at follow-up of patients attending respiratory out-reach clinic in a substance misuse service

Total number of patients n=46	
Mean age (range) years	54 (39–74)
Male:Female	29:17
Body Mass Index (BMI) mean (range)	25 (16–37)
Self-reported breathlessness	46 (100%)
Self-reported cough n (%)	40 (87%)
Self-reported cough with sputum n (%)	36 (78%)
Tobacco dependent n (%)	46 (100%)
Smoked tobacco mean (range) pack-years	42 (5–120)
History of smoking heroin n (%)	43 (93%)
History of smoking crack n (%)	41 (89%)
History of smoking cannabis n (%)	40 (87%)
FEV_1 mean (range) Litres	2.49 (0.56–4.35)
FVC mean (range) Litres	4.65 (1.56–5.96)
FEV_1/FVC ratio mean (range)	0.63 (0.31–0.85)
FEV_1predicted mean (range)%	75 (31–127)
New COPD Diagnosis (NICE criteria) n (%)	22 (48%)
Progression of existing COPD diagnosis n (%)	2 (4%)
→ Mild COPD n	9
→ Moderate COPD n	10
→ Severe COPD n	3
→ Very severe COPD n	2
Oxygen saturations (SaO_2) at rest <97%	22 (48%)
→ Of whom SaO_2 mean (range)%	94 (88–96)
Exhaled Carbon Monoxide (CO) level mean (range) ppm	25 (6–94)
(NB Limit of normal exhaled CO in non-smoker ≤ 5 ppm)	39 (85%)
Referral to Tobacco Dependence Treatment (TDT) accepted n (%)	
Previously ever received influenza vaccination	14 (30%)
Telephone Follow-Up n=28	
Time interval since review mean (range) months	6 (4–12)
Influenza vaccination following respiratory outreach clinic review n	14
→ Influenza vaccination received for first time n	7
Self-reported 'ex-tobacco' smoker following outreach clinic review n	11
→ Stopped smoking working with TDT specialist support n	10

28/46 (61%) were contactable for phone follow-up at mean (range) 6 (4–12) months. Following clinic review, 14/28 (50%) reported receiving influenza vaccination; 7/14 for the first time. 11/28 (39%) reported having stopped smoking tobacco; 10 working with TDT specialists.

Conclusion Take-up of the offer of respiratory review was high in patients with respiratory symptoms attending substance-misuse services. This outreach clinic for this hard-to-reach population was found to be high value; 48% of attendees had a new diagnosis of COPD made; 30% of all attendees had influenza vaccination following review and 23% were supported to stop smoking.

P115 INVESTIGATING A STRUCTURED DIAGNOSTIC PATHWAY FOR CHRONIC BREATHLESSNESS IN PRIMARY CARE; A FEASIBILITY CLUSTER RANDOMISED CONTROLLED TRIAL (CRCT)

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10.1136/thorax-2022-BTSabstracts.250

Aim To conduct a feasibility trial investigating a structured diagnostic pathway versus usual care for adults presenting with chronic breathlessness in primary care.

Methods Ten GP practices were cluster randomised to a structured diagnostic pathway including a panel of early investigations (Intervention group) or Usual care. Eligible patients were recruited opportunistically: ≥40 years old, first presentation of chronic breathlessness, with no prior diagnosis for breathlessness. Feasibility outcomes included recruitment and retention rate. The number of investigations and coded diagnoses were recorded from the healthcare record. Patient reported outcome measures (PROMs) for breathlessness, mental health and health-related quality of life were collected at baseline, six and 12 months.

Results 48/220 (22%) patients were recruited between November 2019 and February 2021: 65% female, mean (SD) age 66 (11) years, BMI 31.2(6.5), median (IQR) MRC dyspnoea scale 2(2–3). 41/48 (85%) participants returned PROMs. The Intervention group had a median (IQR) of 8(7–9) tests compared with 5(3–6) tests in UC within three months. At 12 months, 11/25 (44%) patients in the Intervention group had a coded diagnoses for their breathlessness versus 6/23 (26%) patients in Usual care. A comparison of the PROMs between groups are shown in table 1.

Conclusion The recruitment and retention rate indicate a cRCT to investigate a structured diagnostic pathway in primary care is feasible. The Intervention group underwent more investigations and more patients had a recorded coded diagnosis at 12 months compared with Usual care. PROMs indicate potential patient level benefit, but the intervention group were more symptomatic at baseline. An adequately powered clinical trial is needed to investigate these initial results.

Please refer to page A214 for declarations of interest related to this abstract.

P116 A SYSTEMATIC REVIEW TO IDENTIFY AND COLLATE THE PATIENT-CENTRED FACTORS INFLUENCING PATIENT JOURNEYS THROUGH CLINICAL TRIALS

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10.1136/thorax-2022-BTSabstracts.251

Background Patient-centred trial design and delivery; improves recruitment and retention, with a direct impact on increased cost and time efficiency of research; increases participant satisfaction; encourages participation by a more representative patient group; allows research teams to better meet participants' psychosocial needs; and ensures outcomes that matter to patients are prioritised. Research in this area is increasing, however most explorations focus on narrow facets of trial participation. The aim of this project was to systematically identify the breadth and diversity of patient-centred factors influencing participation and engagement in clinical trials and collate these into an organising framework.

Methods Robust qualitative and mixed methods systematic reviews are becoming increasingly common in health research. The protocol for this review was prospectively registered on PROSPERO, CRD42020184886. We used the SPIDER (Sample, Phenomenon of Interest, Design, Evaluation, Research type) framework as a standardised systematic search strategy tool. 3 databases were searched as well as references checking, and thematic synthesis was conducted. Screening agreement was performed (Cohen's kappa coefficient 0.97, excellent agreement) and code and theme checking were conducted by 2 independent researchers.

Abstract P115 Table 1 PROMs at baseline, six and 12 months

	Usual care (n=19)			Intervention (n=22)			
	Baseline	6 months	12 Months	Baseline	6 months	12 Months	Mean group difference (IG-UC) change from baseline at 12 months
MDP†							
Immediate perception	14.0(12.9)	13.7 (14.0)	16.6 (15.2)	24.8 (12.1)	13.6 (10.6)	12.0 (10.1)	-15.4 (3.5)*
Emotional response	9.8 (12.2)	8.4 (12.0)	10.9 (12.5)	18.6(12.0)	11.9(11.9)	11.7 (13.1)	-8.5 (3.8)*
Dyspnoea-12†	7.4 (5.8)	9.4 (7.9)	9.1 (9.0)	12.7 (8.2)	8.7 (8.4)	8.1 (7.0)	-6.3 (2.6)*
CHQ							
Dyspnoea	3.3 (1.2)	3.6 (1.4)	3.7 (1.4)	3.0 (1.3)	4.5 (1.4)	4.3 (1.7)	1.0 (0.5)*
HADS							
Anxiety	5.7 (4.1)	5.6 (4.6)	5.3 (4.3)	7.5 (4.5)	5.7 (3.1)	7.3 (4.5)	0.3 (1.0)
Depression	5.6 (3.7)	5.3 (4.0)	6.1 (4.2)	5.3 (3.2)	4.7 (4.4)	6.0 (4.9)	0.3 (1.0)
EQ5D-5L							
Index Score	0.76 (0.16)	0.70 (0.33)	0.72 (0.25)	0.63 (0.31)	0.76 (0.20)	0.71(0.26)	0.12 (0.07)*
VAS	68 (15)	66.3 (18.2)	67 (20)	74 (17)	74.30 (14.8)	67 (19)	-6 (5)

*mean difference between groups in change from baseline at 12 months is greater than minimal clinical important difference (MCID).
Data presented as Mean (SD) or Mean (SE) for between group difference. *MDP = Multidimensional Dyspnoea Profile, CHQ = Chronic Heart Questionnaire (self-report), HADS = Hospital Anxiety and Depression Score, EQ5D-5L = EuroQol- 5 Dimension 5 level questionnaire, VAS = Visual Analogue Scale.*
†a reduction in score indicates reduced symptom burden.

Results Data were drawn from 285 peer-reviewed articles. Approximately half were in oncology, with the others in 22 different specialities. 7 (2.5%) were in respiratory medicine. 300 discrete factors were identified, which were sorted into 13 major themes and subthemes. Themes and level-one subthemes are shown in the table 1. Many of the identified factors are straightforward, generalisable and transferable across most specialities and disease models. Others are complex, at times contradictory, and may be context or disease specific.

Conclusions We have used a robust systematic review methodology to develop a framework to guide other researchers towards the important patient-centred themes to consider when designing and delivering trials. Some of the identified factors are disease specific. Respiratory medicine currently lags behind other specialities such as oncology in identifying factors influencing patient perceptions and experiences of trials. Given the benefits of understanding and incorporating patient views into research, and the volume of active respiratory research, we suggest more exploration is needed in respiratory medicine and its subspecialities.

Abstract P116 Table 1

Theme	Level 1 Subtheme
Prior to clinical trial participation	Patient population perceptions of research
	How patients learn about trials
	Recruitment methods
Motivation to take part in trials	Altruistic and societal motivations
	Individualistic motivations
	Individualistic and altruistic interaction
Barriers to participation	Practical barriers
	Attitudinal barriers
	Protocol design barriers
	Investigational product factors
	Conflict of interest concerns
	Barriers created by study timelines
Facilitators to participation	Increasing trial flexibility
	Financial compensation
	Overcoming cultural and language barriers
	Assisting patients to understand the trial
	Improving trial design factors
Demographic factors influencing the decision to enrol in trials	General considerations and interaction potential
	Knowledge and trust
	Age
	Gender
	Sexuality
	Race and ethnicity
	Socioeconomic status
	Education level
	Language, religious and cultural considerations
	Functional status
	Family structure
	Employment status
Impact of care structure and experience on trial enrolment	Location and structure of clinical care
	Previous trials experiences
	Previous healthcare experience
Two-way interaction between health status and trials	Interaction between health status and trial enrolment
	Interaction between trial participation with health and other HCPs
Psychological impact	Factors modifying impact on psychological wellbeing
	Positive psychological consequences
	Negative psychological consequences
Validity of consent	General Considerations
	Paediatric specific consent/assent
	Consent in difficult circumstances (e.g. intrapartum trials)
	Consent of incapacitated adults
Impacts of participation on day-to-day life	Aspects of trial participation with significant negative impact on life
	Factors improving trial participant experience
Special considerations	Reproductive health
	End of life trials
Leaving a trial before protocol completion	Choosing to withdraw from a trial
	Intervention related reasons leading to withdrawal
	Trial design or implementation related reasons leading to withdrawal
	Major life events resulting in withdrawal
	Early closure or patient ineligibility
Experiences of trials ending	Anxiety about the end of trials
	Post-trial follow up arrangements

'Interview with a Vampire' – Blood gas monitoring in clinical care

P117 DOES THE DIFFERENTIAL MEASUREMENT ERROR OF PULSE OXIMETERS IN PATIENTS WITH NON-WHITE SKIN DELAY THE INITIATION OF OXYGEN THERAPY?

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10.1136/thorax-2022-BTSabstracts.252

Introduction and Objectives Recent studies have demonstrated differences that the measurement error of oxygen saturation as measured by pulse oximetry is higher in patients with non-white skin; the error giving higher oxygen saturations than the true value. We hypothesised that this may lead to patients with non-white skin being referred for long-term oxygen therapy (LTOT) later than those with white skin if pulse oximetry is used to inform the timing of this decision.

Method We used data collected routinely from patients referred for LTOT assessment from 2013 to the present day. Their oxygen saturation, pH, pO2, pCO2, bicarbonate and carboxyhaemoglobin were tabulated and compared and stratified by ethnic group. The analysis was registered as an Audit.

Results Data were available from 516 patients referred for LTOT assessment. There were significant differences in

Abstract P117 Table 1

	White (N=454)	Black (N=3)	Unknown (N=44)	SE Asian (N=4)	Other (N=10)	ANOVA p value
Mean pO2, kPa	7.38	4.76	7.46	10.25	7.91	<0.001
Mean CO_2, kPa	5.57	6.76	5.94	4.89	5.24	0.03
Mean pH	7.44	7.42	7.44	7.44	7.44	0.99
COhb, kPa	1.67 (N=431)	1.54	1.75 (N=41)	0.92	1.57 (N=9)	0.29

oxygen levels measured by arterial blood gas between ethnic groups (ANOVA, p<0,0001) with the lowest mean measurements in those with black skin (4.76kPa, N=3). There was also a negative association between carboxyhaemoglobin COHb and oxygen levels -0.23 kPa (95% confidence intervals CI -0.35 to -0.11) and female sex and oxygen levels -0.40 (95% CI: -0.66 to -0.14) in a multivariate regression model that also included age.

Conclusion People with black skin had lower oxygen levels at the point of referral for LTOT. The reasons for this are unclear but may reflect the known inaccuracy of pulse oximetry in darker skin. Female sex and carboxyhaemoglobin levels were associated with lower pO2 at LTOT, suggesting that gender and exposure to tobacco smoke may be associated with later referrals.

P118 WHAT OXYGEN TARGET SATURATION RANGES ARE CURRENTLY PRESCRIBED FOR NON-HYPERCAPNIC PATIENTS IN UK HOSPITALS AND WHAT TARGET RANGES WOULD RESPIRATORY REGISTRARS PREFER TO USE?

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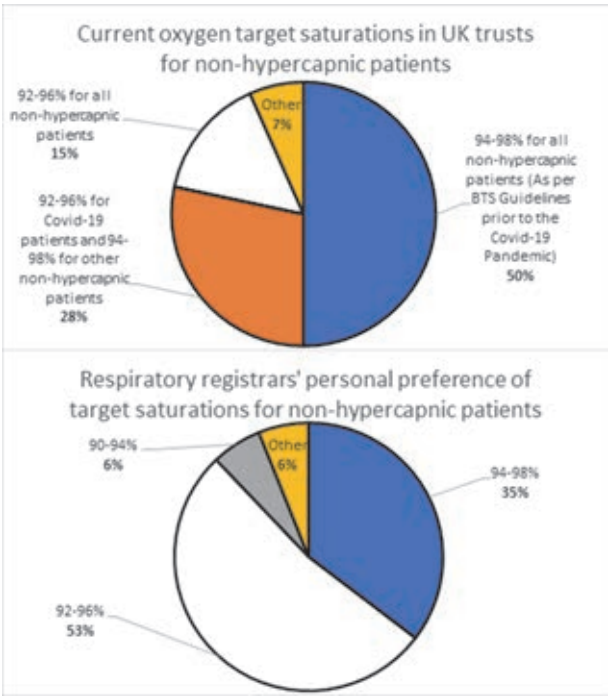
10.1136/thorax-2022-BTSabstracts.253

Introduction and Objectives The current BTS oxygen guideline recommends a target oxygen saturation range of 94–98% for acutely ill patients not at risk of hypercapnia whilst the TSANZ guideline recommends 92–96%. During the COVID-19 pandemic, the recommendation for NHS hospitals was to use a target saturation range of 92–96% for non-hypercapnic patients to conserve oxygen supplies. In the aftermath of the height of the pandemic we undertook a survey in May/June 2022 to establish what target ranges are in current use in UK hospitals and the views of respiratory health care professionals on this subject.

Methods An online questionnaire was created and distributed to respiratory registrars in the UK by email via the Specialty Training Committee representatives or Training Programme Directors.

Results 99 responses were received from 60 different NHS acute hospital trusts across the UK. 30 trusts (50%) currently use a target saturation range of 94–98% for all non-hypercapnic patients. This proportion is even higher (78%) when excluding COVID-19 patients. However, the majority of respiratory registrars who were surveyed (65%) expressed a personal preference for an alternative target saturation range, with 52% preferring target saturations of 92–96% for non-hypercapnic patients. 76% of respondents believed that too much oxygen is used in their hospital and only 1% believed that not enough oxygen is given.

Conclusions Although most UK hospitals use a target oxygen saturation range of 94–98% in the non-hypercapnic population, the preference among the respiratory registrars surveyed was for an alternative strategy (most commonly a target saturation of 92–96%). This suggests a perception among clinicians that more conservative target saturations are non-harmful to these patients, but at present the evidence supporting this is lacking. The UK-ROX and Mega-ROX trials are currently recruiting and aim to evaluate conservative versus standard oxygen saturation targets in mechanically ventilated critically ill patients. Once published these trials will hopefully give us a more concrete basis upon which to make recommendations in this important area.



Abstract P118 Figure 1

P119 AN AUTOMATED AUDIT OF HOSPITAL OXYGEN USE DEVISED DURING THE COVID PANDEMIC

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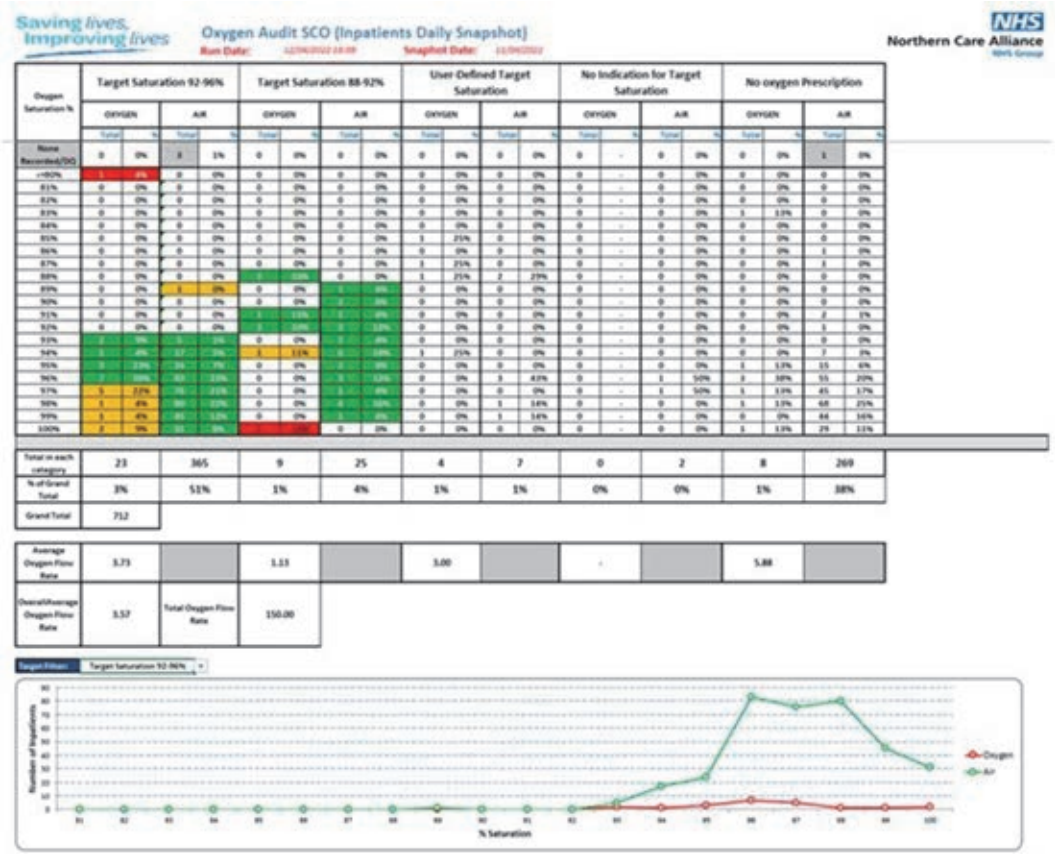
10.1136/thorax-2022-BTSabstracts.254

Background The BTS organised five UK-wide audits of hospital oxygen use between 2008 and 2015. Manual audits are very time-consuming and subject to data entry errors. We devised an automated audit of oxygen prescribing and oxygen use within this hospital at the onset of the Covid-19 pandemic in early 2020.

Methods Oxygen prescribing and bedside observations (NEWS2 scores) are undertaken within an integrated Allscripts Sunrise electronic medical record (EMR) at Salford Royal. We commissioned the Trust IT team to devise a bespoke automated audit of oxygen prescribing and use.

Results Audits of hospital oxygen use can now be run by clinicians in a matter of minutes. The summary report (figure 1) displays the oxygen saturation alongside the oxygen prescription status of every patient in the hospital with the exception of Critical Care areas which do not use NEWS2. The display has a 'traffic-light' colour scheme (green within target range, amber or red if below range or if above range on supplemental oxygen). A graph displays oxygen use and saturation levels



Abstract P119 Figure 1 Example of a summary oxygen audit report

for patients who are prescribed each target range. Clinicians can access raw data including ward location, oxygen device and flow-rate for each individual patient.

Over 22 audits, the percentage of patients using oxygen who had a prescription was >90% 11 times, 80–90% 10 times and 76% once. Although the number of hospital in-patients fell by 46% during the first wave of the pandemic in Spring 2020, the percentage of patients using oxygen increased from 5.5% to 16.5% and total oxygen flow outside of Critical Care rose 117% from a pre-pandemic baseline of 142 l/min to 308 l/min (capacity is about 1100 l/min). Peak oxygen flows (422 and 378 l/min) occurred in November 2020 and January 2021.

Conclusions In hospitals with an integrated electronic medical record, it is possible to automate all fundamental aspects of the BTS oxygen audits and to monitor oxygen use at individual patient level and at a hospital-wide level during major events such as the Covid-19 pandemic. This methodology could be extended to other BTS audits where the audit questions relate to routinely collected EMR data.

P120 EVALUATING THE USE OF THE NEWS2 SPO2 SCALES IN COPD PATIENTS ADMITTED TO MEDICAL WARDS: A PROSPECTIVE CLINICAL AUDIT

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10.1136/thorax-2022-BTSabstracts.255

Objective NEWS2 (RCP 2017)[1] recommends use of 'SpO2 Scale 2' in patients with hypercapnic respiratory failure (usually due to COPD) to aim target saturations of 88–92%. We aimed to identify if COPD patients admitted to medical wards have the correct NEWS2 SpO2 Scale implemented.

Methods Prospective audit of adult inpatients with COPD admitted to medical wards between (May -June 2022) at Leicester Royal Infirmary. Cases were identified through Nervecentre, an electronic patient system. Outcome measures included: evidence of ABG or VBG being performed; correct use of NEWS2 Scale 1; correct use of NEWS2 Scale 2.

Results 53 patients' data were collected, consisting of 58% male and 42% female patients. Ages ranged from 47 -96 (mean age 76). During their admission, 11% had an ABG performed, 62% had VBG performed, 6% had both ABG and VBG, and 9% had neither ABG nor VBG. In terms of NEWS2 Scale use, 75% of patients were placed on Scale 1, of which 28% were inappropriately put on this scale. 25% of patients were placed on Scale 2, of which 31% were inappropriately put on this scale. Overall, 30.2% of audited patients were placed on the incorrect NEWS2 SpO2 Scale.

Conclusion Our audit showed that nearly a third of COPD patients did not have the correct NEWS2 Scale utilised. Very few patients had an ABG performed, which would be the gold standard for identifying a need for Scale 2 usage. Careful consideration should be given when selecting the appropriate NEWS2 SpO2 Scale in COPD patients, which should be guided by evidence of hypercapnic respiratory failure. This would be important in avoiding inappropriate target

saturations and O2 administration, as well as inaccurate 'scoring' of the early warning score, which can influence clinical decision-making. Recommendations include: education and awareness of correct use of NEWS2 Scales; informational posters to guide clinicians; appropriate use of ABG to identify patients suitable for Scale 2. We aim to re-evaluate after these interventions.

REFERENCES

1. Royal College of Physicians. (2017). National Early Warning Score (NEWS) 2. https://www.rcplondon.ac.uk/projects/outputs/national-early-warning-score-news-2.

P121 AN AUDIT OF AMBULATORY OXYGEN ASSESSMENTS UTILISING A PRE-ESTABLISHED BLINDED TREADMILL PROTOCOL

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10.1136/thorax-2022-BTSabstracts.256

Introduction A blinded ambulatory oxygen assessment protocol on a treadmill was established in 2005. Patients perform 2 walking tests, up to fifteen minutes each, on a treadmill at a set speed with a 30 minute rest between tests. The patient wears nasal cannulae on both tests, through which they receive 2L/min of air or Oxygen. Patients rate their breathlessness on a BORG scale every minute and this is recorded with Oxygen saturation via ear probe and heart rate. An increase in distance (10%) or decrease in BORG scores (1 point/10%) would indicate a need for ambulatory Oxygen prescription. The British Thoracic Society (BTS) 2015 ambulatory Oxygen therapy assessment protocol also states that an increase in SpO2 to ≥90% throughout the test would show a benefit to the patient[1].

Aim How many patients referred for assessment would benefit from prescription of ambulatory Oxygen based on the current BTS protocol?

Methods Test results, demographic and clinical data were collated for all patients referred for ambulatory Oxygen assessment over 1 year.

Results 88 patients were referred for assessment with 18 excluded (n=70). 11 patients only carried out the baseline test on air without progressing to the second test on oxygen as there was no significant desaturation during exercise. Of the 59 remaining patients 34 would be recommended ambulatory oxygen therapy, 19 would not and the remaining 6 may require higher flow rates than the 4L/min O2 that is the highest rate within the protocol. Only 18 patients (18/59=31%) had a decrease in BORG (felt better) by 10% or 1 point whilst on supplemental O2. 10 patients (10/59=17%) reported higher BORG scores on Oxygen (?fatigue, ? walked further).

Conclusion Of the 70 patients included in the audit 34 (48.57%) would be recommended ambulatory oxygen therapy, 30 (42.86%) would not and the remaining 6 (8.57%) may require higher flow rates than the 4L/min that is the highest rate within the protocol. This protocol has been particularly useful during the COVID pandemic and the SOP has been shared with other departments.

REFERENCES

1. Hardinge M, Annandale J, Bourne S, *et al*. British Thoracic Society guidelines for home oxygen use in adults: accredited by NICE. *Thorax* 2015;**70**:i1-i43.

P122 ADMISSION BICARBONATE AS A DETERMINANT OF LONG-TERM MORTALITY IN OBESITY-RELATED RESPIRATORY FAILURE REQUIRING ACUTE NON-INVASIVE VENTILATION

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10.1136/thorax-2022-BTSabstracts.257

Introduction Determinants of long-term mortality have been identified to a limited extent for hypercapnic patients with obesity-related respiratory failure (ORRF). It is known that a higher level of admission bicarbonate signifies more severe respiratory insufficiency, requiring higher non-invasive ventilation (NIV) pressures and longer duration of acute NIV in COPD patients.[1] This retrospective survey set out to identify whether admission bicarbonate is a predictor of 1-year mortality for ORRF requiring acute NIV.

Methods Arterial blood gas (ABG) measurements on admission and following initiation of acute NIV were extracted for the period April 2019 to March 2020 from our NIV quality database. Electronic patient records were searched for mortality. Log-rank test was used to correlate pre-NIV bicarbonate with 1-year mortality.

Results Forty-four ORRF patients required acute NIV (n = 44) in the period April 2019 to March 2020. Pre-NIV bicarbonate ranged from 14 to 35.5 mmol/L. Analysis identified that admission bicarbonate <23 mmol/L multiplied 1-year mortality by 8-fold (Hazard Ratio 8.44, p<0.0001) compared to values ≥23 mmol/L. Over 57% of patients with admission bicarbonate <23 mmol/L were dead (due to any cause) at 1 year, compared to 27% for bicarbonate ≥23 mmol/L. The pCO2 was not a significant predictor of long-term mortality.

Discussion Admission bicarbonate appears to be a significant predictor of all-cause mortality for hypercapnic ORRF requiring acute NIV, with levels <23 mmol/L octupling the mortality risk at 1 year. This cohort of ORRF patients with a low initial bicarbonate level on ABG seems to be those with multi-organ insufficiency due to obese morbidity, especially concurrent renal impairment. This is our first survey to quantify additional risk in the ORRF group. Further studies are needed on the effect of home mechanical ventilation on the prognosis of people with ORRF, especially those presenting with multi-organ insufficiency.

REFERENCES

1. Thomas A, *et al.* P267 Association of the length of non-invasive ventilation (NIV) with arterial bicarbonate level in COPD patients with acute hypercapnic respiratory failure (AHRF). *Thorax* 2011;**66:**A176-A177.

P123 RESPIRATORY FAILURE: ASSESSING KNOWLEDGE AND KEY SKILLS AMONGST HEALTHCARE PROFESSIONALS IN INTERPRETING BLOOD GAS ANALYSIS AND RECOGNISING AND MANAGING ACUTE DISEASE

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10.1136/thorax-2022-BTSabstracts.258

Introduction Arterial blood gas analysis, ABG, is pivotal to the diagnosis and management of respiratory failure; with a

Abstract P123 Table 1 Grades and type of employment

Grade of Doctor				MEDDRs' Type of Employment					
		N	%	Trainee	Trust Grade	Locum	IF	Other*	Total
MEDDR	FY1	16	18.8%	15	1				16
	FY2	5	5.9%	2	1	2			5
	SHO	32	37.6%	10	10	11		1	32
	SpR	11	12.9%	5	4	1	1		11
	CF	5	5.9%		4		1		5
Total number MEDDR		**69**	81.2%	32	20	14	2	1	**69**
%				46.4%	29%	20.3%	2.9%	1.5%	100%
MEDST	Final-Year MEDST	**10**	11.7%						
OMEDPR	(ACP, PA, other -not clarified))	**6**	7.1%						
Total number of participants		**85**	100%						

Abbreviations: *MEDDR- Medical doctor; MEDST - Medical student, OMEDPR- Other Medical Professionals, FY1- Foundation Doctor Year 1, FY2- Foundation Doctor Year 2, SHO- Senior House Officer, SpR - Medical Registrar, CF- Clinical fellow, ACP- Advanced Clinical Practitioner, PA- Physician Associate; IF- International Fellow.*
* Other- The participant clarified the employment type as Bank'

broader range of doctors and allied professionals managing the acute presentation, Whether adequate standards of interpretation and skills managing the condition are being met is less established. Objectives in this work were to (1) document and evaluate the ability to recognise and act on respiratory failure, and (2) compare different professional groups.

Methods Prospectively administered, written, multiple-choice questions were designed around respiratory failure and included 6 ABG example cases and 3 questions in management of acute respiratory failure including indications for non-invasive ventilation. 85 questionnaires were voluntarily returned with only three declining; 69 were non-consultant grade medical doctors (MEDDR), 10 final year medical students (MEDST) and six other medical/allied professionals (OMEDPR). Of the MEDDR, 46.4% were in training grades, 29.3% Trust grade positions, and 20.3% as locums. Numbers with correct answer outcomes are expressed as percentages (%) (table 1).

Results Between 73 and 75% answered correctly, identifying the types of respiratory failure; medical registrars (92.4%) and MEDST (83.3%) performed better than others in analysing blood gases. There were no significant differences when analysing the other groups, respectively clinical fellows (76.7%), foundation doctors (70%), senior house officers (68%), and other healthcare professionals (66.7%). Sub-analysing medical doctors knowledge of blood gas interpretation by types of employment, trainees (81.3%) performed better than locums (62.1%) and Trust grade (64%) doctors. Specifically looking at management of type 2 respiratory failure, only half the participants showed satisfactory knowledge with wider gaps seen when looking at indications for NIV with only 9.4% of participants giving close to correct answers. Overall 63.5% of respondents were confident with blood gas interpretation and 52.9% with the management of type 2 respiratory failure. 90.6% were keen to receive formal training.

Conclusions Despite the widespread use of blood gases and non-invasive ventilation, significant gaps remain in blood gas interpretation and in the management of respiratory failure; Most healthcare professionals look for more formal training.

P124 TRANSCUTANEOUS CO2 MEASUREMENT IN A LONG TERM VENTILATION (LTV) SERVICE

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10.1136/thorax-2022-BTSabstracts.259

Background Transcutaneous CO2(TCCO2) measurement is widely used in the diagnosis and monitoring of ventilatory failure. Robust data on the success rates in measurement is scant. TCCO2 measurement requires a multimodal setup. We aimed to discern the factors affecting success rate of TCCO2 measurement in patients either referred or already under the care of a regional LTV service. We also aimed to determine if successful recordings influence management.

Methods All patients undergoing TCCO2 measurement between October 2019 and January 2022 were identified retrospectively. Notes were analysed for basic demographics, indications for TCCO2 measurement, measurement and device used (Radiometer TCM5 or Sentec), setup (ie.self, clinician or carer), inpatient or outpatient study, and how many attempts of TCCO2 measurement had occurred. Successful measurement was defined as adequate dataset for the clinical question not requiring repeat investigation. Statistical comparisons were made by Fisher's exact test.

Results We identified 435 recording events on 288 patients, mean age of 53, and 56% were males. 189(65.6%) had a neuromuscular disorder (NMD). The commonest indications for TCCO2 measurement were in those naïve to ventilation; 'assessment of diaphragmatic weakness or hypoventilation' (43.2%) and a second group established on treatment 'assessing adequacy of home ventilation therapy due to persistent symptoms' (27.2%).

Overall TCM5 devices had statistically higher successful recording rates (197/268,73.5%) than Sentec (100/165,60.6%) [p=0.0056]. Similarly in outpatient studies, TCM5's success rate 187/253(73.9%) vs. Sentec's 94/154(61.0%) was significant [p=0.0079]. Inpatient studies trended correspondingly but failed to reach significance likely due to sample size. When comparing setup the same pattern was seen (Non-

clinician setup: TCM 171/218(78.1%), Sentec 80/139(57.6%) [p<0.001] but note clinician setup was not significant (sample size, n=25).

Upon successful TCCO2 measurement, 110/297(37%) progressed to new ventilation setup or a change in ventilator settings; notably in patients with diagnosis of NMDs [p=0.0001]. 9/44 of the recording events with successful measurement that were done routinely to monitor those already on ventilation resulted in ventilator settings change.

Abstract P124 Table 1 Rate of successful TCCO2 measurement - Radiometer TCM5 versus Sentec (Overall, Inpatient vs Outpatient, Non-clinician setup vs Clinician setup)

Overall, N=433			
	Successful measurement, N (%)	**Failed measurement, N (%)**	**p = 0.0056**
TCM5	197 (73.5%)	71 (26.5%)	
Sentec	100 (60.6%)	65 (39.4%)	
Inpatient Study, N=26			
	Successful measurement, N (%)	**Failed measurement, N (%)**	**p = 0.6922**
TCM5	9 (64.3%)	5 (35.7%)	
Sentec	6 (50%)	6 (50%)	
Outpatient Study, N=407			
	Successful measurement, N (%)	**Failed measurement, N (%)**	**p = 0.0079**
TCM5	187 (73.9%)	66 (26.1%)	
Sentec	94 (61.0%)	60 (39.0%)	
Non-clinician setup (self/carer setup), N=358			
	Successful measurement, N (%)	**Failed measurement, N (%)**	**p < 0.0001**
TCM5	171 (78.1%)	48 (21.9%)	
Sentec	80 (57.6%)	59 (42.4%)	
Clinician setup, N=25			
	Successful measurement, N (%)	**Failed measurement, N (%)**	**p = 0.6729**
TCM5	12 (75.0%)	4 (25.0%)	
Sentec	6 (66.7%)	3 (33.3%)	

Conclusion Radiometer TCM5 had statistically significant higher success rates in our TCCO2 recordings. The reasons for this are unclear. Successful measurement can be helpful in decision making and there is a high success rate of domiciliary recordings.

'Sliding Doors' – Beyond the drain: new insights in pleural disease

P125 DIAPHRAGM DYNAMICS IN PLEURAL EFFUSION

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Introduction and Objectives The relationship between symptoms, pleural effusion size and the diaphragm is unclear. We conducted a pilot study to understand the role of diaphragm shape and movement in patients with unilateral pleural effusions.

Method We prospectively recruited patients with unilateral pleural effusions. Routine investigations were collected. Study-specific thoracic ultrasounds (TUS) were performed at baseline, post intervention, and at day 7. A seven-day visual analogue score (VAS) diary was completed for breathlessness, starting at baseline, immediately post aspiration and then daily thereafter.

Results Of the 45 patients recruited, 17/45(38%) were female. The median [interquartile] age was 71[66–77] years. The most common reported symptom was breathlessness in 43/45(96%). At baseline, the medial effusion depth was 100[80–126]mm over 4[3–5] rib spaces. Procedures were performed in 40/45 (89%), including 32 therapeutic-interventions and 8 diagnostic aspirations. A median of 1,000 [481–1,500]mls of pleural fluid was aspirated. Malignancy was diagnosed in 20/45(44%) patients.

A diaphragm abnormality (abnormal shape, movement or both) was seen in 22/45(49%) with a flattened diaphragm in 7/45(16%), an inverted diaphragm in 2/45(4%), paradoxical movement in 13/45(29%) and no movement in 8/45(36%). A malignant diagnosis was found in 14/22(64%) of those with a diaphragm abnormality at baseline, compared to 6/23(35%) with normal diaphragm (p<0.05). Of those undergoing a therapeutic intervention diaphragm abnormalities persisted in 4/21(19%) with improvement in 15/21(71%) (two were unreported). Diaphragm shape improved in all patients, however two patients had a persistent paradoxically moving diaphragm and two had no movement.

In 27 patients undergoing therapeutic intervention and completing follow up, 19/27(70%) had a diaphragm abnormality at baseline, 4/27(15%) post intervention and 11/27 (41%) at day 7. VAS scores at baseline, post aspiration and day 7 were 44[27–53.5]mm, 25[13–44]mm and 36 [13.5–58.5]mm in those with a diaphragm abnormality compared with 46.5[34.25–72.5]mm, 34.5[18.5–54.75]mm and 22.5[14.25–32.25]mm in those with an normal diaphragm. In those with an abnormal diaphragm at day 7, the change in VAS was -4[-11.5–1] in the abnormal diaphragm group and -23[-31- -10.25] in the normal diaphragm group (p<0.05).

Conclusion A diaphragm abnormality was common, demonstrated reversibility, but recurrence by day 7 was associated with loss of therapeutic benefit.

P126 PATIENT EXPERIENCES OF MALIGNANT PLEURAL EFFUSION MANAGEMENT: A QUALITATIVE STUDY

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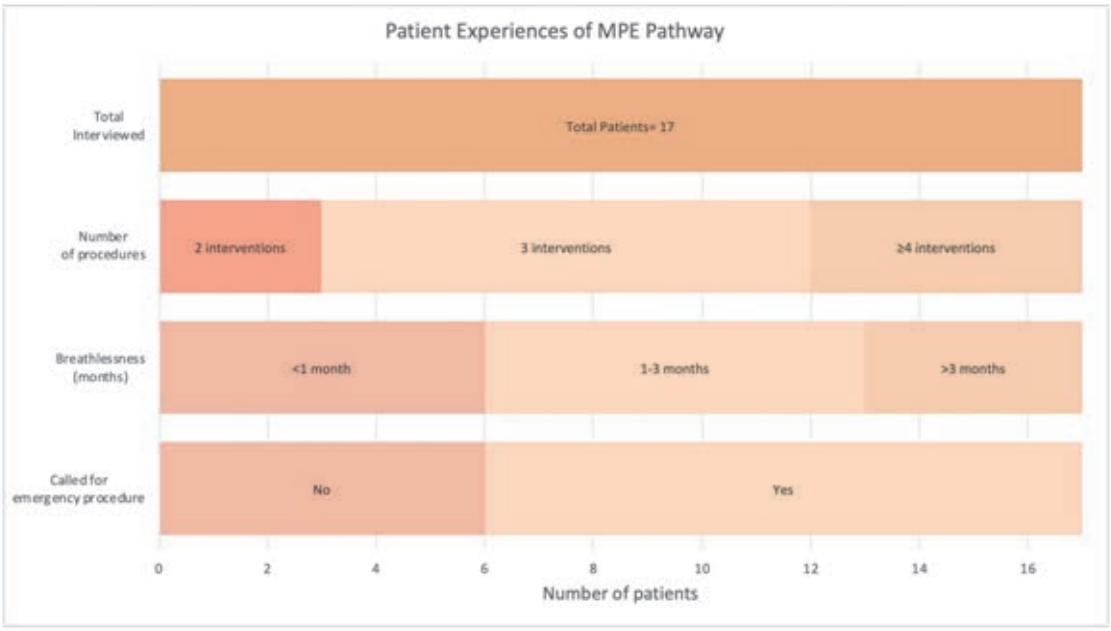
Introduction The current pathway in suspected malignant pleural effusion (MPE) involves multiple procedures to achieve diagnosis and fluid control, typically involving pleural aspiration (procedure-1), biopsy (procedure-2) and finally definitive effusion control with talc or an indwelling pleural catheter



Abstract P126 Figure 1 Patients reporting: number of procedures from referral to definitive fluid control, duration of breathlessness and requirement for an emergency procedure

(IPC, procedure-3). The true patient experience of this pathway is poorly characterised.

Methods An initial retrospective analysis of 56 IPC insertions at a UK tertiary centre (2020–2021) using electronic patient records was undertaken to establish the typical duration of the MPE pathway.

Semi structured qualitative interviews were undertaken with a purposive sample of 17 patients at IPC insertion between March-December 2021.

Results

Quantitative analysis 56 patient notes were reviewed. Median time to treatable diagnosis was 46 days (IQR:28–54) and median time to definitive pleural fluid control was 70 days (IQR:45–84)

Median 100 mm visual analogue dyspnoea score prior to the final definitive fluid control procedure was 51 mm (IQR:40–59 mm)

Qualitative analysis 17 patients (10 male, 7 female) were interviewed.

Breathlessness Breathlessness 'limiting daily activities' was a common complaint throughout the pathway. 65% (11/17) of patients reported duration of breathlessness greater than one month, with 88% (15/17) stating direct impact on essential daily activity. 35% (6/17) reported the duration of breathlessness to be 'unacceptable'.

Procedure Burden 60% (11/17) of patients reported having to make at least one emergency call for urgent fluid drainage or admission, with comments pertaining to 'being too breathless to wait for the next appointment'. 76% (13/17) had undergone 2 or more pleural procedures prior to IPC insertion.

Improving Pathways 70% (12/17) of patients reported that they would have wanted an IPC inserted earlier and would have been keen to explore a new pathway with pleural biopsy and IPC as the first procedure. Concerns with this pathway included 'not enough time to process information' and being 'too soon' to have an indwelling device.

Conclusions The current pathway in MPE is lengthy and involves multiple procedures. Patients report breathlessness and time to diagnosis as key areas of concern. We propose a novel pathway with the first procedure as pleural biopsy and IPC insertion, which appear more aligned to patient needs and expectations.

P127 REGIONAL ERECTOR SPINAE BLOCK FOR MEDICAL THORACOSCOPY

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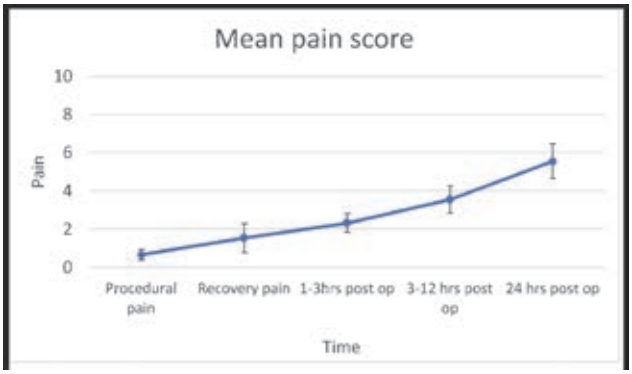
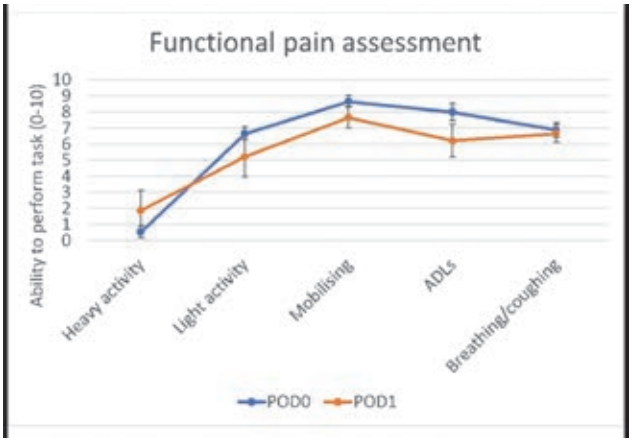
Introduction Medical thoracoscopy (MT) is an invasive procedure, performed under local anaesthetic and sedation. Intra and post procedural discomfort can be significant. Erector spinae plane (ESP) blocks are a regional anaesthetic technique used for pain relief in thoracic procedures. Our centre has recently begun using ESP blocks pre-procedure for post operative analgesia for day case MT, and a service evaluation project examined patient satisfaction and pain outcomes.

Methods 9 patients undergoing MT from Sept 2021 to Feb 2022 were included. Peri- and post-operative opioid use and depth of required sedation was recorded. Pain scores during procedure, in recovery and at home were recorded by retrospective interview and review of recovery charts, and a functional pain questionnaire was administered via telephone.

Results The average greatest depth of sedation required using propofol target controlled infusion was 1.92 (standard error of mean [SEM] 0.27), with remifentanil 2.52 (SEM 0.46). 78% of patients required oral analgesia on day 0 post discharge. 55% of patients required oral analgesia on post-op day 1. Patients used an average of 3.33 mg oral morphine



Abstract P127 Figure 1 Pain scores over time following procedure assessed by telephone questionnaire (n=9)



Abstract P127 Figure 2 Functional pain scoring following discharge from hospital (n=9)

(SEM 2.35) in hospital, and 3 mg (SEM 2) on post-op day 1. Periprocedural pain scores were 0.66 (SEM 0.27). Pain scores in recovery were 1.56 (SEM 0.76). Pain scores 3–12 hours post discharge were 3.56 (SEM 0.7), while pain scores on post-op day 1 were significantly higher at 5.56 (SEM 0.90) (figure 1). Functional pain scoring showed that overall patients were able to tolerate activities of daily living well on discharge and reported a good ability to breathe & cough, but felt less able to perform activities such as light housework or heavier exercise (figure 2). There was a non-significant trend towards greater levels of function overall on post-op day 0 than on day 1. 100% of patients felt that overall their pain was well controlled on the day of the procedure and after returning home. No complications of block were reported.

Discussion ESP blocks provide good peri-procedural analgesia for MT. Pain scores were in keeping with a significant analgesic effect lasting several hours then wearing off. The project showed pain outcomes and patient acceptability were good for the use of regional anaesthesia for MT. A formal randomised controlled trial is now planned.

P128 CONSERVATIVE MANAGEMENT OF PRIMARY AND SECONDARY SPONTANEOUS PNEUMOTHORAX: CASE SERIES

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Background There is increasing evidence supporting conservative management of uncomplicated primary spontaneous pneumothorax (PSP) irrespective of size. We explored its potential in both primary and selected patients with secondary spontaneous pneumothorax (SSP) in the NHS setting.

Method Patients aged 18–80, presenting with unilateral pneumothorax were included, according to the following criteria: Systolic BP > 90 mmHg, SPO2 ≥ 90% on room air, WHO performance status of 0–1, absence of other conditions require close monitoring, and feasibility to comply with regular follow up as per protocol. If patients required intervention due to ongoing symptoms whilst on the pathway, Thora-Vent® 11F/10cm self contained device was inserted and the patient managed on the ambulatory pathway. Primary outcome was lung reexpansion within 8 weeks.

Results Out of 62 consecutive patients assessed, 19 PSP and 25 out of 43 SSP met the inclusion criteria. In the PSP cohort, 13 patients followed conservative approach, and 6 patients received interventions for reason prespecified in the protocol. In the SSP cohort, 22 patients followed conservative approach, while 3 patients received interventions before we could attend to review. Patients who received intervention were managed on our established ambulatory pathway. Follow-up timepoints were set at 24–48 hours, 1 week, 2 weeks, 4 weeks and 8 weeks. Reexpansion within 8 weeks for patients presenting with first episode of pneumothorax occurred in 83.3% (n=10) of the PSP conservative cohort and in 100% (n=12) of the SSP conservative cohort. Median duration to reexpansion for the PSP and SSP conservative cohort was 21

Abstract P128 Table 1

Cohort (n)	Age (Median (IQR))	Size of pneumothorax (Collin's Method)			Re-expansion within 8 weeks of first episode (%)	Time to re-expansion (Median (IQR)	Further pneumothorax (%)	Persistent air leak (%)
		Small (<30%)	Moderate (30-50%)	Large (>50%)				
Primary spontaneous pneumothorax (PSP) (n=19)	25 (24–31)	6 (31.6)	3 (15.8)	10 (52.6)	14 (87.5)	19 days (8–25)	2 (12.5)	1 (6.25)
Secondary spontaneous pneumothorax (SSP) (n=25)	59 (47–68.5)	8 (32)	3 (12)	14 (56)	13 (86.67)	23 days (15.5–37.5)	4 (26.6)	2 (13.3)

(13.5–25) and 24 (14.25–39.74) days, respectively. Acute rehospitalization for Haemopneumothorax was observed in 1 PSP patient on conservative pathway. Two SSP patients on the conservative pathway had subsequent intervention due to continuing symptoms. Reexpansion rates were similar across both groups, without discrepancy in development of recurrent pneumothorax (table 1).

Conclusion While these preliminary findings convey promising outcomes for conservative management of all spontaneous pneumothoraces including SSP, a larger study with robust methodology will be pertinent to assess the overall efficacy and safety of this approach.

P129 AUTOLOGOUS BLOOD PATCH PLEURODESIS – A UK MULTI-CENTRE RETROSPECTIVE CASE SERIES

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Introduction Treatment of persistent air leak (PAL) due to pneumothorax is challenging. Autologous blood patch pleurodesis (ABPP) is a treatment option. Previous evidence is reliant on single centre series, underpowered trials and are mostly described in air leaks post cardiothoracic intervention. There is no United Kingdom (UK) wide data.

Methods Members of the UK Pleural Society were surveyed for patients who underwent ABPP. The results of the survey will be presented at the European Society (16 respondents from 333 members, 12 had performed the procedure, 6 could submit data). Basic demographics, intervention and clinical details of patients were then collected.

Results Data for 12 patients that received ABPP between 2014 and 2022 in 6 respiratory centres was assessed. 11 patients had secondary spontaneous pneumothoraces (SSP) and 1 a pneumothorax followed an oesophagectomy. The underlying pathology of pneumothorax is shown in table 1.

Median PAL time before ABPP was 17.5 days (range 6–43). 50–100 mls of blood was used for ABPP. 5 Patients had 2 attempts at ABPP. PAL resolved after ABPP in 6 patients (50%), 1 of whom received 2 attempts at ABPP. Median time to leak cessation was 5 days (1–7). Only 2 patients had pleural apposition prior to ABPP attempts and only one of those had cessation of PAL post ABPP. Where ABPP was unsuccessful, 2 patients received endobronchial valves which resolved PAL and 1 underwent thoracoscopic surgery with a wedge resection which achieved PAL resolution. 1 achieved lung apposition following ABPP allowing talc pleurodesis resulting in cessation of PAL. 5 patients were diagnosed with hospital acquired pneumonia following ABPP with 3 of those patients dying during their index episode of care.

Conclusion This is the 1st UK wide retrospective case series of ABPP of 'medical' patients with pneumothorax. ABPP is seldom used but can prove effective although mortality is high in this patient group. Lung apposition is not required prior to ABPP. Much larger numbers and robust clinical data is required- an application has been made to the European Respiratory Society to incorporate ABPP within the International Collaborative Effusion (ICE) database (https://erj.ersjournals.com/content/53/5/1900591).

Abstract P129 Table 1 Underlying lung disease of patients receiving ABPP (n=12)

Underlying lung disease/cause of PAL	Number of patients
COPD	6
ILD	3
Bronchiectasis	1
Pulmonary Metastases	1
Post oesophagectomy	1

P130 THE GLENFIELD PLEURAL FLUID CHART: STANDARDISING PLEURAL FLUID DESCRIPTORS FOR PATIENTS AND HEALTHCARE PROFESSIONALS

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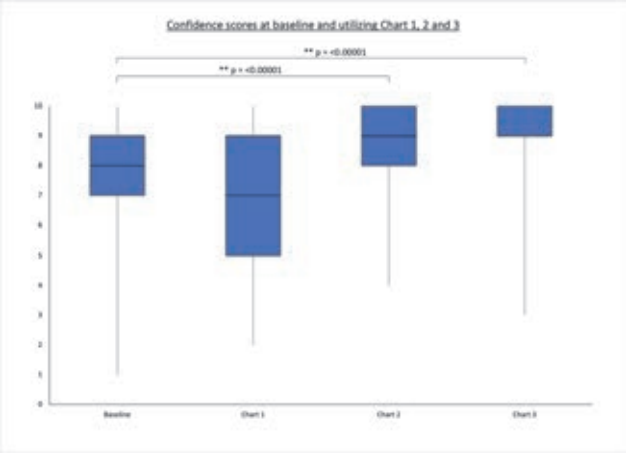
Pleural effusions are caused by various aetiologies. Pleural fluid can have different appearances. Pleural fluid descriptors are used by healthcare professionals to document the appearance of pleural fluid. There is a wide variety of descriptors used. Our aim was to know the variety of descriptors used, and to create a standardised scale for healthcare professionals and patients.

Healthcare professionals locally were asked to describe common pleural fluid appearances. Common descriptors were used to create three colour charts to describe pleural fluid. The charts were provided to patients, carers, and healthcare professionals locally as well as to healthcare professionals nationwide via the UK Pleural Society. Feedback was sought regarding user confidence in describing pleural fluid appearances at baseline and using each chart. Statistical analysis was performed comparing baseline confidence scores with scores using each chart.

7–16 descriptors were received per colour. 73/97 (75%) responders dealt with pleural fluid at least 2–3 times per



Abstract P130 Figure 1

week. The baseline median confidence score amongst all responders was 8 (interquartile range 7–9). Using the three charts, the median confidence scores were 7 (IQR 5–9), 9 (IQR 8–10) and 10 (IQR 9–10). Statistical analysis was performed using the Wilcoxon Signed-Rank Test. There was a statistically significant difference comparing confidence scores at baseline with chart 2 and chart 3 respectively ($p<0.00001$).

There are minimal resources on how to describe pleural fluid appearances. Whilst our preliminary charts require validation, our project takes the initial steps to providing a standardized chart to educate patients, carers, and healthcare professionals on how to describe pleural fluid and improve communication.

P131 PLEURAL NURSE SPECIALISTS: AN EVOLVING ROLE WITHIN THE NATIONAL HEALTH SERVICE

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The Getting It Right First Time (GIRFT) Programme published its national report in September 2021 and highlighted pleural disease as a common condition affecting patients in the National Health Service (NHS). It highlighted the need to reduce hospitalisations and provide a high-quality service. Dedicated nurses to facilitate procedures and provide specialist patient care are required. Our aim was to create a survey to understand the role of the pleural nurse specialist in centres nationwide.

A survey was sent to pleural nurse specialists via the UK Pleural Society. Information was gathered regarding banding, procedural competencies, and nurse-led clinics. Feedback was sought regarding the role including its potential future directions.

29 responses were received. 48.3% responders were band 7 nurses, with the minority being band 6 and 8 nurses, advanced care practitioners and 1 nurse consultant. Most nurses were competent to perform ward tasks including talc slurry pleurodesis. Over 2/3 of responders were competent in thoracic ultrasound however only 55% and 52% were able to perform diagnostic and therapeutic aspirations. 45% and 34% were able to insert chest drain or indwelling pleural catheter (IPC). One nurse consultant was competent to perform thoracoscopy. 69% nurses lead specialist nurse-led pleural clinics.

This survey highlights the differences in nurse specialists across the centres, including the disparity in procedural competences. There is vast potential for the role of pleural nurse specialists, and therefore, it is vital that further training and resources are provided.

P132 INFORMED DECISION OR 'FORMED DECISION': ARE WE GIVING CHOICE TO PATIENTS TO CHOOSE DEFINITIVE MANAGEMENT OF MALIGNANT PLEURAL EFFUSION? A RETROSPECTIVE COHORT STUDY

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10.1136/thorax-2022-BTSabstracts.267

Introduction and Objectives For definitive management of malignant pleural effusion (MPE), chest drain with talc pleurodesis (TP) and indwelling pleural catheter (IPC) are commonly used with no proven superiority of one modality over the other in symptom control.[1] IPCs are increasingly used, but it is not clear if this is always an informed, patient-based decision or more guided by medical advice. This study aimed to assess how often this was a clear, information-based patient choice and to elucidate reasons for preferred treatment.

Methods We collected retrospective data of all patients who received definitive treatment for MPE (TP or IPC) between May 2021 to May 2022, in a tertiary pleural centre in the UK. We reviewed the medical records to assess baseline characteristics, documentation of options discussed and identified reasons influencing choices.

Results 97 procedures were performed for definitive management of MPE out of 546 total pleural procedures. Of this, 82/97 patients were treated with IPC and 15 with TP.

In the IPC group, 41/82 were male (mean age 73.1 years) and 41 were female (mean age 69.9 years). 60(73%) had documented discussion of options, 9(11%) had no documentation and the discussion was unclear in 13(15%). 52(63%) were eligible for both treatments; of these, 36/52(69%) had

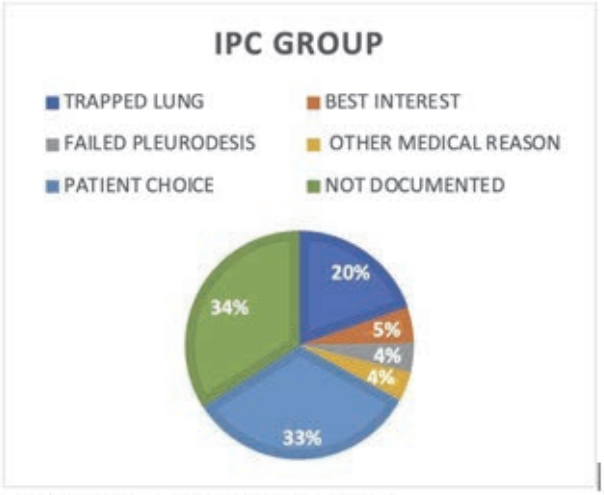

Fig 1a: Reasons for choosing IPC

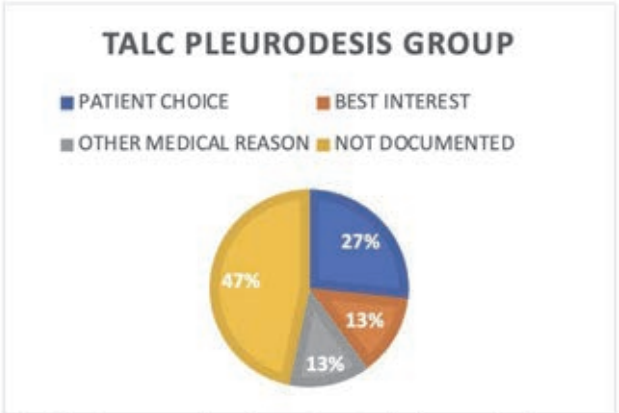

Fig 1b: Reasons for choosing Talc pleurodesis

Abstract P132 Figure 1

options discussed and the precise reasons for IPC choice were documented in 28(53%) (figure 1a).

In the talc pleurodesis group, 10/15 were male (mean age 78.2 years) and 5 were female (mean age 75.2 years). All patients were eligible for either IPC or talc; 10(66%) had discussion of options and precise reasons for talc choice were documented in 8(53%) (figure 1b).

Overall, 67/97(69%) cases had both choices for definitive MPE treatments, 46(68%) had documentation of options discussed and 36(53%) had precise choices documented.

Conclusion About 1/3rd of patients who have the choice of either TP or IPC to manage MPE are either not having detailed discussions or need to have clearer documentation. We propose standardised documentation format for all MPE patients to improve shared decision making.

REFERENCES

1. Bibby AC, *et al*. ERS/EACTS statement on the management of MPE. 2019. *ERJ*.

P133 A CUT ABOVE THE REST – THE UTILITY OF PHYSICIAN ULTRASOUND GUIDED, NON-TARGETED, PERCUTANEOUS PLEURAL BIOPSY TO IMPROVE DIAGNOSTIC PATHWAYS

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Introduction and Objectives Pleural fluid cytology is frequently non diagnostic, or just not diagnostic enough! Real-time ultrasound-guided percutaneous pleural biopsy, using an 18G cutting needle, is a minimally-invasive bed side procedure that can be performed in patients with confirmed or suspected exudative effusions, and as such could be utilised more widely and earlier in a patient's pathway.

Method This was a retrospective study reviewing records of patients who had a percutaneous pleural biopsy performed at our trust between January 2021 and June 2022 by the pleural intervention team under real-time ultrasound. All of these biopsies were non-targeted (i.e. were not directed at areas of clear pleural nodularity on imaging), and were mostly done in patients with non-diagnostic fluid results. Almost all patients had pleural fluid sampled concurrently to biopsy, even if done previously.

Results 25 patients had a pleural biopsy. In 14, fluid sampling had been previously insufficient for a diagnosis; 11 had not undergone fluid sampling prior to pleural biopsy. 19 patients had abnormal pleura identified on CT imaging (ranging from subtle smooth thickening to gross thickening with nodularity). 13 of 25 (*52%*) patients with no prior diagnosis had a definitive diagnosis established on biopsy (cancer, n=7; tuberculosis, n=3; other, n=3), vs. 3 (*12%*) on pleural fluid alone (cancer, n=2; TB, n=1). No patient suffered any significant complication.

Conclusions On a small sample size, percutaneous pleural biopsy had a diagnostic hit rate of 52%, compared to 12% on pleural fluid. 50% of patients with suspected malignancy had this definitively diagnosed on biopsy; these samples were sufficient for molecular genetic analysis to guide oncology management. Pleural biopsy was also more effective than fluid alone at confirming a diagnosis of TB and providing PCR and culture results. This relatively simple procedure can be utilised early in a patients diagnostic pathway to confirm a definitive diagnosis and help avoid further, resource heavy, invasive procedures that patients may not want, be fit for, or have access to. A larger prospective study is need to examine this further and identify potential biomarkers which increase the pre-test probability of a diagnostic biopsy.

P134 ONCE DAILY FIBRINOLYTIC THERAPY IN THE MANAGEMENT OF PLEURAL INFECTION

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Introduction and Objectives The use of intrapleural fibrinolytic therapy in patients with pleural infection has been shown to reduce hospital stay and reduce surgical referral rate. However, the logistics and cost of delivering twice-daily dosing may have contributed to its underutilisation. Trials are ongoing to establish the most appropriate dosing regime. We explored the feasibility and outcomes of an alternative, reduced cost, once-daily dosing strategy.

Methods We completed a prospective observational study of concurrent dosing with once-daily Alteplase and DNase (Deoxyribonuclease) in adult patients with pleural infection, in a single district general hospital. Patients with iatrogenic infections, pregnancy, life expectancy <3 months and those with a known sensitivity to Alteplase or DNase were excluded. Patients with evidence of pleural infection (pleural fluid pH<7.2, gram stain positive for organisms, or bacterial growth in patients with clinic evidence of infection) were evaluated by bedside thoracic ultrasound. Patients with septations/multiloculated effusions received once-daily intrapleural 10 mg Alteplase and 5 mg DNase for a maximum of 3 days. The primary outcome was need for surgical referral, and the secondary outcomes included mortality at 3 months, length of hospital stay, duration of antibiotic therapy and percentage of predicted FVC at 4 months.

Results 46 consecutive patients diagnosed with pleural infection were included. Of those, 26 received at least one dose of fibrinolytic therapy via chest tube, 14 received intercostal tube

Abstract P134 Table 1

Number treated	Mean Age (S.D.)	No. of patients who had surgery within 3 months (%)	No. of deaths within 3 months (4.3%)	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)
46	59.8 (16.3)	2 (4.3%)	2 (4.3%)	9.1	9.83 (11.85)	19.13 days (7.67 +11.46)	88.76% (33% -126%)

drainage and 6 received aspiration alone. 2 patients, both of whom received fibrinolytics, were referred for surgery, but for indications other than management of pleural infection (lung cancer n=1, persistent pneumothorax n=1). 2 patients died within 3 months of diagnosis- one from aspiration pneumonia and one from post surgical complications. The mortality was similar to what was expected based on the RAPID mortality prediction score for the patients in the cohort. Table 1 also summarises other outcomes.

Conclusions This study shows that a cheaper and less onerous once-daily fibrinolytic regime is feasible and achieved acceptable outcomes similar to those expected from standard regimes. Further studies are needed to confirm this.

P135 SMALL CELL LUNG CANCER AND PLEURAL EFFUSION: AN ANALYSIS FROM A DISTRICT GENERAL HOSPITAL

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10.1136/thorax-2022-BTSabstracts.270

Introduction The incidence of malignant pleural effusion (MPE) in small cell lung cancer (SCLC) in a US population is approximately 11%, and overall survival in that group is 3 months (compared to 7 months without an effusion) [Shojaee Respiration 2019]. To our knowledge, no UK based study or local study has ever been done and we sought to determine the characteristics of the local population.

Methods All patients coded as small cell lung cancer from Somerset register from Jan 2012-Sept 2021 were reviewed. We excluded those with indeterminate pathology reports, carcinoid or large cell neuroendocrine cancers. Basic demographics, presence of an MPE and any interventions and outcomes were collected for a descriptive analysis. Continuous variables are presented as mean (±range), median (± IQR) when outliers were present and categorical variables as percentages where appropriate. Caldicott reference C3905.

Results 401 SCLC were identified (11% of all patients, median time to death from presentation 208 days, IQR 304 [many outliers). 224 (55.9%) were female, 177 male [median age 75 years, IQR 13]. 107 (27%) presented with an effusion. {23 were sampled, 10 had positive cytology, all were exudates, 8 required chest drainage, the mean performance status (PS) was 2 (range 1–4) and the median time to death 142 days, IQR 45. Of the 294 with no initial effusions, 70 (24%) developed a pleural effusion with progressive disease [mean PS 1, median age 71.5 years, IQR14, median to death 327 days, IQR 395, 1 outlier]. 224 patients never had a MPE with a median time to death 212 of days, IQR 305, multiple outliers and when compared to those with a MPE at any point, median time to death was 211 days, IQR 295.5 (multiple outliers).

Conclusions Meaningful analysis was difficult due to the presence of multiple outliers in values collected and not correcting for stage at presentation or treatment modalities and Shojaee et al did not correct for those either. Those presenting with an MPE had a poorer prognosis, probably signifying advanced disease and the presence of MPE in our SCLC cohort seems higher. Large prospective databases for this are required.

P136 QUESTIONS CLINICIANS ARE ASKED WHEN OFFERING PATIENTS PLEURODESIS: A SURVEY OF PRACTICE

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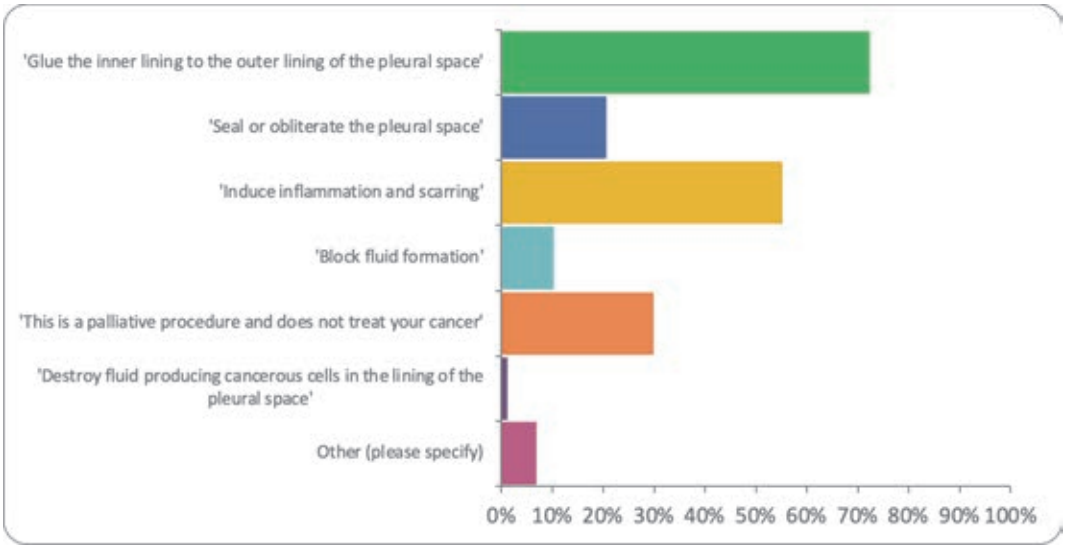
10.1136/thorax-2022-BTSabstracts.271

Introduction Patients with malignant pleural effusions (MPE) have few options available to them for definitive effusion control. Options include an indwelling pleural catheter or pleurodesis. Both are described as palliative interventions with no impact on disease course.

Unsurprisingly patients often enquire whether a pleurodesis leaves them at risk of the redirection of malignant fluid



Abstract P136 Figure 1 Frequency of explanations clinicians use to define the mechanism of pleurodesis to patients

elsewhere. This survey sought to understand how often clinicians are faced with such queries from patients and how they respond to these valid concerns.

Methods An online survey was distributed to Lung Cancer Nursing UK, Mesothelioma UK, UK Pleural Society members and Respiratory trainee networks.

Results The survey received a total of 87 respondents. 38/87 (44%) were consultant respiratory physicians, 20% were cancer nurse specialists, 25% were trainee respiratory physicians and 11% were pleural nurse specialists. Phrases clinicians used to describe the mechanism of action for pleurodesis are shown in figure 1.

64% of respondents indicated that they *had* been asked by patients if fluid is redirected. 24/73 (33%) reported this happened in at least half of their consultations. Clinician responses to these concerns varied, but the most common response was *'No, this doesn't happen, nothing to worry about,'* (20/63, 32%), followed by *'Yes, this might happen, but we can deal with it…'* (22%) and *'We don't know'* (16%).

75% of respondents were not aware of any evidence to support these reassurances. The remaining 25% provided their own clinical experience and their understanding of the mechanisms of MPE formation and of pleurodesis as the basis for reassurance.

There were no statistically significant associations between how pleurodesis is explained to patients, clinician role or being asked about fluid re-direction.

Discussion Redirection of malignant fluid appears to be a commonly held concern by patients when offered pleurodesis. Many clinicians provide reassurances to patients that this is unlikely to occur but accept there is a paucity of evidence to support these reassurances. These data may have exposed a gap in our understanding of the mechanisms underpinning pleurodesis and warrant consideration in future MPE research.

P137 SUCCESS RATE AND SAFETY PROFILE OF IPC INSERTION IN BENIGN PLEURAL EFFUSIONS

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10.1136/thorax-2022-BTSabstracts.272

Introduction Indwelling pleural catheter (IPC) has proved to be effective in reducing the need for further pleural procedures and hospital admissions in patients with malignant pleural effusion but its role in benign pleural effusion (BPE) is not well known. Recent studies suggests that IPC has a role in a specific cohort of patients with BPE.

Aim To review the outcomes and safety profile of IPC in BPE which were refractory to medical management and required repeated pleural drainage.

Methods Retrospective review of consecutive patients who had IPC insertion for BPE between 2013 to 2021.

Results 24 IPC were inserted for BPE including 15 for Congestive cardiac failure (CCF), 5 for Hepatic hydrothorax (HH), 2 for chronic pleuritis and 1 each for renal disease and benign asbestos pleural effusion. Median age of patients was 79 years and 67% were male. 83% of the procedures were performed as outpatient. Patients had an average of 3 pleural procedures before IPC insertion. 10 out of the 24 patients achieved spontaneous pleurodesis (42%) and 7 of these achieving pleurodesis were patients with CCF; median time to pleurodesis was 98 days. All of the 5 patients with hepatic hydrothorax failed to achieve pleurodesis. Complications include 4 pleural infections, 3 of which required a further pleural procedure and antibiotics. 3 out of the 5 patients with hepatic hydrothorax developed pleural infection (60%). 3 patients had mild site infections requiring short course of oral antibiotics only and 2 patients had blocked IPC's.

Conclusion IPCs can be inserted in BPE not responding to the standard medical therapy to control pleural fluid accumulation. This will help to avoid repeated procedures particularly in CCF. Majority of the patients can be managed as oupatients. Further studies are required to assess the safety and efficacy of IPC insertion in patients with hepatic hydrpthorax.

P138 INDWELLING PLEURAL CATHETER-RARE COMPLICATION: A SURVEY OF PRACTICE IN UK

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10.1136/thorax-2022-BTSabstracts.273

Indwelling pleural catheters (IPC) has made a huge impact in the management of patients with malignant pleural effusion, aiding in both drainage and pleurodesis. Complications of IPC's are encountered with their increasing usage and include infection, blockage, pain, loculation, tract seedling,

Abstract P138 Figure 1

displacement. Fracture and severing are encountered during removal and are rare.

We aim to see how the pleural team within UK are faced with this rare complication including their management. We were also interested to see if the complication was related to a particular make (Pleurx/Rocket).

Methods A nine questions survey (attached figure 1) was generated using Google forms and was sent to all members and non-members of UK pleural society.

Results 57 responses were received.

46% mentioned IPC are removed by expert operators only, 36% reported removal was performed by trainees and pleural nurses under supervision.

53% of the responders used Rocket, 25% used Pleurx and 22% used a combination. 40% of the responders have seen IPC fracture, of this 49% will remove using blunt dissection, 38% will do nothing and 13% will/have referred to surgeons.

27% of responders encountered IPC being completely severed, of this 64% reported that they observe and do nothing, 33% will refer to the surgeons for removal and 3% will remove using thoracoscopy. When asked about the outcome of a retained IPC? 62% reported none, 20% mentioned infection.

IPC fracture was seen in 38% of the Rocket, 42% of pleurx only users

Conclusion 40% of the responders have seen IPC fracture and 27% of the responders have seen IPC completely severed. It's interesting to see, 33% will refer to the surgeons to remove a severed IPC when the literature supports leaving it alone. Literature evidence and case series show IPC fracture is common with Rocket brand, but the survey suggest the opposite.

Further studies are required into the mechanism of fracture and prevention. It is important, a standardised approach is required to manage this rare complication.

'The Force Awakens' – The asthma patient experience

P139 PATIENT RECOGNITION OF, AND RESPONSE TO, ACUTE EXACERBATIONS OF COPD IS RELATED TO PREVIOUS EXPERIENCES OF HELP-SEEKING

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10.1136/thorax-2022-BTSabstracts.274

Background Acute exacerbations of COPD (AECOPD) are clinically significant events. Patients' experiences, expectations and understanding affect their recognition of and response to AECOPD.

Aim To understand i) how COPD patients recognise AECOPD and ii) how they subsequently react.

Methods Semi-structured interviews were completed remotely in a multicentre qualitative study. Interviews were transcribed and analysed thematically. Data presented as mean [SD] unless stated.

Results 40 COPD patients were interviewed (21 female; age 69 [8.1] yrs, COPD duration 11.3 [8.3] yrs, median [range] number of exacerbations in the past year 1.5 [0–9]). Three themes were identified:

Theme 1: Recognition of AECOPD onset

Most patients felt able to recognise AECOPD onset (increased breathlessness, fatigue, cough, coloured sputum), however some became suddenly overwhelmed.

Theme 2: Response to AECOPD onset

Patients' responses to AECOPD onset depended on their experience and the outcome of past help-seeking. Those previously taught breathlessness self-management typically used a stepwise approach, including non-pharmacological techniques and inhalers. If felt necessary, they would take a 'rescue pack' (antibiotics and/or steroids) or contact their GP for advice and/or medication. Those attending the hospital did so after GP contact or based on previous advice.

Those not previously taught breathlessness self-management described over-reliance on inhaled medication and either i) frequent 'rescue pack' use or ii) direct presentation to the hospital.

Theme 3: The role of 'rescue packs'

28/40 patients reported 'rescue pack' use. Many patients were knowledgeable about when to take a 'rescue pack' which provided them with a sense of control and security when access to clinicians was limited. However, some relied on repeated 'rescue pack' use without clinical review and experienced overall declining health.

Conclusion Most patients were able to recognise AECOPD onset and their subsequent behaviour related to responses to previous help-seeking. Some were empowered by access to 'rescue packs'. For others, limited access to clinicians and lack of self-management education may have contributed to over-reliance on 'rescue packs' and/or direct hospital presentation. It is important that all patients are guided on how to appropriately respond to AECOPD onset; when to use 'rescue packs' (if provided); and when to seek clinical review.

Please refer to page A214 for declarations of interest related to this abstract.

P140 EVERY PICTURE TELLS A STORY – A PILOT STUDY OF PRODUCING COMICS ON THE PATIENT EXPERIENCE SEVERE ASTHMA AND ITS TREATMENT

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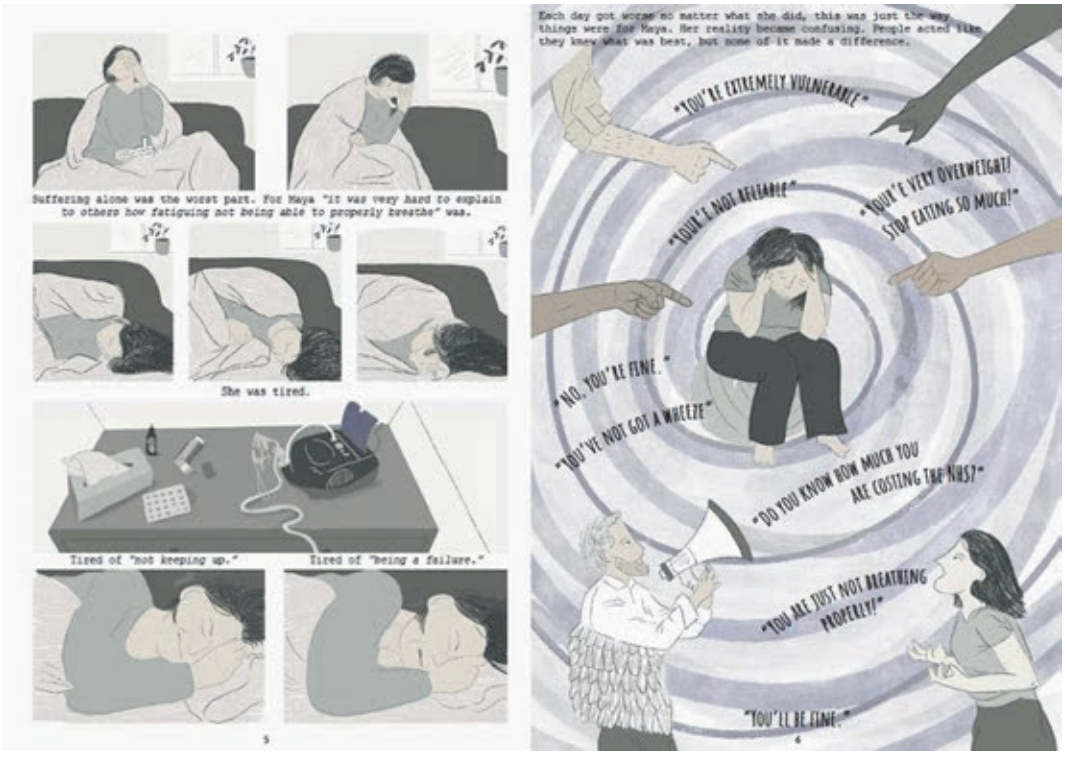
10.1136/thorax-2022-BTSabstracts.275

Background The patient's narrative of the impact of disease and its treatment are an underused resource for sharing the benefits of novel treatments with health professionals and patients.

Methods Six patients with severe asthma who had a good response to biologic treatment were invited to tell their story to an oral history and an illustration student. Within the framework of experiences of their asthma before and after treatment, semi-structured oral history interviews explored individual memory. There was an emphasis on how change over time might be narrated in various registers: verbal recollection intersecting with visual imagination; articulation of emotions and especially key moments of crisis, overcoming adversity, and aspiration; impact on interpersonal relationships; personal sense of self-worth and value; and the identification of core narrative themes and images. The patients then collaborated with the students to produce visual and written stories as comics.



Abstract P140 Figure 1

Results Two patients returned an informed consent form before the deadline. A range of impacts including emotional, social, financial, psychological were discussed (figure 1). Patient's also described life-changing benefits of the treatment:

'I didn't need to take inhalers and I wasn't putting drugs in my body every day.'[ppt. 1]

'I remember it well, erm, they introduced me to an injection. By the August (6 months later) *I hadn't had an attack.'[ppt. 2]*

The students interpreted the stories in differing illustration styles in three illustrated stories.

Conclusions The pilot comics demonstrate how patients' personal stories may be sparked, captured, and given greater context through our collaborative and unique oral history-visualisation approach. With emphasis on change over life courses, our patients' stories – verbally remembered and visually rendered – powerfully communicate the emotional impacts of severe asthma and the profound improvements after biologics. The comics will be assessed as tools to educate clinicians and patients and their families.

Further information is available at https://www.plymouth.ac.uk/research/primarycare/severe-asthma

P141 ASSESSING THE EFFICACY OF INFORMATION VIDEOS AVAILABLE ON THE WEBSITE 'MOVING ON ASTHMA' AT IMPROVING THE KNOWLEDGE BASE OF ADOLESCENT CHILDREN

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10.1136/thorax-2022-BTSabstracts.276

Asthma is a common inflammatory condition that can be life threatening. The National Review of Asthma Deaths (2014) recommended: 'Parents and children…should be educated about managing asthma'.[1]

Aim To assess the efficacy of an educational video on asthma improving knowledge in adolescent children.

Methods Two schools were included within this study. A 6 question Google form was created to assess students' knowledge of asthma. This was completed at 3 timepoints: baseline (pre), immediately after intervention (post), and one week later (delayed).

Results 130 sets of data were analysed from school A, 95 from school B (n=225).

School A had significant increases in knowledge for 4 of the 6 questions between the pre and post-intervention results. Question 4 showed a significant decrease in correct responses. School B had significant increases in 3 of the 6 questions. When combining the schools' data, significant increases were seen in Questions 1, 2, 5 and 6 (table 1)

Abstract P141 Table 1 Data showing changes in correct answers between the pre andpost-tests with McNemar's test showing significant

Both Schools - only Pre and Post-tests (n=225)					
Question	Pre-test		Post-test		McNemar's Test p-values
	Correct	%	Correct	%	Pre-Post
1	89	39.6	192	85.3	**<0.001**
2	200	88.9	213	94.7	**0.021**
3	199	88.4	200	88.9	1
4	193	85.8	179	79.6	0.055
5	201	89.3	217	96.4	**<0.001**
6	65	28.9	151	67.1	**<0.001**

School A and both schools combined showed significant increases for questions 1 and 6 between the pre- and delayed-tests, whilst school B only had a significant increase in question 6.

Subgroup-analysis was performed on School A's data between asthmatics (n=14) and non-asthmatics (n=116). For pre vs post-tests, the non-asthmatic group had the same significant results as the main group analysis whilst the asthmatic group saw no significant changes. School B was not analysed by subgroups because only 1 student stated they were asthmatic.

Conclusions The overall trend of more correct answers after the intervention provides evidence that supports the use of the 'Moving on Asthma' website with its digital, video-assisted, internet based learning tools as an aid to regular clinics. It'll help children understand their condition more and thus maintain better control of their asthma symptoms. A major cause of the mixed results between the different questions is likely to be the questions themselves rather than the students' knowledge. By improving the questions we could see a greater significance in the results.

REFERENCE

1. Royal College of Physicians. Why asthma still kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry report. London: RCP, 2014.

P142 ASTHMA ATTACKS: PATIENT IMPACT, EXPERIENCE AND UNDERSTANDING

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10.1136/thorax-2022-BTSabstracts.277

Introduction Asthma attacks (AA) are responsible for high levels of morbidity, mortality, and healthcare costs globally. Heterogeneity in the causes and pathophysiology of AA has been described but knowledge regarding patient experience and understanding of AA is poor.

Aim To explore patients' experiences and understanding of AA, the impact on their lives and their use of healthcare services and self-management strategies during AA.

Method Semi-structured interviews with patients recently (≤ 4 weeks) treated with oral corticosteroids (OCS) for clinician diagnosed AA were conducted. Interviews were transcribed and analysed using the framework approach.

Results Thirty patients took part (73% female, mean age 50 years). Most had GINA (Global Initiative for Asthma) step 3–4 asthma and 6 had step 5 asthma. Half of the patients were admitted to hospital for AA.

Six themes were generated from the framework approach. Significant heterogeneity was seen in the symptomology of and recovery from AA as experienced by patients. The emotional impact and wider implications such as the capability to do daily activities and the impact on social well-being was significant. Those who experienced multiple AA reluctantly began to incorporate them as part of their day-to-day life. Personalized asthma action plans were often mismatched to patients' experience of AA resulting in plans being ignored. Self-initiation of OCS rescue packs without seeking medical advice was common. The majority expressed a lack of understanding of AA and their management. Reluctance to seek medical help with worsening symptoms to avoid hospitalization or 'wasting time' of health professionals' time was reported; patients often had other priorities or felt there was nothing else their GP 'could have done'. Benefits received from current therapeutic options for AA were often felt to be limited.

Conclusions Patient experiences of AA are highly variable. Concerning variations in understanding, self-management, and seeking medical help were found. Superior personalized interventions which promote an improved understanding of AA and their management are needed.

P143 EVALUATION OF A PHARMACIST LED SEVERE ASTHMA MEDICINES OPTIMISATION CLINIC

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10.1136/thorax-2022-BTSabstracts.278

In 2018 a Pharmacist led medicines optimisation clinic was introduced to our severe asthma service. The aims of this clinic were to assess patients eligibility for biologic therapy in line with the NICE guidelines, provide education for patients on the aims of each of their treatments, counsel them on biologic therapies, optimise inhaler technique and adherence and rationalise medicines to reduce polypharmacy. Patients can be referred by all members of the severe asthma multi-disciplinary team (MDT).

We retrospectively reviewed 40 patients referred to the medicines optimisation clinic from Jan to March 2022, to assess the utilisation and impact of the service and to identify further service improvements we could introduce.

GP and hospital prescription data for preventer inhalers and steroid courses were obtained prior to each appointment. Patients had a median (IQR) adherence to preventer inhaler of 96%(56–108) and median (IQR) prednisolone courses of 2.5(0–5.25) in the past 12 months.

Twenty(50%) patients were referred for an assessment for biologic eligibility. Of these, 4(20%) were not eligible, 3 were non adherent and 1 patient had over reported their steroid use. Six (15%) were for consideration of a switch to an alternative biologic, 3(50%) of this group were found to be non-adherent to ICS and not suitable to switch. Ten(25%) patients were referred for inhaler review and medicines optimisation. Non-adherent patients were educated on importance of adherence and offered a smart inhaler monitoring, an inhaler sensor and app which records each time the inhaler is used. Five(12.5%) patients were given the smart inhaler sensors. Four(10%) patients required a switch to a dry powder inhaler, and we stopped long-term prophylactic antibiotics in 2(5%) patients. Four(10%) patient did not attend the appointment.

Overall, the Pharmacist led medicines optimisation clinic has led to gatekeeping of high cost biologic therapy, interventions to improve adherence, improved inhaler sustainability with switches to dry powder inhalers, antimicrobial stewardship and introduction of innovative smart inhaler monitoring. This evaluation identified that a quarter of patients required an inhaler technique review, which can be carried out by our specialist pharmacist technician, which will increase capacity for biologic reviews.

P144 ADHERENCE TO INHALED CORTICOSTEROIDS IN PREGNANT ASTHMATICS

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10.1136/thorax-2022-BTSabstracts.279

Introduction Adherence to asthma medications is generally low and may be detrimental to clinical outcomes (Robijn et al, 2019).[1] Poor adherence is characterized by underuse of inhaled corticosteroids (ICS), often accompanied by over-reliance on short-acting β_2-agonists for symptom relief. Poor adherence to ICS is of particular concern in pregnant asthmatics and may be the result of historical poor compliance or medication cessation during pregnancy, incorrectly or by choice.

Objectives We studied pregnant asthmatics referred to our obstetric asthma service in order to assess compliance with ICS treatment.

Methods A retrospective analysis was performed for 50 patients referred to obstetric asthma clinic between July 2018 and February 2021 at Manchester Royal Infirmary. Data were collated from General Practice (GP) medication records for ICS pick-up rates (%) for the six months before pregnancy, during the first trimester and two months following their first clinic review. Good compliance was defined as $\geq$70%.

Results Only two patients (4%) achieved the $\geq$70% pick-up rate for ICS treatment in the six-month period prior to pregnancy and this decreased to 2% during the first trimester. However, the rate of compliance increased to 30% (n=15) following their first obstetric asthma clinic review. 42% reported concerns regarding medication risk to pregnancy as being a significant factor in non-compliance (n=21).

Conclusion Poor compliance to ICS treatment in asthma is not confined to pregnant asthmatics and may be a historical finding in these patients. However, an increase in ICS adherence following clinic review indicates that education and reinforcement of medication safety and importance of adherence to treatment is essential in this cohort and will undoubtedly improve clinical outcomes and reduce the risk of exacerbations.

Patient concerns relating safety of inhaled therapies in pregnancy should be addressed early to improve patient outcomes in the high risk group.

Trends to poor compliance in the absence of clinic review has led to the evolution of monthly appointments until review until delivery, rather than early discharge.

REFERENCE

1. Robijn, A L., Jensen, M E., McLaughlin, K., Gibson, P G., Murphy, V E. (2019). Inhaled corticosteroid use during pregnancy among women with asthma: A systematic review and meta-analysis. *Clinical & Experimental Allergy*. https://doi.org/10.1111/cea.13474

P145 WHAT IS THE SEVERE ASTHMA PATIENT JOURNEY TO BIOLOGIC INITIATION IN UK SEVERE ASTHMA CENTRES?

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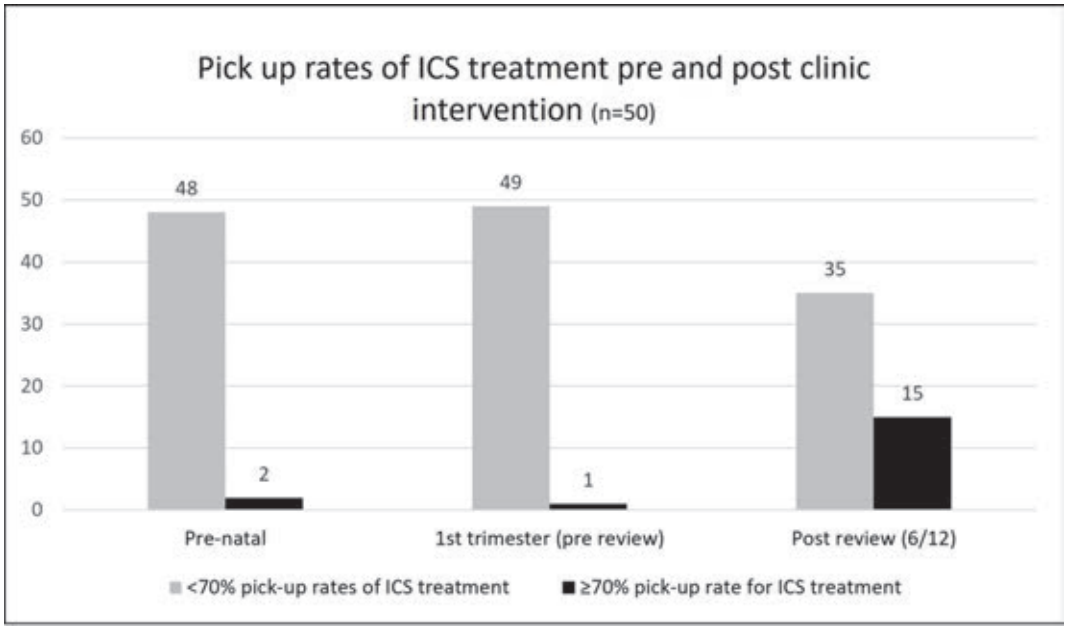
10.1136/thorax-2022-BTSabstracts.280

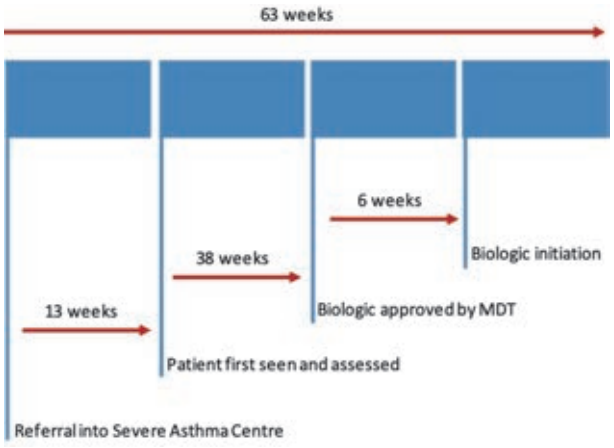
Introduction For patients with severe asthma, biologics effectively reduce oral steroid use, improving asthma control and quality of life. It is recognised that earlier identification and treatment of patients with potential severe asthma leads to improved outcomes. However, the journey time from primary care referral to a severe asthma centre (SAC) through to biologic initiation is unknown.

Objective To understand the patient journey time to biologic initiation for severe asthma patients and explore any variation across severe asthma centres in the UK.

Methods Anonymised data was collected on 422 patients (205 for quarter 4 2019, 217 for quarter 4 2020) across 17 severe



Abstract P144 Figure 1 Pick up rates of ICS treatment



Abstract P145 Figure 1 Schematic of median journey times for severe asthma patients from referral to biologics initiation

asthma centres. Each centre was asked to provide data for consecutive patients in that quarter. Data for 2019 and 2020 were combined, aggregated and analysed using GraphPad.

Results

1. Time to referral to SAC (Data available for 144/422): More than 80% of patients with uncontrolled asthma waited at least 1 year for referral, while 15% were uncontrolled for over 5 years prior to a referral being made.
2. Time from referral to first review in a SAC (data available for 280/422): The median time was 13 weeks (IQR=15.8). Nationally, there was significant variation with an overall range 7 weeks to 36 weeks.
3. Once approved for a biologic (data available for 407/422), patients waited a median of 6 weeks (IQR=10.2). Again, there was variability nationally with an overall range 3 weeks to 29 weeks.
4. The overall patient pathway (from referral to biologic initiation) was 63.5 weeks (data available for 280 complete cases). This includes an optimisation phase which can vary between patients and is related to clinical factors but also influenced by availability of multi-disciplinary input.

Conclusions This study is the first of its kind to assess the severe asthma patient journey times to asthma biologics in the UK. Critically it has shone light on potential areas for pathway optimisation especially around earlier identification of potential severe asthma. It has provided critical insight for the national and local improvement programmes currently focussing on improving access to severe asthma care and biologic therapy.

P146 BIOLOGIC TREATMENTS ACROSS THE SOUTH-WEST SEVERE ASTHMA NETWORK (SWSAN): REAL-WORLD EFFECTS ON ED ATTENDANCE AND HOSPITAL DISCHARGES

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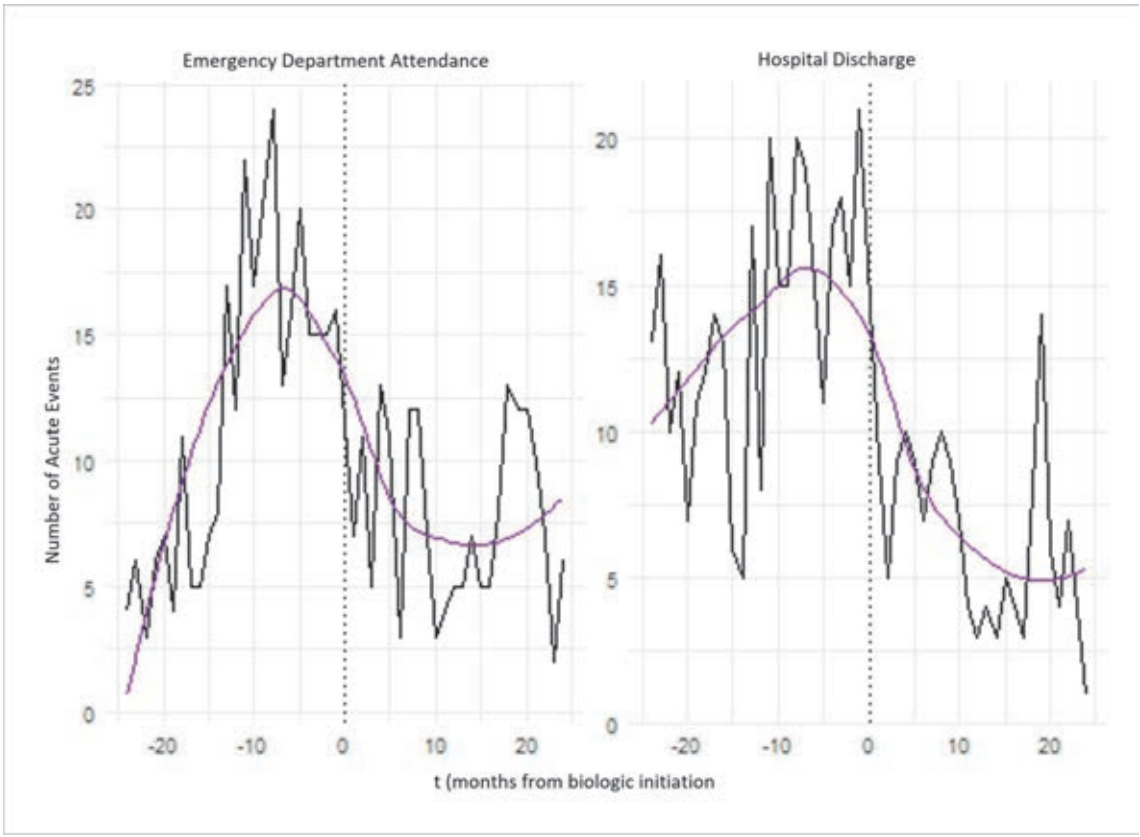

Abstract P146 Figure 1 Number of Emergency Department attendances (left) and Hospital Discharges (right) for South West severe Asthma Network (SWsAN) patients during the 2-year period pre- and post biologic therapy

Introduction and Objectives Biologic therapy has revolutionised the treatment of severe asthma. The South-West severe Asthma Network (SWsAN) comprises 4 hubs that provide specialist asthma services across the largest geographical area in England. A key objective is to improve patient outcomes and we are therefore assimilating both process and outcome metrics as evidence of biologic efficacy. Preliminary outcome data are now available that allow us to demonstrate 'real-world' effects of biologic treatments on hospital and emergency department admissions across our cohort.

Methods We cross-referenced pseudonymised Blueteq prescription data for new asthma biologic prescriptions across SW England in 2018/2019 against Secondary Use Service data for hospital discharges and ED attendances coded for 'exacerbation of asthma'. The first biologic prescription was set as the reference point and the prevalence of each metric was plotted for the 2 years pre- and post-biologic initiation. We also assessed cost-benefit in those patients who had an ED attendance or hospital discharge whilst on biologic therapy.

Results 822 new biologic prescriptions have been issued across the SWsAN since 2018 (n=494 female, 60.1%; n=328 male, 39.9%). Benralizumab is the most prescribed biologic (55.6%), followed by omalizumab (22.7%) and mepolizumab (21.4%). 290 new prescriptions had sufficient 2-year follow-up to be included in the analysis. 107 patients had at least 1 asthma-related ED attendance in the 2 years either side of their biologic prescription. On average, patients had 0.96 (95% CI, 0.22–1.71) fewer ED attendances following biologic therapy ($p<0.001$). 116 patients had at least one asthma-related discharge in the 2 years either side of their biologic prescription. These patients had 1.52 (95% CI, 2.17–0.87) fewer hospital discharges following biologic initiation ($p<0.001$). Cost-analysis demonstrates an estimated saving of £71 per patient/year and £920 per patient/year for ED attendances and hospital discharges respectively.

Discussion The real-world effects of asthma biologics on ED attendance and hospital discharges are highly significant across a large patient cohort. Our data highlights the importance of developing networked systems to improve equity of access to these treatments, and determine more patient-centred outcomes.

P147 USE OF A CONNECTED INHALER SYSTEM IN THE PRE-BIOLOGIC ASSESSMENT OF PATIENTS WITH SEVERE ASTHMA

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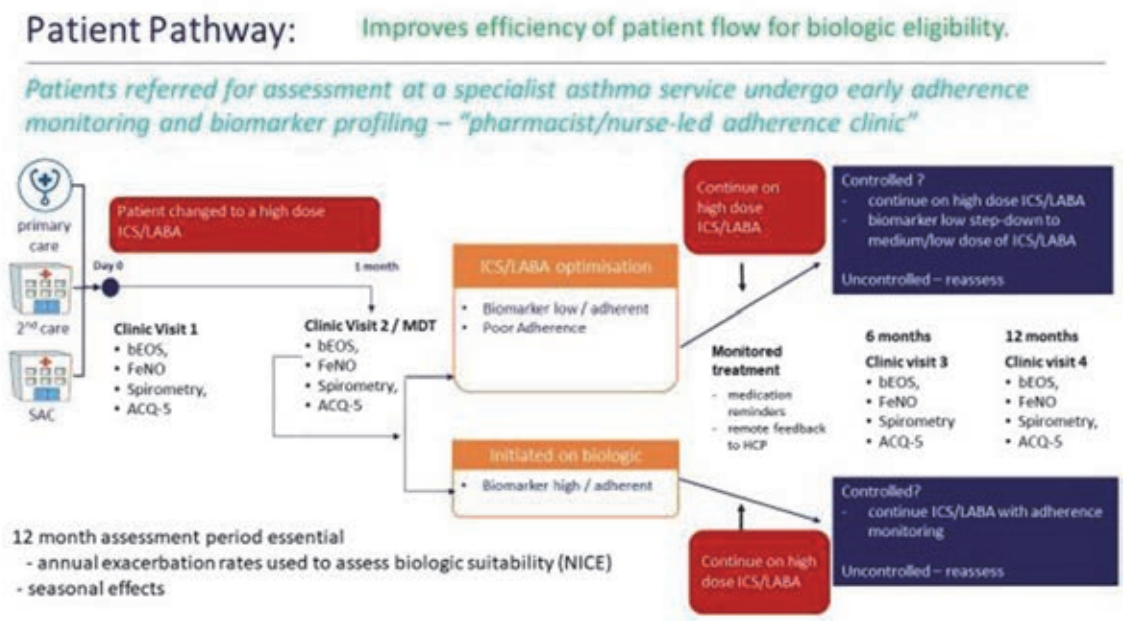
10.1136/thorax-2022-BTSabstracts.282

Background Sub-optimal adherence is a significant factor in patients with difficult-to-treat asthma. Aligning adherence to maintenance inhaled corticosteroid (ICS) treatment with digital inhaler monitoring and measuring fractional exhaled nitric oxide (FeNO suppression) can differentiate patients with poor adherence from those who require treatment escalation with type-2 biologic therapy.[1]

Objectives To assess the feasibility and utility of monitoring adherence using a digital connected inhaler system (CIS) within the patient pathway as a service evaluation; identifying patients for initiation of biologic therapies in UK specialist severe asthma clinics (n=7).

Methods Using a CIS (Propeller Health) patients completed adherence monitoring/biomarker profiling over 1–3 months as part of a pre-biologic assessment followed by clinical decision (initiate biologic therapy or continue monitoring – figure 1). Patients had the following assessments at baseline and follow-up: spirometry, FeNO, peripheral blood eosinophil count and asthma control questionnaire (ACQ-6).

Results To date, 357 patients have been initiated on the CIS with 278 having outcome data at 3 months. In FeNO-high



Abstract P147 Figure 1

subjects (FeNO≥45 ppb, n=181) median adherence was 91% (IQR 76%, 99%). In patients with positive FeNO suppression[1] (n=98), significant differences were observed in FeNO (p<0.001), blood eosinophil count (p=0.03), FEV_1 (% predicted) (p=0.02), FVC (% predicted) (p=0.01) and ACQ-6 score (p=0.02) compared to patients with negative FeNO suppression. At follow-up, the decision to start biologic treatment was made for 20 (24.2%) non-suppressors vs 14 (14.6%) suppressors (p=0.097). FeNO suppressors starting biologic therapy included those still remaining FeNO high (n=5), eosinophilic (n=2) and on maintenance prednisolone (n=1). In FeNO-low subjects (FeNO<45 ppb, n=95), median adherence was 92.5% (IQR 72.5%, 98.3%) with no difference in measurements seen at 3 months, consistent with previous data supporting this 'cut-point' to identify difficult to treat asthma patients with poor ICS adherence.[1]

Conclusion Using a CIS in conjunction with FeNO monitoring is a useful method for assessing adherence to ICS when assessing patient suitability for biologic asthma therapies and to support adherence in routine care.

REFERENCE

1. Heaney *et al*. (RASP-UK) *Am J Respir Crit Care Med* 2019; **199**(4):454–464.

Please refer to page A214 for declarations of interest related to this abstract.

P148 IMPACT OF PATIENT SUPPORT PROGRAMS ON OUTCOMES AMONG PATIENTS WITH SEVERE ASTHMA TREATED WITH BIOLOGIC THERAPIES – A SYSTEMATIC LITERATURE REVIEW

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The optimal effectiveness of treatment in severe asthma (SA) is dependent on adherence to both inhaled and biologic medications. Patient support programs (PSPs) benefit patients with chronic diseases treated with biologics, such as rheumatic or inflammatory bowel diseases, but PSPs impact on outcomes in SA patients treated with biologics is unclear. We conducted a systematic literature review (SLR) to understand the impact of PSPs on treatment adherence, health-related quality of life (HRQOL), and asthma control in this population.

Embase, Medline, and Cochrane databases were searched for studies published from 2003 (the year of the first biologic approval for SA) to March 2022 that described patient-support activities outside of routine clinical care for SA patients on biologic treatment.

Nineteen records covering 15 studies were selected. Most studies described patient education programs (4/15) or support transitioning to at-home administration (7/15). Only 4 studies investigated the changes in patients' asthma treatment adherence, asthma control, or HRQOL, after participation in a PSP. In a UK-based study involving patients initiating biologic therapies, poor adherence to inhaled medication was related to patients' perception that they do not require it as their asthma is under control. Their adherence to inhaled therapy improved after participation in education sessions.

Patient education on the importance of adherence to asthma treatments improved asthma control and HRQOL and significantly reduced the number of emergency room visits in a South American study.

Multidisciplinary management involving therapeutic education and referrals to a dietitian, psychologist, tobacco addiction specialist, or social worker improved asthma control in patients with uncontrolled SA, according to a French study.

A telemedicine-based PSP dedicated to assisting at-home biologic administration in children 6 years or older with SA in the UK, received positive feedback from caregivers and patients. Clinical parameters and asthma control did not deteriorate with at-home administration and HRQOL improved significantly over the first 3 months of at-home administration.

All studies investigating the effects of PSPs among SA patients treated with biologics showed benefits in disease control and HRQOL. Training and telemedicine support were important for transitioning to at-home administration and monitoring per positive feedback from both patients and caregivers.

Please refer to page A214 for declarations of interest related to this abstract.

'Die Hard II' – Antibiotic resistance and challenges in TB

P149 ROUTINE MONITORING OF RIFAMPICIN LEVELS REVEALS SUBTHERAPEUTIC LEVELS IN 76% OF PATIENTS WITH FULLY SENSITIVE TB

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10.1136/thorax-2022-BTSabstracts.284

Introduction Rifampicin plays a key role in TB treatment, due to its bactericidal and sterilizing capacity. Literature suggests that low serum rifampicin levels are associated with treatment failure, relapse and acquired drug resistance. Yet, therapeutic drug monitoring is not routine in active TB treatment.

In October 2021, our service began routine monitoring of rifampicin levels 2 weeks after treatment initiation in order to support early optimisation of dosing. Levels below 8 mg/L were considered subtherapeutic.

Methods We performed a retrospective review of all rifampicin levels taken between September 2021 and May 2022, identifying 38 patients. Only those with documented exact timings of rifampicin levels were included (8 excluded). We compared our practice in the 2 years prior to routine monitoring.

Results Of the 30 patients, only 7 (23.3%) had therapeutic rifampicin levels. 13 (43.4%) had levels between 4–8, and 10 (33.3%) had levels <4. All but one of the rifampicin levels were taken between 1 hr 30 and 3 hrs 40 mins. Of those with subtherapeutic levels, 20 (87.0%) had their dosage increased. Of the patients who had initial levels <4, all levels remained <8 after one dose increase. 4 patients required two dose increases before achieving levels >8. Of the 13 patients who had initial levels 4–8, 11 had their levels repeated after dose increase – 7 patients had levels >8 after one dose increase. 4 patient's levels remained subtherapeutic, requiring further dose increases. 22 (73.3%) of patients had pulmonary

TB. 3 patients had smear positive TB and initial levels <4 – all remained smear positive at 14 days. Of the patients who had initial levels 4–8, 4 were smear positive, 2 of which remained smear positive at 14 days.

In 2020, rifampicin levels were only taken in 13 of 57 patients. Levels were taken in those with concerns around clinical response, compliance and malabsorption. 61.5% of patients had levels <4 and 38.5% had levels >8.

Conclusions Optimisation of rifampicin dosage has the potential to improve treatment outcome and may shorten treatment duration. 76.7% of our patients had subtherapeutic rifampicin levels, which instigated early optimisation of dosing without additional side-effects.

P150 CAN WE BE MORE SPECIFIC ABOUT TARGETS FOR STARTING TUBERCULOSIS TREATMENT?

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Introduction NICE NG33 (Tuberculosis) specifies that those with imaging suspicious for pulmonary tuberculosis (pTB) should be assessed by the TB team within 1 working day, but does not specify standards for starting treatment.

Abstract P150 Table 1

Priority of referral	n	Pathway outcome	n	Median (IQR) days on pathway	Within pathway duration target
High Median/IQR 1 (0–4) days	54	Started TB treatment	39	1 (0–2)	37/39 (94.9%)
		Not TB	10	4 (1–6) p=0.0047	8/10 (80%) p=0.13
		Transfer out	1		
		AFB neg = Medium priority	4		
		Lost to follow-up	0		
		Watch and wait	0		
Medium Median/IQR 26 (6–47) days	129	Started TB treatment	62	10 (3–41)	40/62 (64.5%)
		Not TB	55	35 (19–62) p=0.0002	20/55 (36%) p=0.002
		Transfer out	4		
		Lost to follow-up	1		
		Watch and wait	7		
Low Median/IQR 19 (6–44) days	269	Started TB treatment	198	17 (6–39)	177/198 (89%)
		Not TB	46	29 (9–65) p=0.10	41/46 (89%) p=0.96
		Transfer out	11		
		Lost to follow-up	6		
		Watch and wait	8		

Methodology All our referrals are entered onto the Tuberculosis Pathway (TBP). This database enables staff to track referrals, ensuring prompt diagnosis or exclusion of TB. Referrals are divided into 'High', 'Medium' or 'Low' priority, according to the urgency of the suspected condition: 'High' for those with suspected infectious pTB or CNS disease, 'Medium' for those with suspected non-infectious pTB, and 'Low' for all others. Start Date is defined as the date of referral; End Date is defined as the date TB treatment is started, TB is excluded ('NotTB'), the patient is stepped down to 'Watch and Wait' or declared lost to follow-up. The difference between start and end date is the Pathway Duration (PD); the PD target for 'High' referrals is ≤7d, for 'Medium' referrals is ≤31d, and for 'Low' referrals is ≤91d.

All referrals 2018–2020 were analysed. P values were calculated using Chi-square or Mann Whitney U test.

Results We received 452 referrals 2018–2020 (table 1). Of the 54 'High' patients, median PD was 1d for those with TB and 4d for 'NotTB', p<0.05. 37/39 (94.9%) with TB had PD within target (≤7d), while 8/10 (80%) 'NotTB' were within target (≤7d).

Of the 129 'Medium' patients, 62 (48%) had TB (median PD 10d). 40 achieved the PD target of ≤31d (64.5%); 7 (11.3%) had PD >91d.

Of the 269 'Low' referrals, 198 had TB, of whom 177 (89.4%) achieved PD of ≤91d. No 'NotTB' subsequently developed TB, but one patient on 'Watch and wait' was subsequently diagnosed with TB.

Surprisingly, use of Xpert did not shorten PD for suspected infectious pTB referrals (Xpert: median 1d, IQR 1–3d; NoXpert median 1d, IQR 0–4d; Mann Whitney U test p 0.73).

Conclusion ≤7d is an achievable target to start treatment or exclude TB for the most urgent referrals, but Xpert may not reliably shorten time to diagnosis.

It takes longer to rule out TB than to rule it in.

P151 INTERVENING WITH A MANUALISED PACKAGE TO ACHIEVE TREATMENT ADHERENCE IN PEOPLE WITH TUBERCULOSIS (IMPACT): FEASIBILITY OF COLLECTING COST AND QUALITY OF LIFE DATA FROM RECORDS AND PATIENTS

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Introduction and Objectives Compared to the rest of the UK and Western Europe, England has high rates of tuberculosis (TB). Non-adherence to TB treatment can be detrimental for patients' health and lead to onward infection. The IMPACT study developed a complex manualised intervention including an enhanced TB needs assessment (TNA) for use in routine care within the National Health Service (NHS) to address the demographic, medical, practical, structural, and psychosocial factors contributing to poor adherence. For the health economics workstream of this feasibility study, we aimed to assess the feasibility of capturing useable health economic data in this context, with a view to planning a cost-effectiveness analysis in a future full trial.

Methods Client Service Receipt Inventory (CSRI) and EQ-5D-5L questionnaires were administered at baseline and two, four, and six months post-baseline to 79 adult study participants from four sites in London to collect information on healthcare resource use and health-related quality of life (HRQoL), respectively. Use of TB-related medications was captured from records at baseline and every follow-up timepoint (two weeks, then monthly from one to six months). Time spent delivering the intervention or standard of care was also captured in the respective arm. Descriptive statistics including levels of missingness were produced for the whole group and by intervention arm. No formal statistical testing was performed due to the small sample size, in accordance with the analysis plan.

Results Completion rates of CSRI and EQ-5D-5L questionnaires ranged between 71–99% across timepoints, with differing degrees of missingness and data queries required according to the type of information captured. Utility scores could be calculated from EQ-5D-5L responses for HRQoL, and costs could be calculated for the different categories of healthcare resources used by applying unit cost information to the captured resource use information, with input from clinical and other colleagues on the study team.

Conclusions Our preliminary results suggest that collecting patient-reported and record-based resource use and HRQoL data is feasible in this patient group. Further refinement of the database design would be required to make the collection and analysis of resource use data less labour intensive for the future study.

Please refer to page A215 for declarations of interest related to this abstract.

P152 INCREASE IN WEIGHT DURING TB TREATMENT: 3 YEAR SURVEY

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Background Weight loss is a cardinal symptom of tuberculosis (TB) and routine monitoring of weight is undertaken in TB Clinic. However, the magnitude of weight gain and in which patients this occurs is not well understood.

Methodology Adults diagnosed with TB between January 2019 and December 2021 were retrospectively evaluated with regard to weight gain. In this survey, all patients had good compliance, were adherent with treatment regimens and regularly attended clinic (even during the COVID pandemic).

Results 181 patients (median age 39 years (IQR 30–51); male 60%; UK born 168%) were identified with TB disease and in whom weight at start, 2 months and end of treatment were documented.

The commonest primary sites were pulmonary (28%), extrathoracic (neck) lymphadenopathy (25%), intrathoracic (mediastinal) lymphadenopathy (22%), eye (14%) and pleural (8%) involvement. Smear and culture positivity for pulmonary disease 56 and 84% respectively; non-pulmonary disease 39% (table 1A).

All persons completed intended duration TB therapy. Overall, there was a significant increase in weight (defined as >5% weight gain) over the course of treatment ($p<0.001$) (table 1B). However, half of the patients did not significantly gain weight. The magnitude of weight increase was greatest in pulmonary and pleural disease with nearly half of patients gaining >10% initial weight (see table 1C). Concomitant corticosteroid usage, whether for TB severity or other underlying condition (eye inflammation for example) was also associated with >10% weight gain (RR 1.9; CI 1.2–3.0; $p<0.005$) and is likely to be a confounding variable.

Conclusion It is not a foregone conclusion that there will be a significant weight increase following successful treatment of TB. However, weight increase in pulmonary and pleural disease should be expected. Further investigation and univariate analysis is required to look for predictors of weight gain at the end of treatment.

Weight monitoring is a cheap and easy-to-undertake biological marker. It is essential that there are clinical processes ensuring routine weights are undertaken and recorded.

Abstract P152 Table 1 TB disease characteristics and pattern of weight gain by primary TB site

A. Characteristics of tuberculous disease

Primary TB site, n (%)	50 (27.6)
Pulmonary	15 (8.3)
Pleural	45 (24.9)
Extrathoracic (neck) lymphadenopathy	22 (12.2)
Intrathoracic (mediastinal) lymphadenopathy	26 (14.4)
Eye disease	
Treatment duration, n (%)	139 (76.8)
6 months	26 (14.4)
9 months	16 (8.8)
≥ 12 months	
Organism identification, n (%)	28 (56)
Sputum smear positive [a]	42 (84)
Sputum culture positive [a]	51 (38.9)
Non-pulmonary culture positive [b]	
Resistance, n (%) [c]	4 (3.9)
Pyrazinamde	4 (3.9)
Isoniazid	1 (0.1)
Rifampicin	0
MDR (Isoniazid and Rifampicin)	

[a]out of 50 patients with pulmonary TB

[b] out of 131 patietns with non-pulmonary TB

[c] out of 93 patients with culture positive TB

B. Weight at start, 2 months and end of treatment

(mean ±SEM)	start of treatment	2 months	end of treatment
weight, kg	68.4 ± 1.2	70.0 ± 1.2[d]	73.0 ± 1.1[de]
weight change, kg	-	1.6 ± 0.2	4.5 ± 0.4
weight change,%	-	2.8 ± 0.4	7.5 ± 0.7

[d] $p<0.001$ compared to baseline (repeated measure ANOVA)

[e] $p<0.001$ compared to 2 months of treatment (repeated measure ANOVA)

C. Net weight gain by Primary TB site

Primary TB site	no weight change, n (%)	≥5% gain, n (%)	≥10% gain, n (%)
Pulmonary (50)	17 (43)	33 (66)[f]	24 (48)
Pleural (15)	6 (40)	9 (60)[f]	7 (47)
Neck (45)	27 (60)	18 (40)	6 (13)
Mediastinal (22)	13 (59)	8 (36)	4 (18)
Eye (26)	22 (85)	3 (12)	1 (5)
ALL	92 (50.8)	87 (48.0)	50 (27.6)

[f]$p<0.001$ compared to baseline (repeated measure ANOVA)

P153 TUBERCULOSIS-ASSOCIATED IMMUNE RECONSTITUTION INFLAMMATORY SYNDROME MANAGEMENT

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10.1136/thorax-2022-BTSabstracts.288

Introduction and Objectives Tuberculosis-associated immune reconstitution inflammatory syndrome (IRIS) has been described in both HIV-positive and HIV-negative patients, and can be fatal. Corticosteroids have been used in the treatment of TB-IRIS, but not always successfully, as many cases are corticosteroid-refractory and long-term therapy has multiple side effects. As there are no official management guidelines, other therapeutic options need to be identified. The aims of this review are to identify studies supporting the use of immunotherapy, host-directed therapies (HDT), or corticosteroids in TB-IRIS management.

Methods A systematic literature review of studies describing TB-IRIS management has been conducted, limited to the English language. Case reports, case series, observational studies and randomized controlled trials were included.

Results 232 articles describing 974 patients (909 adults and 65 children) were selected from 3100 reports. HDT and immunotherapy types have been identified in 377 patients (354 adults and 23 children) described in 63 papers. These include: corticosteroids, tumor necrosis factor-α antagonists, thalidomide, lenalidomide, interleukin-1 receptor antagonists, interleukin-2, vascular endothelial growth factor inhibitors, various immunosuppressant and antineoplastic drugs, chloroquine derivatives, montelukast, pentoxifylline, paracetamol and non-steroidal anti-inflammatory drugs. Corticosteroid therapy only for TB-IRIS was identified in 96 papers describing HIV-negative patients, and 89 papers describing HIV-positive patients.

Conclusion More evidence is needed to support the management of TB-IRIS, to evaluate the efficiency and safety profile of HDT and immunotherapy in this context.

P154 COMPLEXITIES IN TUBERCULOSIS CARE IN SEASONAL FARM WORKERS IN SCOTLAND

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10.1136/thorax-2022-BTSabstracts.289

Introduction Tuberculosis (TB) in the UK is still associated with significant morbidity, mortality and disproportionally affects migrants, and those in lower socio-economic groups. New entrant screening aims to identify those individuals with a higher risk of reactivation of TB upon entering the UK, but this may not be uniformly applicable.

Methods Within NHS Tayside, a mixed urban and rural area with high levels of deprivation, that serves approximately 7.6% of Scotland's population, TB incidence rates were estimated over 7 years to identify the groups with the highest TB incidence rates over time, and their disease phenotypes.

Results The three groups with the highest estimated incidence rates were Indian, Pakistani and Romanian with incidence rates respectively of 100, 130 and 140 per 100,000; the incidence rate for Scottish born individuals was 5 per 100,000. Moreover, and in contrast to other groups, rates of TB in Romanian nationals residing in Tayside were estimated to be around two times higher than the incidence rate of TB in Romania, presently estimated at 64/100000. All cases of TB in Romanian nationals over the last 7 years were pulmonary and included a child of 4 months suggesting recent transmission. Individuals from Romania treated for TB had a mean age of 33.5 y in comparison to 64 y for Scottish-born and 39 y for both Indian and Pakistani origin individuals. Only 37.5% of Romanian nationals completed treatment within Scotland.

Discussion Increased incidence and challenges of care of TB in persons from Romania within NHS Tayside is multifactorial and driven by specific needs of this largely seasonal farm-working group. Individuals from Romania are not subject to the pre-visa TB screening for those coming from countries with high incidence rates, nor included in new entrant screening within the UK. Individuals from these communities can experience intersectional difficulties in accessing healthcare, social help, and stable accommodation.

Conclusions TB in migrant workers is neither a new problem nor one isolated to NHS Tayside. Presenting the challenges faced here and developing solutions to these highlights that TB care in the UK at pre-elimination stages will need focused local, as well as national, solutions.

P155 A HIGH RATE OF TUBERCULOSIS TRANSMISSION IN A FOOD (MEAT PROCESSING) FACTORY SETTING? INVESTIGATION INTO A LONG RUNNING TUBERCULOSIS CLUSTER IN THE UK AND THE INTERVENTIONS DEPLOYED IN RESPONSE

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Between 2011 and 2019, 10 tuberculosis (TB) cases were linked to a cluster via strain typing and/or whole genome sequencing. Four further cases were identified in quick succession at the end of 2019 into early 2020. Overall, 13 of the cases had either pulmonary or pulmonary and extrapulmonary TB and 8 cases had confirmed or suspected links to a food factory.

In response an Incident Management Team recommended mass TB screening with the aim of identifying active and latent TB cases to break chains of transmission.

Populations most at risk of TB exposure were identified and invited for screening at the factory. Blood samples were taken to test for TB infection (IGRA) and demographic, symptoms and TB exposure information collected via a questionnaire.

Following high positive IGRA results a second round of screening was offered including onsite chest-x-rays. Based on the screening results, individuals were either discharged or referred to local TB services for follow up. The screening questionnaires information was combined with the blood test and chest-x-rays results.

135 individuals were screened in the first round. Overall IGRA positivity was 54.1%, with 41.2% in the UK born population versus 58.4% in the non-UK born. All IGRA positive individuals were referred for further investigating along with 9 due to symptom history.

348 people attended the second round of screening. 95% had chest-x-rays and 91% blood tests of which 22% were IGRA positive. Overall, 11.6% in the UK born population were positive compared to 25.3% in the non-UK born. Twelve individuals were referred for clinical review/further assessment due to abnormal chest x-rays. One new active TB case was identified and commenced on treatment.

The IGRA positivity levels found in the first round of screening at the factory suggested TB transmission in this cohort particularly evidenced by high levels in the UK born population. In response screening was expanded and subsequently showed lower positivity suggesting the groups most at risk were correctly targeted in the first screening round. The screening enabled many factory workers with latent TB to be identified and offered treatment to break the cycle of disease transmission.

P156 LONDON BASED PILOT STUDY SCREENING NEW STARTERS OF DIALYSIS FOR LATENT TUBERCULOSIS INFECTION (LTBI)

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10.1136/thorax-2022-BTSabstracts.291

Background Latent TB infection (LTBI) remains an important reservoir of TB even in low incidence countries. The prevalence of latent infection is higher in patients with chronic kidney disease and those receiving dialysis.[1] Those with LTBI on renal replacement therapy (RRT) are known to have higher risks of reactivation to active disease.[2] Our centre data has shown risk is highest within the first 24 months of initiating RRT. At present there is no uniform TB screening and with ad hoc testing by clinicians.

Aim Feasibility and yield of screening new dialysis starters for LTBI with a QuantiFERON blood test.

Methods This analysis is between the period 1st May 2021 and 30th April 2022 at our group of West London based dialysis centres as we started to implement this new pathway. Within the first three months of dialysis initiation a QuantiFERON blood test is included as part of routine initiation or monthly infection screening. Positive and recurrent indeterminate results are referred to the TB service. Comorbidities and individual risk factors are collected through electronic patient records.

Results 464 patients have started dialysis during this time. 371 haemodialysis patients, 93 peritoneal dialysis. There has been a gradual increase in monthly QuantiFERON testing as awareness of the pilot has increased (6–17 tests performed per month). 107/464 (23%) patients have now had a QuantiFERON test. A schematic of the results are shown in the figure below.

Abstract P156 Figure 1

Conclusions Our pilot has shown routine testing for LTBI can be implemented in this high risk group and has allowed a significant proportion (14%) of high risk individuals to be assessed by a TB clinician and the multi-disciplinary team. Suitable patients are offered latent TB treatment or may be investigated for active infection.

REFERENCES

1. Getahun, H., Matteelli, A., Chaisson, R.E., Raviglione, M., 2015. Latent Mycobacterium tuberculosis Infection. *New England Journal of Medicine* **372**, 2127–2135. doi:10.1056/nejmra1405427
2. Horsburgh CR Jr, Rubin EJ. Clinical practice. Latent tuberculosis infection in the United States. *N Engl J Med*. 2011 Apr 14;**364**(15):1441–8. doi: 10.1056/NEJMcp1005750. PMID: 21488766.

P157 A NURSE-LED NEW ENTRANT LATENT TB INFECTION SCREENING CLINIC- THE CROYDON EXPERIENCE

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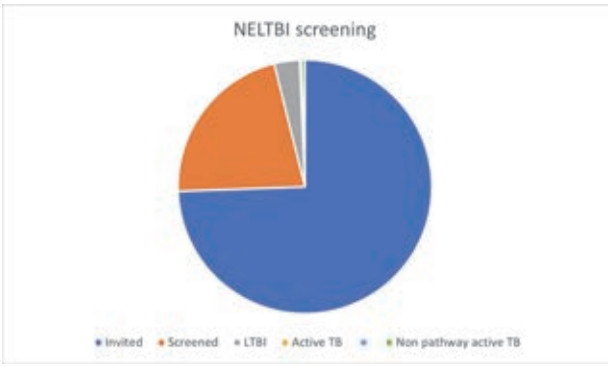
10.1136/thorax-2022-BTSabstracts.292

Introduction Although overall TB incidence in Croydon is 18/10000, there are wards with higher rates (40–79/100000 [1]). There is dynamic influx of people from high incidence countries, especially due to the location of immigration services. Screening this high-risk group for LTBI is essential. We present a successful nurse-led LTBI screening service centrally funded by UKHSA.

Method Individuals were identified through NHS Flag 4 data (international in-migrants at new GP registration) between October 2019 to March 2022.[2] They had to be aged 16–35 years, have entered the UK within the past five years, never been a UK resident and have lived in a high TB incidence country for at least 3 months to be eligible for screening. Patients were invited to a nurse-led appointment where clinical history, CXR and IGRA were obtained.

Results 2525 individuals were invited for screening, 735 attended (29%), 147 were diagnosed with LTBI (20%), with 7 cases of active TB. Interestingly, 15 cases of active TB identified in the clinic had been invited through the programme but did not attend. Prior to the COVID-19 pandemic (October 2019-March 2020), there was a 52% attendance rate (522 screened, 269 attended). The service was suspended from late March-June 2020 and January –March 2021; attendance rate was poor throughout 2020 at 15.6% (1144 screened, 178 attended). To improve attendance, a leaflet about the screening programme was sent prior to appointment letters, which improved the rate to 46% in 2021 (584 screened, 269 attended).

Discussion Of those who attended, the LTBI rate was 20%, highlighting the importance of targeted population screening. Early identification prevents some cases developing active TB. 7 active TB cases were identified early, with improved patient



Abstract P157 Figure 1

outcomes and reduced contacts. Limitations are the poor uptake, partly due the COVID-19 pandemic (service suspension). Barriers include language (non-English speakers); lack of understanding about latent TB; stigma associated with TB; financial constraints; and temporary accommodation of this population, hence difficulty arranging appointments. Leaflets in different languages and work with community and religious leaders would help to raise awareness.

REFERENCES

1. Tuberculosis in England 2021 report – UK Health Security Agency
2. https://www.england.nhs.uk/tuberculosis-programme/area-for-action-8-national-latent-tb-infection-testing-and-treatment-programme/

P158 A NURSE-LED MODEL FOR TUBERCULOSIS SERVICES DELIVERS SAFE AND EFFECTIVE CARE

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Introduction The Covid-19 pandemic led to stretched, and many suspended services throughout the NHS. Guidance was issued regarding Tuberculosis (TB) services which were deemed essential to continue.[1] We analysed how the pandemic changed TB services in a busy District General Hospital with moderate TB workload and the impact on diagnosis, follow-up, and patient outcome.

Methods Data were reviewed for TB patients diagnosed April 2018-March 2019 (pre-pandemic) and April 2020-March 2021 (mid-pandemic) at Royal Bolton Hospital.

Results See table 1.

Discussion The pandemic led to significant changes to our service. The majority of doctor-led clinics were cancelled to cover inpatient wards.

Pre-pandemic, TB Specialist-nurses (TBSNs) did some follow-up TB clinics but predominantly focussed on contact-tracing, counselling, and medication compliance. During the pandemic TBSNs were upskilled and supported to do the majority of TB clinics, managing active and latent TB patients with access to a consultant via telephone and email. There was a weekly MDT with the consultant TB lead to discuss any issues and provide support. The daily availability of ad-

Abstract P158 Table 1

	2018–2019			2020–2021		
No: of patients	33			38		
Disease site	**Pulmonary**		**Extra-pulmonary**	**Pulmonary**		**Extra-pulmonary**
	45.5%		55.5%	23.6%		76.4%
	Single site		**Multi-Site**	**Single Site**		**Multi-Site**
	87.9%		12.1%	78.9%		21.1%
Sensitivity	**Sensitive**		**Drug Resistant**	**Sensitive**		**Drug Resistant**
	62.5%		37.5%	81.2%		18.8%
Treatment started by:	**Doctor**		**Nurse**	**Doctor**		**Nurse**
	Inpatient	**Outpatient**		**Inpatient**	**Outpatient**	
	24.1%	75.9%	0%	7.9%	71.1%	21%
Days from symptom onset to treatment (median)	73			65		
Total clinic appointments	**Face to face**		**Virtual**	**Face to face**		**Virtual**
	503		1	339		11
Clinic appointments per patient (median)	13			13		
Follow-up appointments led by	**Doctor**		**Nurse**	**Doctor**		**Nurse**
	52%		48%	28%		72%
Patients lost to follow-up	3			1		
Hospital admissions	7			1		
Patient deaths	0			1		

hoc consultant support as necessary was a crucial aspect of the nurse-led model.

More patients had extra-pulmonary or multi-site TB mid-pandemic, suggesting probable increased complexity. There was less drug-resistance mid-pandemic however.

TBSNs started treatment in 21% of cases, compared to 0% pre-pandemic, reflecting the new nurse-led model.

Patients had a similar number of follow-up appointments. Mid-pandemic these became predominantly nurse-led. The majority of these appointments remained face-to-face despite restrictions.

Despite the change in model and patient complexity, treatment was commenced at a similar interval after symptom onset. There were fewer hospital admissions mid-pandemic. Fewer patients were lost to follow-up.

One TB patient died mid-pandemic while being treated for Covid-19 as an inpatient.

Conclusion

- A nurse-led model for TB services provides safe, effective, and timely care.
- An expanded TBSN role with the support of a proactive, easily-accessible consultant may present a good model for TB service provision going forward.
- Further research is needed to test this model outside of the pandemic context.

REFERENCES

1. British Thoracic society. Tuberculosis services during the Covid-19 pandemic. Available at https://www.brit-thoracic.org.uk/covid-19/covid-19-information-for-the-respiratory-community/

P159 **ABSTRACT WITHDRAWN**

'Infinity War' – Ongoing clinical challenges in COVID-19

P160 UTILITY OF CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) IN AVOIDING MECHANICAL VENTILATION IN COVID-19 PATIENTS

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There has been much debate on how best to manage COVID pneumonitis. We established a Respiratory High Care Unit (RHCU) to provide CPAP for hypoxic patients as an intermediate between standard oxygen therapy (SOT) and mechanical ventilation (MV). In some centres, CPAP was not offered outside trial settings, meaning deteriorating patients went straight from SOT to MV.

The RECOVERY-RS trial has found that CPAP reduces the need for MV in severe COVID. This study reported for every 12 people treated with CPAP, in comparison to SOT, 1 patient avoided MV.[1]

Between 1/6/20 and 30/3/21, we admitted 156 patients to the RHCU. All patients met local Trust criteria for CPAP. Out of these, 69 patients (48%) were considered to be suitable for full escalation (intubation and mechanical ventilation on ITU). 1 patient died of non-COVID causes and was excluded. Of the remaining 68 patients, 72% improved with CPAP, with all patients surviving until discharge. 28% were transferred to intensive care for MV.

Patients that avoided intubation had a mean age of 53.8 years, an average clinical frailty score (CFS) of 1.3 and a pO_2 on admission to RHCU of 9.1kPa versus an age of 63.5 years, CFS of 1.5 and pO_2 of 8.0kPa in those intubated.

This analysis showed that CPAP was an effective modality of treatment, with 72% of patients avoiding going on to MV, which was the standard care provided in some other centres. For every 1.4 patients given CPAP, 1 MV was avoided. This data strongly supports emerging evidence on the benefit of CPAP in avoiding MV in COVID patients.

REFERENCE

1. Perkins G, Ji C, Connolly B, Couper K, Lall R, Baillie J *et al*. An adaptive randomized controlled trial of non-invasive respiratory strategies in acute respiratory failure patients with COVID-19. 2021.

P161 UTILITY OF CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) IN COVID PNEUMONITIS PATIENTS NOT SUITABLE FOR MECHANICAL VENTILATION

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Hospitals throughout the country have utilised different strategies in the management of COVID pneumonitis. Our hospital established a Respiratory High Care Unit (RHCU) to provide CPAP to patients deteriorating despite Standard Oxygen Therapy (SOT). Patients were considered to be either for full escalation (intubation and mechanical ventilation) or to have CPAP as a ceiling of care.

Our aim was to assess CPAP success in those not eligible for mechanical ventilation.

We retrospectively analysed patients admitted to RHCU who had a CPAP ceiling of care. Between 1stJune 2020 and 31st March 2021, 156 patients were admitted, with 144 notes available for analysis. Patients were transferred to RHCU following review by respiratory consultant and met Trust criteria for CPAP. 75 patients (52%) had a ceiling of care of CPAP. 8 patients were excluded.

Average age was 75.1 years. Mean Clinical Frailty Score (CFS) was 3.6. 70% were male. 97% were admitted with FiO_2 $\geq$40%. Mortality in patients with CPAP as ceiling of care was 79%.

Patients that survived had a mean age was 74.6 years, a mean CFS of 3.1 and a pO_2 on admission of 7.8kPa, as compared to a mean age of 75.2 years, a mean CFS of 3.7 and pO_2 on admission of 7.7kPa in those that died. Demographics between the two cohorts of patients were similar, making it difficult to predict who would survive with CPAP therapy.

21% of patients not suitable for mechanical ventilation survived with CPAP. In other centres, these patients may have only been eligible for SOT alone. The data suggests that offering CPAP may increase survival in patients that would not be suitable for mechanical ventilation.

P162 COMPARISON OF MORTALITY AND RADIOLOGICAL CHANGES DURING THE FIRST TWO COVID-19 WAVES WITHIN A UK DISTRICT GENERAL HOSPITAL

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All patients admitted with COVID-19 pneumonia should have a chest X-ray (CXR) at 6–12 weeks as per British Thoracic Society (BTS). Our study firstly aims to report our compliance with these recommendations. Secondly, we aim to quantify CXR changes on follow up, and also on alternative investigations that may be more sensitive. We also analyse mortality data between the first two waves.

Our study is a single-centre retrospective audit of 1759 COVID-19 positive patients admitted to a district general hospital in the UK, over a 50-week period, between March 2020 and February 2021. Mortality data was gathered over a period of 5 weeks around the peaks of each wave to give comparable populations. CXRs were analysed by an appropriately trained physician, and this was used to give a subjective rating of COVID severity.

Our results demonstrated that there was a significant difference between the mortality data and survival between the first and second wave. Additionally, our data aligns with other comparable studies demonstrating radiological changes at follow-up in both CXRs and Computerised Tomography (CT) scans. These studies concluded that CXRs are cost-efficient in monitoring ongoing COVID-related changes and support BTS recommendations. One study showed that for monitoring of ongoing long-term sequelae of COVID, CT scans were more sensitive as reinforced by our study, although logistically challenging.[1]

We found 4.5% of patients received a follow-up CXR in 6–12 weeks. This study demonstrates that awareness and compliance with BTS guidelines falls short, supported by similar studies. Additionally, monitoring could be improved through the use of machine learning and universal CXR scoring tools to stratify CXR severity, which could reduce clinician workload and the need for CT scans.[2]

Abstract P162 Table 1 Comparison of CXR changes between initial CXR and follow-up CXR

Initial CXR Findings (n=No. of patients)	Follow-up CXR Findings	No. of Patients
Normal (n=16)	Normal	12
	Mild Changes	3
	Significant Changes	1
	Worsening	0
Mild Changes (n=36)	Normal	26
	Mild Changes	7
	Significant Changes	1
	Worsening	2
Moderate Changes (n=64)	Normal	36
	Mild Changes	21
	Significant Changes	6
	Worsening	1
Severe Changes (n=43)	Normal	26
	Mild Changes	12
	Significant Changes	3
	Worsening	2

REFERENCES

1. X. Han, Y. Fan, O. Alwalid, N. Li, X. Jia, M. Yuan, Y. Li, Y. Cao, J. Gu, H. Wu and H. Shi, 'Six-month Follow-up Chest CT Findings after Severe COVID-19 Pneumonia,' *Radiology,* vol. **299**, no. 1, pp. E177-E186, April 2021.
2. J. Cohen, L. Dao, K. Roth, P. Morrison, Y. Bengio, A. Abbasi, B. Shen, H. Mahsa, M. Ghassemi, H. Li and T. Duong, 'Predicting COVID-19 Pneumonia Severity on Chest X-ray With Deep Learning,' Cureus, vol. **12**, no. 7, p. e9448, 28 July 2020.

P163 STAFF EXPERIENCE OF ROUTINE BREATHLESSNESS ASSESSMENT ON A VIRTUAL COVID WARD

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Introduction Our hospital redeployed healthcare professionals to implement a telephone-based Virtual Covid Ward (VCW) during the COVID-19 pandemic. Standardised clinical assessment included numeric (0 – 10) rating scales (NRS) for breathlessness and cough, and pulse oximetry.

Aims and objectives To assess staff experience of routine breathlessness documentation by surveying feedback on the clinical effectiveness of assessment tools used in the VCW.

Methods Data were obtained from an anonymous online survey distributed to VCW staff, summarised in themes and analysed with descriptive statistics.

Results 9/19 VCW staff completed the survey; 9 female; 5 nurses, 3 physiotherapists, 1 Operating Department Practitioner; 8 were senior, 1 junior. 100% had acute or respiratory medicine experience, 66% had experience in remote assessments. 100% reported absence of breathlessness at rest the most reassuring sign when discharging patients. 100% confidence when assessing breathlessness over the phone. 100% felt breathlessness was a 'red flag'. 66% found the breathlessness NRS useful and 67% found the cough NRS useful. 89% believed patients' responses were meaningful at least half the time. 78% believed patients overestimated the breathlessness score at least half of the time and 55% believed patients underestimated respiratory distress.

Conclusion VCW staff were confident in assessing patients remotely and using the NRS. Staff found assessment of breathlessness useful in predicting adverse patient outcomes, but were less confident using the NRS (0–10) rating scale to quantify breathlessness was clinically valuable.

P164 USING ARTIFICIAL INTELLIGENCE TO INTERROGATE MULTI-NATIONAL IMAGING DATASETS TO DETERMINE THE MECHANISM OF COVID-19 PNEUMOTHORAX

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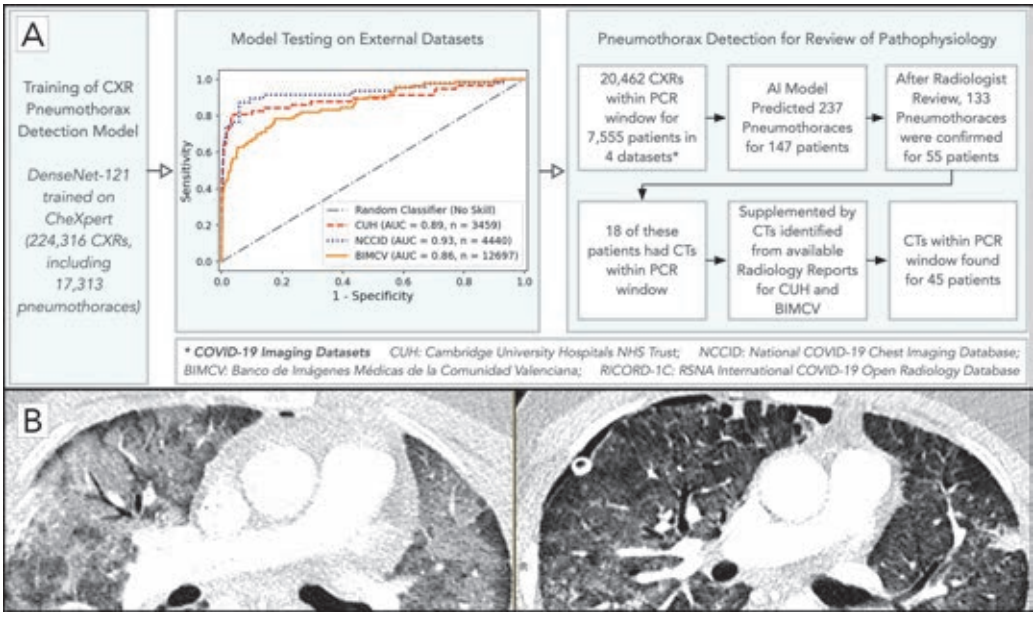

Abstract P164 Figure 1

Introduction Pneumothorax is a rare but important complication of COVID-19.[1] Although barotrauma may account for some cases, many affected patients have not received positive-pressure ventilatory (PPV) support[1]. The pathophysiology of COVID-pneumothorax is challenging to investigate because imaging data exist in diverse silos and only 0.97% of patients admitted for COVID-19 experience this complication.[1] To provide mechanistic insight, we used artificial intelligence at scale to identify cases for detailed analysis from 4 large imaging datasets across 26 centres in 7 countries.

Methods A convolutional neural network was trained to detect pneumothorax on chest x-rays (CXRs) using the open-source CheXpert dataset, which includes 17,313 pneumothoraces. Testing was performed on labelled subsamples of the COVID-19 datasets. After running the model on all COVID-positive CXRs, predicted pneumothoraces were reviewed and the incidence of COVID-pneumothorax was estimated. Available CTs for patients with pneumothorax were assessed by radiologists. Radiology reports were used to curate additional CTs for two datasets.

Results and Discussion Quantitative results are summarised in figure 1. Adjusting for model sensitivity, the estimated incidence of COVID-pneumothorax was 0.97%, consistent with previous research.[1] 45 pneumothorax patients with CTs were identified; however, 13 unrelated to COVID-19, and 9 iatrogenic cases (except barotrauma) were excluded. Almost all remaining patients displayed diffuse, moderate-to-severe pneumonitis.

Most pneumothoraces in patients on PPV were likely related to an interplay of barotrauma and COVID-19, with an acute lung injury pattern on CT. A high proportion demonstrated emphysema and three patients developed cystic abnormalities. One case followed a cavitating pulmonary infarction secondary to pulmonary embolism.

Patients who had not received PPV, or had but were stepped down, developed pneumothoraces later in the disease. CT showed patterns consistent with the absorption stage of COVID-19, where consolidation is reduced but ground glass opacification persists with development of irregular bronchial dilatation. Such pneumothoraces perhaps represent increased parenchymal resistance.

Conclusion There are multiple mechanisms of COVID-pneumothorax. Barotrauma in patients with acute lung injury is most common, whilst pneumothorax in the absence of PPV most commonly occurs in the sub-acute, absorption stage of the disease.

REFERENCE

1. Marciniak SJ, *et al*. COVID-19 Pneumothorax in the United Kingdom. *ERJ* 2021.

Please refer to page A215 for declarations of interest related to this abstract.

P165 ASSOCIATION BETWEEN VITAMIN D DEFICIENCY AND EXTENDED DURATION OF COVID-19 SYMPTOMS

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Introduction and Objectives Vitamin D (VD) is involved in immunity and inflammation through mechanisms such as renin inhibition and inflammatory cytokine reduction. There is already evidence to suggest that VDD may increase COVID-19 infection susceptibility, however research assessing the impact of VDD on COVID-19 symptom duration is limited. The aim of this research was to determine whether VDD is a significant independent risk factor for extended durations of COVID-19 symptoms.

Methods The study included 392 healthcare workers who isolated due to COVID-19 symptoms during the first wave of the pandemic (12th to 22nd May 2020) as part of the convalescent immunity (COCO) study. Data on 8 symptom types and duration of symptoms were collected, including patients' demographics and co-morbidities. Anti-SARS-Cov-2 antibodies were measured using a combined IgG, IgA and IgM ELISA (The Binding Site). Vitamin D status was determined by measurement of serum 25(OH)D_3 using the AB SCIEX Triple Quad 4500 mass spectrometry system. VDD was defined as serum 25(OH)D3 <30 nmol/L.

Results Through univariate analysis of VDD and non-VDD staff, we initially showed VDD to be significantly associated with longer durations of body aches (median 7 days, IQR 5–14 vs. median 5 days, IQR 3–7.5; p=0.0075) and fatigue (median 12 days, IQR 7–14 vs. median 7 days, IQR 4–14; p=0.0127). VDD did not influence the duration of the other 6 symptoms analysed, such as cough and fever. Using binary logistic regression models, we confirm that VDD is a significant independent risk factor for extended durations of fatigue (OR 2.089, 95% CI 1.087–4.011; p=0.027) and body aches (OR 3.069, 95% CI 1.538–6.124; p=0.001). Additionally, VDD staff experienced a significantly greater quantity of symptoms compared to non-VDD staff (median 5, IQR 4–7 versus median 4, IQR 3–6; p=0.0030).
Conclusions This is one of the first studies to investigate the influence of VDD on COVID-19 symptom duration. Our results indicate that VDD is a significant independent risk factor for a longer duration of body aches and fatigue. Larger studies are required to confirm these results and determine if VD supplementation could shorten symptoms.

P166 AN EVALUATION OF THE CLINICAL CHARACTERISTICS OF AN ANTI-SARS-COV-2 IGG ENZYME-LINKED IMMUNOSORBENT ASSAY

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Introduction and Objectives The widespread disruption caused by the coronavirus disease 2019 (COVID-19) pandemic continues to impact on daily life. Despite extensive progress in combating the disease, the immunogenic mechanisms are not fully understood. With increasing vaccination rates and the emergence of new variants, it is important to monitor and identify individuals who have produced an immune response and those who remain at higher risk. This study aimed to evaluate the clinical performance of a serological anti-SARS-CoV-2 Immunoglobulin G (IgG) Enzyme-Linked Immunosorbent Assay (ELISA), initially created by AstraZeneca and further developed and validated by ProAxsis Ltd.
Methods The ProAxsis ELISA was used to assess anti-spike protein SARS-CoV-2 IgG levels, in a total of 423 positive plasma samples including asymptomatic, symptomatic, mildly asymptomatic, early infection, post-seroconversion, low and high titre samples and vaccinated individuals. A total of 701 negative plasma samples were also assessed. Samples from each of the SARS-CoV-2 genetic variants (alpha, delta and omicron), along with the World Health Organisation (WHO) International Reference Panel (NIBSC:20/268) were assessed. In addition, 101 plasma samples from patients with antibodies to other coronaviruses or medical conditions were tested.
Results Sensitivity and specificity of the ProAxsis Anti-SARS-CoV-2 IgG ELISA was 100.0% (CI 95% = 99.1 – 100.0%) and 99.3% (CI 95% = 98.3 – 99.8%) respectively. The ProAxsis and comparator test (Euroimmun) demonstrated good agreement, Cohen's Kappa (κ) = 0.991 (CI 95% = 0.982 – 0.999, p<0.0001). Seroconversion was observed with the ProAxsis ELISA at an earlier stage post-infection than with the comparator assay. The WHO Reference Panel was found to correlate perfectly with the Euroimmun assay and were as expected for each titre. Of the 101 virology samples tested only one sample (Anti-malaria plasma *P.falciparum*) displayed some cross-reactivity (33.3%).
Conclusions The ProAxsis Anti-SARS-CoV-2 IgG ELISA demonstrated robust clinical performance, with almost perfect agreement against the comparator assay. The ProAxsis ELISA will be highly useful in identifying individuals who have raised antibodies following exposure to SARS-CoV-2 or vaccination and has the potential to play an important role in antibody analyses in clinical trials and large populations.

Please refer to page A215 for declarations of interest related to this abstract.

P167 'STAY ALERT, CONTROL THE VIRUS, SAVE LIVES'. DO NEUTRALISING MONOCLONAL ANTIBODIES REALLY LIVE UP TO THE HYPE?

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The introduction of community prescribed neutralising monoclonal antibodies marked a change in clinical approach to acute COVID-19 infections in non-hospitalised patients. Sotrovimab when used in moderate-high risk patients, had been demonstrated to significantly reduce disease progression leading to hospitalization or death.[1] Molnupiravir offers similar benefits albeit less effective.[2]

Local community provision for delivery to high-risk patients (As defined in the interim clinical commissioning policy for antivirals or neutralising monoclonal antibodies for non-hospitalised patients with COVID-19) commenced in December 2021, and data from electronic records for the first 30 days for one CCG footprint was reviewed for outcomes, with the aim of determining the efficacy of these treatments for referred patients. However, their efficacies in reducing primary care interventions are not clearly defined.

104 patients were referred by the local Covid Medicines Delivery Unit for clinical triage. 9 had opted out of data sharing. Of the remaining 95, 70 were deemed eligible for treatment, and of these 48 received treatment, whilst 22 did not for reasons detailed below. Further treatment for respiratory illness was recorded within 28 days of initial assessment, and categorised as yellow for primary care intervention, and red for secondary care intervention.

Comparison between Sotrovimab and no treatment group for eligible patients highlighted a significant decrease in all events in the treatment group (7.1% versus 45.5%, p=0.002). Secondary care events rates occurred at 3.6% in the Sotrovimab group versus 22.7% in the no treatment group (p=0.05) – with one COVID related death in the no treatment group. Molnupiravir similarly reduced primary care interventions in the treatment group versus the non-treatment group. For comparison, the referred group who were found to be ineligible for treatment required no secondary care treatment, with primary care treatment occurring in 8% of individuals.

The primary reason for no treatment in the eligible cohort was referral outside the treatment window period (77.2%).

This early service data supports use of anti-COVID medication in the clinically vulnerable group within non-hospital settings, reducing requirements for further primary or secondary

Abstract P167 Table 1

Data	Number	%	Gender (Male, n, %)	Mean Age (Yrs)
Total referrals	104			
Data Opt-outs	9	8.7 % of total referrals		
Included referrals	95	91.3 % of total referrals	46, 48.4%	51.8
Eligible referrals	70	73.7 % of included referrals	33, 68.8%	
Treated referrals	48	68.6 % of eligible referrals	25, 52.1%	49.5
Sotrovimab	28	58.3 % of treated referrals	15, 53.6%	49.3
Primary care events	1	3.6 % of sotrovimab referrals		
Secondary care events	1	3.6 % of sotrovimab referrals		
All events	2	7.1 % of sotrovimab referrals		
Molnupiravir	20	41.7 % of treated referrals	10, 50.0%	49.7
Primary care events	1	5.0 % of molnupiravir referrals		
Secondary care events	0	0.0 % of molnupiravir referrals		
All events	1	5.0 % of molnupiravir referrals		
Not Treated	22	31.4 % of eligible referrals	8, 36,4%	51.5
Outside Rx window	17	77.3 % of not treated		
Declined Rx	4	18.2 % of not treated		
Referred onto secondary care	1	4.5 % of not treated		
Primary care events	5	22.7 % of not treated		
Secondary care events	5	22.7 % of not treated		
All events	10	45.5 % of not treated		
Ineligible referrals	25	26.3 % of included referrals	13, 52.0%	56.8
Primary care events	2	8.0 % of ineligible referrals		
Secondary care events	0	0.0 % of ineligible referrals		
All events	2	8.0 % of ineligible referrals		

	Sotrovimab n=28	Not treated n=22	p-value
Mean Age	49.3	51.5	0.64 (ii)
Male %	53.6	36.4	0.18 (i)
Primary care events	3.6%	22.7%	0.05 (i)
Secondary care events	3.6%	22.7%	0.05 (i)
All events	7.2%	45.5%	0.002 (i)

(i) Fishers exact test
(ii) Mann-Whitney U test

care interventions. They can help reduce the burden on already overwhelmed health care systems.

REFERENCES

1. Gupta A, Gonzalez-Rojas Y, Juarez E, Crespo Casal M, Moya J, Falci DR, *et al*. Early Treatment for Covid-19 with SARS-CoV-2 Neutralizing Antibody Sotrovimab. *New England Journal of Medicine* 2021;**385**(21):1941–50.
2. Jayk Bernal A, Gomes da Silva MM, Musungaie DB, Kovalchuk E, Gonzalez A, Delos Reyes V, *et al*. Molnupiravir for oral treatment of Covid-19 in nonhospitalized patients. *New England Journal of Medicine* 2021;**386**(6):509–20.

P168 REMDESIVIR IN THE TREATMENT OF CHILDREN 28 DAYS TO < 18 YEARS OF AGE HOSPITALISED WITH COVID-19 IN THE CARAVAN STUDY

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Background A small proportion of children, including infants, develop severe COVID-19 disease. The CARAVAN study (NCT04431453) is evaluating safety, pharmacokinetic, virologic, and clinical outcomes of remdesivir (RDV) treatment in paediatric patients. Interim results in participants 28 days and older are presented here.

Methods Hospitalised patients 28 days to <18 years weighing ≥3kg with PCR-confirmed COVID-19 were enrolled in 5 age- and weight-based cohorts. Intravenous RDV was given for up to 10 days: 200 mg on Day 1 followed by 100 mg daily for those <18 y weighing ≥40kg; or 5 mg/kg on Day 1 followed by 2.5 mg/kg daily for those 28d to <18 y weighing 3 to <40kg. Assessments occurred at screening, Days 1 to 10 or until discharge, and Day 30 follow-up. Descriptive statistical analysis was conducted for study assessments, including adverse events (AEs), clinical laboratory tests, clinical status on a 7-point ordinal scale, duration of hospitalisation, and SARS-CoV-2 viral load using PCR. Sparse samples were collected for assay of RDV and its metabolites, and population pharmacokinetic (PopPK) analysis performed.

Results 53 participants were enrolled: 57% female, 30% Black, 44% Hispanic or Latino, 76% on supplemental oxygen (23% invasive ventilation, 34% high-flow and 19% low-flow oxygen). Most (72%) experienced ≥1 AE (table 1); most common was constipation (17%). Serious AEs were reported for 21%; none was study-drug related. 2 participants discontinued

Abstract P168 Table 1 Overall safety showing proportion of participants with AEs

Participants, n (%)	Cohort 1 n=12	Cohort 2 n=12	Cohort 3 n=12	Cohort 4 n=12	Cohort 8 n=5	Total N=53
Any AE	11 (92)	7 (58)	9 (75)	7 (58)	4 (80)	38 (72)
Grade ≥3 AE	6 (50)	2 (17)	1 (8)	4 (33)	2 (40)	15 (28)
SAE	5 (42)	2 (17)	0	3 (25)	1 (20)	11 (21)
Treatment discontinuation due to AE	2 (17)	0	0	0	0	2 (4)
Treatment-emergent death	1 (8)	1 (8)	0	0	1 (20)	3 (6)
Grade 3–4 laboratory abnormalities	9 (75)	2 (17)	4 (33)	4 (36)	3 (60)	22 (42)

treatment due to AEs and 3 died within the 30-day study period. Overall, 75% and 85% showed clinical improvement (≥2 point increase on the ordinal scale) at Day 10 and last assessment, respectively, while 60% and 83% were discharged by Day 10 and Day 30, respectively. Time to confirmed negative SARS-CoV-2 PCR was 5 and 7 days from nasal/oropharyngeal samples in cohort 2 and 3, respectively, and not estimable in the other cohorts. PopPK results confirmed the appropriateness of the dosing regimens.

Conclusions RDV was generally well tolerated in children hospitalised for COVID-19 who were 28 days and older, weighing at least 3 kg. No new safety trends for RDV were identified and a high proportion of participants had clinical improvement. CARAVAN is ongoing for enrolment of full term and preterm neonates.

P169 NON-GENERALISABILITY OF BIOMARKERS FOR MORTALITY IN SARS-COV-2

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10.1136/thorax-2022-BTSabstracts.303

Rationale Sophisticated scores have been proposed for prognostication of mortality due to SARS-CoV-2 but perform inconsistently.

Objectives We conducted these meta-analyses to uncover why and to pragmatically seek a single dependable biomarker for mortality.

Methods We searched the PubMed database for 'SARS-CoV-2' and 'biomarker term' and 'mortality'. The period was set to 30th June 2021. To aggregate the data, the *meta* library in R was used to report overall mean values and 95% confidence intervals. We fitted a random effects model to obtain pooled AUCs and associated 95% confidence intervals for the European/North American, Asian, and overall datasets.

Main Results Biomarker effectiveness varies significantly in different regions of the world. Admission CRP levels are a good prognostic marker for mortality in Asian countries, with a pooled area under curve (AUC) of 0.82 (95% CI [0.79, 0.84]), but only an average predictor of mortality in Europe/North America, with a pooled AUC of 0.66 (95% CI [0.62, 0.71], $P<0.0001$). We see the same pattern for D-dimer and IL-6. This explains why the proposed prognostic scores do not perform evenly. Notably, urea and troponin had pooled AUCs ≥ 0.77 regardless of location, implying that end-organ damage at presentation is a key prognostic factor. These differences might be due to age, genetic backgrounds, or different modes of death (younger patients in Asia dying of cytokine storm while older patients die of multi-organ failure).

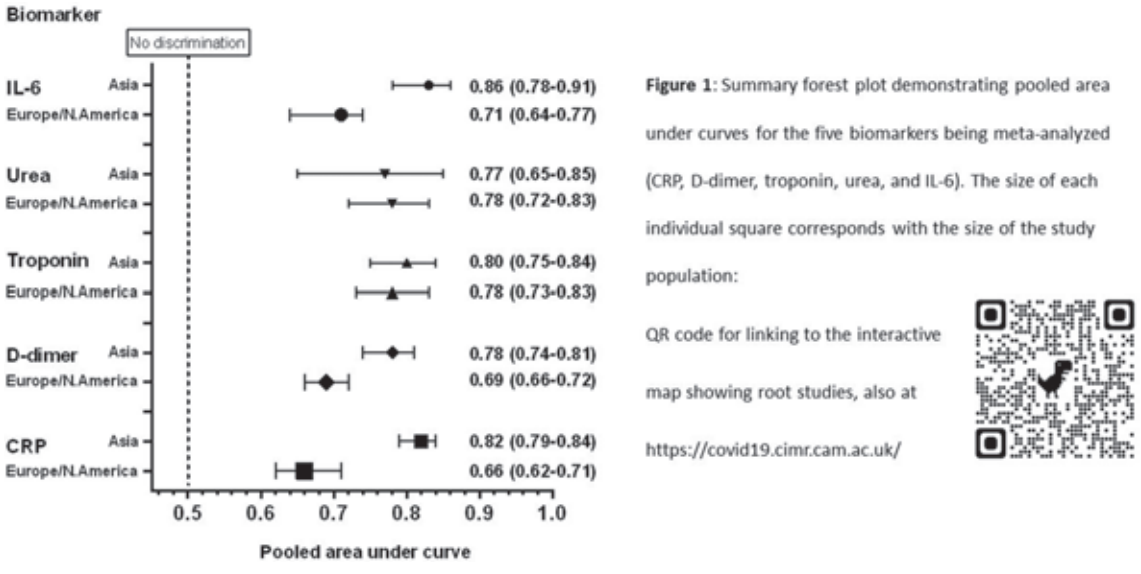

Figure 1: Summary forest plot demonstrating pooled area under curves for the five biomarkers being meta-analyzed (CRP, D-dimer, troponin, urea, and IL-6). The size of each individual square corresponds with the size of the study population:

QR code for linking to the interactive map showing root studies, also at https://covid19.cimr.cam.ac.uk/

Abstract P169 Figure 1

Conclusions Biomarker effectiveness varies significantly by geographical location. To track these changes we have mapped the root studies on the following website (https://covid19.cimr.cam.ac.uk/) This has significant implications for prognosticating SARS-CoV-2 and also for future pandemics.

P170 HUMORAL IMMUNE RESPONSES TO COVID-19 VACCINES ARE REDUCED IN PATIENTS WITH SEVERE ASTHMA

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10.1136/thorax-2022-BTSabstracts.304

Background Patients with severe asthma (SA) may be at higher risk of severe COVID-19 (C-19) illness. C-19 vaccines aim to reduce number and severity of infections. Patients with SA are often treated with maintenance oral corticosteroids (mOCS) and/or biologics- it is unknown if vaccines will generate the same protective responses in patients with SA on such therapies.

Aims

1. To compare magnitude and range of post-vaccination (PV) antibody responses (IgG) in patients with SA on biologics, mOCS or high-dose inhaled corticosteroids (ICS) with healthy controls (HC) without asthma.
2. To review temporal trends in PV IgG in patients with SA

Methods The Virtus finger-prick quantitative C-19 antibody test was used to detect IgG levels 16–24 weeks post second-dose of the C-19 vaccine (123 AstraZeneca, 56 Pfizer, 5 Moderna). PV IgG levels were also measured in a subset of patients 6 weeks PV. IgG>0.2 AU was considered positive with range: very high >1.25 AU, high 0.751–1.25 AU, medium 0.401–0.75 AU and low 0.201–0.4 AU. SA was defined as per ATS/ERS criteria.

Results PV IgG results were obtained from 127 patients with SA (84 on biologics, 13 mOCS and 46 ICS) and 57 HC. After adjusting for age, significantly fewer people with SA compared to HC had a positive PV IgG result (81% vs 95% p=0.016). Compared to HC (1.24 AU), lower median IgG levels were seen in patients on high dose ICS (1.02 AU, p=0.033) and mOCS (0.40 AU, p=0.017).

Patients on biologics had high or very high IgG levels (omalizumab n=25, 0.80 AU; mepolizumab n=25, 1.07 AU; benralizumab n=34, 1.11 AU).

Paired temporal measurements in 37 SA patients showed regression coefficient -0.005 (95%CI -0.006,-0.003) and can be interpreted as IgG decreases, on average, by 0.15 AU per month.

Conclusion Overall, a higher proportion of patients with SA had a negative PV IgG level after receiving 2 doses of a C-19 vaccine. This was mainly seen in patients on mOCS while biologic use was not associated with reduced humoral antibody response. These results reinforce the need for booster vaccines in SA, especially in those on mOCS.

'Cool Runnings' – Innovations in pulmonary rehabilitation

P171 EFFECTS OF PHARMACOLOGICAL AND NON-PHARMACOLOGICAL INTERVENTIONS ON PHYSICAL ACTIVITY OUTCOMES IN CHRONIC RESPIRATORY DISEASES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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10.1136/thorax-2022-BTSabstracts.305

Introduction The effect of pharmacological and non-pharmacological interventions on physical activity (PA) outcomes across chronic respiratory diseases (CRDs) is not fully elucidated.

Objectives i) To evaluate the effects of all available interventions on PA outcomes in CRDs; ii) to explore which PA outcomes have been used as endpoints in clinical studies.

Methods Two different databases were compiled with searches performed in July 2021 and June 2022, yielding a total of 89 studies.

Results Compared to usual care (UC), PA behavioural modification interventions, applied alone or alongside exercise training, resulted in significant improvements in the mean (95% CI) steps/day: 1060 (667, 1454) (p<0.00001) (figure 1) and 679 (93, 1266) (p=0.02), respectively. Moreover, pharmacological interventions compared to placebo yielded a significant difference in steps/day: 602 (104, 1100) (p=0.01) (figure 1). In patients with CRDs exercise training alone compared to UC led to non-significant (p=0.11) improvements in steps/day (441 (-69, 951)). In patients with COPD, PA behavioural modification interventions compared to UC led to significant (p<0.0001) improvements in steps/day 913 (504, 1322), whilst bronchodilator therapy significantly improved steps/day by 396 (125, 668) (p=0.02).

Conclusions In CRDs, only PA behavioural modification and pharmacological interventions lead to significant improvements in steps/day compared to the control. In COPD, bronchodilators led to significantly increased steps/day in patients with COPD (by 396 steps/day), compared to placebo, likely by reducing exertional breathlessness, improving lung function, and decreasing dynamic hyperinflation. PA behavioural modification interventions, however, lead to a 2-fold improvement in steps/day compared to bronchodilators, thereby promoting the assumption that there are significant (but limited improvements) in PA when lung function is ameliorated. For further improvements in PA, the behaviour of the patient towards PA should be modified. Clinical and methodological gaps were profound in the literature while large-scale clinical trials are needed to assess the minimal important difference of PA outcomes in response to different pharmacological or non-pharmacological interventions.

Please refer to page A215 for declarations of interest related to this abstract.

P172 'IT'S REALLY JUST BEEN A LEARNING EXPERIENCE': A QUALITATIVE STUDY TO EXPLORE THE EXPERIENCES OF PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) USING ACTIVITY MONITORS

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10.1136/thorax-2022-BTSabstracts.306

Introduction and Objectives Apps and wearables are increasingly being used by people with Chronic Obstructive Pulmonary Disease (COPD) to help improve levels of physical activity. Physical activity can increase life expectancy, reduce hospital admission, and improve quality of life for people with COPD. Previous research has focussed on the use of activity monitors for monitoring physical activity, often as an objective research measure. However, understanding the experiences of people with COPD using monitoring technology in everyday life could support the development and delivery of effective interventions to increase activity levels. Therefore, this qualitative study aimed to explore the experiences of people with COPD using activity monitors at home in everyday life.

Methods Seven semi-structured face-to-face or telephone interviews were conducted with people with COPD between August 2018 and June 2020. Eligible participants had all used apps and/or wearables (i.e., Fitbit, Garmin, or Apple Watch) to monitor their activity (e.g., steps, distance, heart rate) within the last year. Interviews were analysed using Interpretative Phenomenological Analysis (IPA).

Results Four themes were developed using IPA demonstrating the positive and negative journey of engagement with activity monitors over time: 1) Motivational features to keep monitoring physical activity, 2) The importance of setting achievable goals to manage expectations of activity, 3) Development of knowledge and awareness of activity levels, and 4) Life with the tracker from 'before' to 'now'.

Conclusions This study has provided a detailed insight into how people with COPD use apps and wearables to monitor their physical activity at home in everyday life. Monitoring technology has the potential to widely benefit people with COPD by increasing physical activity and self-management of their health condition. However, further research is needed to understand how healthcare practitioners can support and encourage people with COPD to engage with technology. Understanding how to incorporate technology and utilise activity data collected at home could enable more effective remote delivery of interventions, healthcare, and treatment.

P173 'IT'S DEFINITELY THE FUTURE': HEALTHCARE PRACTITIONERS' VIEWS AND EXPERIENCES OF ACTIVITY MONITORS TO SUPPORT PEOPLE WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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10.1136/thorax-2022-BTSabstracts.307

Introduction and Objectives Activity monitors (i.e. apps and wearables) are becoming increasingly utilised by the general population and people with Chronic Obstructive Pulmonary Disease (COPD). Adapting to COVID-19 involved the remote delivery of COPD treatments, including pulmonary rehabilitation. However, research prior to COVID-19 has reported that few healthcare practitioners used activity monitors within treatment and rarely discussed or reviewed patients' activity data. Barriers to utilising patient activity data have included; time, expertise, and scepticism about the benefits of reviewing data. Understanding how healthcare practitioners can incorporate technology and utilise activity data collected at home could enable more effective remote delivery of interventions, healthcare, and treatment. This qualitative research aimed to explore healthcare practitioners' views and experiences of supporting people with COPD who have used activity monitors.

Methods Seventeen semi-structured telephone or online interviews were conducted with healthcare practitioners between September 2020 and May 2021. Healthcare practitioner occupations included nurse, occupational therapist, physician, and physiotherapist. Participants all had experience of supporting people with COPD who had used activity monitors. Interviews were analysed using inductive thematic analysis.

Results Five preliminary themes were developed underlining healthcare practitioners' experiences of supporting patients with COPD using activity monitors; 1) Using skills and experience to increase accessibility, digital literacy and engagement, 2) The importance of discussion and dialogue to support patients with using activity monitors, 3) Using objectively monitored activity levels to encourage physical activity and support exercise prescription, 4) Implementation of research into usual care and applications to real life, and 5) Benefits of using activity monitors and their future potential.

Conclusions This study highlighted that HCPs recognise the potential for activity monitors to positively impact patients' ability to self-manage their COPD. However, there is also a need for training, best practice guidelines and/or recommendations to support HCPs to engage with activity monitors. If physical activity data collected at home is utilised and integrated effectively and efficiently into healthcare practices to support COPD treatment, there is potential for activity monitors to positively impact patients' health and self-management behaviours.

P174 AN INVESTIGATION OF PHYSICAL ACTIVITY IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD) TO PROMOTE PHYSICAL ACTIVITY (PA) IN SAUDI

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10.1136/thorax-2022-BTSabstracts.308

Introduction Chronic obstructive pulmonary disease (COPD) is characterised by persistent respiratory symptoms and airflow limitation. Physical Activity (PA) frequently induces breathlessness and thus patients often limit daily activities resulting in further deconditioning.[1] Several studies in COPD have shown that physical activity is associated with lower risk for both COPD associated mortality and in-hospital stays.[2] There is limited research about levels of PA in COPD in Saudi Arabia and the reasons behind levels of physical activity.

Study aims To measure self-reported physical activity, and quality of life (QoL) in people with COPD, compared with a healthy control group from Saudi Arabia.

Methods People with COPD and healthy controls from Saudi Arabia were invited to complete an online survey including

Abstract P174 Table 1

Median (IQR)	COPD n=33	Healthy n=44	p	Published literature data for healthy
IPAQ-SF (METs/week)	462.0 (57.1–1019.5)	693.0 (268.1–1920.3)	0.049	(600–1500)[3]
EQ-5D-5L	0.747 (0.544–0.892)	0.862 (0.713–0.879)	0.053	0.940[4]
VAS	70.0 (40.5–85.0)	81.7 (70.0–90)	0.004	85[4]

International Physical Activity Questionnaires short form (IPAQ-SF), and QoL (EQ-5D-5L). Inactivity was defined as: do not meet the global recommendations of at least 150 minutes of moderate-intensity, or 75 minutes vigorous-intensity physical activity per week.

Results 33 COPD participants (26 male) and 44 healthy participants (23 male) were included to the analysis. Mean ±standard deviation age of people with COPD was 65.5 ±9.4 and healthy controls was 50.4 ±8.9 years ($p<0.05$). Table 1 shows that IPAQ, and EQ5DL were significantly different between COPD and healthy people ($p<0.05$), with COPD lower than published data.

Conclusion The result show that physical activity and quality of life in COPD was lower than healthy controls in Saudi Arabia and lower than normal range of published data. The barriers and the facilitators to physical activity in COPD will be investigated by interviewing patients with COPD allied health professionals. This will inform the development of guidance to promote suitable physical activity in Saudi people with COPD.

REFERENCES

1. Pitta F, *et al*. Quantifying physical activity in daily life with questionnaires and motion sensors in COPD. *European Respiratory Journal* 2006;**27**(5):1040–1055.
2. Puhan *et al*. Simple functional performance tests and mortality in COPD. *European Respiratory Journal*. 2013;42(4):956–963.
3. World Health Organization 2020. Global Strategy on Diet, Physical Activity and Health.
4. Jiang R, *et al*. US population norms for the EQ-5D-5L and comparison of norms from face-to-face and online samples. *Quality of Life Research*. 2020;**30**(3):803–816.

P175 COMPARING EXERTIONAL DESATURATION BETWEEN THE 6-MINUTE WALK TEST (6MWT) AND 1-MINUTE SIT TO STAND TEST (1MSTST) IN THOSE PRESCRIBED AMBULATORY OXYGEN (AO)

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Introduction During the COVID-19 pandemic the 1MSTST was utilised as a remote exercise test for AO prescription, with comparable physiological response to the 6MWT[1]. However, reduced desaturation has been reported using 1MSTST compared with 6MWT[2], and was observed on return to face-to-face appointments.

Remote exercise testing has patient choice and sustainability benefits. Using the 1MSTST would support this, however, test inaccuracy could affect prescription. Our aim was to determine whether using the 1MSTST compared with the 6MWT would affect AO prescription.

Methods Data was collected from June 2021 to January 2022. Patients attending face-to-face clinic, whose prescription optimised their oxygen levels according to a 6MWT, completed a 1MSTST to determine whether remote monitoring could be offered. Lowest SpO_2 between tests were compared, with accepted oximeter SpO_2 margin of error of ±2%, and impact on prescription determined.

Results Ten patients completed both tests. Mean age 54.5 (SD 3.92) years, three (30%) men, six patients (60%) had COPD.

When compared, the lowest SpO_2 on the 6MWT and 1MSTST matched in six (60%) patients, but not in four patients. The difference in degree of desaturation between tests ranged from 3% to 5%.

Using 1MSTST alone, five (50%) patients would have had their AO prescription weaned.

Conclusion Basing AO prescription on the 1MSTST would have led to inappropriate weaning of AO in half of patients, when referenced against usual practice using the 6MWT.

However, for six patients the test results matched within the SpO2 margin of error and in four of those the 1MSTST resulted in the same AO prescription outcome as the 6MWT, and could be used to facilitate virtual follow up.

The role of the 1MSTST in AO prescription is unclear and requires further investigation, including repeatability of 1MSTST desaturation and predictability of patient characteristics to inform utility.

REFERENCES

1. Crook *et al* (2017). A Multicenter validation of the 1-min sit-to-stand test in patients with COPD. *European Respiratory Journal*. Volume **49**: 1–11.
2. Holland *et al* (2020) Home-based or remote exercise testing in chronic respiratory disease, during the COVID-19 pandemic and beyond: a rapid review. *Chronic Respiratory Disease*. Volume **17**: 1–18.

P176 PULMONARY REHABILITATION ONLINE: CURRENT STATUS AND AVAILABILITY IN 2022

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10.1136/thorax-2022-BTSabstracts.310

Background Pulmonary rehabilitation (PR) is a core component of COPD treatment. An alternative to traditional face-to-face PR is online PR, also known as tele-rehabilitation. Despite lack of delivery standardisation there has been recent progression towards an online platform with myCOPD (NICE, 2022)[1]. The British Thoracic Society advising face-to-face PR suspension and COVID-19 restrictions may have encouraged services to develop tele-rehabilitation.

Methods A questionnaire survey of PR services in England explored the availability and practice of tele-rehabilitation in England. Additional aims were the investigation of recent development of tele-rehabilitation including changes following the COVID-19 pandemic, and potential barriers to and predictors of success for tele-rehabilitation delivery. The questionnaire used closed and open-ended questions and free text-boxes. Data was collected between 30th March 2022 and 19th April 2022.

Results 61 responses (33%) were received. 11 PR services (18%) stated that they had used a form of tele-rehabilitation prior to the COVID-19 pandemic and 59 (97%) services described using a form of tele-rehabilitation during COVID-19 restrictions. Common remote methods during COVID-19 restrictions included telephone (27%), videoconferencing with

patients in groups (23%) and individual patient videoconferencing (21%).

15 (25%) PR services strongly agreed, and 23 (38%) agreed, that inability to use tele-rehabilitation due to unfamiliarity with digital equipment or lack of access to the internet prevented many service users from using remote PR. 31 (51%) PR services strongly agreed, and 14 (23%) agreed, that face-to-face PR was preferred by users.

31 (51%) PR services disagreed, and 13 (21%) strongly disagreed that tele-rehabilitation would be too costly whilst 7 (11%) strongly agreed, and 45 (74%) agreed that tele-rehabilitation would be beneficial to users.

Conclusion Tele-rehabilitation became widespread following COVID-19 restrictions, most commonly through telephone and videoconferencing. Most service users were thought to be unable to access tele-rehabilitation due to inability to access the internet and prefer face-to-face PR. Most services reported that cost was not an obstacle to tele-rehabilitation and would be beneficial to users.

REFERENCES

1. NICE. (2022). *Recommendations | myCOPD for managing chronic obstructive pulmonary disease.* [online] Available at: <https://www.nice.org.uk/guidance/MTG68/chapter/1-Recommendations> [Accessed 30 June 2022].

P177 THE FUTURES BRIGHT THE FUTURES DIGITAL

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10.1136/thorax-2022-BTSabstracts.311

Introduction PR has had to adapt and embrace new ways of working during the Covid-19 global pandemic, one alternative is the introduction of digital PR. During the pandemic one PR service piloted a digital exercise prescription platform, Rehab Guru, to provide personalised digital exercise and educational support. Rehab Guru is an on-line platform which enables clinicians to independently prescribe exercise, monitor progress, view outcomes and send educational content.

Method In 2021, 33 patients with a diagnosis of COPD in a PR service in England were offered and accepted Rehab Guru, the programme was completed by 61% (n=22), with 24% (n=8) patients still on the course at time of data analysis.

Results

Abstract P177 Table 1

	Pre-Digital PR (average)	Post Digital PR (average)	Change
6MWT	251	296	45
MRC	4	3	-1
CRD – dyspnoea	2.69	3.37	0.68
Fatigue	2.73	3.06	0.33
Emotion	3.51	3.1	-0.41
Mastery	3.71	4.39	0.69

Discussion The results show that digital PR is an alternative option for appropriate patients, outcomes demonstrated clinically significant increases in 6MWT and quality of life measures with significant reduction in MRC scores. Rehab Guru offers an effective alternative to more traditional PR in appropriate patients. Rehab Guru's ability to individualise patients rehab programme and monitor patient's outcomes is key and demonstrate digital PR's place in a menu of options for patients with COPD undergoing PR.

P178 DEVELOPMENT AND IMPLEMENTATION OF A NOVEL CENTRALISED VIRTUAL PULMONARY REHABILITATION SERVICE ACROSS AN INTEGRATED CARE SYSTEM

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Introduction Pulmonary rehabilitation (PR) is at the forefront of the NHS long term plan, due to its ability to improve quality of life, functional capacity, admission prevention, and self-efficacy in patients with long term respiratory conditions. Virtual PR (VPR) has been found to be feasible and has accelerated in use over the course of the covid-19 pandemic with face to face (F2F) PR capacity reducing due to loss of venues, shielding, and increasing demand. VPR can increase patient choice, accessibility, and reach patients groups that may not engage in traditional F2FPR.

We looked at the feasibility and implementation of a centralised VPR service across an integrated care system (ICS), spanning a large geographical area, and multiple pulmonary rehab systems.

Many boroughs within the ICS were running their own VPR service. It was decided that centralising the service would increase patient choice by offering a greater variety of class days and times, but also increase clinical capacity for services to restart F2F services.

Methods A host site was agreed, which then recruited one physiotherapist and two B4 therapy assistants to run VPR for the whole ICS. The referral process to the host site was agreed and a pilot trialled with one borough referring in, to identify any barriers prior to opening the referral pathway to the rest of the ICS. Barriers identified were information governance, reporting of outcome measures (including NACAP), and establishment of responsibility for the patient.

Results Here we present preliminary data from the initial 3 months after service launch.

At the time of writing, 35 referrals have been received from 4 out of the 6 boroughs. Of the 35 referrals; 8 chose not to start the course, 3 enrolled but failed to complete the course, and 4 have completed. The remainder are in class or have their start date booked.

Conclusions We have shown that operationally, a centralised VPR service is feasible to run across a large geographical area with multiple different PR services. Further analysis should target how the service has impacted staffing capacities and wait times across the network, and uptake amongst underrepresented groups.

P179 THE IMPACT OF A 6-WEEK COVID-19 REHABILITATION PROGRAMME ON DYSPNOEA POST COVID-19

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10.1136/thorax-2022-BTSabstracts.313

Introduction Dyspnoea is one of several ongoing symptoms experienced by those recovering from COVID-19 (Arnold et al, 2021). It can impact people for numerous weeks and months following the initial infection. Post COVID-19 rehabilitation may help; however, little is known about the effects of rehabilitation on dyspnoea and the related emotional response. This study aims to explore the impact of an outpatient hospital-based rehabilitation programme on dyspnoea and its emotional burden in those recovering from COVID-19.

Method People experiencing ongoing symptoms of COVID-19, both post-hospitalisation and community managed, were referred for assessment of their rehabilitation needs prior to commencing the programme. Consent and ethical approval was gained to allow data collection and analysis for a longitudinal cohort study. The COVID-19 hospital-based programme was twice weekly for 6-weeks. The Multidimensional Dyspnoea Profile (MDP) (Banzett et al, 2015) was completed pre and post-rehabilitation. Data was analysed using a paired t-test. For the MDP, data was explored to understand the most prevalent sensation of dyspnoea. Data is presented as the immediate perception (A1+SQ) and emotional domain (A2).

Results Nineteen people completed the MDP pre-rehabilitation (74% female, mean [SD] age 53.21 [9.99] years). Hospital admissions were 5 (26.3%) and the mean [SD] length of hospital stay was 8.8 [12.66] days. The mean [SD] unpleasantness (A1) score was 5.21 [1.69]. Chest tightness was the most severe and prevalent sensation (SQ). Frustrated was the most severe emotion (A2).

Fourteen people completed the MDP Post-rehabilitation. The mean [SD] unpleasantness (A1) score was 4.29 [2.46]. Hyperventilating was the most severe and prevalent sensation (SQ). Frustrated was the most severe emotion (A2). There was no statistically significant difference between the immediate perception pre and post-rehabilitation (-3.37 [10.40]), p=0.22). There was a statistically significant difference between the emotional domain pre and post-rehabilitation (4.36 [5.32]), p< 0.01.

Conclusion These results demonstrate rehabilitation did improve the immediate perception of dyspnoea but this was not statistically significant. Unpleasantness of dyspnoea reduced following rehabilitation. Furthermore, the sensation of dyspnoea changed following the rehabilitation programme. The emotional domain statistically significantly increased following rehabilitation. Further research is required due to the multifactorial nature of dyspnoea.

P180 PHYSICIANS' ATTITUDES, BELIEFS AND BARRIERS TO PULMONARY REHABILITATION FOR COPD PATIENTS IN SAUDI ARABIA: A CROSS-SECTIONAL STUDY

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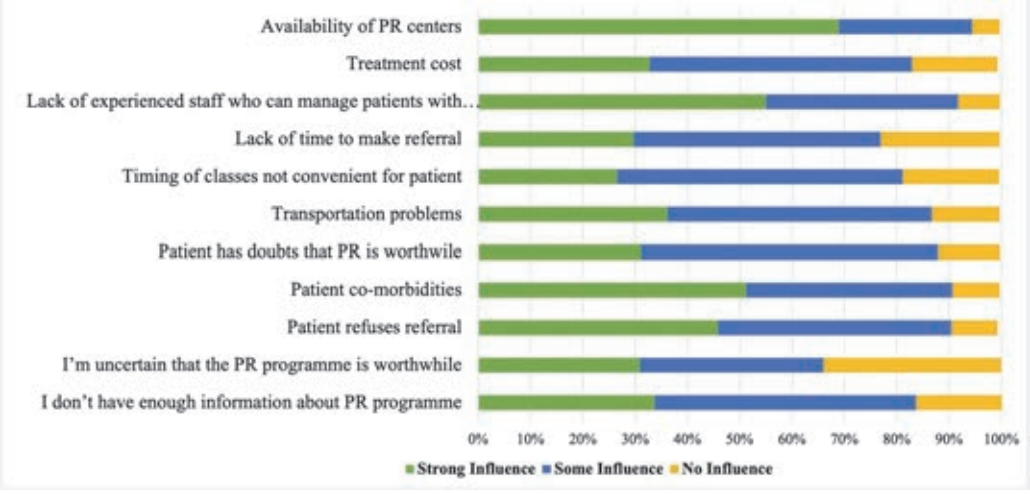
10.1136/thorax-2022-BTSabstracts.314

Aim This study aimed to assess physicians' attitudes toward delivering pulmonary rehabilitation (PR) to Chronic Obstructive Pulmonary Disease (COPD) patients and identify factors and barriers that might influence referral decisions.

Methods Between September 2021 and January 2022, a cross-sectional online survey was distributed to all physicians in Saudi Arabia.

Results 502 physicians completed the online survey, of which 62.0% (n= 312) were male. General physicians accounted for 51.2%, while internal medicine specialists and pulmonologists accounted for 26.9% and 6.6%, respectively. Only 146 (29%) physicians had referred COPD patients to a PR program. The difference in referral rates between all specialties (p=0.011) was statistically significant. Physicians with more years of experience were more



Abstract P180 Figure 1 Barriers for referring COPD patients to pulmonary rehabilitation, using strong, some or no influence grading

likely to refer COPD patients to PR ($p<0.001$). Moreover, home-based PR program was preferred by 379 physicians (75.5%), and 448 (89.2%) perceived smoking cessation as an essential component of PR. Availability of PR centers (69%) was the most common barrier for not referring patients to PR. (figure 1).

Conclusion The overall referral rate was low among all physicians, owing to a lack of PR centers and trained staff. Home-based delivery was the preferred method of delivering PR, with smoking cessation as an essential component.

P181 PROOF-OF-CONCEPT STUDY USING NON-INVASIVE ELECTRICAL MUSCLE STIMULATION FOR ENGAGEMENT OF RESPIRATORY MUSCLES

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10.1136/thorax-2022-BTSabstracts.315

79% of Mechanically Ventilated (MV) patients develop Ventilator Induced Diaphragm Dystrophy (VIDD), wherein their respiratory muscles degrade by up to 32% within 6 days of ventilation. VIDD is associated with delayed liberation from MV, longer stays in the Intensive Care Unit (ICU), and increased complications. Currently, the primary method of weaning consists of gradually reducing ventilatory support and providing some respiratory physiotherapy once the patient is awake. However, this occurs well after patients develop VIDD, and there is a need for a solution that would prevent VIDD. Electrical Muscle Stimulation (EMS) is a well-known and safe technique used to improve muscle strength and can be a promising solution, however has not been explored as a possible therapy for MV patients.

Here we show that applying EMS through non-invasive electrodes placed on the thoracic cavity, we can successfully engage the respiratory muscles. A variety of electrical muscle stimulation parameters and locations were evaluated by applying electrical current to the thoracic cavity. The muscle responses were observed visually and via ultrasound. The intercostal muscles and diaphragm were observed to be engaged and move under the effect of the electrical stimulation. By changing the frequency and amplitude of stimulation, the tetanic nature of the muscle contraction could be changed. This pilot trial suggests that there is a directly observable benefit of using non-invasive Electrical Muscle Stimulation to engage the diaphragm and intercostal muscles of a healthy volunteer. This has great potential as a treatment for MV patients to improve respiratory muscle strength.

We anticipate this proof-of-concept to be a starting point for more sophisticated development of a novel EMS system that can provide personalized stimulation to prevent VIDD from occurring and reducing the weaning time of patients. Furthermore, an *in vivo* study will be needed to test the system and evaluate its clinical efficacy in patients.

P182 DESCRIBING LONG-TERM OUTCOMES AND THE ASSOCIATION WITH BOTH RECEIVING A DIAGNOSIS AND TIME TO DIAGNOSIS IN ADULTS PRESENTING WITH BREATHLESSNESS: A UK RETROSPECTIVE STUDY USING ELECTRONIC HEALTHCARE RECORDS

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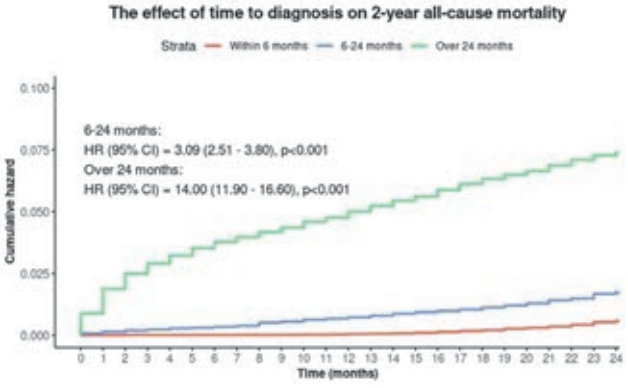
10.1136/thorax-2022-BTSabstracts.316

Introduction Patients with chronic cardiorespiratory diseases commonly present with chronic breathlessness and there are well-described delays in diagnosis. The impact of delays to diagnosis in adults presenting with breathlessness is unknown. We therefore investigated the association of receiving a diagnosis or not, and time to diagnosis, on all-cause mortality in adults presenting with breathlessness.

Method Adults with a first-recorded code for breathlessness (index date) and subsequent coded diagnosis between 2007 and 2017 were included from a UK primary care database (CPRD-GOLD). Cox regression (HR [95% CI]) was used to determine the association of receiving a relevant diagnosis or not on 2-year outcome of all-cause mortality. Time-zero was set at date of diagnosis, and a landmark date of 2-years after index date was set for adults who did not receive a relevant diagnosis. For adults who received a diagnosis, the effect of time to diagnosis on mortality was investigated (time to diagnosis <6 months as reference vs 6–24 months and >24 months). Models were adjusted for sex, age, deprivation, body mass index, smoking, ethnicity, no. of comorbidities, and prior hospital admissions.

Results 101369 adults had a first-recorded code of breathlessness, of whom 66909 (66%) received and 34460 (34%) did not receive a diagnosis: mean (SD) age 57 (16) vs 49 (16) years, 38% vs 48% never smokers, 15% vs 28% no



Abstract P182 Figure 1 Kaplan-Meier curve for 2-year all-cause mortality

comorbidities, respectively. Adults who received a diagnosis had a higher risk of 2-year all-cause mortality (3.11 [2.43–3.98]) compared with those without a diagnosis. In adults who received a diagnosis, time to diagnosis was positively associated with risk of mortality (6–24 months 2.50 [1.81–3.46]; >24 months: 12.40 [9.35–16.50]). Figure 1 shows an unadjusted 2-year survival curve for all-cause mortality.

Conclusion Adults who received a relevant diagnosis for breathlessness had a higher risk of mortality within two years compared with those who did not receive a diagnosis. In those with a diagnosis, waiting beyond six months for a diagnosis was associated with worse survival.

'Catch Me If You Can' – Opportunities to improve care in airways disease

P183 COPD PATIENTS ARE ABLE TO USE DPI SUCCESSFULLY, REGARDLESS OF AGE AND SEVERITY OF AIRFLOW LIMITATION

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10.1136/thorax-2022-BTSabstracts.317

Background There is an increasing urgency for healthcare professionals to also consider the environmental impact when making decisions on care. For inhaled therapies, pressurized metered dose inhalers (pMDI) have a 20–40-fold greater carbon footprint compared to dry powder inhalers (DPI), which make them a significantly more sustainable form of treatment. However, there is a persistent concern among clinicians whether patients with advanced COPD can generate sufficient inspiratory effort to use DPIs successfully to ensure effective and consistent inhaler therapy.

Methods Pooled data of 246 patients (34.6% female, mean age 66.8 years and FEV1 1.5l) with COPD from previous clinical trials were analysed to identify possible predictors of peak inspiratory flow rate (PIF) via the DPI Easyhaler (PIF_{EH}) and to assess the proportion of patients able to achieve a PIF_{EH} of 30 L/min, which is needed to use the Easyhaler successfully.

Results The mean PIF_{EH} was 56.9 L/min and 99% (243/246) of the study patients achieved sufficient PIF levels. In the statistical modelling, none of the analysed patient characteristics (age, gender and BMI) or expiratory spirometry values predicted PIF_{EH} significantly and the model accounted only for 18% of the observed variation in PIF_{EH}.

Conclusions Based on our results, impaired expiratory lung function or patient characteristics do not predict patient's ability to efficiently use Easyhaler DPI in COPD. 99% of the patients succeeded in generating sufficient inspiratory effort for correct dose delivery from the Easyhaler. Considering the targets set for sustainability in healthcare, this topic should be addressed in the clinics as DPIs are a valid alternative for most patients when choosing the best inhaler for each individual patient.

P184 'SMART INHALER' IN ROUTINE CLINIC PRACTISE: IS THERE A ROLE IN MILD AND MODERATE ASTHMA MANAGEMENT?

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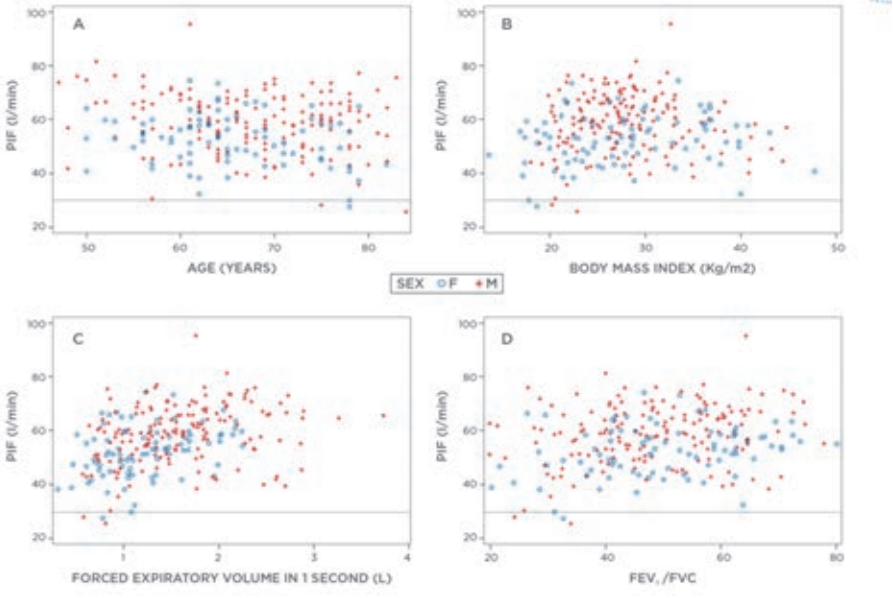
10.1136/thorax-2022-BTSabstracts.318

Objectives Confirming adherence to therapy is recommended prior to escalating treatment regime in patients with asthma. This is usually based on patient report and prescription pick up rates. We report the utility of using 'smart' inhaler



Abstract P183 Figure 1

Abstract P184 Table 1 The demographics of participants and concordance recorded together with the mean duration of smart inhaler use

	All Participant	MART	Non-MART
Number (n)	26	9	17
Age (yrs)	51 (14)	50 (16)	51 (13)
Gender (female:male)	16:10	6:3	10:7
Time since asthma diagnosis (yrs)	23 (18)	27 (12)	21 (20)
Highest recorded eos count (x10^9/L)	0.41 (0.21)	0.38 (0.19)	0.43 (0.23)
Mean OCS (past yr)	0.6 (1.3)	0.6 (1.4)	0.6 (1.3)
Mean (SD)% concordance	75% (36%)	80% (32%)	72% (39%)
- >85% dose concordance	42%	44%	41%
- >50% dose concordance	73%	89%	65%
Mean (SD) duration of smart inhaler use (days)	144 (120)	113 (71)	161 (138)

technology to objectively address adherence with inhaled therapy among patients with mild to moderate asthma.

Methods Consecutive consenting patients (age $\geq$ 18) adherent to therapy based on clinical assessment had their LABA/ICS combination inhaler/s switched over to budesonide/formoterol turbohaler (Symbicort) with sensor. A proportion of the patient advised to use Symbicort as maintenance and reliever therapy (MART) while others to use it as Non-MART. This commercially available treatment comes with a sensor that connects via Bluetooth to an app, which records every time the inhaler is used. Inhaler technique and the use of the app was taught by a specialist nurse and asthma metrics recorded. At 4 weeks, adherence data was reviewed; asthma control was reviewed; and ongoing follow up arranged.

Results Of the 26 patients (mean age 51, 16 females), 73% recorded dose concordance > 50%. There is a greater concordance in MART group in which 89% of patients recorded concordance > 50% whilst only 65% in non-MART group achieve the same level of concordance. Results depicted in table 1.

Conclusion 'Smart' inhalers used in routine clinical practice may help in achieving better asthma control both by identifying sub-optimal adherence, which can then be addressed. However, smart inhaler use alone does not guarantee adherence and role of clinicians in monitoring concordance data and providing suitable education remains very important.

P185 COMPREHENSIVE ASSESSMENT OF INHALER PRESCRIBING AND ADHERENCE IN PATIENTS ADMITTED TO HOSPITAL WITH ACUTE SEVERE ASTHMA MAY IMPROVE MANAGEMENT

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10.1136/thorax-2022-BTSabstracts.319

Inappropriate use of inhalers (due to suboptimal adherence or prescribing) is associated with adverse outcomes in asthma. Despite this, patterns of inhaler prescribing and adherence are not routinely assessed on admission. This could lead to inappropriate treatment escalation and missed opportunities for patient education.

To evaluate the feasibility and potential impact of a routine adherence report we collected data on primary care prescription issue over the previous year in 95 consecutive patients admitted with asthma using electronic records. The medication possession ratio (MPR) for preventer medication was calculated; a cut off of 75% considered sub-optimal adherence. The numbers of prescribed short-acting β2-agonist inhalers and oral corticosteroids were also recorded. Results were retrospectively reviewed for each patient alongside discharge medication to determine whether knowledge of adherence on admission would have identified inappropriate prescribing, better inform patient education, or may have prevented unnecessary treatment escalation.

Adherence reports were completed for 84/95 (88.4%) patients (one died before discharge, 10 had inaccessible records). 29 patients had first been prescribed preventer medication during the current exacerbation (on or just before admission). Of these 18 had received $\geq$ 1 SABA prescription during the previous year, 11 of whom had

Abstract P185 Table 1 Medication prescription and adherence in the previous 12 months. n=84 (61 female) median (range) age 44.5(18–87)

Preventer treatment prescribed in the 12 months prior to current exacerbation				
	n	MPR median (range)	Suboptimal adherence (MPR<0.75) n (%)	
None	29	-	-	
Any preventer Rx	55	0.58 (0–1.6)	36 (65.5%)	
ICS only	12	0.63 (0.1–1.5)	7 (58.3%)	
ICS/LABA	40	0.6 (0–1.6)	28 (70%)	
ICS/LABA/LAMA	3	1 (0.33–1.0)	1 (33.3%)	
Rescue treatment prescribed in the 12 months prior to current exacerbation & length of hospital stay				
	All mean (SD)	Suboptimal adherence mean (SD)	Good adherence mean (SD)	(p value)
SABA inhalers (number in 12/12)	5.3(5.8)	4.(4.8)	6.3(7.5)	0.20 NS
OCS courses (number in 12/12)	1.6(2.2)	1.5(2.1)	1.9(2.5)	0.38 NS
Length of stay current admission (days)	1.8(2.3)	1.3(2.1)	2.7(2.5)	0.01*

(MPR = medication possession ratio; ICS – inhaled corticosteroids ; LABA – long acting β_2 agonist; LAMA – long acting antimuscarinic; SABA – short acting β_2 agonist; OCS – rescue oral corticosteroids)

evidence of a historical blood eosinophilia suggesting missed opportunities for ICS prescribing in at least 37.9%. Of the 55 patients taking preventer medication prior to the current exacerbation, 36 (65.5%) had suboptimal adherence; 10 of whom had their ICS dose increased on discharge, suggesting inappropriate treatment escalation in 27.8%. 42 patients had been prescribed excessive SABA (at least 3 inhalers a year, including 10 of those with optimal adherence to preventer medication). Overall, this suggests that the adherence report identified areas for patient education in 83.6% of those who had already been established on preventer medication. Patients with MPR <0.75 had a significantly shorter length of stay (1.3 v 2.7 days, p=0.01) suggesting less severe exacerbations which may have been prevented by improved adherence.

A comprehensive asthma prescribing and adherence report is feasible for patients admitted with acute severe asthma, and is likely to improve patient education and appropriate prescribing in the majority.

P186 FACILITATORS TO RECRUITING COPD PATIENTS TO AN ADHERENCE INTERVENTION TRIAL

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Introduction and Objectives Recruitment rates to clinical trials in primary care are often lower than anticipated, even in successful trials. Researchers can be too optimistic about the number of eligible patients, and the GPs' time and ability to recruit patients. The MAGNIFY cluster randomised trial is investigating the effect of a technologically-supported adherence package (Ultibro Breezhaler + adherence support technology) for COPD patients in primary care. This abstract explores facilitators for recruiting patients into a GP practice-level intervention trial.

Methods Eligible practices willing to implement the adherence package were invited to participate. Algorithms run on electronic medical records (EMR) of intervention arm practices identified COPD patients aged ≥40 years, with ≥2 moderate/severe exacerbations in the last two years and ≤50% adherence to mono/dual therapy. Pharmacists were funded to recruit patients over a maximum of two calls; initial calls entailed a remote review and invitation to use the technology if suitable, with offer of a second to support device set-up and resolve problems.

Results To date, 398/672 (59.2%) potentially eligible patients have been reviewed. 67/398 (16.8%) were deemed clinically unsuitable during the initial call. Of the remaining 331 patients, 218 (96.1%) accepted the support package; giving an overall recruitment rate onto the intervention of 54.8% (218/398 patients).

Conclusions The recruitment rate was higher than many primary care trials. Recruitment of primary care patients into intervention trials may benefit from using cluster randomised trial designs and adopting novel approaches including EMR searches and dedicated pharmacists to identify, screen and recruit potential patients.

P187 CAN PHARMACY STAFF BETTER SUPPORT SMOKING CESSATION: AS REFERRERS AND CASE MANAGERS?

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10.1136/thorax-2022-BTSabstracts.321

Introduction and Objectives As part of the medicines reconciliation process at hospital admission, pharmacy teams check and document smoking status, and when appropriate, offer very brief advice and nicotine replacement therapy. At this hospital trust, this information was recorded within the prescribing system, therefore could not be used by the Tobacco Dependency Team (TDT) to find potential clients.

From October 2021 until the end of March 2022, an NHSE commissioned pilot recruited and trained local borough community pharmacists (CPs) to provide cessation support. It was run alongside existing hospital and local authority smoking cessation provision and aimed to facilitate referrals to CPs, particularly for patients reluctant to access hospital based smoking cessation services.

This project aimed to improve the efficiency of referral to the TDT and widen access to smoking cessation services to attempt to better meet local need.

Methods Documentation of smoking status by the pharmacy team was transferred from the patient's electronic prescription to an in-house electronic 'order form'. This form generated an automatic referral to the TDT (including those who were a never/ex-smoker) and allowed them to interview and triage the patient to the most appropriate care provider (TDT or CP) based on patient characteristics, preference and location.

Results Prior to the pilot, the number of smokers referred to the TDT was 420/month, of which 15 were from pharmacy staff. During the pilot, referrals remained consistent at 411/month, but the proportion from pharmacy staff increased to 65.

8/64 local CPs were recruited and trained to participate in the pilot, of whom 3 were referred patients by the TDT during the pilot period.

Conclusions By adjusting the established medicines reconciliation process, the visibility and utility of the pharmacy-documented smoking status was improved. This did not increase the administrative burden on pharmacy staff, rather it resulted a reduction of referral workload for non-pharmacy teams. CPs may offer an opportunity to treat patients that otherwise might not access hospital-based tobacco dependency services, but further evaluation over a longer period of time is needed.

P188 MISSED OPPORTUNITIES FOR CHRONIC LUNG DISEASE IN DEEP END GENERAL PRACTICES IN SOCIOECONOMICALLY DEPRIVED AREAS

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10.1136/thorax-2022-BTSabstracts.322

Background Those living in the most deprived sectors of society are the most effected by chronic lung diseases. The NIHR Deep End Clinical Research Network comprises of Deep End General Practices in the most deprived areas of Sheffield. These patient populations are likely to experiencing the greatest burden of chronic lung disease.

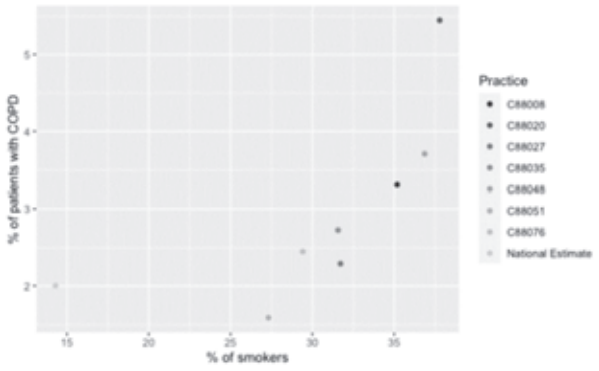
Aim This work serves to map the landscape (prevalence, risk factors and interventions) for patients with chronic lung disease registered in Deep End General Practices in Sheffield to identify priority areas for future research.

Method Seven out of nine (78%) Deep End Practices consented to inclusion in this project encompassing 67300 patients. Most practices were in the bottom decile of the UK Index of Multiple Deprivation. All but one practice had a higher proportion of patients from ethnic minority groups than the UK average of 13%, (median 49.3% (IQR38,52).

Data were extracted (April-July 2020) at practice level through code searching EMIS and SytmOne, without date restrictions. Codes encompassed chronic lung diseases of interest, relevant risk factors and evidenced interventions. Data analysis was conducted in R 4.1.0.

Result Deep End Practices had significantly higher proportions of smokers, median 31.7% (IQR 30.5, 36.0) than the national average of 14%. The proportion of patients diagnosed with chronic obstructive pulmonary disease (COPD), median 2.7% (IQR 2.4, 3.5) was slightly higher than the national average, 2%. (figure 1) In those diagnosed with COPD a median of 12.8% (IQR8.7, 15.8) had commenced pulmonary rehabilitation with a median of 47% (IQR41.6, 74.1) declining. The proportion of patients with COPD receiving seasonal influenza vaccination was a median of 60.8% (IQR 58.6, 62.8). The proportion of COPD patients receiving pneumococcal vaccination was much lower, median 24.4% (IQR19. 6, 36.0). Relatively low pneummococcal vaccination uptake was seen also seen in patients with asthma and bronchiectasis.

Conclusion Deep End Practices in Sheffield experience a high burden of chronic lung disease and these data suggest that a significant burden remains unrecognised. Evidence-based treatments such as pulmonary rehabilitation for COPD and vaccination in all chronic lung diseases are failing to reach even recognised patients.



Abstract P188 Figure 1

P189 SMALL AIRWAYS OBSTRUCTION AND LIFETIME OCCUPATIONAL EXPOSURE IN THE UK BIOBANK COHORT

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10.1136/thorax-2022-BTSabstracts.323

Background Small airways obstruction (SAO) may be an early indication of serious obstructive lung diseases such as chronic obstructive pulmonary disease (COPD) or asthma. During the working life, occupational exposures may contribute to early sub-clinical lung damage, increasing respiratory morbidity and mortality later in life. The aim of our analysis was to assess the association of SAO with occupational exposures among the participants of the UK Biobank.

Methods The ALOHA+ job exposure matrix (JEM), which is based on the International Standard Classification of Occupations V.1988, was applied to each UK Biobank participant with lifetime occupational data available. Cumulative exposure for each type of occupational exposure was calculated using duration and intensity of exposure. This variable was expressed in exposure unit-years (EU-years) and categorised as never exposed, low (<median), moderate (≥median to 90th percentile) and high (≥ 90th percentile) exposure. SAO was spirometrically defined using three different parameters below the lower limit of normal (LLN): $FEV_3/FVC<LLN$, $FEV_3/FEV_6<LLN$ and $FEF_{25-75}<LLN$. Odds ratios (OR) and 95% confidence intervals (CI) for SAO were estimated using a logistic regression model adjusted for various potential confounders: age, sex, smoking status, smoking pack years, UK Biobank assessment centre, Townsend deprivation index, and ethnicity.

Results We identified a total of 65,145 UK Biobank participants with the best quality spirometry and lifetime occupational data. A high lifetime exposure to any type of pesticides (insecticides, herbicides, and fungicides) showed increased odds of having SAO, regardless of the parameter used ($FEF_{25-75}<LLN$, OR=1.38, 95%CI 1.07–1.76; $FEV_3/FVC<LLN$, OR=1.59, 95%CI 1.10–2.22; $FEV_3/FEV_6<LLN$, OR=1.23, 95%CI 1.06–1.43). Furthermore, this association showed a dose-response trend. SAO was also associated with, the three different classes of pesticides when examined individually. For example, for SAO defined as $FEF_{25-75}<LLN$: insecticides (high exposure OR=1.40, 95%CI 1.08–1.78), herbicides (moderate exposure OR=1.59, 95% CI 1.21–2.06), and fungicides (high exposure OR=1.47, 95%CI 1.12–1.88).

Conclusion Among the UK Biobank participants, lifetime occupational exposure to any type of pesticide was suggestive of increased risk of SAO, in a dose-dependent manner. Further research should focus on the occupations that increase the risk of SAO and prognostic significance for later COPD or asthma.

Please refer to page A215 for declarations of interest related to this abstract.

P190 HARM REDUCTION IN TREATING SMOKERS: REAL WORLD DATA FROM SECONDARY CARE

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10.1136/thorax-2022-BTSabstracts.324

Introduction Hospital smokers are very different to healthy, motivated, self-referred smokers attending community services. Hospital smokers often have multiple co-morbidities, mental health issues, terminal or life changing illnesses and are often under great stress at their (sometimes enforced) hospital visit.[1]

In 2013 NICE produced guidance on harm-reduction to smokers who were not ready to stop smoking.[2]

Methods A multisite service evaluation in the real world.

Of 2,912 smokers attending 16 hospitals in Wales in 2018, 43% were not ready to set a quit date. Our secondary care smoking cessation services offer all pharmacotherapy, with 1:1 behavioural support, a one year follow up programme and CO validation at every visit. In our harm-reduction group we offered additional, as-needed, pre-quit behavioural and pharmacological support in sessions tailored around patients' needs.

Results 172 smokers who were not ready to set a quit date agreed to a harm reduction approach (14%).

28% of these individuals became motivated to set a quit date. 50% set a quit date one month after their initial appointment, 11% six weeks, 14% two months, 21% three months and 4% four months.

58% of those who set a quit date had become smoke free at one month and 23% became one year quitters (CO validated and self reported data).

Conclusions An initial harm-reduction approach for smokers not ready to set a quit date is beneficial in supporting long term smoking cessation in hospital smokers.

REFERENCES

1. British Thoracic Society Recommendations for Hospital Smoking Cessation Services for Commissioners and Health Care Professionals. *BTS Reports* Vol. **4** Issue 4. December 2012.
2. Tobacco: harm-reduction approaches to smoking. NICE public health guidance 45. Jun 2013.

P191 IMPROVED SMOKING CESSATION QUIT RATES USING HEALTH PSYCHOLOGY BEHAVIOUR CHANGE INTERVENTIONS IN COPD PATIENTS

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10.1136/thorax-2022-BTSabstracts.325

Introduction Cigarette Smoking is the leading cause of COPD; smoking cessation in COPD reduces mortality and is the only intervention proven to reduce the rate of FEV1 decline. Stop Smoking Services usually focus on providing a combination of nicotine-replacement therapy (NRT) and support based on the NCSCT standard treatment programme. However, quit rates amongst COPD patients are limited with some studies showing a 16–25% quit conversion rate. The Camden COPD and Home Oxygen Service based in North London, UK, provides a service that has seen a significant increase in quit rates amongst their COPD patients.

Methods The intervention provided to patients is based on a combination of smoking cessation treatment (NRT) and cognitive behaviour therapy in the context of health psychology models. This allows for individual tailoring of the treatment programme by the therapist. The analyst is able to evaluate, assess, formulate, and design suitable interventions that address the following psychological factors: 1. Beliefs 2. Values 3.Thoughts 4.Feelings and 5.Attitudes; attributes which can lead to an increase in risky behaviours such as smoking. The intervention lasts over a period of 12 weeks with an extended weekly 1 hr face to face appointment as opposed to short appointment times seen in conventional treatment programmes.

Results The quit conversion rate at the end of 12 week program during Q1 2018–2019 NHS was 75% compared to the UK expected conversion rate of 35% within the general population.

Conclusion We provide evidence that tailoring health psychology models to individual COPD patients and providing prolonged therapy improves quit outcomes by almost 40%

REFERENCE

1. Genetic ancestry and the relationship of cigarette smoking to lung function and per cent emphysema in four race/ethnic groups: a cross-sectional study. Powell R#1, *et al. Thorax*. 2013 Jul;**68**(7):634–642.
2. http://www.ncsct.co.uk/usr/pub/LSSS_service_delivery_guidance.pdf
3. Smoking and Chronic Obstructive Pulmonary Disease (COPD). Parallel Epidemics of the 21st Century. *Rafael Laniado-Laborín Int J Environ Res Public Health*. 2009 Jan; **6**(1): 209–224.
4. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/647069/models_of_delivery_for_stop_smoking_services.pdf

P192 BEHAVIOURAL CHANGE SUPPORT: EARLY INTEGRATION IN A HOSPITAL SMOKING CESSATION SERVICE MAY IMPROVE PATIENT OUTCOMES AND QUIT RATES

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10.1136/thorax-2022-BTSabstracts.326

Background Evidence shows that changing patient's health-related behaviour can have major impact on mortality and morbidity and understanding of associated health inequalities is important to navigate barriers to changing behaviour and improving health outcomes.

Behavioural change support (BCS) is essential to smoking cessation (SCS) intervention but is an unmet need and there's a knowledge gap as to where these resources should be best implemented in the patient journey.

We hypothesise that, hospital-based SCS that include earlier BCS provision combined with pharmacotherapy and follow-up support for at least one-month post-discharge would enhance service quality and patient experience. Smokers are more likely to adopt and maintain lasting smoke-free behaviours translating into higher quit rates and fewer hospital admissions.

Objectives To investigate whether early BCS improved: a) patient adherence to follow up; b) engagement for the less motivated patients; c) staff experience and confidence in management of challenging cases; d) quit rates.

Methods A Health Psychologist (HP) delivered rigorous BCS training to the UCLH SCS core team over a period of four weeks in June 2022. The pilot consists of educational sessions; observational learning of the HP providing BCS to patients

and supervised sessions by the HP of the team; reflective learning practice; MDT discussion of difficult cases and distance learning materials.

A traffic light approach was developed to first assess the risk of a patient requiring intensive BCS and so delivering it only to those deemed to have greater need.

Results Of around 80 smokers seen each month by UCLH SCS, we identified high-risk cohort of 50 needing BCS. 80% of these had long-term conditions (LTC) including respiratory, or substance misuse. 70% reported that they had one or more quit attempts pre- admission and although keen to quit felt that BCS would be more helpful succeeding.

Post evaluation surveys identified 100% of the team were more confident in understanding stages of BCS and the practical implementation of these techniques.

Discussion BCS is integral to SCS and its application at start of the patient journey may positively impact initial outcomes but more importantly maintenance and long term quit rates hence avoiding exacerbating LTC.

P193 QUANTIFYING THE UNMET NEED IN SEVERE ASTHMA: AN ANALYSIS OF THE NUMBER OF UNTREATED BIOLOGIC ELIGIBLE PATIENTS IN THE UK

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10.1136/thorax-2022-BTSabstracts.327

Introduction Biologic therapies have transformed the lives of patients with severe asthma, however >70% of patients with suspected severe asthma are yet to be referred to secondary care[1]. Several commercial companies have provided assessments of the number of biologic-eligible asthma patients in the UK to quantify unmet need. However, these assessments have assumed adequate ICS adherence, that the OCS prescription was indeed for asthma versus a co-morbidity, and that it is taken when prescribed versus stored as a rescue pack. As such, a more accurate assessment taking into account these factors is required to allow adequate planning of specialist services.

Methods A single primary care network (PCN) in London covering a population of 53888 individuals was chosen to establish the number of biologic eligible adult patients. An EMIS web search was used to identify asthmatics on the National QoF register who had been issued ³2 OCS in 2021. These were cross-checked with local hospital emergency department attendances to identify patients who had been issued a total of ³ 3 OCS over the year and therefore meeting NICE biologic eligibility thresholds. ICS prescription records were reviewed to confirm adequate (75%) ICS adherence. The primary care consultation notes of each patient meeting this threshold was reviewed to confirm that the OCS was prescribed for asthma rather than a co-morbidity, and patients were then contacted to confirm they had taken the OCS they were prescribed. Patients already prescribed biologic therapy for asthma within the PCN were also identified.

Results Within the PCN population, 2473/53888 (4.6%) adults with asthma were identified. 129/2473 (5.2%) had been issued ³2 OCS or were already prescribed a biologic (n=7). 38/129 (29.5%) were excluded as the OCS was prescribed for a comorbidity other than asthma. 51/129 biologic-naïve patients had ³3 confirmed exacerbations, however, only 31/51 had sufficient ICS dose and/or adherence. 28/31 had biomarker levels appropriate for a NICE approved biologic.

Conclusion Considering key confounding factors including ICS adherence, 1.4% of patients with asthma fulfil criteria for biologic therapy. At present, 80% of these are yet to be initiated on treatment.

REFERENCES

1. Ryan D, Heatley H, Heaney LG, Jackson DJ, Pfeffer PE, Busby J, *et al*. Potential Severe Asthma Hidden in UK Primary Care. *J Allergy Clin Immunol Pract*. 2021 Apr;**9**(4):1612–1623.e9.

P194 ASSESSING VARIATION IN SEVERE ASTHMA CARE IN ENGLAND: A NATIONAL BENCHMARKING STUDY

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10.1136/thorax-2022-BTSabstracts.328

Background To improve access to severe asthma services across England, an understanding of variation in delivery models, pathways and practice is critical.

Aim This study aimed to assess variation in severe asthma care across primary care, secondary care and tertiary care in England.

Methods Organisations involved in severe asthma care in England were invited to join this benchmarking study. Semi-structured interviews were conducted with respondents between March and May 2021. Responses were analysed using quantitative and thematic analysis techniques.

Results 220 different organisations in England responded across different care settings. 3 key areas of variation emerged as most significant.

1) Patient Identification: Processes for identification of uncontrolled asthma in primary care were varied. Most reported reactive models, with only 18% of respondents employing proactive approaches to identify at-risk patients. In addition, education around uncontrolled and severe asthma was highly variable with over 50% of primary care respondents reporting not having received any formal training or education.

2) Clinical Staff Resource: 68% of tertiary care respondents reported clinical staffing limitations as the most significant barrier to service improvement. Over 30% of tertiary care respondents reported having no designated adherence lead and 48% reported poor access to essential psychology support.

3) Pathway capacity: 36% of tertiary care respondents reported other capacity challenges limited by: infrastructure (physical space available for clinics and testing); access to administrative support and technology to improve data flows.

Conclusion Significant variation was observed in several areas of service provision. This work highlights an opportunity to rethink pathways and services for severe asthma patients to address unwanted variation and to improve access to severe asthma care.

P195 UPDATED COCHRANE SYSTEMATIC REVIEW: NO EVIDENCE THAT VITAMIN D REDUCES ASTHMA EXACERBATIONS OR IMPROVES ASTHMA CONTROL

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10.1136/thorax-2022-BTSabstracts.329

Introduction A 2016 Cochrane review on vitamin D for the management of asthma[1] suggested a role in reducing exacerbations, yet debate has continued with subsequent randomised controlled trials reporting inconsistent findings.

Objectives To evaluate the efficacy of administration of vitamin D and its hydroxylated metabolites in reducing the risk of asthma exacerbations and improving asthma symptom control.

Methods We searched the Cochrane Airways Group Register for double-blind randomised placebo-controlled trials of vitamin D or its hydroxylated metabolites in children and adults with asthma from the beginning of records until November 2021. Four authors independently evaluated study eligibility, extracted data, and assessed risk of bias.

Results Administration of vitamin D did not influence the proportion of participants experiencing one or more asthma exacerbations treated with systemic corticosteroids (primary outcome; odds ratio [OR] 0.99, 95% confidence interval [CI] 0.77 to 1.27; 1709 participants, 14 studies; high-quality evidence) or any secondary efficacy outcome, including Asthma Control Test score (mean difference 0.74 points, 95% CI -0.20 to 1.68, 1303 participants; 8 studies; moderate-quality evidence). Vitamin D did not affect the proportion of participants experiencing one or more serious adverse events (OR 0.89, 95% CI 0.56 to 1.41; 1541 participants, 12 studies; high-quality evidence),

Sub-group analysis did not reveal any evidence of effect modification by baseline vitamin D status, vitamin D dose, or age. A single trial investigating administration of calcidiol (25-hydroxyvitamin D_3) reported a benefit of the intervention for the primary outcome of asthma control.

Conclusions This systematic review does not find evidence to support a role for vitamin D supplementation to reduce risk of asthma exacerbations or improve asthma control. Participants with severe asthma and those with baseline 25(OH)D concentrations <25 nmol/L were poorly represented, and a protective effect of the intervention cannot be excluded in these groups. A single study investigating effects of calcidiol yielded positive results; further studies investigating effects of this metabolite are needed.

REFERENCE

1. Martineau AR, Cates CJ, Urashima M, Jensen M, Griffiths AP, Nurmatov U, Sheikh A, Griffiths CJ. Vitamin D for the management of asthma. *Cochrane Database of Systematic Reviews* 2016, Issue 9. Art. No: CD011511.

Please refer to page A215 for declarations of interest related to this abstract.

P196 WORK-RELATED ASTHMA IN STAINLESS STEEL WELDERS, IRRITANT OR ALLERGY?

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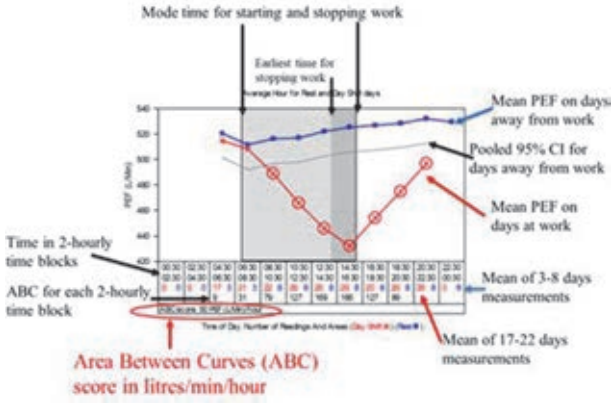
10.1136/thorax-2022-BTSabstracts.330

Background Work-related asthma in welders is often thought to be irritant rather than allergic, limiting the availability of surveillance, assisted retraining and compensation. Excess inflammatory gene activation is a feature of asthma in stainless-steel welders compared with isocyanate asthma. We have investigated a cohort of stainless-steel welders with work-related asthma to see if they best fit irritant or allergic endotypes.

Methods Sequential stainless-steel welders with work-related asthma were included. The timing of the start and recovery of falls of Peak Expiratory Flow (PEF) were identified from Oasys analysis of 2-hourly measurements at work and home recorded for 4 weeks. Non-specific bronchial hyperresponsiveness (NSBR), atopy, eosinophilia and FeNO were measured at clinic visits while exposed. The irritant endotype was defined as either pre-existing asthma, or latency from first exposure <6 months or increased NSBR and the start of PEF decline <2 hours after starting work or the start of recovery <2 hours after leaving work (figure 1).

Results Twenty-five welders showed changes in PEF confirming work-related asthma. One had pre-existing asthma, two had latencies from first exposure to first symptom <6 months and 3 had NSBR. A possible irritant endotype was present in 4/25. Peripheral eosinophilia and raised FeNO were uncommon. Specific inhalation testing with chromates showed a dual reaction in the only worker tested, with no response to welding mild steel or to potassium chloride adjusted to the same acid pH as the chromate solution, confirming specific chromate sensitisation in this welder.

Conclusion The endotype is incompatible with a purely irritant mechanism in 21/25 and has non-Th2 characteristics. Stainless-steel welders with work-related asthma should be managed as occupational asthma with hypersensitivity.



Abstract P196 Figure 1

'WALL-E' – The future of digital healthcare delivery

P197 REMOTE CONSULTATION; THE CLINICIAN'S PERSPECTIVE

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10.1136/thorax-2022-BTSabstracts.331

Introduction In March 2020, the National Health Service (NHS) England recommended that face-to-face appointments were reduced, and virtual clinics rapidly implemented. This presented an opportunity to evaluate the clinician experience of delivering a remote (telephone or video) clinic, with a view to understanding how this model may become embedded in practice.

Methods An electronic survey was distributed throughout a large teaching hospital and was designed to gain the views of clinicians focusing on three main topics regarding remote clinics: previous and current consultation experience, technical aspects of remote consultations and delivering a remote clinic.

Results 123 participants completed the survey; 50 allied health professionals, 40 medical staff, 31 nursing staff and 2 unclassified responses. A breakdown of the responses throughout the 16 directorates is illustrated in figure 1.

Pre-pandemic, 36% (n 44) of clinicians participated in telephone clinics and only 3% (n 4) in video clinics. During and following the Covid-19 pandemic this increased to 94% (n 116) of respondents moving to telephone consultations and 47% (n 58) using the video consultation method.

Although 72% (n 89) of participants agreed they had appropriate equipment to run remote clinics, 65% (n 80) had rarely or never received training in telephone consultations and 73% (n 90) had rarely or never received any training in video consultations.

The majority (87%) feel that a telephone clinic can be conducted in a confidential environment, dropping to 61% with regard to video clinics.

90% (n 110) of respondents would like to have remote consultations as an option, but identified areas that would improve practice. These included dedicated space, IT support, training resources, administrative support and improved internet connectivity.

Discussion Patient choice, careful patient selection, requirement for investigations and access to appropriate technology is required to increase acceptability and safety of remote consultation. Training packages and technical support to support clinicians is inadequate, and requires further investment.

Conclusion The clinician perspective on the delivery of remote consultations is positive overall, provided sufficient training and support is in place. There is also a need for future studies to understand the impact on clinical and patient reported outcomes.

P198 SERVICE EVALUATION OF HOME SPIROMETRY FOLLOWING LUNG TRANSPLANTATION

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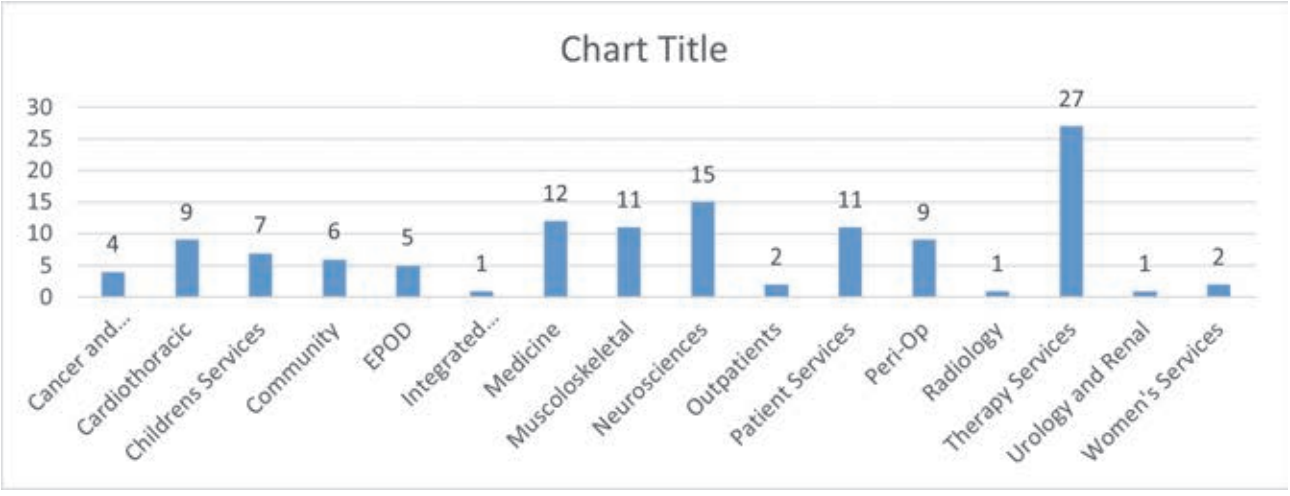
10.1136/thorax-2022-BTSabstracts.332

Introduction and Objectives Following Lung Transplantation recipients perform regular spirometry to assess allograft function. Due to infection risks during the COVID pandemic, this was difficult to perform when vulnerable immunosuppressed patients were shielding. Therefore, we provided our patients with home spirometry allowing them to be perform spirometry remotely.

Methods Bluetooth spirobank spirometers and an app created by patientMpower to transmit the data were given to 164 lung transplant patients. The service was then evaluated by comparing results from the device against recent (>3 months) spirometry performed at the hospital. The views of clinicians and patients were also obtained about the service through questionnaires.

Results 164 patients were provided with home spirometers, 112 questionnaires were collected from clinicians following patient consultations and 94 patients were interviewed for their experience. Nearly a quarter of patients (23%) reported difficulties with the spirometer's initial setting up or using the smartphone app.



Abstract P197 Figure 1

The FEV1 and FVC readings from home spirometry correlated well with measurements taken in clinic with an R^2 of 0.69 and 0.59 respectively ($p<0.01$ n=78). Clinicians found home spirometry useful in 79.6% (n=112) of consultations and felt the need for hospital spirometry was removed in 63% of cases.

Patients were asked to perform spirometry daily or once a week after lung transplantation depending on when they had their transplant. 50% of patients met this goal submitting readings at least three times per week. The median patient rating of the program was 9 out of 10 (10= excellent, n=91). Patient evaluations indicated that the spirometer was easy to use (91.4%), compact (86.0%), and the app was helpful (71.0%) (n=94). In comparison to the previous analogue spirometer, 88.4% of respondents preferred the new Bluetooth spirometer (n=73).

Conclusion We found Bluetooth home spirometer provided accurate results, which was useful in the clinical setting and is acceptable to patients. In addition, it provided real time remote monitoring aiding in assessment of allograft function, which was a benefit over the analogue counterpart particularly during COVID.

P199 SUSTAINED PATIENT USE AND IMPROVED OUTCOMES WITH A COPD DIGITAL SERVICE

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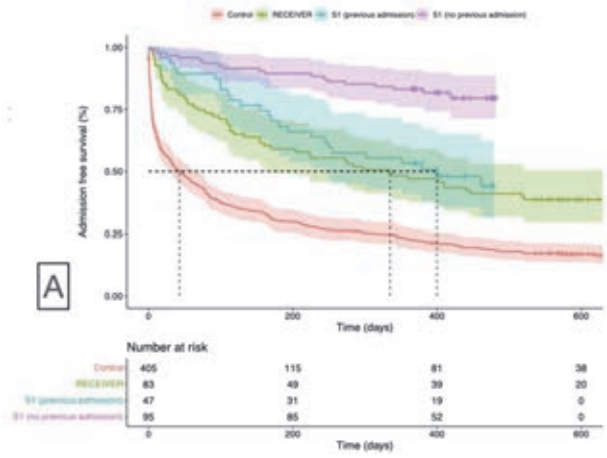
10.1136/thorax-2022-BTSabstracts.333

Background Digital solutions offer the opportunity to improve accessibility and uptake of strategies that improve clinical outcomes for people with COPD. LenusCOPD has been co-designed to enable digital transformation of COPD services for proactive preventative care. A patient-facing progressive web application, clinician dashboard and support website integrates patient-reported outcomes (PROs), self-management resources, structured clinical summary, wearable and home NIV data with asynchronous patient-clinician messaging. We commenced the implementation-effectiveness observational cohort RECEIVER trial in September 2019 to explore the feasibility and utility of this application alongside routine care (NCT04240353). The primary endpoint was the sustained patient usage and secondary endpoints including admissions, mortality, exacerbations, service workload and quality of life. We paused recruitment in March 2021and provided LenusCOPD as routine care in the 'DYNAMIC-SCOT' COVID-19 response service scale-up.

Methods 83 RECEIVER trial participants and 142 DYNAMIC-SCOT participants had completed minimum 1 year follow-up when we censored data on 31st August 2021. We established a control cohort with 5 patients matched per RECEIVER participant from de-identified contemporary routine clinical data held with NHS Greater Glasgow & Clyde Safe Haven.

Findings Sustained patient app utilisation was noted in both cohorts, with an average of 3.5 PRO submissions per person per week. Median time to admission or death was 43 days in control, 338 days in RECEIVER and 400 days in the sub-cohort of DYNAMIC-SCOT participants who had had a respiratory-related admission in the preceding year (figure 1). The 12-month risk of admission or death was 74% in control patients, 53% in RECEIVER and 47% in the DYNAMIC-SCOT sub-cohort participants. LenusCOPD service users had a greater reduction in annual admission and occupied bed day rates compared to control patients, with a median of 2.5 community-managed COPD exacerbations per patient per year and stable quality of life scores during follow up. Patient-clinician messaging workload was manageable.



Abstract P199 Figure 1 Kaplan-Meier survival plots of time to readmission or death from index/onboarding date until 31st August 2021 in control, RECEIVER and DYNAMIC-SCOT cohorts (S1, subdivided by occurrence or absence of a respiratory-related admission in the year prior to onboarding to the service)

Interpretation A high proportion of people continued to use the co-designed LenusCOPD application during extended follow-up. Outcome data supports scale-up of this digital service transformation. Qualitative evaluations into participant's perceived benefits of the app are ongoing, along with formation of risk prediction models using AI-based algorithms.

Please refer to page A215 for declarations of interest related to this abstract.

P200 A VIRTUAL AGE? EVALUATING THE PATIENT AND HEALTHCARE WORKER PERSPECTIVE ON VIRTUAL CLINIC DELIVERY FOR PATIENTS WITH CYSTIC FIBROSIS (CF) AND NON CF BRONCHIECTASIS (NCFB) AT A SPECIALIST CARDIO-THORACIC HOSPITAL

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10.1136/thorax-2022-BTSabstracts.334

COVID-19 posed a challenge for delivery of outpatient appointments. Implementation of virtual clinics has changed how clinicians work. Gilbert et. al reported that the use of virtual clinics at the Royal Orthopaedic hospital resulted in high patient satisfaction[1]. There are obvious advantages to virtual clinic such as reduced risk of transmission of infection, no travel to and from the hospital and also CF patients have home monitoring so data can be gathered remotely. Would patients with CF and nCFB at our specialist hospital be satisfied with virtual clinics?

Method We sent patients with appointments between 1st July and 1st October 2021 a questionnaire. We also invited staff members to complete a survey. 55 nCFB and 54 CF patients responded.

Results Technical difficulties were reported by between 7% and 15% patients and occasionally by staff members. Patients felt virtual clinic was more accessible than face-to-face in 87.2% (nCFB) and 90% (CF). For 49% of the nCFB patients, they had either an investigation or face-to-face appointment booked after the virtual appointment, and this was 37% in the CF cohort. Consultants said that virtual clinics for new nCFB patients were often useful; for follow up appointments this was 75% 'often useful' and 25% 'sometimes useful'. Staff responded that they would wish face to face clinics to continue.

Conclusion From this survey patients have indicated that virtual clinics are accessible and reduce long travel times to come to appointments; staff responded that they find them useful particularly for long term patient follow up, less so for new patient reviews, but they wish them to continue.

REFERENCE

1. Gilbert AW, Billany JCT, Adam R, *et al*. Rapid implementation of virtual clinics due to COVID-19: report and early evaluation of a quality improvement initiative, *BMJ Open Quality* 2020;**9**:e000985. doi:10.1136/bmjoq-2020-000985

P201 A ZOOM WITH A VIEW: SERVICE USER VIEWS ON A DIGITAL INFORMATION RESOURCE TO SUPPORT REMOTE SPEECH AND LANGUAGE THERAPY (SLT) FOR INDUCIBLE LARYNGEAL OBSTRUCTION (ILO)

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10.1136/thorax-2022-BTSabstracts.335

Introduction Our tertiary Airways service offers assessment and treatment for Inducible Laryngeal Obstruction (ILO), (breathing difficulties due to inappropriate adduction of the larynx on inspiration). Speech and Language therapy (SLT) is identified as the 'cornerstone' of treatment for ILO.

During the Covid-19 pandemic, we produced an online information and therapy resource to support as an adjunct to virtual therapy by SLTs. This included educational information about ILO, videos to support understanding and instructions on how to complete the SLT airway control techniques, as well as symptom monitoring measures.

This paper summarises patient feedback on the resource.

Methods An online survey was sent to 312 patients who had received the resource to support their virtual consultations.

Survey questions gathered both quantitative and qualitative data based on Kirkpatrick's (1993) model of training evaluation, focusing on: Reaction, Learning, Behaviour and Results.

Results 69 patients (49 females, 19 males, median age= 64, age range=26–78) completed the survey (22% response rate).

The resource was rated highly by patients for quality, interest and engagement (Reaction), and for learning from it. Diagrams and demonstration videos helped them understand ILO (Learning) and practice therapy techniques outside of therapy sessions (Behaviour) and were rated as the most helpful aspects of the resource. Following use of the resource 76% reported that their ILO symptoms were either 'better' or 'a lot better' (Results). Having the resource always accessible online was described as very useful, due to offering a reminder of techniques and to help explain ILO to others.

Conclusion Digital resources are a useful adjunct to remote ILO therapy, and continue to be used in our service to support face to face, as well as virtual SLT sessions for the treatment of ILO.

P202 EFFECT OF A TECHNOLOGY-ENABLED MULTIDISCIPLINARY RESPIRATORY IN-REACH SERVICE ON PEOPLE ADMITTED WITH AIRWAYS DISEASE EXACERBATIONS IN AN ACUTE GENERAL HOSPITAL

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10.1136/thorax-2022-BTSabstracts.336

Introduction It has been demonstrated that objectively confirming or refuting asthma diagnosis, assessment of severity, comorbidities and adherence can help develop effective management plans. We have also shown that about a third of COPD exacerbation diagnoses within the emergency pathway have alternative primary diagnoses.[1] Precise and accurate diagnosis via a respiratory multidisciplinary team (MDT) reviews enable tailored therapy for individual patients to improve prognosis and outcomes. We examined the effect of such reviews on establishing alternative diagnoses, oral corticosteroid (OCS) stewardship, discharges and readmissions in a busy metropolitan hospital with about 500 emergency attendances per day.

Methods Our hospital acquired a new electronic prescribing information and communications system (PICS), which was programmed to generate an automated alert whenever a patient anywhere in the hospital (including the Emergency Department) is prescribed Prednisolone $\geq$ 30 mg plus nebulised bronchodilators simultaneously. A 10-week pilot of an early respiratory MDT in-reach review of suspected airways disease exacerbations based on this technology-enabled alert on suspected ADE was conducted starting 17-Feb-2022.

Results Out of the 120 patients with suspected ADE (pre-MDT diagnoses: 60 COPD, 60 asthma), 28 (23%) had an alternative primary diagnosis; 34 (28%) had OCS stopped; 44 (36%) were discharged immediately, 48 (40%) were found suitable for Early Supported Discharge and 11 (9%) were readmitted within 30 days.

Discussion Our pilot demonstrates that an early respiratory MDT in-reach review of people admitted to hospital with suspected airways disease exacerbations results in a number of benefits in relation to their journey including early discharge. Importantly, the 30-day readmission rate of 11% was substantially lower than recently published figures of 38% in the UK[2]. This is in keeping with Recommendation 2 (Respiratory specialist advice) of the June 2022 Summary Report of the National Asthma and COPD Audit Programme. Such early reviews could be additionally valuable for harm reduction via OCS stewardship. Further studies are needed on the longer term effect of such increased throughput on community (especially pulmonary rehabilitation) services.

REFERENCES

1. Castle L, *et al. AJRCCM* 2009; **179**: A1516.
2. Alqahtani *et al. Int J Chron Obstruct Pulmon Dis* 2021;**16**: 2769–2781.

P203 ASSESSING THE CONCORDANCE BETWEEN PATIENT-REPORTED ICS ADHERENCE AND OBJECTIVE E-MONITORING OF ICS THERAPY

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10.1136/thorax-2022-BTSabstracts.337

Introduction The prevalence of asthma and the scale of sub-optimal inhaled corticosteroid (ICS) use therein, demands efficient detection of medicines non-adherence. Several tools estimate adherence to medicines in asthma, each with varying complexity of application and limitations. The Test of Adherence to Inhalers[1] (TAI) questionnaire asks patients to rate their agreement with 10-items, and the subsequent score classifies adherence as good, intermediate or poor. A more objective, though currently less accessible tool is the electronic monitor (eMonitor), where a Bluetooth enabled sensor is attached to the inhaler device to record the date/time of each actuation. If actual use is ≥75% of expected use, adherence is good. The resultant impact of guaranteed ICS use on Fractionate expired Nitric Oxide (FeNO) can then allow a judgement of pre-monitor adherence – this is the FeNO suppression test[2] (FST).

Methods Patients attending a hospital asthma clinic completed the TAI, received an eMonitor and were followed up 6 weeks later. The FST was positive if the 6-week FeNO decreased by ≥42% from baseline.

Results Data for 88 patients were included, of whom 76 (86%) had good ICS adherence according to the eMonitor. 35 people had a positive FST; 12 (34%) had a TAI adherence that was designated good, 19/35 (54%) intermediate and 4 (11%) poor. In the negative FST group, 15/41 (37%) had a TAI adherence classification of good, 21 (51%) intermediate and 5 (12%) poor.

Conclusion In this cohort, a third of patients with eMonitoring/biomarker evidence to suggest *suboptimal* ICS adherence (that is, a positive FST) completed a TAI that *over-estimated* ICS use. Conversely, in the FST negative patients (likely to have been adherent prior to eMonitor initiation), almost two thirds of patients identified themselves on TAI as having suboptimal adherence. This suggests that the TAI may not accurately predict adherence or potentially, that using the eMonitor in itself encourages better adherence in the short-term.

REFERENCES

1. Plaza V *et al*. Test of Adherence to Inhalers Arch Bronchoneumol 2017;**53**:360–1.
2. Heaney LG *et al*. Remotely Monitored Therapy and Nitric Oxide Suppression Identifies Non-Adherence in Severe Asthma. *American Journal of Respiratory and Critical Care Medicine* 2019;**199**(4):454–464.

P204 DIGITAL INTERVENTIONS TO IMPROVE ADHERENCE TO MAINTENANCE MEDICATION IN ASTHMA: A COCHRANE SYSTEMATIC REVIEW

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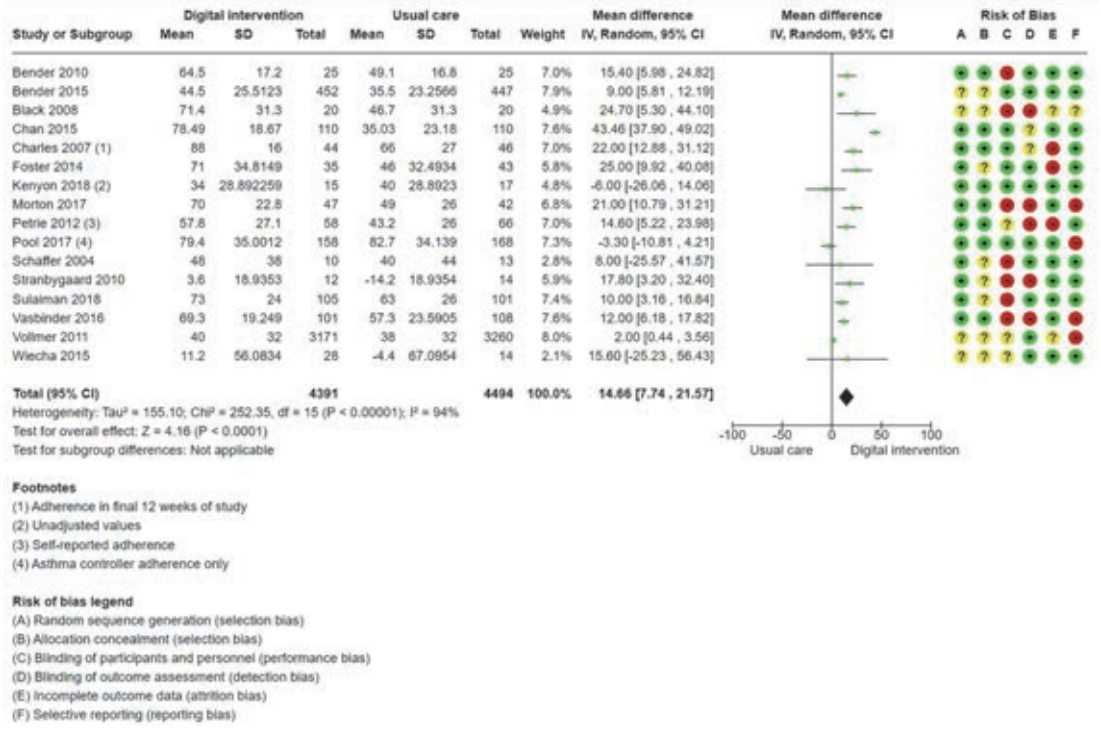
10.1136/thorax-2022-BTSabstracts.338

Background Asthma affects 339 million patients globally. Poor medication adherence leads to increased symptoms,



Abstract P204 Figure 1

exacerbations, hospitalisations, and healthcare utilisation. The impact of digital adherence interventions on adherence and asthma outcomes is unknown.
Objectives To determine the effectiveness of digital interventions for improving adherence to maintenance treatments in asthma.
Methods We included randomised controlled trials (RCTs) of any duration in any setting, comparing a digital adherence intervention with a non-digital adherence intervention/usual care in patients with asthma of all ages.
Results We included 40 parallel randomised controlled trials (RCTs) involving adults and children with asthma (n = 15,207), 8 of which are ongoing. Pooled results showed that digital interventions may increase adherence (mean difference of 14.66 percentage points, 95% confidence interval (CI) 7.74 to 21.57; likely to be clinically significant in those with poor baseline adherence. Subgroup analysis by type of intervention was significant (P = 0.001), with better adherence with electronic monitoring devices (EMDs) and short message services (SMS). Digital interventions were likely to improve asthma control (standardised mean difference (SMD) 0.31 higher, 95% CI 0.17 to 0.44). They may reduce asthma exacerbations (risk ratio 0.53, 95% CI 0.32 to 0.91).

Digital interventions may result in a slight change in unscheduled healthcare utilisation. School or work absence data could not be included for meta-analysis due to the heterogeneity and the low number of studies. They may result in little or no difference in lung function (forced expiratory volume in one second (FEV_1)): there was an improvement of 3.58% predicted FEV_1, 95% CI 1.00% to 6.17%). Digital interventions likely produce a small increase in quality of life (SMD 0.26 higher, 95% CI 0.07 to 0.45). Acceptability data showed positive attitudes towards digital interventions. There were no data on cost-effectiveness or adverse events.
Conclusions Overall, digital interventions may result in a large increase in adherence. There is moderate-certainty evidence that digital adherence interventions likely improve asthma control to a degree that is clinically significant, and likely slightly increase quality of life with potential reduction in asthma attacks. Future studies should use consistent adherence and outcome measures to enable comparisons.

Please refer to page A215 for declarations of interest related to this abstract.

P205 THE MEASUREMENT OF ADHERENCE TO INHALED CORTICOSTEROIDS IN ASTHMA USING ELECTRONIC MONITORING DEVICES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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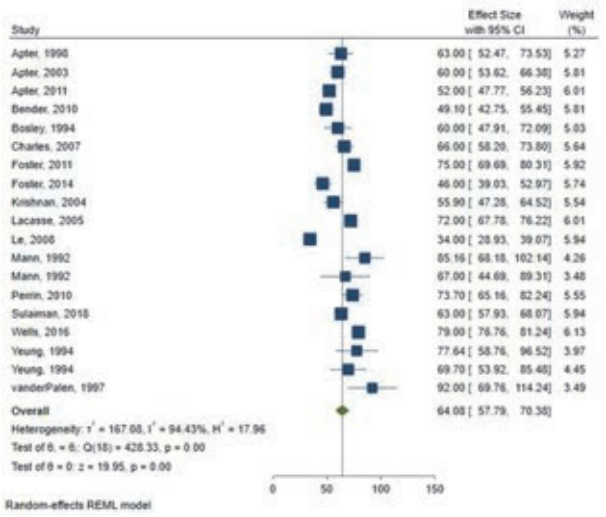
10.1136/thorax-2022-BTSabstracts.339

Background Underuse of inhaled corticosteroids (ICS) in asthma is a common problem and has been linked to adverse clinical outcomes. Electronic monitoring devices (EMDs or digital inhalers) are increasingly recognised as the gold standard for quantification of inhaler adherence and are likely to play a part in the future digitisation of self-management. This review sought to use EMD measurement to estimate population adherence in asthma and assess standards in EMD-measured adherence.



Abstract P205 Figure 1

Methods After database searches, studies were included if they utilised EMDs in adults and were controlled trials or cohort studies. Summary data were extracted to inform narrative review and meta-analysis. The primary outcome was a population estimate of adherence. The study protocol is registered on the Prospero database (CRD42017057708). Initial searches were conducted in 2017 and an update is underway.
Results Thirty-five randomised controlled trials and cohort studies were suitable for inclusion in the initial review. The studies had a high degree of heterogeneity between study designs, study interventions and how studies defined, measured and calculated adherence.

A population estimate of mean daily ICS adherence was taken from meta-analysis of pooled control and cohort groups representing 19 studies and 1365 participants. This demonstrated that 64.1% of prescribed doses (95% CI 57.8 – 70.4%, I2 94.4%) were taken. Meta-analysis of eight randomised controlled trials assessing adherence interventions suggested a post-intervention standardised mean difference (SMD) of 0.5 (95% CI 0.2 – 0.8, $I^2$75.3%, p<0.01). The SMD provides a pooled measure of effect with 0.2 denoting a small effect, 0.5 a moderate effect and 0.8 a large effect.
Conclusion EMD studies demonstrate differences in methodology and outcome measures. Meta-analysis, limited by study heterogeneity, derives a mean adherence and suggests a moderate effect of adherence interventions.

Please refer to page A216 for declarations of interest related to this abstract.

P206 IMPACT OF DIGITAL INTERVENTIONS ON QUALITY OF LIFE IN PATIENTS WITH ASTHMA: A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS

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Introduction and objective Asthma is the most common inflammatory disease of the lungs. Globally, 339 million people suffer from asthma. Asthma is known to negatively influence the quality of life (QOL) of the patients who suffer

from it. Over the last years, digital health has emerged as a promising tool for achieving optimal and personalized asthma management. Little information is known about the impact of digital health interventions on the QOL among asthma patients. The objective of the systematic literature review and meta-analysis was to identify and synthesize the data on the impact of digital health interventions on the QOL among asthma patients.

Methods Key biomedical databases (Embase, MEDLINE, CENTRAL, and Cochrane Airways) were searched from database inception to June 2022 to identify the randomized controlled trials (RCT) comparing digital interventions with non-digital control group/usual care among asthma patients (aged ≥12 years). The outcome of interest was QOL change using the Asthma Quality of Life Questionnaire (AQLQ). Each study was reviewed by two independent reviewers; a third reviewer resolved disagreements. The risk of bias assessment was performed using Cochrane's RoB-2 tool.

Results Out of 1,387 screened publications, 10 studies met the inclusion criteria and were included in the meta-analysis. The digital interventions comprised, interactive web-portals or smartphone applications (n=6 studies), interactive voice response/speech (n=2), text messages (n=1) and electronic monitoring devices (n=1). The pooled results from the meta-analysis revealed a small but statistically significant improvement in QOL with digital interventions (standardized mean difference: 0.21, 95%CI 0.02 to 0.41) compared to the control/usual-care group. A sub-group analysis indicated better results for digital interventions versus the control/usual care group among the studies assessing only adult patients (0.43, 95%CI 0.23 to 0.63) than those including both adolescents and adults (0, 95%CI -0.21 to 0.20). The meta-analysis results from only adult patient studies were also clinically significant (threshold=0.3).

Conclusion The findings demonstrated that digital health interventions can be associated with a significant positive change in QOL among asthma patients, especially in adults. This study advocates the use and further development of digital interventions to support and improve the clinical management of chronic health conditions like asthma.

'Into the Woods' – Managing co-morbidities in airways disease

P207 THE INFLUENCE OF OBESITY ON THE CLINICAL OUTCOME OF BENRALIZUMAB TREATMENT IN SEVERE EOSINOPHILIC ASTHMA A SUBGROUP ANALYSIS FROM THE BPAP STUDY

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10.1136/thorax-2022-BTSabstracts.341

Introduction and Objectives The BPAP study has previously described real-world outcomes of patients with severe eosinophilic asthma (SEA) following 1 year of treatment with benralizumab. It is recognised that obesity can be an independent driver of respiratory symptoms in patients with asthma and is associated with additional non-T2 inflammatory pathways. Whether co-morbid obesity in SEA is associated with a differential response to benralizumab treatment is poorly understood.

Methods The BPAP study is a retrospective, observational study of patients with SEA from eight UK centres. Clinical outcomes were described at baseline, 1 year and 2 years post-benralizumab initiation, and are presented for patients grouped by BMI (<30, ≥30–39 and ≥40, reported in this order throughout).

Results 258 patients with BMI recorded at baseline were included; 120 with BMI <30, 105 with BMI ≥30–39, and 33 with BMI ≥40. For these groups, the baseline annualised exacerbation rate (AER) was 4.6, 5.7, 6.1 (ANOVA, p=0.022); the baseline ACQ-6 was 2.7, 3.3, 3.8 (p<0.001);

Abstract P207 Table 1 Key results: Annualised exacerbation rate (AER), maintenance oral corticosteroid (mOCS) use and asthma control [ACQ-6]by BMI at baseline

BMI Category	BMI < 30 (N=120)			BMI ≥30-39 (N=105)			BMI ≥40 (N=33)		
AER	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***
Mean (95%CI) AER [a]	4.6 (4.0–5.2)	1.0 (0.7–1.2)	0.9 (0.6–1.1)	5.7 (5.0–6.5)	1.1 (0.8–1.5)	1.2 (0.9–1.5)	6.1 (4.7–7.5)	1.8 (1.1–2.6)	1.7 (0.9–2.6)
mOCS use	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***
mOCS use in overall cohort, n (%) [a]	77/120 (64)	37/112 (33)	27/98 (28)	62/105 (59)	35/92 (38)	26/79 (33)	24/33 (73)	8/22 (36)	4/16 (25)
mOCS use in patients on mOCS at baseline, n (%)[b]	-	33/73 (45)	25/61 (41)	-	30/56 (54)	23/46 (50)	-	8/16 (50)	4/12 (33)
mOCS dose (mg/day) in patients on mOCS at baseline, median (IQR)[b]	10.0 (5.0–20.0)	0.0 (0.0–7.8)	0.0 (0.0–5.0)	10.0 (7.5–20.0)	5.0 (0.0–10.0)	2.5 (0.0–10.0)	10.0 (7.5–18.8)	2.5 (0.0–7.5)	0.0 (0.0–5.0)
ACQ-6	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***	***Baseline***	***1 year***	***2 years***
Mean (SD) ACQ-6 score [a]	2.7 (1.4)	1.7 (1.4)	1.3 (1.4)	3.3 (1.5)	2.3 (1.5)	1.9 (1.5)	3.8 (1.2)	3.2 (1.6)	1.7 (1.3)
Total patients with an improvement of ≥ 0.5 units for AQC-6 [MCID]from baseline, n (%)[a]	-	51/84 (61)	43/64 (67)	-	44/68 (65)	33/47 (70)	-	6/18 (33)	9/12 (75)
Total patients achieving ACQ-6 score < 1.5, n (%) [a]	30/117 (26)	43/85 (51)	43/65 (66)	11/95 (12)	19/70 (27)	21/50 (42)	1/28 (4)	2/19 (11)	6/13 (46)

[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

and the mean (SD) eosinophil count (cells/μL) was 744 (707), 574 (432) 462 (319), p=0.01. A relative reduction (vs baseline) in AER at 1 year was 78%, 81% and 70%, and at 2 years was 80%, 79% and 72%. The proportion who remained completely exacerbation-free at 2 years was 45%, 25% and 18% (p = 0.007). The proportion of OCS-dependent patients still requiring daily OCS for asthma at 2 years was 41%, 50%, 33% (p=0.53). The mean ACQ6 at 2 years was 1.3, 1.9, 1.7 whilst the proportion of patients achieving an ACQ-6 <1.5 at 2 years was 66%, 42%, 46% (p=0.03). Additional outcomes for patients who remained on treatment at 1 and 2 years are shown in table 1.

Conclusions Patients with SEA and co-morbid obesity report a higher disease burden at baseline which may in part relate to the reduced likelihood of achieving a more complete cessation of asthma-related symptoms and exacerbations with benralizumab. However, further research is needed to understand whether additional obesity-related inflammatory pathways contribute to this residual disease burden in some patients.

Please refer to page A216 for declarations of interest related to this abstract.

P208 ABSTRACT WITHDRAWN

P209 A TOTAL DIET REPLACEMENT WEIGHT MANAGEMENT PROGRAMME FOR DIFFICULT-TO-TREAT ASTHMA ASSOCIATED WITH OBESITY: A RANDOMISED CONTROLLED TRIAL

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10.1136/thorax-2022-BTSabstracts.342

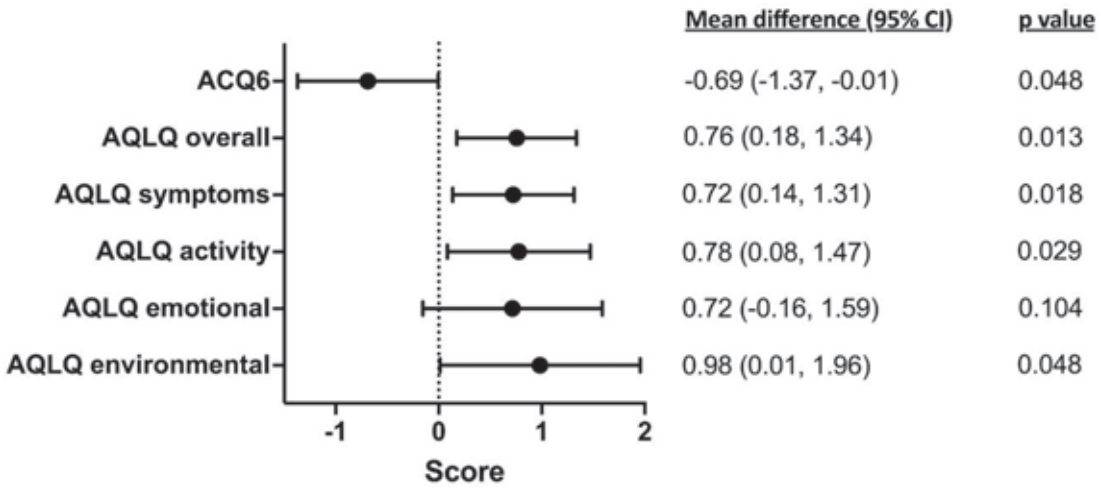
Introduction Obesity is often linked with difficult-to-treat asthma and increased morbidity and mortality. Asthma and obesity are on the rise posing a challenge to asthma specialists. The Counterweight-Plus weight management programme (CWP) is a dietitian-supported, structured diet programme with an evidence base in weight management and type 2 diabetes (Lean *et al*. Lancet, Feb 2018; doi: 10.1016/S0140-6736(17)33102–1). Its effects have not been assessed in patients with asthma and obesity.

Objective To evaluate the effects of CWP against usual care (UC) on asthma-related outcomes in a single-centre, randomised, controlled trial in patients with difficult-to-treat asthma and obesity.

Methods We randomised (1:1 CWP:UC) adults with difficult-to-treat asthma and body mass index (BMI) $\geq$30kg/m^2. CWP: 12-week total diet replacement phase (850kcal/day low-energy formula); food reintroduction and weight loss maintenance up to week 52. Primary outcome: change in asthma control questionnaire (ACQ6) score over 16 weeks between groups, adjusting for baseline using ANCOVA (intention-to-treat analysis). Secondary outcome: change in asthma quality of life questionnaire (AQLQ) score.

Results 35 participants were randomised (36 screened) and 33 attended 16-week follow-up (17 CWP, 16 UC). Mean (95% CI) ACQ6 at baseline was 2.8 (2.2, 3.3) in CWP and 2.7 (2.2, 3.3) in UC. Weight-loss was greater with CWP than UC (mean difference -12.3kg; 95%CI -17.1, -7.5; p<0.001). Over 16 weeks, mean change in ACQ6 was –0.4 (-1.0, 0.1) for CWP and 0.2 (-0.2, 0.6) for UC with a mean difference of –0.69 (-1.37, -0.01; p=0.048) between groups. A greater proportion of participants had $\geq$0.5 improvement in ACQ6 (minimal clinically important difference) with CWP than UC (53% vs 19%; p=0.041; NNT=3 (95%CI 1.5, 26.9)). AQLQ improved more with CWP than UC (mean difference 0.76; 95%CI 0.18, 1.34; p=0.013), with similar trends observed in AQLQ symptom, activity and environmental domains (see figure 1).

Conclusions Weight-loss, with a structured low-energy formula diet replacement programme, yields significant improvements in asthma control and quality of life over 16 weeks, compared to usual care, in adults with difficult-to-treat asthma and obesity. The Counterweight-Plus weight management programme may be a generalisable treatment option for this challenging phenotype. Longer-term outcomes continue to be studied.



Abstract P209 Figure 1 Mean differences in asthma control questionnaire (ACQ6) and asthma quality of life questionnaire (AQLQ) scores between Counterweight-Plus and usual care over 16-weeks using ANCOVA adjusting for baseline scores

P210 THE IMPACT OF INTRODUCING ANTI-IL-5/5R BIOLOGIC THERAPIES ON WEIGHT AND BMI IN PREDNISOLONE-DEPENDENT PATIENTS WITH SEVERE ASTHMA

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10.1136/thorax-2022-BTSabstracts.343

Introduction Weight gain is a well-recognised adverse effect of oral corticosteroid (OCS) therapy. Obesity is a frequently seen co-morbidity in asthma and has been shown to inadvertently affect patient reported outcomes[1]. Biologic therapies for severe eosinophilic asthma (SEA) reduce exposure to OCS but there is no long-term data on whether these therapies lead to a significant change in weight.

Method We retrospectively identified patients with SEA who had received either mepolizumab or benralizumab for a minimum of 3 years and who were on maintenance (m)OCS at baseline. Body mass index (BMI), weight and mOCS dose at the start of treatment and at 3-year review were recorded. A clinically significant change in weight was defined as a change of ±5% body weight.

Results Sixty-two patients (62% female, mean [SD] age 54.3 [12.9]) were identified (n=40, mepolizumab; n=22, benralizumab). The mean follow-up duration was 50.5 months. At baseline, mean BMI was 30.7 kg/m^2 (6.1) and the median (IQR) daily mOCS dose 10 mg (5–15).

At follow up, 85.5% of patients were no longer taking mOCS; of those who continued, 2 did so for asthma control and 7 for adrenal insufficiency. The median OCS dose reduced to 0 mg (0–0). The mean change in body weight across the cohort was -1.3% (10.2) and -3.1% (9.5) in the obese subgroup. Twenty patients (32.3%) achieved significant weight loss (-11.9% [6.3]), 15/62 (24.2%) gained significant weight (+11.8% [6.0] and 27/62 (43.5%) had no significant change (-0.73% [2.93]). Baseline BMI, age, gender, mOCS dose or biologic agent did not predict which patients gained or lost weight.

Conclusion Treatment with anti-IL-5/5R biologics did not lead to a significant change in weight in patients with SEA over a 3 year period. Despite significant reductions in OCS exposure, only a third of patients had a clinically meaningful reduction in weight, with almost a quarter of patients increasing their weight significantly. Obese patients should be offered additional support to lose weight.

REFERENCES

1. Peters U, Dixon AE, Forno E. Obesity and asthma. *J Allergy Clin Immunol*. 2018 Apr;**141**(4):1169–1179.

P211 ASTHMA IN PREGNANCY: HOW ARE WE DOING? A SERVICE EVALUATION ACROSS GENERAL ASTHMA AND SEVERE ASTHMA CLINICS IN A TERTIARY HOSPITAL

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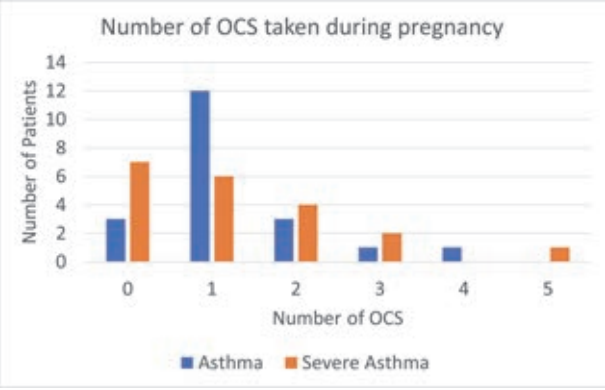
10.1136/thorax-2022-BTSabstracts.344

Introduction Asthma is common and can complicate pregnancy. Uncontrolled asthma is associated with adverse outcomes for both mother and baby. National and regional guidelines advocate good asthma control through continuous monitoring, patient education and stepwise approach to treatment.

Objectives To assess if the Greater Manchester and Eastern Cheshire (GMEC) guidelines are being followed and identify where care can improve.

Methods A prospective service evaluation of 40 women attending Wythenshawe hospital's general asthma clinic (March 2019 – March 2022) and severe asthma clinic (November 2020 – March 2022)

Results Patients attending the general asthma clinic were commonly referred through A&E after an exacerbation which required oral corticosteroids (OCS) figure 1. These patients often required escalation of treatment, multiple courses of OCS and more frequent follow-up. In contrast, patients attending the severe asthma clinic were already known to the clinic prior to pregnancy, required fewer courses of OCS as well as – figure 1; fewer clinic appointments during their pregnancy. Women in the severe asthma clinic on new biologic treatment still required OCS. Overall, adherence to medication was good, however, novel asthma treatments on occasion were stopped by primary care. Furthermore, conversations regarding patients' asthma triggers, flu vaccination and personal asthma action plan were poorly executed, and monitoring wasn't comprehensive. This may have been influenced by a high incidence of telephone consultations, COVID-19 or these conversations occurring verbally. A well-known risk of uncontrolled asthma is delivering via caesarean section, we recorded that many patients in the severe cohort had elective c-sections, however in the general asthma cohort over 50% of our patients required an emergency c-section.



Abstract P211 Figure 1 Bar graph representing the total number of Oral Corticosteroids (OCS) patients had during pregnancy

Discussion The high number of emergency c-sections highlights the need to work closer with obstetrics in those patients with asthma, as well as the need for further research to support our findings. GMEC guidelines were poorly adhered to, due to their nonspecific nature. Consequently, a facilitated template is required to provide a simple reminder of the key discussion points and a means to record the important data collected, to optimise asthma care.

P212 ABSTRACT WITHDRAWN

P213 REAL-WORLD EFFECTIVENESS OF BENRALIZUMAB IN PATIENTS WITH EOSINOPHILIC GRANULOMATOSIS WITH POLYANGIITIS (EGPA)

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10.1136/thorax-2022-BTSabstracts.345

Introduction Eosinophilic granulomatosis with polyangiitis (EGPA) is a multi-system disorder characterised by asthma, eosinophilia, and vasculitis. Treatment options include oral corticosteroids (OCS) and other immunosuppressants. Recently, the anti-IL5 biologic mepolizumab has demonstrated efficacy in a phase 3 study.[1] However, the anti-IL5R biologic benralizumab offers more complete tissue eosinophil depletion and is therefore of considerable interest. Here we report the real-world effectiveness of benralizumab treatment in patients with EGPA.

Methods We retrospectively analysed patients with EGPA who had completed at least 24 weeks treatment with benralizumab in our tertiary multidisciplinary EGPA clinic. All patients had severe eosinophilic asthma (SEA) and met NICE eligibility criteria for benralizumab under this. Clinical data were collected at baseline and over the first year of treatment. Remission was defined as a Birmingham Vasculitis Activity Score of 0 and receipt of OCS ≤4 mg/day or for adrenal insufficiency. An EGPA relapse was defined as either: evidence of new vasculitis-related symptoms excluding asthma exacerbations (AE), or including AE.

Results Fifty-nine patients were included: 8 completed 24 weeks of treatment with 51 completing 48 weeks. 14/59 (24%) were ANCA positive. 49/59 (83%) were taking OCS at baseline with a median (range) daily dose 10.0 mg (2–40). At 24 weeks, 61% of patients had stopped their OCS for EGPA and SEA. This increased to 74% by 48 weeks. In total, remission status was achieved in 33/51 (64.7%) of patients at 48 weeks with no significant differences based on ANCA status. At 48 weeks, 47/51 (92.2%) remained relapse-free excluding AE in the definition. This dropped to 32/51 (62.7%) if AE were included, with a significant difference according to ANCA status for the latter classification only (p=0.036), figure 1.

Conclusion In the largest case series of patients with SEA and co-morbid EGPA treated with benralizumab to date, we observed a significant steroid-sparing effect with almost two-thirds of patients achieving remission by 48 weeks. Pulmonary relapses appeared more common in ANCA-positive patients suggesting non-eosinophil mediated inflammation may be more important in this phenotype.

REFERENCES

1. Wechsler, M.E., *et al*. Mepolizumab or Placebo for Eosinophilic Granulomatosis with Polyangiitis. *N Engl J Med*, 2017; **376**(20): p. 1921–1932.

P214 ORAL CORTICOSTEROID-RELATED HEALTHCARE RESOURCE UTILISATION IN PATIENTS WITH COPD

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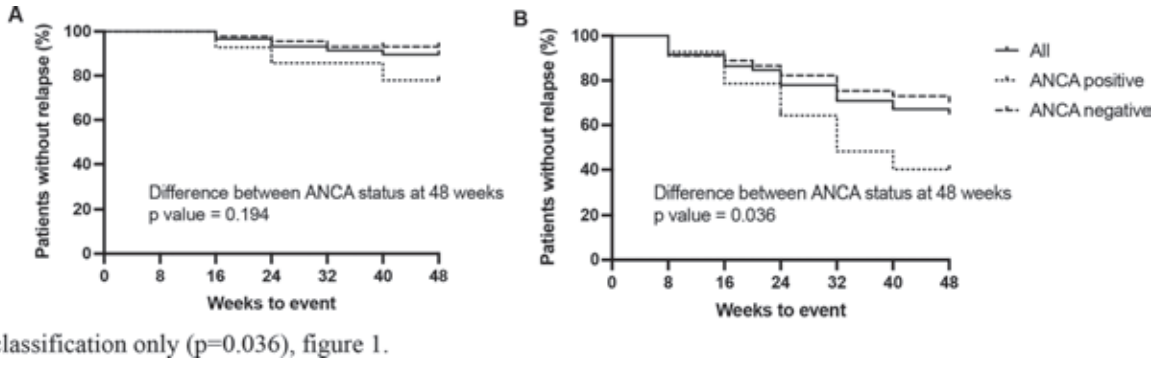
10.1136/thorax-2022-BTSabstracts.346

Introduction and Objectives Oral corticosteroids (OCS) are sometimes used to manage exacerbations in patients with chronic obstructive pulmonary disease (COPD). Evidence suggests chronic OCS use is related to adverse outcomes, which may be associated with additional healthcare resource utilisation (HCRU) and costs. The objective of this study was to compare HCRU in patients who ever or never used OCS (OCS vs non-OCS cohorts) and to examine associations between cumulative OCS exposure and HCRU/costs.

Methods This matched historical observational cohort study used the UK Clinical Practice Research Datalink (1987–2019). Patients with a COPD diagnosis on/after 1 April 2003 and Hospital Episode Statistics linkage were included. Attendances for emergency room, specialist or primary care (PC) outpatient and inpatient visits were analysed. Costs were estimated using Health and Social Care 2019 and NHS Reference Costs 2019–2020 reports.

Results Compared with the non-OCS cohort, the OCS cohort had higher annualised total attendances and costs (table 1). Compared with patients with cumulative OCS doses <0.5 g, patients with higher cumulative doses had higher costs (incidence rate ratios; 95% CI) starting at 0.5–<1.0 g for specialist consultations (1.91; 1.89, 1.93), inpatient non-elective short stays (1.10; 1.09, 1.12) and long stays (1.039; 1.036, 1.042) and PC consultations (1.274; 1.267, 1.281).



classification only (p=0.036), figure 1.

Abstract P213 Figure 1 Percentage of patients without EGPA relapse according to relapse definition and ANCA status. Vasculitic relapse (A), Vasculitic and asthma relapse (B)

Abstract P214 Table 1 Annualised attendance and costs[a,b]

Attendance type	Total attendance per 1000 patient-years (95% CI)		Total all-cause costs (£) per 1000 patient-years (95% CI)		Rate ratio[h] (95% CI), OCS vs non-OCS
	OCS	non-OCS	OCS	non-OCS	
Inpatient attendances					
Elective day case[c,d]	272.6 (270.6, 274.6)	229.0 (227.2, 230.8)	204992.7 (203493.0, 206500.6)	172212.7 (170849.1, 173584.4)	1.19 (1.18, 1.20)
Elective inpatient case[c,e]	59.9 (58.9, 59.9)	48.5 (47.6, 49.3)	224717.7 (221216.8, 224695.0)	181994.7 (178870.0, 185160.3)	1.235 (1.227, 1.242)
Non-elective short stay[f]	102.2 (100.9, 101.8)	70.2 (69.2, 71.3)	64468.9 (63699.4, 64226.3)	44325.1 (43692.4, 44964.7)	1.45 (1.43, 1.47)
Non-elective long stay[g]	279.9 (277.9, 282.0)	180.3 (178.7, 181.9)	854615.0 (848445.1, 860818.5)	550332.7 (545422.5, 555276.1)	1.55 (1.54, 1.56)
Emergency room	211.7 (210.0, 213.5)	147.4 (146.0, 148.9)	38532.0 (38212.2, 38853.8)	26833.5 (26568.8, 27100.1)	1.44 (1.41, 1.46)
Specialist consultation	998.4 (994.5, 1002.2)	373.1 (370.7, 375.4)	134777.5 (134261.9, 135294.7)	50362.9 (50050.3, 50676.9)	2.68 (2.65, 2.70)
PC consultation	8727.2 (8715.9, 8738.6)	5750.6 (5741.5, 5759.8)	340362.3 (339921.6, 340803.5)	224275.0 (223920.0, 224630.3)	1.52 (1.51, 1.53)

[a]Based on n=44,182 patients with COPD and HES linkage. Overall, 106,775 patients with COPD received OCS; 53,299 pairs were matched in the OCS and non-OCS cohorts (mean [SD] age, 64.6 [12.5] years; 59.8% male; median follow-up time, 7.8 years).
[b]Individual matching was performed between the OCS cohort (index date: first COPD-related OCS prescription) and non-OCS cohort (index date: nearest primary care visit to an OCS patient) based on index date, age at index date, sex, HES linkage availability and smoking status at index date.
[c]Elective admission decisions to admit could be separated in time from the actual admission; excludes patients transferred from another hospital provider.
[d]Length of stay, 0 days.
[e]Length of stay, ≥1 day.
[f]Length of stay, ≤1 day.
[g]Length of stay, ≥2 days.
[h]Rate ratios for costs and attendances are similar because costs are derived from attendance.
CI, confidence interval; COPD, chronic obstructive pulmonary disease; HES, Hospital Episode Statistics; OCS, oral corticosteroids; PC, primary care; SD, standard deviation.

Conclusions OCS use is associated with increased HCRU and costs, with a positive dose-response relationship.

Please refer to page A216 for declarations of interest related to this abstract.

P215 A SYSTEMATIC LITERATURE REVIEW OF FACTORS RELATED TO MORTALITY IN PATIENTS WITH COPD

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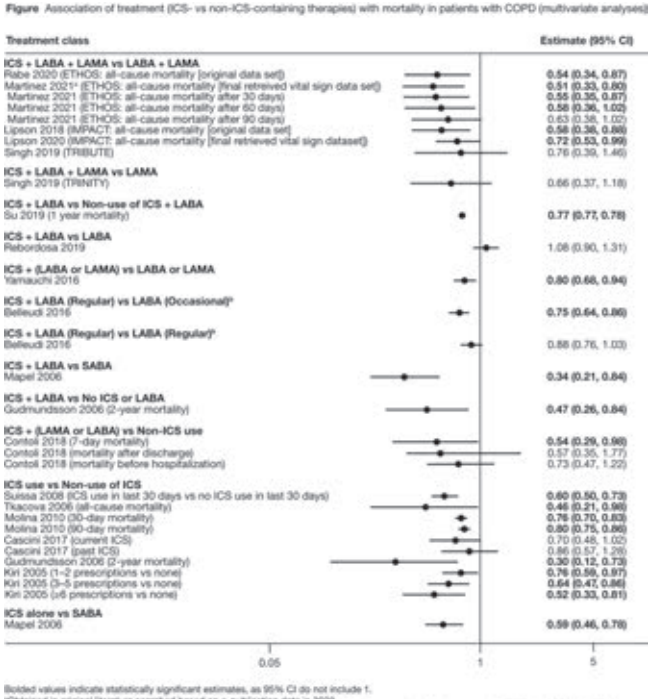
10.1136/thorax-2022-BTSabstracts.347

Introduction and Objectives Chronic obstructive pulmonary disease (COPD) is a leading cause of mortality worldwide, but the strongest predictors of mortality in patients with COPD are unclear. The objective of this systematic literature review was to assess associations of treatment and comorbidities with mortality in patients with COPD.

Methods A systematic literature review spanning over 15 years (January 2005–December 2020; English-language only) was conducted using Embase, Cochrane and PubMed to examine how 1) inhaled corticosteroid (ICS)- versus non-ICS-containing therapies (including no therapy) and 2) comorbidities impact mortality in patients with COPD. References providing univariate and multivariate analyses were assessed separately.

Results Of 643 identified COPD treatment references, 24 references were included and 18 references (16 studies) had multivariate analyses. Mortality risk was lower with ICS- versus non-ICS-containing therapy across most references (figure 1); 14 references (12 studies) reported statistically reduced risk. For comorbidities, 54 of 6952 identified references were included. Cardiovascular diseases (CVDs) were most frequently observed, with heart failure (estimate [95% confidence interval] range: 1.10 [1.03–1.17] to 2.72 [1.67–4.44]) and arrhythmia (1.30 [1.10–1.60] to 1.56 [1.25–1.96]) independently predicting increased mortality.



Abstract P215 Figure 1

Conclusions In COPD, reduced mortality risk was observed with ICS- versus non-ICS-containing therapies. CVD, including heart failure and arrhythmia, was associated with increased mortality risk.

Please refer to page A216 for declarations of interest related to this abstract.

P216 EFFECT OF STRUCTURED CARDIAC ASSESSMENT ON SURVIVAL WITHOUT READMISSION AFTER HOSPITALISATION WITH EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (COPD)

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10.1136/thorax-2022-BTSabstracts.348

Introduction In COPD patients heart disease is often underdiagnosed and undertreated. The post-exacerbation period is hazardous, with adverse cardiac events common. A pilot randomised controlled trial of a structured cardiac assessment in patients hospitalised with COPD exacerbation (ECOPD) was undertaken. We report 90-day readmission rates according to whether heart disease was diagnosed and/or treated correctly.

Methods 101 patients hospitalised with ECOPD were randomised 1:1 to receive usual care ± a structured cardiac assessment (SCA) including echocardiogram and CT coronary artery calcium score (CACS). Patients were categorised at the time of hospital discharge:

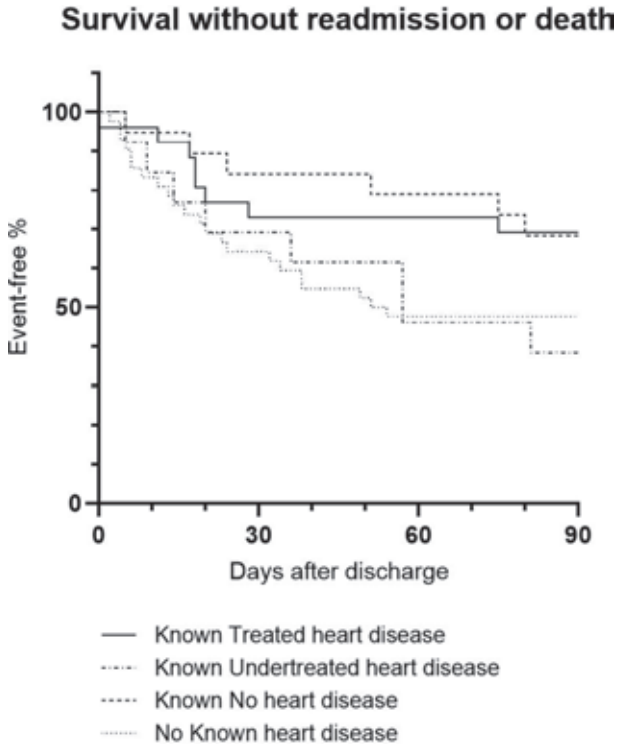
1) *Known Treated heart disease*, if any of myocardial infarction, coronary artery disease requiring intervention, left ventricular ejection fraction < 50% or CACS > 100 known and treated according to pre-specified guideline-informed criteria

2) *Known Undertreated heart disease*, if any of these conditions present but not treated appropriately

3) *Known No heart disease*, if no diagnosis made by SCA

4) *No Known heart disease*, if no diagnosis made but SCA not performed.

Time to first all-cause readmission or death without readmission, censored at 90 days, was recorded.



Abstract P216 Figure 1

Results 100 patients survived to discharge. Mean age 72, median length of stay 5.5 days. Within 90 days, 7/100 patients died. 34/100 experienced readmission.

Survival curves separate, showing a trend for patients with Known No heart disease and Known Treated heart disease to be more likely to remain event-free than patients with Known Undertreated heart disease and those whose heart disease status was not intensively investigated. (p=0.119, log-rank test).

27 patients had Known Treated heart disease, with 24 having undergone SCA. 14 (64%) of these achieved Known Treated status via SCA.

Conclusions This pilot study is limited by small numbers but suggests that better diagnosis and appropriate treatment may preserve readmission-free survival at the same level as for patients known to be heart disease-free.

A structured cardiac assessment shows promise as an intervention to reduce the burden of death and readmission following hospitalisation with ECOPD. Assessment of the effect of SCA on days alive outside hospital at one year is planned, to inform the design of a definitive randomised controlled trial.

P217 EXPERIENCE WITH TUMOUR NECROSIS FACTOR-ALPHA INHIBITORS FOR THE TREATMENT OF CARDIAC SARCOIDOSIS IN A U.K. MEDICAL CENTRE

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10.1136/thorax-2022-BTSabstracts.349

Introduction and Objectives Cardiac sarcoidosis (CS) is associated with significant morbidity and mortality. First and second line management is usually with steroids and immunosuppressive medications. In the United Kingdom, tumour necrosis factor alpha inhibitors, including infliximab, are currently not licensed for treatment of cardiac sarcoidosis because of apprehension around worsening heart failure. Nonetheless, they have been used as salvage therapies in patients with refractory cardiac sarcoidosis.

Methods We conducted an observational study of all cardiac sarcoidosis patients treated with infliximab in a tertiary centre, with specialist cardiac sarcoidosis service, from January 2017 to April 2022.

Results Out of 1348 CS patients in our registry, five male patients diagnosed with pulmonary and cardiac sarcoidosis were treated with infliximab(3–5 mg/kg) due to refractory cardiac disease despite conventional treatment. One of the patients had a relapse (ventricular arrhythmia and FDG-uptake) seven months after stopping infliximab and was subsequently restarted on infliximab. The mean(±SD) age at CS diagnosis was 45.8(±4.4) years and mean duration between CS diagnosis and starting infliximab was 26.42 (±14.77) months. Infliximab was commenced due to persistent inflammation on FDG-PET scan despite being on at least two agents (prednisolone and methotrexate ± hydroxychloroquine) in 4 cases and prednisolone alone (intolerance to methotrexate) in one case. At baseline, 4 patients presented with ventricular arrhythmias and 2 with heart failure. After a mean (±SD) follow up of 15.2(±6.8) months, 83.3% (n=5) of the patients had decreased myocardial uptake on PET (1 was awaiting a scan), mean left ventricular (LV) ejection fraction (n=4) improved from 51% (±5.61) to 59.5% (±5.5) and mean

Abstract P217 Table 1 Case series outcomes table

	Case no.	IFX dose& regime	Follow-up duration (months)	Change in prednisolone dose		Change in FDG-PET uptake		Change in LV systolic function		Change in arrythmia burden		Adverse events		Composite Endpoint			
				Dose pre-IFX(mg)	Dose post-IFX(mg)	Pre-IFX	Post-IFX	LVEF pre-IFX (%)	LVEF post-IFX(%)	Pre-IFX	Post-IFX	Infections	Heart failure	VT/VF (requiring device)	All-cause mortality	Aborted SCD (device)	Cardiac Transplant
	Case 1	IFX 3 mg/kg every 8 weeks (break after 10th dose due to covid pandemic; restarted 3 months later)	29	20	15	Active CS (SUVmax 11.1)	Improvement (SUVmax3.5)	58	59	N/A	N/A	0	0	0	0	0	0
	Case 2	IFX 3 mg/kg every 8 weeks. Stopped after 15.6 months due to resolution	15.6	10	10	Active CS (SUVmax 10.2)	Improvement (SUVmax 2.65)	55	62	VA	0	1 (chest infection)	0	0	0	0	0
	Case 2 Relapse (7 months after stopping IFX) due to VT and FDG uptake	IFX 3 mg/kg every 8 weeks	12	10	10	Active CS (SUVmax 3.3)	Improvement (no uptake)	N/A	50	VA	0	0	Mild LVSD	0	0	0	0
	Case 3	IFX 3 mg/kg 0 weeks and 4 weeks; missed 8 weeks' appointment due to COVID-19	10	20	20	Active CS (SUVmax 11.3)	N/A	55	N/A	0	N/A	1 (Covid-19)	0	0	0	0	0
	Case 4	IFX 3 mg/kg at 0, 2 and 8 weeks afterwards	16	20	10	Active CS (SUVmax 13)	Improved (SUVmax 3.4)	45	66	VA	N/A	0	0	0	1 (PFO and shunt/ complications)	0	0
	Case 5	IFX 3 mg/kg 0, 2, 6 and every 8 weeks	8.5	30	15	Active CS (SUVmax 11.3)	Improved (no uptake)	46	51	VA	0	0	0	0	0	0	0
Totals	**6**	IFX 3 mg/kg	Mean=15.2	Mean=18.3	Mean=13.3	All had active CS	5 improved; 1 data not available	Mean=51.8	Mean=57.6	4 had VAs; 1 data not available	None had VA; 3 had data not available	2	1	0	1	0	0

CS = cardiac sarcoidosis; FDG-PET =fluorodeoxyglucose positron emission tomography;IFX = Infliximab; LV = left ventricular; LVEF = left ventricular ejection fraction; LVSD = left ventricular systolic dysfunction; N/A = data not available; PFO= patent foramen ovale; SCD = sudden cardiac death; VA = ventricular arrhythmia; VF = ventricular fibrillation; VT = ventricular tachycardia

(±SD) prednisolone dose decreased from 18.33 mg (±6.87) to 13.33 mg (±3.73). One patient died following complications of patent foramen ovale repair. There were no new ventricular arrhythmias, aborted sudden cardiac death episodes or need for a cardiac transplant. There were two new cases of infection (pneumonia and COVID-19 pneumonitis) during follow-up.

Conclusions Infliximab can play a vital role in stabilising refractory cardiac sarcoidosis by stemming clinical deterioration, arrhythmia burden and decreasing the dose of maintenance steroids used. However, there is a risk of infections and possible relapse on ceasing infliximab.

'Endgame' – Long term impacts of COVID-19

P218 THE NEEDS OF LONG COVID SERVICE USERS IN HAMPSHIRE AND ISLE OF WIGHT ICS: A PROSPECTIVE MIXED METHODS EVALUATION

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10.1136/thorax-2022-BTSabstracts.350

Introduction and Objectives To better understand the support needs of patients with Long Covid an evaluation of the Long Covid service in the Hampshire and Isle of Wight Integrated Care System (ICS) was undertaken to inform service improvement.

Methods This prospective mixed methods evaluation conducted between September and October 2021 included an ICS-wide online survey, as well as interviews and focus groups with Long COVID service users.

Results Of 1005 service users approached, 139 (14%) completed the survey. Three focus groups (which included 11 participants) and 17 interviews were conducted. A fifth of service users who responded to the survey either did not feel empowered to identify support or felt that support was not detectable or available. Just over half of service users were reliant on family and friends for support (52%) and a reasonable proportion sought private healthcare support (13%). A wide range of needs and issues were identified from the survey, interviews and focus groups, with fatigue and breathlessness the most commonly reported symptoms. The varied types of support reported are detailed in table 1.

There was a particular desire for peer-led and professional-led support groups, to share concerns, ideas, and learning – particularly as clinical evidence of the condition is continually evolving. Four areas were highlighted for consideration when designing Long COVID services: 1) optimising information sharing between referral and assessment, to make the most of any delays due to capacity pressures; 2) offering an accessible model of care, taking a hybrid face-to-face and virtual approach and periodic 'check-ins' for patients affected over the long term; 3) undertaking comprehensive, holistic assessments which lead to individually tailored management plans; 4) being aware of deprivation and other factors (such as digital literacy) which could influence decision-making to better offer individualised management.

A model of care for delivering Long COVID support services was recommended to the ICS based upon these findings.

Abstract P218 Table 1 The types of support people 1a) received or 1b) self-sought, 2) felt were essential, and 3) felt were desirable from the surveys, interviews, and focus groups

Type of support*	Examples	Data source (I & FG: interviews and focus groups; S: survey)
1. a) Support people received	**Referred for or recommended by healthcare professionals:**	
	• 'Your Covid recovery' and 'Living with' app: https://www.yourcovidrecovery.nhs.uk/ https://www.livingwith.health/products/covid-recovery/	I & FG; S
	• Steps to wellbeing service https://www.steps2wellbeing.co.uk/	S
	• Local authority helpline	S
	• Mental health (virtual/telephone/app) programmes and/or counselling (virtual and face-to-face) (iTalk; Talking Change; Talking Therapies; private counselling [unknown providers] and psychotherapy [including Physiotherapy mental health unit and Primary Care Mental Health team])	I & FG; S
	• Medical reviews (general practitioner; respiratory; cardiology; neurological [private and NHS]; gastroenterology; rheumatology [private]; dermatology; chronic fatigue)	I & FG; S
	• Non-medical professional reviews (physiotherapy; occupational therapy; social services [including reablement]; dietetics; speech and language therapy)	I & FG; S
	• Specialist Long COVID service referrals (Hobbs Rehabilitation Clinic [private] and NHS)	I & FG
	• Sleepio app (insomnia) https://www.sleepio.com/#howSleepioWorks	I & FG
	• Fatigue management advice (pacing; boom-bust cycle)	I & FG
	• Co-morbid condition support groups (stroke – unnamed group)	I & FG
	• Occupational health services	I & FG; S
	• Human Resources support (e.g., keeping workplace updated and workplace rehabilitation support)	S
	• Research projects:	S
	Portsmouth Long COVID Study	
	Coverscan research project including webinars: https://perspectum.com/news/perspectum-launches-the-first-covid-19-recovery-study	

1. b) Support people self-sought	**Self-sought and available:**	
	• Personal training/physiotherapy/exercising (unnamed sources)	I & FG; S
	• Restorative yoga (unnamed sources)	I & FG
	• Walking groups (unnamed sources)	I & FG
	• Walking App (unnamed)	S
	• Swimming/aqua aerobics (unnamed sources)	I & FG
	• Chiropody (unnamed source)	S
	• Massage	S
	• Counselling (private)	I & FG; S
	• Social media support groups and advice forums (e.g., Facebook Long COVID Support Forum; Facebook group for doctors with Long COVID [unnamed]; Long COVID Instagram pages [unnamed]) 'AbSent': https://www.facebook.com/AbScent.org/ https://www.facebook.com/groups/longcovid/	I & FG; S
	• ShutEye app (sleep quality monitoring) https://www.shuteye.ai/	I & FG
	• ZOE COVID app (symptom monitoring) https://covid.joinzoe.com/about	I & FG; S
	• Gupta programme https://www.guptaprogram.com/	I & FG; S
	• YouTube and other online Long COVID bloggers and podcasters (some unnamed sources) GezMedinger: https://www.youtube.com/channel/UCln_SCEd4JiGkHIUZd1VlXw	I & FG; S
	• TV documentaries (unnamed source)	S
	• Online/virtual exercise and stretching programmes (unnamed sources)	I & FG
	• Support groups (for both the person living with Long COVID and their direct family members) https://www.vosuk.org/about-us/	I & FG
	• Chronic fatigue syndrome and fibromyalgia information and advice (for both the person living with fatigue/post-exertional malaise and their family and friends)	I & FG
	• Spiritual guidance	S
	• Relaxation techniques (e.g., Yoga, Tai Chi, Mindfulness)	S
	• Breathing classes	S
	• Long Covid and ME/CFS Holistic Healing Summit 2021	S
	• Complementary therapies and remedies (herbal teas; oral tablets; vitamins; B12 injections; reflexology; acupuncture)	I & FG; S
	• Voluntary services Solent MS therapy centre: https://solentmstc.org.uk/ Just About You Home Help (Age UK, Isle of Wight): https://www.ageuk.org.uk/isleofwight/our-services/just-about-you-home-help/	S
2) Support people felt were essential	• Peer-support	I & FG
	• Feedback from symptom diaries to better self-manage/understand triggers	I & FG
	• Periodic follow-up with Long COVID specialists	I & FG
	• Long COVID specific education/advice for:	I & FG
	▪ Reduced ability to conduct activities of daily living	
	▪ Exercise/physical activity/post-exertional malaise	
	▪ Fatigue management (including work activities/tasks)	
	▪ Navigating and applying for financial support available (inc. disability badges)	
	▪ Non-Long COVID specialist healthcare professionals	
	▪ Employers and colleagues	
	▪ Family and friends	
	▪ Stress management (and to deal with underlying stressors)	
	▪ Guilt management (and to deal with the underlying reasons for guilt)	
	▪ Grief management (and to deal with underlying reasons for grief)	
	▪ PTSD/fear management (and to deal with underlying reasons for PTSD)	
	• Dealing with loneliness/social isolation	I & FG
	• Wider connections with voluntary sector (e.g., Mind)	I &FG; S
3) Support people felt were desirable	• Education/resources for community managers and admins for online or social media peer support groups	I & FG
	• Identifying/lobbying for ongoing local financial support like a Furlough scheme, but for those with Long COVID	I & FG

**This table reports the types of support reported by all participants, even if only reported by one participant, therefore this table is a representation of the collective experiences and may not be reflective of each individual participants experiences; this table is not in order of perceived level of importance for participants or in chronological order according to number of times reported; this table merges support offering and does not specifically distinguish support according formal NHS healthcare services, private healthcare, Human Resource services and voluntary sector support offerings, although this is included when known.*

Conclusions These findings corroborated recently published NICE recommendations for managing Long COVID and therefore provide further justification for rapid uptake of the NICE recommendations. These findings may also offer an adaptable model to effectively operationalise NICE recommendations going forward.

P219 EVALUATION OF THE UTILITY OF THE BREATHING PATTERN ASSESSMENT TOOL IN A POST-COVID SYNDROME MDT ASSESSMENT CLINIC

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10.1136/thorax-2022-BTSabstracts.351

Introduction Breathing pattern dysfunction (BPD) describes when an individuals breathing is disconnected from their respiratory or metabolic requirements. BPD is a recognised reason for sustained breathlessness and is acknowledged as important in post-COVID syndrome[1] (PCS). The Breathing Pattern Assessment Tool (BPAT) is used to assess and screen for BPD. A score of $\geq$4 being a trigger for potential onward referral to a specialist physiotherapist for assessment[2].

Objectives

1. Evaluate the utility of the BPAT in a PCS assessment clinic
2. Compare BPAT scores with other outcome measures of breathlessness, BPD and QoL.

Methods A convenience sample of consecutive patients attending PCS assessment clinic between October 2021 and May 2022 was used. Patients had sustained symptoms 12-weeks following initial COVID-19 infection, not explained by an alternative diagnosis. Patients completed BPAT, Nijmegen Questionnaire (NQ), EQ5D, PHQ, GAD7 and symptom-based numerical rating scales (NRS). The BPAT was carried out by the specialist physiotherapists and occupational therapists. Results are described as mean (standard deviation) and frequencies. Correlations between measures were completed using Pearson's correlation coefficient.

Results Seventy-three patients were included (table 1). Twenty-eight (38%) had a BPAT>4, 15(54%) of which were referred on to a specialist respiratory physiotherapy service for specific BPD treatment. The BPAT showed moderate correlation with the NQ (r=0.303, p>0.001) and weak correlations with NRS for breathlessness (r=0.305, p>0.014), cough (r=0.265, p>0.034) and fatigue (r=0.254, p>0.043). The NQ correlated moderately with both the PHQ (r= 0.578, p>0.001) and GAD7 (r=0.485, p>0.001).

Abstract P219 Table 1 Patient demographics

Demographics	
Age	43.14 (13.21)
Gender	Male n=22, Female n=51
Ethnicity	
White	n=47
Black	n=12
Asian	n=7
Mixed	n=7
Outcome measures from post covid clinic	
BPAT	3.44 (3.02)
Nijmegen	27.82 (13.79)
EQ5D	12.48 (11.71)
Breathlessness NRS	4.17(2.39)
Cough NRS	2.31 (2.93)
Fatigue NRS	5.92 (2.41)
Pain NRS	3.57 (3.41)
Sleep NRS	4.74 (2.84)
1 minutes Sit to Stand	22.97 (11.47)
GAD7	5.72 (6.96)
PHQ9	5.97 (7.60)
BPAT >4	n=28 (38%)

Mean (standard deviation) unless otherwise stated; NRS: Numerical Rating Scale

Conclusion The BPAT Tool is a useful component of breathlessness assessment in the context of a PCS assessment clinic. It can provide a useful screening tool to identify patients with BPD who may benefit from specialist intervention with respiratory physiotherapists. Further understanding is required of how BPD responds to therapy and which type of treatments are important for this cohort.

REFERENCES

1. Hylton H, Long A, Francis C, *et al*. Real-world use of the Breathing Pattern Assessment Tool in assessment of breathlessness post-COVID-19. *Clin Med (Lond)*. 2022 Jun 27.
2. Todd S, Walsted ES, Grillo L *et al*. Novel assessment tool to detect BPD in patients with refractory asthma. *Respirology*. 2018;**23**(3).

P220 THORACIC MOBILISATION TECHNIQUES COMBINED WITH STRETCHES IMPROVES THORACIC COMPLIANCE AND RESPIRATORY RATE IN LONG COVID

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10.1136/thorax-2022-BTSabstracts.352

Background A number of patients with COVID-19 experience prolonged symptoms, known as 'Long COVID'. Fatigue, dyspnoea and chest wall tightness are common symptoms. These symptoms limit exercise tolerance and cause anxiety. They require thorough and costly investigations that do not always provide a pathway to traditional treatments. We present the impact of thoracic mobilisation, a combination of stretches and general advice on abdominal breathing on long COVID symptoms.

Methods Consecutive adult long COVID patients attending a general respiratory physiotherapy clinic with breathlessness and chest wall tightness were included. All patients were assessed for thoracic expansion using a cloth tape, measuring at T6 level from resting expiration to maximum inspiration. Resting respiratory rate (RR) was also measured as breaths per minute (bpm). All patients were then treated with a single application of thoracic mobilisation techniques (muscle energy techniques and/or rib stacking) and combinations of muscle stretches including serratus anterior, pectoralis minor and diaphragm stretches. General advice regarding abdominal breathing was also demonstrated.

Results Thirty four consecutive long COVID patients were included (mean age 52 y, 16□). Nine patients (26%) had pre-existing respiratory co-morbidities including asthma, COPD and sleep-disordered breathing and 12 patients (35%) had no past medical history. Prior to intervention mean thoracic expansion was 1.92 cm (±1.15) and mean RR was 17.6 bpm (±5.1). After intervention, thoracic expansion improved to 3.89 cm (±1.32) and RR to 11.2 bpm (±4.6). There were significant improvements in both thoracic expansion and respiratory rate (p<0.0001).

Conclusion Normal thoracic expansion is approximately 3.5 – 7 cm. This group of long COVID patients displayed suboptimal thoracic expansion at T6. This appears to have had an effect on resting respiratory rate. Post mobilisation both thoracic expansion and resting respiratory rate improved. This is likely due to improved thoracic compliance with mobilisations and stretches, reducing the work of breathing in these

patients. The addition of simple breathing advice, rather than longer breathing re-education sessions helped to further reduce and correct respiratory rate.

A single application of thoracic mobilisation techniques combined with stretches and simple advice on breathing can improve thoracic expansion and resting respiratory rate in long COVID.

P221 DOES VIRTUAL GROUP BREATHING PATTERN RETRAINING IMPROVE SYMPTOMS OF BREATHLESSNESS IN PATIENTS WITH BREATHING PATTERN DISORDER FOLLOWING COVID-19 INFECTION?

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10.1136/thorax-2022-BTSabstracts.353

British Thoracic Society (BTS) guidelines recommend assessment of breathing pattern disorder (BPD) for ongoing breathlessness post COVID-19 infection. 23.7% of patients attending post covid clinic were referred for breathing pattern retraining (BPR) (Heightman et al, 2021)[2] and evidence suggests that BPR can improve breathlessness arising from BPD (British Thoracic Guidance, 2020)[1]. Due to large referral numbers, limited specialist work force and increased waiting times following redeployment during the Covid pandemic, virtual group BPR treatment (VGT) was trialled as an alternative to one-to-one intervention.

Data were collected from patients referred for BPR following completion of post Covid-19 multidisciplinary clinic assessment. Breathlessness (Dyspnoea 12- D12), breathing pattern (Brompton Breathing Pattern Assessment Tool – BPAT) and fatigue (Fatigue Assessment Scale – FAS) were assessed by a specialist Physiotherapist on referral and completion of VGT. VGT consisted of 6, 1 hour, physiotherapist led sessions run fortnightly using a virtual platform. The programme included BPR at rest and on exertion, activity management, pacing advice, psychological health advice and relaxation. The interactive nature of the sessions also enabled facilitated peer support. Group size was 6–10 participants. A Wilcoxon Sign Rank test was used to compare pre and post treatment data.

- 32 patients enrolled, 26 completed the groups in full across 4 cohorts. 6 dropped out due to work or medical reasons.
- Complete data sets (n=18) were analysed (16 female, 2 male, median age= 46, mean 15 months post infection).
- VGT for 26 patients saved 52 hours of clinician time compared with usual, one-to-one intervention
- Improvement in BPAT, D12 and FAS were statistically significant (table 1)

Virtual group BPR treatment improved breathing pattern and breathlessness for patients within the post covid BPD. With social distancing regulations, VGT offers an effective alternative to face to face group treatment. This saved clinician time which could enable reduced wait times for treatment.

REFERENCES

1. British Thoracic Society. British thoracic society guidance on respiratory follow up of patients with a clinico-radiological diagnosis of COVID-19 pneumonia, 2020.
2. Heightman M, Prashar J, Hillman TE, *et al*. Post-COVID-19 assessment in a specialist clinical service: a 12-month, single-centre, prospective study in 1325 individuals. *BMJ Open Resp Res*, 2021;**8**.

P222 HEALTH-RELATED QUALITY OF LIFE SYMPTOM BURDEN AFTER COVID-19

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10.1136/thorax-2022-BTSabstracts.354

Introduction Patients hospitalised with COVID-19 are susceptible to chronic symptoms that can impact their health-related quality of life (HRQL). There is a limited understanding of the timeline of these symptoms or predictors of poorer HRQL outcomes in this patient cohort.

We compared HRQL symptoms; specifically mobility, breathlessness, and anxiety and depression in patients pre- and post- hospitalisation with COVID-19, to identify any predictors of persistent symptoms.

Method 350 patients admitted with COVID-19 to Royal Berkshire Hospital between March 2020 and September 2021 were included. Symptom data was captured using the validated EQ-5D-5L questionnaire with pre-COVID scores (week 0), recorded retrospectively at time of discharge or at 6 weeks, compared with scores at 6- and 12-weeks post hospital discharge. Statistical analyses used a one-tailed dependent t-test to compare scores between the time points and logistic

Abstract P221 Table 1

TABLE 1 – Outcome measures Pre and Post Virtual Group BPR Treatment

Outcome	Pre	Post	MCID	Mean difference	P value	95% CI (LL, UL)	Effect size (Hedges g)
BPAT	5.11	0.94	-	-4.50	<0.001	(-5.00, -3.50)	4
D-12	15.9	11.6	2.83	-5.05	0.008	(-10.00, -2.00)	0.54
FAS	32.7	28.3	4	-5.00	0.029	(-9.00, -0.50)	0.57

MCID (Minimally clinically important difference), CI (confidence interval), LL (lower limit), UL (upper limit)

regression examined the influence of comorbidity burden, ICU admission and length of stay.

Results Complete data was available for n=350 (61% male, mean age 57.8 years, SD 12.81). All patients required supplementary oxygen therapy with 79% requiring non-invasive ventilation and 16.62% mechanical ventilation. A statistically significant improvement was found in mobility, breathlessness and anxiety and depression scores at 12 weeks compared to 6 weeks. Overall HRQL scores were lower at week 0 than at week 12 (mean=5.6, SD 2.66 vs. mean=5.78, SD 5.46, p=0.0434), indicating a poorer HRQL outcome at 12 weeks compared to pre-COVID. Thus, the t-test result for the null hypothesis (HRQL at 0 weeks ≤HRQL at 12 weeks) was not statistically significant. There was no statistically significant difference on score outcomes of patients who required ICU compared to ward-based care. Pre-existing pulmonary disease was the only statistically significant risk factor identified to increase breathlessness scores at 12 weeks.

Conclusion Hospitalised patients who survived COVID-19 have impaired HRQL symptoms at 12 weeks compared to their pre-COVID baseline, though were on an improving trajectory. The data highlights that COVID-19 rehabilitation services may need to consider longer programme durations with appropriate psychological and physical support and targeting individuals with pre-existing pulmonary disease may help to address the symptom chronicity. Further research is required to tailor rehabilitation services.

P223 'I NEVER FELT LIKE THIS BEFORE' CLINICAL PRESENTATIONS OF PATIENTS REFERRED TO A TERTIARY AIRWAYS SERVICE FOLLOWING COVID-19 INFECTION

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10.1136/thorax-2022-BTSabstracts.355

Introduction Laryngeal dysfunction can present as a spectrum of clinical presentations, including Inducible laryngeal obstruction (ILO) and/or Chronic Cough (CC). ILO and CC can occur following an initial viral insult (Hull et al). In our Tertiary Airways service, we noted an increase in the numbers of referrals for patients with upper airway and laryngeal symptoms following infection with Covid-19.

Aims To describe the clinical presentations of patients referred to our service with laryngeal and upper airway symptoms following Covid-19 infection.

Methods Referrals received between April 2020 and May 2022 with suspected laryngeal dysfunction (ILO, CC or heightened laryngeal sensitivity) following Covid infection were reviewed. Electronic records were searched for referral information, demographic details, and assessment results.

Results 66 (18%) referrals out of 362 received within the time period were for symptoms following infection with Covid-19. 57 patients (86%) had no premorbid laryngeal difficulties before Covid-19 infection. Mean age was 53 (range 27–75), and 71% were female. 98% were of White British ethnicity.

Reason for referral was categorised into four types, with 34 patients having more than one reason cited.

To date, 38 of the 66 patients have had laryngoscopic assessment, which confirmed ILO for 26 patients. 21 of the 26 (80%) did not have ILO before Covid-19 infection. 13 of the 26 patients with ILO had suspected ILO on referral, whilst 13 did not. A binary logistic regression using referral reason as the predictor for ILO was non-significant, indicating that no specific referral reason predicted subsequent ILO diagnosis with laryngoscopy.

Conclusions In line with the literature, viral insult can lead to laryngeal hypersensitivity and hyperresponsiveness, which can manifest as a clinical spectrum, including ILO. New presentation with ILO was common in patients assessed for upper airway symptoms post-Covid-19. Correlation between referral reason and assessment outcome was poor, therefore assessment via laryngoscopy is essential to confirm diagnosis before intervention. Patients from minority ethnic groups were not referred to the service, despite being at higher risk of medical complications following Covid-19.

Abstract P223 Table 1

Referral reason/clinical symptom	Number	Percentage
Possible Inducible Laryngeal Obstruction (ILO)	35	47%
Breathlessness	32	49%
Cough	25	38%
Heightened laryngeal sensitivity (HLS)	18	27%

P224 USING THE SIT TO STAND TESTS TO ASSESS FUNCTIONAL STATUS AND OXYGEN DESATURATIONS FOLLOWING COVID-19

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10.1136/thorax-2022-BTSabstracts.356

Introduction COVID-19 leads to persistent symptoms and in some instances oxygen desaturation (>3%) (Greenhalgh et al, 2020). Field walking tests are used in respiratory diseases to assess oxygen desaturation and exercise capacity due to their high reliability (Hernandes et al, 2014). However, under COVID-19 restrictions these tests became problematic to perform due to limitations of space, time, and equipment. This project aims to investigate sit to stand test's (1STS & 5STS) in comparison to the Incremental shuttle walk test (ISWT) to

assess function and oxygen desaturation (SpO_2) in patients following COVID19 infection. In addition, to investigate if there is a difference in results to patients who received hospital care during the acute stage of COVID-19, to those who were managed in the community.

Methods Patients attending out-patient COVID-19 rehabilitation comprised of those hospitalised for acute COVID-19 and community managed referrals. Oxygen saturation was recorded directly before and after the tests. An independent T- test was used to measure group means for statistical difference and Pearson's correlation was used to compare 5STS, 1STS and ISWT performance outcomes.

Results Twenty-nine patients were eligible for analysis, mean (SD) age 54 (7.8) years (65.5% female and 69% White British) 7 (24%) participants had hospital admissions with a mean time from discharge to assessment of 347 days. There were desaturations of >3% in 3 (10%) participants during the 1STS and 9 (38%) in the ISWT and no desaturations of >3% during the 5STS. The difference between patient groups and SPO2 desaturations are non-significant at 0.559 for ISWT, 0.447 for 1STS and 0.447 5STS. There was no significant difference between SpO_2, RPE and BORG for patient groups in each test condition. There was a strong correlation (R=-0.88) between the 1STS repetitions and 5STS time. There was a moderate correlation between ISWT and both STS tests (5STS R=-0.53 and 1STSR=-0.66).

Conclusions The 5STS does not detect desaturation, whilst the ISWT detected meaningful desaturation in 38% of the population. There was a strong correlation with respect to performance on both STS tests, but not with the ISWT.

P225 PULMONARY REHABILITATION IN LONG COVID – THE IMPACT OF SOCIAL DEPRIVATION AND TREATMENT DELAY ON OUTCOMES

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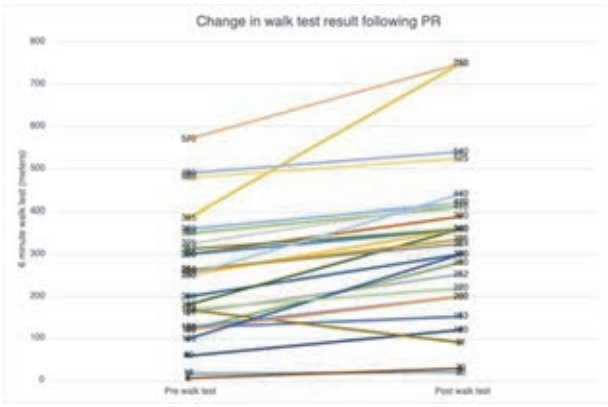
10.1136/thorax-2022-BTSabstracts.357

Introduction Post COVID-19 syndrome (Long COVID) is a new and emerging condition which affects up to 2.2 million patients in the UK as of April 2022. Physical deconditioning is a hallmark of Long COVID. Pulmonary Rehabilitation (PR) is a well-established treatment for many chronic respiratory diseases to improve physical conditioning. Delays in starting PR and socioeconomic factors could play a role in completion rate and efficacy. The validity of PR in Post COVID-19 Syndrome has not yet been clearly defined.

Methods We performed a retrospective observational study of patients undergoing PR between June 2020 and April 2021 for Post Covid-19 Syndrome to evaluate the change in exercise tolerance, as well as the effects of the Index of Multiple Deprivation (IMD) score and delay between infection and PR on patients' outcomes.

Completion was defined as attainment of patient's pre-PR defined personal goals. Pre- and Post-PR 6-minute Walk test (6MWT) results were used to measure exercise tolerance.

Results 86 patients participated in PR during the study period with 30 (34.9%) patients completing the program with a mean age of 59 years. The mean number of sessions attended was 10.6 (range 2–19). The number of sessions did not correlate with improvement in 6MWT. Completion of PR was



Abstract P225 Figure 1

associated with a statistically significant improvement of 6MWT distance (figure 1) using Wilcoxon rank test ($p < 0.001$). The mean delay between infection and starting PR was 200 days. IMD decile and time between diagnosis of COVID infection and starting PR did not have any influence on the change in 6MWT results.

Conclusions This study is a real-world delivery of PR in patients with Post COVID-19 syndrome, illustrating the improvements in physical conditioning. Unlike previous studies in the COPD population, socioeconomic status and the delays in starting PR did not affect the outcome of PR.[1] As such this PR should be offered to any eligible patients following COVID-19 infection to improve their physical fitness.

REFERENCE

1. Steiner MC, Lowe D, Beckford K, *et al*. Socioeconomic deprivation and the outcome of pulmonary rehabilitation in England and Wales, *Thorax* 2017;**72**:530–537.

P226 DYNAMO COVID-19. DYNAMIC ASSESSMENT OF MULTI ORGAN LEVEL DYSFUNCTION IN PATIENTS RECOVERING FROM COVID-19: INSULIN RESISTANCE AND METABOLIC FLEXIBILITY

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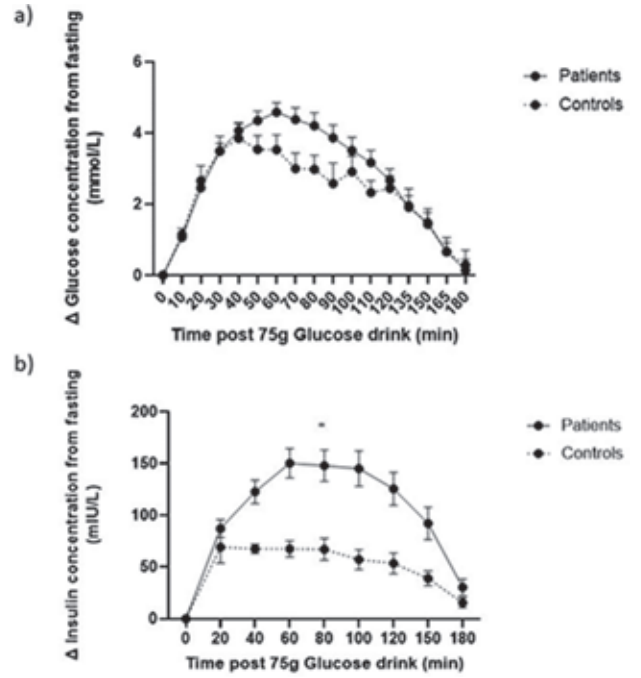
10.1136/thorax-2022-BTSabstracts.358

Introduction Initial acute hyperglycaemia is reported in patients during hospitalisation with SARS-CoV-2 infection. However, it is unclear what maladaptations occur long-term. Whole-body insulin sensitivity and metabolic flexibility were assessed alongside whole-body and regional fat content to provide insight of metabolic health status in recovering patients.

Methods Adults were recruited at 5–7 months following hospital discharge for severe SARS-Cov2 infection (n=21), along



Abstract P226 Figure 1

with control volunteers (n=10) of a similar age, gender, ethnicity and BMI.

Indirect calorimetry was conducted before and during an oral glucose tolerance test (OGTT) to assess metabolic flexibility [Δ respiratory exchange ratio (RER) from fasting to peak]. In conjunction, regular arterialised venous bloods were taken from a retrograde cannula over a 3-hour period to determine blood glucose and serum insulin. At separate visits (within 2 weeks), dual energy X-ray absorptiometry measured whole-body fat fraction, whilst ^{1}H Magnetic Resonance Spectroscopy (MRS) quantified intra and extra-myocellular lipid fractions (IMCL and EMCL) in the thigh muscle and MR Imaging using a mDIXON scan identified subjects with fatty liver (fat fraction≥5.6%). Average daily activity over a 7-day period was measured using an accelerometer. Data are Non-parametric: median(IQR), parametric: mean(SD) and categorical: n(%).

Results The OGTT serum insulin response was greater in patients (P) than controls (C) (figure 1b), but the blood glucose (figure 1a) and RER responses [P: 0.08(0.07) vs C: 0.13 (0.07), p=0.1] were not. Patients had a lower average daily step count [P: 3,626(2,385–6,337) steps vs C: 7,670(5,111–10,074), p=0.07] and more had a fatty liver [P: 13(68%) vs C: 3(30%), p=0.048]. Whole-body fat fraction [P: 38.3(6.8)% vs C: 37.4(9.6)%, p=0.8] and IMCL:EMCL [P: 0.45(0.28) vs C: 0.67(0.42), p=0.1] were not different. Physical activity and liver fat were independent factors for insulin resistance in a multivariate regression model.

Conclusion Patients recovering from severe Covid-19 have worse insulin sensitivity compared to controls, but similar metabolic flexibility. Physical inactivity and liver adiposity may play a role in these observations.

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P227 REDUCED RESPIRATORY MUSCLE STRENGTH, LUNG FUNCTION, AND FUNCTIONAL STATUS AND SYMPTOMOLOGY IN PATIENTS REFERRED TO LONG COVID CLINICS, AN OBSERVATIONAL COHORT ANALYSIS

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10.1136/thorax-2022-BTSabstracts.359

Introduction One in ten people will develop Long COVID (LC) following infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Despite broad-ranging and episodic symptomology, there are no data that demonstrate changes in functional status (FS), respiratory muscle strength and lung function over time. We conducted a sixteen-week cohort observation of LC patients to determine changes in FS, respiratory muscle strength and lung function.

Method Sixty-six patients (n=48 females, mean age 51 ± 10 years, n=8 hospitalised, mean time post-infection 6.2 ± 1.8 months) were recruited from LC clinics in the United Kingdom (CPMS ID: 52331). Patients completed five face-to-face visits (day 0, 28, 56, 84 and 110 ± 3 days) and bi-weekly telephone consultations (day 14, 42, 70 and 98 ± 3 days). FS was assessed via the post-COVID functional status scale (PCFS) and the six-minute walk test (6MWT). Maximum inspiratory (MIP) and expiratory (MEP) respiratory muscle pressure and lung function (forced vital capacity (FVC) and forced expired volume in one second (FEV_1) were assessed during face-to-face visits according to published standards.

Results PCFS was 2.7 ± 0.4 AU, P=0.02 at baseline and improved at 16-weeks (2.1 ±1.1 AU) and still highlighted impaired FS. 6MWT was 322 ± 133 meters at baseline and improved at 16 weeks (430 ± 150 meters, P<0.01) but remained lower than normative values for healthy age-matched controls. MIP was 77 ± 21 cmH_2O at baseline (86% predicted) and was unchanged post 16 weeks (88 ± 25 cmH_2O, 92% predicted, P>0.05). Baseline MEP was 115 ± 41 cmH_2O (96% and was unchanged post-16-weeks (119 ± 48 cmH_2O, 92% predicted, P>0.05). Lung function data were below predicted values and unchanged over 16 weeks (baseline FVC: 3.10 ± 0.53 $L.s^{-1}$, 72% predicted, post 16 weeks: 3.16 ± 0.34 $L.s^{-1}$, 73% predicted, *P*>0.05 and baseline FEV_1: 2.68 ± 0.39 $L.s^{-1}$, 85% predicted, post 16 weeks: 2.75 ± 0.36 $L.s^{-1}$, 85% predicted).

Conclusion LC patients demonstrate reduced respiratory muscle strength and lung function which could be associated with reduced FS and should be addressed via specific rehabilitation approaches.

Please refer to page A216 for declarations of interest related to this abstract.

P228 COMPARING CARDIOMETABOLIC RISK INDICATORS BETWEEN ADULTS POST-HOSPITALISATION WITH COVID-19 AND HEALTHY CONTROLS

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Introduction and Objectives Adults with cardiometabolic disease including diabetes, hypertension and obesity are associated with more severe acute coronavirus disease 2019 (COVID-19). The aim of this exploratory cross-sectional study was to compare detailed cardiometabolic risk profiling between adult survivors of severe COVID-19 and healthy controls.

Methods Eligible patients in the COVID-19 group were between 3–7 months post-discharge from hospital with acute COVID-19 and recruited through a longitudinal cohort study (PHOSP-COVID). Historical adult age and sex matched healthy controls with no pre-existing conditions recruited prospectively to a different study were used as a comparator group. Cardiometabolic risk indicators were assessed including measures typically measured in clinical care (resting blood pressure, fasting glucose, BMI, waist circumference), alongside more detailed assessments including central and peripheral arterial stiffness using pulse wave velocity (PWV), Homeostatic Model Assessment for Insulin Resistance (HOMA-IR) and an oral glucose tolerance test (OGTT). Data are presented as mean [SD] or median [interquartile range] depending on distribution.

Results 38 adults recovering from severe COVID-19 (mean [SD] age 62 [9] years, 45% male) and 17 healthy controls (mean [SD] age 62 [9] years, 53% male) completed the study (table 1). BMI and other clinical measures (blood pressure, fasting glucose, HbA1C) indicated a higher cardiometabolic risk profile in adults post-COVID-19 compared to healthy controls – Table 1. Carotid-femoral and brachial-ankle PWV were higher in the adults post-COVID-19 compared to the healthy controls and similarly insulin resistance assessed by HOMA-IR was also higher. Exercise capacity was reduced in the post-COVID-19 group compared to the healthy controls.

Conclusions This exploratory cross-sectional study shows that routinely used clinical tests of cardiometabolic risk indicate higher future risk for adults post-COVID compared to healthy controls. More detailed measures of cardiometabolic risk support this finding. It is unclear whether acute COVID-19 further contributes to pre-existing cardiometabolic risk. However, our small exploratory study supports the need for interventions such as aerobic exercise training which are proven to reduce aortic stiffness in adults with cardiometabolic disease or who are at future risk of cardiometabolic disease.

P229 CARDIOPULMONARY EXERCISE TESTING IN PATIENTS WITH LONG COVID

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10.1136/thorax-2022-BTSabstracts.361

Objective Examine the relationship between symptoms and exercise physiological parameters in patients with long covid.

Methods Patients with long covid symptoms 6–12 months after covid19 infection referred to the long covid clinic were invited for Cardiopulmonary Exercise Testing (CPET). None had required ventilatory support during covid19 infection. All patients had normal transthoracic echocardiograms and normal resting flow-volume curves and gas transfer measurements. All patients underwent standard cycle ergometer symptom-limited CPET. Treatment guided by the CPET was offered and follow-up CPET was performed at 3 months.

Results 32 patients had a first CPET. The commonest symptoms were breathlessness (30/32), fatigue (26/32), cough (7/32), 'brain fog' (6/32) and chest pain (5/32). The main CPET physiological abnormalities were a borderline low peak oxygen uptake (mean 82.5% predicted), a low anaerobic threshold (AT, mean 47.6% of predicted maximal oxygen uptake) and a low oxygen uptake/work rate slope (mean 9.4 ml/min/W). The oxygen pulse curve flattened early in exercise, but peak oxygen pulse was normal (mean 88.9%).

20 patients underwent a second CPET. 14 patients had improved symptoms: breathlessness (11/20), fatigue (9/20), cough (2/20), 'brain fog' (3/20) and chest pain (0/20). Symptom improvement was associated with a rise in peak oxygen uptake (to mean 85.3% predicted) and oxygen pulse (to mean 94.1% predicted) although both remained within the normal range. The AT remained low (mean 46.4% predicted maximal

Abstract P228 Table 1 Comparing cardiometabolic measures between adults post-hospitalisation with COVID-19 and healthy controls

Measure	N=	Adults post-hospitalisation with COVID-19	N=	Adult Healthy controls	Mean between group difference [SD]
Age, years	38	62 [9]	17	62 [9]	
Comorbidities	38		17		
0		12 (31.6%)		15 (88.2%)	
1		13 (34.2%)		1 (5.9%)	
More than 2		13 (34.2%)		1 (5.9%)	
Body mass index, kg/m^2	38	30.1 [26.7–33.6]	17	24.9 [22.4–26.4]	5.86 [4.15]
Resting systolic blood pressure, mmHg	38	142 [133–151]	16	114 [104–132]	25 [18]
Resting diastolic blood pressure, mmHg	38	74 [68–80]	16	84 [77–87]	-7 [5]
Resting heart rate, beats/min	38	63 [59–73]	16	71 [61–77]	-4 [3]
Glucose, mmol/L	34	5.3 [4.9–5.7]	12	4.8 [4.5–5.1]	1.2 [0.9]
Haemoglobin A1c, mmol/L	36	5.8 [5.3–6.2]	11	5.4 [5.3–5.6]	0.5 [0.4]
HOMA-IR	23	2.8 [1.8–5.6]	11	1.1 [0.5–2.1]	4.8 [3.4]
VO2 peak (ml/min/kg)	24	13.9 [11.6–19.7]	13	33.7 [24.8–36.4]	-16.5 [11.7]
Carotid-femoral pulse wave velocity, m/s	37	9.50 [8.15–11.50]	9	7.30 [6.75–10.45]	1.44 [1.02]
Brachial-ankle pulse wave velocity, m/s	35	15.80 [13.60–17.50]	9	11.80 [11.0–14.90]	2.62 [1.85]

Data presented as mean [SD] or median [IQR] depending on distribution
One participant in the post-COVID-19 group was taking beta-blockers

oxygen uptake). The ventilatory equivalent for carbon dioxide (VE/VCO2) was normal 28.6 L/L at AT.

6 patients with unchanged symptoms had a reduction in oxygen pulse to mean 81.5% predicted compared to the first CPET but a rise in VE/VCO2 to 33.7 L/L at AT.

Conclusions

1. Long covid is associated with impaired peak oxygen uptake, AT and oxygen pulse. This suggests an oxygen delivery or uptake disorder or deconditioning. The transthoracic echocardiograms were normal suggesting a disorder at the muscle level.
2. A targeted treatment programme based on CPET improves symptoms and physiological parameters in long covid patients.

Patients with unchanged symptoms after 3 months of treatment had persistent physiological abnormalities but appeared to develop features of dysfunctional breathing syndrome.

P230 ASSESSMENT OF CARDIO-PULMONARY FUNCTION IN CHILDREN AND ADOLESCENTS WITH SUSPECTED LONG COVID

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10.1136/thorax-2022-BTSabstracts.362

Introduction Persistent respiratory symptoms and exercise intolerance following severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection in children and adolescents is common.[1] Our aim was to review the clinical data on patients who had been referred with suspected long COVID (LC). Unfortunately, there is a lack of an agreed definition for LC. The patient cohort were referred with persistent respiratory symptoms/signs (cough, exertional dyspnoea or wheeze) for at least 3 months following confirmed (PCR or antigen test positive) mild SARS-CoV-2 infection that did not require hospitalisation.

Methods This was a retrospective analysis of clinical data obtained during clinical assessment. Patients had undergone pulmonary function tests (PFTs) including; spirometry, Single breath transfer factor (T_{LCO}) and static lung volume measurements (Vyntus Body – Vyaire^{TM} Medical) followed by an incremental maximal ramp cardiopulmonary exercise testing (CPET) performed on a cycle ergometer (Jaeger CPX & Vyntus ONE – Vyaire^{TM} Medical).

Results Seven patients (four male) with suspected LC had undergone PFTs and CPET. Demographics and summary data are presented (table 1). Five had normal PFT results. Of the two that had abnormal PFTs both had co-existing morbidities. One had mild airflow obstruction (previous pneumothorax) and the other had a restrictive defect (Di-George syndrome and obesity). Three patients had a reduced peak Oxygen uptake (VO_{2peak} < 85% predicted). The cardiovascular and gas exchange response to incremental exercise were normal and there was no evidence of ventilatory limitation or dysfunctional breathing in any of the patients.

Conclusions Although only a small cohort was examined, this study suggests that SARS-CoV-2 infection does not seem to be causing any longstanding cardiopulmonary function impairment in children and adolescents. Whilst there may be pathophysiological changes following SARS-CoV-2 infection, as previously reported in adults,[2] a reduced aerobic capacity is seen in some of these patients and this may due to physical de-conditioning rather than any physiological impairment caused by SARS-CoV-2 infection.

REFERENCES

1. Dobkin S *et al*. (2021) Protracted respiratory findings in children post-SARS-CoV-2 infection Pediatr Pulmonol.
2. Rinaldo RF *et al*. (2021). Deconditioning as main mechanism of impaired exercise response in COVID-19 survivors. *ERJ* 2021 **58**:2100870.

Declarations of interest

T1 **GENETIC OVERLAP STUDY BETWEEN ACUTE RESPIRATORY DISTRESS SYNDROME AND IDIOPATHIC PULMONARY FIBROSIS**

This research was funded by Action for Pulmonary Fibrosis, Wellcome Trust (221680/Z/20/Z), Instituto de Salud Carlos III (PI20/00876), ITER (agreement OA17/008), GSK / Asthma + Lung UK (C17-1), NIHR Leicester Biomedical Research Centre. G Jenkins reports personal fees from Astra Zeneca, Biogen, Boehringer Ingelheim, Bristol Myers Squibb, Chiesi, Daewoong, Galapagos, Galecto, GlaxoSmithKline, Heptares, NuMedii, PatientMPower, Pliant, Promedior, Redx, Resolution Therapeutics, Roche, Veracyte and Vicore. L Wain reports research funding from GSK and Orion and consultancy for Galapagos, outside of the submitted work.

T4 **NOVEL LUNG ORGANOID MODEL REVEALS CRUCIAL ROLE OF LUNG RESIDENT MESENCHYMAL STROMAL CELLS IN COPD PATHOGENESIS**

A Krasnodembskaya holds research grant from MRC.

T5 **POINT OF CARE BLOOD EOSINOPHIL GUIDED ORAL PREDNISOLONE FOR COPD EXACERBATIONS: A MULTI-CENTRE DOUBLE BLIND RANDOMISED CONTROLLED TRIAL (THE STARR2 TRIAL)**

Study was funded via a research grant from the National Institute for Social Care and Health Research.

T6 **ELEVATED SERUM CATHEPSIN K IS ASSOCIATED WITH DISEASE ACTIVITY IN LYMPHANGIOLEIOMYOMATOSIS AND CATHEPSIN K INHIBITION IS BENEFICIAL IN VITRO AND IN VIVO**

This study was funded by The LAM Foundation, USA.

S8 **DO PHYSICAL ACTIVITY LEVELS AND PROMS IMPROVE FOLLOWING THERAPEUTIC ASPIRATION OF PLEURAL EFFUSIONS?**

Funded by an unrestricted grant from Tintron Labs, Gothenburg Sweden.

S15 **EFFICACY OF ORAL NALBUPHINE EXTENDED RELEASE FOR THE TREATMENT OF CHRONIC COUGH IN IDIOPATHIC PULMONARY FIBROSIS: INTERIM ANALYSIS OF A PHASE 2 STUDY**

P Molyneaux has received consultancy fees from Trevi Therapeutics. Medical writing support and editorial support were provided by T Rouwette, of Excerpta Medica, with support from Trevi Therapeutics.

S25 **REFLECTING REAL-WORLD PATIENTS IN MESOTHELIOMA RESEARCH: A PRE-SPECIFIED INTERIM REPORT FROM THE PRAGMATIC, PROSPECTIVE, OBSERVATIONAL ASSESS-MESO COHORT**

ASSESS-meso is funded by the Avon Mesothelioma Foundation and Cancer Research UK.

S28 **PAWS FOR THOUGHT: SNIFFER DOGS FOR INFECTION SURVEILLANCE IN NON-SPUTUM PRODUCING PEOPLE WITH CF**

This project was completed thanks to funding from the CF Trust (UK).

S34 **SUPPORTING SELF-MANAGEMENT OF INDOOR ASTHMA TRIGGERS AND ALLERGENS IN CHILDREN & TEENS WITH SEVERE ASTHMA: WHAT DO FAMILIES VALUE AND WHAT FURTHER INFORMATION DO THEY NEED?**

This work is funded by Asthma + Lung UK as part of Asthma UK Centre for Applied Research AUK-AC-2018-01

S36 **ACUTE AND LONG-TERM IMPACTS OF COVID-19 ON ECONOMIC VULNERABILITY: A POPULATION-BASED LONGITUDINAL STUDY IN 16,910 ADULTS**

This study was supported by a grant from Barts Charity to ARM (MGU0466). The funder had no role in any aspect of the study design; in the collection, analysis, and interpretation of data; in the writing of the report; or in the decision to submit this abstract.

S37 **ELEVATED NETOSIS AND MIGRATION BUT IMPAIRED ANTI-MICROBIAL RESPONSES IN NEUTROPHILS FROM NON-ICU, HOSPITALIZED COVID-19 PATIENTS**

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S38 **OMICRON (B.1.1.529) SARS-COV-2 INFECTION RESULTS IN LESS SEVERE DISEASE THAN INFECTION WITH DELTA (B.1.1.617.2) VARIANT AMONG HOSPITALISED ADULTS: A PROSPECTIVE COHORT STUDY**

This study was undertaken as part of the AvonCAP study, which is a University of Bristol sponsored study funded under an investigator-led collaborative agreement by Pfizer Inc.

S39 **COVID-19 INCIDENCE AND HOSPITALISATION IN ROUTINE CLINICAL PRACTICE AMONG ASTHMA PATIENTS IN ENGLAND IN 2020**

Funding GSK 214629. KJ Rothnie: employee of GSK and holds stocks/shares in GSK. X Han, Q Fu, FM Hutchinson, HJ Birch, D Leather, R Sharma, C Compton, and AS Ismaila are employees of GSK and/or hold stocks/shares in GSK. AS Ismaila is also a part-time member of the McMaster University faculty. B Numbere is an employee of CY Partners Recruitment Ltd and is on assignment at GSK as a Complementary Worker. T Tritton, T Holbrook, AF Ford, and L Massey are employees of Adelphi Real World; Adelphi Real World received funds from GSK to conduct the analysis.

S41 **INCIDENCE OF SARS-COV-2 AND NON-SARS-COV-2-ASSOCIATED COMMUNITY ACQUIRED LOWER RESPIRATORY TRACT INFECTIONS IN BRISTOL, UK: A PROSPECTIVE COHORT STUDY**

This study is an investigator-led, University of Bristol sponsored study which is funded through a collaborative agreement by Pfizer Inc

S42 **VITAMIN D TO PREVENT COVID-19 OR OTHER ACUTE RESPIRATORY INFECTIONS: PHASE 3 RANDOMISED CONTROLLED TRIAL (CORONAVIT)**

This study was supported by Barts Charity (ref. MGU0459), Pharma Nord Ltd, the Fischer Family Foundation, DSM Nutritional Products Ltd, the Exilarch's Foundation, the Karl R Pfleger Foundation, the AIM Foundation, Synergy Biologics Ltd, Cytoplan Ltd, the UK National Institute for Health Research Clinical Research Network, the HDR UK BREATHE Hub, Thornton & Ross Ltd, Warburtons Ltd, Mr Matthew Isaacs (personal donation), and Hyphens Pharma Ltd.

S44 **REPAIR OF ACUTE RESPIRATORY DISTRESS SYNDROME IN COVID-19 BY STROMAL CELLS (REALIST-COVID TRIAL): 1 YEAR FOLLOW UP FOR SAFETY AND PULMONARY DYSFUNCTION**

The REALIST trial was funded by the Wellcome Trust Health Innovation Challenge Fund [reference 106939/Z/15/Z] and the Northern Ireland Health and Social Care Research and Development Fund for needs led research. The funders had no role in the study design, data collection, data analysis, data interpretation, or the writing of this abstract. Orbsen Therapeutics Ltd. has granted a non-exclusive, trial-specific licence to the Cellular and Molecular Therapies Division of the National Health Service Blood and Transplant Service to manufacture ORBCEL-C to Good Manufacturing Practice standards for the REALIST trial. Orbsen Therapeutics Ltd. has had no role in the study design, data collection, data analysis, data interpretation, or the writing of this abstract.

S46 **TEZEPELUMAB REDUCES MUCUS PLUGGING IN PATIENTS WITH UNCONTROLLED, MODERATE-TO-SEVERE ASTHMA: THE PHASE 2 CASCADE STUDY**

Co-authors L Nordenmark and C Emson contributed equally. Funding: This study was funded by AstraZeneca and Amgen Inc. Acknowledgements: Medical writing support was provided by P Narang, PhD, of PharmaGenesis London, London, UK, with funding from AstraZeneca and Amgen Inc. Disclosures: L Nordenmark, C Emson, Å Hellqvist, J Johnston, H Greberg, JM Griffiths and G Colice are employees of AstraZeneca and own stock or stock options in AstraZeneca. JD Newell Jr is a VIDA medical advisor, owns stock options in VIDA, received publishing royalties from Elsevier, is a volunteer radiology faculty member at the University of Washington, is a visiting professor of radiology and biomedical engineering at the University of Iowa and is paid from NIH grants through the University of Iowa. JR Parnes is an employee of Amgen and owns stock or stock options in Amgen, CE Brightling has received grants and consultancy fees from 4D Pharma, AstraZeneca, Chiesi, Genentech, GlaxoSmithKline, Mologic, Novartis, Regeneron, Roche, and Sanofi.

S47 **DESTINATION: TEZEPELUMAB LONG-TERM SAFETY AND EFFICACY VERSUS PLACEBO IN PATIENTS WITH SEVERE, UNCONTROLLED ASTHMA**

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S48 **EFFICACY OF TEZEPELUMAB ACCORDING TO AGE AT ASTHMA ONSET IN NAVIGATOR**

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S49 EFFECT OF TEZEPELUMAB ON A COMPOSITE OF SEVERE ASTHMA EXACERBATIONS AND ACUTE WORSENING EVENTS, COMPEX, IN THE PHASE 3 NAVIGATOR STUDY

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S51 HETEROGENEITY OF SPUTUM AND SYSTEMIC INFLAMMATORY MEDIATOR PROFILES IN BRONCHIECTASIS

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S54 THE LUNG MICROBIOME IN NONTUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE

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S56 ZFP36L1 AND ZFP36L2 DEFICIENCY CONTRIBUTE TO STEROID REFRACTORINESS AND EPITHELIAL REMODELLING IN SEVERE ASTHMA

Funded by Asthma UK, Rosetrees Trust, King's Health Partners, King's College London.

S59 EPITHELIAL IMMUNE ACTIVATION AND INTRACELLULAR INVASION BY NON-TYPEABLE HAEMOPHILUS INFLUENZAE

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S61 REDUCING THE ENVIRONMENTAL IMPACT OF PRESSURIZED METERED DOSE INHALERS: RELATIVE BIOAVAILABILITY OF BUDESONIDE/GLYCOPYRRONIUM/FORMOTEROL FUMARATE DIHYDRATE WITH NOVEL PROPELLANT FORMULATIONS IN HEALTHY SUBJECTS

This study was supported by AstraZeneca.

S62 EXPLORING THE ENVIRONMENTAL IMPACT OF INHALER DISPOSAL AND THE FEASIBILITY OF POSTAL INHALER RECYCLING IN THE UK: RESULTS FROM THE TAKE AIR PILOT, POSTAL INHALER RECYCLING SCHEME

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S63 PARTNERING PATIENTS ON CLIMATE CHANGE; ASSESSING PATIENTS' UNDERSTANDING OF THE CARBON FOOTPRINT OF INHALERS

A Wi. has made unpaid contributions to publications on the carbon footprint of inhalers and respiratory treatment which were sponsored by GlaxoSmithKline and AstraZeneca. He is a member of the U.N. Medical and Chemical Technical Options Committee. A Wo. declares consulting/ lecture fees for GSK, Novartis, Boerhinger, Sandoz, TEVA. He is Cochair of the Montreal Protocol Technology and Economic Assessment Panel, and a member of the Medical and Chemical Technical Options Committee.

S64 IMPACT OF CHOICE OF SALBUTAMOL PMDI AND USE OF SPACER ON DRUG DELIVERY AND EMISSIONS – BEST FOR PATIENT AND ENVIRONMENT

Authors are employed in a scientific / clinical capacity by Trudell Medical.

S71 MESENCHYMAL CELL SENESCENCE INFLUENCES ATII CELL VIABILITY IN LAM

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S73 **THE INFLAMMATORY RESPONSE OF AIRWAY EPITHELIAL CELLS TO SOLUBLE MEDIATORS OBTAINED FROM H. INFLUENZAE INFECTED MACROPHAGES**

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S75 **ASTHMA EXACERBATIONS IN ROUTINE CLINICAL PRACTICE DURING COVID-19 IN ENGLAND IN 2020**

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S79 **COPD EXACERBATIONS IN ROUTINE CLINICAL PRACTICE DURING COVID-19 IN ENGLAND IN 2020**

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S80 **A CLUSTER-RANDOMISED EVALUATION OF A THEORY-BASED INTERVENTION TO HELP PEOPLE WITH TB DISEASE GET THE MOST FROM THEIR TREATMENT AND CARE: THE IMPACT FEASIBILITY STUDY**

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S81 **CHRONIC DISEASES AND TB RISK FACTORS AMONG TB HOUSEHOLD CONTACTS IN SOUTHERN AFRICA**

This work was supported by the Wellcome Trust (203905/Z/16/Z).

S88 **ADVERSE OUTCOMES FOLLOWING INITIATION OF ORAL CORTICOSTEROIDS FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE: LONG-TERM OBSERVATIONAL STUDY**

This study was supported by AstraZeneca.

S95 **PROLONGED NEUTROPHIL DYSFUNCTION AND PHENOTYPE IN ELDERLY HOSPITALISED COMMUNITY ACQUIRED PNEUMONIA PATIENTS**

Funded by the MRC.

S102 **ASSESSMENT OF TWO OSCILLATING POSITIVE EXPIRATORY PRESSURE (OPEP) DEVICES : HOW DO THE DIFFERING MECHANISMS OF ACTION IMPACT LAB PERFORMANCE**

Authors are employed in a scientific / clinical capacity by Trudell Medical

S104 **COMMUNICATION BETWEEN INFECTION EXPERIENCED LUNG STROMAL CELL SUBSETS AND RESIDENT IMMUNE CELLS IS ALTERED IN THE INFLUENZA VIRUS INFECTED LUNG**

This work was supported by the Wellcome Trust [210703/Z/18/Z].

S106 **FIBROBLAST GαQ/11 CONTROLS LUNG REPAIR VIA REGULATION OF LUNG EXTRACELLULAR MATRIX PROPERTIES**

This work was funded by a Malcolm Weallans Pulmonary Fibrosis Research Grant from Asthma + Lung UK (PFT21F\7) and a Wellcome Prime research grant administered by the University of Nottingham.

S107 **SOX9 REGULATES ALVEOLAR DAMAGE AND EXTRACELLULAR MATRIX SECRETION BY FIBROBLASTS IN IDIOPATHIC PULMONARY FIBROSIS: DOWNSTREAM SECRETED PROTEINS ARE PROMISING BIOMARKERS**

L Pearmain and this project was funded by the MRC: MR/R00191X/1.

S109 **GENOME-WIDE ANALYSIS OF LONGITUDINAL LUNG FUNCTION AND GAS TRANSFER IN INDIVIDUALS WITH IDIOPATHIC PULMONARY FIBROSIS**

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S111 ADULT HOSPITALISED COMMUNITY ACQUIRED PNEUMONIA INCIDENCE IN BRISTOL: COMPARISON OF RETROSPECTIVE ICD-10 BASED ANALYSIS AND PROSPECTIVE STUDY DATA

JC, EB, AV, JS, BDG, and GE are employees of Pfizer Vaccines and hold stock or stock options. CH is Principal Investigator of the Avon CAP study, an investigator-led University of Bristol study funded by Pfizer, and has previously received support from the National Institute for Health Research in an Academic Clinical Fellowship. AF is a member of the Joint Committee on Vaccination and Immunization and chair of the WHO European Technical Advisory Group of Experts on Immunization committee; and in addition to receiving funding from Pfizer as Chief Investigator of the Avon CAP study, leads another project investigating transmission of respiratory bacteria in families jointly funded by Pfizer and the Gates Foundation. MPES is has received personal fees from GlaxoSmithKine, Pfizer, Merck, AstraZeneca, and Sanofi Pasteur as a speaker at international meetings and as a member of advisory boards and is currently undertaking contract work for Pfizer

S118 DIGITAL PEAK FLOW MONITORING CAN PREDICT NEXT-DAY PEAK FLOW MEASUREMENTS

S Ananth: none to declare; S Alpi: employee of Smart Respiratory (which has developed the digital peak flow meter mentioned in the abstract); T Antalffy: co-founder and employee of Smart Respiratory. S Ananth has no affiliations with Smart Respiratory at all- S Ananth conceived the abstract idea, performed all data analysis independently and wrote the first draft of the abstract.

S121 MANDIBULAR MOVEMENT MONITOR FOR THE DIAGNOSIS OF OBSTRUCTIVE SLEEP APNOEA: CLINICAL APPLICATION

PhD student (SA) funded by Rehabilitation Health Sciences Department, College of Applied Medical Sciences, King Saud University, Riyadh, (Saudi Arabia); Sunrise devices donated by Sunrise SA (Belgium).

S122 MATHEMATICALLY ARTERIALISED VENOUS BLOOD GAS SAMPLING IN THE MANAGEMENT OF PATIENTS WITH HYPERCAPNIC RESPIRATORY FAILURE

Funded by an unrestricted grant (£30,000) from Obimedical, Denmark.

S126 DUPILUMABEFFICACY IN CHILDREN WITH UNCONTROLLED TYPE 2 ASTHMA ANALYZED BY BASELINE HIGH OR MEDIUM ICS DOSE: LIBERTY ASTHMA VOYAGE STUDY

Research sponsored by Sanofi and Regeneron Pharmaceuticals, Inc. ClinicalTrials.gov Identifier: NCT02948959.

S127 RELATION BETWEEN CHANGE IN TYPE 2 BIOMARKER LEVELS AND EFFICACY OUTCOMES IN PATIENTS WITH ASTHMA TREATED WITH DUPILUMAB

Research sponsored by Sanofi and Regeneron Pharmaceuticals, Inc. ClinicalTrials.gov Identifier: NCT02414854.

S128 BASELINE CHARACTERISTICS OF PATIENTS WITH ASTHMA TREATED WITH DUPILUMAB IN A REAL-WORLD SETTING: RESULTS FROM THE RAPID REGISTRY

Research sponsored by Sanofi and Regeneron Pharmaceuticals, Inc. ClinicalTrials.gov Identifier: NCT04287621.

P7 **TESTING AT-RISK PATIENTS FOR NTM-PD IN CURRENT CLINICAL PRACTICE: RESULTS OF AN INTERNATIONAL SURVEY**

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P8 **A SYSTEMATIC LITERATURE REVIEW AND META-ANALYSIS OF PATIENT RISK FACTORS FOR NON-TUBERCULOUS MYCOBACTERIAL PULMONARY DISEASE (NTM-PD)**

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P11 **CHARACTERISTICS AND LONG-TERM REAL-WORLD OUTCOMES OF SEVERE ASTHMA PATIENTS TREATED WITH BENRALIZUMAB IN THE UNITED KINGDOM; 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). AMG has attended advisory boards for GlaxoSmithKline, Novartis, AstraZeneca, Regeneron, Sanofi and Teva; has received speaker fees from Novartis, AstraZeneca, Sanofi and Teva; has participated in research with Astra Zeneca; has attended international conferences with Teva and has consultancy agreements with AstraZeneca and Sanofi. 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. 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.

P25 **SWALLOWING SAFETY AND PERFORMANCE IN PATIENTS WITH IDIOPATHIC PULMONARY FIBROSIS: EVIDENCE FROM THE WATER SWALLOW TEST**

PhD Project funding from Imam Abdulrahman Bin Faisal University, Kingdom of Saudi Arabia and Saudi Arabia Cultural Bureau in London. No competing interests or conflicts of interest.

P33 **WHAT AFFECTS ACCEPTABILITY OF REMOTE DIGITAL MONITORING OF SPIROMETRY IN PATIENTS WITH INTERSTITIAL LUNG DISEASE?**

S Barth has received a grant from patientMpower Ltd which has been administered via ICHT. C Edwards is Chief Scientific Officer and a shareholder in patientMpower Ltd.

P34 **FEASIBILITY OF REMOTE MONITORING WITH DAILY HOME SPIROMETRY AND PULSE OXIMETRY IN AN INTERSTITIAL LUNG DISEASE CLINICAL SERVICE SETTING**

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P36 **VALIDATING PULMONARY ARTERIAL HYPERTENSION-ASSOCIATED GENOMIC MUTATIONS OF EIF2AK4: WHEN IS A VARIANT PATHOGENIC?**

Funded by the Evelyn Trust.

P38 **ASSESSING THE REPEATABILITY OF NT-PROBNP TESTING USING LABORATORY AND POINT OF CARE TESTING IN PAH (REPEAT-PAH)**

Investigators award from Janssen.

P41 **CT LUNG PARENCHYMAL APPEARANCES IN CHRONIC THROMBOEMBOLIC PULMONARY HYPERTENSION (CTEPH)**

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P42 **PULMONARY EMBOLISM (PE) TO CHRONIC THROMBOEMBOLIC PULMONARY DISEASE (CTEPD): FINDINGS FROM A SURVEY OF UK PHYSICIANS**

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P48 **AN OBSERVATIONAL, CROSS-SECTIONAL STUDY TO INVESTIGATE WHETHER ROOM-AIR VENTILATORS, USED IN THE COMMUNITY SETTING, ARE COLONISED WITH POTENTIAL AIRBORNE PATHOGENS (IPAP STUDY)**

Funding for this study was from Breas Medical UK.

P54 **THE IMPACT OF A CLINICAL DECISION SUPPORT SYSTEM IN THE ASSESSMENT OF CPAP COMPLIANCE IN OBSTRUCTIVE SLEEP APNOEA AND IN THE IDENTIFICATION OF RESIDUAL EXCESSIVE DAYTIME SLEEPINESS**

The CDSS is owned by SleepHealth Solutions Ltd. Drs Chakrabarti, Craig, Angus and Mr McKnight lead the development team of SleepHealth Solutions Ltd.

P55 **THE IMPLEMENTATION OF A COMPUTER GUIDED CONSULTATION (CLINICAL DECISION SUPPORT SYSTEM) FOR THE ASSESSMENT OF SUSPECTED OBSTRUCTIVE SLEEP APNOEA IN A LARGE SLEEP SERVICE: A TWELVE MONTH ANALYSIS**

Drs Chakrabarti, Craig and Angus lead the development team at SleepHealth Solutions and were involved in the development and validation of the CDSS.

P72 **FEASIBILITY OF COMBINED STRUCTURAL AND FUNCTIONAL PROTON LUNG IMAGING IN YOUNG CHILDREN WITH CYSTIC FIBROSIS**

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P79 **ANALYSIS OF ANTIFUNGAL USE FROM 2015 – 2021 IN A TERTIARY CARE CARDIOPULMONARY HOSPITAL: THE IMPACT OF THE COVID-19 PANDEMIC ON ANTIFUNGAL PRESCRIBING PRACTICES**

Funding from Pfizer.

P80 **REBOUND IN ASTHMA EXACERBATIONS FOLLOWING RELAXATION OF COVID-19 RESTRICTIONS**

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P84 **"I AM NOT FIXED;" A QUALITATIVE STUDY EXPLORING THE VIEWS ABOUT RESPIRATORY CARE OF PEOPLE BORN WITH OA/TOF**

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P90 **ACCEPTABILITY AND FEASIBILITY PILOT OF CO-DESIGNED TELEHEALTH PHYSIOTHERAPY INTERVENTIONS FOR CHILDREN WITH ASTHMA AND DYSFUNCTIONAL BREATHING**

This research was funded by The Royal Brompton and Harefield Hospitals Charity Fund.

P98 **CONSENT AND COMPLICATIONS IN BRONCHOSCOPY: A TRAINEE-LED, REGION-WIDE EVALUATION**

Abstract submitted on behalf of TERRANE (Trainees Enhancing Respiratory Research Across the North of England). No funding was received for this work. We have no conflicts of interest to declare.

P115 **INVESTIGATING A STRUCTURED DIAGNOSTIC PATHWAY FOR CHRONIC BREATHLESSNESS IN PRIMARY CARE; A FEASIBILITY CLUSTER RANDOMISED CONTROLLED TRIAL (CRCT)**

This work was funded by a NIHR Clinician Scientist Fellowship (CS-2016-16-020) awarded to Dr Rachael A Evans.

P139 **PATIENT RECOGNITION OF, AND RESPONSE TO, ACUTE EXACERBATIONS OF COPD IS RELATED TO PREVIOUS EXPERIENCES OF HELP-SEEKING**

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P147 **USE OF A CONNECTED INHALER SYSTEM IN THE PRE-BIOLOGIC ASSESSMENT OF PATIENTS WITH SEVERE ASTHMA**

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P148 **IMPACT OF PATIENT SUPPORT PROGRAMS ON OUTCOMES AMONG PATIENTS WITH SEVERE ASTHMA TREATED WITH BIOLOGIC THERAPIES – A SYSTEMATIC LITERATURE REVIEW**

This research was funded by AstraZeneca.

P151 **INTERVENING WITH A MANUALISED PACKAGE TO ACHIEVE TREATMENT ADHERENCE IN PEOPLE WITH TUBERCULOSIS (IMPACT): FEASIBILITY OF COLLECTING COST AND QUALITY OF LIFE DATA FROM RECORDS AND PATIENTS**

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P164 **USING ARTIFICIAL INTELLIGENCE TO INTERROGATE MULTI-NATIONAL IMAGING DATASETS TO DETERMINE THE MECHANISM OF COVID-19 PNEUMOTHORAX**

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P166 **AN EVALUATION OF THE CLINICAL CHARACTERISTICS OF AN ANTI-SARS-COV-2 IGG ENZYME-LINKED IMMUNOSORBENT ASSAY**

Study funded by ProAxsis Ltd.

P171 **EFFECTS OF PHARMACOLOGICAL AND NON-PHARMACOLOGICAL INTERVENTIONS ON PHYSICAL ACTIVITY OUTCOMES IN CHRONIC RESPIRATORY DISEASES: A SYSTEMATIC REVIEW AND META-ANALYSIS**

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P189 **SMALL AIRWAYS OBSTRUCTION AND LIFETIME OCCUPATIONAL EXPOSURE IN THE UK BIOBANK COHORT**

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P195 **UPDATED COCHRANE SYSTEMATIC REVIEW: NO EVIDENCE THAT VITAMIN D REDUCES ASTHMA EXACERBATIONS OR IMPROVES ASTHMA CONTROL**

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P199 **SUSTAINED PATIENT USE AND IMPROVED OUTCOMES WITH A COPD DIGITAL SERVICE**

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P204 **DIGITAL INTERVENTIONS TO IMPROVE ADHERENCE TO MAINTENANCE MEDICATION IN ASTHMA: A COCHRANE SYSTEMATIC REVIEW**

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P205 THE MEASUREMENT OF ADHERENCE TO INHALED CORTICOSTEROIDS IN ASTHMA USING ELECTRONIC MONITORING DEVICES: A SYSTEMATIC REVIEW AND META-ANALYSIS

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P207 THE INFLUENCE OF OBESITY ON THE CLINICAL OUTCOME OF BENRALIZUMAB TREATMENT IN SEVERE EOSINOPHILIC ASTHMA A SUBGROUP ANALYSIS FROM THE BPAP STUDY

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P214 ORAL CORTICOSTEROID-RELATED HEALTHCARE RESOURCE UTILISATION IN PATIENTS WITH COPD

This study was supported by AstraZeneca.

P215 A SYSTEMATIC LITERATURE REVIEW OF FACTORS RELATED TO MORTALITY IN PATIENTS WITH COPD

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P227 REDUCED RESPIRATORY MUSCLE STRENGTH, LUNG FUNCTION, AND FUNCTIONAL STATUS AND SYMPTOMOLOGY IN PATIENTS REFERRED TO LONG COVID CLINICS, AN OBSERVATIONAL COHORT ANALYSIS.

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Dr Karl Staples
Dr Aashish Vyas
Dr Steven Walker
Dr Thomas Ward

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