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. *NB: 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. *See also recommendation 2 – relating to out of hours procedures.*
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.