Prone Positioning for Ventilated Patients

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GUIDELINE

Guidelines are evidence-based strategies for actions that allow for professional judgement

island health

Purpose:	• Prone positioning is an evidence-based intervention that **should be considered** for adult patients with acute respiratory distress syndrome (ARDS) or severe hypoxemia to improve oxygenation and reduce mortality.
	• This guideline has been developed to:
	  ○ Provide **evidence-based direction** for when and why adult patients may benefit from prone positioning;
	  ○ Ensure a **consistent, safe, and coordinated approach** to proning within Island Health critical care and acute care settings; and
	  ○ Align practice with **current national and international standards** for the management of ARDS.
	• Proning *should be initiated* in accordance with clinical assessment, patient tolerance, and multidisciplinary decision-making. The intent of this guideline is to support clinicians in determining when proning is indicated, ensuring the intervention is applied safely and effectively, and maintaining continuity of care across sites.

Cultural Safety and Humility:	Island Health offers programs and services on the unceded and traditional territories of the Coast Salish, Nuu-chah-nulth, and Kwakwaka'wakw Peoples. As a signatory to the 2015 Declaration of Commitment to Cultural Safety and Cultural Humility, Island Health is committed to addressing the ongoing impacts of colonialism and Indigenous-specific racism in order to provide a culturally safe, inclusive, healthy and respectful environment. The organization is committed to strengthening diversity, equity and inclusion to enable excellence in health and care for everyone, everywhere, every time. Through these commitments, Island Health strives to deliver the highest possible standard of care and to promote safe workplaces.

Scope:	• **Audience (e.g. Registered Nurses (RNs), etc.):**
	  ○ Most Responsible Physicians (MRPs)
	  ○ Intensivists
	  ○ Emergency Physicians
	  ○ Registered Respiratory Therapists (RRTs)
	  ○ Registered Nurses (RNs)
	  ○ Physiotherapists (PTs)
	  ○ other critical care-trained staff.
	• **Environment:**
	  ○ Island Health–wide.
	  ○ Adult Intensive Care Units and other acute care environments where invasive mechanical ventilation is provided.
	• **Indications (when this document is to be used):**
	  ○ Patients with severe ARDS and refractory hypoxemia (PaO_2/FiO_2 ≤150) despite optimal PEEP and lung-protective ventilation strategies.
	• **Exceptions (when this document is NOT to be used):**
	  ○ Island Health–wide.

	○ Elevated intracranial pressure. ○ Recent or unstable facial, eye, or tracheal surgery/trauma. ○ Unstable cervical spine. ○ New pacemaker insertion (within 48 hours). ○ Pregnancy. ○ Open abdomen or recent abdominal surgery. ○ Massive hemoptysis. ○ Anterior chest tube with air leak. ○ Neonatal or pediatric patients.
Outcomes:	• Timely identification of intubated and ventilated adults who may benefit from prone positioning. • Appropriate clinical decision-making regarding when and why to initiate proning. • Consistent application of evidence-informed criteria across Island Health critical care settings. • Improved interdisciplinary communication and shared understanding of proning indications and contraindications. • Enhanced patient safety and outcomes through standardized assessment and initiation practices.

1.0 Guideline

- Prone positioning should be considered for adult patients who are intubated and mechanically ventilated with moderate-to-severe acute respiratory distress syndrome (ARDS) or refractory hypoxemia despite optimal ventilator management.
- This section provides direction for decision-making on when proning is appropriate, potential risks and benefits, and the evidence informing these recommendations.
- Clinical judgment should guide all decisions, taking into account individual patient condition, tolerance, and available resources.

1.1 Indications for Prone Positioning

- Proning redistributes lung perfusion and ventilation, increases functional lung volume, improves oxygenation, and may reduce ventilator-induced lung injury.
- Proning should be considered when:
  - The patient is intubated and mechanically ventilated with PaO_2/FiO_2 less than or equal to 150 mmHg despite optimized ventilator settings (FiO_2 greater than or equal to 0.6, PEEP greater than or equal to 10 cmH_2O).
  - The patient demonstrates refractory hypoxemia or hypercapnia unresponsive to conventional measures.
  - There are radiographic findings of bilateral infiltrates consistent with ARDS.
  - Airway and hemodynamic stability can be reasonably maintained during positioning.
  - The interdisciplinary critical care team agrees proning is indicated.

1.2 Contraindications and Precautions

- Recognizing contraindications and precautions helps balance risk versus benefit and prevents adverse events.

- Proning may be contraindicated or delayed when:
  - There is an unstable spinal, pelvic, or long bone fracture;
  - The patient has open chest or abdominal wounds, or increased intracranial pressure;
  - There is severe hemodynamic instability unresponsive to intervention;
  - The patient is immediately post–sternotomy or cardiac surgery;
  - There are unsecured airway, chest tubes, or devices that pose a risk during turning.
- Consider the following precautions when proning a patient:
  - Patients with obesity, multiple lines, or elevated intra-abdominal pressure may require additional staff or support equipment.
  - Continuous monitoring of oxygenation, hemodynamics, and airway security should be maintained during and after proning.
  - Proning may be terminated early if sustained desaturation, hypotension, or arrhythmia occurs.

1.3 Timing and Duration

- Early and prolonged proning is associated with improved oxygenation and reduced mortality in ARDS.
- Proning should be considered early (within 24 to 36 hours of ARDS onset) for eligible patients.
- Sessions should aim for 12 to 16 hours of prone positioning per cycle, or as clinically tolerated.
- Return to supine may be indicated when oxygenation improves (PaO_2/FiO_2 greater than 150 for greater than or equal to 4 hours) or if contraindications develop.

1.4 Decision-Making and Team Collaboration

- Interdisciplinary collaboration and consistent communication improve patient safety and team coordination.
- The decision to prone should be interdisciplinary, involving the physician, respiratory therapist, and primary nurse.
- A team huddle should occur before every proning episode to review indication, airway plan, and required equipment.
- Documentation of indication, tolerance, and response should occur in the EHR (iView) per site practice.

1.5 Key Points

- Proning should be considered for intubated and ventilated adults with moderate-to-severe ARDS and persistent hypoxemia.
- Avoid proning in patients with contraindications or where risk outweighs potential benefit.
- Early, team-based assessment and preparation optimize outcomes and minimize complications.
- Clinical judgment remains essential — the guideline supports, but does not replace, individualized decision-making

1.6 Cardiac Arrest Management During Pronation

General Principles

1. Do not delay CPR to supinate the patient. Initiate compressions in the prone position immediately.
2. Monitor CPR effectiveness using end-tidal CO_2 and arterial waveform. Supinate the patient only if compressions are ineffective or airway management cannot be maintained.

3. Be aware that uncontrolled repositioning increases risk of accidental extubation, line dislodgement, or deterioration in oxygenation. Turning hypoxemic patients supine may worsen gas exchange.
4. Follow applicable Island health cardiac arrest management protocols. See examples below:
    - Ventricular Fibrillation/Pulseless Ventricular Tachycardia Cardiac Arrest Protocol (Adults).
    - Asystole/Pulseless Electrical Activity Cardiac Arrest Protocol (Adults)
    - Nurse Initiated Activity (NIA): Registered Nurse (RN)-Initiated Adult Emergency Cardiac Care
    - Resuscitation Record (Cardiac Arrest/Code Blue) Documentation Guidelines
    - Resuscitation / Code Blue Documentation Back-Entry in the EHR at CPOE Activated Sites

Preparation and Safety

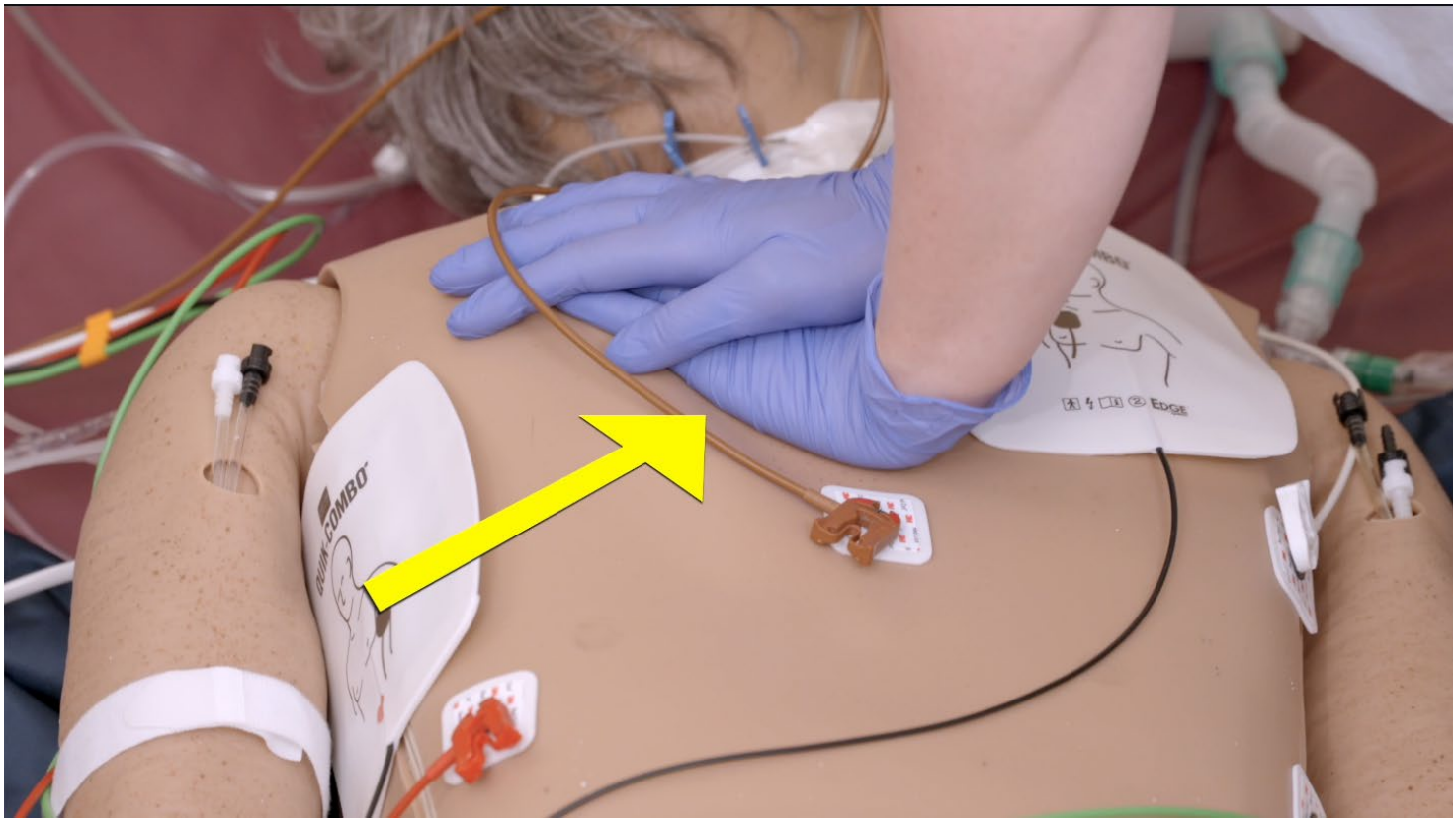
5. Keep a 1 L IV fluid bag labeled "For CPR Use" at the bedside of all proned patients to allow immediate placement beneath the sternum.
6. Ensure Code Blue/emergency equipment is readily available, including a defibrillator with pads suitable for prone placement
7. Confirm all team members are aware of the patient's proned status and the modifications required for CPR in this position.

Initiating Compressions

8. Max-inflate or activate the "CPR/Code" mode on the ICU bed if available to provide a firm surface for compressions.
9. If the bed does not support effective recoil, partially roll the patient to one side to insert a CPR board beneath the chest.
    - If staff are available, have one team member stabilize the airway and head while another assists in sliding the board under the upper chest.
    - If staff are not immediately available (for example, nurse alone), begin compressions in the prone position without delay.
        • Do not delay CPR to insert the board or IV bag if the patient is too heavy to move safely.
        • Start compressions immediately and add support (board or IV bag) as soon as additional help arrives.
10. Position a 1 L IV fluid bag lengthwise beneath the sternum to optimize compression depth and counterpressure.

To place the IV bag:
• Gently lift the near-side shoulder or upper torso just enough to slide the bag beneath the upper chest.
• The bag should rest lengthwise along the sternum, approximately below the scapulae, centered at the midline.
• Avoid excessive movement or rolling; maintain airway stability and endotracheal tube security at all times.

11. Deliver compressions over the midline thoracic spine, approximately between T7 and T9 (the area corresponding to the largest transverse section of the left ventricle).
12. Monitor compression quality using waveform capnography (end-tidal CO_2) and invasive arterial pressure if available.
13. Rotate compressors frequently—prone CPR is more physically demanding and may become less effective as provider fatigue develops



Defribrillation

14. Defibrillation can be performed safely while the patient remains prone.

15. Apply pads in one of the following configurations:

- **a.** Postero-lateral placement:
  - **i.** Place the first pad (negative/“sternal”) on the patient’s left mid-axillary line, approximately at the level of the heart.
  - **ii.** Place the second pad (positive/“apical”) on the right upper back/scapular region, just below the shoulder blade and lateral to the spine.
  - **iii.** This creates a diagonal current path through the heart from back-to-front.
- **b.** Bi-axillary placement:
  - **i.** Place one pad beneath each axilla (underarm area), both angled slightly upward toward the shoulders.
  - **ii.** Ensure pads are clear of chest tubes, lines, and pressure areas.

16. Follow Island health cardiac arrest management protocols.

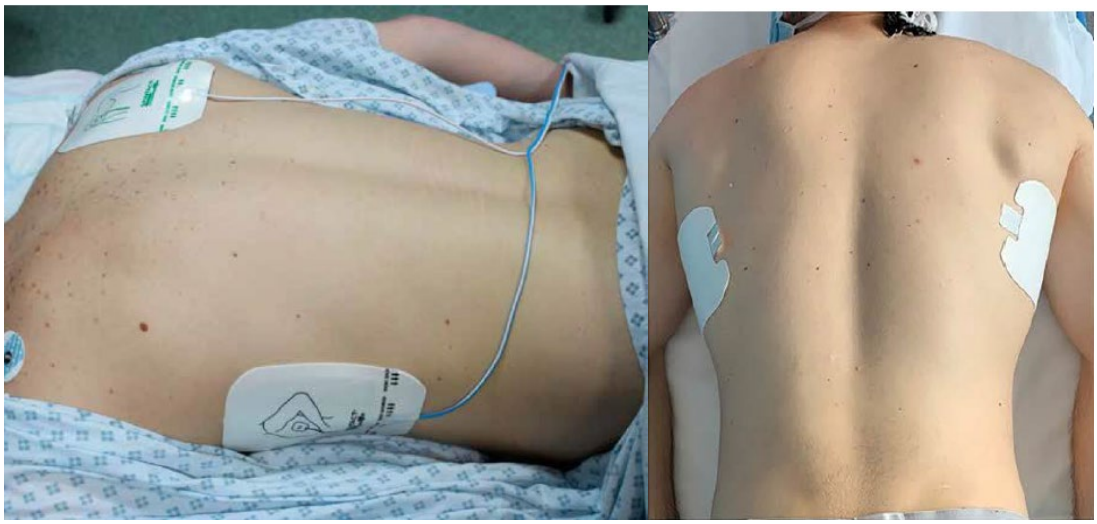


Figure 2. Location of defibrillation pads in prone position. Left: Postero-lateral, Right: Bi-axillary

When to Supinate

17. Consider supinating the patient rapidly only if:
- **a.** Compressions are ineffective despite correct positioning and adequate support,
- **b.** Airway compromise, accidental extubation, or equipment failure occurs, or
- **c.** Sufficient qualified staff are present to perform the turn safely under airway supervision.

18. Do not attempt to supinate if adequate personnel are unavailable or if doing so would significantly delay ongoing compressions.

19. When supination is required, coordinate as a controlled, team-based maneuver directed by the airway manager or physician.

Post-Event Actions

20. After return of spontaneous circulation (ROSC):
- **a.** Reassess airway stability, line security, and patient positioning.
- **b.** Inspect skin and pressure areas.
- **c.** Reassess ventilator settings and hemodynamics.

21. Document the event in the EHR (iView) or paper record, including:
- **d.** Modifications to standard CPR procedure,
- **e.** Compression site and method used,
- **f.** Defibrillation pad placement,
- **g.** Staff involved, and
- **h.** Patient response and outcome.

2.0 Definitions

- **Acute Respiratory Distress Syndrome (ARDS):** A form of acute respiratory failure characterized by non-cardiogenic pulmonary edema and severe hypoxemia with bilateral infiltrates on chest imaging, defined by the Berlin criteria.
- **Prone Positioning:** A therapeutic intervention in which an **intubated and mechanically ventilated patient** is positioned face-down to improve oxygenation and reduce ventilator-induced lung injury.
- **Supine Position:** The standard body position in which the patient lies flat on their back, face upward.
- **Refractory Hypoxemia:** Severe low arterial oxygen tension (PaO_2 less than 60 mmHg or PaO_2/FiO_2 less than or equal to 150) that persists despite optimized ventilator settings and adjunctive therapies such as increased PEEP or FiO_2.
- **PaO_2/FiO_2 Ratio (P/F Ratio):** The ratio of arterial oxygen tension (PaO_2) to the fraction of inspired oxygen (FiO_2); used to assess the severity of hypoxemia in ARDS.
- **Positive End-Expiratory Pressure (PEEP):** The pressure applied by the ventilator at the end of expiration to prevent alveolar collapse and improve oxygenation.
- **Mechanical Ventilation:** Use of a ventilator to provide positive-pressure breathing support via an endotracheal or tracheostomy tube.
- **Hemodynamic Stability:** A state in which the patient's blood pressure and cardiac output are adequate to maintain organ perfusion without excessive pharmacologic or mechanical support.
- **Interdisciplinary Team:** A collaborative group—typically including physicians, respiratory therapists, nurses, and allied health staff—responsible for assessment, decision-making, and implementation of prone positioning.
- **Contraindication:** A medical condition or factor that increases risk such that proning should not be undertaken (e.g., unstable spinal fracture, open abdominal wound).
- **Precaution:** A clinical consideration requiring increased vigilance or adaptation when proning (e.g., obesity, high airway pressures, multiple invasive lines).

3.0 Related Island Health Policy Documents

- Clinical Documentation Policy
- Manual Prone Positioning (Linen Wrap Method) for Ventilated Patients
- Mechanical Prone Positioning (Overhead Lift) for Ventilated Patients Procedure
- Ventricular Fibrillation/Pulseless Ventricular Tachycardia Cardiac Arrest Protocol (Adults)
- Asystole/Pulseless Electrical Activity Cardiac Arrest Protocol (Adults)
- Nurse Initiated Activity (NIA): Registered Nurse (RN) - Initiated Adult Emergency Cardiac Care
- Resuscitation Record (Cardiac Arrest/Code Blue) Documentation Guidelines
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4.0 References

- Alhazzani, W., Evans, L., Alshamsi, F., Møller, M. H., Ostermann, M., Prescott, H. C., … Levy, M. M. (2023). *Surviving Sepsis Campaign: International guidelines for the management of sepsis and septic shock 2023.* Intensive Care Medicine, 49(5), 573–622. https://doi.org/10.1007/s00134-023-07081-1
- Brower, R. G., Matthay, M. A., Morris, A., Schoenfeld, D., Thompson, B. T., & Wheeler, A. (2000). *Ventilation with lower tidal volumes as compared with traditional tidal volumes for acute lung injury and the acute respiratory*

distress syndrome. New England Journal of Medicine, 342(18), 1301–1308. https://doi.org/10.1056/NEJM200005043421801

- Canadian Critical Care Society (CCCS). (2021). *Clinical practice recommendations for the management of acute respiratory distress syndrome in adults.* Retrieved from https://canadiancriticalcare.org
- Guérin, C., Reignier, J., Richard, J.-C., Beuret, P., Gacouin, A., Boulain, T., … Mercat, A. (2013). *Prone positioning in severe acute respiratory distress syndrome.* New England Journal of Medicine, 368(23), 2159–2168. https://doi.org/10.1056/NEJMoa1214103
- National Institute for Health and Care Excellence (NICE). (2020). *COVID-19 rapid guideline: Managing COVID-19 (NG159).* Retrieved from https://www.nice.org.uk/guidance/ng159
- Papazian, L., Aubron, C., Brochard, L., Chiche, J. D., Combes, A., Dreyfuss, D., … Argaud, L. (2019). *Formal guidelines: Management of acute respiratory distress syndrome.* Annals of Intensive Care, 9(1), 69. https://doi.org/10.1186/s13613-019-0540-9
- Society of Critical Care Medicine (SCCM). (2023). *Clinical practice guidelines for mechanical ventilation in adult patients with acute respiratory distress syndrome.* Retrieved from https://www.sccm.org
- American Heart Association (AHA). (2020). *2020 American Heart Association Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care.* Circulation, 142(16_suppl_2), S337–S357. https://doi.org/10.1161/CIR.0000000000000916
- Resuscitation Council UK. (2021). *Peri-arrest management of the patient in the prone position: Guidance for healthcare providers.* Retrieved from https://www.resus.org.uk
- Edgcombe, H., Carter, K., & Yarrow, S. (2008). *Anaesthesia in the prone position.* British Journal of Anaesthesia, 100(2), 165–183. https://doi.org/10.1093/bja/aem380
- Brown, C. A., et al. (2020). *Feasibility and quality of cardiopulmonary resuscitation in the prone position: A systematic review.* Resuscitation, 155, 41–47. https://doi.org/10.1016/j.resuscitation.2020.07.017
- Gheeraert, P. J., & Jost, D. (2021). *Cardiac arrest in the prone position: Practical recommendations and evidence review.* Resuscitation, 159, 16–23. https://doi.org/10.1016/j.resuscitation.2020.11.028
- Surviving Sepsis Campaign: Acute Respiratory Distress Syndrome (ARDS) Guidelines (2023 update)
- Canadian Critical Care Society (CCCS) Recommendations for ARDS Management
- Society of Critical Care Medicine (SCCM) Clinical Practice Guidelines for Mechanical Ventilation in ARDS
- National Institute for Health and Care Excellence (NICE) Guidance: Prone Positioning in ARDS (NG159)

5.0 Resources

- Proning Educational Video