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British Thoracic Society Quality Standard for Pleural Disease

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Abstract This British Thoracic Society Quality Standard sets out markers of high-quality, cost-effective patient care in pleural disease derived from the best available evidence. It is aimed at healthcare professionals and services providing care and treatment for patients with pleural disease.

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BTS QUALITY STANDARD FOR PLEURAL DISEASE

The British Thoracic Society (BTS) has been at the forefront of the production of guidance for best clinical practice in respiratory medicine, since the Society was established over 40 years ago. This included Guidelines developed using internationally recognised methodology, Clinical Statements based on expert consensus and Quality Standards.

BTS produces Quality Standards for each Guideline to support in the dissemination and implementation of a Guideline's recommendations.

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 pleural disease.

The rationale for these quality standards is drawn from evidence and recommendations summarised in the BTS Guideline for Pleural Disease.[2] A link to the document can be found below:

https://www.brit-thoracic.org.uk/clinical-resources/guidelines/pleural-disease/

This document aims to improve the standards of care for adults with pleural disease. The purpose of the document is to provide commissioners, planners and patients with a guide to the minimum standards of care that patients with pleural disease should expect, together with measurable markers of good practice.

BTS Quality Standards are intended for:

- *Healthcare 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.

METHOD OF WORKING

The BTS convened a Pleural Disease Quality Standard Working Group in March 2024, with the following membership:

Dr Mark E Roberts, Co-chair—Consultant in Respiratory Medicine, Sutton-in-Ashfield
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We would also like to acknowledge Dr John Wrightson, who was part of the original committee for this document and died in May 2024. He was passionate about high-quality clinical pleural delivery and education, and a valued colleague in the pleural community.
Members of the Quality Standards Working Group submitted Declaration of Interest forms in line with BTS policy and copies of forms are available on request from BTS Head Office.
The draft document was considered in detail by the BTS Standards of Care Committee in December 2024.

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.

The quality measures are not intended to be new sets of targets or mandatory indicators for performance management that need to be collected. The quality measures are specified in the form of a numerator and a denominator, which define a proportion or ratio (numerator/denominator). It is assumed that the numerator is a subset of the denominator population. The suggested numerator and denominator are provided to allow healthcare professionals and service providers to examine their clinical performance in relation to each Quality Standard. It is recognised that no national quality indicators will be available for this condition, and institutions will need to agree locally what information is required for the denominator to be used in each case and what the expected level of achievement should be, given local circumstances. A brief description of 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. These have been numbered, but there is no order of priority associated with this. The following is a summary of the 16 quality statements.

Summary of quality statements for pleural disease for non-specialists

1. **Access to services and turnaround of specimens**
If cancer within the pleural space is suspected, a sample should be taken within 5 working days of the initial referral to ensure that a diagnosis is made promptly. Where cancer is identified, additional testing results should be available no more than 10 working days after the sample is taken.

2. **Access to pleural services including ambulatory care**
Problems in the pleural space sometimes need to be managed in hospital but can often be managed as an outpatient. Patients should be able to have a procedure within 5 working days of a decision being made to conduct a 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.

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

4. **Specialist review in complex pleural disease**
Every hospital that manages pleural disease should have a way to access a specialist in pleural disease to discuss complex or unusual cases.

5. **Testing for undiagnosed pleural effusion**
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.

6. **Pleural biopsy**
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.

7. **Access to CT and other imaging modalities**
A CT scan with contrast should usually be performed where a patient has fluid around only one lung. This helps with diagnosis as underlying cancer is the most common cause of this fluid. It can also help with making other diagnoses.

Summary of quality statements for pleural disease for non-specialists

8. **Definitive management options in malignant pleural effusion (MPE)**
Where the cause of the fluid around the lung 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 then stay in the pleural space longer term until all the fluid is removed. This can be managed in the patient's usual place of residence. Both options should be offered to the patient where appropriate to their disease.

9. **Named practitioner in confirmed or suspected malignant disease**
Where the diagnosis is cancer, the patient should have access to a specialist practitioner or team to contact for support. This is so the patient can access care directly without needing to use emergency pathways (eg, the emergency department).

10. **Ambulatory pleurodesis in MPE**
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 services should be available to patients.

11. **Prompt sampling of pleural fluid in suspected pleural infection**
Sometimes fluid around the lung is caused by infection in the pleural space. In circumstances where this is suspected, prompt investigation and treatment are required. The fluid should be sampled within 24 hours of the diagnosis being suspected, including a risk/benefit analysis of procedures where patients are on anti-coagulation at presentation. Hospital tests should be available to support this diagnosis.

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

13. **Follow-up of pleural infection**
Where a patient has been treated for infection within the pleural space, they should be followed up in the outpatient clinic within 4 weeks of discharge to ensure that they are recovering as expected.

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

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

16. **Recurrent pneumothorax management**
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 option, there should be an opportunity to discuss surgical options to prevent recurrence.

1. Quality statement: Access to services and turnaround of specimens	
	Patients undergoing investigation for pleural malignancy should have appropriate diagnostic sampling performed within 5 working days of referral, with initial pathology results available within 3 working days of sampling and molecular markers within 10 working days of sampling.
Quality measure	***Structure***: Evidence of local or regional arrangements to ensure that suitable patients have timely access to pleural investigations including pleural biopsy, particularly where there is a high suspicion of mesothelioma or other malignancies with a low cytological yield. ***Process***: Proportion of suitable patients with suspected pleural malignancy (new unilateral pleural effusion without suspicion of infection) who have access to specialist pleural investigations with final results available within 10 working days of referral. ***Numerator***: Number of patients who have pleural malignancy diagnosed (including tissue typing) within 10 working days of referral in whom investigation is appropriate. ***Denominator***: All patients with suspected pleural malignancy in whom investigation is appropriate.
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 1 week of referral. Systems should also be in place to ensure pathology results, including molecular testing, are available within a further 10 working 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 working days. ***Care systems*** establish defined pathways to reduce unnecessary delays and ensure investigation most likely to yield a diagnosis is performed. ***Patients*** will be appropriately investigated with minimal delays, optimising pathways and reducing anxiety.
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]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	Patients undergoing investigation for pleural malignancy often experience unnecessary delays. 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 cytology sampling or repeated cytological sampling in low cytological yield tumours) and pathological reporting. 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 anxiety.

2. Quality statement: Access to pleural services including ambulatory care	
	Patients requiring a pleural procedure should have rapid access to services, which should include ambulatory care where clinically appropriate.
Quality measure	***Structure***: Evidence of local arrangements to ensure rapid access to services, including ambulatory care where appropriate and which should include the following: ► For symptomatic or undiagnosed pleural effusion, where a pleural procedure is clinically indicated, it should be offered within 5 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 catheters, should be available with appropriate support. ► 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 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. ***Numerator***: The number of people with symptomatic and/or undiagnosed pleural effusion requiring a pleural procedure or opinion who were offered a procedure within 5 days and who had access to ambulatory care. ***Denominator***: The total number of people requiring a pleural procedure for fluid.

2. Quality statement: Access to pleural services including ambulatory care (Continued)	
	Patients requiring a pleural procedure should have rapid access to services, which should include ambulatory care where clinically appropriate.
Description of what the quality statement means for each audience	***Service providers*** ensure: ► 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, 7 days a week. ► Access to an ambulatory pathway for the management of pleural disease. ► A readily accessible point of access (eg, mobile phone or email service) to pleural service or a specialist pleural nurse or equivalent. ***Healthcare professionals*** **ensure**: ► Access to or offer of a pleural procedure for drainage of pleural fluid in outpatients is available within 5 working 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. ***Patients with pleural disease*** will: ► Have access to diagnostic and/or symptomatic drainage within 5 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, 7 days a week.
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]
Other possible national data sources	None identified
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]
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] The GIRFT 2021 recommends one band 6 pleural specialist nurse per 300 pleural procedures undertaken.[8] Pleural procedures should only be undertaken by staff with relevant competencies.[3 6 9 10] 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]

3. Quality statement: Safety protocols	
	All services undertaking pleural procedures should have clearly defined safety and procedure protocols which must be followed to reduce risk of harm and complications.
Quality measure	***Structure***: Evidence of local arrangements to ensure that services have clearly defined protocols which should include: ► 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 diagnostic images stored in an appropriate PACS archive. ► All required equipment should be available and prepared before commencing any procedure. Procedures should be undertaken in a clean, dedicated procedure room unless the clinical situation does not permit this (eg, a patient on intensive care). ► A pleural procedures specific safety LocSSIP (Local Safety Standard for Invasive Procedures) should be completed for each patient before and after all pleural procedures. A Team brief should be completed for each pleural procedure list. ► Procedures should be completed in working hours (usually 9–5) except in an emergency. ► Peri-procedural thoracic ultrasound must be used for all pleural fluid procedures unless real-time CT imaging is more appropriate. ► 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 pathology (where an urgent procedure is required, the risks of delaying to conduct blood parameters should be placed in the clinical context). A coagulation profile check is generally not required for pleural procedures if there is no patient history or suspicion of coagulopathy and the patient is not on anticoagulants. ► Usual physiological parameters (pulse, blood pressure, saturation and respiratory rate) should be measured before and after pleural procedures. ► A local sedation policy should be in place where sedation is required. ► There should be a clear local plan to deal with haemorrhage associated with pleural procedures. ► All services should collect appropriate data to monitor complication rates. ► The complication rate should be at or below those recommended in the BTS Pleural procedures clinical statement. ***Process***: Proportion of people who underwent a pleural procedure with a clearly defined safety and procedure protocol including use of a safety LocSSIP. ***Numerator***: The number of people who underwent a pleural procedure with a clearly defined safety and procedure protocol and completed LocSSIP. ***Denominator***: Total number of people who underwent a pleural procedure.
Description of what the quality statement means for each audience	***Service providers*** ensure systems are in place to monitor and record safe practice. ***Healthcare providers*** ensure: ► Patients are assessed appropriately to determine urgency and appropriateness of pleural procedures. ► That appropriate safety and procedure protocols are followed. ► That protocols are in place to manage serious adverse events appropriately. ► That data are collected and presented at local governance meetings. ***Care systems*** ensure safe pleural procedure services are available. ***Patients with pleural disease undergoing pleural procedures*** should be confident that the unit has safe operating practices.
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]
Other possible national data sources	None identified
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]
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 is key to good practice.[2] LocSSIP and consent should be implemented in line with National Safety Standard for Invasive Procedures.[9 10 12] NPSA 2008 and NatSSIPs recommend local incident data are reviewed to aid learning and mitigate risk.[9 12]

4. Quality statement: Specialist review in complex pleural disease	
	All centres that manage pleural disease should have access to pleural specialist review or advice for complex pleural disease management.
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 disease includes but is not limited to: ► Malignant pleural effusion (MPE): septated, non-expandable lung (NEL), co-infection. ► Transudates: resistant and/or undiagnosed transudative effusion. ► Pleural infection: multiloculated collections, NEL, resistant organisms, bronchopleural fistula. ► Pneumothorax: complex bullous disease, tethered lung and prolonged air leaks. ► Chylothorax: access to specialist investigation/guidance. ***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. ***Measure***: Access to specialist pathways defined above (yes/no).
Description of what the quality statement means for each audience	***Service providers*** ensure that patients with complex pleural disease, including malignancy, infection and pneumothorax, have access to specialist pleural services either by way of review or advice to the local treating team. There should be clear evidence of referral pathways or regional multidisciplinary teams (MDTs) in place. ***Healthcare professionals*** ensure that patients with complex pleural disease are reviewed by or discussed with specialist pleural teams. Access may be via defined referral pathways or a local/regional MDT. ***Care systems*** ensure that defined referral pathways or local/regional pleural MDTs are established. ***Patients with complex pleural disease*** will be discussed with regional experts when appropriate.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	The incidence of complex MPE is increasingly common. The evidence base for management is limited, so often specialist input is required. Not all cases will require direct input, and so advice or MDT discussion may be adequate. The BTS Guideline for Pleural Disease 2023 states that patients with complex MPE and an indwelling pleural catheter (IPC) should have access to specialist pleural services.[2]

5. Quality statement: Testing for undiagnosed pleural effusion	
	In patients with undiagnosed pleural effusion, pleural fluid samples should be sent in sufficient volumes and according to suspected cause, in appropriate containers and for all relevant tests.
Quality measure	***Structure***: Provision should be made within pleural/respiratory services to have access to pleural fluid biochemical tests (including pleural fluid pH for non-purulent collections, lactate dehydrogenase (LDH), glucose and protein) and microbiological analysis 7 days a week. Local protocols should be made available to stipulate the correct volumes and containers for these tests. In addition, provisions should be made to ensure access to additional tests on pleural fluid (eg, flow cytometry, adenosine deaminase (ADA), etc) where clinically indicated. Non-purulent pH measurement will usually be achieved with analysis using a blood-gas machine. Pleural services should have pathology support to allow both smear and cell block preparation to be undertaken on pleural fluid cytology samples to optimise diagnostic yield. ***Process***: Proportion of patients with pleural fluid who undergo diagnostic pleural fluid sampling. ***Numerator***: Number of patients with undiagnosed pleural effusion where pleural fluid is sent for all appropriate tests given the clinical situation, and with appropriate volume of fluid considering the tests submitted. ***Denominator***: Total number of patients with pleural effusion indicated for diagnostic sampling.

5. Quality statement: Testing for undiagnosed pleural effusion (Continued)	
	In patients with undiagnosed pleural effusion, pleural fluid samples should be sent in sufficient volumes and according to suspected cause, in appropriate containers and for all relevant tests.
Description of what the quality statement means for each audience	***Service providers*** should ensure access to urgent pleural fluid tests 7 days a week in addition to access to other additional tests when indicated. They should ensure the presence of local protocols for optimal pleural fluid sampling and processing including (when sufficient fluid is available): ► 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 bottle and an anaerobic blood culture bottle. Blood culture bottles should be prioritised where available fluid volumes are small. ► Smear and cell block preparation are undertaken on pleural fluid cytology samples to optimise diagnostic yield. ***Healthcare professionals*** ensure that samples of pleural fluid are sent to the appropriate tests and in the correct volumes and containers to maximise the diagnostic yield. ***Care systems*** ensure provision of services and equipment to ensure all required tests on pleural fluid samples are carried out with no delays with pathways for transfer of samples from local to other providers for non-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 for the appropriate tests to ensure diagnosis in a timely fashion.
Relevant existing indicators	BTS Guideline for Pleural Disease 2010[13] BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None indicated
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	The timely identification of the aetiology of pleural effusion is crucial to effective management. In the case of suspected pleural infection, delay in diagnosis is associated with worse outcomes. Acute presentation with pleural effusion is common, and therefore access to standard biochemical and microbiological tests, including pleural fluid pH measurement, should be available 7 days a week. Access to other less commonly required tests should be ensured whether through local provision or outsourcing to other providers. The quality specifications above regarding optimal volume, processing and analysis of pleural fluid are supported by scientific evidence and aim at maximising diagnostic yield.

6. Quality statement: Pleural biopsy	
	In patients with undiagnosed pleural effusion, where pleural fluid analysis and imaging are not diagnostic, pleural biopsy should be offered where clinically appropriate.
Quality measure	***Structure***: Provision should be made within pleural services and referral pathways to have access to both thoracoscopic pleural biopsy and radiologically guided (CT or ultrasound) biopsy in the context of a single pleural aspiration cytology being non-diagnostic or non-actionable (ie, insufficient for molecular analysis). There is additionally a role for pleural biopsy in diagnosing other non-malignant conditions (eg, TB). ***Process***: Proportion of patients with suspected malignant pleural disease and non-diagnostic/actionable cytology undergoing pleural biopsy where clinically appropriate. ***Numerator***: Number of patients with suspected malignant pleural disease and non-diagnostic/actionable cytology who have a biopsy result recorded in their clinical record. ***Denominator***: Total number of people with non-diagnostic/actionable cytology from initial aspirate where further investigations are appropriate.
Description of what the quality statement means for each audience	***Service providers*** ensure diagnostic pathways allow referral for pleural biopsy in the context of non-diagnostic/actionable cytology or suspicion of other pleural disease where pleural biopsy is helpful. Access to both radiologically guided pleural biopsy and thoracoscopic biopsy (by local anaesthetic thoracoscopy (LAT) or video-assisted thoracic surgery (VATS)) must be provided, which may involve referral to a tertiary provider. ***Healthcare professionals*** ensure that people with undiagnosed pleural disease are offered appropriate diagnostic testing as directed by local multidisciplinary teams. ***Care systems*** ensure provision of radiological and thoracoscopic pleural biopsy is available to all secondary care providers and that agreements are in place to facilitate tertiary referral where needed. ***Patients with pleural disease*** should have access to diagnostic testing most likely to yield the appropriate diagnosis and then identify appropriate treatment. This may include biopsy using CT or ultrasound guidance, or a minor surgical procedure allowing direct inspection of the pleura.

6. Quality statement: Pleural biopsy (Continued)	
	In patients with undiagnosed pleural effusion, where pleural fluid analysis and imaging are not diagnostic, pleural biopsy should be offered where clinically appropriate.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	Pleural biopsy is often required to reach a definitive diagnosis of malignant disease where pleural fluid cytology is non-diagnostic or non-actionable where targeted therapies may be options. Repeating pleural fluid cytology where an adequate initial sample volume (at least 25 mL) has been obtained and is of lower sensitivity than pleural biopsy, and risks introducing unnecessary delay into the diagnostic pathway. The BTS Guideline for Pleural Disease 2023 advises performing either a radiological guided biopsy or thoracoscopy in the diagnosis of pleural effusion where a cause has not been established after clinical evaluation, CT and diagnostic pleural aspiration.[2]

7. Quality statement: Access to CT and other imaging modalities	
	In patients with undiagnosed unilateral pleural effusions who need a CT scan, a pleural (late venous) phase contrast CT scan of the chest should be performed. If malignancy is suspected, the CT should also include the abdomen and pelvis. Other imaging modalities, including PET and MRI, should be available as required.
Quality measure	***Structure***: Protocols within pleural/respiratory services should specify that CT scans ordered for investigation of an undiagnosed pleural effusion are requested with the correct contrast-enhanced imaging protocol and that the scans should cover the abdomen and pelvis where malignancy is suspected. ***Process***: Proportion of patients with new pleural effusion on initial imaging who undergo appropriate CT imaging. ***Numerator***: Number of appropriate patients with undiagnosed pleural effusion who receive a venous phase CT scan. ***Denominator***: Total number of all appropriate patients with undiagnosed pleural effusion who have had a CT scan.
Description of what the quality statement means for each audience	***Service providers*** should ensure access to necessary radiological investigations for patients with undiagnosed pleural effusion including: ► Contrast-enhanced CT scans. ► Additional imaging modalities such as PET scans or MRI scans. ***Healthcare professionals*** should ensure that CT scans requested for patients with undiagnosed pleural effusion are late venous post-contrast scans and that the abdomen and pelvis are scanned when malignancy is suspected. ***Care systems*** ensure provision of sufficient resources to all secondary care providers to provide appropriate investigations and that agreements are in place to facilitate tertiary referral where necessary. ***Patients with an undiagnosed pleural effusion who are undergoing CT scans for further investigation of the pleural effusion*** will have a particular scan to diagnose pleural diseases. They may require additional tests if there is a clinical indication, and these should be available.
Relevant existing indicators	BTS Guideline for Pleural Disease 2010[13] BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	CT scans are an essential component for the diagnosis of malignant pleural effusion (MPE) and can also show features that support a benign diagnosis (eg, pleural infection). Contrast enhancement (in 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 contrast-enhanced 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 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.

8. Quality statement: Definitive management options in malignant pleural effusion (MPE)	
	All patients with recurrent, symptomatic malignant pleural effusion (MPE) should have access to both talc pleurodesis and indwelling pleural catheter insertion.
Quality measure	***Structure***: Evidence of local arrangements for delivery of both talc pleurodesis and indwelling pleural catheter via dedicated pleural or respiratory teams. Patients requiring definitive management should have access to written information and documented discussion about both options. In cases where lung apposition is adequate, indwelling pleural catheter (IPC) or pleurodesis should be offered based on patient choice. In cases of non-expandable lung (NEL), IPC should be offered if clinically appropriate. ***Process***: Proportion of patients with proven MPE (cytological or histological evidence), or highly likely MPE (based on imaging) and symptomatic recurrent pleural effusion. ***Patient level*** ***Numerator***: Number of patients with recurrent and symptomatic MPE and expandable lung that are offered both talc pleurodesis and IPC. ***Denominator***: All patients with MPE and recurrent effusion and expandable lung. ***Institution level*** Written patient information is available for both talc pleurodesis and indwelling catheter insertion.
Description of what the quality statement means for each audience	***Service providers*** ensure that systems, expertise and equipment are in place to carry out either talc or IPC based on patient preference, with sufficient access to each intervention to minimise repeated, non-definitive procedures for patients. ***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-expandable lung). In patients with non-expandable lung, the expertise to identify this and deliver IPC should be available. ***Care systems*** ensure that adequate expertise and equipment are in place to deliver both interventions. ***Patients diagnosed with MPE and recurrent effusion*** will be offered a personalised, timely, definitive intervention, with access to both talc pleurodesis and IPC. This is intended to provide control of fluid (and prevent recurrence). Options may include a chest tube in hospital and an indwelling pleural catheter as an outpatient.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] Lung GIRFT Programme National Specialty Report 2022[4]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
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] Talc pleurodesis and IPCs have consistently been shown to be comparable in terms of breathlessness management in large scale randomised trials.

9. Quality statement: Named practitioner in confirmed or suspected malignant disease	
	Patients referred to a pleural service should have phone or email access to a named support person or team at all stages of their pleural diagnostic and treatment pathway.
Quality measure	***Structure***: Evidence of local arrangements to provide contact details for a named clinical team who can provide written information and ensure early pleural input when required. The named practitioner should ensure continuation of care with community teams if required for indwelling pleural catheter (IPC) management. ***Process***: Proportion of patients with confirmed or suspected malignant pleural effusion (MPE) who have access to a named practitioner or team. ***Numerator***: Number of patients with suspected MPE who have received contact details for a specialist clinical contact. ***Denominator***: Total number of patients with confirmed or suspected MPE.

9. Quality statement: Named practitioner in confirmed or suspected malignant disease (Continued)	
	Patients referred to a pleural service should have phone or email access to a named support person or team at all stages of their pleural diagnostic and treatment pathway.
Description of what the quality statement means for each audience	***Service providers*** ensure that a process is in place to provide contact details for named practitioners at the earliest possible point in the MPE pathway. ***Healthcare professionals*** ensure that every patient who is seen in an outpatient pleural service with confirmed or suspected MPE is given the contact details required to ensure they can access the pleural service in a timely manner to prevent unnecessary admission to hospital. ***Healthcare systems*** ensure that there is a clearly defined pathway to ensure provision of a named practitioner eg, clinical nurse specialist to support patients on the MPE pathway. ***Patients who are referred to the MPE pathway*** will be offered contact details and written information to ensure they are able to access the pleural team in a timely manner and avoid hospital admission where possible.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] NHS England Clinical Nurse Specialist in Cancer Care 2011[14]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	Up to a third of patients with MPE will have a recurrent pleural effusion within 2 weeks. Patients with clear written information regarding access points for support and repeat procedures can reduce emergency admissions and the burden on acute, unscheduled care, which is typically burdensome on patients.

10. Quality statement: Ambulatory pleurodesis in malignant pleural effusion (MPE)	
	For patients who have an indwelling pleural catheter (IPC) inserted, and do not have non-expandable lung, services should be equipped to provide mechanisms to improve pleurodesis success with either talc delivered via IPC or aggressive drainage.
Quality measure	***Structure***: Evidence of local or regional arrangements that allow patients with an IPC in situ, and do not have non-expandable lung, to receive talc via the IPC or increased frequency drainage (ideally daily) to improve chances of pleurodesis success and catheter removal. ***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. ***Numerator***: The number of people with MPE and IPC in situ, without NEL, who are offered talc or aggressive drainage ± IPC removal. ***Denominator***: The number of people with MPE and IPC in situ, who do not have NEL, and wish to prioritise removal of the IPC. ***Process measure***: Organisational access or delivery of this service (yes/no).
Description of what the quality statement means for each audience	***Service providers*** ensure systems are in place to deliver talc via IPC or aggressive drainage and subsequent IPC removal including relevant community services. ***Healthcare professionals*** ensure that patients with IPC in situ are assessed for NEL and if not present, offered the options as above to help achieve catheter removal and ensure patients are referred for talc or aggressive drainage. ***Care systems*** ensure that dedicated pleural services are available to provide these specialist interventions including liaison with community services. ***Patients who opt for ambulatory management of pleural fluid*** will be offered at least one management strategy to improve the chances of pleurodesis and IPC removal (talc pleurodesis or increased drainage frequency).
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	IPCs can reduce total number of inpatient hospital days and are equivalent to chest drain + talc pleurodesis in the management of breathlessness. Trials have shown that talc can be safely delivered as an outpatient via an IPC and improve pleurodesis rates for patients who wish to prioritise IPC removal but would prefer to avoid inpatient hospital stay. Aggressive (daily) drainage of an IPC can also improve pleurodesis rates, and in centres without the resources to deliver talc via the IPC, this may be a viable alternative.

11. Quality statement: Prompt sampling of pleural fluid in suspected pleural infection	
	In the context of respiratory infective symptoms, a unilateral pleural effusion should be promptly recognised as potential pleural infection and sampled within 24 hours if appropriate to confirm or exclude the diagnosis.
Quality measure	***Structure***: Evidence of local arrangements for early recognition of pleural infection and prompt sampling of pleural fluid under ultrasound guidance via dedicated pleural services or radiology ***Process***: Proportion of patients with respiratory infective symptoms and a unilateral pleural effusion ≥2 cm on ultrasound imaging who undergo sampling of the effusion. ***Numerator***: Number of patients diagnosed with pleural infection with a documented presentation to hospital with infective respiratory symptoms and a unilateral pleural effusion ≥2 cm within 30 days prior to diagnosis who undergo fluid sampling within 24 hours of presentation. ***Denominator***: Total number of patients diagnosed with pleural infection.
Description of what the quality statement means for each audience	***Service providers*** ensure systems are in place to carry out appropriate tests which are: ► Pleural fluid pH and biochemistry for diagnosis of pleural infection. ► 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 the use of thoracic ultrasound and performing pleural procedures. This may include an assessment of the risk of proceeding/delaying in the presence of antiplatelet or anticoagulant treatment. ***Care systems*** ensure that appropriate services and equipment are available for pleural fluid sampling 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.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11]
Rationale	People with respiratory infective symptoms and a unilateral pleural effusion may have pleural infection, which may require urgent drainage. Therefore, prompt pleural fluid sampling in this context is recommended to prevent delayed diagnoses, known to be associated with worse outcomes, and facilitate early treatment. The BTS Guideline for Pleural Disease 2023[2] recommends that in patients with suspected pleural infection: ► Sampled pleural fluid should be sent for culture and microbiology in blood culture bottles and a universal container. ► 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.

12. Quality statement: Access to intrapleural enzyme therapy and thoracic surgery	
	Patients with evidence of medical treatment failure* should have access to intrapleural enzyme therapy (IET) and a thoracic surgery opinion within 48 hours of treatment failure. **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).*
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. ***Process***: Proportion of patients with pleural infection and documented medical treatment failure who received either IET and/or thoracic surgery referral within 48 hours. ***Numerator***: Number of patients with pleural infection and documented medical treatment failure who received either IET and/or thoracic surgery referral within 48 hours where clinically appropriate. ***Denominator***: Total number of patients with pleural infection and documented medical treatment failure where clinically appropriate.

12. Quality statement: Access to intrapleural enzyme therapy and thoracic surgery (Continued)	
	Patients with evidence of medical treatment failure* should have access to intrapleural enzyme therapy (IET) and a thoracic surgery opinion within 48 hours of treatment failure. **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).*
Description of what the quality statement means for each audience	***Service providers*** ensure systems are in place for assessing early medical treatment failure and access to IET and/or thoracic surgery services. ***Healthcare professionals*** ensure that a record of the patients with pleural infection and evidence of medical treatment failure is made and that consideration of IET or thoracic surgery opinion is documented. ***Care systems*** ensure that appropriate services are available to enable access to IET and/or thoracic surgery services. ***Patients with pleural infection and evidence of medical treatment failure (continued infection)*** will either be referred for surgical treatment or be offered enzyme treatment via the chest tube.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11]
Rationale	The BTS Guideline for Pleural Disease 2023 recommends that intrapleural enzyme therapy comprised of combination tissue plasminogen activator (tPA) and DNase should be considered for the treatment of pleural infection, where initial chest tube drainage has ceased and leaves a residual pleural collection.[2] The rationale is that intrapleural treatments break down the septations that are formed in the pleural space during pleural infection and reduce fluid viscosity to allow improved drainage of infected fluid. Despite optimal medical treatment, some patients with pleural infection fail to improve and surgical intervention may be required. While there is no evidence to support early surgical drainage in pleural infection, it is reasonable to obtain a thoracic surgery opinion early if medical treatment fails to allow timely management of pleural infection. VATS access is favoured over thoracotomy for adults in the surgical management of pleural infection.

13. Quality statement: Follow-up of pleural infection	
	All patients discharged from hospital with a diagnosis of pleural infection should be reviewed in a specialist clinic within 4 weeks to ensure ongoing recovery and to detect early relapse/recurrence.
Quality measure	***Structure***: Evidence of local arrangements to ensure patients discharged from hospital with a diagnosis of pleural infection are reviewed in clinic within 4 weeks; the review should include the following: ► Symptom recovery. ► Review of risk factors for development of pleural infection such as alcohol intake and dental hygiene. ► Chest X-ray and/or thoracic ultrasound. ► Blood tests including inflammatory markers and consideration of HIV status, immunoglobulin screen and pneumococcal antibody screen. ► Decision on duration of antibiotic therapy. ***Process***: Proportion of patients discharged from hospital with a diagnosis of pleural infection and clinic follow-up within 4 weeks of discharge. ***Numerator***: Number of patients discharged from hospital with a diagnosis of pleural infection and clinic follow-up within 4 weeks of discharge. ***Denominator***: Total number of patients discharged from hospital with a diagnosis of pleural infection.
Description of what the quality statement means for each audience	***Service providers*** ensure systems are in place to follow up patients discharged from the hospital with a diagnosis of pleural infection within 4 weeks. ***Healthcare professionals*** ensure that follow-up of patients discharged from hospital with a diagnosis of pleural infection takes place within 4 weeks and the quality measures stated above are checked. ***Care systems*** ensure that facilities are in place to allow the follow-up of patients discharged from hospital with a diagnosis of pleural infection to be carried out within 4 weeks of discharge. ***Patients discharged from hospital with a diagnosis of pleural infection*** should be reviewed in clinic within 4 weeks of hospital discharge.

13. Quality statement: Follow-up of pleural infection (Continued)	
	All patients discharged from hospital with a diagnosis of pleural infection should be reviewed in a specialist clinic within 4 weeks to ensure ongoing recovery and to detect early relapse/recurrence.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2] BTS National Pleural Services Organisational Audit 2021[11] BTS Pleural Disease Guideline 2010[15]
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] Early follow-up after hospital discharge allows early detection of relapse or recurrence of pleural infection as these are well-recognised complications. It should be recognised that there is currently little evidence to support ideal follow-up duration. Patients discharged on intravenous antibiotics at home, or early after admission, may need earlier follow-up than patients who are closer to completing their antibiotic course. Identification of risk factors predisposing to the development of pleural infection allows for these to be treated, thereby reducing the risk of recurrence.

14. Quality statement: Pneumothorax treatment according to preference	
	Patients with primary spontaneous pneumothorax (PSP) should be offered clinically appropriate treatment according to their preference (ie, prioritising symptom relief or avoiding intervention) unless clinically contraindicated.
Quality measure	***Structure***: Evidence of local arrangements for patients with PSP to have access to all treatments including conservative, ambulatory, needle aspiration and chest drain. ***Process***: Proportion of patients with PSP who receive clinically appropriate treatment according to their preference. ***Numerator***: Number of patients with PSP who receive clinically appropriate treatment according to their preference to include all above treatment options. ***Denominator***: Total number of patients with PSP.
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, that is, either prioritising symptom relief or avoiding intervention where clinically appropriate (high-risk characteristics or risk of deterioration - this usually requires chest drain insertion). ***Care systems*** ensure that appropriate pleural and respiratory services with essential equipment and expertise are in place to provide access to all treatments including conservative, ambulatory, needle aspiration and chest drain insertion. ***Patients with PSP*** should be involved in decision-making relating to treatment, including options of no intervention and rapid relief of symptoms if appropriate.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	Patients with PSP can be managed in a number of ways. The choice of treatment should be based on the clinical assessment and patient preference, provided that there are no high-risk characteristics, a risk of deterioration or a contraindication to their treatment of choice. The BTS Guideline for Pleural Disease 2023 recommends: ► Conservative management can be considered for the treatment of patients with minimal or no symptoms (ie, no significant pain or breathlessness and no physiological compromise) who may prioritise avoidance of intervention. ► Ambulatory management should be considered for the initial treatment of PSP in adults who prioritise symptom relief but wish to avoid hospital admission, provided they have good support and access to centres with available expertise and follow-up facilities. Patients prioritising symptom relief but not suitable for conservative or ambulatory management, needle aspiration or tube drainage should be considered for the initial treatment.[2]

15. Quality statement: Prolonged air leak	
	Patients with spontaneous pneumothorax and a prolonged air leak* should have their case discussed with thoracic surgeons early if clinically appropriate, with a clear documentation of treatment plan (ie, within 24 hours of diagnosis of prolonged air leak). **Prolonged air leak in pneumothorax is defined as an ongoing air leak detected after 3–5 days of treatment with a chest drain.*
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 discussion if clinically appropriate (within 24 hours of diagnosis of prolonged air leak). ***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 clear documentation of treatment plan. ***Numerator***: Number of patients with spontaneous pneumothorax and prolonged air leak who have their case discussed with the thoracic surgery team within 24 hours of diagnosis of prolonged air leak, if clinically appropriate, with clear documentation of treatment plan. ***Denominator***: Total number of patients with spontaneous pneumothorax and prolonged air leak who are clinically appropriate to be discussed with thoracic surgeons.
Description of what the quality statement means for each audience	***Service providers*** ensure that systems are in place for patients with spontaneous pneumothorax and prolonged air leak to have access to a thoracic surgery team for an early discussion. This may include transfer to another hospital for provision of care, if thoracic surgery is not on-site. ***Healthcare professionals*** ensure that the patient with spontaneous pneumothorax and persistent air leak is identified and discussed with the thoracic surgery team with clear documentation to ensure that they are considered for a surgical treatment if clinically appropriate. ***Care systems*** ensure that appropriate thoracic surgery services are in place for clinically appropriate patients with spontaneous pneumothorax and prolonged air leak. ***Clinically appropriate patients with spontaneous pneumothorax and prolonged air leak*** should be discussed early with the thoracic surgery team to explore whether surgery is an option and should have a clear, documented plan of treatment.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2] Respiratory Medicine GIRFT Programme National Specialty Report 2021[8]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2] Respiratory Medicine GIRFT Programme National Specialty Report 2021[8]
Rationale	The management of spontaneous pneumothorax and persistent air leak is complex with limited evidence. Thoracic surgery should be considered for all patients with pneumothorax and persistent air leak as the best option for resolving the air leak and concurrently reducing recurrence risk. Non-surgical options such as autologous blood patch, chemical pleurodesis and endobronchial valves are less efficacious and would usually be offered only to patients not appropriate for surgical intervention. Therefore, early discussion with the thoracic surgery team to consider surgery for persistent air leak will allow prompt treatment decisions.

16. Quality statement: Recurrent pneumothorax management	
	Patients with spontaneous recurrent pneumothorax* should be considered for elective surgical recurrence prevention if clinically appropriate. **Recurrent pneumothorax includes patients with second ipsilateral or first contralateral pneumothorax.*
Quality measure	***Structure***: Evidence of local arrangements 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. ***Process***: Proportion of patients with recurrent (ie, more than one episode) pneumothorax who are offered referral to the thoracic surgery team for elective surgical treatment for recurrence prevention where referral to surgery is clinically appropriate. ***Numerator***: Number of patients with recurrent pneumothorax who are offered referral to the thoracic surgery team for recurrence prevention where referral to surgery is clinically appropriate. ***Denominator***: Total number of patients with recurrent pneumothorax where referral to surgery is clinically appropriate*. *Where a referral has not been made, evidence of why the patient is inappropriate for such an intervention will be taken from the medical notes.

16. Quality statement: Recurrent pneumothorax management (Continued)	
	Patients with spontaneous recurrent pneumothorax* should be considered for elective surgical recurrence prevention if clinically appropriate. **Recurrent pneumothorax includes patients with second ipsilateral or first contralateral pneumothorax.*
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. ***Care systems*** ensure that appropriate thoracic surgery services are available for elective surgical recurrent prevention in patients with recurrent pneumothorax. ***Clinically appropriate patients with recurrent pneumothorax*** should have access to a thoracic surgery team to discuss surgical options relating to pneumothorax recurrence prevention.
Relevant existing indicators	BTS Guideline for Pleural Disease 2023[2]
Other possible national data sources	None identified
Source references	BTS Guideline for Pleural Disease 2023[2]
Rationale	Patients with recurrent pneumothorax are at high risk of further recurrence. The BTS Pleural Disease Guideline 2023 recommends that elective surgery should be considered for patients with a second ipsilateral or first contralateral pneumothorax in clinically appropriate patients (eg, where the patient is documented as frail or unlikely to manage a surgical intervention, this would be counted as inappropriate).[2] It is important to note that some patients might be considered high-risk after the first episode of pneumothorax, for example, first episode of tension pneumothorax, or high-risk occupations, etc. In this case, elective surgical pneumothorax recurrence prevention may be considered good practice but is not mandated.

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