



# Chest Drain Management Guideline

## 1. Purpose

The purpose of chest tube drainage is to remove air and/or fluid from the pleural cavity or mediastinum to allow lung re-expansion and restore negative intrathoracic pressure. Chest drains are typically inserted following cardiothoracic surgery or in response to conditions that result in fluid or air accumulation in the pleural space.<sup>1,2</sup>

This guideline provides direction on the management and removal of pleural and mediastinal chest drains, including troubleshooting strategies. It does not cover the use or management of pericardial drains, which have distinct indications and clinical considerations.

Additional information on chest drain placement can be accessed via the WACHS Library: '[ClinicalKey – chest tube placement](#)' (procedure video and information). This resource covers indications; contraindications; equipment; drainage suction systems; anatomy; insertion procedure; post procedure care and complications.

## 2. Guideline

### 2.1 Safety points

Key safety points for managing chest drains include:

- All orders for chest drain management, including removal should be documented in the patient's healthcare record by the medical officer (MO) before being carried out.
- Patient identification and procedure matching requirements should be met. Refer to the WACHS [Patient Identification and Procedure Matching Policy](#).
- Canister should be kept upright and below the level of the patient's chest.
- Patients to be educated about drain positioning to support adherence.
- Two non-toothed chest drain clamps (with rubber or plastic protection) should be available nearby for emergency use.
- Emergency suction should always be available and functioning in addition to chest drain suction (where in use).
- Patients with chest drains should be escorted when going to and from the clinical area by an appropriately skilled nurse.

### 2.2 Clamping

Clamping of chest drains should:

- Only be clamped or have the three-way taps turned off in exceptional, carefully considered circumstances.
- Only occur briefly—such as during drainage system changes or at the request of an MO with expertise in chest drain management.

Prolonged clamping may cause life-threatening complications such as tension pneumothorax or surgical emphysema. When clamping, closely monitor for signs of respiratory distress or compromised respiratory function.<sup>4</sup>

## 2.3 Care following insertion of a chest drain

Immediately following insertion:

- Ensure the drain tube has been connected to the chest drainage system\*.
- Place the drainage system below the level of the patient's chest.
- Apply a dry dressing to the insertion site.
- Secure the chest drain tubing to the patient's skin with adhesive stretch dressing (avoid unnecessary skin traction by not stretching the dressing during application to skin).
- Ensure the two emergency chest drain clamps are available nearby and the patient is comfortable.

\*All sites to ensure they adequately stock adult chest drainage systems for size 24-32F chest drains.

\*All sites to ensure they adequately stock paediatric chest drainage systems for size 20F and smaller chest drains – the smaller chest drain sizes do not fit the adult chest drainage systems.

A '[Care following insertion](#)' checklist is available for clinicians. The checklist reinforces immediate actions following insertion and outlines key points for:

- documentation
- establishing correct position of the chest drain tube
- pain management and activity
- transporting the patient
- patient education
- chest drain dressing
- adequate supply of chest drainage systems.

## 2.4 Monitoring

Monitoring of the chest drainage system and the insertion site is outlined on the [MR129 WACHS Chest Drain Assessment and Observation Chart](#).

Vital signs are recorded on an age appropriate observation and response chart. Frequency of observations is outlined on the [MR129 WACHS Chest Drain Assessment and Observation Chart](#). Consider more frequent observations if sedation used during insertion or if clinically indicated.<sup>3</sup>

## 2.5 Application of suction

Suction should only be used as directed by the medical team responsible for the patients care.

A written medical order for application of suction to a chest drain can be documented on the [MR129 WACHS Chest Drain Assessment and Observation Chart](#). Orders for cessation should be documented in the healthcare record and recorded on the MR129 once completed.

A '[Management of suction](#)' checklist is available for clinicians. The checklist outlines general information on high and low flow suction and provides checklist each for both:

- Suction for single bottle systems with **no** inbuilt suction control mechanism.

- Suction for triple bottle systems **with** inbuilt suction control mechanism.

## 2.6 Changing the chest drain system

Changing the chest drain collection system may be required and is crucial to maintaining effective pleural drainage and preventing hydrostatic back pressure.

Indications for changing the system include:

- Fluid drainage approaches 800 – 1000 mL, or as per MO request.
- Tubing or canister is visibly damaged or compromised.
- Patient's respiratory status deteriorates, suggesting impaired drainage.
- Routine system change (every 72 hours for single bottle systems or as per local protocol).

A '[Changing the chest drain system' checklist](#) is available for clinicians. The checklist reiterates the indications for changing a system and provides the steps involved with changing the system.

## 2.7 Troubleshooting chest drains

Potential issues with chest drains include:

- accidental removal of chest drain
- accidental disruption to chest drainage circuit
- chest drainage system knocked over
- surgical emphysema
- continuous bubbling and frothing of drainage fluid.

A '[Troubleshooting guide](#)' is available for clinicians. The guide provides a summary of issues and outlines subsequent actions. This can be printed out for use in the clinical area.

## 2.8 Removal of chest drain

Chest drains are generally removed when:

- radiological examination shows that the patient's lung has reinflated<sup>11</sup>
- drainage of fluid has ceased, or
- cessation of bubbling and oscillation (pneumothorax<sup>3</sup>).

Prior to drain removal an MO may request a 'clamping trial' to detect small air leaks not immediately obvious at the bedside. This should not be for a prolonged period of time ( $\leq 6$  hours for alert patients).<sup>5,6,7</sup> These patients should remain in the clinical area and be closely observed for signs of respiratory distress for the duration of the clamping trial. The drain should be unclamped immediately if signs of clinical deterioration and the MO notified.

### Pre-removal preparation

Before removing a chest drain, ensure the following steps are completed:

- **Medical orders:** Confirm the presence of a written order for drain removal in the patient's healthcare record (inclusive of which drain if multiple insitu).

- **Patient condition:** Review patient status, including coagulation profile and recent anticoagulant administration (preferably more than six hours since last dose to reduce bleeding risk).
- **Pain management:** Assess pain levels, administer prescribed analgesia as needed, and allow sufficient time for analgesic effect prior to drain removal.
- **Confirm lung re-expansion:** Review recent chest X-ray (if available) to ensure lung re-expansion.
- **Drain design:** Check if the drain has a self-retaining mechanism (e.g., pigtail catheter) and confirm the correct removal process as per manufacturer's instructions.
- **Staffing requirements:** For large-bore drains (18-32 Fr), two nurses are required, including one with chest drain removal experience.<sup>3,8</sup> For small-bore drains (12-16 Fr), a single nurse may suffice.
- **Post-removal imaging:** Plan for a follow-up chest X-ray within 2-4 hours post removal<sup>8</sup> if required by the treating MO.
- **Patient communication:** Ensure the patient understands the breath-holding technique or other instructions required for the procedure. If this is not feasible, plan to time removal during exhalation.<sup>3</sup>

### Removal procedure

A ['Removal of chest drain' checklist](#) is available for clinicians. The checklist outlines the equipment needed, the steps for removing the chest drain and reinforces the post removal care.

## 3. Roles and Responsibilities

**Clinicians** working in acute settings managing and removing chest drains are to work within their scope of practice, level of training and education and job role. Specific responsibilities are outlined within the main content of this guideline and the supporting resources.

**All staff** are required to comply with the directions in WACHS policies and procedures as per their roles and responsibilities. Guidelines are the recommended course of action for WACHS, and staff are expected to use this information to guide practice. If staff are unsure which policies procedures and guidelines apply to their role or scope of practice, and/or are unsure of the application of directions they should consult their manager in the first instance.

## 4. Monitoring and Evaluation

This guideline will be evaluated by relevant managers through routine clinical incident investigation processes and consumer feedback review.

This guideline will be reviewed as required to confirm its effectiveness, relevance, and currency, facilitated by the specified review contact at a minimum every five years or unless otherwise indicated by emergent clinical risk or best practice changes occur.

## 5. References

1. Sullivan B. [Nursing management of patients with a chest drain](#). BrJ Nurs. 2008;17(6):388-393 DOI: [10.12968/bjon.2008.17.6.28906](#) [Accessed: 23 January 2025]
2. Mahmood K, Wahidi MM. [Straightening out chest tubes: what size, what type, and when](#). Clin Chest Med. 2013 Mar; 34(1):63-71 DOI: [10.1016/j.ccm.2012.11.007](#) [Accessed: 23 January 2025]
3. ACI. [Pleural drains in adults: a consensus guideline](#) v2.4. NSW Agency for Clinical Innovation; 2016. Avail from: [Accessed: 23 January 2025]
4. Mbinji M. [Chest drains: maintenance](#). JBI EBP Database. 2021: JBI-1634. Evidence Summary [Accessed: 23 January 2025]
5. Paydar S, Ghahramani Z, Ghoddsi Johari H, et al. [Tube Thoracostomy \(Chest Tube\) Removal in Traumatic Patients: What Do We Know? What Can We Do?](#) Bull Emerg Trauma. 2015;3(2):37-40. PMID: [PMC4771264](#) [Accessed: 23 January 2025]
6. Rasheed MA, Majeed FA, Ali Shah SZ and Naz A. [Role of Clamping Tube Thoracostomy Prior to Removal in Non-Cardiac Thoracic Trauma](#) Ayub Med Coll Abbottabad 2016;28(3):476-479 [Accessed: 23 January 2025]
7. Imtiaz T, Majeed FA, Raza A, Rahim K, Saeed Y, Imran M Is Chest Tube Clamping Necessary before Removal *Pak Armed Forces Medical Journal* 2016; 66(4):591-94
8. Sir Charles Gardiner Hospital Nursing Practice Guidelines – [Chest Drain Management](#), 2017 [Accessed: 23 January 2025]
9. Sharma L. Chest drains: Insertion. Adelaide, SA: The Joanna Briggs Institute; 2013: JBI Connect
10. [Havelock T, Teoh R, Laws D, Gleeson F. Pleural procedure and thoracic ultrasound: British Thoracic Society Pleural Disease Guideline 2010](#). Thorax 2010; 65(2) [Accessed: 23 January 2025]
11. Hunter J. [Chest drain removal](#). Nurs Stand. 2008;22(45):35-38. DOI: [10.7748/ns2008.07.22.45.35.c6590](#) [Accessed: 23 January 2025]
12. Fysh ET, Smith NA, Lee YC. Optimal chest drain size: the rise of the small-bore pleural catheter. *Seminars in respiratory and critical care medicine*. Dec 2010;31(6):760-768.
13. Cafarotti S, Dall'Armi V, Cusumano G, et al. Small-bore wire-guided chest drains: safety, tolerability, and effectiveness in pneumothorax, malignant effusions, and pleural empyema. *The Journal of thoracic and cardiovascular surgery*. Mar 2011;141(3):683-687.
14. Becker JC, Zakaluzny SA, Keller BA, Galante JM, Utter GH. [Clamping trials prior to thoracostomy tube removal and the need for subsequent invasive pleural drainage](#). Am J Surg. 2020 Aug;220(2):476-481. doi: [10.1016/j.amjsurg.2020.01.007](#). [Accessed: 23 January 2025]

15. Elsayed H, Roberts R, Emadi M, Whittle I, Shackcloth M. [Chest drain insertion is not a harmless procedure - Are we doing it safely?](#) *Interact Cardiovasc Thorac Surg*. Dec 2010;11(6):745-748. DOI: [10.1510/icvts.2010.243196](#) [Accessed: 23 January 2025]
16. Hannaway N, Brown D, Monkhouse S. [What is the correct way to remove a chest drain--on inhalation or exhalation, or does it not matter?](#) *Nurs Times*. May 2010;106(17):18 [Accessed: 23 January 2025]

## 6. Definitions

Nil

## 7. Document Summary

<b>Coverage</b>	WACHS wide
<b>Audience</b>	Clinicians working in acute settings inserting, managing and removing chest drains
<b>Records Management</b>	<a href="#">Health Record Management Policy</a>
<b>Related Legislation</b>	<a href="#">Carers Recognition Act 2004</a> (WA) <a href="#">Health Practitioner Regulation National Law (WA) Act 2010</a> (WA) <a href="#">State Records Act 2000</a> (WA)
<b>Related Mandatory Policies/Frameworks</b>	<ul style="list-style-type: none"> <li>MP 0122/19 <a href="#">Clinical Incident Management Policy</a></li> <li>MP 0175/22 <a href="#">Consent to Treatment Policy</a></li> </ul>
<b>Related WACHS Policy Documents</b>	<ul style="list-style-type: none"> <li><a href="#">Consent to Treatment Policy</a></li> <li><a href="#">Patient Identification and Procedure Matching Policy</a></li> <li><a href="#">Specimen Collection Procedure</a></li> <li><a href="#">Waste Management Policy</a></li> </ul>
<b>Other Related Documents</b>	<ul style="list-style-type: none"> <li>WACHS <a href="#">Care following insertion checklist</a></li> <li>WACHS <a href="#">Changing of chest tube system checklist</a></li> <li>WACHS <a href="#">Management of suction checklist</a></li> <li>WACHS <a href="#">Removal of chest drain checklist</a></li> <li>WACHS <a href="#">Troubleshooting guide</a></li> <li>WA Health <a href="#">Procedure Specific Information Sheets (PSIS)</a> (R09 Inserting a Chest Drain)</li> </ul>
<b>Related Forms</b>	<ul style="list-style-type: none"> <li><a href="#">MR129 WACHS Chest Drain Assessment and Observation Chart</a></li> <li><a href="#">MR144 WACHS Fluid Balance Work Sheet</a></li> </ul>
<b>Related Training</b>	Nil
<b>Aboriginal Health Impact Statement Declaration (ISD)</b>	ISD Record ID: 4101
<b><a href="#">National Safety and Quality Health Service (NSQHS) Standards</a></b>	1.27, 2.4, 6.6, 8.4
<b><a href="#">Aged Care Quality Standards</a></b>	Nil

<b>Chief Psychiatrist's Standards for Clinical Care</b>	Nil
<b>Other Standards</b>	Nil

## 8. Document Control

Version	Published date	Current from	Summary of changes
3.00	28 October 2025	28 October 2025	<ul style="list-style-type: none"> <li>change to guideline format</li> <li>removal of general and educational information available from other sources</li> <li>procedural information moved to alternate format as supporting resources and linked to within the relevant sections of the guideline</li> <li>removal indwelling pleural catheter information.</li> </ul>
3.01	12 December 2025	28 October 2025	Minor amendment <ul style="list-style-type: none"> <li>added direction to ensure adequate supply of chest drain systems to fit all sizes of chest tubes stocked at site.</li> </ul>

## 9. Approval

<b>Policy Owner</b>	Executive Director Clinical Excellence
<b>Co-approver</b>	Executive Director Nursing and Midwifery Services
<b>Contact</b>	Program Officer Clinical Practice Standards
<b>Business Unit</b>	WACHS Safety Quality and Performance
<b>EDRMS #</b>	ED-CO-15-94162
<p><i>Copyright to this material is vested in the State of Western Australia unless otherwise indicated. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the provisions of the Copyright Act 1968, no part may be reproduced or re-used for any purposes whatsoever without written permission of the State of Western Australia.</i></p>	

**This document can be made available in alternative formats on request.**