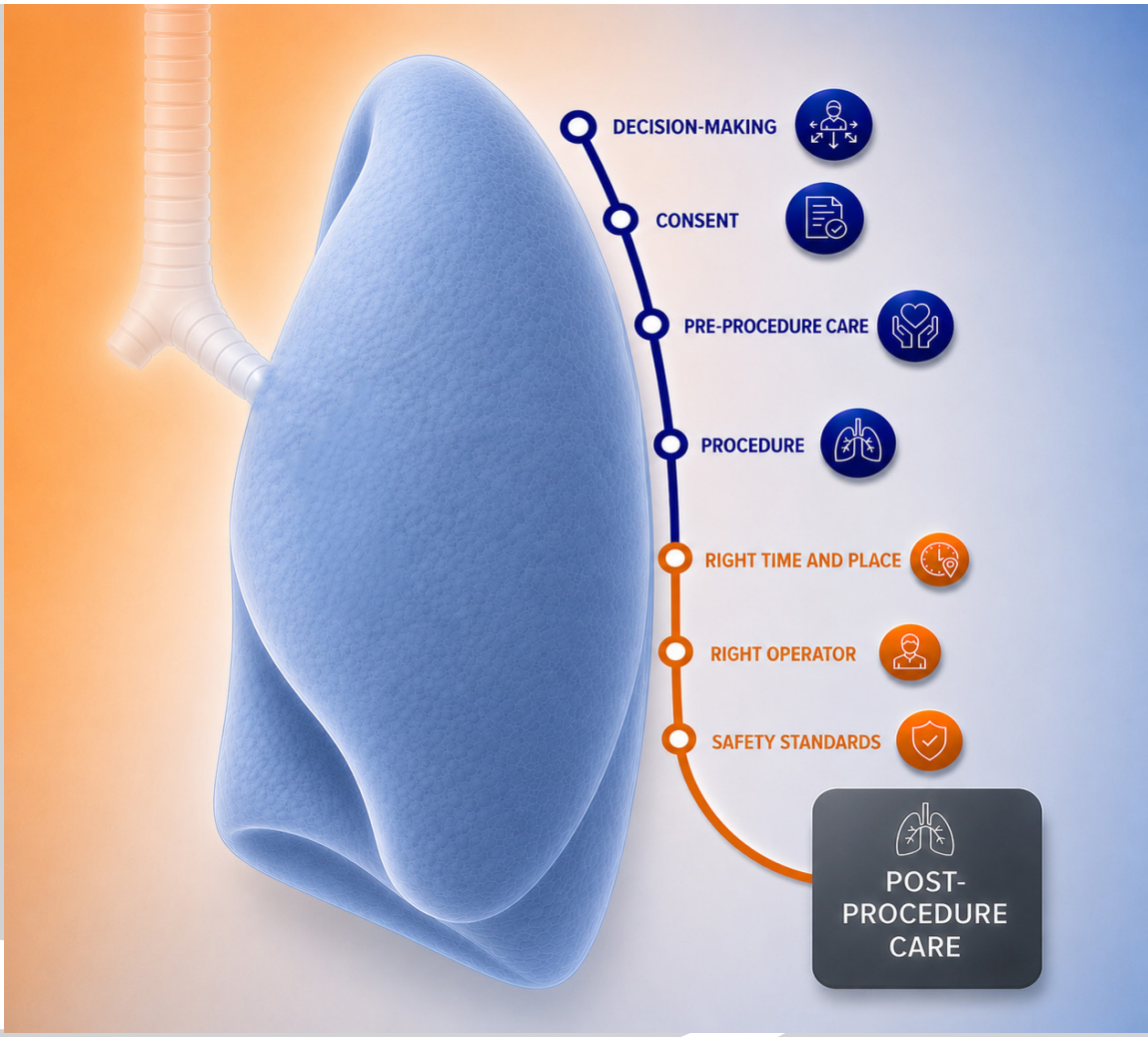
A Shared Aspiration

A review of the quality of care provided to adults who underwent a chest drain insertion or pleural aspiration

EXTENDED REPORT



NCEPOD

Improving the quality of healthcare

A Shared Aspiration

A review of the quality of care provided to adults who underwent a chest drain insertion or pleural aspiration

A report published by the National Confidential Enquiry into Patient Outcome and Death (2026)

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) is an independent body to which a corporate commitment has been made by the medical and surgical royal colleges, associations and faculties related to its area of activity. **NCEPOD** is a company, limited by guarantee (3019382) and a registered charity (1075588).

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Cohort: Patients aged 18 and older who were admitted to hospital between 01/01/2024 and 31/12/2024 and had a chest drain inserted or pleural aspiration undertaken.

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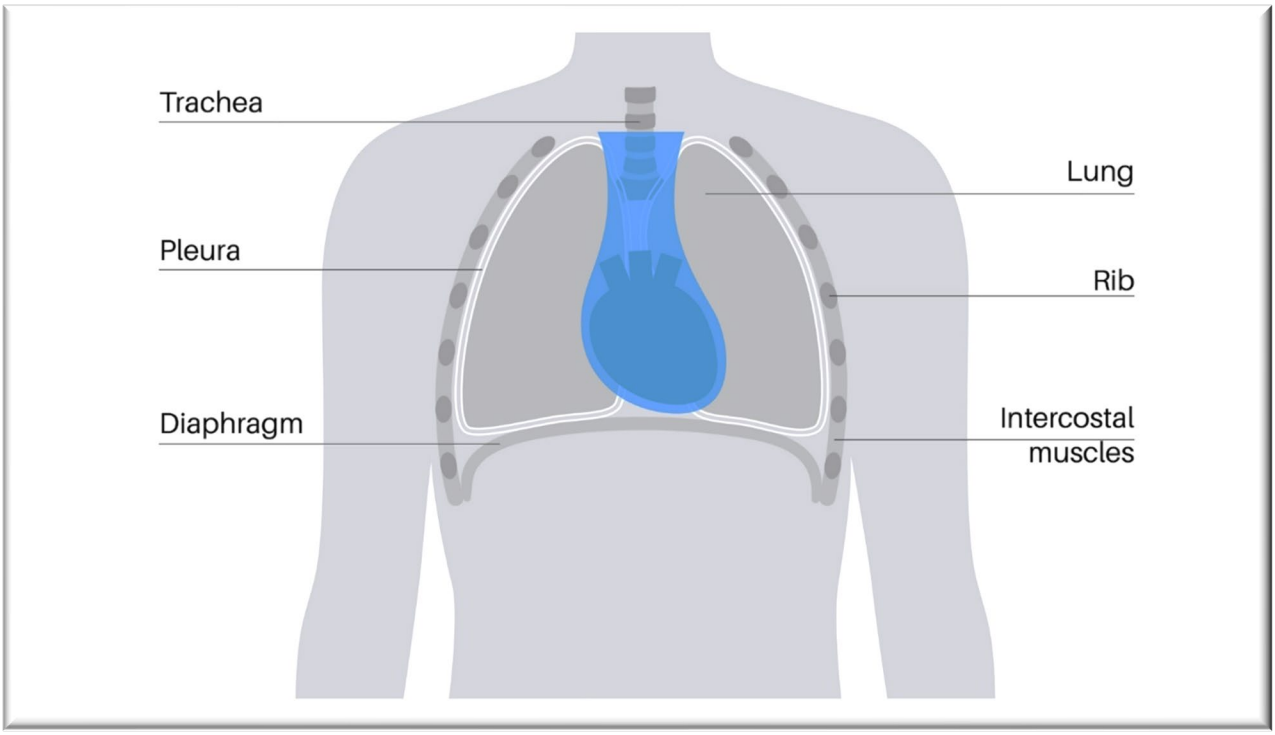
NOTES TO READERS

Definitions

For the purposes of this study, where the term 'pleural procedures' is used in the report it refers to both insertion of chest drains and pleural aspirations.

Chest drains inserted in trauma patients were not included due to the method of study sampling. However, learning from the report for 'medical' chest drains would lead naturally to a crossover to 'surgical' chest drains.

Chest drain insertion: (or chest tube thoracostomy) involves putting a flexible plastic tube into the chest cavity to drain a large volume of air or fluid continuously over hours or days.
Pleural aspiration: (thoracentesis or pleural tap) is where a needle and syringe are used to temporarily draw out a limited volume of air or fluid from the pleural space surrounding the lungs to provide immediate relief of symptoms.



Indication for the procedures

These procedures are used to diagnose unknown conditions or to provide therapeutic relief from abnormal fluid or air in the chest cavity. Common reasons include:

- An abnormal build-up of fluid between the lung and the chest wall causing severe shortness of breath, or the suspicion of an infection or malignancy – this is called **pleural effusion**
- A condition where air leaks into the pleural space causing the lung to partially or completely collapse. This trapped air pushes against the outside of the lung, preventing it from expanding normally during breathing – this is called **pneumothorax**
- Risk of a **pleural infection** within the pleural cavity, most commonly developing as a severe complication of bacterial pneumonia, though it can stem from surgery, trauma or a systemic infection.

INTRODUCTION FROM OUR CHAIR

(BACK TO CONTENTS)

Over 30,000 pleural procedures are undertaken in the UK every year; the majority of which are chest drains and pleural aspirations. This review primarily focused on procedures undertaken for pleural effusion and pneumothorax, noting that chest drains inserted in trauma patients were not included. Although the vast majority are performed safely, these are invasive procedures with the potential for serious complications. This study identified variation in all aspects of the intervention and aftercare, including access to specialist pleural teams. There are existing standards and guidelines relating to pleural disease, but these are not always followed, particularly out of hours, and not all hospitals have a formal policy for chest drain insertion. Standardisation of pleural procedures irrespective of the time or location would help ensure that all patients receive the same safe, high standard of care.

Clinicians with the most experience were more likely to report confidence in performing chest drains and pleural aspirations. Evidence shows that procedures undertaken by specialist pleural teams are safe. However, 60% of patients identified in this study were admitted outside weekday working hours. Ideally, pleural teams would be available 24 hours a day, but this is unlikely to be feasible in many hospitals. Prioritising drain insertion during the day or having a 24-hour on-call service should be considered.

The risks associated with pleural interventions do not end with the procedure. Post-procedure monitoring, imaging and drain removal are just as important as insertion but often overlooked. In 20% of patients, chest drains were removed too early or left in longer than required, resulting in reinsertion or unnecessarily prolonged hospital stays. Where a proforma was used post-procedure care was better.

Where consent was obtained and documented, only one-quarter of hospitals used a procedure-specific consent form. Reviewers believed that the consent process, including documentation, could be improved in more than half of the cases reviewed (58%).

The use of minimum standards, including a procedure-specific consent form, safety checklist and proforma for post-procedure monitoring, is associated with better consent, better pain management and better quality of care in general. Agreeing and using these standards would be relatively straightforward and inexpensive and would help address many of the variations in care identified.

With many thanks to everyone involved in the production of this report.



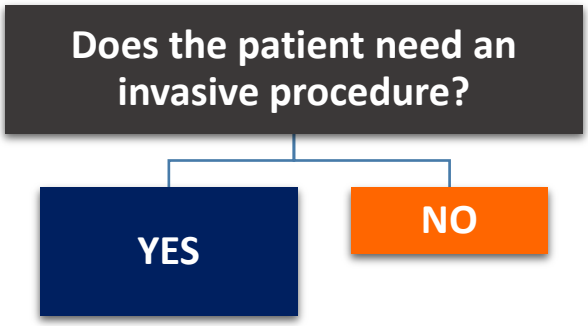
Dame Suzy Lishman DBE
NCEPOD Chair

IMPROVING THE CARE PROVIDED TO PATIENTS UNDERGOING A CHEST DRAIN INSERTION OR PLEURAL ASPIRATION

NCEPOD reviewed the care of adults admitted to hospital between 01/01/2024 and 31/12/2024 and had a chest drain inserted, or a pleural aspiration undertaken. Care was reviewed using 978 clinician questionnaires, 563 sets of case notes, 173 organisational questionnaires, 697 healthcare professional survey responses and 45 patient surveys.

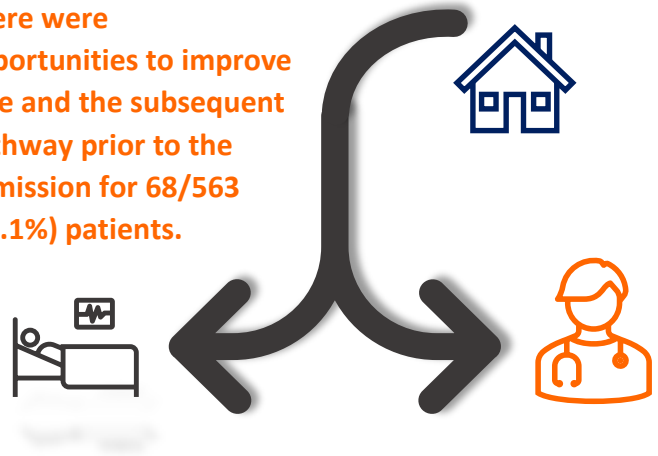
24/7 decision makers may stop patients having unnecessarily invasive procedures

With better decision-making, 82/563 (14.6%) patients could have had a less invasive approach.



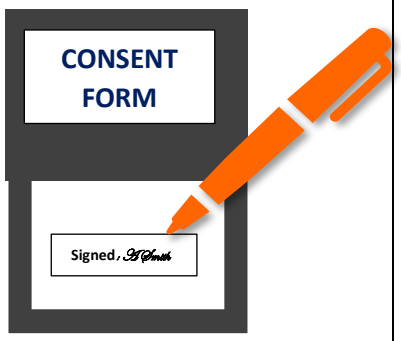
Alternative pathways increase the number of patients treated during normal working hours

There were opportunities to improve care and the subsequent pathway prior to the admission for 68/563 (12.1%) patients.



Procedure specific consent forms would ensure all patients are better informed

Written consent was documented in only 314/563 (55.8%) patients. Use of procedure-specific consent forms was limited, being present in only 68/173 (39.3%) hospitals.



Easy access to skilled clinicians out of hours would provide safe clinical practice



Only 62/173 (35.8%) hospitals had an escalation protocol for complex or high-risk patients out of hours.

Embedding national safety standards would promote consistent care



Procedure safety checklists (LocSSIPs) were only documented in 182/526 (34.6%) cases reviewed.

A clear plan can support pain management and the monitoring and removal of a chest drain.

106/440 (24.1%) patients had no documented post-procedure plan and where there was one, important elements, including drainage targets, monitoring plans and pain management, were frequently omitted.



RECOMMENDATIONS

These recommendations have been formed by a consensus exercise involving all those listed in the acknowledgements. The recommendations have been independently edited by medical editors experienced in developing recommendations for healthcare audiences to act on. The recommendations and **AREAS FOR IMPROVEMENT** highlight areas that are suitable for regular local clinical audit and quality improvement initiatives by those providing care to this group of patients. The results of such work should be presented at quality or governance meetings and action plans to improve care should be shared with executive boards.

1	Agree minimum standards for chest drain insertions* and pleural aspirations that can be used for all patients, by all specialties. ▪ The minimum standards should align with the associated guidance listed below and include all the **AREAS FOR IMPROVEMENT** highlighted by this study. **Chest drains inserted in trauma patients were excluded from this study as they are undertaken on a separate pathway.* Documenting the agreed minimum standards on a proforma for medical (non-trauma) procedures would support process reliability from decision making to discharge.
FOR ACTION BY	British Thoracic Society as the secretariat in collaboration with the Intensive Care Society, College of Intensive Care Medicine, Royal College of Emergency Medicine, Royal College of Physicians, Society for Acute Medicine, Surgical Royal Colleges, Royal College of Radiologists, Royal College of Nursing, the Association of Respiratory Nurse Specialists, the Association of Chartered Physiotherapists in Respiratory Care, and the Chartered Society of Physiotherapists.
RATIONALE FOR THE RECOMMENDATION	There was variation in the approaches taken to chest drain insertions and pleural aspirations that contributed to risk, including decision making, consent, ultrasound use, safety checks, pain management, post-procedure chest drain care, chest drain removal and management of complications.
ASSOCIATED GUIDANCE	**BRITISH THORACIC SOCIETY: QUALITY STANDARD FOR PLEURAL DISEASE** **BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE** **BRITISH THORACIC SOCIETY: CLINICAL STATEMENT ON PLEURAL PROCEDURES** **INTENSIVE CARE SOCIETY: CHEST DRAIN SAFETY CHECKLIST** **COLLEGE OF INTENSIVE CARE MEDICINE: SAFETY CHECKLISTS NatSSIPs2 and LocSSIPs** **ROYAL COLLEGE OF EMERGENCY MEDICINE: POST-PROCEDURAL CARE** **ROYAL COLLEGE OF EMERGENCY MEDICINE: BEST PRACTICE GUIDELINE ON CONSENT** **GENERAL MEDICAL COUNCIL: PROFESSIONAL STANDARDS: DECISION MAKING AND CONSENT** **NATIONAL SAFETY STANDARDS FOR INVASIVE PROCEDURES (NatSSIPs2)** **GIRFT: RESPIRATORY MEDICINE** **NHSE: BEST PRACTICE TARIFF FOR PLEURAL EFFUSION**
SUGGESTIONS TO AID LOCAL IMPLEMENTATION OF THIS RECOMMENDATION	

2	Embed mechanisms to optimise the safety of chest drain insertion and pleural aspiration out of hours. ▪ By not undertaking a procedure out of hours unless it is an emergency; ▪ By ensuring there are senior clinicians available to decide whether the procedure needs to be undertaken as an emergency; *and* ▪ When an emergency procedure is required, ensuring it is undertaken by a clinician who has the core skills to perform it safely. *NB: Chest drains inserted in trauma patients were excluded from this study as they are undertaken on a separate pathway.* *See also recommendation 1 - the minimum standards that should be applied for all patients.*
FOR ACTION BY	Commissioners working with their local trusts/health boards.
RATIONALE FOR THE RECOMMENDATION	Many clinicians who were undertaking chest drain insertions and pleural aspirations reported a lack of confidence, especially out of hours. Across different specialties there was variation in the delivery of training in these procedures. There were also gaps in the recording of training and competency assessments.
ASSOCIATED GUIDANCE	**ROYAL COLLEGE OF EMERGENCY MEDICINE LEARNING: ATTAINING COMPETENCY** **JOINT ROYAL COLLEGES OF PHYSICIANS TRAINING BOARD: CURRICULUM FOR INTERNAL MEDICINE STAGE 1 IMPLEMENTATION AUGUST 2019** **GIRFT: RESPIRATORY MEDICINE**
SUGGESTIONS TO AID LOCAL IMPLEMENTATION OF THIS RECOMMENDATION	

AREAS FOR IMPROVEMENT

The same standard of care should be available to everyone needing a chest drain/pleural aspiration, wherever and wherever the procedure is performed. We have identified steps needed as a focus for improvement.

PRE-PROCEDURE

Availability of a competent decision maker to determine if a chest drain/pleural aspiration is necessary. This would prevent unnecessary drain insertions and promote more conservative approaches where possible.	
STANDARDS	**REASON**
BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE *Acute management for spontaneous pneumothorax recommendations and small-bore Seldinger chest drains (typically ≤ 14 French) instead of large-bore tubes inserted via blunt dissection.* **BRITISH THORACIC SOCIETY: QUALITY STANDARD FOR PLEURAL DISEASE** *QS14: Pneumothorax treatment according to preference*	Reviewers identified 82/563 (14.6%) patients for whom a less invasive approach could have been taken with better decision making and considered that the quality of care was affected in 39/82 patients.

Dedicated consent forms for chest drain insertion or pleural aspiration and documented evidence that the patient has been provided with information about the procedure.	
STANDARDS	**REASON**

BRITISH THORACIC SOCIETY: QUALITY STANDARD FOR PLEURAL DISEASE *QS3: Safety protocols* **BEST PRACTICE GUIDELINE: INVASIVE PROCEDURES IN THE EMERGENCY DEPARTMENT** **GENERAL MEDICAL COUNCIL: PROFESSIONAL STANDARDS: DECISION MAKING AND CONSENT**	Consent processes showed considerable variation across cases reviewed. Written consent was documented in only 314/563 (55.8%) cases reviewed, with the remainder comprising verbal consent, best-interest decisions or undocumented consent (T5.1). At an organisational level, the use of procedure-specific consent forms were used in only 68/173 (39.3%) hospitals (T5.2).

Where an emergency chest drain or pleural aspiration is required, ensure it is undertaken by a clinician who has the core skills to perform it safely.	
STANDARDS	**REASON**
ROYAL COLLEGE OF EMERGENCY MEDICINE LEARNING: ATTAINING COMPETENCY **JOINT ROYAL COLLEGES OF PHYSICIANS TRAINING BOARD: CURRICULUM FOR INTERNAL MEDICINE STAGE 1 IMPLEMENTATION AUGUST 2019**	Training records were maintained and updated in only 55/124 (44.4%) hospitals and a register of competent clinicians was kept in 23/157 (14.6%) hospitals. Just 16/173 (9.2%) hospitals ensured that a competent operator was present on their on-call rota and only 62/173 (35.8%) hospitals had an escalation protocol for complex or high-risk patients out of hours.

Access to alternative pathways for a chest drain or pleural aspiration, so that it is not undertaken only as an emergency admission.	
STANDARDS	**REASON**
GIRFT: RESPIRATORY MEDICINE **BRITISH THORACIC SOCIETY: QUALITY STANDARD FOR PLEURAL DISEASE** *QS2: Access to pleural services including ambulatory care*	Reviewers identified opportunities to improve care prior to the admission in 68/563 (12.1%) patients, most commonly through rapid access to a specialist pleural clinic, which could help to prevent the emergency admission and take pressure off the acute care pathway. For patients with a pleural effusion, these data describe a group with severe frailty for whom reviewers felt that intervention should have been avoided and palliative care would have been more appropriate. This is particularly relevant when previous attempts at drainage have provided little or no symptomatic relief.

The use of a procedure safety checklist: LocSSIPs/NatSSIPs2 and pre-procedure checks.	
STANDARDS	**REASON**
BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE **NATIONAL SAFETY STANDARDS FOR INVASIVE PROCEDURES2 (NatSSIPs2)** **COLLEGE OF INTENSIVE CARE MEDICINE: SAFETY CHECKLISTS NatSSIPs2 AND LocSSIPs**	It was reported from 23/163 (14.1%) hospitals that they did not routinely employ LocSSIPs for chest drain insertion. Procedure safety checklists (LocSSIPs) were not routinely documented, being present in only 182/526 (34.6%)

	cases reviewed and reported by clinicians for 353/755 (46.8%) patients (F5.9).

Analgesia and pain management.	
STANDARDS	**REASON**
FACULTY OF PAIN MEDICINE: CORE STANDARDS **BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE**	In the view of the reviewers there was room for improvement in the pain management of 65/373 (17.4%) patients. Furthermore, reviewers were unable to answer in 190 cases, suggesting that documentation was often insufficient to assess the quality of pain management. Data from the patient survey showed that 23/45 patients experienced at least moderate pain during the procedure and 21 post-procedure, suggesting that pain is a significant issue for patients.

PERI-PROCEDURE

Operator expertise and competence, and appropriate supervision/escalation arrangements if needed.	
STANDARDS	**REASON**
BRITISH THORACIC SOCIETY: QUALITY STANDARD FOR PLEURAL DISEASE	Published data from the healthcare professional survey showed that self-reported confidence in chest drain insertion among non-respiratory medical registrars diminishes with increasing time since their last pleural procedure. The survey also showed that doctors in specialties with experience of pleural procedures within the last year were more likely to feel confident inserting a chest drain without supervision. However, in no specialty were all doctors confident with pleural procedures. Just 16/173 (9.2%) hospitals ensured that a competent operator was present on their on-call rota and only 62/173 (35.8%) hospitals had an escalation protocol for complex or high-risk patients out of hours.

Analgesia and pain management.	
STANDARDS	**REASON**
FACULTY OF PAIN MEDICINE: CORE STANDARDS **BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE**	In the view of the reviewers there was room for improvement in the pain management of 65/373 (17.4%) patients. Furthermore, reviewers were unable to answer in 190 cases, suggesting that documentation was often insufficient to judge the quality of pain management. Data from the patient survey showed that 23/45 patients experienced at least moderate pain during the procedure and 21 post-procedure, suggesting that pain is a significant issue for patients (F5.14).

Use and documentation of thoracic ultrasound (including image saving) which can be audited.	
STANDARDS	**REASON**

BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE **ROYAL COLLEGE OF RADIOLOGISTS: STANDARDS FOR THE PROVISION OF AN ULTRASOUND SERVICE** **NHS ENGLAND PATIENT SAFETY ALERT ON CHEST DRAINS**	Ultrasound guidance was used for 344/369 (93.2%) patients (T5.6). However, among the 25 patients who did not have an ultrasound, case reviewers considered this appropriate in seven patients.

POST-PROCEDURE – AFTER A CHEST DRAIN INSERTION

Post-procedural planning which may include: ▪ **immediate and ongoing observations** ▪ **chest X-ray**	▪ **a targeted amount of fluid to be drained** ▪ **monitoring plans** ▪ **pain management**
STANDARDS	**REASON**
NATIONAL PATIENT SAFETY ALERT – DETERIORATION DUE TO RAPID OFFLOAD OF PLEURAL EFFUSION FLUID FROM CHEST DRAINS **BRITISH THORACIC SOCIETY: GUIDELINE FOR PLEURAL DISEASE** **ROYAL COLLEGE OF EMERGENCY MEDICINE: POST-PROCEDURAL CARE** **ASSOCIATION OF RESPIRATORY NURSE SPECIALISTS: GOOD PRACTICE STANDARDS FOR CONTROLLED REMOVAL OF FLUID FROM CHEST DRAINS (ADULTS)**	A post-procedure plan provides clear guidance on decisions regarding monitoring, imaging, and drain removal, all of which are clinically and operationally important. Nearly a quarter of patients (106/440; 24.1%) (unknown in 13) had no documented post-procedure plan. While chest radiography was commonly recorded, other important elements, including drainage targets (170/334; 50.8%), monitoring plans and pain management (128/334; 38.3%), were frequently omitted (F6.1). Of the patients with an effusion, 34/338 (10.0%) had more than 1500ml of fluid drained within the first hour after insertion (F6.2).

Ongoing chest drain care: ▪ **daily monitoring** ▪ **management and escalation of complications**	▪ **a process for removal of the chest drain.**
STANDARDS	**REASON**
GIRFT: RESPIRATORY MEDICINE **ASSOCIATION OF RESPIRATORY NURSE SPECIALISTS: GOOD PRACTICE STANDARDS FOR CONTROLLED REMOVAL OF FLUID FROM CHEST DRAINS (ADULTS)**	The chest drain was checked on a daily basis in 264/325 (81.2%) patients (T6.1). However, a significant minority did not have a daily drain check documented. While chest radiography was commonly recorded, other important elements, including drainage targets (170/334; 50.8%), monitoring plans and pain management (128/334; 38.3%), were frequently omitted (F6.1). The median length of time a drain was in place was 2.9 days (F6.3). In total, 75/396 (18.9%) chest drains were not left in place for an appropriate duration (T6.2), with both premature removal (n=26) and prolonged retention (n=43) observed (unknown in six).

Post-procedure analgesia and pain management.	
STANDARDS	**REASON**
FACULTY OF PAIN MEDICINE: CORE STANDARDS	Data from the patient survey showed that 23/45 patients experienced at least moderate pain during the procedure

	and 21 post-procedure, suggesting that pain is a significant issue for patients (F5.14).

Regular clinical audit of the above areas for improvement and of procedural complications.	
STANDARDS	**REASON**
HEALTHCARE QUALITY IMPROVEMENT PARTNERSHIP	There were 70/153 (45.8%) hospitals that reported a local audit approach. However, free text comments noted that this approach was commonly limited to procedures undertaken by the pleural team and would therefore systematically exclude procedures undertaken out of hours, which were the focus of this review.

Robust incident reporting, including the ability for data interrogation and sharing.	
STANDARDS	**REASON**
NHS ENGLAND: PATIENT SAFETY INCIDENT FRAMEWORK **WELSH GOVERNMENT: PATIENT SAFETY INCIDENT REPORTING AND MANAGEMENT** **DEPARTMENT OF HEALTH NORTHERN IRELAND: FRAMEWORK FOR LEARNING AND IMPROVEMENT FROM PATIENT SAFETY INCIDENTS** **THE STATES OF JERSEY DEPARTMENT FOR HEALTH AND SOCIAL SERVICES: PATIENT SAFETY LEARNING EVENT POLICY**	The data also suggested that there was a perception that it was not easy to extract data (or to analyse themes or long-term trends in safety events) from the risk management systems used (T7.2). The reviewers stated that additional learning was possible in 96/423 (22.7%) cases reviewed (unknown in 140). This included choice of procedure, safety processes (such as LocSSIPs), consent, post-procedure care including drain removal, and management of anticoagulants around the time of the procedure.

1 METHODS OF DATA COLLECTION

DETAILED INFORMATION ABOUT THE METHODS IS AVAILABLE HERE

(BACK TO CONTENTS)

Study advisory group

A multidisciplinary group of clinicians was convened to steer the study from design to completion, define the objectives of the study and advise on the key questions. The group comprised lay and patient representatives and healthcare professionals in respiratory medicine, acute medicine, emergency medicine, critical care, interventional radiology, respiratory and pleural nursing, general nursing, pharmacy and patient safety.

Study aims and objectives

The aim of the study was to identify areas for improvement in the quality of care for patients undergoing pleural procedures, reviewing any incident investigations relating to pleural procedures and associated lessons learned, and identifying patient safety incidents that had not been reported.

Study population and case ascertainment

Inclusion criteria

Non-elective patients aged 18 and older who were admitted to hospital between 01/01/2024 and 31/12/2024 and had a chest drain inserted, or a pleural aspiration undertaken (OPCS code T12.0-T12.9) during their hospital stay were included. Chest drains were overrepresented in the sample as they provided greater insight and learning across the whole patient pathway.

Exclusion criteria

Procedures performed on already inserted chest drains (e.g. in-dwelling pleural catheters) were excluded. Trauma patients were excluded as they are treated on a different pathway. These patients are to be covered in an upcoming NCEPOD study on rib fractures.

Data collection

Up to eight patients per hospital were selected from this sample. Chest-drains (as opposed to pleural aspirations and other minor pleural procedures) were over-represented in the sample.

Data were collected from the following sources:

- **A clinician questionnaire** was sent to the named respiratory consultant at discharge.
- **An organisational questionnaire** was sent to every hospital.
- **Copies of the case notes** were requested for the included admission for peer review by a multidisciplinary group of case reviewers.
- **Surveys** were completed anonymously by patients and clinician views were collected through a collaboration with the pleural team at Guys and St Thomas' NHS Foundation Trust.

Data analysis rules

- Small numbers have been suppressed if they risk identifying an individual (usually <3-5).
- Any percentage under 1% has been presented in the report as <1%.
- Percentages were not calculated if the denominator was less than 100 so as not to inflate the findings, unless to compare groups within the same analysis.
- There will be variation in the denominator for different data sources and for each individual question as it is based on the number of answers given.

1 METHODS OF DATA COLLECTION

Study advisory group

A multidisciplinary group of clinicians was convened to steer the study from design to completion, define the objectives of the study and advise on the key questions. The group comprised lay and patient representatives and healthcare professionals in respiratory medicine, acute medicine, emergency medicine, critical care, interventional radiology, respiratory and pleural nursing, general nursing, pharmacy and patient safety.

Study aims and objectives

The aim of the study was to identify areas for improvement in the quality of care for patients undergoing chest drain insertion and pleural aspiration; reviewing any incident investigations relating to pleural procedures and associated lessons learned; identifying patient safety incidents that had not been reported.

The objectives were to explore areas for improvement in the following areas:

- The initial recognition of the need, and decision-making process for the procedure
- Consent to the procedure
- Location/timing of the procedure
- Peri-procedure investigations (use of ultrasound), processes and care provided
- Procedure complications
- Post-procedural care (days following chest drain insertion)
- Documentation of the procedure
- Protocols, standards, safety procedures and the use of guidelines across specialties
- Training in chest drain insertion/pleural aspiration and the retention of skills, including the recording/monitoring of staff competency
- The presence of a dedicated pleural service and access to it (hours/areas of the hospital)
- Audit of standards/guidelines and the mechanism for incident reporting/sharing of learning.

Hospital participation

Data were collected from all hospitals in England, Wales, Northern Ireland and Jersey that admit and treat patients who require insertion of chest drains (including independent hospitals where applicable).

Study population and case ascertainment

Inclusion criteria

Patients aged 18 and older who were admitted to hospital between 01/01/2024 and 31/12/2024 and had a chest drain inserted, or a pleural aspiration undertaken (OPCS code T12.0-T12.9) during their hospital stay were included. Chest drains were overrepresented in the sample as they provided greater insight and learning across the whole patient pathway.

Exclusion criteria

Procedures performed on already inserted chest-drains (e.g. in-dwelling pleural catheters) were excluded. Trauma patients were excluded as they are treated on a different pathway. These patients are to be covered in an upcoming NCEPOD study on rib fractures.

Identification of the population

Each local reporter at participating hospitals was sent a pre-set spreadsheet to record patients admitted to hospital who had undergone a pleural procedure. Basic data were requested for each patient identified, including age, admission/discharge dates and times, date of pleural procedure, ICD10 and OPCS codes during the hospital stay, source of admission and discharge destination and whether an incident had been reported during the admission.

Up to eight patients per hospital were then selected from this sample. The study advisory group agreed that patient safety incidents and areas for improvement were more likely to be found among patients with chest drains and those admitted as an emergency or treated out of hours, including at weekends. The sample was therefore weighted towards these patients. Where a clinical incident had been reported, these patients made up to 50% of cases of each hospital's selection.

Data collection

Data were collected from the following sources:

Clinician questionnaire

A clinical questionnaire was assigned to the named respiratory consultant at discharge for completion. This included questions about the care received following the pathway of care from pre-admission to discharge.

Case notes

Copies of the case notes were requested for peer review of each patient's included episode of care. A list detailing the elements of the case notes that were required was provided to the NCEPOD local reporters, who collated the notes from each participating trust/health board.

Organisational questionnaires

Organisational questionnaires were disseminated to the NCEPOD local reporter for completion, with assistance from relevant local clinical leads. These detailed the organisational structures in place to deliver the service to patients who have a pleural procedure.

Surveys

The survey questionnaires were not linked to the data from patients selected for case review. They were designed using Microsoft Forms so that both patients who had undergone a pleural procedure and their treating clinicians could complete them anonymously.

Patient survey

The patient survey collected data on the lived experience of patients regarding the care they had received relating to a pleural procedure. The link to the patient survey was sent to a study contact– a senior respiratory clinician in each hospital – who shared it with patients who had had a pleural procedure when they attended their follow-up appointment. It was also promoted by the British Thoracic Society.

Clinician survey

Clinician views were collected in collaboration with the pleural team at Guy's and St Thomas' NHS Foundation Trust, who ran a nationwide survey of confidence and competence in chest drain insertion by circulating an anonymous online survey to resident doctors in general medicine, emergency medicine and critical care. NCEPOD local reporters and study contacts distributed the survey to encourage maximum involvement of clinicians.

Peer review of the case notes and questionnaire data

A multidisciplinary group of case reviewers comprised consultants and resident doctors in respiratory medicine, emergency medicine, interventional radiology, critical care medicine, acute medicine, emergency medicine, and pleural and respiratory nurses.

Using a semi-structured electronic questionnaire (reviewer assessment form), each set of case notes was reviewed by at least one reviewer within a multidisciplinary meeting. A discussion, chaired by an NCEPOD clinical co-ordinator, took place at regular intervals, allowing each reviewer to summarise their cases and ask for opinions from other specialties or raise aspects of the case for further discussion.

Data analysis

Following cleaning of the quantitative data, descriptive data summaries were produced. Qualitative data collected from the case reviewers' opinions and free-text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. As the methodology provides a snapshot of care over a set point in time, with data collected from several sources to build a national picture, denominators will change depending on the data source, but each source is referenced throughout the document. This deep dive uses a qualitative method of peer review, and anonymised case studies have been used throughout this report to illustrate themes. The sampling method of this enquiry, unlike an audit, means that data cannot be displayed at a hospital/trust/health board/regional level.

Data analysis rules

- Small numbers have been suppressed if they risk identifying an individual (usually <3-5)
- Any percentage under 1% has been presented in the report as <1%
- Percentages were not calculated if the denominator was less than 100 so as not to inflate the findings, unless to compare groups within the same analysis
- There will be variation in the denominator for different data sources and for each individual question as it is based on the number of answers given.

Information governance

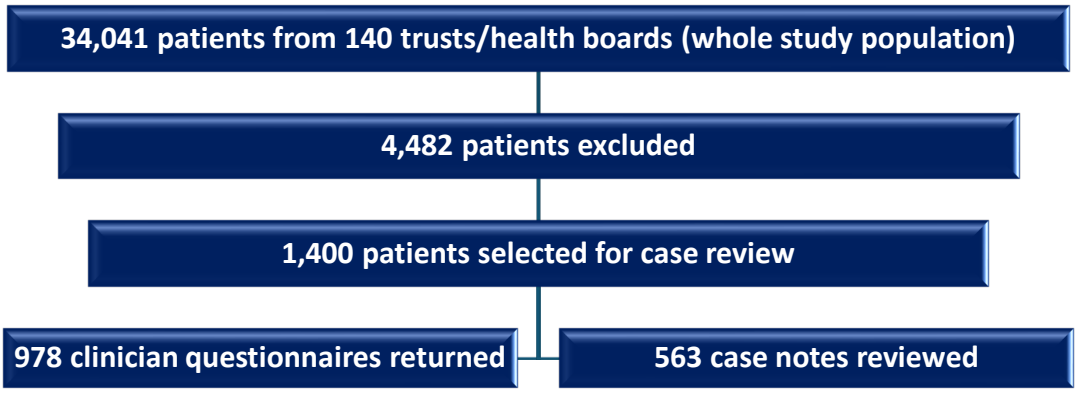
All data received and handled by NCEPOD complied with all relevant national requirements, including the General Data Protection Regulation 2016 (Z5442652), Section 251 of the NHS Act 2006 14 (PIAG 4-08(b)/2003, App No 007), and the Code of Practice on Confidential Information. Each patient was given a unique NCEPOD number.

2 DATA RETURNED AND THE STUDY POPULATION

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

(BACK TO CONTENTS)

Data returns



F2.1 Data returned

Organisational data

- Organisational questionnaire: 173/200 hospital questionnaires returned

Survey data

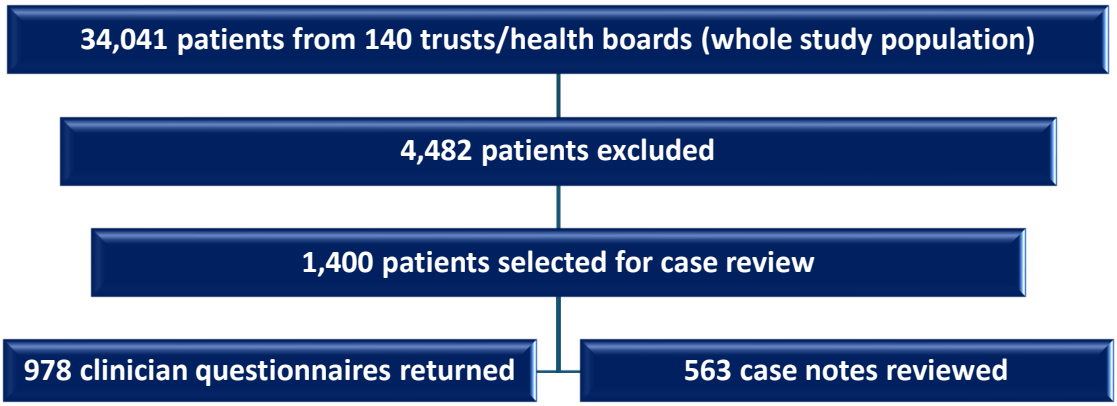
- Health and social care professional survey: general medicine 455 and emergency medicine/intensive care medicine 242
- Patient survey: 45

- In total, 34,041 patients who underwent a chest drain or pleural aspiration during the study time period were identified across 140 hospitals. Once patients meeting the exclusion criteria (mainly trauma patients) were removed, 29,559 remained for the analysis.
- Patients were admitted less frequently at weekends and out of hours. The pattern of daytime admissions showed a peak at 7am with a further peak at 2 to 3pm (F2.2).
- The overall patient cohort occupied a total of 411,755 bed days, illustrating the impact on acute hospital bed occupancy at a cost of around £231m.
- Among the patients selected for inclusion in the study, the pattern of hospital admissions showed a more even distribution through the days of the week and a later initial peak in the working day (9-11am) (F2.3), reflecting the sampling strategy's focus on out of hours admission.
- The mean age of the sample population was 66 years (median 70 years) and 580/978 (59.3%) of the sample were men. Overall, 588/978 (60.1%) patients were treated for pleural effusion (mean age 70.2 years).
- Where it was documented, 374/452 (82.7%) of the pleural effusions were exudates and 78/452 (17.3%) were transudates. There were 276/978 (28.2%) patients treated for pneumothorax (mean age 58.5 years), and 159/978 (16.3%) for pleural infection (mean age 63.5 years). Excluding pleural aspirations, case review data showed that of 448 chest drains, 109/448 (24.3%) were in place for less than a day and 323/448 (72.1%) patient for five days or less (unknown in 16).

- The procedure was undertaken as an emergency in 129/933 (13.8%) patients, it was urgent in 542/933 (58.1%) and non-urgent in 262 (28.1%).
- Emergency procedures were most required in acute care areas such as the emergency department (91/241; 37.8%), and critical care (15/53; 28.3%) (F2.4).
- There were 153/475 (32.2%) urgent and 24/219 (11.0%) non-urgent procedures undertaken out of hours (F2.5). Overall, only 74/251 (29.5%) out of hours procedures were considered emergencies, indicating room to improve compliance with the best practice.
- Of the 170 patients with a pneumothorax, 51/170 (30.0%) were primary spontaneous, 87/170 (51.2%) were secondary spontaneous, and 20/170 (11.8 %) were iatrogenic.
- There were 5/170 (2.9%) patients with tension pneumothorax and six where the cause was not categorised. Of the 52 patients with infection, the underlying cause was pneumonia in 44.
- There were 144/978 (14.7%) patients who required at least one additional drain insertion during the hospital admission. The majority (117/144; 81.3%) of patients had one additional procedure (F2.6).
- The underlying indication for the procedure in these patients was pleural effusion in 69, pneumothorax in 53 and infection in 22. This means that a greater proportion of those with a pleural infection (22/95; 23.2%) or a pneumothorax (53/260; 20.4%) needed a repeat procedure than those with pleural effusion (69/573; 12.0%).
- Patients aged 60 years or younger made up a higher proportion of those with a pneumothorax (136/276; 49.3%) or pleural infection (65/159; 40.9%) than with a pleural effusion (142/585; 24.3%) (F2.7).
- Data on ethnicity showed that White British/White-other groups were slightly overrepresented compared with UK census data (T2.1). This may in part be explained by the proportion of older people included in this study, as 93.6% of people in the over 65 age group in the UK are of white ethnicity.
- The proportion of fit patients (Rockwood clinical frailty score of 1–4) who had a pneumothorax was greater (208/569: 36.6%) than the proportion who were mildly frail or worse (Rockwood clinical frailty score 5–9: 57/348; 16.4%).
- There was at least one comorbid condition in 871/978 (89.1%) patients. Multimorbidity (the presence of at least two comorbid conditions) has an overall population prevalence of 23-27%,[4] and 468/978 (47.9%) patients had multimorbidity (F2.8).
- The most common comorbidity was cancer (localised or metastatic, including haematological) in 391/978 (40.0%) patients, of whom 254/391 (65.0%) had a pleural effusion and 61/391 (15.6%) a pneumothorax. A total of 201/978 (20.6%) patients had chronic obstructive pulmonary disease (COPD), and among these, 95/201 (47.3%) had a pneumothorax and 90/201 (44.8%) a pleural effusion.
- At their initial assessment, 357/863 (41.4%) patients had a respiratory rate above 20 breaths per minute, and 156/863 (18.1%) had a rate ≥25 (unknown in 112) (F2.9). Both findings would add points to the NEWS2 score, indicating that many of these patients were significantly unwell.

2 DATA RETURNED AND THE STUDY POPULATION

Data returns



F2.1 Data returned

Organisational data

- Organisational questionnaire: 173/200 hospital questionnaires returned

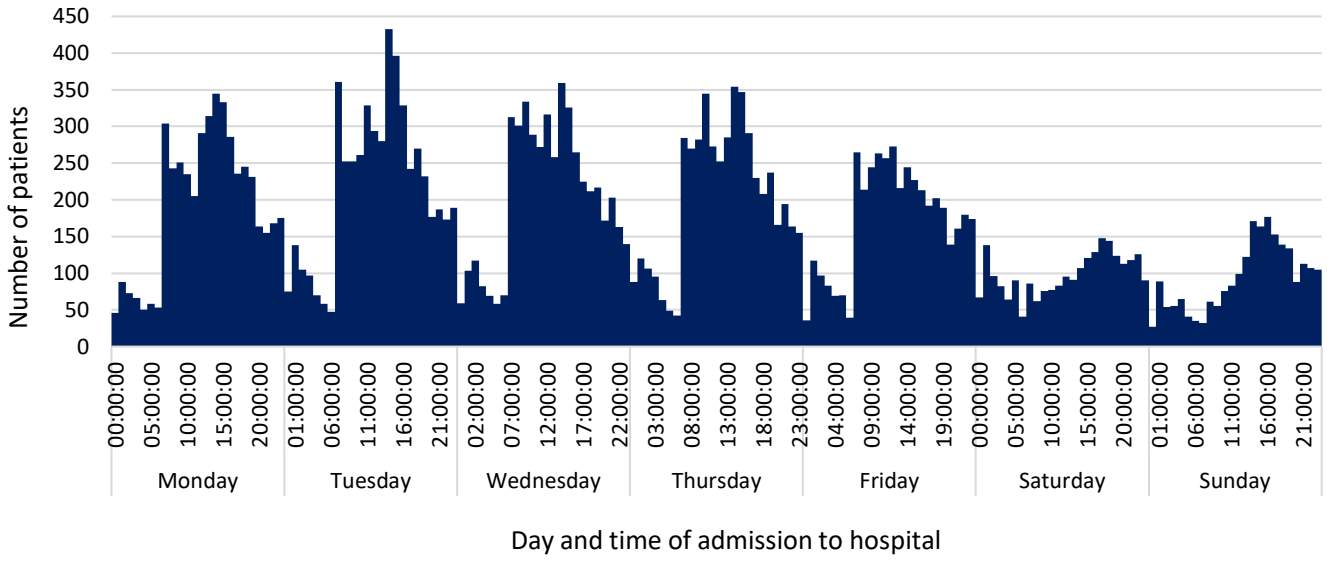
Survey data

- Health and social care professional survey: general medicine 455 and emergency medicine/intensive care medicine 242
- Patient survey: 45

Whole study population

In total, 34,041 patients who underwent a chest drain or pleural aspiration during the study time period were identified across 140 hospitals. Once patients meeting the exclusion criteria (mainly trauma patients) were removed, 29,559 remained for the analysis. The average age was 67 years (median 71 years) and 17,119/29,559 (57.1%) were men.

Patients were admitted less frequently at weekends and out of hours. The pattern of daytime admissions showed a peak at 7am with a further peak between 2 and 3pm (F2.2).



F2.2 Day and time of admission to hospital, whole study population; *n=29,559*

Spreadsheet data

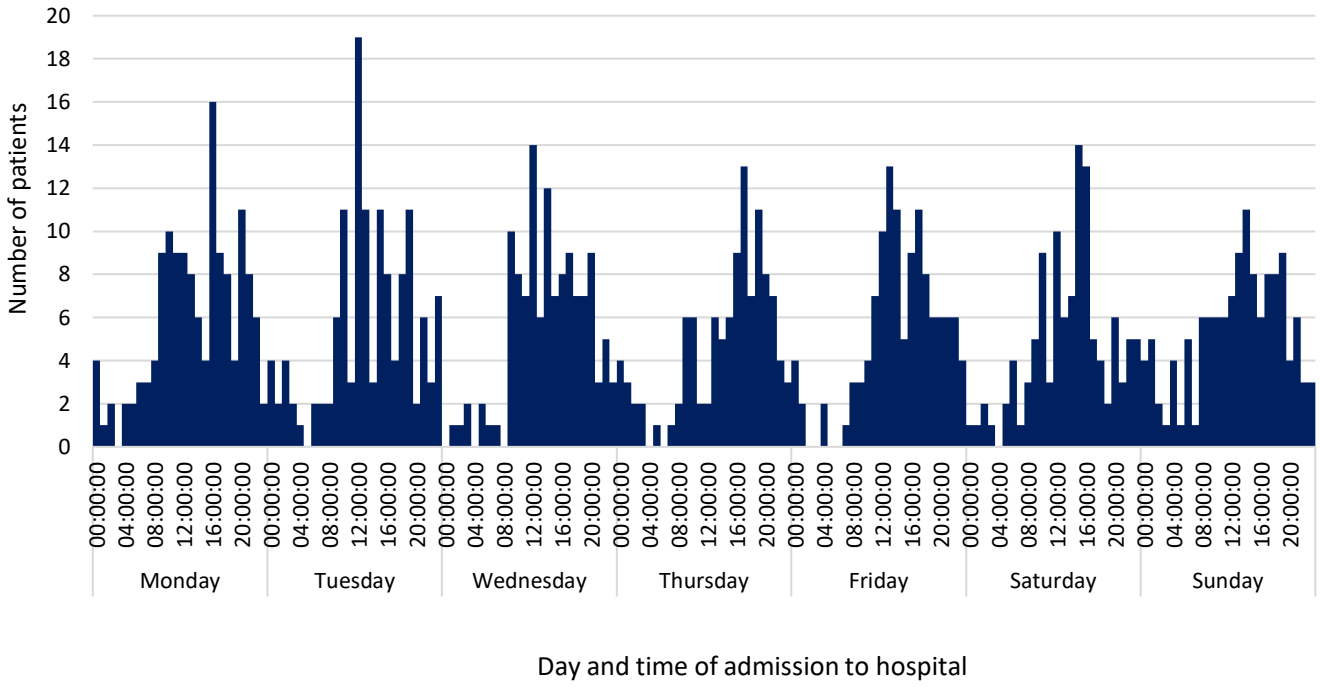
Procedure codes were available for 29,316 patients. Of these, 9,816/29,316 (33.5%) patients had a pleural aspiration. Pleural aspiration was undertaken much more frequently for patients with a pleural effusion (4,036/7,869; 51.3%) than for those with a pneumothorax (114/2,582; 4.4%).

Data on length of stay were available for 17,109 patients with a pleural effusion and 4,918 with a pneumothorax. There were 246/4,918 (5.0%) patients with a pneumothorax treated with a zero length of stay. Of those with a pleural effusion, 3,186/17,109 (18.6%) had a zero length of stay. Overall, 14,333/29,559 (48.5%) patients had a length of stay of ≤7 days and 26,012/29,559 (88.0%) ≤28 days.

The overall patient cohort occupied a total of 411,755 bed days, illustrating the impact on acute hospital bed occupancy. The discharge destination was available for 29,029 patients. Most patients were discharged home (23,746/29,029; 81.8%). There were 2,897/29,029 (10.0%) patients who died during the hospital admission and of these 483/2,897 (16.7%) had a diagnosis of pneumothorax.

Study population selected for case review

Among the patients selected for inclusion in the study, the pattern of hospital admissions showed a more even distribution through the days of the week and a later initial peak in the working day (9-11am) (F2.3), reflecting the sampling strategy's focus on out of hours admission.



F2.3 Day and time of admission to hospital, sampled population; *n=978*
Clinician questionnaire data

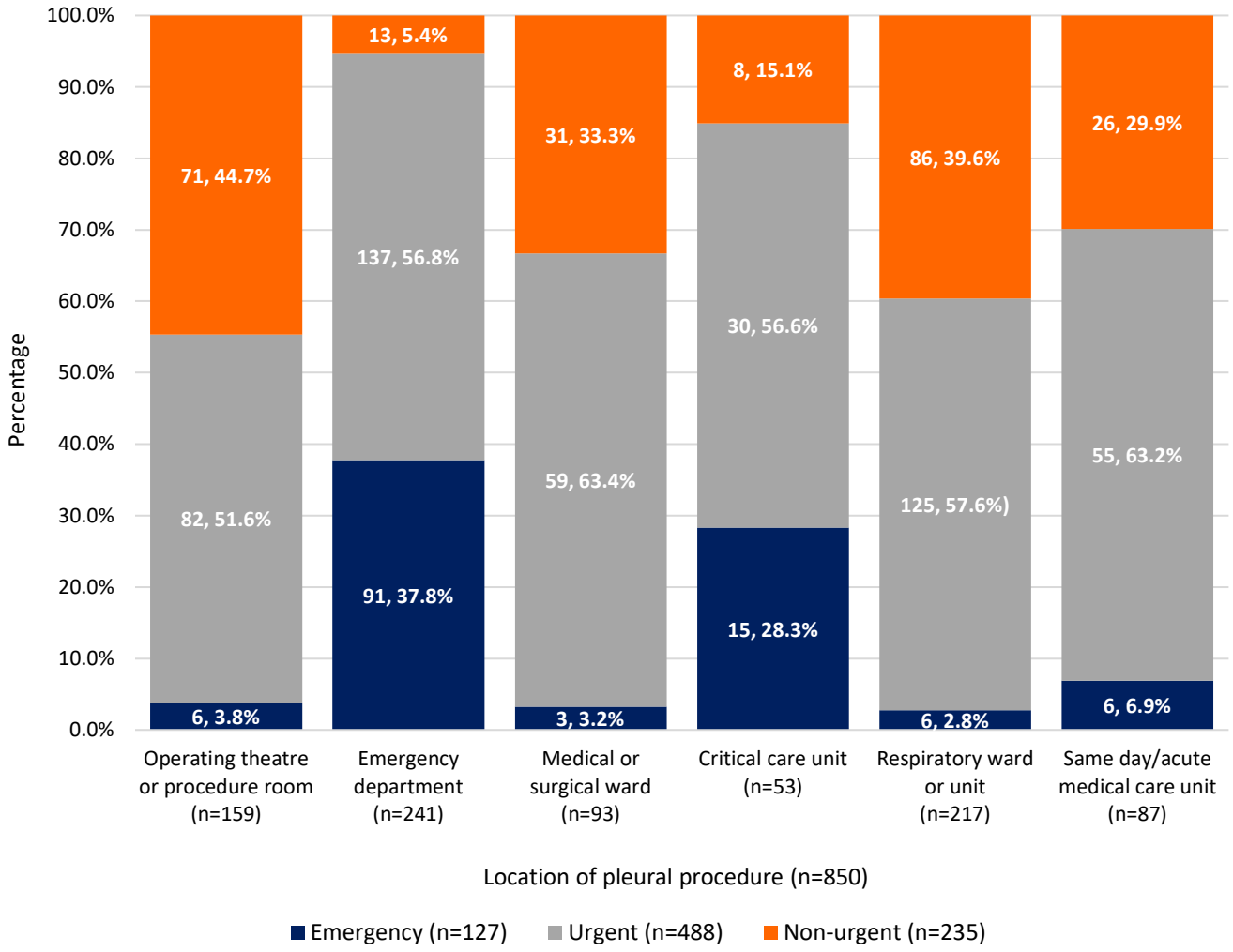
The mean age of the sample population was 66 years (median 70 years) and 580/978 (59.3%) of the sample were men. Overall, 588/978 (60.1%) patients were treated for pleural effusion (mean age 70.2 years).

Where it was documented, 374/452 (82.7%) of the pleural effusions were exudates and 78/452 (17.3%) were transudates. There were 276/978 (28.2%) patients treated for pneumothorax (mean age 58.5 years), and 159/978 (16.3%) for pleural infection (mean age 63.5 years). Excluding pleural aspirations,

case review data showed that of 448 chest drains, 109/448 (24.3%) were in place for less than a day and 323/448 (72.1%) patient for five days or less (unknown in 16).

The clinician questionnaire recorded the urgency of the procedure for 933 patients. The procedure was undertaken as an emergency in 129/933 (13.8%) patients, it was urgent in 542/933 (58.1%) and non-urgent in 262 (28.1%).

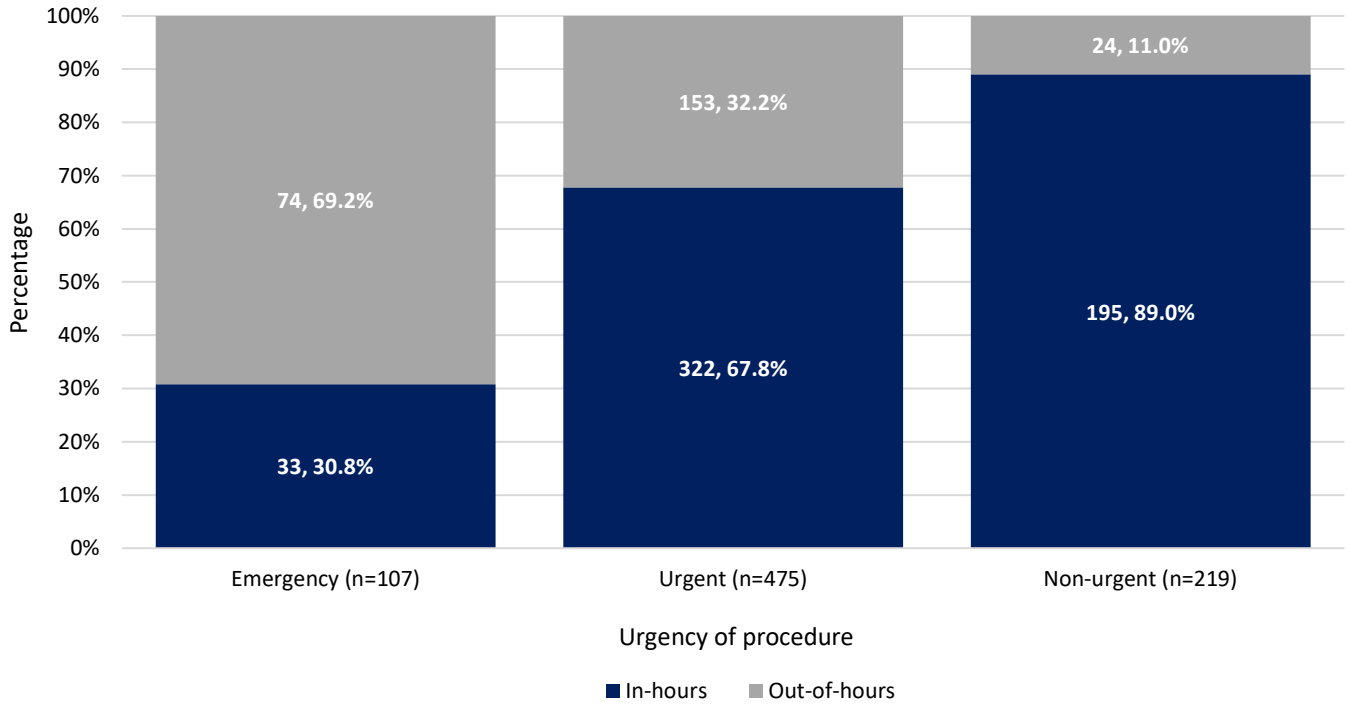
Emergency procedures were most required in acute care areas such as the emergency department (91/241; 37.8%), and critical care (15/53; 28.3%) (F2.4).



F2.4 Urgency of procedure vs location of procedure
Clinician questionnaire data; n=850

Recent British Thoracic Society quality standards recommend that pleural procedures should only be undertaken outside of normal working hours (usually 9-5) in an emergency situation.[1]

There were 153/475 (32.2%) urgent and 24/219 (11.0%) non-urgent procedures undertaken out of hours (F2.5). Overall, only 74/251 (29.5%) out of hours procedures were considered emergencies, indicating room to improve compliance with best practice.



F2.5 Timing of procedure versus urgency
Clinician questionnaire data; *n=801*

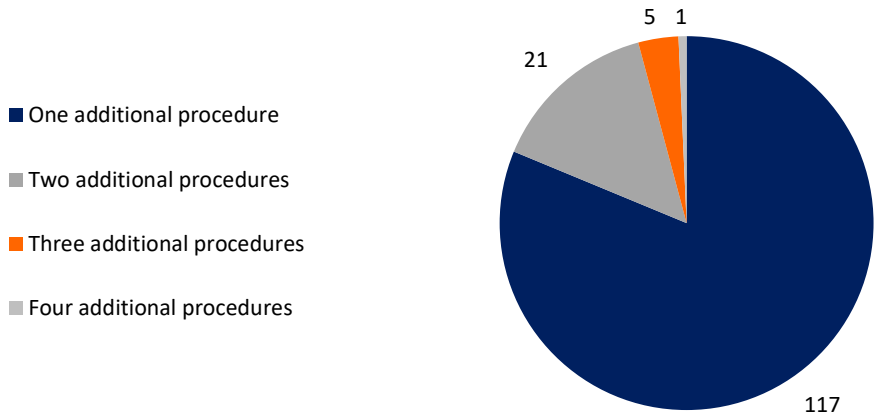
Indication for the procedure

The indication for a pleural procedure among patients included in the in-depth case note review was similar to the overall population (effusion 325/547 (59.4%); pneumothorax 170/547 (31.1%); infection 52/547 (9.3%)) (unknown in 16).

Of the 170 patients with a pneumothorax, 51/170 (30.0%) were primary spontaneous, 87/170 (51.2%) were secondary spontaneous, and 20/170 (11.8 %) were iatrogenic. There were 5/170 (2.9%) patients with tension pneumothorax and six where the cause was not categorised. Of the 52 patients with infection, the underlying cause was pneumonia in 44.

Repeat chest drain insertions

There were 144/978 (14.7%) patients who required at least one additional drain insertion during the hospital admission. The majority (117/144; 81.3%) of patients had one additional procedure (F2.6).

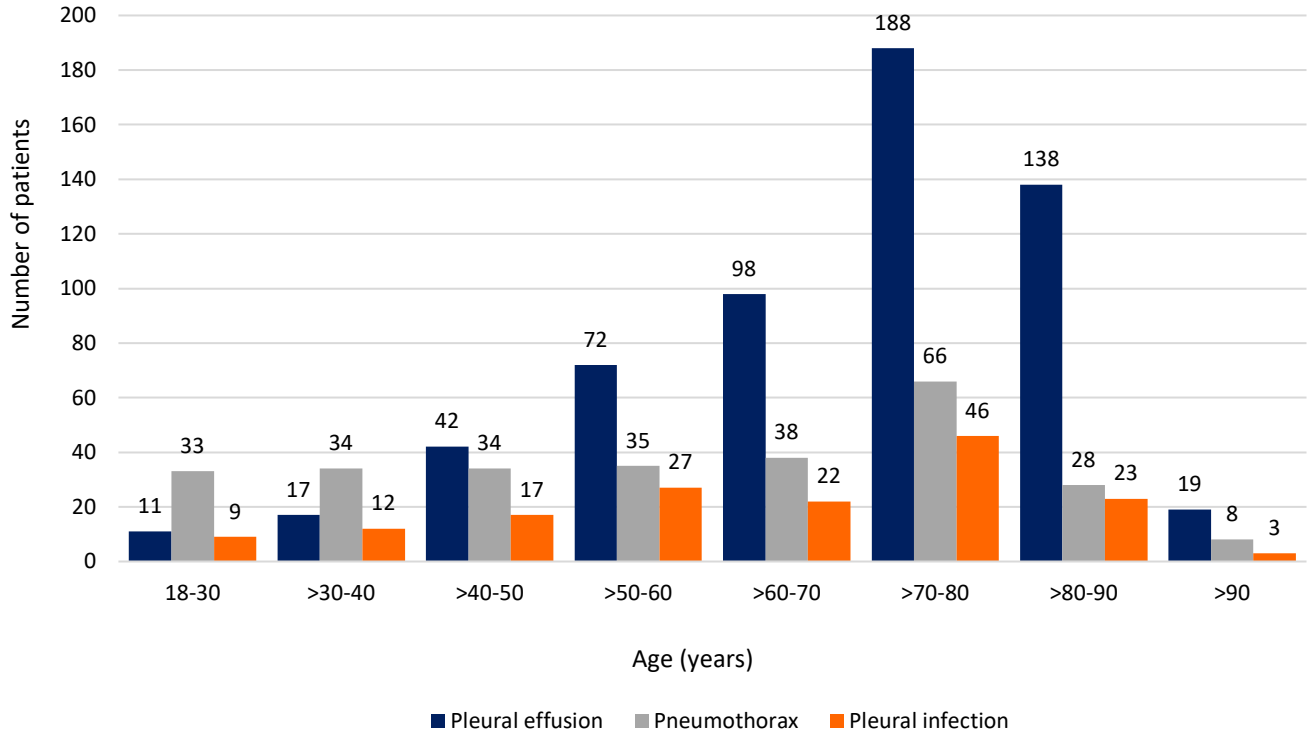


F2.6 Number of additional procedures
Clinician questionnaire data; *n=144*

The underlying indication for the procedure in these patients was pleural effusion in 69, pneumothorax in 53 and infection in 22. This means that a greater proportion of those with a pleural infection (22/95; 23.2%) or a pneumothorax (53/260; 20.4%) needed a repeat procedure than those with pleural effusion (69/573; 12.0%).

Demographic data

Patients aged 60 years or younger made up a higher proportion of those with a pneumothorax (136/276; 49.3%) or pleural infection (65/159; 40.9%) than with a pleural effusion (142/585; 24.3%) (F2.7).



F2.7 Age distribution of patients with effusion, pneumothorax and infection
Clinician questionnaire data; n=978

Data on ethnicity showed that White British/White-other groups were slightly overrepresented compared with UK census data (T2.1). This may in part be explained by the proportion of older people included in this study, as 93.6% of people in the over 65 age group in the UK are of white ethnicity.[2] There were 145/978 (14.8%) patients whose ethnicity was not known.

T2.1 Ethnicity of the study population	Number of patients	%	2021 census data
White British/White-other	750	90.0	81.7
Asian/Asian British (Indian, Pakistani, Bangladeshi, Chinese, other Asian)	47	5.6	9.3
Black/African/Caribbean/Black British	21	2.5	4.0
Mixed/Multiple ethnic groups	3	0.4	2.9
Other ethnic group	12	1.4	2.2
Subtotal	**833**		
Unknown	145		
Total	**978**		

Clinician questionnaire data

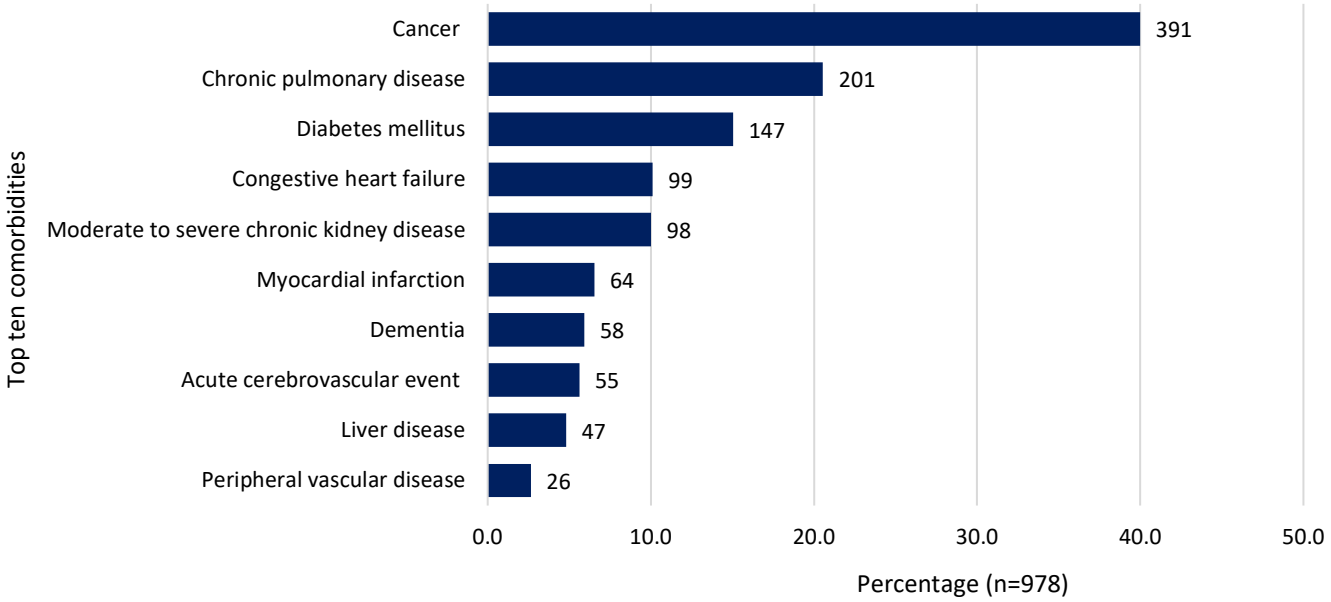
Frailty and comorbidity

The Rockwood clinical frailty scale was developed to describe overall functional status of patients.[3] Originally developed for people aged 65 or older, it is now commonly used in patient assessment in UK hospitals. Scores range from one (very fit) to nine (terminally ill).

The proportion of fit patients (Rockwood clinical frailty score of 1–4) who had a pneumothorax was greater (208/569: 36.6%) than the proportion who were mildly frail or worse (Rockwood clinical frailty score 5–9: 57/348; 16.4%).

There was at least one comorbid condition in 871/978 (89.1%) patients. Multimorbidity (the presence of at least two comorbid conditions) has an overall population prevalence of 23-27%,[4] and 468/978 (47.9%) patients had multimorbidity (F2.8).

The most common comorbidity was cancer (localised or metastatic, including haematological) in 391/978 (40.0%) patients, of whom 254/391 (65.0%) had a pleural effusion and 61/391 (15.6%) a pneumothorax. A total of 201/978 (20.6%) patients had chronic obstructive pulmonary disease (COPD), and among these, 95/201 (47.3%) had a pneumothorax and 90/201 (44.8%) a pleural effusion.



F2.8 Most common comorbidities

Clinician questionnaire data; n=978 (answers may be multiple)

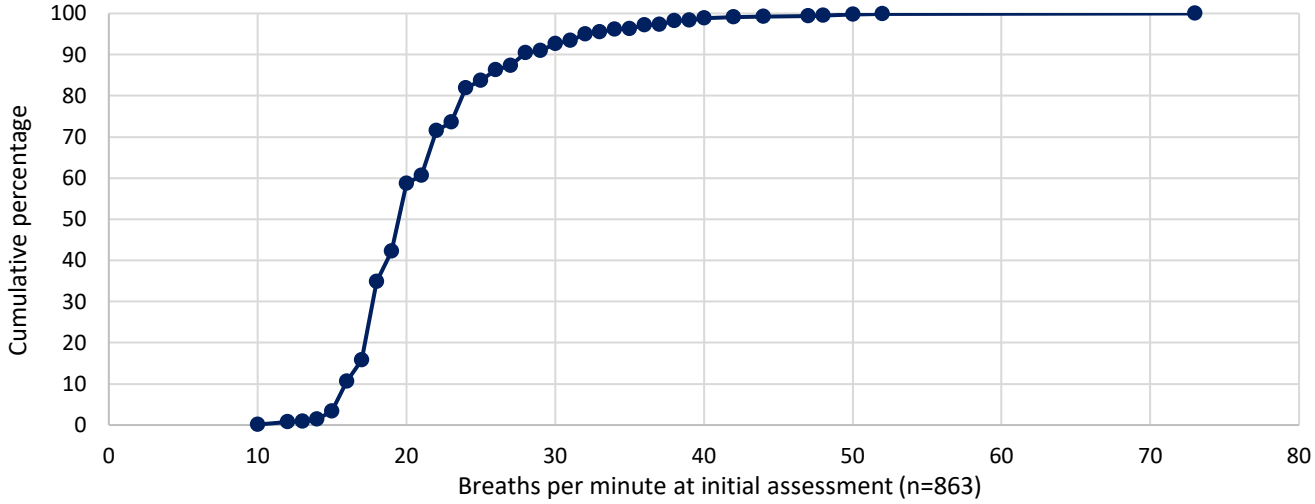
Of the patients with a pleural effusion, cancer was a comorbidity in 254/588 (43.2%), heart failure in 67/588 (11.4%) and kidney disease in 63/588 (10.7%). Of those who had a pneumothorax, chronic obstructive pulmonary disease was a comorbidity in 95/276 (34.4%).

Respiratory parameters of the study population

At their initial assessment, 357/863 (41.4%) patients had a respiratory rate above 20 breaths per minute, and 156/863 (18.1%) had a rate ≥25 (unknown in 112) (F2.9). Both findings would add points to the NEWS2 score, indicating that many of these patients were significantly unwell.[5]

The use of oxygen can also indicate severity of illness, although it is sometimes used conservatively to help resolve small pneumothoraces more quickly. In total, 398/978 (40.7%) patients were treated with

supplemental oxygen. Of these, 170/398 (42.7%) had a normal oxygen saturation of 95–100%; among this group, 47/170 (27.6%) were being treated for pneumothorax.



F2.9 Number of breaths per minute at the initial assessment

Clinician questionnaire data; n=863

3 ARRANGEMENTS FOR CHEST DRAINS AND PLEURAL ASPIRATIONS

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

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- Data from the organisational survey showed that a specialist pleural team was available in 118/178 (66.3%) hospitals. Cover by this specialist team was available 24/7 in five hospitals and for 40 hours (five working days of eight hours) or less in 92/118 (78.0%) hospitals, confirming that many hospitals had different arrangements in place for chest drains and pleural aspirations undertaken out of hours.
- Competency for unsupervised insertion of chest drains is included in the specialty curricula for resident doctors in training in acute, critical care, emergency and respiratory medicine. However, responsibility for out of hours chest drain insertion for patients on general wards is generally allocated to the on-call medical registrar who may not be from one of the above specialties.
- Published data from the healthcare professional survey showed that self-reported confidence in chest drain insertion among non-respiratory medical registrars diminishes with increasing time since their last pleural procedure. The survey also showed that doctors in specialties with experience of pleural procedures within the last year were more likely to feel confident inserting a chest drain without supervision. However, in no specialty were all doctors confident with pleural procedures.
- When asked whether they had ever performed an out of hours pleural procedure, 63/64 (98.4%) doctors in respiratory medicine and 63/83 (75.9%) doctors in emergency medicine reported having done so. A lower percentage of doctors in intensive care medicine (85/159; 53.5%) and general medicine (121/391; 30.9%) had actual out of hours experience (T3.1).
- Only 44/391 (11.3%) general medicine clinicians felt confident to insert a chest drain unsupervised.
- Organisational survey data showed that respiratory medicine was the most common specialty for pleural procedure training, with programmes provided in 96/104 (92.3%) hospitals (F3.1). Training records were maintained and updated in only 55/124 (44.4%) hospitals and a register of competent clinicians was kept in 23/157 (14.6%) hospitals.
- Just 16/173 (9.2%) hospitals ensured that a competent operator was present on their on-call rota and only 62/173 (35.8%) hospitals had an escalation protocol for complex or high-risk patients out of hours.
- During working hours, pleural procedures in the study population were most commonly performed by respiratory medicine consultants or respiratory/pleural nurses (370/536; 69.0%).
- Out of hours during the week, this fell to 24/86 (27.9%), with many being undertaken by emergency medicine clinicians (38/86; 44.2%). The remaining procedures were performed by clinicians in: general medicine, 9/86 (10.5%), critical care medicine 11/86 (12.8%), acute medicine (4/86), general surgery (2/86) and interventional radiology (1/86).
- Weekends showed a similar pattern but with equal proportions of procedures undertaken by respiratory medicine and emergency medicine clinicians (48/146; 32.9%) (F3.2).

3 ARRANGEMENTS FOR CHEST DRAINS AND PLEURAL ASPIRATIONS

Elective insertion of chest drains during working hours is generally undertaken by pleural services, a sub-specialty of respiratory medicine and has been shown to have low complication rates.[6] Data from the organisational survey showed that a specialist pleural team was available in 118/178 (66.3%) hospitals. Cover by this specialist team was available 24/7 in five hospitals and for 40 hours (five working days of eight hours) or less in 92/118 (78.0%) hospitals, confirming that many hospitals had different arrangements in place for chest drains and pleural aspirations undertaken out of hours.

The development of specialist pleural services means that non-respiratory doctors undertake elective pleural procedures infrequently. The general internal medicine curriculum only requires doctors to be competent in unsupervised practice for aspiration of air or fluid from the pleural space, while other procedures such as chest drain insertion are listed as supervised or simulated.[7]

Competency for unsupervised insertion of chest drains is included in the specialty curricula for resident doctors in training in acute, critical care, emergency and respiratory medicine. However, responsibility for out of hours chest drain insertion for patients on general wards is generally allocated to the on-call medical registrar who may not be from one of the above specialties. Competency to insert a chest drain may have only been assessed in a skills laboratory, and doctors on the medical on-call rota who have been signed off as competent are only rarely required to insert a chest drain in clinical practice.

All organisations should have systems in place to ensure that appropriate out of hours expertise is available to support patient safety. The British Thoracic Society Quality Standard for pleural disease states that safety protocols should require operators to be adequately trained and procedures to be undertaken during working hours (usually 9–5), except in an emergency.[1]

Published data from the healthcare professional survey showed that self-reported confidence in chest drain insertion among non-respiratory medical registrars diminishes with increasing time since their last pleural procedure. The survey also showed that doctors in specialties with experience of pleural procedures within the last year were more likely to feel confident inserting a chest drain without supervision. However, in no specialty were all doctors confident with pleural procedures.[8]

When asked whether they had ever performed an out of hours pleural procedure, 63/64 (98.4%) doctors in respiratory medicine and 63/83 (75.9%) doctors in emergency medicine reported having done so. A lower percentage of doctors in intensive care medicine (85/159; 53.5%) and general medicine (121/391; 30.9%) had actual out of hours experience (T3.1). Only 44/391 (11.3%) general medicine clinicians felt confident to insert a chest drain unsupervised.

T3.1 Chest drain experience and confidence of doctors in different specialties		
Specialty	**Experience in last year (%)**	**Confident to perform unsupervised (%)**
Respiratory medicine	63/64 (98.4)	58/64 (90.6)
Emergency medicine	63/83 (75.9)	61/83 (73.5)
Intensive care medicine	85/159 (53.5)	97/159 (61.0)
General medicine	121/391 (30.9)	44/391 (11.3)

Clinician survey data; n=697

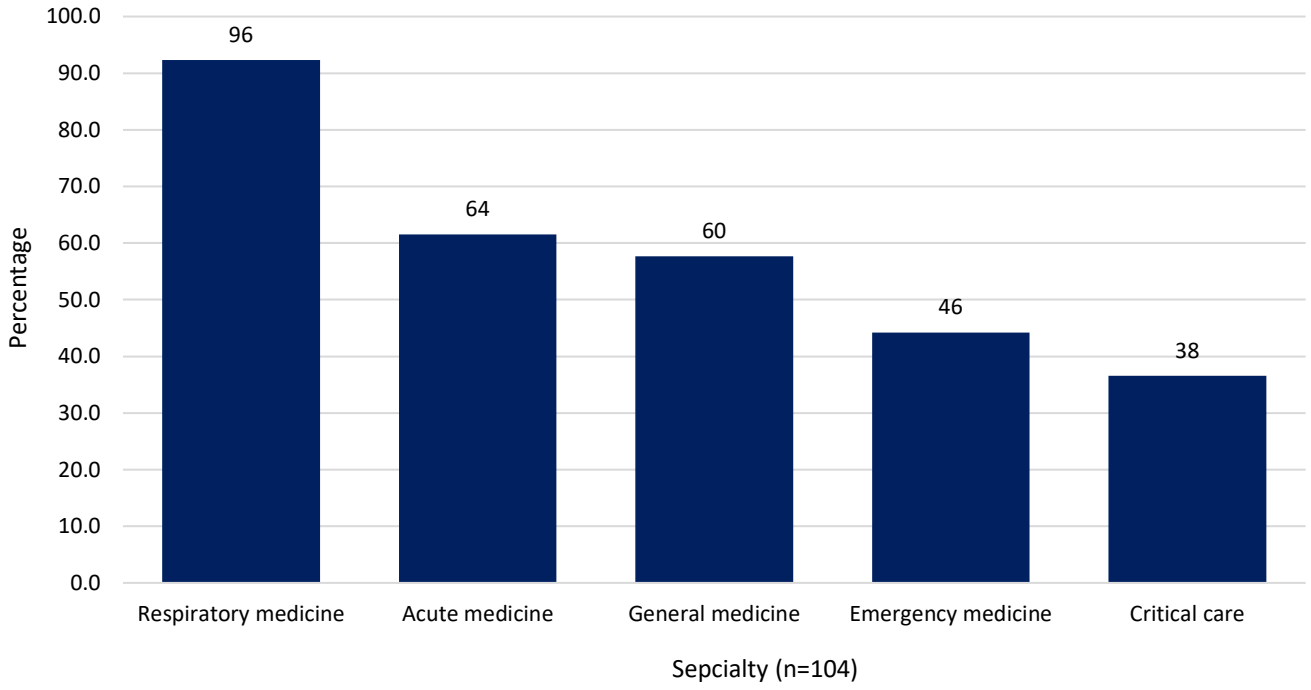
Comments from medical registrars

"It is the one procedure that the thought of terrifies me most and fills me with anxiety when working out of hours"

"There is often hesitancy to performing a chest drain by most specialty registrars not working in high volume specialist centres. This can lead to delays in procedure performance."

"I think it is dangerous to expect me to be able to insert a chest drain"

Organisational survey data showed that respiratory medicine was the most common specialty for pleural procedure training, with programmes provided in 96/104 (92.3%) hospitals (F3.1). Training records were maintained and updated in only 55/124 (44.4%) hospitals and a register of competent clinicians was kept in 23/157 (14.6%) hospitals.



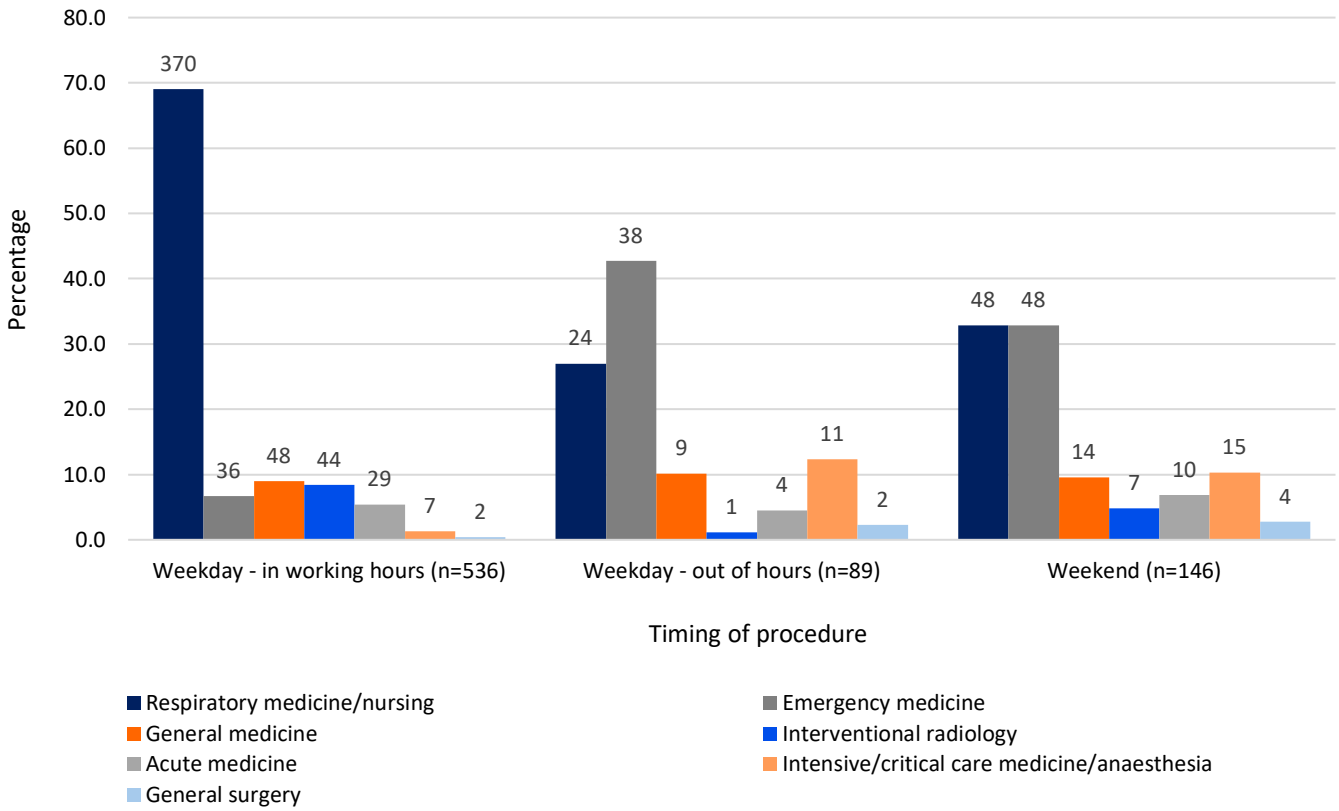
F3.1 Number of hospitals providing training in pleural procedures for different specialties
Organisational data; n=104 (answers may be multiple)

Just 16/173 (9.2%) hospitals ensured that a competent operator was present on their on-call rota and only 62/173 (35.8%) hospitals had an escalation protocol for complex or high-risk patients out of hours.

During working hours, pleural procedures in the study population were most commonly performed by respiratory medicine consultants or respiratory/pleural nurses (370/536; 69.0%).

Out of hours during the week, this fell to 24/86 (27.9%), with many being undertaken by emergency medicine clinicians (38/86; 44.2%). The remaining procedures were performed by clinicians in: general medicine, 9/86 (10.5%), critical care medicine 11/86 (12.8%), acute medicine (4/86), general surgery (2/86) and interventional radiology (1/86).

Weekends showed a similar pattern but with equal proportions of procedures undertaken by respiratory medicine and emergency medicine clinicians (48/146; 32.9%) (F3.2).



F3.2 The specialty of the operator at different times/locations

Clinician questionnaire data; *n=768*

4 ADMISSION, INVESTIGATION AND DECISION MAKING

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

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CASE STUDY: GOOD CARE

A young patient with a malignant pleural effusion was seen with breathlessness due to a large pleural effusion. To relieve symptoms, 1.5L of fluid were aspirated in the same day emergency care procedure room. The patient's symptoms immediately improved. An appointment was made 72 hours later in the pleural specialist clinic for review of results and consideration of further intervention.

The reviewers thought that this was an example of a well-organised service and a coordinated care pathway, which helped to reduce pressure on inpatient beds.

CASE STUDY: ROOM FOR IMPROVEMENT

An older patient with a malignant pleural effusion was admitted as an emergency with breathlessness and low oxygen saturations. Urgent drainage of the effusion resulted in relief of symptoms and improved oxygenation. The patient had been admitted ten days previously in a similar situation. A two-week follow-up in pleural clinic had been arranged.

The reviewers considered this an opportunity to improve care before the index admission. A clearly defined pathway that the patient could access and which facilitated rapid review by the pleural service could have prevented the emergency admission and taken pressure off the acute service.

Admission to hospital

- There were 168/929 (18.1%) patients who had a previous admission to hospital where a chest drain was indicated (59 with a pneumothorax and 109 with infection or effusion) (unknown for 49). Of these, 41 had been admitted within the previous two weeks (and 73 in the previous four weeks).
- Reviewers identified opportunities to improve care prior to the admission in 68/563 (12.1%) patients, most commonly through rapid access to a specialist pleural clinic, which could help to prevent the emergency admission and take pressure off the acute care pathway.
- The majority of patients were admitted via the emergency department (739/954; 77.5%) (T4.1). Overall, 497/954 (52.1%) patients in the study were admitted outside of weekday working hours (08:00–17:59). The out of hours admissions were split between weekdays (232/497; 46.7%) and weekends (265/497; 53.3%).

Initial assessment

- The reviewers considered that there was a delay in assessment for 47/563 (8.3%) patients.
- At least one imaging modality was used in 558/563 (99.1%) patients (unable to answer in three, and the remaining three patients were treated for pneumothorax) (F4.1).
- Reviewers found room for improvement in pre-procedure imaging in 49/536 (9.1%) patients. This was mainly due to a lack of ultrasound scanning facilities.

Timing of the procedure, decision making and delays

- The decision to undertake a pleural procedure was most frequently made in the emergency department (300/978; 30.7%) and on the respiratory ward (231/978; 23.6%) (T4.2).
- There was a delay in the decision to insert a chest drain in 94/477 (19.7%) patients. Delays in decision making occurred in all the wards where patients were located (F4.2) (unknown in 85). They were also distributed both within and outside of normal working hours.
- The reviewers considered that the grade and specialty of the person making the decision was appropriate in 449/563 (79.8%) instances. There were only 21/513 (4.1%) cases reviewed where the person making the decision made it remotely (unknown in 50). Advice was sought from another healthcare professional about the pleural procedure in 176/492 (35.8%) cases (unknown in 71).
- There were further delays in carrying out the procedure after the decision had been made in 139/563 (24.7%) instances. They occurred when the patient was under the care of all clinical specialties and the reasons for delay were frequently not documented.
- Organisational data showed that 121/173 (69.9%) hospitals used pleural procedure packs or their equivalent. There is therefore room to improve this in more than a quarter of hospitals.
- Overall, reviewers considered that 400/524 (76.3%) procedures were undertaken at the appropriate time, while 102/524 (19.5%) procedures should have been undertaken sooner (unknown in 39). The main reasons given for inappropriately delayed procedures included waiting for specialist review, imaging delays, anticoagulation and missed diagnosis.
- There were 22/524 (4.2%) instances where the reviewers thought the procedure should have been delayed. The time of arrival in hospital did not appear to have an impact on whether the timing of procedure was considered inappropriate, neither did the specialty of the operator.
- Clinical questionnaire data showed that 186/936 (19.9%) patients required transfer to a new location for their procedure (unknown in 42). The transfer contributed to a delay for 37/186 (19.9%) patients.
- Across the whole clinical pathway, 228/563 (40.5%) patients experienced a delay at one or more step from initial assessment to the procedure itself. There were six patients who experienced a delay at every step of the pathway (T4.3 and F4.3).
- Reviewers identified 82/563 (14.6%) patients for whom a less invasive approach could have been taken with better decision making and considered that the quality of care was affected in 39/82 patients. In this group, 19/82 patients died during the admission, and a further two died within 30 days of discharge.
- For patients with a pleural effusion, these data describe a group with severe frailty for whom reviewers felt that intervention should have been avoided and palliative care would have been more appropriate. This is particularly relevant when previous attempts at drainage have provided little or no symptomatic relief.
- For ten fit and well patients with a pneumothorax, an invasive procedure could have been avoided, potentially shortening their length of stay as well as improving their experience of care (F4.4).

4 ADMISSION, INVESTIGATION AND DECISION MAKING

Admission to hospital

Opportunity to prevent admission

There were 168/929 (18.1%) patients who had a previous admission to hospital where a chest drain was indicated (59 with a pneumothorax and 109 with infection or effusion) (unknown for 49). Of these, 41 had been admitted within the previous two weeks (and 73 in the previous four weeks).

Reviewers identified opportunities to improve care prior to the admission in 68/563 (12.1%) patients, most commonly through rapid access to a specialist pleural clinic, which could help to prevent the emergency admission and take pressure off the acute care pathway.

The GIRFT report on respiratory medicine makes recommendations about the workforce and infrastructure required to reduce acute admissions and length of stay for patients with pleural disease.[9] These recommendations are designed to support organisations to deliver high-quality services with sufficient capacity for patients with pleural disease.

Route of admission

The majority of patients were admitted via the emergency department (739/954; 77.5%) (T4.1). Overall, 497/954 (52.1%) patients in the study were admitted outside of weekday working hours (08:00–17:59). The out of hours admissions were split between weekdays (232/497; 46.7%) and weekends (265/497; 53.3%). As would be expected, admission from an outpatient clinic was more frequent on weekdays in working hours.

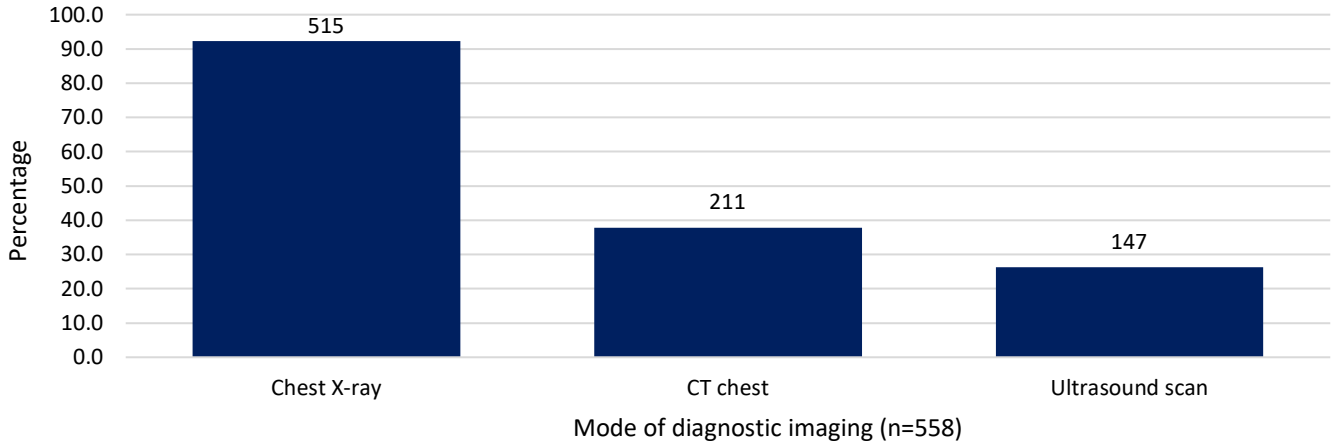
T4.1 Route of admission	Number of patients	%
Via the emergency department	739	77.5
Referral from attendance at outpatient clinic	73	7.7
Referral from primary care	58	6.1
Hospital transfer	42	4.4
Other	42	4.4
Subtotal	**954**	
Unknown	24	
Total	**978**	

Clinician questionnaire data

Initial assessment

Due to the route of admission, the initial clinical assessment generally took place in the emergency department. The reviewers considered that there was a delay in assessment for 47/563 (8.3%) patients.

Imaging is an essential part of the clinical assessment used to diagnose pleural abnormalities (fluid or air in the pleural cavity) suggested by the clinical examination and which will require intervention. At least one imaging modality was used in 558/563 (99.1%) patients (unable to answer in three, and the remaining three patients were treated for pneumothorax) (F4.1).



F4.1 Imaging performed prior to the procedure

Case review data; *n=558*

Ultrasound is an imaging modality that is specifically recommended to improve safety in the peri-procedural care of patients with a pleural effusion. In the diagnostic process, chest X-ray, computed tomography (CT) and ultrasound scanning were all used in combination, the most common investigation being the chest X-ray, which was used in 515/558 (92.3%) patients.

Reviewers found room for improvement in pre-procedure imaging in 49/536 (9.1%) patients. This was mainly due to a lack of ultrasound scanning facilities.

Other than imaging, there are no specific tests required before chest drain insertion. Reviewers also considered that all necessary investigations were undertaken in 499/563 (88.6%) patients and that all of the necessary information was captured by the investigations undertaken in 508/563 (90.2%).

In the small number of patients where information was missing, this mostly related to assessment of bleeding risk, which could have been anticipated in patients taking anticoagulants and those with low platelet counts. Documentation that bleeding risk has been considered is an important step in preparing for all invasive procedures.

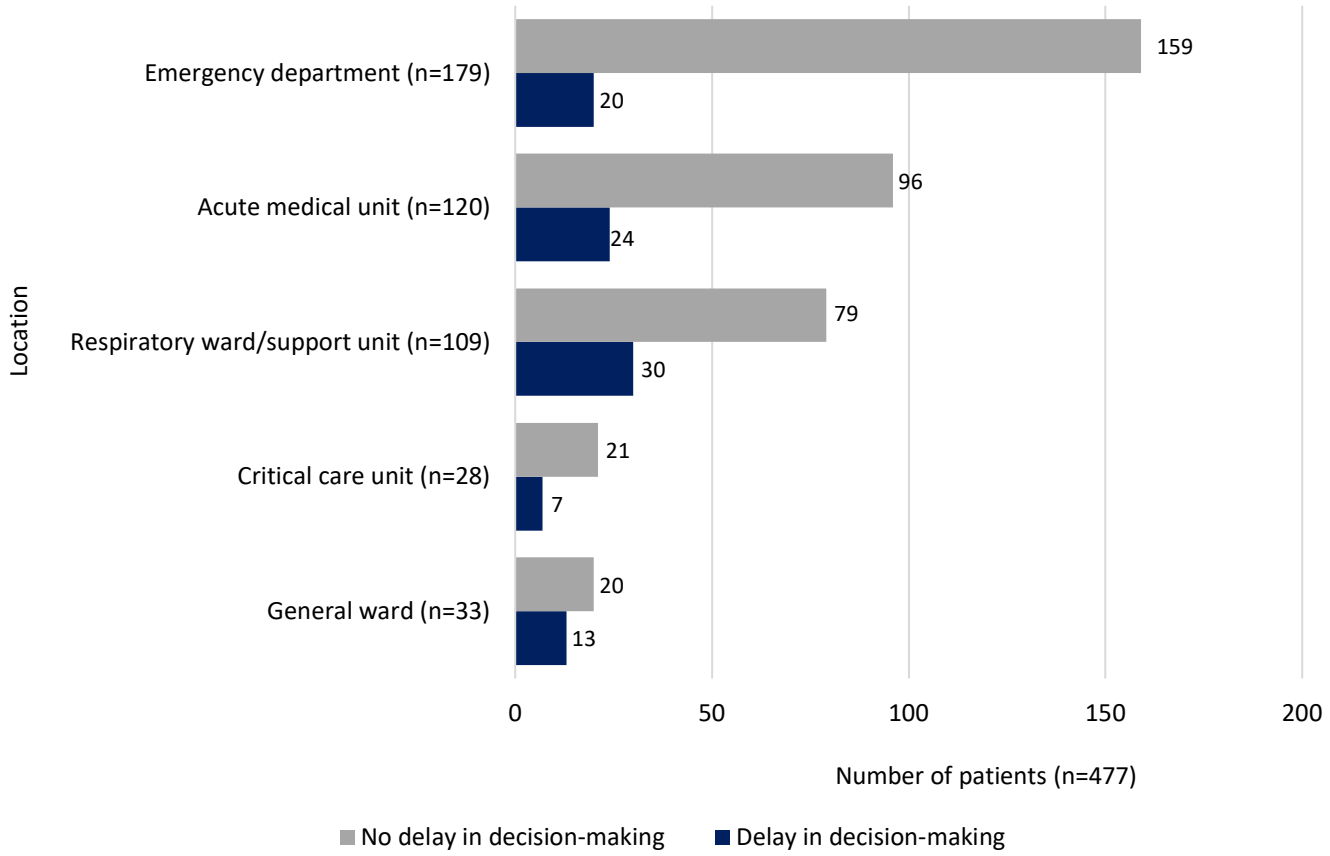
Timing of the procedure, decision making and delays

The decision to undertake a pleural procedure was most frequently made in the emergency department (300/978; 30.7%) and on the respiratory ward (231/978; 23.6%) (T4.2).

T4.2 Location of the patient when the decision made that pleural procedure was required	Number of patients	%
Emergency department	300	30.7
Respiratory ward	231	23.6
Acute medical unit	178	18.2
General ward	63	6.4
Critical care unit	51	5.2
Respiratory support unit	14	1.4
Outpatient department	11	1.1
Other	130	13.3
Total	**978**	

Clinician questionnaire data

There was a delay in the decision to insert a chest drain in 94/477 (19.7%) patients. Delays in decision making occurred in all the wards where patients were located (F4.2) (unknown in 85). They were also distributed both within and outside of normal working hours.



F4.2 Location of decision and delay in decision making
Case review data; n=477

The reviewers considered that the grade and specialty of the person making the decision was appropriate in 449/563 (79.8%) instances. There were only 21/513 (4.1%) cases reviewed where the person making the decision made it remotely (unknown in 50). Advice was sought from another healthcare professional about the pleural procedure in 176/492 (35.8%) cases (unknown in 71). Again, this advice was sought by doctors in all specialties.

There were further delays in carrying out the procedure after the decision had been made in 139/563 (24.7%) instances. They occurred when the patient was under the care of all clinical specialties and the reasons for delay were frequently not documented.

To help reduce delays, GIRFT recommends using procedure packs, which keep all the equipment required for the procedure in one place. Organisational data showed that 121/173 (69.9%) hospitals used pleural procedure packs or their equivalent. There is therefore room to improve this in more than a quarter of hospitals.

Overall, reviewers considered that 400/524 (76.3%) procedures were undertaken at the appropriate time, while 102/524 (19.5%) procedures should have been undertaken sooner (unknown in 39). The main reasons given for inappropriately delayed procedures included waiting for specialist review, imaging delays, anticoagulation and missed diagnosis.

There were 22/524 (4.2%) instances where the reviewers thought the procedure should have been delayed. The time of arrival in hospital did not appear to have an impact on whether the timing of procedure was considered inappropriate, neither did the specialty of the operator.

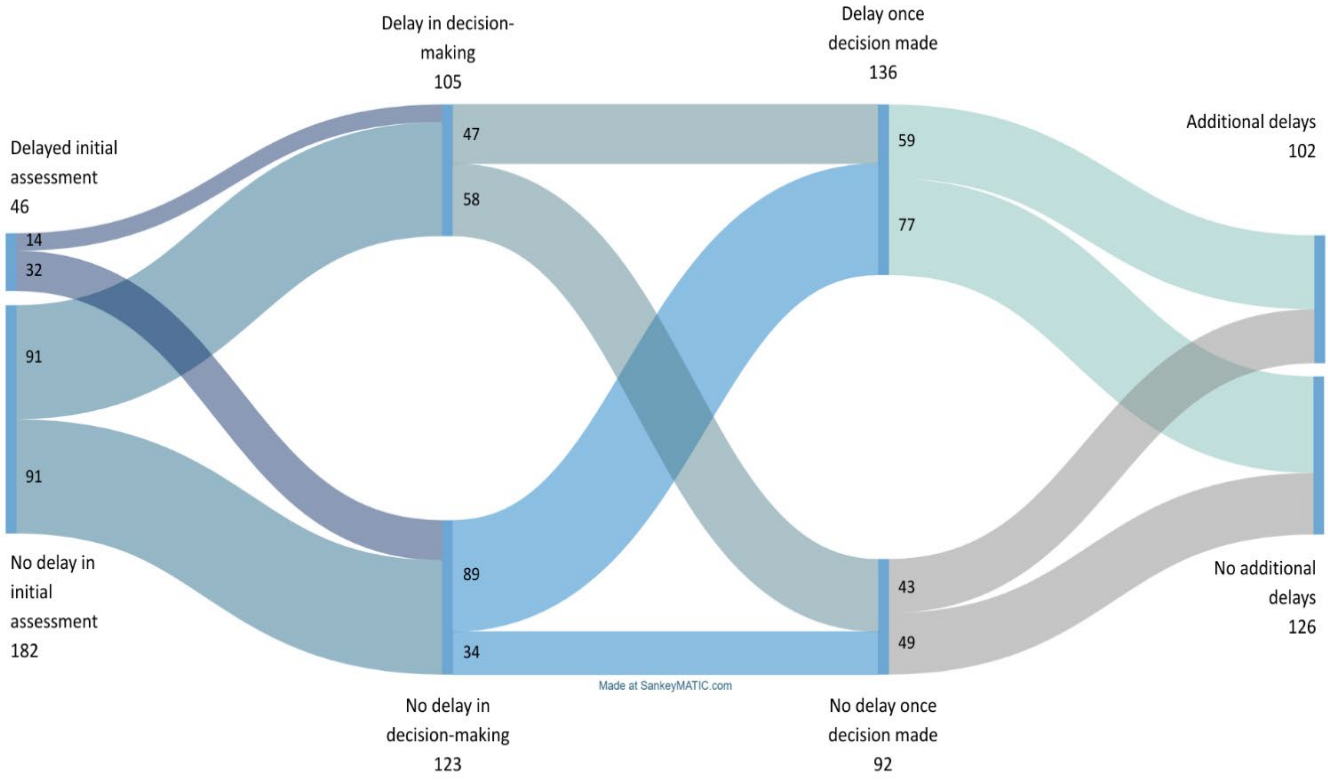
Clinical questionnaire data showed that 186/936 (19.9%) patients required transfer to a new location for their procedure (unknown in 42). The transfer contributed to a delay for 37/186 (19.9%) patients.

Across the whole clinical pathway, 228/563 (40.5%) patients experienced a delay at one or more step from initial assessment to the procedure itself. There were six patients who experienced a delay at every step of the pathway (T4.3 and F4.3).

T4.3 Additive and multiple delays in the pathway	Number of patients
Delayed initial assessment	46
Additional patients who experienced delay in decision making	90
Additional patients who experienced delay once decision made	81
Additional patients who experienced delay in their pleural procedure (not elsewhere specified)	11
Total number of patients experiencing delay in the pathway	**228**
No delay/unknown	335
Total	**563**

Case review data

Figure 4.3 focuses on the 228 patients who had a delay at some point in the pathway and shows how the delays at different points in the pathway intersected.



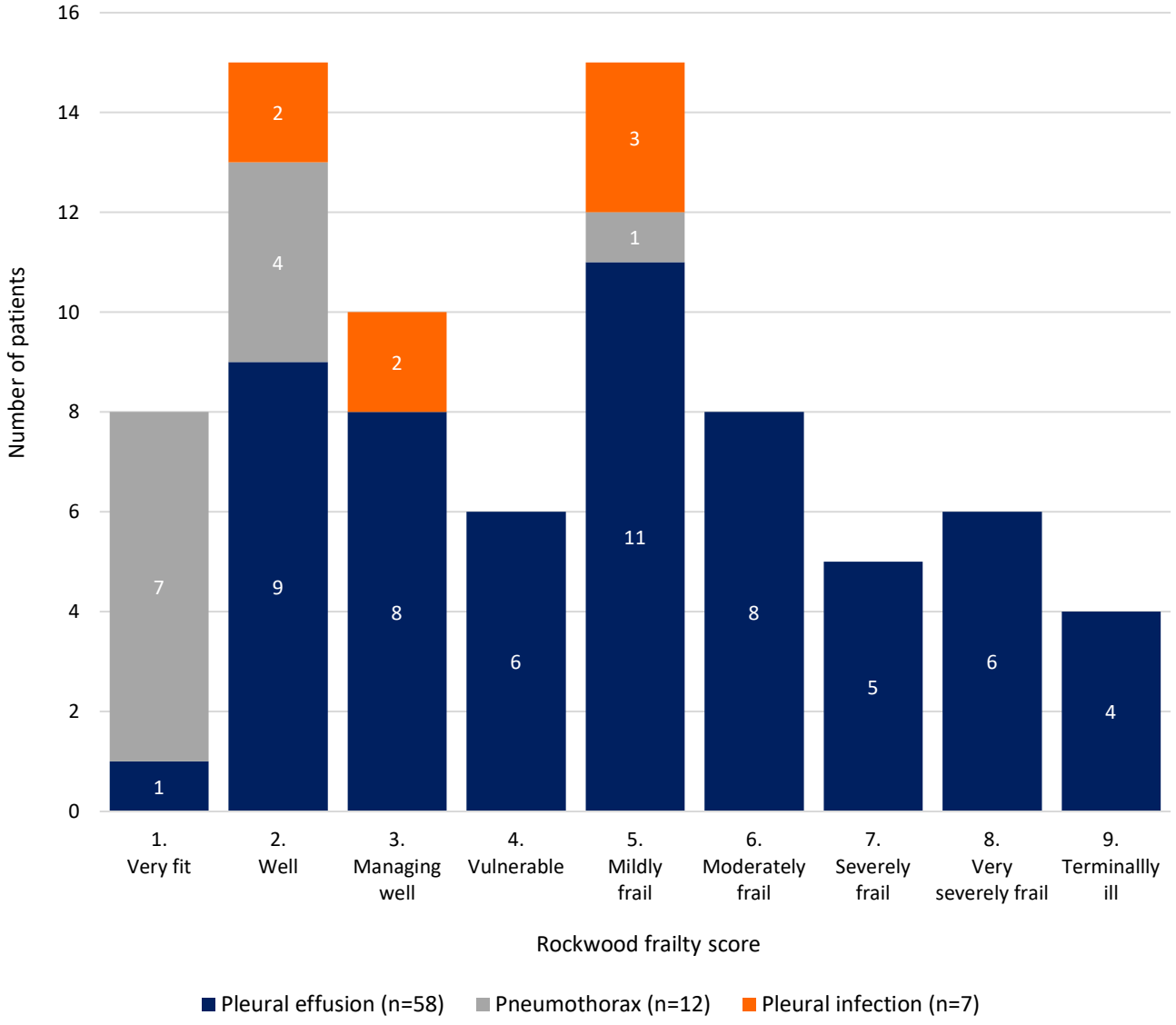
F4.3 Patients experiencing delays

Case review data; n=228

Using the least invasive procedure can both improve patient safety and reduce acute length of stay. Reviewers identified 82/563 (14.6%) patients for whom a less invasive approach could have been taken with better decision making and considered that the quality of care was affected in 39/82 patients. In this group, 19/82 patients died during the admission, and a further two died within 30 days of discharge.

For patients with a pleural effusion, these data describe a group with severe frailty for whom reviewers felt that intervention should have been avoided and palliative care would have been more appropriate. This is particularly relevant when previous attempts at drainage have provided little or no symptomatic relief.

For the patients with a primary spontaneous pneumothorax, guidelines have moved away from treatment based on the size of pneumothorax.[10] Less invasive approaches result in shorter length of stay and lower recurrence and complication rates.[11] For ten fit and well patients with a pneumothorax, an invasive procedure could have been avoided, potentially shortening their length of stay as well as improving their experience of care (F4.4).



F4.4 Rockwood frailty score of patients believed by the reviewers to have had an inappropriately invasive procedure or indication

Case review data; n=77

Case study: good practice

A fit young patient presented with chest pain and breathlessness. The chest X-ray showed a large pneumothorax. Conservative management was considered but a decision was made to aspirate. The patient improved and was managed with early review as an outpatient, with X-rays showing slow, progressive resolution of the pneumothorax.

The reviewers thought that this was an example of guideline-based good practice. No admission was required, and the less invasive approach (aspiration rather than drainage) was appropriate based on the patient's symptoms and level of fitness.

Case study: room for improvement

A frail older patient with extreme weight loss and underlying advanced malignancy was admitted with breathlessness and a moderate pleural effusion. A chest drain was inserted and drained four litres of blood-stained fluid over the next two days. There was no improvement in breathlessness, the patient remained bed bound and died before the drain was removed.

The reviewers thought that the course of this patient's deterioration was predictable and that a less invasive approach to treatment (aspiration or more likely, no intervention) and active palliative care would have been more appropriate.

5 PERI-PROCEDURAL CARE

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

(BACK TO CONTENTS)

CASE STUDY: GOOD CARE

An older patient with a moderate pleural effusion had a chest drain inserted by the respiratory registrar. A pleural pathway document was used, which included a standardised consent form, a safety checklist and a proforma for post-procedure monitoring.

The reviewers commented that this standardisation of documentation could be an effective safety intervention.

CASE STUDY: ROOM FOR IMPROVEMENT

A patient had a prolonged admission with a pleural effusion requiring insertion of two separate chest drains. A written consent form was used for both procedures. Neither form noted which side the drain was to be inserted or mentioned pain, bleeding or infection in the list of possible complications.

The reviewers thought that this was a clear example of how practice needed to improve to ensure that patients were better informed and all possible complications were always included in the consent process. Although ultrasound guidance was used for both procedures, they considered that failure to note the side of the procedure was a patient safety issue.

Specialty, grade and location

- Pleural procedures are undertaken across multiple clinical environments, including respiratory wards, general medical wards, procedure areas and the emergency department (F5.1).
- A greater proportion of chest drains inserted in the emergency department are carried out urgently or as an emergency: mainly for pneumothorax. The distribution across settings and specialties highlights that pleural procedures are not delivered within a single, co-ordinated service (F5.2).
- In the opinion of the reviewers the grade and specialty of operators were appropriate for the majority of patients (418/427; 97.9%) (unknown in 136). Most procedures were undertaken by consultants, senior resident doctors or specialty and associate specialist (SAS) grade doctors (F5.3).
- It was of note that formal policies for chest drain insertion were not available in 22/173 (12.7%) hospitals.

Consent process

- Consent processes showed considerable variation across cases reviewed. Written consent was documented in only 314/563 (55.8%) cases reviewed, with the remainder comprising verbal consent, best-interest decisions or undocumented consent (T5.1).
- At an organisational level, procedure-specific consent forms were used in only 68/173 (39.3%) hospitals (T5.2).
- Documentation of consent varied by clinical setting, with more consistent recording in procedural and respiratory areas, and less reliable recording in emergency and critical care settings (F5.4).
- Reviewers identified room for improvement in the consent process in more than half of assessable case notes (278/483; 57.6%), most commonly due to incomplete documentation rather than

complete absence of consent (T5.3). This indicates that the issue is not only whether consent is obtained, but also how thoroughly it is recorded.

- Reviewers were more likely to identify room for improvement in the consent process if the consent was not written (F5.5). Where written consent was obtained, room for improvement was less common if a specific consent form for pleural procedures was used (16/66; 24.2%) compared with other forms of written consent (89/205; 43.4%).
- The use of procedure-specific consent forms was associated with fewer reviewer concerns (F5.6). This indicates that standardised documentation may function as a safety intervention, supporting more consistent and complete consent processes.
- Consent processes also varied by specialty, with the most room for improvement in emergency medicine (F5.7). Differences in consent processes may reflect differences in casemix and urgency but may also be due to less standardised processes.
- Procedural urgency must not be used to excuse poor safety practice but should be recorded to describe the context in which processes were applied. In 289/448 (64.5%) cases, urgency was not recorded, and in emergency cases reviewers identified room for improvement in more than two-thirds of cases (F5.8).

Procedural preparation: Local Safety Standards for Invasive Procedures (LocSSIPs)

- It was reported from 23/163 (14.1%) hospitals that they did not routinely employ LocSSIPs for chest drain insertion.
- Procedure safety checklists (LocSSIPs) were not routinely documented, being present in only 182/526 (34.6%) cases reviewed and reported by clinicians for 353/755 (46.8%) patients (F5.9). This demonstrates that checklist use is not yet embedded as standard practice across settings.
- When a checklist was present, it generally (>90% from both case review and clinician questionnaire data) included all relevant standards, and their use would therefore be likely to result in safer care (F5.10).
- The use of a safety checklist varied significantly by specialty. It was most commonly used in respiratory medicine (125/222; 56.3%) and the intensive care unit (8/17) and was much less commonly used in other specialties (F5.11).
- The presence of a safety checklist was associated with fewer consent-related concerns (F5.12) and improved overall quality of care (F5.13). This suggests that checklist use is a marker of a more structured and safety-focused pathway, rather than simply a documentation exercise.

Procedure documentation

- Documentation of aspects of the pleural procedure were incomplete in the majority of cases, with only 79/978 (8.1%) containing all expected elements (T5.4). Key technical and safety information was frequently omitted including drain size (202/978; 20.7%) drain position (200/978; 20.4%), drain secured (264/978; 26.7%) and sampling recorded (153/978; 15.6%).
- Incomplete documentation limits the ability to assess procedural quality, identify complications and ensure continuity of care. This represents a significant gap in the safety framework surrounding pleural procedures.

Anticoagulation and bleeding risk

- Assessing bleeding risk and managing anticoagulation at the time of the procedure are important aspects of care. A substantial minority of patients had bleeding-related risk factors before the procedure (T5.5).
- Without clear documentation of anticoagulation management, it is not possible to determine whether bleeding risks were appropriately assessed or mitigated. This represents a potential patient safety concern, particularly given the proportion of patients with identifiable risk factors.

Ultrasound for pleural effusion

- Ultrasound guidance was used for 344/369 (93.2%) patients (T5.6). However, among the 25 patients who did not have an ultrasound, case reviewers considered this appropriate in seven patients. In the 18 patients where reviewers believed ultrasound should have been used, 15 had no LocSSIPs used and three had complications.

Pain management

- Data from the patient survey showed that 23/45 patients experienced at least moderate pain during the procedure and 21 post-procedure, suggesting that pain is a significant issue for patients (F5.14).
- Although local anaesthetic was used for most patients (T5.7), documentation of pain assessment and additional analgesia was inconsistent. Pain at the time of the procedure was documented in 91/831 (11.0%) patients (T5.8), likely reflecting under-documentation rather than absence of symptoms.
- The high proportion of cases where reviewers were unable to assess pain management further supports the conclusion that pain is not being consistently assessed or recorded.
- In the view of the reviewers there was room for improvement in the pain management of 65/373 (17.4%) patients. Furthermore, reviewers were unable to answer in 190 cases, suggesting that documentation was often insufficient to judge the quality of pain management.

Procedure proforma

- A procedure proforma standardises documentation of all of the peri-procedural care of patients undergoing chest drain insertion. This differs from a LocSSIPs (pre-procedural checklist) as it often contains consent, procedure note and post-procedure care instructions **(SEE APPENDIX)**.
- It was reported from 44/167 (26.3%) hospitals that standardised documentation for chest drain insertions was not used (T5.9).
- Reviewers reported that peri-procedural care was managed using a specific proforma in only 141/518 (27.2%) patients (T5.10).
- At organisational level, clinicians recorded that a proforma for pleural procedures was used for 353/863 (40.9%) patients (T5.11). For 127/863 (14.7%) patients without a completed proforma, one was available in the organisation but not used.
- Cases reviewed where a proforma had been used showed fewer consent-related concerns than those without one (118/325; 36.3% vs 72/123; 58.5%) (F5.15).
- Use of a proforma was also associated with increased LocSSIPs use (103/133; 77.4%) compared with cases without a proforma 63/358 (17.6%) without (F5.16).

- When a proforma was used there was also less room for improvement in pain management (12/102; 11.8% vs 49/250; 19.6%) (F5.17).
- The use of a proforma was also consistently associated with improved consent processes, greater use of safety checklists, better pain management, and higher overall quality of care. A proforma represents a practical and scalable intervention that addresses multiple areas of variation identified throughout the pathway.

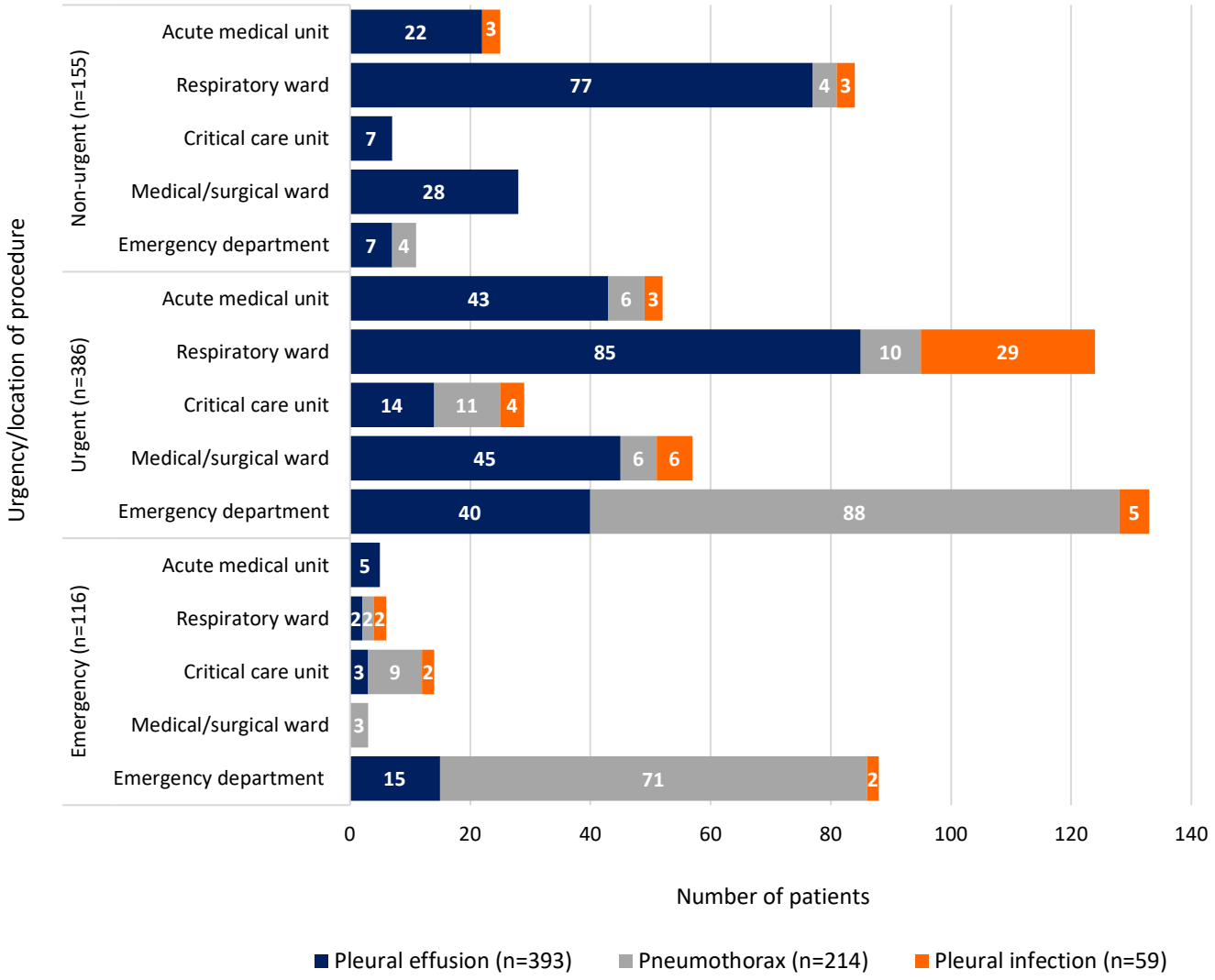
Pleural service

- Pleural services were involved for 143/522 (27.4%) patients (T5.13). For the 379 patients where a service was not used reviewers believed it should have been for 144/357 (40.3%) but identified 213 patients where this was considered appropriate (T5.14).
- Specialist pleural input was more likely to be required for patients with pleural effusion or infection than for pneumothorax (F5.18). This is to be expected, as pneumothorax more commonly requires urgent treatment in an emergency department.
- The pleural service was more likely to be involved in patients for whom a proforma was used (F5.19). This may reflect that better developed pathways were used once the pleural team is involved. However, a proforma could also serve as a prompt to involve the pleural team.
- These findings suggest that access to specialist pleural expertise is variable, and that earlier involvement may improve decision making and pathway efficiency.

5 PERI-PROCEDURAL CARE

Specialty, grade and location

Pleural procedures are undertaken across multiple clinical environments, including respiratory wards, general medical wards, procedure areas and the emergency department (F5.1). This variation reflects differences in indication, with pleural effusion/ infection work more commonly occurring in inpatient and specialist settings, and pneumothorax managed in emergency settings, including the emergency department.

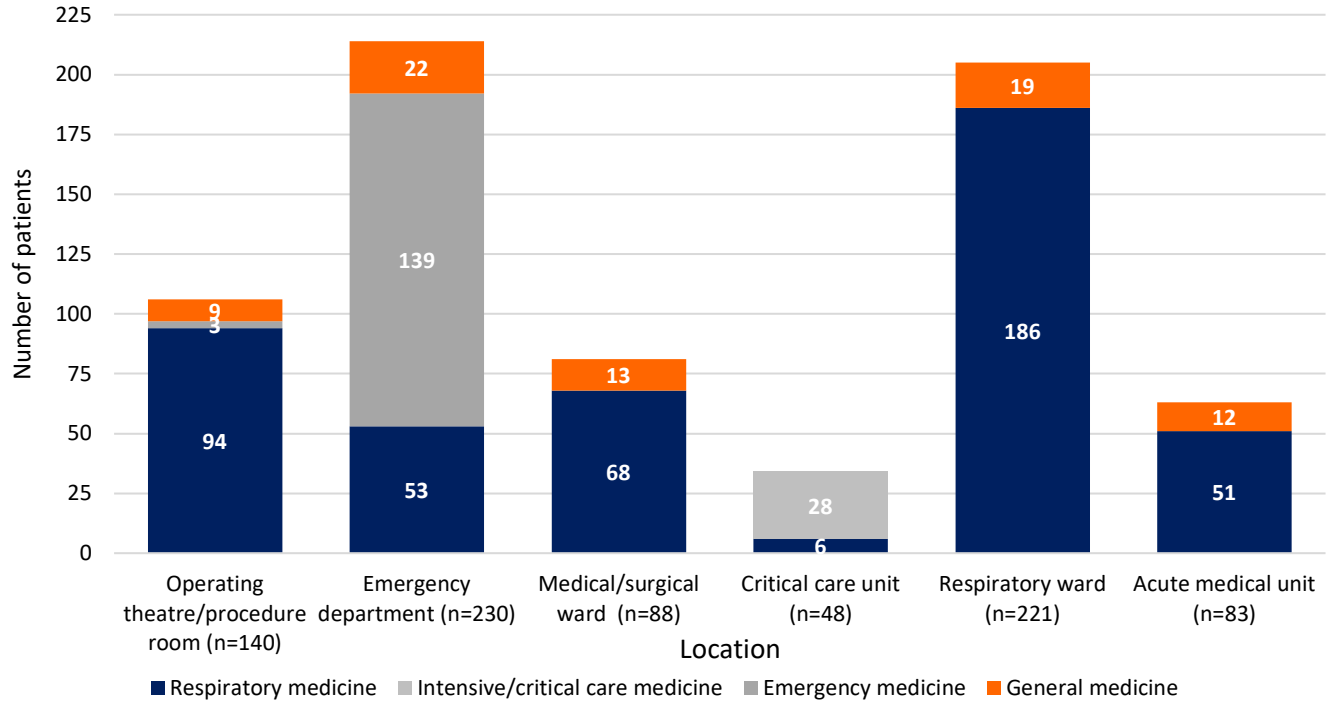


F5.1 Indication for pleural procedure and urgency and location of procedure
Clinician questionnaire data

A greater proportion of chest drains inserted in the emergency department are carried out urgently or as an emergency: mainly for pneumothorax. The distribution across settings and specialties highlights that pleural procedures are not delivered within a single, co-ordinated service (F5.2).

This fragmentation increases the risk of variation in processes, documentation and safety practices, reinforcing the need for standardised processes and pathways that can be consistently applied regardless of location. These processes are documented in guidelines that represent the specialties commonly

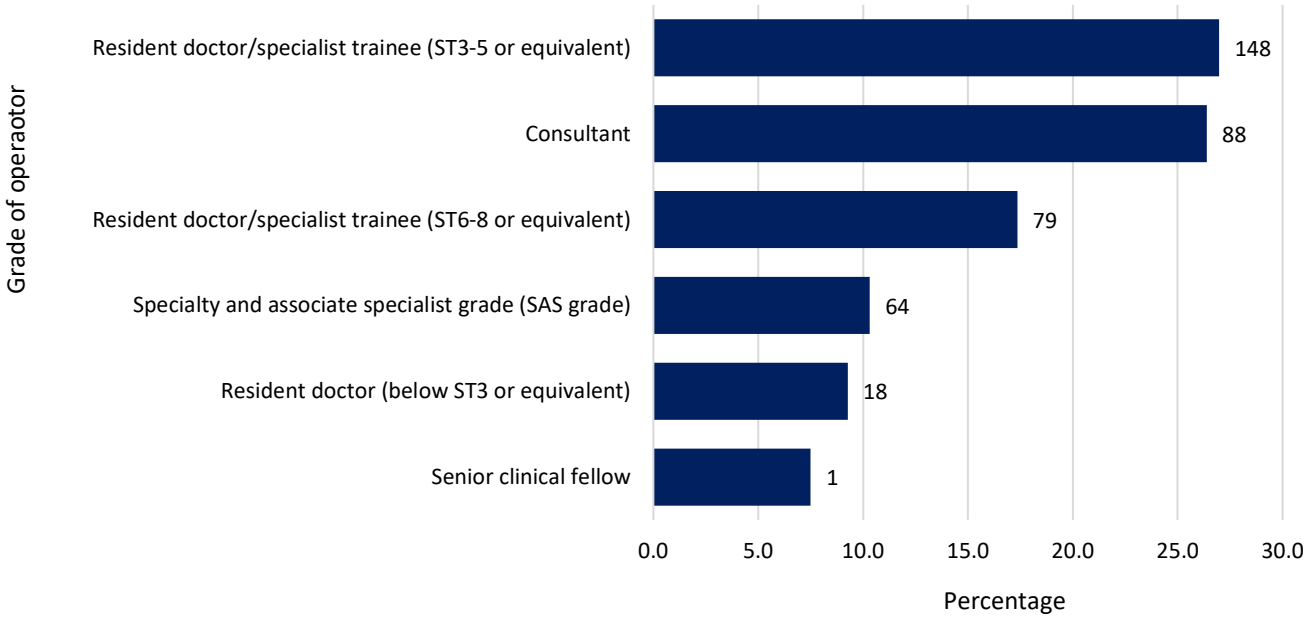
performing these procedures, including the use of checklists.[11-13] It was of note that formal policies for chest drain insertion were not available in 22/173 (12.7%) hospitals.



F5.2 Location of procedure and specialty of operator

Clinician questionnaire data

In the opinion of the reviewers the grade and specialty of operators were appropriate for the majority of patients (418/427; 97.9%) (unknown in 136). Most procedures were undertaken by consultants, senior resident doctors or specialty and associate specialist (SAS) grade doctors (F5.3). This indicates that procedural performance is not primarily limited by operator seniority. Instead, reviewers found that system-level factors, particularly variation in processes and documentation, were the more significant determinants of care quality.



F5.3 Grade of operator

Clinician questionnaire data; n=853

Consent process

Consent processes showed considerable variation across cases reviewed. Written consent was documented in only 314/563 (55.8%) cases reviewed, with the remainder comprising verbal consent, best-interest decisions or undocumented consent (T5.1).

This variation suggests that consent is not consistently standardised, increasing the risk of incomplete documentation and variable patient understanding.

T5.1 How consent was taken	Number of patients	%
Written	314	55.8
Form 4/'Lacks capacity'	131	23.3
Verbal – documented in notes	88	15.6
Not documented	30	5.3
Total	**563**	

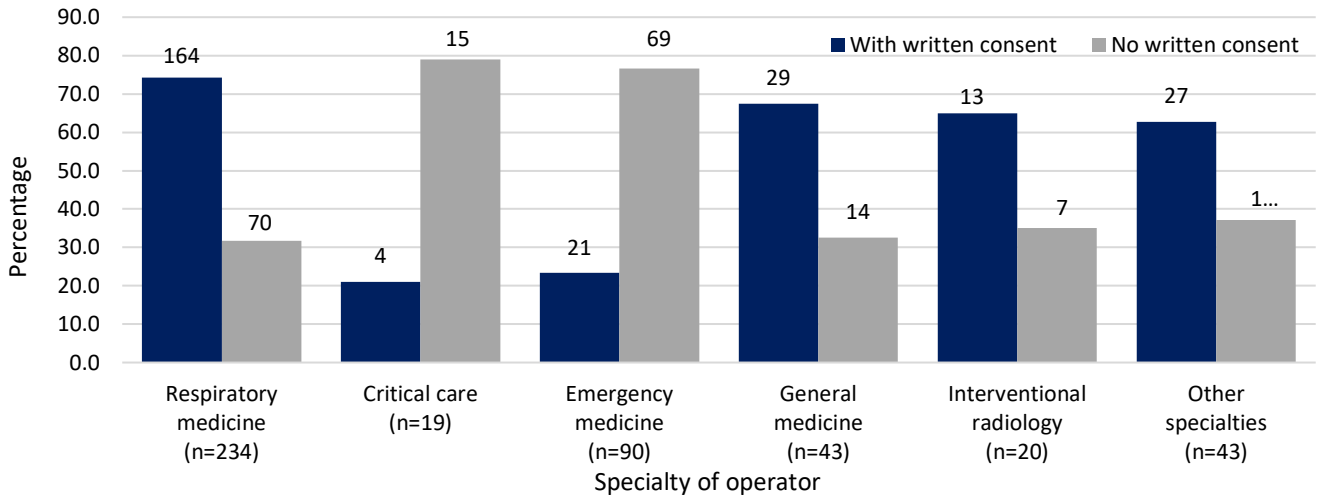
Case review data

At an organisational level, procedure-specific consent forms were used in only 68/173 (39.3%) hospitals (T5.2).

T5.2 How consent for pleural procedures was recorded	Number of hospitals	%
Via the completion of standard surgical/procedure consent form	121	69.9
Via completion of a 'Best Interest' form/'Form 4'	79	45.7
Via completion of a specific pleural procedures consent form	68	39.3
Verbally and recorded in the notes	64	37.0
Other	15	8.7
Unknown	9	5.2

Organisational data. Answers may be multiple; n=173

Documentation of consent varied by clinical setting, with more consistent recording in procedural and respiratory areas, and less reliable recording in emergency and critical care settings (F5.4). This suggests that process reliability varies by clinical setting, with urgent and time-pressured environments more prone to incomplete documentation.



F5.4 The proportion of patients with written consent in different locations where the pleural procedure was performed

Case review data; n=563

In urgent, time-pressured settings such as the emergency department and critical care, patients may be acutely unwell, sedated, ventilated or otherwise lack capacity, meaning written self-consent may not be feasible or appropriate.

Lower rates of written consent in these areas may therefore reflect appropriate use of best-interests or emergency decision making processes, including Form 4 (a consent form for adults who lack mental capacity) documentation where relevant, rather than simply indicating poor process reliability or incomplete documentation.

This context should be acknowledged, with reference to guidance on consent for patients who lack capacity or require urgent treatment.[13,14]

Royal College of Emergency Medicine and Intensive Care Society guidance, which recognises chest drain insertion as an invasive emergency department procedure, advises that verbal or written consent should be obtained wherever the patient has capacity and the clinical situation allows.[12-14]

In urgent or emergency circumstances, guidance does not require a signed consent form if this would delay necessary treatment; however, the consent discussion, or the reason consent could not be obtained, should be clearly documented as soon as reasonably possible.

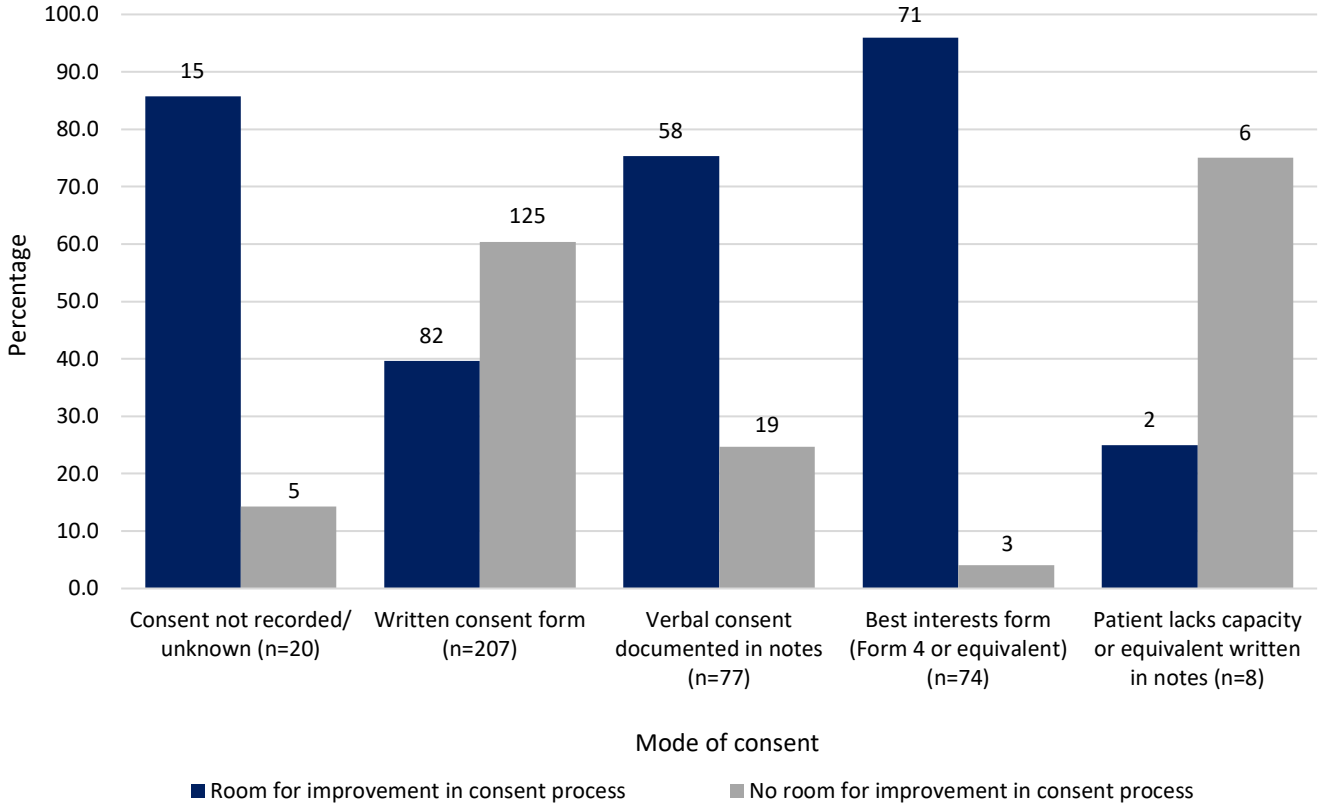
All clinicians should ensure that, before chest drain insertion, the record includes the indication, urgency, capacity assessment where relevant, risks and benefits discussed, alternatives considered, consent obtained or best-interests rationale, and any procedural safety checks such as correct side/site confirmation. This should be embedded as expected practice for chest drain insertion in all locations, supported by use of local checklists, senior oversight and audit of documentation quality.[11,15]

Reviewers identified room for improvement in the consent process in more than half of assessable case notes (278/483; 57.6%), most commonly due to incomplete documentation rather than complete absence of consent (T5.3). This indicates that the issue is not only whether consent is obtained, but also how thoroughly it is recorded.

T5.3 Reviewer was of the opinion that the consent process could have been improved	Number of patients	%
Yes	278	57.6
No	205	42.4
Subtotal	**483**	
Unknown	80	
Total	**563**	

Case review data

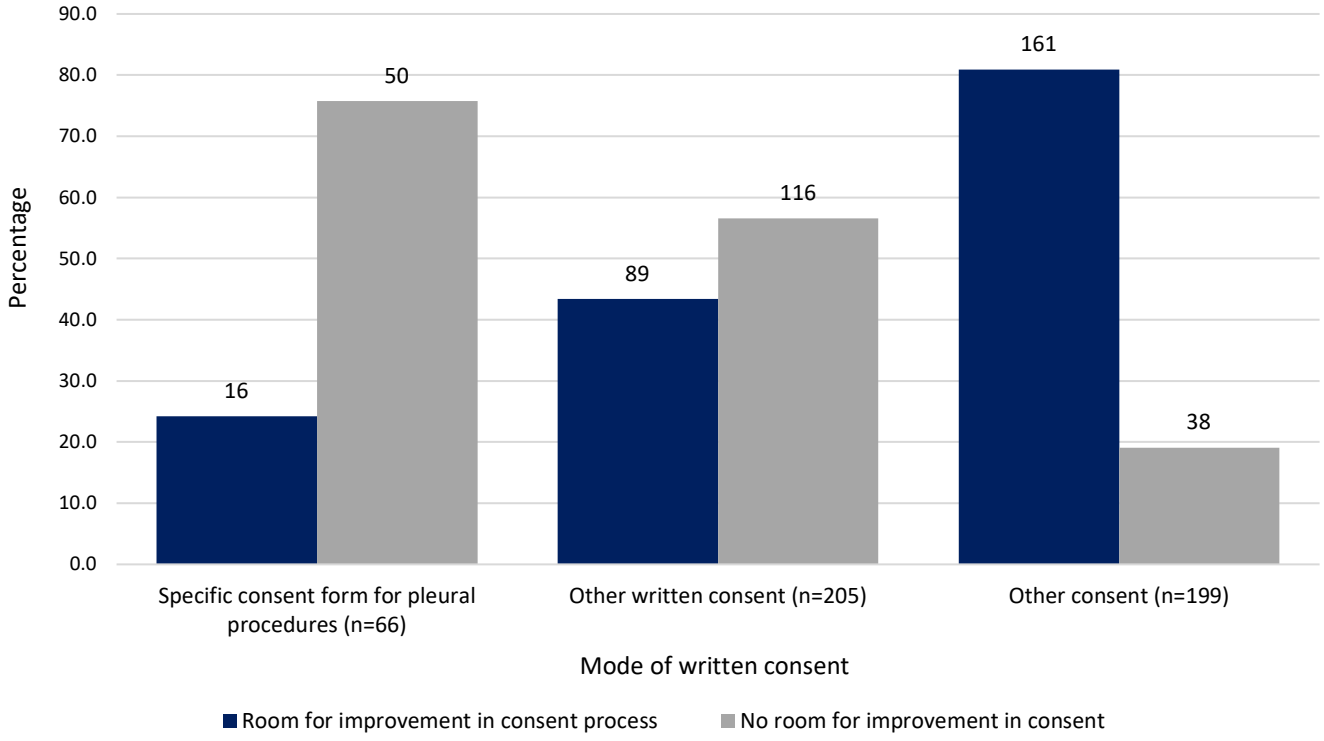
Reviewers were more likely to identify room for improvement in the consent process if the consent was not written (F5.5). Where written consent was obtained, room for improvement was less common if a specific consent form for pleural procedures was used (16/66; 24.2%) compared with other forms of written consent (89/205; 43.4%). This suggests that where the process is standardised, this supports better judged consent.



F5.5 Room for improvement in the consent process and the mode of consent taking

Case review data

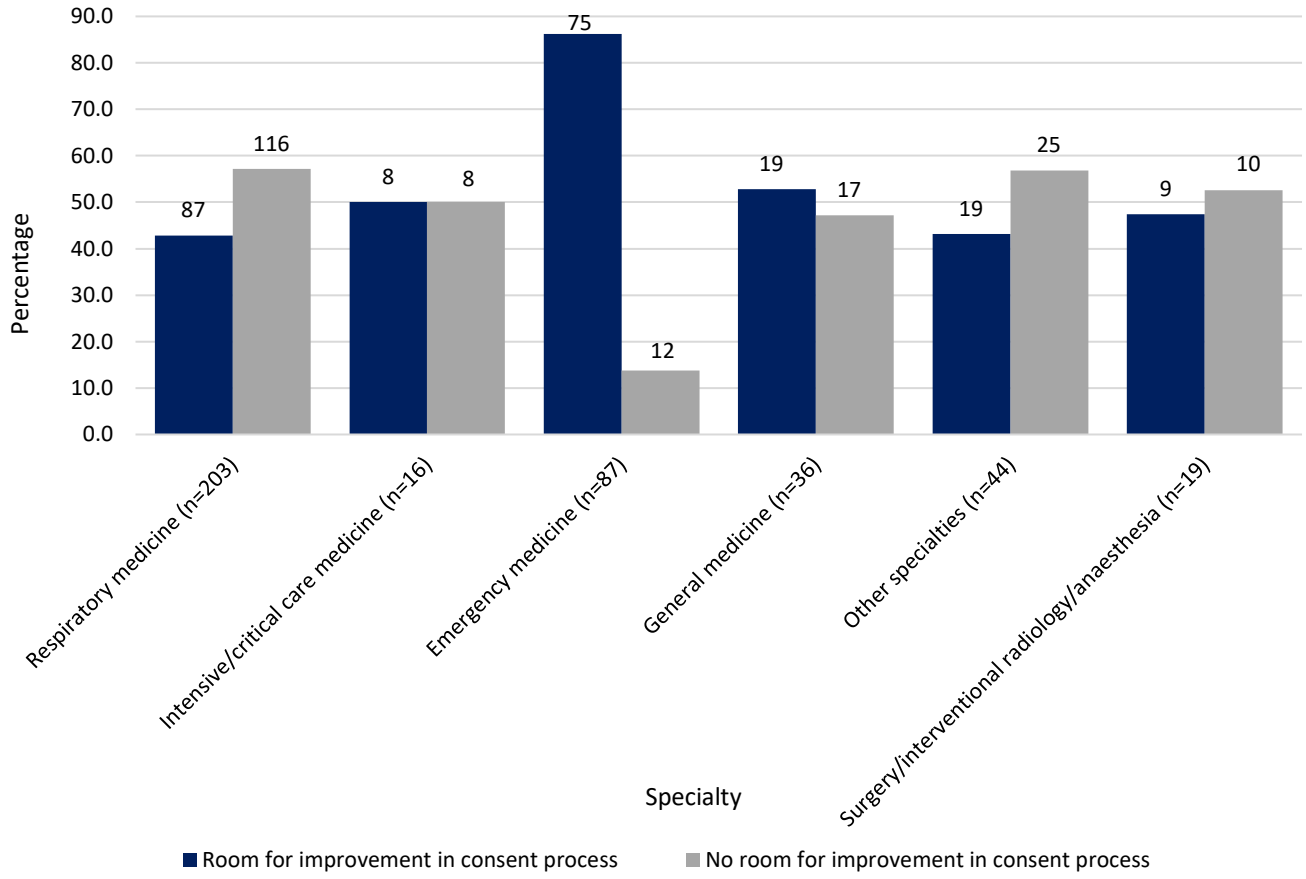
The use of procedure-specific consent forms was associated with fewer reviewer concerns (F5.6). This indicates that standardised documentation may function as a safety intervention, supporting more consistent and complete consent processes.



F5.6 Use of pleural-procedure-specific consent form vs room for improvement in the consent process

Case review data

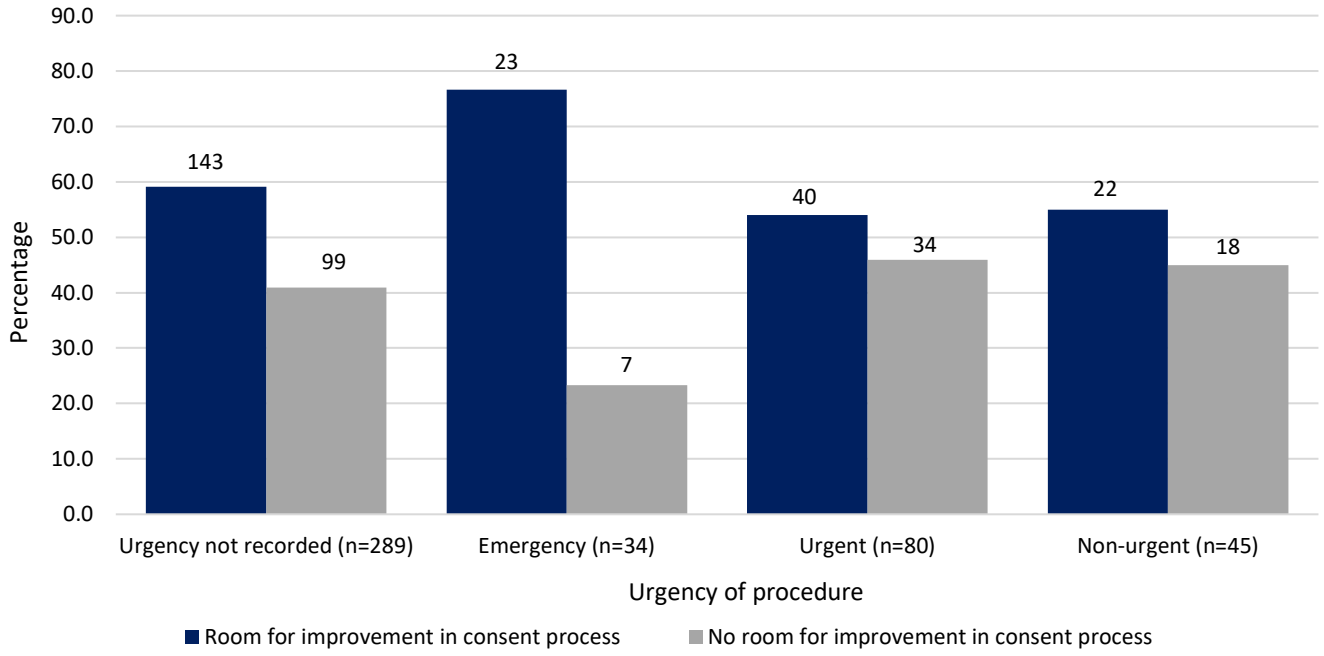
Consent processes also varied by specialty, with the most room for improvement in emergency medicine (F5.7). Differences in consent processes may reflect differences in casemix and urgency but may also be due to less standardised processes. Standardisation has been introduced to improve safety more commonly in elective procedures.[16]



F5.7 Specialty of operator and room for improvement in consent
Case review data

Procedural urgency must not be used to excuse poor safety practice but should be recorded to describe the context in which processes were applied. In 289/448 (64.5%) cases, urgency was not recorded, and in emergency cases reviewers identified room for improvement in more than two-thirds of cases (F5.8). This reinforces the need for streamlined, standardised processes that can be replicated when care is time-pressured.

Royal College of Emergency Medicine, and Intensive Care Society guidance on invasive procedures specifically recommend accurate documentation even in emergency settings where informed consent may be taken verbally.[12,14]

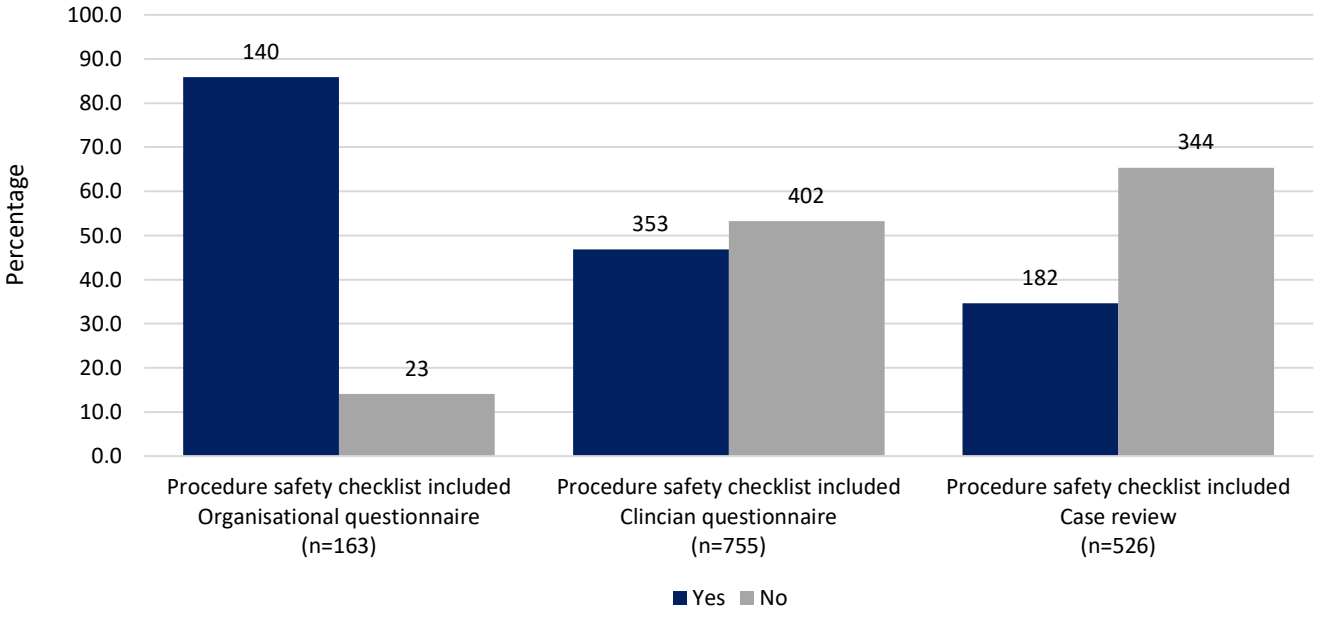


F5.8 Room for improvement in consent associated with the urgency of the procedure

Case review data

Procedural preparation: Local Safety Standards for Invasive Procedures (LocSSIPs)

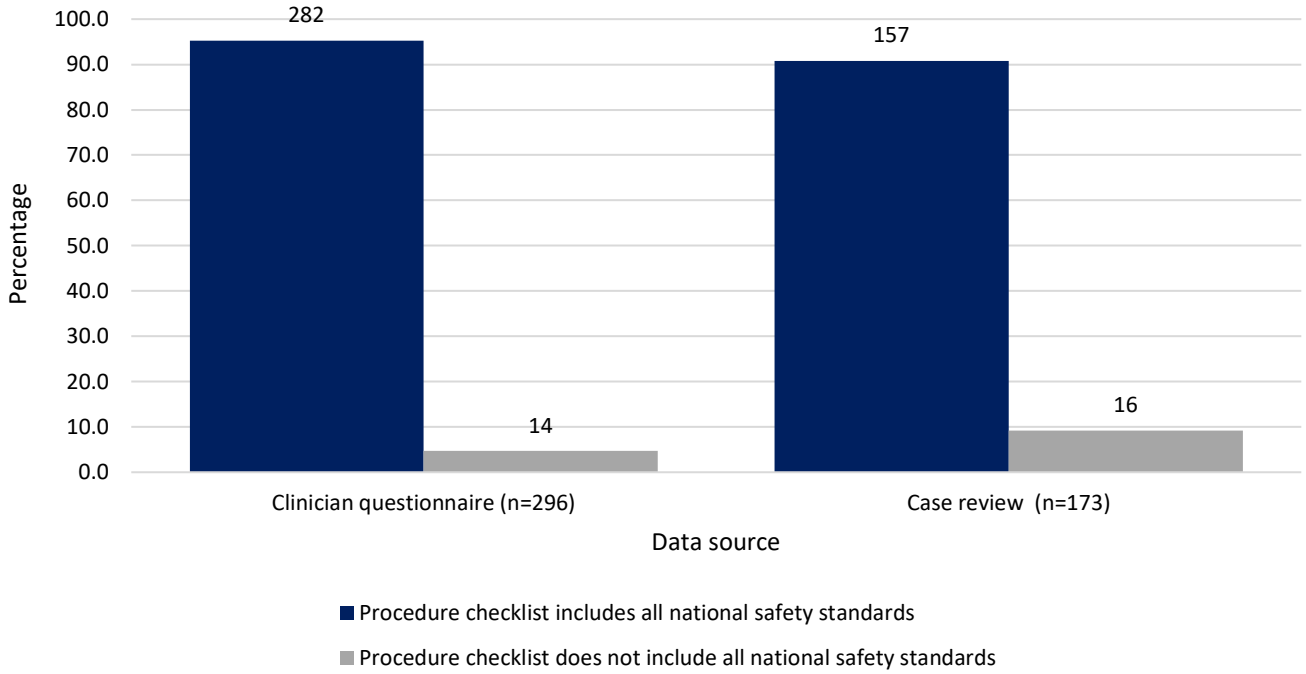
Safety standards for invasive procedures were designed to improve patient safety and to reduce the incidence of harm caused by 'never events'. They were introduced in the NHS in 2015 and their use is subject to regular audit to ensure that they are reliably used and regularly updated.[16] These should be the next stage in the process for safe chest drain insertion. It was reported from 23/163 (14.1%) hospitals that they did not routinely employ LocSSIPs for chest drain insertion. Procedure safety checklists (LocSSIPs) were not routinely documented, being present in only 182/526 (34.6%) cases reviewed and reported by clinicians for 353/755 (46.8%) patients (F5.9). This demonstrates that checklist use is not yet embedded as standard practice across settings.



F5.9 Inclusion of a procedure safety checklist

Organisational questionnaire, clinician questionnaire and case review data

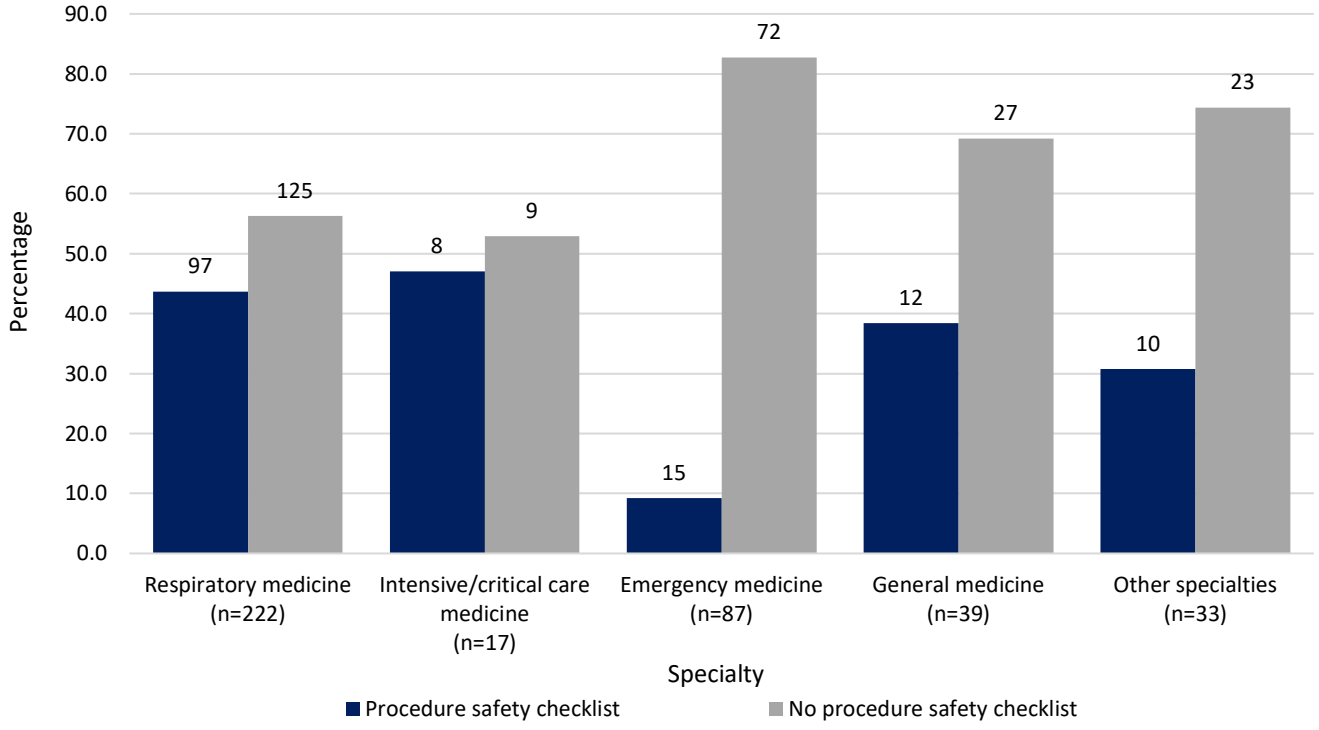
When a checklist was present, it generally (>90% from both case review and clinician questionnaire data) included all relevant standards, and their use would therefore be likely to result in safer care (F5.10).



F5.10 Inclusion of all national safety standards in LocSSIPs

Clinician questionnaire data

The use of a safety checklist varied significantly by specialty. It was most commonly used in respiratory medicine (125/222; 56.3%) and the intensive care unit (8/17) and was much less commonly used in other specialties (F5.11).



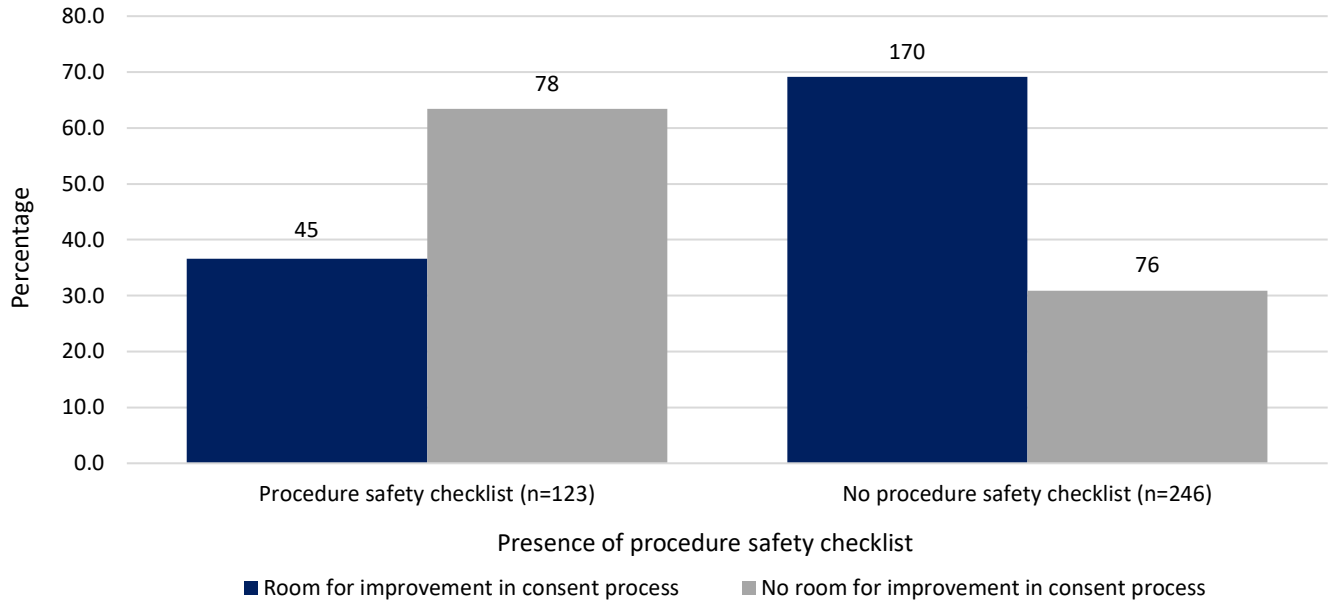
F5.11 Use of LocSSIPs by clinical specialty

Case review data

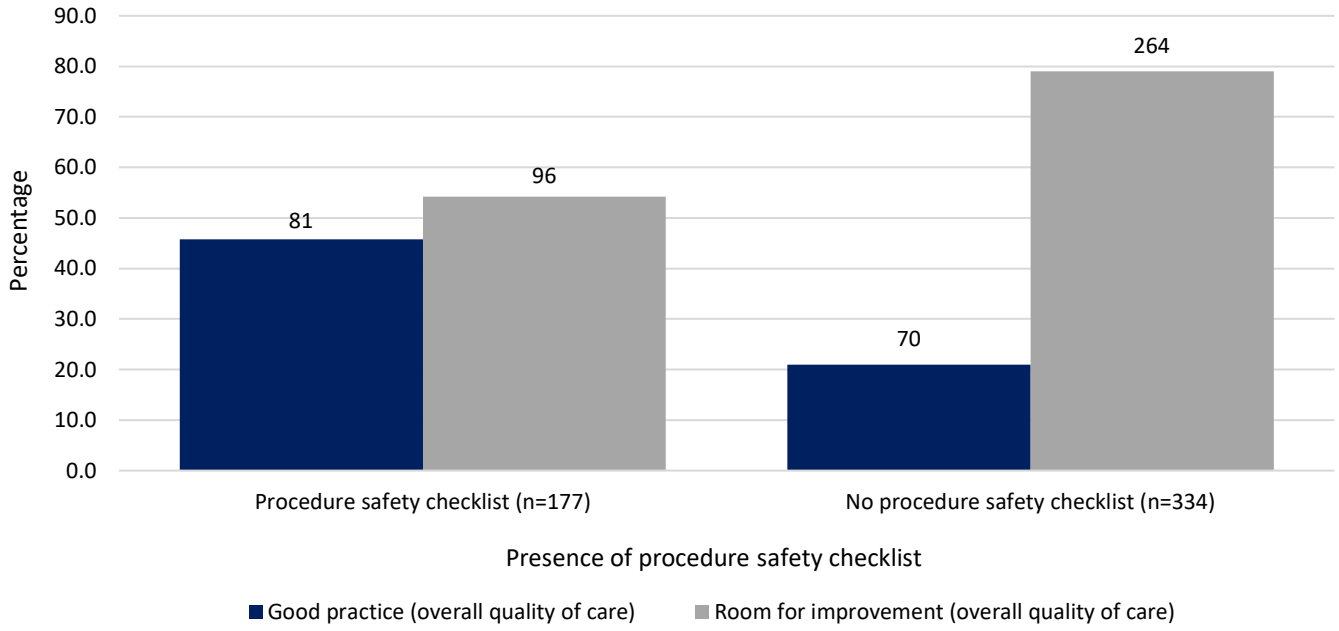
Checklists should be used for all invasive surgical procedures. When implemented correctly these have been shown to reduce patient harm and improve patient outcomes in healthcare. Invasive pleural procedural checklists facilitate standardisation, harmonisation and education across different specialties in different settings across organisations.[16]

Both the Royal College of Emergency Medicine guidelines for invasive procedures including chest drains and the British Thoracic Society Quality Standard specifically recommends the use of LocSSIPs.[12,17-19]

The presence of a safety checklist was associated with fewer consent-related concerns (F5.12) and improved overall quality of care (F5.13). This suggests that checklist use is a marker of a more structured and safety-focused pathway, rather than simply a documentation exercise.



F5.12 Room for improvement in consent associated with the use of a procedure safety checklist
Case review data



F5.13 Use of a procedure safety checklist and rating of overall quality of care
Case review data

Procedure documentation

Documentation of aspects of the pleural procedure were incomplete in the majority of cases, with only 79/978 (8.1%) containing all expected elements (T5.4). Key technical and safety information was frequently omitted including drain size (202/978; 20.7%) drain position (200/978; 20.4%), drain secured (264/978; 26.7%) and sampling recorded (153/978; 15.6%).

Incomplete documentation limits the ability to assess procedural quality, identify complications and ensure continuity of care. This represents a significant gap in the safety framework surrounding pleural procedures.

T5.4 Aspects of the procedure that were not documented	Number of patients	%
Maximum depth of pleural fluid*	483	49.4
Drain secured*	264	27.0
Size of drain*	202	20.7
Appropriate position*	200	20.4
Samples sent for analysis	153	15.6
Analgesia/anaesthetic	133	13.6
Consent	108	11.0
Technique employed*	100	10.2
Grade of proceduralist	83	8.5
Pre-procedure tests completed	73	7.5
Ultrasound guidance used*	64	6.5
Post-procedure plan	58	5.9
Specialty of proceduralist	53	5.4
Complications of the procedure	29	3.0
Chest X-ray to confirm position*	22	2.2

*Clinician questionnaire data. *Answers may be multiple; n=978. **Aspiration/pneumothorax not included in calculation as appropriate*

Anticoagulation and bleeding risk

Assessing bleeding risk and managing anticoagulation at the time of the procedure are important aspects of care. A substantial minority of patients had bleeding-related risk factors before the procedure (T5.5).

T5.5 Risk factors for bleeding that were present pre-procedure	Number of patients	%
Anti-coagulants	125	23.9
Anti-platelet agents	25	4.8
Other coagulopathy	14	2.7
Other	13	2.5
Low platelets	8	1.5
None	352	67.4

Case review data. Answers may be multiple; n=522

Without clear documentation of anticoagulation management, it is not possible to determine whether bleeding risks were appropriately assessed or mitigated. This represents a potential patient safety concern, particularly given the proportion of patients with identifiable risk factors. This finding supports the need for checklists to improve pre-procedure risk assessment and procedural care.

Ultrasound for pleural effusion

The 2008 NPSA Rapid Response Report on the risks of chest drain insertion highlighted serious avoidable harm, including cases where the absence of ultrasound guidance contributed to organ injury.[20] In this study, ultrasound use for drainage of pleural effusions, which was recommended in the safety alert, appears to have become embedded in practice.

Ultrasound guidance was used for 344/369 (93.2%) patients (T5.6). However, among the 25 patients who did not have an ultrasound, case reviewers considered this appropriate in seven patients. In the 18 patients where reviewers believed ultrasound should have been used, 15 had no LocSSIPs used and three had complications.

This reinforces the role of ultrasound as a core safety component of pleural procedures rather than an optional adjunct.

T5.6 Ultrasound guidance was used during the procedure	Number of patients	%
Yes	344	93.2
No	25	6.8
Subtotal	**369**	
Unclear from notes	43	
N/A: Pneumothorax	151	
Total	**563**	

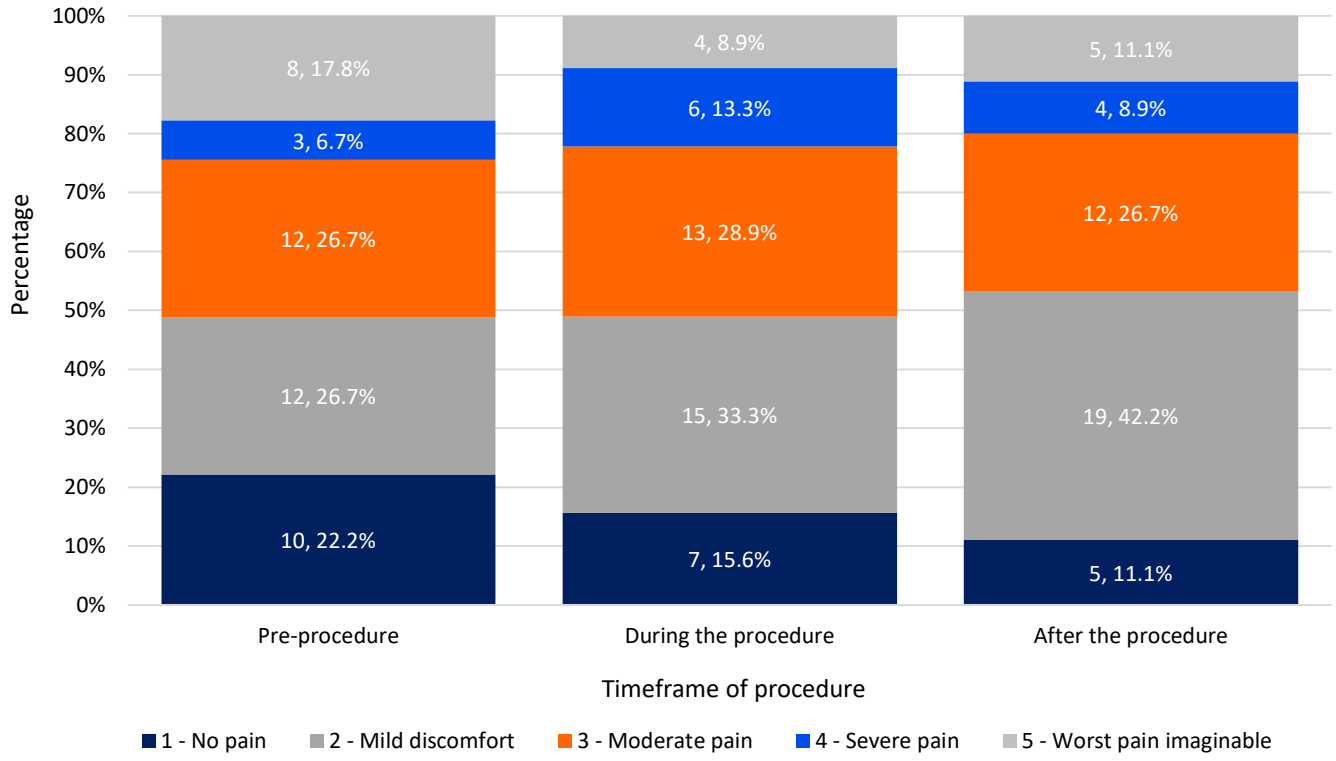
Case review data

These data suggest that the standard use of ultrasound is now recognised, even if not universally delivered.

Pain management

Pain management around the time of insertion is fundamental from a patient perspective. This was highlighted by responses in the patient questionnaire. Data from the patient survey showed that 23/45 patients experienced at least moderate pain during the procedure and 21 post-procedure, suggesting that pain is a significant issue for patients (F5.14).

"I felt that this procedure should not have been undertaken on a ward with just the curtain around my bed. While I agreed for this procedure, I did not feel at all confident with the process, the person who inserted the drain was supervised, but I was not prepared for such a brutal intervention, and several times I thought I would lose consciousness. If I was to have a chest drain inserted again I would not be at all happy to have this at ward level, furthermore I don't feel I had sufficient pain relief prior to the intervention, this left me feeling nervous, scared, apprehensive and I might say even frightened."



F5.14 Patient rating of pain pre-, peri- and post-procedure

Patient survey data; n= 45

Although local anaesthetic was used for most patients (T5.7), documentation of pain assessment and additional analgesia was inconsistent. Pain at the time of the procedure was documented in 91/831 (11.0%) patients (T5.8), likely reflecting under-documentation rather than absence of symptoms.

T5.7 Type of anaesthesia/analgesia used	Number of patients	%
Local anaesthetic	771	91.2
Opioids (e.g. codeine)	98	11.6
Paracetamol	78	9.2
General anaesthetic	36	4.3
NSAIDs	7	0.8

Clinician questionnaire data. Answers may be multiple; n=845

T5.8 Documentation of pain	In pain at time of procedure	%	Room for improvement in any aspect of pain management/analgesia	%
Yes	91	11.0	65	17.4
No	740	89.0	308	82.6
Subtotal	**831**		**373**	
Unknown	147		190	
Total	**978**		**563**	

Clinician questionnaire data

The high proportion of cases where reviewers were unable to assess pain management further supports the conclusion that pain is not being consistently assessed or recorded. Although electronic records around pain management were not always available to reviewers, standardised documentation of pain

management at the time of the procedure is likely to improve documentation and the consideration of appropriate pain relief at this time.

In the view of the reviewers there was room for improvement in the pain management of 65/373 (17.4%) patients. Furthermore, reviewers were unable to answer in 190 cases, suggesting that documentation was often insufficient to judge the quality of pain management.

Standardised recording of pain at the time of the procedure is important to ensure that appropriate pain relief is considered and administered. Excessive pain during a procedure that should not cause significant discomfort should prompt review by a more senior member of the team.

Procedure proforma

A procedure proforma standardises documentation of all of the peri-procedural care of patients undergoing chest drain insertion. This differs from a LocSSIPs (pre-procedural checklist) as it often contains consent, procedure note and post-procedure care instructions **(SEE APPENDIX)**.

It was reported from 44/167 (26.3%) hospitals that standardised documentation for chest drain insertions was not used (T5.9).

T5.9 A standardised documentation template for the insertion of chest drains	Number of hospitals	%
Yes	123	73.7
No	44	26.3
Subtotal	**167**	
Unknown	6	
Total	**173**	

Organisational data

Reviewers reported that peri-procedural care was managed using a specific proforma in only 141/518 (27.2%) patients (T5.10).

T5.10 Evidence that the patient's peri-procedural care was managed using a specialised proforma	Number of patients	%
Yes	141	27.2
No	377	72.8
Subtotal	**518**	
Unknown	45	
Total	**563**	

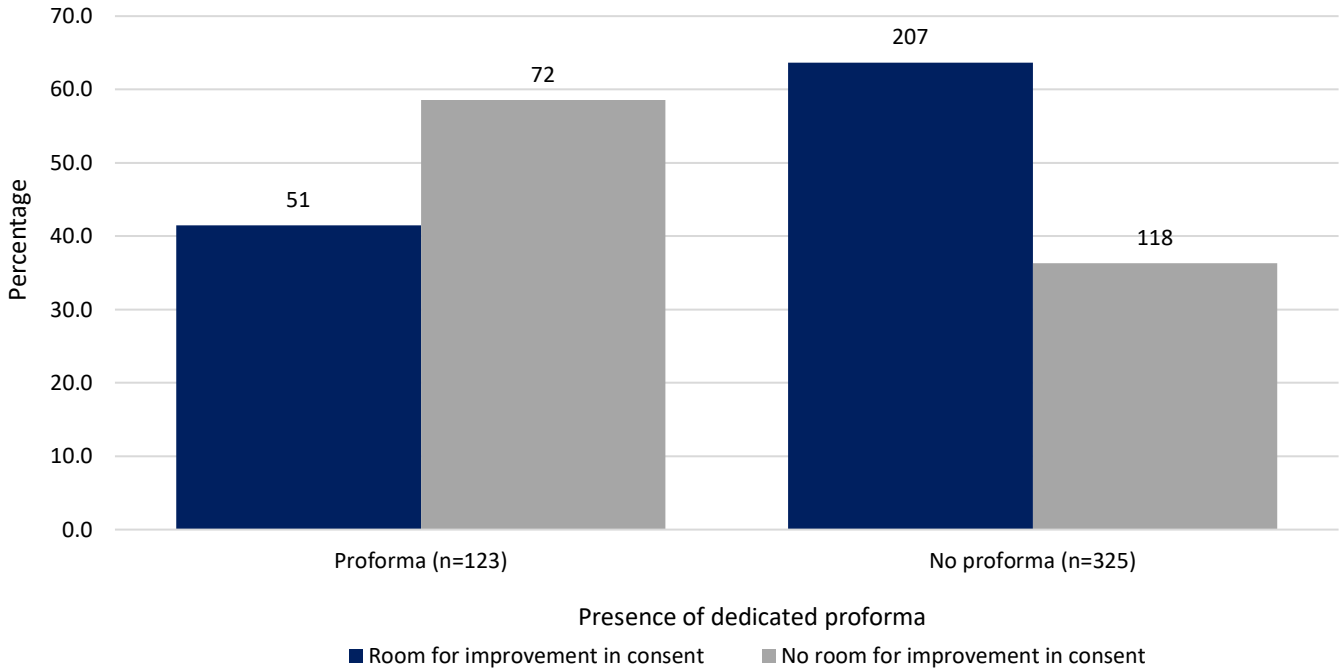
Case review data

At organisational level, clinicians recorded that a proforma for pleural procedures was used for 353/863 (40.9%) patients (T5.11). For 127/863 (14.7%) patients without a completed proforma, one was available in the organisation but not used. This suggests that lack of proforma use is both a provision and implementation issue.

T5.11 A specific proforma for pleural procedures was used in the care of this patient	Number of patients	%
Yes	353	40.9
No, this does not exist locally	221	25.6
No, this was not completed (unknown if this exists locally)	138	16.0
No, this is available locally, but was not completed for this patient	127	14.7
This was not fully completed for this patient	24	2.8
Subtotal	**863**	
Not documented	115	
Total	**978**	

Clinician questionnaire data

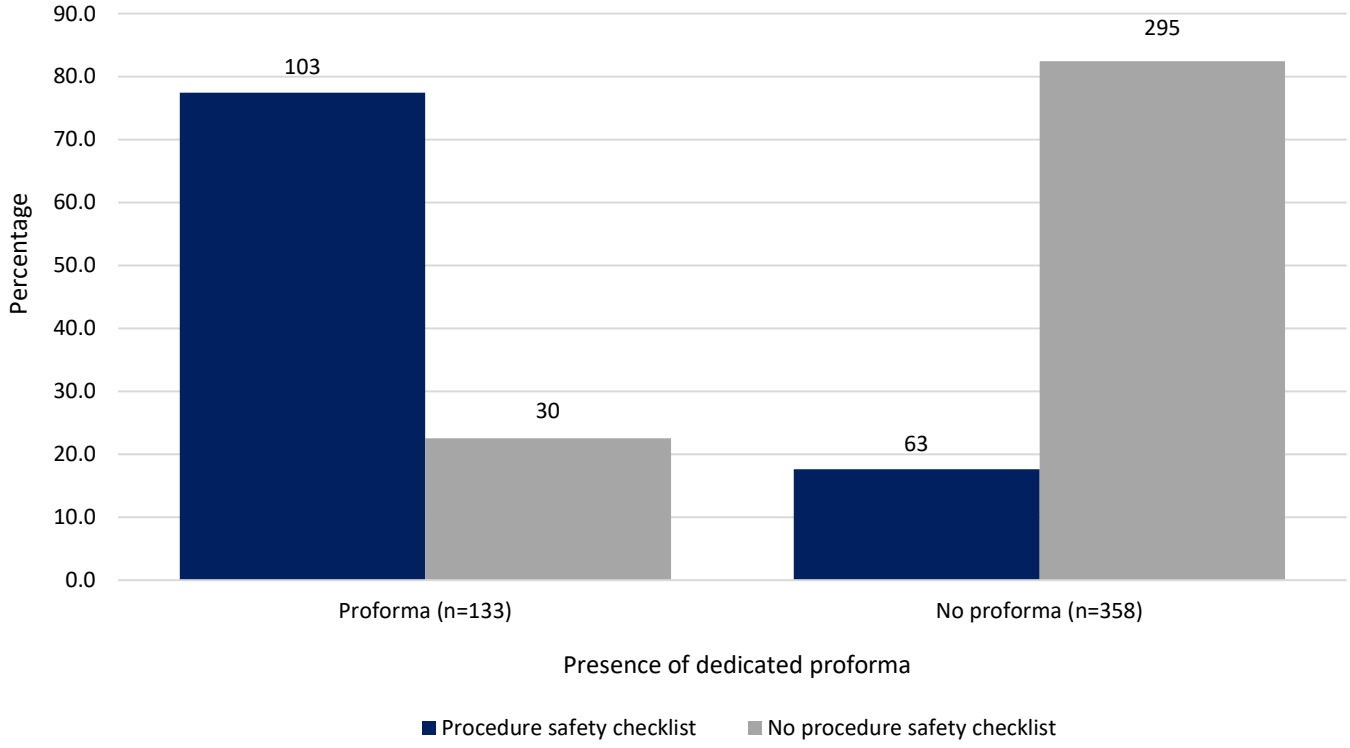
Cases reviewed where a proforma had been used showed fewer consent-related concerns than those without one (118/325; 36.3% vs 72/123; 58.5%) (F5.15).



F5.15 Use of a dedicated proforma and room for improvement in consent

Case review data

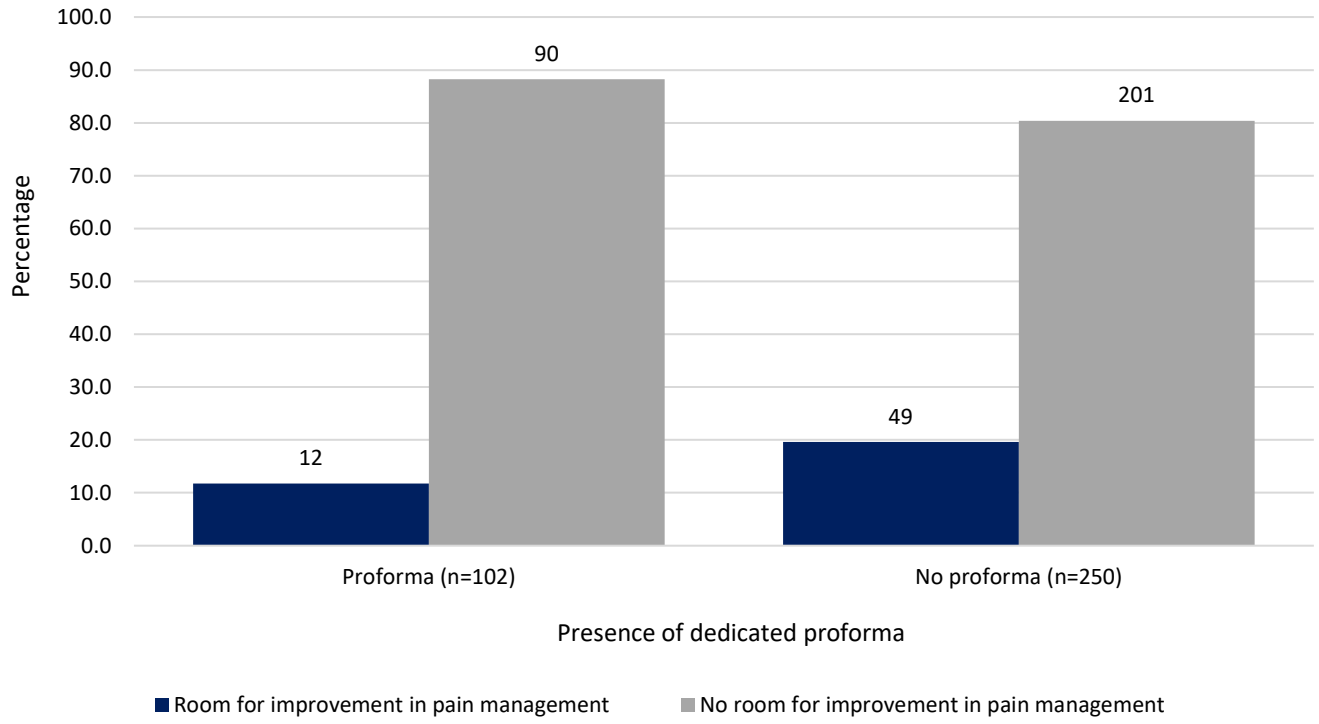
Use of a proforma was also associated with increased LocSSIPs use (103/133; 77.4%) compared with cases without a proforma 63/358 (17.6%) without (F5.16).



F5.16 Use of a proforma and use of LocSSIPs

Case review data

When a proforma was used there was also less room for improvement in pain management (12/102; 11.8% vs 49/250; 19.6%) (F5.17).



F5.17 Use of a proforma and room for improvement in pain management

Case review data

These effects translate into overall quality of care. Where a proforma was used, good care was identified much more often than where no proforma was used (58/140;41.4% v 85/367; 23.2%).

The use of a proforma was also consistently associated with improved consent processes, greater use of safety checklists, better pain management, and higher overall quality of care. A proforma represents a practical and scalable intervention that addresses multiple areas of variation identified throughout the pathway.

Pleural service

Specialist pleural input can improve consistency, expertise and pathway adherence.[11] However, not every pleural procedure requires specialist involvement. Pleural services were involved for 143/522 (27.4%) patients (T5.13). For the 379 patients where a service was not used reviewers believed it should have been for 144/357 (40.3%) but identified 213 patients where this was considered appropriate (T5.14).

T5.13 Evidence that a specialised pleural service was involved in the care of this patient	Number of patients	%
Pleural service	143	27.4
No pleural service	379	72.6
Subtotal	**522**	
Unknown	41	
Total	**563**	

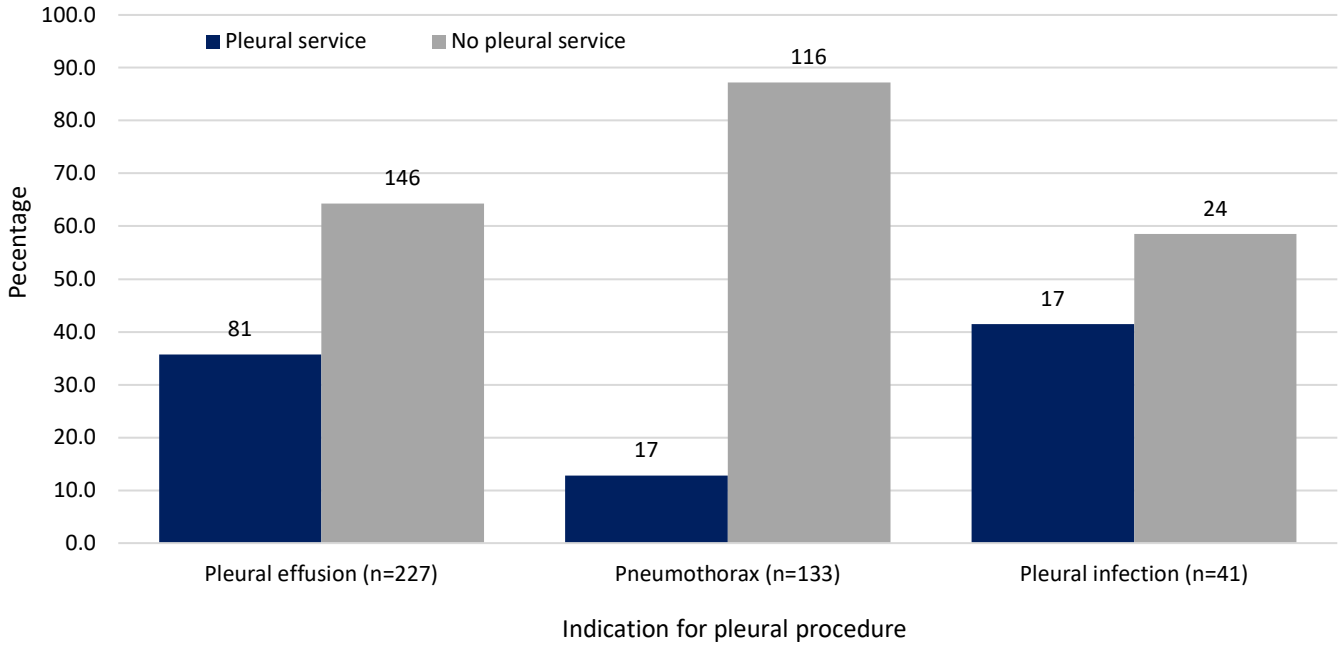
Case review data

T5.14 Where a pleural service was not involved, the patient would have benefitted from this	Number of patients	%
Yes	144	40.3
No	213	59.7
Subtotal	**357**	
Unknown	22	
Total	**379**	

Case review data

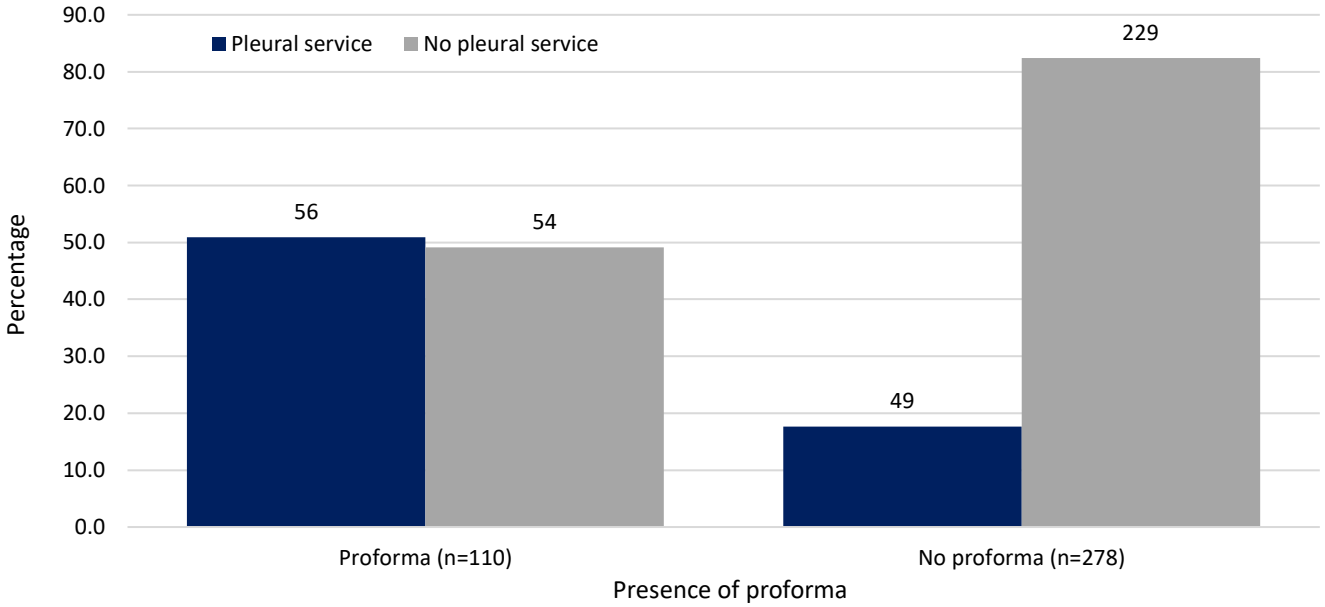
Reviewers commented that the reasons for specialist pleural involvement included reducing diagnostic delays and ensuring that preferred treatment was chosen at the correct time. This underlines the need for consistent core standards in all clinical settings and supports the recently published British Thoracic Society Quality Standard, which recommends that all hospitals treating pleural disease have access to specialist pleural advice.[1]

Specialist pleural input was more likely to be required for patients with pleural effusion or infection than for pneumothorax (F5.18). This is to be expected, as pneumothorax more commonly requires urgent treatment in an emergency department.



F5.18 Pleural service involvement and the indication for a pleural procedure
Case review data

The pleural service was more likely to be involved in patients for whom a proforma was used (F5.19). This may reflect that better developed pathways were used once the pleural team is involved. However, a proforma could also serve as a prompt to involve the pleural team.



F5.19 Pleural service involvement and use of proforma
Case review data

These findings suggest that access to specialist pleural expertise is variable, and that earlier involvement may improve decision making and pathway efficiency.

This reinforces the need for systems that facilitate timely specialist input, particularly for complex pleural disease.

6 POST-PROCEDURAL CARE OF CHEST DRAINS

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

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CASE STUDY: GOOD CARE

An older patient had a chest drain inserted for a large unilateral pleural effusion. The drain remained in place for six days. A pleural pathway document was included in the records. This included a monitoring proforma that prompted all necessary observations at appropriate intervals and specifically noted the safety alerts recommending avoidance of rapid fluid offload.

The reviewers thought this was an example of good practice. In particular, linking the monitoring plan with the previous safety alert kept it relevant, and was likely to improve safe practice.

CASE STUDY: ROOM FOR IMPROVEMENT

A chest drain was inserted for drainage of a moderate sized unilateral pleural effusion. After three days, the drain was still swinging but there was no further drainage. A chest X-ray was requested and shown to be normal but the drain was not removed. The drain remained open with no further drainage and daily X-rays were carried out for two further days before the drain was removed. The patient went home the day after drain removal.

The reviewers considered that the drain had been left in longer than needed, leading to a length of stay three days longer than necessary.

Post-procedure plan

- A post-procedure plan provides clear guidance on decisions regarding monitoring, imaging, and drain removal, all of which are clinically and operationally important. Nearly a quarter of patients (106/440; 24.1%) (unknown in 13) had no documented post-procedure plan.
- While chest radiography was commonly recorded, other important elements, including drainage targets (170/334; 50.8%), monitoring plans and pain management (128/334; 38.3%), were frequently omitted (F6.1).
- Where a proforma was used, there was a trend towards better post-procedure nursing care and medical care. Room for improvement in post-procedure nursing care was identified in 20/100 (20.0%) cases with a proforma, compared with 69/244 (28.3%) without a proforma.

Post-procedure care

- Of the patients with an effusion, 34/338 (10.0%) had more than 1500ml of fluid drained within the first hour after insertion (F6.2).
- The chest drain was checked on a daily basis in 264/325 (81.2%) patients (T6.1). However, a significant minority did not have a daily drain check documented.
- The median length of time a drain was in place was 2.9 days (F6.3). In total, 75/396 (18.9%) chest drains were not left in place for an appropriate duration (T6.2), with both premature removal (n=26) and prolonged retention (n=43) observed (unknown in six).
- The drain removal was planned in over 90% of patients (315/345; 91.3%; unknown in 108) and 30/426 (7.0%) patients needed re-insertion of the drain (unknown in 27). There were 12 patients who experienced a complication at the time of drain removal, including bleeding and pain.

6 POST-PROCEDURAL CARE OF CHEST DRAINS

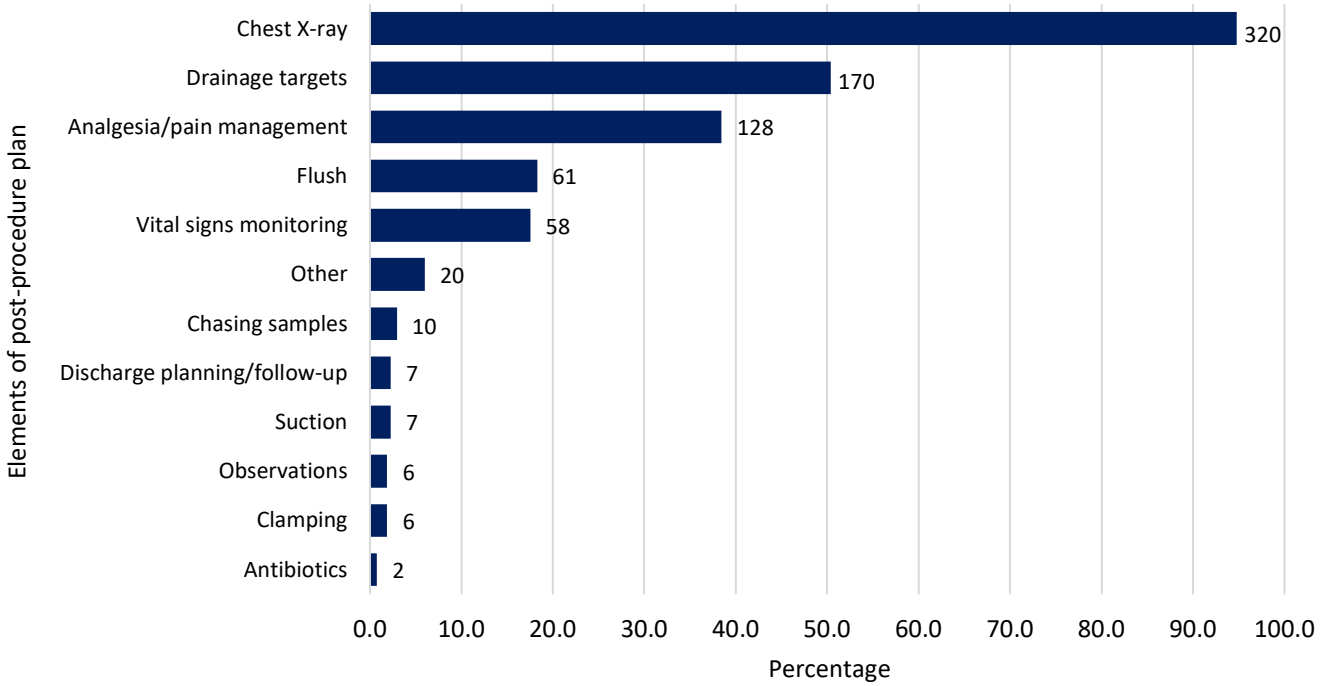
For this chapter, pleural aspirations have been removed from the analysis. The denominator for chest drain insertion is 453.

Post-procedure plan

A post-procedure plan provides clear guidance on decisions regarding monitoring, imaging, and drain removal, all of which are clinically and operationally important. Nearly a quarter of patients (106/440; 24.1%) (unknown in 13) had no documented post-procedure plan.

While chest radiography was commonly recorded, other important elements, including drainage targets (170/334; 50.8%), monitoring plans and pain management (128/334; 38.3%), were frequently omitted (F6.1). Despite this, reviewers reported that appropriate post-operative analgesia was prescribed for 275/293 (93.8%) patients (unknown in 160). However, there was room for improvement in post-procedure nursing care for 90/437 (20.6%) patients (unknown in 16) and in post-procedure medical care and decision making for 142/430 (33.0%) patients (unknown in 23).

Where a proforma was used, there was a trend towards better post-procedure nursing care and medical care. Room for improvement in post-procedure nursing care was identified in 20/100 (20.0%) cases with a proforma, compared with 69/244 (28.3%) without a proforma. Similarly, room for improvement in post-procedure medical care was identified in 34/117 (29.1%) of cases with a proforma, compared with 100/282 (35.5%) without one.



F6.1 Elements of the post-procedure plan

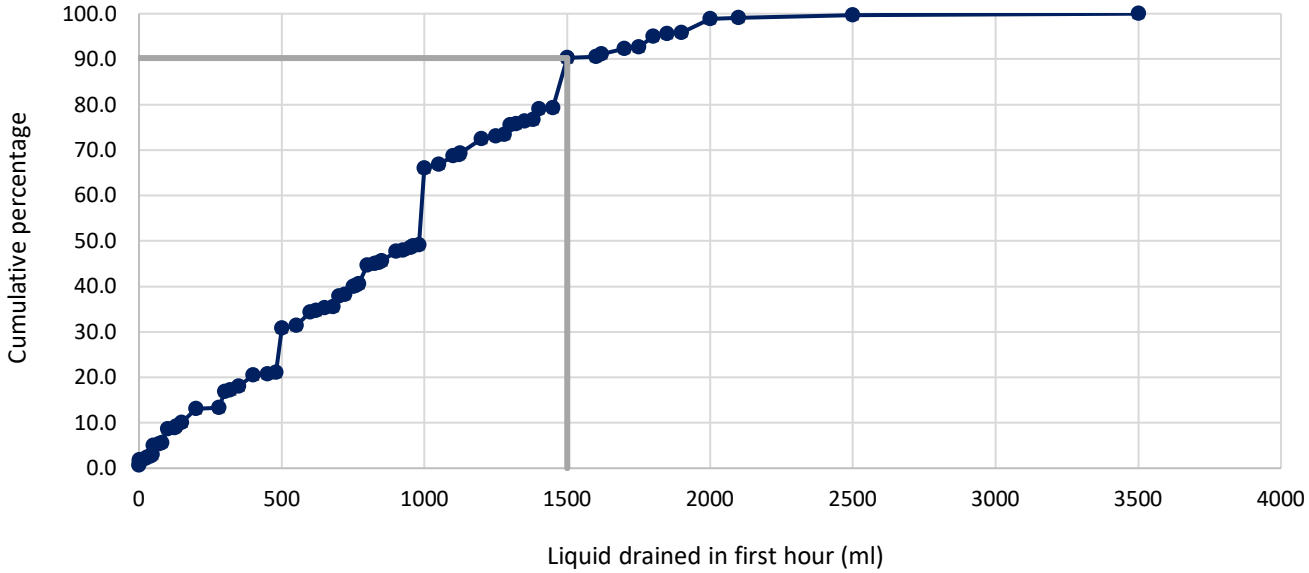
Case review data; *n=334*

Post-procedure care

Reviewers identified gaps in both nursing and medical care, often related to poor documentation, lack of clear planning and inadequate monitoring. These issues were less frequent where a proforma was used, again highlighting the role of structured pathways in improving care.

The 2020 National Patient Safety Alert on rapid offload of pleural effusion fluid recommends that no more than 1500ml fluid should be drained from a pleural effusion in the first hour after chest drain insertion.[21]

Of the patients with an effusion, 34/338 (10.0%) had more than 1500ml of fluid drained within the first hour after insertion (F6.2). The largest volume drained in the first hour was 3500ml. Documentation of the volume drained was inconsistent, limiting assurance that fluid drainage was actively controlled.



F6.2 Liquid drained within the first hour of drain insertion

Case review data; n=338

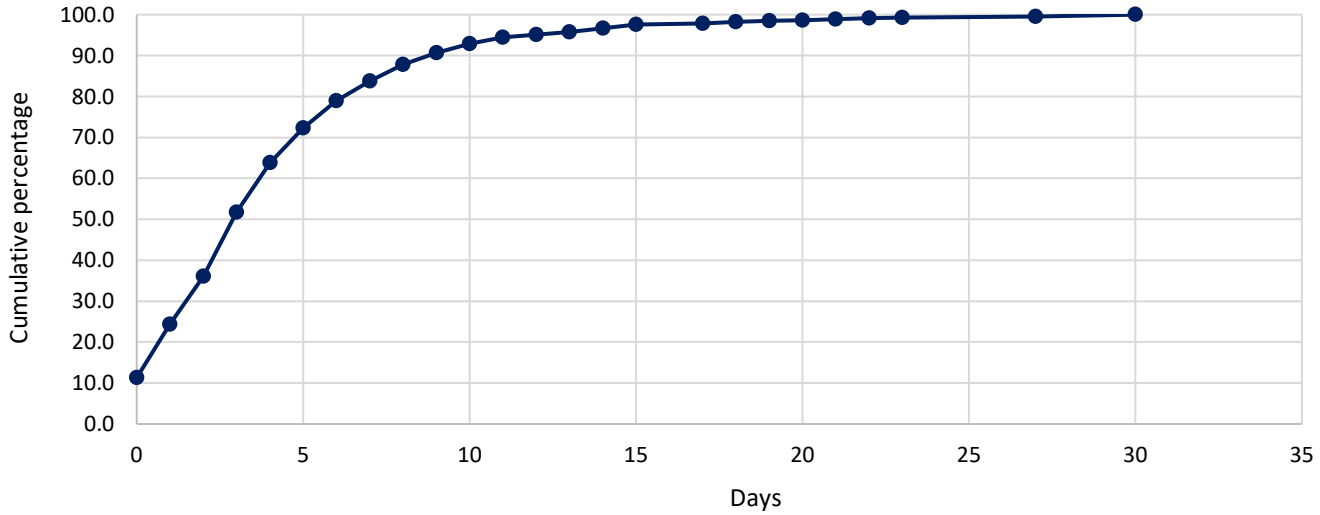
This finding means that despite the patient safety alert, patients remain exposed to the recognised risk of re-expansion pulmonary oedema and cardiovascular instability. Data on complications (presented in chapter7) showed that there were five patients who experienced this complication.

The chest drain was checked on a daily basis in 264/325 (81.2%) patients (T6.1). However, a significant minority did not have a daily drain check documented. The drain was clamped in 183/388 (47.2%) patients (unknown in 65).

T6.1 The chest drain was checked at least daily for bleeding/signs of infection	Number of patients	%
Drain checked at least daily	264	81.2
Drain not checked daily	61	18.8
Subtotal	**325**	
Unknown	128	
Total	**453**	

Case review data

The median length of time a drain was in place was 2.9 days (F6.3). In total, 75/396 (18.9%) chest drains were not left in place for an appropriate duration (T6.2), with both premature removal (n=26) and prolonged retention (n=43) observed (unknown in six).



F6.3 Number of days the drain was in place (data does not include pleural aspirations)
Case review data; n=453

T6.2 The drain was in place for an appropriate length of time	Number of patients	%
Yes	321	81.1
No	75	18.9
Subtotal	**396**	
Unknown	57	
Total	**453**	

Case review data

Prolonged drainage contributed to increased length of stay, while premature removal led to the need for reinsertion in 16 cases. This means that patients experienced increased clinical risk both because of early removal and prolonged exposure to the risks of chest drains as well as avoidable bed days. These findings indicate variability in post-procedural decision making and monitoring.

The drain was dislodged in 54/420 (12.9%) patients (unknown in 33) and in seven of these patients the drain was not documented as secured. Overall, the drain was not documented as being appropriately secured in 33/267 (12.4%) patients (unknown in 186).

The drain removal was planned in over 90% of patients (315/345; 91.3%; unknown in 108) and 30/426 (7.0%) patients needed re-insertion of the drain (unknown in 27). There were 12 patients who experienced a complication at the time of drain removal, including bleeding and pain.

Outcome and follow-up

Patients were most frequently discharged home (406/563; 72.1%). There were 86/563 (15.3%) patients who died prior to hospital discharge. There were 15 patients died who within 30 days of discharge, and the reviewers thought that seven of these deaths were potentially related to the chest drain.

Where the information was available, 48/296 (16.2%) patients were readmitted in the next 30 days. Of these readmissions, 18 were related to the chest drain itself.

Follow-up was arranged for 324/427 (75.9%) patients (unknown in 121). Among the patients without arranged follow-up, the reviewers thought that 41/103 (39.8%) patients should have had follow-up arranged.

7 COMPLICATIONS, INCIDENT REPORTING AND GOVERNANCE ARRANGEMENTS

DETAILED FINDINGS ABOUT THIS ARE AVAILABLE HERE

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- Data were provided by 47/122 (38.5%) hospitals about incidents reported in patients undergoing pleural procedures (noting that these were not necessarily events directly related to the procedure). An incident was reported in 1,601/7,747 (20.7%) patients.
- Organisational data showed that Datix was the most used risk management system amongst the study participants (124/173; 71.7%) (T7.1).
- The data also suggested that there was a perception that it was not easy to extract data (or to analyse themes or long-term trends in safety events) from the risk management systems used (T7.2).

Complications of the pleural procedure

- Reviewers identified complications on review of 127/542 (23.4%) patients (T7.3). The reviewers considered that 48/127 (37.8%) complications were reportable as a clinical incident, and of these, 37/48 patients had suffered harm as a result. There was evidence in the case records that only four of these events had been reported. This may reflect an acceptance that some complications are 'acceptable' or 'normal' and could be considered a lost opportunity to learn from these events and reduce future harm to patients.
- The most common complications identified were surgical emphysema and pneumothorax (F7.1).

Opportunities for learning

- The reviewers stated that additional learning was possible in 96/423 (22.7%) cases reviewed (unknown in 140). This included choice of procedure, safety processes (such as LocSSIPs), consent, post-procedure care including drain removal, and management of anticoagulants around the time of the procedure.
- There were 70/153 (45.8%) hospitals that reported a local audit approach. However, free text comments noted that this approach was commonly limited to procedures undertaken by the pleural team and would therefore systematically exclude procedures undertaken out of hours, which were the focus of this review.
- Where local clinical audit was undertaken, it was used to update local training and procedural protocols in 66/70 hospitals, results were fed back to clinicians at 61/70 hospitals, and findings were fed back to hospital leadership and relevant committees in 54/70 hospitals.
- There is an opportunity to improve practice by widening the focus of local audit and quality improvement activity to include pleural procedures undertaken in all locations and by all specialties.
- The overall quality of care was rated as good in 160/547 (29.3%) patients (unknown in 16) (F7.2).
- The proportion rated as good practice by urgency was: emergency, 11/47 (23.4%); urgent, 71/237 (29.9%) and non-urgent, 34/116 (29.3%) (F7.3).

7 COMPLICATIONS, INCIDENT REPORTING AND GOVERNANCE ARRANGEMENTS

Pleural interventions (especially tube drain insertion) are associated with patient safety incidents frequently enough to have been the subject of two national patient safety alerts in 2008 and 2020.[20, 21]

A British Thoracic Society audit showed that 69/111 (62.2%) hospitals reported at least one safety incident relating to pleural procedures (a third of which resulted in severe harm and a fifth in catastrophic harm or death) over a three-year period.[22]

A recent review of patient safety events has shown that harm, including death, as a direct result of complications of chest drain insertion, continues to occur.[23] This evidence supported the rationale for establishing the study.

Local risk management systems are used in hospitals to record and investigate patient safety events. These systems are separate from the electronic patient record. They are searchable using keywords and it should therefore be possible to use them to identify incidents related to a specific procedure such as chest drain insertion.

Since 2024, in England, all of the systems in use are designed to upload data to the Learn from Patient Safety Events (LFPSE) system in real time.[24] Within each organisation, reporting of an individual incident remains largely a voluntary process. However, organisations with a culture that leads to high levels of reporting of safety events (including those with a low level of harm and near misses) have been shown to be safer.[18]

For this study, in order to understand both the number of incidents being reported, and whether there were more opportunities for learning, organisations were asked to provide data on clinical incidents that occurred in patients undergoing a pleural procedure.

Data were provided by 47/122 (38.5%) hospitals about incidents reported in patients undergoing pleural procedures (noting that these were not necessarily events directly related to the procedure). An incident was reported in 1,601/7,747 (20.7%) patients.

Organisational data showed that Datix was the most used risk management system amongst the study participants (124/173; 71.7%) (T7.1).

T7.1 Systems used locally for incident reporting	Number of hospitals	%
Datix (RLDatix/Datix Cloud IQ)	124	71.7
InPhase/Incident Oversight	24	13.9
Ulysses 2000 Ltd	17	9.8
Radar Healthcare (Smartgate Solutions Ltd)	8	4.6
Other	2	1.2
Total	**173**	

Organisational data

The data also suggested that there was a perception that it was not easy to extract data (or to analyse themes or long-term trends in safety events) from the risk management systems used (T7.2).

T7.2 Functions of the learning resource management system	Number of hospitals	%
Can be easily searched to extract data on key fields, e.g. searching 'chest drain'	83	48.0
Can be used to identify long-term trends in patient safety/improvements in care	62	35.8
Allows managers to easily provide feedback to the reporter on actions taken	58	33.5
Automatically uploads or links to national databases to streamline mandatory reporting	36	20.8
Provides automated tools to help investigators identify common themes	26	15.0
Is bi-directionally linked with the electronic patient record, allowing for clinical data (e.g. admission dates) to be extracted	12	6.9
Is linked to other routine clinical information to enrich analysis without increasing the burden	6	3.5
None of these	5	2.9

Organisational data; n=173

There was also limited knowledge of the automated upload function to the LFPSE system (36/173; 20.8%). This may explain why only 42 hospitals were able to provide data on safety events linked to the clinical cases submitted for review.

It may also explain why only 49/173 (28.3%) hospitals (55 unknown) had interrogated their incident reporting data to learn from incidents related to pleural procedures (data not shown). A better understanding of LRMS functions would help to improve how these systems are used locally to learn from incidents.

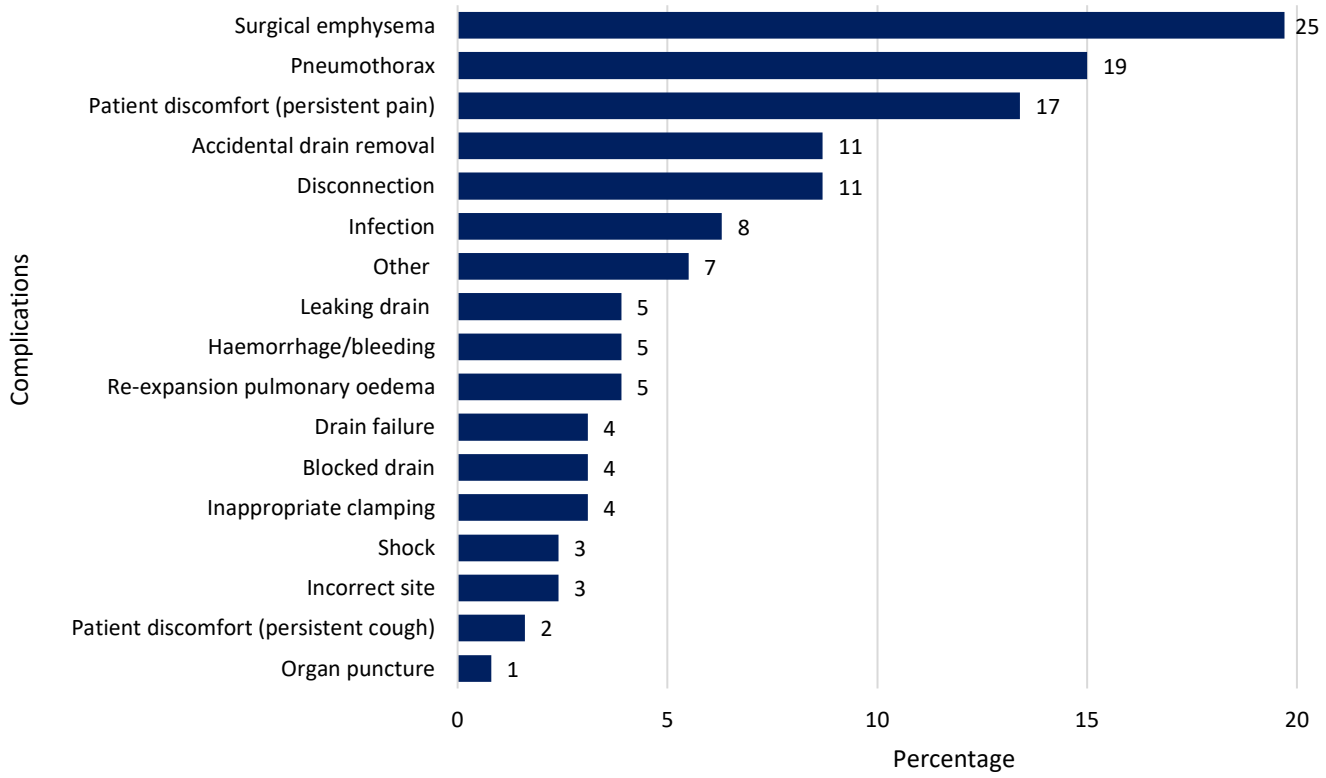
Complications of the pleural procedure

Reviewers identified complications on review of 127/542 (23.4%) patients (T7.3). The reviewers considered that 48/127 (37.8%) complications were reportable as a clinical incident, and of these, 37/48 patients had suffered harm as a result. There was evidence in the case records that only four of these events had been reported. This may reflect an acceptance that some complications are 'acceptable' or 'normal' and could be considered a lost opportunity to learn from these events and reduce future harm to patients. The complications identified were dealt with appropriately in 78/100 cases.

T7.3 Pleural procedure-related complications	Number of patients	%
Yes	127	23.4
No	415	76.6
Subtotal	**542**	
Unknown	21	
Total	**563**	

Case review data

The most common complications identified were surgical emphysema and pneumothorax (F7.1).



F7.1 Complications of the pleural procedure
Case review data, n=127

Opportunities for learning

The reviewers stated that additional learning was possible in 96/423 (22.7%) cases reviewed (unknown in 140). This included choice of procedure, safety processes (such as LocSSIPs), consent, post-procedure care including drain removal, and management of anticoagulants around the time of the procedure. The data on reportable incidents outlined above confirms that there are multiple opportunities being missed to learn from and improve the care of patients treated with a chest drain.

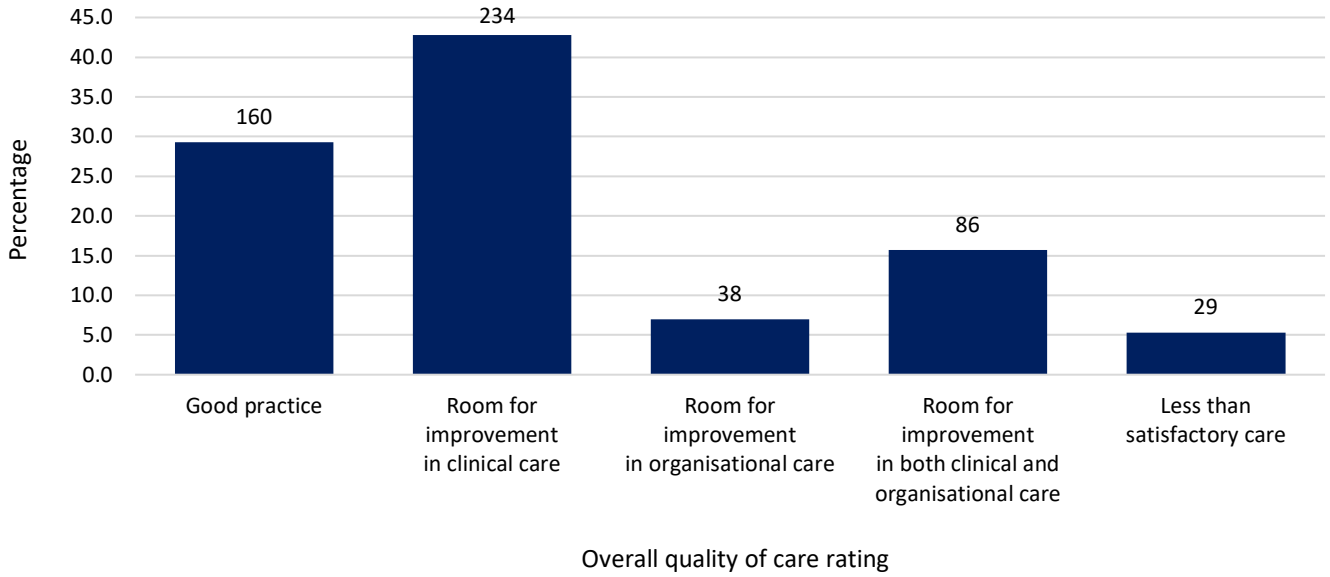
Clinical audit and quality improvement are other approaches that can be used to ensure learning and improvement at a local level. There were 70/153 (45.8%) hospitals that reported a local audit approach. However, free text comments noted that this approach was commonly limited to procedures undertaken by the pleural team and would therefore systematically exclude procedures undertaken out of hours, which were the focus of this review. Added to the perceived challenges in extracting patient safety data from reporting systems, this suggests there is a gap in governance arrangements and surveillance of out of hours pleural procedures that needs closing.

Where local clinical audit was undertaken, it was used to update local training and procedural protocols in 66/70 hospitals, results were fed back to clinicians at 61/70 hospitals, and findings were fed back to hospital leadership and relevant committees in 54/70 hospitals.

There is an opportunity to improve practice by widening the focus of local audit and quality improvement activity to include pleural procedures undertaken in all locations and by all specialties.

Overall quality of care

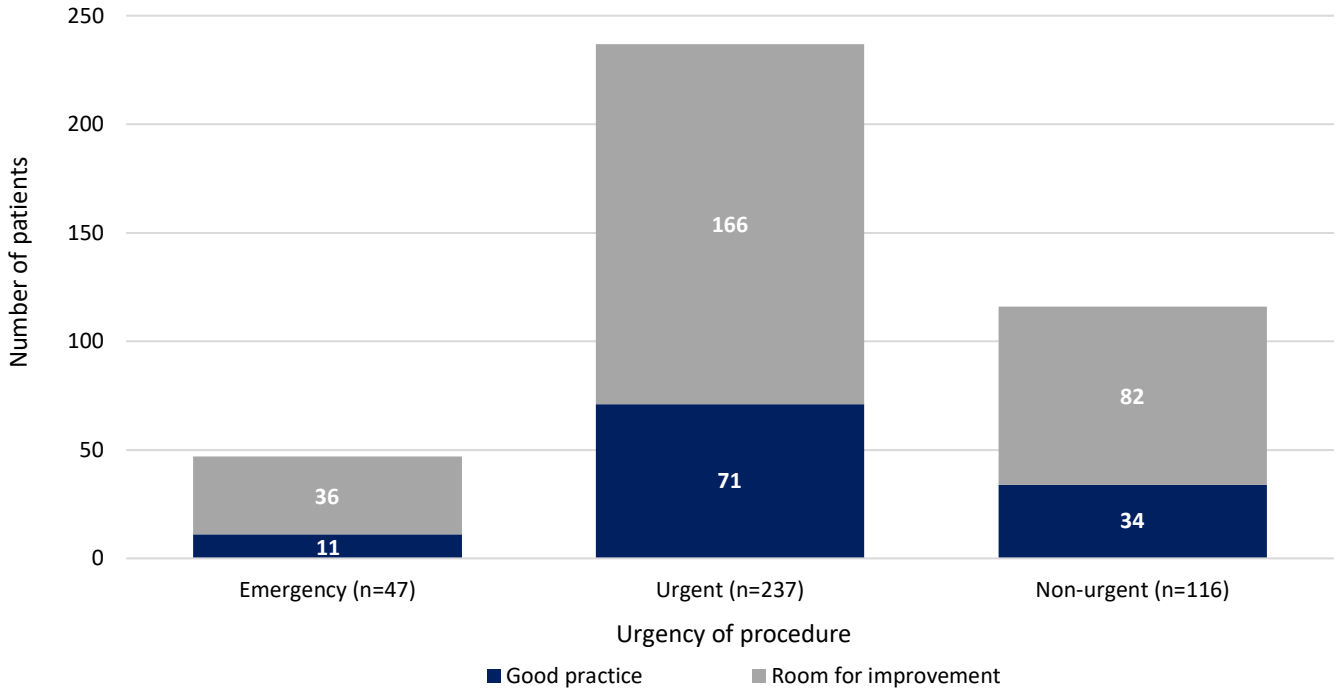
The reviewers rated the overall quality of care as good in 160/547 (29.3%) patients (unknown in 16). There was room for improvement in clinical care in 320/547 (58.5%) patients and in the organisation of care in 124/547 (22.7%). Care was rated as less than satisfactory for 29/547 (5.3%) patients (F7.2).



F7.2 Overall quality of care

Case review data; n=547

Although the urgency of the procedure was recorded in the clinician questionnaire for 400/563 (71.0%) patients, good practice was observed in patients treated with all degrees of urgency. The proportion rated as good practice was: emergency, 11/47 (23.4%); urgent, 71/237 (29.9%) and non-urgent, 34/116 (29.3%) (F7.3).



F7.3 Urgency and overall quality of care

Case review data; n=400