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3	British Thoracic Society
4	Quality Standard for Pleural Disease
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7	Draft for public consultation
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9	Available for public consultation until Monday 30 June 2025
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21 BTS Quality Standard for Pleural Disease

- The British Thoracic Society (BTS) has been at the forefront of the production of Guidelines for best clinical practice in respiratory medicine, since the Society was established over 40 years ago. The Society was awarded NICE Accreditation for its guideline production process in November 2011 and the Society's Guideline Production Manual setting out the detailed methodology and policy to produce guidelines is reviewed annually by the BTS Standards of Care Committee (SOCC).
- A statement on quality standards based on each BTS Guideline is a key part of the range of supporting
 materials that the Society produces to assist in the dissemination and implementation of a Guideline's
 recommendations.
- 30 A quality standard is a set of specific, concise statements that:
- act as markers of high-quality, cost-effective patient care across a pathway or clinical area, covering
 treatment or prevention.
- are derived from the best available evidence.
- NICE Quality Standards and the 2024 NICE Quality Standards Process Guide (1) were used as a model for the
 development of BTS Quality Standards.
- This document contains Quality Standards to be used in primary and secondary care for adults with pleuraldisease.
- 38 The rationale for these quality standards is drawn from evidence and recommendations summarised in the
- 39 BTS Guideline for Pleural Disease.(2) A link to the document can be found below:
- 40 https://www.brit-thoracic.org.uk/quality-improvement/guidelines/pleural-disease/
- 41 This document aims to improve the standards of care for adults with pleural disease. The purpose of the
- 42 document is to provide commissioners, planners and patients with a guide to the minimum standards of care
- 43 that patients with pleural disease should expect, together with measurable markers of good practice.
- 44 BTS Quality Standards are intended for:
- Health care professionals to allow decisions to be made about care based on the latest evidence and
 best practice.
- Patients with pleural disease and their carers to enable understanding of what services they should
 expect from their health and social care provider.
- Service providers to be able to quickly and easily examine the clinical performance of their organisation
 and assess the standards of care they provide.
- **Commissioners** so that they can be confident that the services they are purchasing are high quality and cost effective.
- 53 Method of Working
- The British Thoracic Society convened a Pleural Disease Quality Standard Working Group in March 2024, with
 the following membership:
- 56 Dr Mark Roberts, Co-chair Consultant in Respiratory Medicine, Sutton-in-Ashfield

- 57 Prof Najib M Rahman, Co-chair Professor of Respiratory Medicine, Oxford 58 Dr Dinesh Addala Respiratory Specialty Trainee, Oxford 59 Dr Eihab Bedawi Consultant in Respiratory Medicine, Sheffield Respiratory Specialty Trainee, Oxford 60 Dr Malvika Bhatnagar 61 **Dr Poppy Denniston** Respiratory Specialty Trainee, London 62 Dr Maged Fayed Consultant in Respiratory Medicine, Alexandria, Egypt Dr Alguili Elsheikh 63 Respiratory Specialty Trainee, Oxford 64 Mrs Rachel Halliday Lung Cancer Specialist Nurse, Chester 65 Dr Rob Hallifax Consultant in Respiratory Medicine, Oxford Respiratory Specialty Trainee, Oxford 66 Dr Beenish Iqbal 67 Dr David McCracken Consultant in Acute and Respiratory Medicine, Belfast 68 Dr Kirstie Opstad BTS Clinical Guideline and Quality Standards Programme Manager, London 69 **Dr Helen Roberts** Consultant in Respiratory Medicine, Sutton-in-Ashfield 70 **Dr Andrew Stanton** Consultant in Respiratory Medicine, Newcastle upon Tyne
- 71

72 Members of the Quality Standards Working Group submitted Declaration of Interest forms in line with BTS 73 policy and copies of forms are available on request from BTS Head Office.

74 The draft document was considered in detail by the BTS Standards of Care Committee in December 2024.

75 Each Quality Standard includes the following:

• A **Quality Statement**, which describes a key marker of high-quality, cost-effective care for this condition.

• Quality Measures, which aim to improve the structure, process and outcomes of health care.

78 The quality measures are not intended to be new sets of targets or mandatory indicators for performance 79 management that need to be collected. The quality measures are specified in the form of a numerator and a 80 denominator, which define a proportion or ratio (numerator/denominator). It is assumed that the numerator 81 is a subset of the denominator population. The suggested numerator and denominator are provided to allow 82 healthcare professionals and service providers to examine their clinical performance in relation to each 83 quality standard. It is recognised that no national quality indicators will be available for this condition, and 84 institutions will need to agree locally what information is required for the denominator to be used in each 85 case, and what the expected level of achievement should be, given local circumstances. A brief description 86 about the quality standard in relation to each audience is given.

The BTS Guideline for Pleural Disease 2023 (2) and the BTS Clinical Statement on Pleural Procedures 2023 (3) are the main references for the 16 quality statements. There is no specific order of priority associated with the list of quality statements.

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91 Summary of Quality Statements for Pleural Disease (with plain English summary)

92 Access to services and turnaround of specimens

- 93 If cancer within the pleural space is expected, a sample should be taken within 7 days of the initial referral to
- 94 ensure that a diagnosis is made promptly. Where cancer is identified, additional testing results should be
- 95 available no more than 10 days after the sample is taken.

96 Access to pleural services including ambulatory care

- 97 Problems in the pleural space sometimes need to be managed in hospital but can often be managed as an
- 98 outpatient. Patients should be able to have a procedure within 5 days of a decision being made to conduct a
- 99 procedure. Services should be available to insert tunnelled tubes as an outpatient. In an emergency, services
- should be available to insert a tube using appropriate imaging guidance (ultrasound or CT) 24 hours a day.

101 Safety protocols

- 102 Safety is of paramount importance in undertaking pleural procedures. Services should ensure that they are
- 103 working to nationally recognised standards when undertaking procedures. Procedures should only be
- 104 undertaken out of hours in an emergency situation.

105 Specialist review in complex pleural disease

106 Every hospital that manages pleural disease should have a way to access a specialist in pleural disease to 107 discuss complex or unusual cases.

108 Testing for undiagnosed pleural effusion

- 109 Where a patient has fluid around the lung and the cause is unclear, samples should be taken for all
- appropriate tests, and basic test results should be available to the treating clinician 7 days a week.

111 Pleural biopsy

- 112 Where there is fluid around the lung and fluid results are inconclusive, pleural biopsy should be offered if this
- is appropriate for the patient. This may be using ultrasound and a needle, or by thoracoscopy (camera into
- the pleural space and biopsy under direct vision). This achieves a diagnosis in most patients.

115 Access to computed tomography (CT) and other imaging modalities

- 116 A CT scan should be performed where a patient has fluid around only one lung. This helps with diagnosis as
- 117 underlying cancer is the commonest cause of this fluid. It can also help with making other diagnoses.

118 Definitive management options in malignant pleural effusion (MPE)

- 119 Where the cause of the fluid is cancer, there are two main options for management. The first is to admit to
- hospital, insert a tube through the chest wall into the fluid and then offer talc pleurodesis (talc in the pleural
- space to allow the lung to stick to the chest wall and stop the fluid coming back). The second option is to
- insert a tube that is tunnelled under the skin that will the stay in the pleural space longer term until all the
- 123 fluid is removed. This can be managed in the patient's usual place of residence. Both options should be
- 124 offered to the patient.

125 Named practitioner in confirmed or suspected malignant disease

- 126 Where the diagnosis is cancer, the patient should have access to a specialist practitioner or team to contact
- 127 for support. This is so the patient can access care directly without needing to use emergency pathways (for
- 128 example the Emergency Department).

129 Ambulatory pleurodesis in MPE

- 130 Where a tunnelled chest tube is inserted, frequent tube drainage and talc instillation have both been shown
- to allow early removal of the tunnelled tube. Where services exist to insert a tunnelled tube, both these
- 132 services should be available to patients.

133 Prompt sampling of pleural fluid in suspected pleural infection

- 134 Sometimes fluid around the lung is caused by infection in the pleural space. In circumstances where this is
- 135 suspected, prompt investigation and treatment are required. The fluid should be sampled within 24 hours of
- 136 the diagnosis being suspected. Hospital tests should be available to support this diagnosis.

137 Access to intrapleural enzyme therapy and thoracic surgery

- 138 Where there is infection in the pleural space, if patients do not respond to antibiotics and tube drainage,
- 139 other treatments may help to improve the patient's condition. This includes treatments administered via the
- 140 chest tube, and surgery. The additional treatment and/or an opinion about surgery should be available within
- 141 48 hours of the identification of the failure of initial treatment.

142 Follow-up of pleural infection

- 143 Where a patient has been treated for infection within the pleural space, they should be followed up in the
- 144 outpatient clinic within four weeks of discharge to ensure that they are recovering as expected.

145 **Pneumothorax treatment according to preference**

- 146 For patients with a collapsed lung (pneumothorax) without underlying lung disease, decision-making about
- 147 treatment should include patient preference as it is not always necessary to undergo a procedure to remove
- the air from the chest.

149 Prolonged air leak

- 150 A collapsed lung (pneumothorax) occurs due to a leak of air from the lung into the pleural space. In most
- 151 patients this heals up within a few days. Some patients who need to have their pneumothorax drained
- 152 continue to leak air from the lung for a significant period. In this group, if surgery would be an option, an
- 153 early discussion with a thoracic surgeon (after 3 to 5 days) should be undertaken.

154 Recurrent pneumothorax management

- 155 For patients who have a collapsed lung (pneumothorax) on the same side of the chest more than once,
- surgery is sometimes an option to stop the lung collapsing again. For patients in whom this would be an
- 157 option, there should be an opportunity to discuss surgical options to prevent recurrence.

158 Quality Statement: Access to services and turnaround of specimens

159	Quality statement	Patients undergoing investigation for pleural malignancy should
160		have appropriate diagnostic sampling performed within seven
161		days of referral with initial pathology results available within three
162		days of sampling and molecular markers within 10 days of
163		sampling.

- 164Quality measureStructure: Evidence of local or regional arrangements to ensure that165suitable patients have timely access to pleural investigations166including pleural biopsy, particularly where there is a high suspicion167of mesothelioma or other malignancies with a low cytological yield.
- 168**Process**: Proportion of suitable patients with suspected pleural169malignancy who have access to specialist pleural investigations with170final results available within 17 days of referral.
- 171Numerator: Number of patients who have pleural malignancy172diagnosed (including tissue typing) within 17 days of referral.
- 173Denominator: All patients with suspected pleural malignancy.

174 Description of what the quality statement means for each audience

Service providers ensure that systems are in place to allow patient access, where pleural malignancy is suspected, to specialist pleural diagnostics, including pleural biopsy within one week of referral. Systems should also be in place to ensure pathology results, including molecular testing is available within a further

178 10 days.

Healthcare professionals ensure that patients with suspected pleural malignancy have access to specialist pleural diagnostics, including pleural biopsy within one week of referral and pathology results, including molecular testing within a further 10 days.

182 Care systems establish defined pathways to reduce unnecessary delays and ensure investigation most likely
 183 to yield a diagnosis is performed.

184 **Patients** will be appropriately investigated with minimal delays, optimising pathways and reducing anxiety.

185 186 187	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) Lung Cancer GIRFT Programme National Specialty Report 2022 (4) National Optimal Lung Cancer Pathway 2020 (5)
188	Other possible national data sources	None identified
189	Source references	BTS Guideline for Pleural Disease 2023 (2)
190 191	Rationale	Patients undergoing investigation for pleural malignancy often experience unnecessary delays.
192 193 194		Delays can occur at multiple stages of the pathway, including awaiting review by a pleural specialist, awaiting diagnostic investigations, inappropriate tests being performed (such as

195 196	cytology sampling or repeated cytological sampling in low cytological yield tumours) and pathological reporting.
197 198 199	Optimal pathways, including the option of direct access to biopsy, reduce waiting times potentially avoiding emergency admissions, supporting rapid progress to treatment and reducing patient
200	anxiety.
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201	Quality Statement:	Access to pleural services including ambulatory care
202	Ouality statement	Patients requiring a pleural procedure should have rapid access to

205Quality measureStructure: Evidence of local arrangements to ensure rapid access to206services, including ambulatory care where appropriate and which207should include the following:

appropriate.

- For symptomatic or undiagnosed pleural effusion, where a pleural procedure is clinically indicated, it should be offered within five days of the decision being made, unless the patient's symptoms or evidence of infection makes a more urgent procedure necessary.
 An ambulatory service, including insertion of indwelling pleural
- 214 catheters (IPCs), should be available with support which
 215 includes a pleural nurse specialist.
 216 Availability of expertise and equipment to insert a chest drain
- Availability of expertise and equipment to insert a chest drain
 Availability of expertise and equipment to insert a chest drain
 for pneumothorax when required 24 hours a day.
 Availability of expertise and equipment (including thoracic
 - Availability of expertise and equipment (including thoracic ultrasound) to undertake a pleural procedure for pleural fluid if an emergency, 24 hours a day.
 - **Process**: The proportion of people requiring a pleural procedure or opinion who had rapid access to services including ambulatory care.

services, which should include ambulatory care where clinically

- Numerator: The number of people with symptomatic and/or undiagnosed effusion requiring a pleural procedure or opinion who were offered a procedure within five days and who had access to ambulatory care.
- 227Denominator: The total number of people requiring a pleural228procedure.

229 Description of what the quality statement means for each audience

230 Service providers ensure:

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- An appropriate referrals system is in place for pleural procedures including ensuring the time between
 the decision to perform a pleural procedure and the pleural procedure being performed is recorded.
- There is enough access to a pleural procedure in a timely manner (number of lists, or ad-hoc availability)
- Access to appropriate equipment, expertise and protocols to manage emergency pleural disease
 including thoracic ultrasound 24 hours a day, seven days a week.
- Access to an ambulatory pathway for the management of pleural disease.
- A readily accessible point of access to pleural service or a specialist pleural nurse.

238 Health care professionals ensure:

Access to or offer of a pleural procedure for drainage of pleural fluid is available within 5 days of the
 decision being made.

- Appropriate triage of referrals to allow timely drainage for symptom relief.
- An offer of ambulatory management of pleural disease is considered if clinically appropriate.
- Care systems ensure appropriate services are available to offer timely and safe access to pleural procedures
 throughout the week.

245 **Patients with pleural disease** will:

- Have access diagnostic and/ or symptomatic drainage within five days of the decision being made.
- Have access to a pleural nurse specialist.
- Be offered ambulatory management of their pleural disease if clinically appropriate.

Patients with pneumothorax or pleural effusion requiring an emergency pleural procedure will have safe
 and appropriate access to this, 24 hours a day, seven days a week.

251 252 253 254 255	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) BTS Clinical Statement on Pleural Procedures 2023 (3) BTS Training Standards for Thoracic Ultrasound (TUS) 2019 (6) BTS Guideline for the Investigation and Management of Malignant Pleural Mesothelioma 2018 (7)
256	Other possible national data sources	None identified
257 258 259 260 261	Source references	BTS Guideline for Pleural Disease 2023 (2) BTS Clinical Statement on Pleural Procedures 2023 (3) BTS Training Standards for Thoracic Ultrasound (TUS) 2019 (6) BTS Guideline for the Investigation and Management of Malignant Pleural Mesothelioma 2018 (7)
262 263 264 265 266 267	Rationale	Patients who require pleural procedures are often symptomatic and prompt intervention should be offered. GIRFT 2021 recommends thrice weekly medical sessions per 300 patients with pleural disease and more than one consultant providing the service.(8) GIRFT 2022 recommends that this service should be available for cancer patients on weekdays 52 weeks per year.(4)
268 269 270 271 272 273		Patients often prefer ambulatory treatment. The BTS Clinical Statement on Pleural Procedures 2023 recommends that indwelling pleural catheter (IPC) is first line for recurrent malignant pleural effusion (MPE) and non-expandable lung (NEL) according to patient choice, second line after failed chemical pleurodesis and can be considered in selected cases of non-MPE.(3)
274 275		The GIRFT 2021 recommends one band 6 pleural specialist nurse per 300 pleural procedures undertaken.(8)
276 277		Pleural procedures should only be undertaken by staff with relevant competencies.(3, 6, 9, 10)
278 279 280		The BTS Clinical Statement on Pleural Procedures 2023 recommends that pleural procedures are undertaken in working hours wherever possible.(3) However, appropriately trained staff, including

ultrasound operators should be immediately available for emergency pleural procedures. (3, 6, 9, 10)

283 Quality Statement: Safety protocols

284 285 286	Quality Statement	All services undertaking pleural procedures should have clearly defined safety and procedure protocols which must be followed to reduce risk of harm and complications.
287 288	Quality measure	Structure : Evidence of local arrangements to ensure that services have clearly defined protocols which should include:
288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 301 302 303 304 305 306 307 308 309 310 311		 Informed consent must be taken before all pleural procedures, in line with the GMC recommendations. An accurate record of the exchange of information leading to the decision must be kept in the medical records and written information should be provided for more invasive procedures. The operator should have been adequately trained, procedures documented in the medical notes and images stored where appropriate All required equipment should be available and prepared before commencing any procedure Procedures should be undertaken in a clean, dedicated procedure room A pleural procedures specific safety checklist should be completed for each patient before and after all pleural procedures (NatSSIPs) checklist should be completed for each pleural procedure list. Procedures should be completed in working hours (usually 9-5) except in an emergency. Thoracic ultrasound must be used for all pleural fluid procedures. Full blood count (FBC), urea and electrolytes (U&E) and liver function tests (LFT) should normally be completed before all non-urgent pleural procedures to identify possible causes of pleural pleural procedures to identify possible causes of plause pleural procedures to identify possible causes of plause pleural pleural pleural pleural pleural ple
 313 314 315 316 		risks of delaying to conduct blood parameters should be placed in the clinical context). Coagulation profile check is not required for pleural procedures if there is no patient history of coagulopathy and the patient is not on anticoagulants.
317		• Physiological parameters should be measured before, and after
318		pleural procedures.
319		• A local sedation policy should be in place where sedation is
320		required.
321		• There should be a clear local plan to deal with significant
322		complications.
323		• All services should collect appropriate data to monitor the
324		complication rate.
325		• The complication rate should be at or below those
326		recommended in the BTS Pleural procedures clinical statement.

327 328 329		Process : Proportion of people who underwent a pleural procedure with a clearly defined safety and procedure protocol including use of a safety (WHO) checklist.
330 331		Numerator : The number of people who underwent a pleural procedure with a clearly defined safety and procedure protocol
332 333		Denominator : Total number of people who underwent a pleural procedure.
334	Description of what the quality statem	ent means for each audience
335	Service providers ensure systems are in	place to monitor and record safe practice.
336	Healthcare providers ensure:	
337 338 339 340	 Patients are assessed appropriately That appropriate safety and proced That protocols are in place to mana That data is collected and presented 	to determine urgency and appropriateness of pleural procedures. ure protocols are followed. ge serious adverse events appropriately. d at local respiratory meetings.
341	Care systems ensure safe pleural procedure services are available.	
342 343	Patients with pleural disease undergo operating practices.	sing pleural procedures should be confident that the unit has safe
344 345 346 347 348	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) BTS Clinical Statement on Pleural Procedures 2023 (3) British Thoracic Society National Pleural Services Organisational Audit Report 2021 (11) BTS Training Standards for Thoracic Ultrasound (TUS) 2019 (6)
349	Other possible national data sources	None identified
350 351 352	Source references	BTS Guideline for Pleural Disease 2023 (2) BTS Clinical Statement on Pleural Procedures 2023 (3) BTS Training Standards for Thoracic Ultrasound (TUS) 2019 (6)
353 354 355 356	Rationale	Pleural procedures are commonly undertaken but are associated with significant risks. The BTS Guideline for Pleural Disease 2023 states that consideration of safety and appropriate preparation are key to good practice.(2)
357 358		Checklists and consent should be implemented in line with National Safety Standard for Invasive Procedures.(9, 10, 12)
359 360		NPSA 2008 and NatSSIPs recommend local incident data are reviewed to aid learning and mitigate risk. (9, 12)

361	Quality Statement: Specialist review	ew in complex pleural disease
362 363 364	Quality statement	All centres that manage pleural effusion should have access to pleural specialist review or advice for complex pleural disease management.
365 366 367 368	Quality measure	Structure : Evidence of local or regional arrangements to ensure that centres that manage complex pleural disease have access to specialist pleural services. Complex pleural effusions include but is not limited to:
369 370 371 372 373 374 375 376 377		 Malignant pleural effusion (MPE) – septated, non-expandable lung (NEL), co-infection. Transudates – resistant and/or undiagnosed transudative effusion. Pleural infection – mutliloculated collections, trapped lung, resistant organisms. Pneumothorax – complex bullous disease, tethered lung and prolonged air leaks. Chylothorax – access to specialist investigation/guidance.
378 379 380 381		Process : An organisation that manages pleural disease should have access to sub-specialist pleural input and can access this advice via regional/national mechanisms. Some, or all of this specialist advice may be available in the index organisation itself.
382		Measure: Access to specialist pathways defined above (yes/no).
383	Description of what the quality staten	nent means for each audience
384 385 386	Service providers ensure that patients way of review or advice to the local tr regional multidisciplinary teams (MDTs	with complex MPE have access to specialist pleural services either by eating team. There should be clear evidence of referral pathways or s) in place.
387 388	Healthcare professionals ensure that p pleural teams. Access may be via defin	atients with complex MPE are reviewed by or discussed with specialist ed referral pathways or a local/regional MDT.
389	Care systems ensure that defined refe	rral pathways or local/regional pleural MDTs are established.
390	Patients with complex MPE will be dis	cussed with regional experts when appropriate.
391	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2)
392	Other possible national data sources	None identified
393	Source references	BTS Guideline for Pleural Disease 2023 (2)
394	Rationale	The incidence of complex MPE is increasingly common.
395 396		The evidence base for management is limited, so often specialist input is required.

397 398	Not all cases will require direct input and so advice, or MDT discussion may be adequate.
399 400 401	The BTS Guideline for Pleural Disease 2023 states that patients with complex MPE and an indwelling pleural catheter (IPC) should be reviewed by specialist pleural services.(2)

- 402 **Quality Statement:** Testing for undiagnosed pleural effusion
- 403 In patients with undiagnosed pleural effusion, pleural fluid Quality statement 404 samples should be sent in sufficient volumes and according to 405 suspected cause, in appropriate containers and for all relevant 406 tests.
- 407 **Quality measure** Structure: Provision should be made within pleural/respiratory 408 services to have access to pleural fluid biochemical tests (including 409 pleural fluid pH for non-purulent collections, LDH, glucose and 410 protein) and microbiological analysis seven days a week. Local 411 protocols should be made available to stipulate the correct volumes 412 and containers for these tests. In addition, provisions should be 413 made to ensure access to additional tests on pleural fluid (e.g. flow 414 cytometry, adenosine deaminase (ADA), etc.) where clinically 415 indicated. 416 Pleural services should have pathology support to allow both smear
- and cell block preparation to be undertaken on pleural fluid cytology 417 samples to optimise diagnostic yield. 418
- Process: Proportion of patients with pleural fluid who undergo 419 420 diagnostic pleural fluid sampling.
- 421 Numerator: Number of patients with undiagnosed pleural effusion 422 where pleural fluid is sent for all appropriate tests given the clinical 423 situation, and with appropriate volume of fluid considering the tests submitted. 424
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Denominator: Total number of patients with pleural effusion indicated for diagnostic sampling.

Description of what the quality statement means for each audience 427

428 Service providers should ensure access to urgent pleural fluid tests seven days a week in addition to access 429 to other additional tests when indicated. They should ensure the presence of local protocols for optimal 430 pleural fluid sampling and processing including (when sufficient fluid available):

- 431 At least 25-50 ml of pleural fluid sent for cytology to allow sufficient cytological analysis
- Where pleural infection is suspected 5-10 ml is sent in each of a plain container, an aerobic blood culture 432 bottle and an anaerobic blood culture bottle 433
- 434 Smear and cell block preparation are undertaken on pleural fluid cytology samples to optimise diagnostic 435 yield
- 436 Healthcare professionals ensure that samples of pleural fluid are sent to the appropriate tests and in the 437 correct volumes and containers to maximise the diagnostic yield.
- 438 Care systems ensure provision of services and equipment to ensure all required tests on pleural fluid samples 439 are carried out with no delays with pathways for transfer of samples from local to other providers for non-440 urgent tests that are clinically indicated.

- **Patients with pleural effusion who undergo diagnostic pleural sampling** will have their pleural fluid samples
- sent in a timely fashion to the appropriate tests to ensure diagnosis in a timely fashion.

443	Relevant existing indicators	BTS Guideline for Pleural Disease 2010 (13)
444		BTS Guideline for Pleural Disease 2023 (2)
445	Other possible national data sources	None indicated
446	Source references	BTS Guideline for Pleural Disease 2023 (2)
447	Rationale	The timely identification of the aetiology of pleural effusion is crucial
448		to effective management. In the case of suspected pleural infection,
449		delay in diagnosis is associated with worse outcomes.
450		Acute presentation with pleural effusion is common, and therefore
451		access to standard biochemical and microbiological tests, including
452		pleural fluid pH measurement should be available seven days a
453		week.
454		Access to other less commonly required tests should be ensured
455		whether through local provisions or outsourcing to other providers.
456		The quality specifications above regarding optimal volume,
457		processing and analysis of pleural fluid are supported by scientific
458		evidence and aim at maximising the diagnostic yield.

459 **Quality Statement:** Pleural biopsy

460 461 462	Quality statement	In patients with undiagnosed pleural effusion, where pleural fluid analysis and imaging are not diagnostic, pleural biopsy should be offered where clinically appropriate.
463	Quality measure	Structure: Provision should be made within pleural services and
464		referral pathways to have access to both thoracoscopic pleural
465		biopsy and radiologically guided (CT or ultrasound) biopsy in the
466		context of a single pleural aspiration cytology being non-diagnostic
467		or non-actionable (i.e. insufficient for molecular analysis).
468		Process: Proportion of patients with suspected malignant pleural
469		disease and non-diagnostic/actionable cytology undergoing pleural
470		biopsy where clinically appropriate
471		Numerator: Number of patients with suspected malignant pleural
472		disease and non-diagnostic/actionable cytology who have a biopsy
473		result recorded in their clinical record.
474		Denominator: Total number of people with non-
475		diagnostic/actionable cytology from initial aspirate where further
476		investigations are appropriate.

477 Description of what the quality statement means for each audience

478 **Service providers** ensure diagnostic pathways allow referral for pleural biopsy in context of non-diagnostic 479 /actionable cytology through a pleural/lung cancer multidisciplinary team (MDT). Access to both 480 radiologically guided pleural biopsy and thoracoscopic biopsy (by local anaesthetic thoracoscopy (LAT) or 481 video-assisted thoracic surgery VATS) must be provided, which may involve referral to a tertiary provider.

482 **Healthcare professionals** ensure that people with suspected malignant pleural disease are offered 483 appropriate diagnostic testing as directed by local multi-disciplinary teams.

484 **Care systems** ensure provision of radiological and thoracoscopic pleural biopsy is available to all secondary 485 care providers and that agreements are in place to facilitate tertiary referral where needed.

486 Patients with malignant pleural disease should have access to diagnostic testing most likely to yield the 487 appropriate diagnosis and then identify appropriate treatment. This may include biopsy using CT or 488 ultrasound guidance, or a minor surgical procedure allowing direct inspection of the pleura.

- 489 **Relevant existing indicators** BTS Guideline for Pleural Disease 2023 (2)
- 490 Other possible national data sources None identified
- 491Source referencesBTS Guideline for Pleural Disease 2023 (2)
- 492RationalePleural biopsy is often required to reach a definitive diagnosis of493malignant disease where pleural fluid cytology is non diagnostic or494non-actionable where targeted therapies may be options.

495 496	Repeating pleural fluid cytology where an adequate initial sample volume (at least 25 ml) has been obtained and is of lower sensitivity
497	than pleural biopsy, and risks introducing unnecessary delay into the diagnostic pathway
499	The BTS Guideline for Pleural Disease 2023 advises performing
500	either a radiological guided biopsy, or thoracoscopy in the diagnosis
501 502	of pleural effusion where a cause has not been established after clinical evaluation. (T and diagnostic pleural aspiration (2)

503	Quality Statement: Access to com	puted tomography (CT) and other imaging modalities
504	Quality statement	In patients with undiagnosed unilateral pleural effusions who need
505		a CT scan, a pleural (late venous) phase contrast CT scan of the
506		chest should be performed. If malignancy is suspected, the CT
507		should also include the abdomen and pelvis.
508	Quality measure	Structure: Protocols within pleural/respiratory services should
509		specify that CT scans ordered for investigation of an undiagnosed
510		pleural effusion are requested with the correct contrast-enhanced
511 512		imaging protocol and that the scans should cover the abdomen and pelvis where malignancy is suspected.
513		Process: Proportion of patients with new pleural effusion on initial
514		imaging who undergo appropriate CT imaging.
515 516		Numerator : Number of appropriate patients with undiagnosed pleural effusion who receive a venous phase CT scan.
517		Denominator : Total number of all appropriate patients with
518		undiagnosed pleural effusion who have had a CT scan.
519	Description of what the quality staten	nent means for each audience
520	Service providers should ensure access	to necessary radiological investigations for patients with undiagnosed
521	pleural effusion including:	
522	Contrast-enhanced CT scans	
523	Additional imaging modalities such	as PET scans or MRI scans
524	Healthcare professionals should ensu	ire that CT scans requested for patients with undiagnosed pleural
525	effusion are late venous post-contrast	scans and that the abdomen and pelvis are scanned when malignancy
526	is suspected.	
527	Care systems ensure provision of sufficient resources to all secondary care providers to provide appropriate	
528	investigations and that agreements are in place to facilitate tertiary referral where necessary.	
529	Patients with an undiagnosed pleural	effusion who are undergoing CT scans for further investigation of the
530	pleural effusion will have a particular scan to diagnose pleural diseases. They may require additional tests in	
531	there is a clinical indication, and these	should be available.
532	Relevant existing indicators	BTS Guideline for Pleural Disease 2010 (13)
533		BTS Guideline for Pleural Disease 2023 (2)
534	Other possible national data sources	Not identified
535	Source references	BTS Guideline for Pleural Disease 2023 (2)
536	Rationale	CT scans are an essential component for the diagnosis of malignant
537		pleural effusion (MPE) and can also show features that support a
538		benign diagnosis (e.g. pleural infection). Contrast-enhancement (in
539		the late venous phase) is important to appropriately examine the

pleura as some of the features, particularly when subtle, will not show on a non-contrast CT scan or an arterial-phase contrastenhanced CT scan. In cases where there is a new unilateral pleural effusion and pulmonary embolism needs to be ruled out, a dual phase CT scan can be considered. In some situations where more information is needed to rule out or

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In some situations where more information is needed to rule out or rule in malignant pleural disease, or to delineate its extent (including involvement of nerves and muscles) other imaging modalities such as PET scans or MRI scans are required.

549	Quality Statement: Definitive man	agement options in malignant pleural effusion (MPE)
550 551 552	Quality statement	All patients with recurrent, symptomatic malignant pleural effusion (MPE) should have access to both talc pleurodesis and indwelling pleural catheter insertion.
553 554 555	Quality measure	Structure : Evidence of local arrangements for delivery of both talc pleurodesis and indwelling pleural catheter via dedicated pleural or respiratory teams.
556 557 558		Patients requiring definitive management should have access to written information and documented discussion about both options.
559 560 561		In cases where lung apposition is adequate, indwelling pleural catheter (IPC) or pleurodesis should be offered based on patient choice.
562 563		In cases of non-expandable lung (NEL), IPC should be offered if clinically appropriate and readily available.
564 565 566		Process : Proportion of patients with proven MPE (cytological or histological evidence), or highly likely MPE (based on imaging) and symptomatic recurrent pleural effusion.
567		Patient Level
568 569 570		Numerator : Number of patients with recurrent and symptomatic MPE and expandable lung that are offered both talc pleurodesis and IPC.
571 572	S C	Denominator : All patients with MPE and recurrent effusion and expandable lung.
573	cx V	Institution Level
574	X	Written patient information is available for both talc pleurodesis and
575		indwelling catheter insertion.
576	Description of what the quality statem	nent means for each audience
577 578 579	Service providers ensure that systems, based on patient preference, with suffice procedures for patients.	, expertise and equipment are in place to carry out either talc or IPC cient access to each intervention to minimise repeated, non- definitive

Healthcare professionals ensure that patients with recurrent MPE are offered both treatments in equipoise
 in cases where either would be technically feasible (patients without non-expansile lung). In patients with
 non-expansile lung, the expertise to identify this and deliver IPC should be available.

583 **Care systems** ensure that adequate expertise and equipment is in place to deliver both interventions.

584 **Patients diagnosed with MPE and recurrent effusion** will be offered a personalised, timely, definitive 585 intervention, with access to both talc pleurodesis and IPC. This is intended to provide control of fluid (and prevent recurrence). Options may include chest tube in hospital and an indwelling pleural catheter as anoutpatient.

588 589	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) Lung Cancer GIRFT Programme National Specialty Report 2022 (4)
590	Other possible national data sources	None identified
591	Source references	BTS Guideline for Pleural Disease 2023 (2)
592 593 594 595 596 597 598	Rationale	 The BTS Guideline for Pleural Disease 2023 recommends that patients with recurrent MPE are offered talc pleurodesis or IPC for definitive management on the basis that this: Prevents repeated procedures. Prevents hospital admission/emergency. Prevents deterioration in performance status and symptoms that may preclude systemic treatment.(2)
599 600 601		Talc pleurodesis and IPCs have consistently been shown to be comparable in terms of breathlessness management and effectiveness in large scale randomised trials.

602	Quality Statement:	Named practitioner in confirmed or suspected malignant diseas
002	Quanty Statement.	Numea practicioner in comminea or suspected manghant diset

603	Quality statement	All patients in the malignant pleural effusion (MPE) diagnosis and
604		treatment pathway should have access to a named practitioner or
605		team (such as a generic email address, pleural specialist nurse or
606		lung cancer nurse) to contact for support/admission avoidance and
607		access to outpatient services.

- 608Quality measureStructure: Evidence of local arrangements to provide contact details609for a named nursing team who can provide written information and610ensure early pleural input when required. The named practitioner611should ensure continuation of care with community teams if612required for indwelling pleural catheter (IPC) management.
- 613**Process**: Proportion of patients in the MPE pathway who have614access to a named practitioner or team.
- 615Numerator: Number of patients with suspected MPE who have616received contact details for a specialist clinical contact.
- 617Denominator: Total number of patients who are on the MPE618pathway.

619 Description of what the quality statement means for each audience

- 620 **Service providers** ensure that a process is in place to provide contact details for named practitioners at the 621 earliest possible point in the MPE pathway.
- 622 **Healthcare professionals** ensure that every patient who is seen in an outpatient pleural service is given the 623 contact details required to ensure they can access the pleural service in a timely manner to prevent 624 unnecessary admission to hospital.
- 625 **Healthcare systems** ensure that there is a clearly defined pathway to ensure provision of a named 626 practitioner e.g. clinical nurse specialist to support patients on the MPE pathway.

627 Patients who are referred to the MPE pathway will be offered contact details and written information to 628 ensure they are able to access the pleural team in a timely manner and avoid hospital admission where 629 possible.

630 631	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) NHS England Clinical Nurse Specialist in Cancer Care 2011 (14)
632	Other possible national data sources	None identified
633	Source references	BTS Guideline for Pleural Disease 2023 (2)
634 635	Rationale	Up to a third of patients with MPE will have a recurrent pleural effusion within two weeks.
636		Patients with clear written information regarding access points for
637		support and repeat procedures can reduce emergency admissions
638		and the burden on acute, unscheduled care, which is typically:

- Burdensome on patients.
- Challenging to access specialists; and less cost effective.

641	Quality Statement: Ambulatory pl	eurodesis in malignant pleural effusion (MPE)
642 643 644	Quality statement	For patients who have an IPC inserted, have expansile lung and wish to prioritise catheter removal, services should be equipped to provide mechanisms to improve pleurodesis success with either
645 646		drainage.
647 648 649 650	Quality measure	Structure : Evidence of local or regional arrangements that allow patients with an IPC in situ, and have expandable lung, to receive talc via the IPC or increased frequency drainage (ideally daily) to improve chances of pleurodesis success and catheter removal.
651 652 653		Process : Proportion of people with MPE and IPC in situ who have access to talc via IPC or aggressive drainage and catheter removal as above.
654 655		Numerator : The number of people with MPE and IPC in situ, without NEL that are offered talc or aggressive drainage +/- IPC removal.
656 657		Denominator : The number of people with MPE and IPC in situ, and do not have non-expandable lung (NEL).
658 659		Process measure: Organisational access or delivery of this service (yes/no)
660	Description of what the quality statem	nent means for each audience
661 662	Service providers ensure systems are i IPC removal.	n place to deliver talc via IPC or aggressive drainage and subsequent
663 664 665	Healthcare professionals ensure that p the options as above to help achieve ca drainage.	atients with IPC in situ are assessed for NEL and if not present, offered theter removal and ensure patients are referred for talc or aggressive
666	Care systems ensure that dedicated ple	eural services are available to provide these specialist interventions.
667 668 669	Patients who opt for ambulatory man strategy to improve the chances of p frequency).	nagement of pleural fluid will be offered at least one management leurodesis and IPC removal (talc pleurodesis or increased drainage
670	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2)
671	Other possible national data sources	None identified
672	Source references	BTS Guideline for Pleural Disease 2023 (2)
673 674 675	Rationale	IPCs can reduce total number of inpatient hospital days and are equivalent to chest drain + talc pleurodesis in the management of breathlessness.

676 677	Trials have shown that talc can be safely delivered as an outpatient via an IPC and improve pleurodesis rates for patients that wish to
678	prioritise IPC removal but would prefer to avoid inpatient hospital
679	stay.
680	Aggressive (daily) drainage of an IPC can also improve pleurodesis
681	rates, and in centres without the resources to deliver talc via the IPC
682	would be a viable alternative.
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- 683 Quality Statement: Prompt sampling of pleural fluid in suspected pleural infection
- 684Quality statementIn the context of respiratory infective symptoms, a unilateral685pleural effusion should be promptly recognised as potential686pleural infection and sampled within 24 hours to confirm or687exclude the diagnosis.
- 688Quality measureStructure: Evidence of local arrangements for early recognition of689pleural infection and prompt sampling of pleural fluid under690ultrasound guidance via dedicated pleural services or radiology
- 691**Process**: Proportion of patients with respiratory infective symptoms692and a unilateral pleural effusion ≥ 2 cm who undergo sampling of the693effusion.
- 694Numerator: Number of patients diagnosed with pleural infection695with a documented presentation to hospital with infective696respiratory symptoms and a unilateral pleural effusion ≥ 2 cm within69730 days prior to diagnosis.
- 698Denominator: Total number of patients diagnosed with pleural699infection.

700 Description of what the quality statement means for each audience

- 701 Service providers ensure systems are in place to carry out appropriate tests which are:
- Pleural fluid pH and biochemistry for diagnosis of pleural infection; and
- Fluid culture and microscopy, sent in blood culture bottles and universal container respectively.
- Report pH results immediately and other biochemical parameters within 24 hours.
- **Healthcare professionals** ensure that a diagnosis of pleural infection is considered in patients with respiratory infective symptoms and unilateral pleural effusion ≥ 2 cm and undergo prompt and appropriate sampling of the effusion by individuals trained in use of thoracic ultrasound and performing pleural procedures.
- 709 **Care systems** ensure that appropriate services and equipment are available for pleural fluid sampling 710 including access to radiology and thoracic ultrasound.
- Patients with symptoms of respiratory infection and a unilateral pleural effusion will have pleural fluid
 sampling to determine the best treatment within 24 hours of diagnosis.

713 714	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) BTS National Pleural Services Organisational Audit 2021 (11)
715	Other possible national data sources	None identified
716 717	Source references	BTS Guideline for Pleural Disease 2023 (2) BTS National Pleural Services Organisational Audit 2021 (11)
718 719	Rationale	People with respiratory infective symptoms and a unilateral pleural effusion may have pleural infection, which may require urgent

720 dr 721 re 722 as	rainage. Therefore, prompt pleural fluid sampling in this context is ecommended to prevent delayed diagnoses known to be associated with worse outcomes and facilitate early treatment.
723 Tł 724 pa	ne BTS Guidelines for Pleural Disease 2023 (2) recommends that in atients with suspected pleural infection:
	Sampled pleural fluid should be sent for culture and microbiology in blood culture bottles and a universal container respectively. Sampled pleural fluid, if not frankly purulent, should be sent for immediate pH measurement to guide drainage decisions. If the initial pH is not diagnostic of pleural infection, or is not available, the lactate dehydrogenase (LDH) and glucose values are used as indicators of probability of pleural infection to guide drainage decisions.

735 737Quality statementPatients with evidence of medical treatment failure* should have access to intrapleural enzyme therapy (IET) and a thoracic surgery oplnion within 48 hours of treatment failure.738 739*Medical treatment failure is defined as cessation of initial chest tube drainage and presence of residual pleural fluid collection despite adequate siting of the chest drain with persistent inflammatory markers and/or ongoing systemic inflammatory response syndrome (SIRS).743 744Quality measureStructure: Evidence of local arrangements to ensure a Standard Operating Procedure for IET and access to thoracic surgery services for either in-person review or remote discussion.746 747 748Process: Proportion of patients with pleural infection and documented medical treatment failure who received either IET and/or thoracic surgery referral within 48 hours.749 750 751Numerator: Number, of patients with pleural infection and documented medical treatment failure.754 752Denominator: Total number of patients with pleural infection and documented medical treatment failure.755 757 758 759 759 759 759 759 759 759 759 759 759 759 759 759 750 750 750 750 751 751 751 752 753754 754 755 756 756 756 757 757 757 758 759 759 759 759 759 759 759 759 759 759 759 759 759 759 759 759 750 750 751 751 751 751 752 753 753754 754 755 755 756 756 756 756 756 756 757 757 757 756 756 7577 7577 7577 756 7567 7560 7577 <th>734</th> <th>Quality Statement: Access to intra</th> <th>apleural enzyme therapy and thoracic surgery</th>	734	Quality Statement: Access to intra	apleural enzyme therapy and thoracic surgery
736 access to intrapleural enzyme therapy (IET) and a thoracic surgery opinion within 48 hours of treatment failure. 737 *Medical treatment failure is defined as cessation of initial chest tube drainage and presence of residual pleural fluid collection despite adequate siting of the chest drain with persistent inflammatory markers and/or ongoing systemic inflammatory response syndrome (SIRS). 743 Quality measure Structure: Evidence of local arrangements to ensure a Standard Operating Procedure for IET and access to thoracic surgery services for either in-person review or remote discussion. 746 Process: Proportion of patients with pleural infection and documented medical treatment failure who received either IET and/or thoracic surgery referral within 48 hours. 752 Denominator: Number of patients with pleural infection and documented medical treatment failure. 754 Description of what the quality statement means for each audience 755 Service providers ensure systems are in place for assessing early medical treatment failure and access to IET and/or thoracic surgery services. 757 Healthcare professionals ensure that a record of the patients with pleural infection and documented medical treatment failure (continued infection), will either is made and that consideration of IET or thoracic surgery opinion is documented. 758 Service providers ensure systems are in place for assessing early medical treatment failure is made and that consideration of IET or thoracic surgery opinion is documented. 759 Care systems ensure that a	735	Quality statement	Patients with evidence of medical treatment failure* should have
737 opinion within 48 hours of treatment failure. 738 *Medical treatment failure is defined as cessation of initial chest 739 tube drainage and presence of residual pleural fluid collection 740 despite adequate siting of the chest drain with persistent 741 inflammatory markers and/or ongoing systemic inflammatory 742 response syndrome (SIRS). 743 Quality measure Structure: Evidence of local arrangements to ensure a Standard 744 Operating Procedure for IET and access to thoracic surgery services 745 Fropersion review or remote discussion. 746 Process: Proportion of patients with pleural infection and 747 and/or thoracic surgery referral within 48 hours. 748 Aumerator: Number of patients with pleural infection and 750 Denominator: Total number of patients with pleural infection and 751 and/or thoracic surgery referral within 48 hours. 752 Denominator: Total number of patients with pleural infection and 753 documented medical treatment failure and access to IET 754 Description of what the quality statement means for each audience 755 Service providers ensure systems are in place for assessing early medical treatment failure and access to	736		access to intrapleural enzyme therapy (IET) and a thoracic surgery
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769 intrapleural enzyme therapy comprised of combination tissue	768	Rationale	The BTS Guideline for Pleural Disease 2023 recommends that
	769		intrapleural enzyme therapy comprised of combination tissue

770	plasminogen activator (tPA) and DNase should be considered for the
771	treatment of pleural infection, where initial chest tube drainage has
772	ceased and leaves a residual pleural collection.(2) The rationale is
773	that intrapleural treatments break down the septations that are
774	formed in the pleural space during pleural infection and reduce fluid
775	viscosity to allow improved drainage of infected fluid.
776	Good practice points for the use of IET in pleural infection, as per the
777	BTS Guideline for Pleural Disease 2023, include:
778	i) Patient consent should be taken when using tPA and DNase as
779	there is a potential risk of pain and bleeding.
780	ii) When administering tPA plus DNase, the regime should be 10
781	mg tPA twice daily (10 mg two times per day) + 5 mg DNase two
782	times per day for 3 days, based on randomised controlled trial
783	data.
784	iii) Based on retrospective case series data, 5 mg tPA two times per
785	day + 5 mg DNase two times per day for 3 days may be as
786	effective and can be used if considered necessary.
787	iv) Reduced doses of tPA may be considered in those with a
788	potentially higher bleeding risk (e.g., those on therapeutic
789	anticoagulation which cannot be temporarily ceased).(2)
790	Despite optimal medical treatment, several patients with pleural
791	infection fail to improve and surgical intervention may be required.
792	Whilst early surgical drainage in pleural infection is not
793	recommended due to lack of evidence, it appears reasonable to
794	obtain a thoracic surgery opinion early if medical treatment fails to
795	allow timely management of pleural infection. VATS access is
796	favoured over thoracotomy for adults in the surgical management
797	of pleural infection.
-	

798 Quality Statement: Follow-up of pleural infection

799 800 801	Quality statement	All patients discharged from hospital with a diagnosis of pleural infection should be reviewed in a specialist clinic within four weeks to ensure ongoing recovery and to detect early relapse/recurrence.
802 803 804 805	Quality measure	Structure : Evidence of local arrangements to ensure patients discharged from hospital with a diagnosis of pleural infection are reviewed in clinic within four weeks; the review should include the following:
806 807 808 809 810 811 812		 Symptom recovery. Review of risk factors for development of pleural infection such as alcohol intake, dental hygiene. Chest X-ray and/or thoracic ultrasound. Blood tests including inflammatory markers, HIV status, immunoglobulin screen and pneumococcal antibody screen. Decision on duration of antibiotic therapy.
813 814		Process : Proportion of patients discharged from hospital with diagnosis of pleural infection and clinic follow-up within four weeks.
815 816		Numerator : Number of patients discharged from hospital with diagnosis of pleural infection and clinic follow-up within four weeks.
817 818		Denominator : Total number of patients discharged from hospital with diagnosis of pleural infection.
819	Description of what the quality statem	ent means for each audience
820 821	Service providers ensure systems are diagnosis of pleural infection within four	in place to follow-up patients discharged from the hospital with a ir weeks.
822 823	Healthcare professionals ensure that for infection takes place within four weeks	ollow-up of patients discharged from hospital with diagnosis of pleural and the quality measures stated above are checked.
824 825	Care systems ensure that follow-up of is carried out within four weeks.	patients discharged from hospital with diagnosis of pleural infection
826 827	Patients discharged from hospital with weeks of hospital discharge.	diagnosis of pleural infection should be reviewed in clinic within four
828 829	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2) BTS National Pleural Services Organisational Audit 2021 (11)
830	Other possible national data sources	None identified
831 832 833	Source references	BTS Guideline for Pleural Disease 2023 (2) BTS National Pleural Services Organisational Audit 2021(11) BTS Pleural Disease Guideline 2010 (15)

834 835 836	Rationale	The BTS Pleural Disease Guideline 2010 states that all patients with pleural infection require outpatient follow-up with a repeat chest x-ray and inflammatory markers.(15)
837 838 839		Early follow-up after hospital discharge allows early detection of relapse or recurrence of pleural infection as these are well-recognised complications.
840 841 842		Identification of risk factors predisposing to development of pleural infection allows for these to be treated, thereby reducing risk of recurrence.

- 843 Quality Statement: Pneumothorax treatment according to preference
- 844Quality statementPatients with primary spontaneous pneumothorax (PSP) should be845offered clinically appropriate treatment according to their846preference (i.e., prioritising symptom relief or avoiding847intervention) unless clinically contraindicated
- 848Quality measureStructure: Evidence of local arrangements for patients with PSP to849have access to all treatments including conservative, ambulatory,850needle aspiration and chest drain.
- 851**Process**: Proportion of patients with PSP who receive clinically852appropriate treatment according to their preference.
- 853Numerator: Number of patients with PSP who receive clinically854appropriate treatment according to their preference to include all855above treatment options.
- 856 **Denominator**: Total number of patients with PSP.
- 857 Description of what the quality statement means for each audience

Service Providers ensure that systems are in place for patients with PSP to be provided treatment of their preference including conservative and ambulatory care, needle aspiration and chest drain insertion A dedicated outpatient follow-up pathway should be in place for patients managed with conservative and ambulatory care.

- Healthcare professionals ensure that the patient with PSP is considered for all treatments based on their
 preference, i.e. either prioritising symptom relief or avoiding intervention, if there is no clinical
 contraindication, i.e. high-risk characteristics or risk of deterioration (which usually requires chest drainage).
- 865 **Care systems** ensure that appropriate pleural and respiratory services with essential equipment and 866 expertise are in place to provide access to all treatments including conservative, ambulatory, needle 867 aspiration and chest drain insertion.
- 868 **Patients with PSP** should be involved in decision-making relating to treatment, including options of no 869 intervention, rapid relief of symptoms if appropriate.

870	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2)
871	Other possible national data sources	None identified
872	Source references	BTS Guideline for Pleural Disease 2023 (2)
873	Rationale	Patients with PSP can be managed in a number of ways. The choice
874		of treatment should be based on the clinical assessment and patient
875		preference provided that there are no high-risk characteristics, a risk
876		of deterioration or a contraindication to their treatment of choice.
877		The BTS Guideline for Pleural Disease 2023 recommends:
878		Conservative management can be considered for the treatment
879		of patients with minimal or no symptoms (i.e., no significant

880 pain or breathlessness and no physiological compromise) who 881 may prioritise avoidance of intervention. 882 Ambulatory management should be considered for the initial • treatment of PSP in adults who prioritise symptom relief, but 883 884 wish to avoid hospital admission, provided they have good support and access to centres with available expertise and 885 follow-up facilities. 886 887 Patients prioritising symptom relief but not suitable for conservative 888 or ambulatory management, needle aspiration or tube drainage 889 should be considered for the initial treatment.(2)

891 892 893 894	Quality statement	Patients with spontaneous pneumothorax and a prolonged air leak* should have their case discussed with thoracic surgeons early (i.e., within 24 hours of diagnosis of prolonged air leak), if clinically appropriate, with a clear documentation of treatment plan
895 896		*Prolonged air leak in pneumothorax is defined as an ongoing air leak detected after 3 to 5 days of treatment with a chest drain.
897 898 899 900	Quality measure	Structure : Evidence of local arrangements for patients with spontaneous pneumothorax and prolonged air leak to have access to a thoracic surgery team for an early (within 48 hours of diagnosis of prolonged air leak) discussion if clinically appropriate.
901 902 903 904		Process : Proportion of patients with spontaneous pneumothorax and prolonged air leak who have their case discussed early with the thoracic surgery team, if clinically appropriate, with a clear documentation of treatment plan.
905 906 907 908		Numerator : Number of patients with spontaneous pneumothorax and prolonged air leak who have their case discussed with the thoracic surgery team, if clinically appropriate, with a clear documentation of treatment plan.
909 910 911		Denominator : Total number of patients with spontaneous pneumothorax and prolonged air leak who are clinically appropriate to be discussed with thoracic surgeons.

912 Description of what the quality statement means for each audience

913 **Service Providers** ensure that systems are in place for patients with spontaneous pneumothorax and 914 prolonged air leak to have access to a thoracic surgery team for an early discussion. This may include transfer 915 to another hospital for provision of care, if thoracic surgery is not on-site.

916 **Healthcare professionals** ensure that the patient with spontaneous pneumothorax and persistent air leak is 917 identified and discussed with the thoracic surgery team with clear documentation to ensure that they are

918 considered for a surgical treatment if clinically appropriate.

- 919 Care systems ensure that appropriate thoracic surgery services are in place for clinically appropriate patients
 920 with spontaneous pneumothorax and prolonged air leak.
- 921 **Clinically appropriate patients with spontaneous pneumothorax and prolonged air leak** should be discussed 922 early with the thoracic surgery team to explore whether surgery is an option; and should have a clear, 923 documented plan of treatment.

924	Relevant existing indicators	BTS Guideline for Pleural Disease 2023 (2)
925		Respiratory Medicine GIRFT Programme National Specialty Report
926		2021 (8)

927 **Other possible national data sources** None identified

928 929 930	Source references	BTS Guideline for Pleural Disease 2023 (2) Respiratory Medicine GIRFT Programme National Specialty Report 2021 (8)
931	Rationale	The management of spontaneous pneumothorax and persistent air
932		leak is complex with limited evidence. Thoracic surgery should be
933		considered for all patients with pneumothorax and persistent air
934		leak as the best option for resolving the air leak and concurrently
935		reducing recurrence risk.
936		Non-surgical options such as autologous blood patch, chemical
937		pleurodesis and endobronchial valves are less efficacious and would
938		usually be offered only to patients not appropriate for surgical
939		intervention.
940		Therefore, early discussion with the thoracic surgery team to
941		consider surgery for persistent air leak will allow prompt treatment

- 943 Quality Statement: Recurrent pneumothorax management
- 944
945Quality statementPatients with spontaneous recurrent pneumothorax* should be
considered for elective surgical recurrence prevention if clinically
appropriate.946*Recurrent pneumothorax includes patients with second ipsilateral
or first contralateral pneumothorax.947Quality measure949Quality measure949Structure: Evidence of local arrangements for patients with
- 950 recurrent pneumothorax to have access to a thoracic surgery team
 951 for elective surgical recurrence prevention where referral to surgery
 952 is clinically appropriate.
 953 Process: Proportion of patients with recurrent (i.e., more than one
- 954episode) pneumothorax who are offered referral to the thoracic955surgery team for elective surgical treatment for recurrence956prevention where referral to surgery is clinically appropriate.
- 957Numerator: Number of patients with recurrent pneumothorax who958are offered referral to the thoracic surgery team for recurrence959prevention where referral to surgery is clinically appropriate.
- 960Denominator:Totalnumberofpatientswithrecurrent961pneumothorax where referral to surgery is clinically appropriate*.
- 962*Where a referral has not been made, evidence of why the patient963is inappropriate for such an intervention will be taken from the964medical notes.
- 965 **Description of what the quality statement means for each audience**

Service Providers ensure that systems are in place for patients with recurrent pneumothorax to have access
 to a thoracic surgery team for elective surgical recurrence prevention where referral to surgery is clinically
 appropriate.

- Healthcare professionals ensure that the patient with recurrent pneumothorax is identified and referred to
 the thoracic surgery team for elective surgical recurrence prevention where referral to surgery is clinically
 appropriate.
- 972 **Care systems** ensure that appropriate thoracic surgery services are available for elective surgical recurrent 973 prevention in patients with recurrent pneumothorax.
- 974 Clinically appropriate patients with recurrent pneumothorax should have access to a thoracic surgery team
 975 to discuss surgical options relating to pneumothorax recurrence prevention.
- 976 **Relevant existing indicators** BTS Guideline for Pleural Disease 2023 (2)
- 977 Other possible national data sources None identified
- 978 **Source references** BTS Guideline for Pleural Disease 2023 (2)

979	Rationale	Patients with recurrent pneumothorax are at high risk of further
980		recurrence. The BTS Pleural Disease Guideline 2023 recommends
981		that elective surgery should be considered for patients with a
982		second ipsilateral or first contralateral pneumothorax in clinically
983		appropriate patients (for example, where the patient is documented
984		as frail or unlikely to manage a surgical intervention, this would be
985		counted as inappropriate).(2)
986		It is important to note that some patients might be considered high-
987		risk after the first episode of pneumothorax e.g. first episode of
988		tension pneumothorax, or high-risk occupations, etc. In this case,
989		elective surgical pneumothorax recurrence prevention may be
990		considered as good practice but is not mandated.
991		

992

993 References

- National Institute for Health and Care Excellence (NICE). Quality standards: process guide 2024. https://www.nice.org.uk/guidance/pmg43/resources/quality-standards-process-guide-pdf-72286834
 672069
- Roberts ME, Rahman NM, Maskell NA, Bibby AC, Blyth KG, Corcoran JP, et al. British Thoracic Society
 Guideline for Pleural Disease. *Thorax*. 2023;78(Suppl 3):s1-s42. https://thorax.bmj.com/content/78/
 Suppl_3/s1.long
- Asciak R, Bedawi EO, Bhatnagar R, Clive AO, Hassan M, Lloyd H, et al. British Thoracic Society Clinical
 Statement on Pleural Procedures. *Thorax*. 2023;78(Suppl 3):s43-s68. https://thorax.bmj.com/content/
 78/Suppl_3/s43.long
- Beckett P, Doffman S. Toy E, Anderson V, Hugh, M. Lung Cancer GIRFT Programme National Specialty
 Report 2022. https://gettingitrightfirsttime.co.uk/wp-content/uploads/2025/01/Lung-Cancer-Nation
 al-Report-07-10j-FINAL.pdf
- 10065.NHS England. National Optimal Lung Cancer Pathway (NOLCP). 2024. https://rmpartners.nhs.uk/wp-1007content/uploads/2024/09/national-optimal-lung-cancer-pathway_v4_01jan2024.pdf
- Stanton AE, Edey A, Evison M, Forrest I, Hippolyte S, Kastelik J, et al. British Thoracic Society Training
 Standards for Thoracic Ultrasound (TUS). *BMJ Open Respir Res.* 2020;7(1). https://bmjopenrespres.
 bmj.com/content/7/1/e000552
- Woolhouse I, Bishop L, Darlison L, De Fonseka D, Edey A, Edwards J, et al. British Thoracic Society
 Guideline for the investigation and management of malignant pleural mesothelioma. *Thorax*.
 2018;73(Suppl 1):i1-i30. https://thorax.bmj.com/content/73/Suppl_1/i1
- 10148.Allen M. Respiratory Medicine GIRFT Programme National Specialty Report. https://gettingit1015rightfirsttime.co.uk/wp-content/uploads/2021/11/Respiratory-Medicine-Oct21L.pdf
- 10169.NHS.NationalPatientSafetyAgency.2008.https://assets.publishing.service.gov.uk/media/10175a7ba827e5274a7202e18938/0721.pdf
- Evison M, Blyth KG, Bhatnagar R, Corcoran J, Saba T, Duncan T, et al. Providing safe and effective pleural medicine services in the UK: an aspirational statement from UK pleural physicians. *BMJ Open Respir Res.* 2018;5(1):e000307. https://bmjopenrespres.bmj.com/content/bmjresp/5/1/e000307.full.pdf

- 1021 11. Stanton AE, Evison M. British Thoracic Society National Pleural Services Organisational Audit 2021.
 1022 https://www.brit-thoracic.org.uk/quality-improvement/clinical-audit/bts-national-audit-reports/
- Centre for Perioperative Care. CfP. National Safety Standards for Invasive Procedures (NatSSIPs 2).
 2023. https://cpoc.org.uk/sites/cpoc/files/documents/2023-02/1.%20CPOC_NatSSIPs_FullVersion_20
 23_0.pdf
- Hooper C, Lee YC, Maskell N, Group BTSPG. Investigation of a unilateral pleural effusion in adults: British
 Thoracic Society Pleural Disease Guideline 2010. *Thorax*. 2010;65 Suppl 2:ii4-17. https://thorax.bmj.
 com/content/65/Suppl_2/ii4.long
- National Cancer Action Team. Clinical Nurse Specialists in Cancer Care; Provision, Proportion and Performance. 2011. https://www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/
 2017/11/Clinical-Nurse-Specialists-in-Cancer-Care_Census-of-the-Nurse-Workforce_Eng-2011.pdf
- 1032 15. Davies HE, Davies RJ, Davies CW, Group BTSPDG. Management of pleural infection in adults: British
 1033 Thoracic Society Pleural Disease Guideline 2010. *Thorax*. 2010;65 Suppl 2:ii41-53. https://
 1034 thorax.bmj.com/content/65/Suppl_2/ii41.long

1035