



British Thoracic Society
National Pleural Services Organisational Audit Report 2021
National Audit Period 1 April – 30 April 2021
National Data Collection Period 1 April – 30 June 2021
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Summary

There have been a number of national documents and publications in recent years that have set out standards of care for aspects of pleural services, culminating in the National Respiratory GIRFT Report¹ with a dedicated chapter on ‘Improving the care of patients with pleural disease’. This recent work has built on the foundations laid by the NPSA alert² regarding the harms identified from chest drain insertion and the BTS Pleural Disease Guidelines in 2010 with a strong focus on improving patient safety³. The BTS Pleural Services Organisational Audit is the first project to synthesise these standards into a single set of auditable standards and to assess adherence to these standards at a national scale.

This audit was completed by 111 hospital sites and provided organisational information on 5 key topics: medical leadership, service delivery, pleural nursing, out of hours care and patient safety and clinical governance. The results make for sobering reading and have highlighted significant concern with respect to ongoing patient harm in pleural medicine some 14 years after the NPSA alert was published.

1 in 5 of all hospitals reported a level 4 (severe harm) incident and 1 in 8 reported a level 5 (catastrophic harm / death) incident relating to thoracic ultrasound (TUS) / pleural procedure in the last 3 years. Two-thirds of trusts do not have out of hours protocols to access thoracic ultrasound and procedural operators and over half of trusts do not have reliable access to an emergency level trained thoracic operator, in the out of hours setting. It is possible, although inconclusive from this audit, that these infrastructure issues may be underlying factors in the finding of ongoing patient harm. There is a significant lack of resource within pleural services with only 12% of hospitals compliant with GIRFT report recommendations on medical sessions and only 6% compliant with GIRFT recommendations on pleural nursing. There is a lack of dedicated time within jobs plans and lack of nominated lead clinicians to deliver training in thoracic ultrasound and pleural procedures which also translates into a worrying lack of appropriately trained operators in the out of hours setting.

This report sets out national improvement objectives to address some of the key areas that require change to support the development of robust action plans to address these patient safety concerns.

Key Findings

Patient Safety and Clinical Governance

- 62% (69/111) of hospital sites report a patient safety incident related to thoracic ultrasound and/or pleural procedures within the last 3 years (from 1st April 2021).
- 33% (23/69) patient safety incidents were level 4 harm incidents (severe harm) and 20% (14/69) were level 5 incidents (catastrophic harm / death).
- 9% (10/111) sites have had both a level 4 and level 5 incident in the last 3 years.

Out of hours care

- 63% (41/111) of hospital sites do not have out of hours pleural disease management pathways to access appropriately trained thoracic ultrasound and pleural procedure operators.
- 53% (59/111) of hospital sites do not have access to an emergency level thoracic ultrasound operator (ability to identify a large, simple pleural effusion and identify a site for drain insertion/aspiration).

Pleural Nursing

- Only 6% (7/111) hospital sites were compliant with the number of specialist pleural nurses recommended by the National Respiratory GIRFT report.
- 70% (78/111) of hospitals do not have any pleural specialist nurses as part of their pleural service.

Service Delivery

- 12% (13/111) hospital sites were compliant with the number of medical sessions for size of service recommended by the National Respiratory GIRFT report.
- The provision of key elements of infrastructure and resource to deliver a clinically effective service was poor including dedicated administrative support (36%), specific telephone line for pleural referrals (32%), dedicated email for pleural referrals (47%) and an admission avoidance pleural pathway (48%).

Medical Leadership

- 87% (96/111) of hospital sites have a nominated pleural service lead but the designation of a thoracic ultrasound mentor and a pleural procedure training lead was lower at 52% (58/111) for both roles.
- The allocation of dedicated time within job plans to deliver these three roles was poor at 32% (pleural lead, 36/111), 13% (TUS mentor, 14/111) and 14% (pleural procedure training lead, 15/111).

National Improvement Objectives:

- 1) Hospitals should have an agreed out of hours protocol to access appropriately trained thoracic ultrasound and pleural procedural operators **(Target: 100%)**
- 2) Trusts/Health Boards should identify nominated Thoracic ultrasound mentors & pleural procedure training leads. **(Target: 100%)**
- 3) Nominated thoracic ultrasound mentors and training leads should have recognised time within job plans to deliver these leadership roles **(Target: 100%)**
- 4) Hospitals should urgently appoint a pleural nurse where there are none, and all should work towards achieving the recommended nursing complement (1 band 6 nurse/300 pleural procedures) **(Target: 70%)**
- 5) Hospitals should set in place admission avoidance pathways and appropriate infrastructure to reduce hospital length of stay and maximise generation of the Best Practice Tariff for Pleural Effusion (in England) **(Target: 95%)**

Timeframe: To be demonstrated locally by April 2024 and permanently implemented by the time of the next BTS Pleural Services Organisational Audit.

Background

In May 2008, the National Patient Safety Agency released a Rapid Response Report (RRR) on the 'Risks of Chest Drain Insertion', following a systematic search of the National Reporting and Learning System². This identified 12 deaths and 15 serious harm incidents from 2152 incidents regarding intercostal chest drains submitted from 2005-2008. Since then, the delivery of safe pleural services has undoubtedly improved with the widespread adoption of physician-led bedside thoracic ultrasound (TUS) to guide pleural procedures for pleural effusions driven by the NPSA alert and recommendations in subsequent British Thoracic Society (BTS) Pleural Guidelines in 2010³. More recently, the publication of an aspirational statement for provision of pleural services has provided a detailed framework for training, service delivery, models of care and specific templates for out of hours service provision. These minimum and aspirational standards were conceived with limitation of risk and patient safety being paramount and to drive improvements in patient safety locally and nationally. BTS has, subsequently, built on these aspirational standards and published a National Training Standard in Thoracic Ultrasound providing a blueprint for safe TUS training and delivery⁵. Additional national recommendations have also been provided in the National Respiratory Getting It Right First Time (GIRFT) Report¹ and the BTS National Safety Standards for Invasive Procedures (NATSIPPs)⁶ for pleural procedures with further relevant recommendations expected in the National Lung Cancer GIRFT Report⁷ when published.

There are, therefore, multiple standards in existence relevant to the safe and effective delivery of pleural medicine. It is therefore of paramount importance that these standards are combined into a single benchmarking process to ensure patient safety and effective service delivery. This will both provide assurance as to whether the required progress in patient safety has been made since the 2008 NPSA alert and the appropriate infrastructure and resources are present to deliver a modern-day pleural service.

Aims and Objectives

The first BTS National Organisational Audit of Pleural Services was designed with the following aims:

- To provide benchmarking data on where pleural services in the UK are positioned in relation to the previously published recommendations from the NPSA, BTS, GIRFT and UK pleural clinicians.
- To use these benchmarks to inform the development of BTS quality standards for pleural service delivery that would form an ongoing rolling national audit process to drive improvements and outcomes
- To establish if there are any concerns about patient safety within current service provision of pleural services nationally that may inform further quality improvement and patient safety initiatives

Key Objectives

The BTS Pleural Services Organisational Audit assessed service compliance against 5 key topic areas: Patient safety and Clinical Governance, Out of hours care, Pleural nursing, Service delivery and Medical leadership. The audit standards for each topic are presented below.

Patient safety & Clinical Governance

- Pleural procedure safety checklists and written evidence of consent for pleural procedures should be implemented in accordance with published National Safety Standards for Invasive Procedures (NPSA 2008, BMJORR 2018, BTS NATSSIPs).
- Local incident data relating to pleural procedures is reviewed to understand learning and actions required to mitigate risk (NPSA 2008, BTS NATSSIPs).

Out of hours care

- Clinical guidelines are implemented for out of hours pleural disease management (NPSA 2008, BMJORR 2018).
- Appropriately trained thoracic ultrasound operators are immediately available for emergency out of hours pleural procedures (NPSA 2008, BMJORR 2018, BTS TUS 2020).

Pleural Nursing

- Specialist pleural nurses are required to support pleural services – recommended at 1x band 6 per 300 pleural procedures (Resp GIRFT 2021).

Service delivery

- 3x medical sessions are required per 300 patients with pleural disease to provide pleural interventions on a Monday, Friday and mid-week with more than one consultant providing the service (Resp GIRFT 2021).
- Dedicated administrative staff are required to support a pleural service, including a dedicated maned telephone line for pleural referrals (Resp GIRFT 2021).
- A dedicated pleural procedure venue is required for pleural services (Resp GIRFT 2021, BTS NATSSIPs).
- Pleural procedure equipment should be standardised across, and made available in dedicated packs (BMJORR 2018, Resp GIRFT 2021).

Medical Leadership

- A pleural procedure training lead is identified and provided with appropriate time within job plan to deliver pleural procedure training for all staff involved in chest drain insertion (NPSA 2008, BMJORR 2018).
- A thoracic ultrasound (TUS) mentor is appointed within every trust to lead the training programmes for TUS (BMJORR 2018, BTS TUS 2020).
- All hospitals should have a dedicated pleural lead with dedicated time within job plan for service development (BMJORR 2018, Resp GIRFT 2021).

Methodology

The 2021 BTS Pleural Services Organisational Audit ran from 1 April 2021 to 30 April 2021 with a data entry period of 1 April 2021 to 30 June 2021.

One response per hospital site (not per trust) was required. Information about the pleural service for each hospital, as of 1 April 2021, was requested. Where figures were required for the 12-month period, respondents were asked to provide data for the previous 12 months, or the last available 12 months period. Children-only hospitals were excluded from this audit, and only data from adult services within each hospital was accepted. Data were entered onto the online data collection tool via the BTS audit system with supervision from a consultant respiratory physician at each site.

The GIRFT 2021 recommendations regarding the number of medical sessions and number of specialist pleural nurses were described as a number of sessions per total number of pleural patients per year (3x medical sessions for every 300 patients with pleural disease) and a number of nurses per total number of pleural procedures per year (1x band 6 per 300 pleural procedures)¹. The audit therefore asked hospitals to estimate their total number of pleural patients and pleural procedures over the previous 12 months in incremental categories of 300 (<300, 300-600, 600-900, 900-1200 and 1200+). Each category was allocated the appropriate number of medical sessions and specialist pleural nurses according to the GIRFT recommendations and adherence to these standards assessed for each hospital (Table 1) using the actual number of medical sessions and actual number of specialist nurses.

Table 1: Expected number of medical sessions and specialist pleural nurses

Estimated number of pleural patients & pleural procedures	Expected number of medical sessions	Expected number of band 6 specialist pleural nurses
<300	3	1
300-600	6	2
600-900	9	3
900-1200	12	4
1200+	12+	5+

In relation to patient safety, additional questions were asked regarding patient safety incidents relating to pleural procedures registered in the hospital's incident reporting system within the last 3 years and the level of harm of incidents (level 4 - severe and level 5 - catastrophic).

Results

A total of 111 hospital site teams completed the audit, covering 85 trusts. Seventy-three responses were from hospital sites that were part of a multi-site trust (specifically meaning more than one site with either acute or general in-patient medical/surgical /oncology services). (Only a very small proportion recorded that the pleural service provision was equal across each site of the trust (10%, 7/73).

Patient Safety and Clinical Governance

62% (69/111) of hospital sites report a patient safety incident related to thoracic ultrasound and/or pleural procedures within the last 3 years (from 1st April 2021). Of these incidents, 33% (23/69) were level 4 harm incidents (severe harm) and 20% (14/69) were level 5 incidents (catastrophic harm / death). 9% (10/111) sites have had both a level 4 and level 5 incident in the last 3 years.

17% (19/111) of all hospital sites have listed the provision of thoracic ultrasound and/or pleural procedures on a risk register.

There was no clear relationship between patient safety incidents and access to TUS/pleural operators out of hours, or with provision of pleural nursing (Table 2). There was a stronger suggestion of relationship between access to large bore operators and safety event reporting, but in the absence of understanding the nature of these events it's not possible to draw any further conclusions.

Table 2: Reporting of patient safety events in relation to pleural nurse / out of hours operator provision

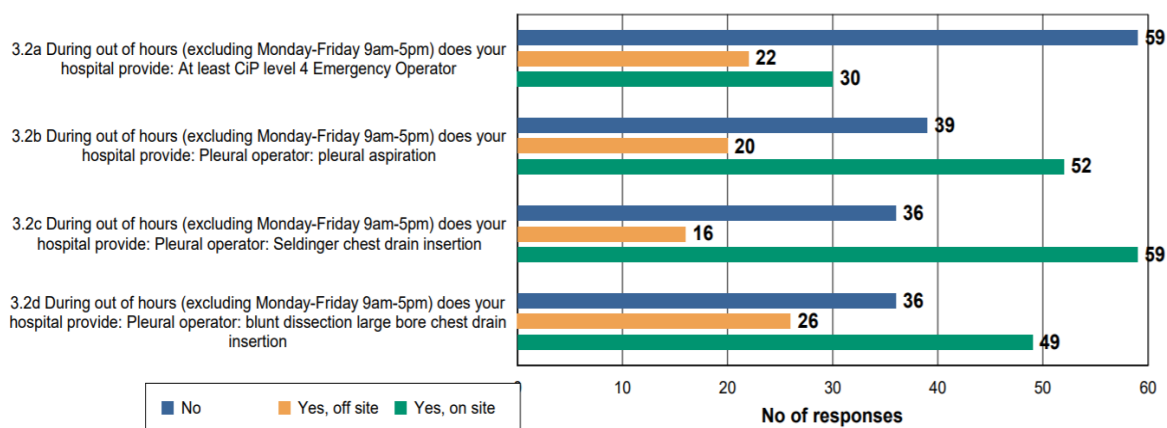
		Patient safety event reported (n=69)	No patient safety event reported (n=42)	p for difference (N-1 Chi squared test)
Number (%) of hospitals with any pleural nurse provision		20 (29.0)	13 (30)	P=0.911
Number (%) of hospitals with out of hours access to operators for:	Emergency TUS	29 (42)	23 (54.8)	P=0.19
	Pleural aspiration	40 (58)	32 (66.7)	P=0.36
	Seldinger chest drain insertion	43 (62.3)	32 (76.2)	P=0.131
	Large bore drain insertion	41 (59.4)	34 (81)	P=0.0189

Standards for ultrasound reporting in radiology departments require that images are stored for review. A similar standard should apply to images obtained during bedside TUS. 93% (103/111) of hospital sites are unable to upload thoracic ultrasound images captured during bedside TUS assessment to provide clinical governance of the physician-led TUS service.

Out of hours care

37% (41/111) of hospital sites do not have out of hours pleural disease management pathways to access appropriately trained thoracic ultrasound and pleural procedure operators. 87% (97/111) of hospitals use dedicated pleural procedure safety checklists but only 40% (39/97) of these hospitals use these across all areas of the hospital. Figure 1 shows the proportion of trusts that have reliable access to specific procedural operators out of hours and whether these operators are on-site or off-site. 53% (59/111) of hospital sites do not have access to an emergency level thoracic ultrasound operator (ability to identify a large, simple pleural effusion and identify a site for drain insertion / aspiration).

Figure 1: Availability of appropriately trained procedural staff for pleural disease management



Pleural Nursing

Using the estimated number of pleural procedures per annum, only 6% (7/111) hospital sites were compliant with the number of specialist pleural nurses recommended by the National Respiratory GIRFT report (Table 3). Furthermore, 70% (78/111) of hospitals do not have any pleural specialist nurses as part of their pleural service (Figure 2).

Figure 2: Number of pleural specialist nurses per hospital

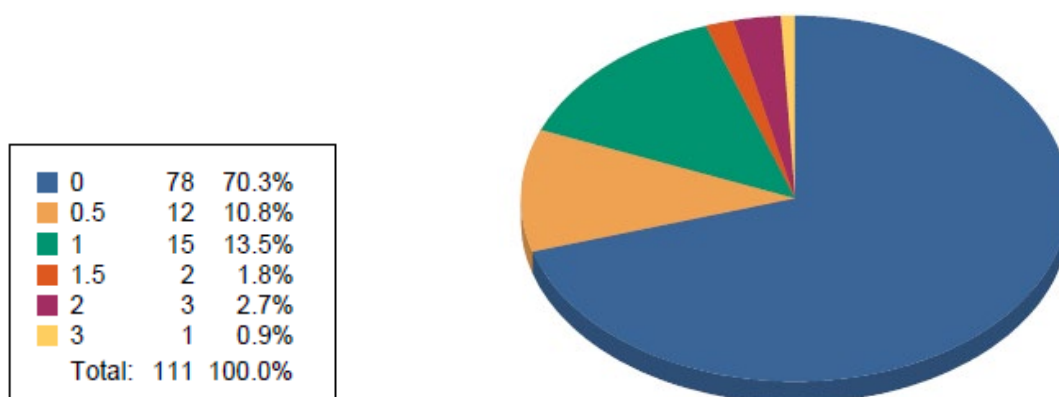


Table 3: Adherence to recommended number of specialist pleural nurses according to number of pleural procedures per annum

Estimated number of pleural procedures within per year & recommended number of nurses	Number of hospital non-complaint n (%)	Number of hospitals compliant n (%)
<300 (n=51) Recommended specialist nurses: 1	46/51 (90%)	5/51 (10%)
300-600 (n=43) Recommended specialist nurses: 2	41/43 (95%)	2/43 (5%)
600-900 (n=7) Recommended specialist nurses: 3	7/7 (100%)	0/7 (0%)
900-1200 (n=5) Recommended specialist nurses: 4	5/5 (100%)	0/5 (0%)
1200+ (n=5) Recommended specialist nurses: 5+	5/5 (100%)	0/5 (0%)
Total	104/111 (94%)	7/111 (6%)

Service Delivery

Using the estimated number of pleural patients per annum, only 12% (13/111) hospital sites were compliant with the number of medical sessions recommended by the National Respiratory GIRFT report (Table 4). Furthermore, 39% (43/111) of hospital sites have only one consultant delivering the pleural service and, therefore, without any cross cover for leave, sickness or absence. The provision of key elements of infrastructure and resource to deliver a clinically effective service was poor including dedicated administrative support (36%), manned telephone line for pleural referrals (32%), dedicated email for pleural referrals (47%) and an admission avoidance pleural pathway (48%, Table 5).

Table 4: Adherence to recommended number of medical sessions for pleural services according to number of pleural patients per annum

Estimated number of pleural patients per year & recommended number of sessions	Number of hospital non-complaint n (%)	Number of hospitals compliant n (%)
<300 (n=52) Recommended sessions: 3	45/52 (86%)	7/52 (14%)
300-600 (n=31) Recommended sessions: 6	28/31 (90%)	3/31 (10%)
600-900 (n=8) Recommended sessions: 9	6/8 (75%)	2/8 (25%)
900-1200 (n=7) Recommended sessions: 12	7/7 (100%)	0/7 (0%)
1200+ (n=13) Recommended sessions: 12+	12/13 (92%)	1/13 (8%)
Total	98/111 (88%)	13/111 (12%)

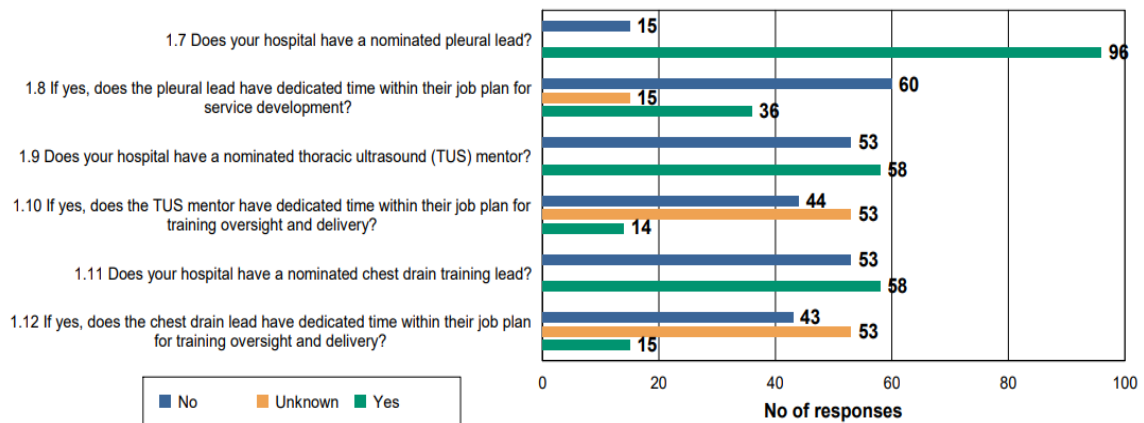
Table 5: Summary of adherence to service delivery infrastructure for pleural services

Quality Standard	% of sites meeting standard
Dedicated administrative staff	36% (40/111)
Manned telephone line for pleural referrals	32% (35/111)
Dedicated email address for pleural referrals	47% (52/111)
Standardised pleural equipment across site	52% (58/111)
Dedicated pleural procedure packs	78% (87/111)
Dedicated pleural clinic	77% (86/111)
Dedicated pleural procedure room	68% (76/111)
Admission avoidance pleural pathway	48% (53/111)
Data capture system to achieve Best Practice Tariff	51% (57/111)
Inpatient pleural in-reach service with bedside TUS	75% (83/111)

Medical Leadership

The majority of hospital sites have a nominated pleural service lead (87%, 96/111) but the designation of a thoracic ultrasound mentor and a pleural procedure training lead was lower at 52% (58/111) for both roles (Figure 3). Furthermore, the allocation of dedicated time within job plans to deliver these three roles was poor at 32% (pleural lead, 36/111), 13% (TUS mentor, 14/111) and 14% (pleural procedure training lead, 15/111).

Figure 3: Summary of audit responses for medical leadership in pleural services



Discussion

A significant number of sites in the UK engaged with the first BTS Pleural Services Organisational Audit, leading to a valuable dataset which will be representative of UK practice. The audit has harmonised a series of national documents into a single assessment of auditable standards in pleural medicine and assessed the adherence to these standards across the NHS.

The level of patient harm reported and of ongoing risk recognition across the UK is of grave concern. It is sobering to see this reported in the context of the pivotal NPSA alert being now nearly 14 years old. The audit was not designed to identify definite reasons behind patient safety incidents, but the data perhaps does allow for some postulation. Contributing factors could relate to lack of training, environment and process including poor adherence to the standards of a dedicated pleural procedure room, completion of procedural checklists, dedicated pleural procedure packs, and image capture and storage. The audit found no clear causative relationship between access to appropriately trained procedural operators and hospitals reporting patient safety incidents and this, along with the lack of out of hours protocols, warrants further study.

The audit highlights a significant concern about the provision of appropriately trained thoracic ultrasound and pleural procedure operators in the out of hours setting. Whilst the development of pleural services has focused pleural intervention into sub-specialty services, the need for out of hours management for pleural emergencies remains a key component of patient safety yet an increasingly difficult one to deliver as training and experience becomes the focus within the sub-specialty pleural service itself. This highlights the importance of training leads within the hospital with adequate time within job plans to deliver training to clinicians involved in out of hours care. All hospitals require clear protocols on how to access these operators in the out of hours setting but 63% of hospitals do not have such protocols. Furthermore, over half of hospitals do not have any access to a thoracic USS operator out of hours either on-site or off-site and over half of hospitals do not have access to a pleural aspiration operator on-site out of hours. 47% of hospitals do not have access to an appropriately trained on-site operator to insert a Seldinger chest drain out of hours.

Pleural disease clearly has a specific profile in the majority of hospitals in the form of a dedicated pleural lead (87% of hospitals), dedicated pleural clinics (77% of hospitals), dedicated pleural procedure room (68% of hospitals), dedicated pleural procedure packs (78% of hospitals), dedicated pleural procedure safety checklists (87% of hospitals) and inpatient in-reach service for physician-led bedside thoracic ultrasound assessment (75% of hospitals). We have identified a worrying lack of pleural specialist nursing workforce. 70% of hospitals do have any specialist pleural nursing provision at all. GIRFT identified the association between reduced length of stay associated with pleural disease (across all levels of complexity) in hospitals with pleural nurses and they should be recognised as an integral and pivotal component of safe and effective patient care in modern day pleural services. Issues around training curricula for specialist nurses were out with the scope of this audit but clearly appropriate support for them is needed and documents such as the BTS TUS training standard were specifically designed to be applicable to any discipline and should support pleural nurse development. This audit has revealed an alarming lack of identified training leads in thoracic USS and pleural procedures, a lack of time allocated within job plans to deliver these critical training roles, significantly under-resourced pleural services in terms of medical sessions, consultant time and specialist pleural nursing. Only 12% and 6% of pleural services are compliant with the GIRFT optimal care recommendations for medical sessions and pleural nursing respectively.

National Improvement Objectives for Pleural Services

An overarching aim should be to implement GIRFT recommendations with specific objectives being:

- 1. Hospitals should have an agreed out of hours protocol to access appropriately trained thoracic ultrasound and pleural procedural operators (100% of hospitals by April 2024)**
- 2. Trusts/Health Boards should identify nominated Thoracic ultrasound mentors & pleural procedure training leads. (target 100% of hospitals by April 2024)**
- 3. Nominated thoracic ultrasound mentors and training leads should have recognised time within job plans to deliver these leadership roles (100% of hospitals by April 2024)**

It should be an immediate action for all hospitals to ensure patient safety in the event of a pleural emergency out of hours. The provision of appropriate time within job plans for training leads to build a workforce of competent operators to provide emergency cover is essential to delivering this objective. Training frameworks to emergency level operators with readily available access to more experienced and specialised operators if required must become the standard of care across the country.

Whilst the development of specialist pleural services creates some challenges in providing adequate training and exposure to a more general medical workforce managing pleural disease out of hours, there must be a keen focus on training to a minimum standard to ensure patient safety out of hours. The BTS Thoracic Ultrasound Training Standards⁵ specifically sets out a training framework for an emergency level TUS operator to provide out of hours TUS in emergency situations where a large pleural effusion may need intervention. A thoracic ultrasound mentor should lead implementation of this framework, utilising staff across acute/speciality medical and critical care services ultimately to support out of hours safety. A pleural procedures lead would also support this agenda.

4. Hospitals should urgently appoint a pleural nurse where there are none, and all should work towards achieving recommended nursing complement (1 band 6 nurse/300 pleural procedures, 70% of hospitals by April 2024)

Specialist pleural nursing must become a core component of every pleural service and, given the result of this audit, will require a major investment in recruitment, appropriate training support and curricula. To support this requires standardised training frameworks and a peer support network. National societies such as the BTS can support this through training standards covering a broad range of pleural procedures, dedicated pleural nursing training resources and developing new ways to connect the pleural nursing workforce.

5. Hospitals to set in place admission avoidance pathways and appropriate infrastructure to reduce hospital length of stay and maximise generation of the Best Practice Tariff for Pleural Effusion (in England) (95% of hospitals).

Investment in pleural services may be required to facilitate adherence to the GIRFT recommendations and attainment of the best practice tariff may be one avenue to support this investment. Pleural leads require time within job plan to undertake gap analysis for the service and develop admission avoidance pathways. These, alongside pleural nurse support and appropriate infrastructure should reduce length of stay and maximise day case attendances, hence maximising opportunity for generation of Best Practice Tariff (BPT) for Pleural Effusion. Appropriate number of medical sessions need to be provided to ensure rapid access to pleural services. Leads should be supported to enable appropriate coding of (and therefore maximising income generation from) more complex episodes. Where possible specifically being able to code as “day case” rather than “out-patient” for example, further enhances BPT generation. Dedicated administrative support, specific telephone lines and email addresses all support rapid access, admission avoidance and effective clinical care and should be priority for implementation for pleural services where these are lacking.

Conclusion and further actions

This audit has confirmed a significant level of patient risk and harm in relation to TUS and pleural disease in the UK. The underlying causes for this need to be established urgently.

This is the first BTS Pleural Services Organisational Audit which has identified key areas for national improvement and set important benchmarks in the current pleural service infrastructure and resources. BTS has a programme of work in which champions and supports the previously published GIRFT recommendations around pleural nurse provision, service development and training to enable safe out of hours provision of care and support in job plans for clinicians to deliver this⁸ and this work will continue.

There is clearly a need for further investigation into the patient harm identified in this audit, to better understand the contributing factors and to allow the development of a dedicated action plan to protect patients.

As important as the objectives set out by these results, is the need to offer this national audit again in future to ensure appropriate improvements have been made. To facilitate this and to empower pleural leads, the creation of formal BTS Quality Standards of care for patients with pleural disease, based on standards utilised in this audit is required, which will be informed by further investigation into underlying causes for patient safety concerns.

Further consideration should also be given to a possible A National Reporting & Learning System (NRLS) enquiry and/or a National Confidential Enquiry into Patient Outcome and Death (NCEPOD) review.

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August 2022

Standards

Reference documents used to design this audit:

- National Respiratory GIRFT Report, published March 2021 (**'Resp GIRFT 2021'**) (1)
- NPSA RRR 2008 Risks of Chest Drain Insertion (**'NPSA 2008'**) (2)
- (6)
- BTS National Training Standards in Thoracic Ultrasound, published BMJORR 2020 (**'BTS TUS 2020'**) (5)
- Providing safe and effective pleural medicine services in the UK: an aspirational statement from UK pleural physicians, published 2018 BMJORR (**'BMJORR 2018'**) (4)
- BTS National Safety Standards for Invasive Procedures – Bronchoscopic and Pleural Procedures, November 2018 (**'BTS NATSSIPs'**) (6)

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