

	<p>Policies and Procedures</p> <p>Title: VENTILATION –Acute-Care of Mechanically Ventilated Patient - Adult</p> <p>RN Specialty Practice: RN Clinical Protocol: Advanced RN Intervention</p> <p>ID Number: 1138</p>
<p>Authorization:</p> <p><input checked="" type="checkbox"/> SHR Nursing Practice Committee</p>	<p>Source: Nursing</p> <p>Date Effective: June 2017</p> <p>Scope: Saskatoon City Hospital (PACU) Royal University Hospital (PACU, ICU,CCU, ER) St. Paul’s Hospital (ICU, PACU,ER)</p>

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1. DEFINITIONS

- Acute:** Patients who are mechanically ventilated with a goal to wean
- MRP:** Most Responsible Physician
- RRT:** Registered Respiratory Therapist

2. ROLES:

- Registered Nurses (RNs):** RNs identified by their manager in targeted practice settings will be certified in the RN Specialty Practice (Advanced RN Intervention): Ventilation –Acute - Care Of Mechanically Ventilated Adult Patient.
- Registered Respiratory Therapist (RRT):** the initiation, monitoring and weaning of a mechanical ventilator are basic competencies for the RRT under the direction of the Most Responsible Physician (MRP) or designate.

3. PURPOSE

- 3.1 To provide evidenced based standards of nursing care for safe and efficient management of a mechanically ventilated patient.
- 3.2 To meet the needs, comfort and goals set for the patient with an acute ventilator or respiratory failure.

4. POLICY

- 4.1 Registered Nurses (RNs) who have completed and are proficient in the Registered Nurse Special Nursing Practice (RNSP) competencies shall monitor patients receiving mechanical ventilation.
- 4.2 The RN certified in this RNSP will have first completed the following learning modules/activities prior to performing the nursing care of a mechanically ventilated patient:
 - 4.2.1 Review the policy and procedure.
 - 4.2.2 Successfully complete the self-directed learning module for Mechanical Ventilation.
 - 4.2.3 Be deemed competent in the competencies and policies:
 - Endotracheal Tubes - Assisting with Intubation
 - Endotracheal Tubes - Securing, Care of
 - Endotracheal Tubes-Extubation
 - Suctioning Adult Clients with Artificial Airways
 - Tracheostomy Care-Adult-Pediatric-Neonate
 - 4.2.4 Successfully demonstrate the competencies to a Clinical Nurse Educator or Registered Nurse Preceptor proficient in these competencies skills.
- 4.3 Appropriate PPE should be worn
- 4.4 Ventilator and bedside alarms must be on at all times. Never leave a patient unattended with alarms off.
- 4.5 Alarm response: for all audible ventilator alarms, the nearest available RN or RRT will respond immediately to the patient's bedside and assess for respiratory distress or a disconnect.
- 4.6 Suction equipment, oxygen, and Manual Ventilation Device (MVD) and masks are readily available at the bedside of all patients with artificial airways.
- 4.7 Intubation supplies are readily accessible for all patients with artificial airways - see policies:
 - Endotracheal Tube(Adult, Pediatric) – Assisting with Intubation # 1039
 - Endotracheal Tubes (Adult, Pediatric)– Securing, Care of # 1176.
 - Tracheostomy Care - Adult-Pediatric-Neonate #1184

5. PROCEDURE:

- 5.1 The MRP or Designate will write orders to initiate Mechanical Ventilation, to change ventilator settings and to wean and extubate.

- 5.1.1 Orders must include:
 - 5.1.1.1 Mode, Tidal Volume, Frequency, FiO₂ as applicable.
 - 5.1.1.2 Positive End Expiratory Pressure (PEEP) as applicable.
 - 5.1.1.3 Pressure Support (PS) as applicable.
 - 5.1.1.4 Any other ventilator parameters depending on the mode of ventilation (i.e. High Frequency, Oscillating Ventilation).
 - 5.1.1.5 Weaning parameters when applicable – see Appendix B Spontaneous Breathing Trial Protocol.

5.2 The RRT per the MRP or Designate orders will:

- 5.2.1 Provide and set up the mechanical ventilator, accessories and tubing specific to patient's needs.
- 5.2.2 Set up in-line suction for ventilated patients.
- 5.2.3 Initiate ventilation, set the alarms and provide adjunctive ventilator equipment.
- 5.2.4 Set the ventilation parameters based on the patient's ideal body weight and medical condition.
- 5.3.5 Adjust ventilator settings in conjunction with the physician orders.
- 5.2.6 Monitor ventilator and patient q4h, prn, after setting changes and after reinitiating ventilator i.e.: post transport.

5.3 The Registered Nurse Will:

- 5.3.1 Assess the patient Q hourly and prn. Include vital signs: Temperature, HR, RR, BP, SpO₂, EtCO₂, sedation score.
- 5.3.2 Respiratory assessment to include chest auscultation, work of breathing and patient's comfort with the ventilator.
- 5.3.3 Ventilator settings are also checked Q4H which include mode, FiO₂, SP0₂, ETC0₂, PEEP, pressure support, RR and tidal volume.
- 5.3.4 Verify security of artificial airway – see policies:
 - Endotracheal Tubes(Adult , Pediatric) – Securing, Care of #1176
 - Tracheostomy Care – Adult, Pediatric, and Neonate # 1184
- 5.3.5 The RN shall be knowledgeable of current and prescribed ventilator settings.
- 5.3.6 Physician orders and ventilator setting change requests are promptly communicated to the RRT.
- 5.3.7 Ensure the securement device goes around the head/neck and is comfortable for the patient.
- 5.3.8 Notify the RRT if the securement device needs to be adjusted due to an increase or decrease in edema.
- 5.3.9 Collect Blood Gases if ordered and arterial line is present.

- 5.3.10 Consider whether the patient needs physical restraints to prevent accidental removal of the ETT/tracheostomy tube.
- 5.3.11 Follow ventilator associated pneumonia (VAP) prevention protocol- see Appendix A
- 5.3.12 Assess the patient's ability to wean – see Appendix B – Spontaneous Breathing Trial
- 5.3.13 Suction as required both orally and via the artificial airway – see Policy Suctioning Adult Clients with Artificial Airways.
- 5.3.14 In Critical Care, if the FiO₂ is temporarily increased to pre-oxygenate during suctioning, the RN who increases it shall verify that it is readjusted to the ordered level after suctioning is complete.
- 5.3.15 Respond to all alarms and assess patient, determine the cause and take appropriate action.
- 5.3.16 In Critical Care, the RN may change the FiO₂ (fraction of inspired oxygen) setting on a ventilator only in an emergency. RRT and/or MRP are immediately notified of any changes made.
- 5.3.17 If unable to determine the reason for an alarm sounding, remove patient from the ventilator and manually ventilate the patient with 100% O₂ and page RRT.
- 5.3.18 Identify a method of communication with the patient so that the patient will be able to alert the nurse when needed. Ensure that the method is communicated to the rest of the healthcare team.
- 5.3.19 Reassure and remind patient frequently about intubation and ventilation. Reassure family and provide education as needed.

6. Transport of a mechanically ventilated patient:

- 6.1 In Acute Care
 - 6.1.1 Patients who are acutely ventilated need to be accompanied by two qualified Healthcare staff when they are transported between departments. ie. To Medical Imaging or the OR.
 - 6.1.2 Qualified staff includes RN with RNSP, physician, RRT, physiotherapist, paramedic.
 - 6.1.3 Patients who are chronically ventilated may be transported with one qualified staff and a second support staff member as required for the circumstance.
- 6.2 The patient must be transported on a transport ventilator or manually ventilated with a manual ventilation device (MVD).
 - 6.2.1 If using a transport ventilator ensure additional batteries are available and plug in to electrical outlet when available.
- 6.3 All patients with an endotracheal tube or tracheostomy in place should have all supplies that would be required for re-intubation. This includes intubation kit (SKU # 112737), bag-valve-mask with PEEP valve.

- 6.3.1 If the patient has tracheostomy tube in place, see Policy Tracheostomy Care.
- 6.3.2 Oxygen source with reserve of 30 minutes longer than is required. It is preferred to conserve transport oxygen and use an alternate oxygen source if one can be obtained from a non-transport source while patient is having test / procedure.
- 6.4 All mechanically ventilated patients are required to have SpO₂ and ETCO₂ monitoring on transport.
- 6.5 Patients being transferred from Acute Care to Long Term Care Must have Form # 103125 Transfer to Long Term Care Home Checklist.

7. DOCUMENTATION

- 7.1 Document:
 - 7.1.1 Type, size and location of airway.
 - 7.1.2 Level of an Endotracheal Tube (ETT) at the teeth/gum once a shift, after any adjustments and prn.
 - 7.1.3 Ventilator settings at the onset of the shift, q4h and with any change in orders or patient's condition.
 - 7.1.4 SpO₂ and ETCO₂ q1h and with any change in orders or patient's condition.
 - 7.1.5 Amount, consistency and color of tracheal secretions after each suction session on the flow sheet.
 - 7.1.6 Unexpected outcomes and nursing interventions.
- 7.2 Refer to Region Wide Policy: Transfer of Information for Ongoing Care for correct transfer of information and forms required.

8. REFERENCES

Capital Health. Mechanical ventilation – initiation, monitoring, and weaning. Interdisciplinary Clinical Manual: Policy and Procedure. 2014.

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University of Kentucky/UK HealthCare Policy and Procedure. Management of Patients with Endotracheal Tubes, With or Without Mechanical Ventilatory Assistance.

<http://www.hosp.uky.edu/policies/viewpolicy.asp?PolicyID=1567>

University of Toledo Medical Center Ventilator management. Policy and Procedure. 2014.



Patient Label

Hospital Admission Date - _____

ICU Admission Date - _____

ICU Discharge Date - _____

Site - RUH ICU / SPH ICU / SPH PCU

ICU - Ventilator Associated Pneumonia (VAP) Surveillance Form

*(Review criteria with mechanically ventilated patients during daily rounds but do not complete forms unless VAP criteria met) – use only one form/mechanically ventilated patient/ICU admission

Determination of VAP based on the following criteria (all “Yes” level criteria must be satisfied)

Yes	Criteria
<input type="checkbox"/> (1 or more criteria met)	<input type="checkbox"/> New or progressive and persistent infiltrate <u>or</u> <input type="checkbox"/> Consolidation, <u>or</u> <input type="checkbox"/> Cavitation on CXR compatible with pneumonia
<input type="checkbox"/> (1 or more criteria met)	<input type="checkbox"/> WBC \geq 12,000 or $<$ 4,000 <u>or</u> <input type="checkbox"/> Temperature greater than 38 degrees Celsius with no other cause <u>or</u> <input type="checkbox"/> Altered mental status with no other cause, in patient $>$ 70 years old.
<input type="checkbox"/> (2 or more criteria met)	<input type="checkbox"/> New onset of purulent sputum, <u>or</u> change in character of sputum, <u>or</u> increase respiratory secretions or increase in suctioning requirements <input type="checkbox"/> New onset or worsening cough, or dyspnea, or tachypnea <input type="checkbox"/> Rales (crackles) or bronchial breath sounds on auscultation <input type="checkbox"/> Worsening gas exchange (e.g., O ₂ desaturations, PaO ₂ /FiO ₂ $<$ 240, an increase in O ₂ requirements or an increase in ventilation demand)
<input type="checkbox"/>	Mechanical ventilation in place for at least 48 hours prior to meeting above criteria
<input type="checkbox"/>	Infection evident for at least 48 hours after meeting above criteria

VAP criteria met – Date _____ Time _____ Physician _____

Possible contributing factors for VAP- (complete at time of VAP diagnosis)

Complete VAP Bundle Difficult to Achieve Yes No

if Yes – which component unmet (provide rationale):

<input type="checkbox"/> Head of bed 30-45° for \geq 21.6hrs / 24 hr period	<input type="checkbox"/> Daily sedation vacation <u>with</u> spontaneous breathing trial
<input type="checkbox"/> EVAC or Tracheotomy tube insitu	<input type="checkbox"/> Oral vs Nasal access for trachea and stomach tubes

Additional Considerations:

Chlorhexadine oral care (q1-4hrs) <input type="checkbox"/> Yes <input type="checkbox"/> No	On DVT prophylaxis <input type="checkbox"/> Yes <input type="checkbox"/> No	Receiving nutrition <input type="checkbox"/> Yes <input type="checkbox"/> No
Initiation of anti-microbial treatment prior to VAP diagnosis <input type="checkbox"/> Yes <input type="checkbox"/> No	Early Tracheotomy (48hrs) <input type="checkbox"/> Yes <input type="checkbox"/> No	

- Patient admitted to ICU with neurological impairment Yes No
 - High risk for aspiration at time of intubation Yes No
 - Patient diagnosed with more than one infection during ICU stay Yes No
- ☞ If Yes – was there evidence of another infection within 24 hours prior to VAP diagnosis? Yes No

Reference - Getting Started Kit: Prevention of Ventilator-Associated Pneumonia in Adults and Children How-to Guide (2009). Canadian ICU Collaboration. Safer Healthcare Now and Inst of Health Improvement accessed online March 29, 2011 <http://www.saferhealthcarenow.ca/EN/Interventions/VAP/Documents/VAP%20Getting%20Started%20Kit.pdf>

Spontaneous Breathing Trial (SBT) Protocol

A **spontaneous breathing trial (SBT)** is an integrated patient assessment during which the patient breathes spontaneously with little or no ventilator assistance and is used to identify the patient's ability to breathe without the assistance of the ventilator.

Objective measurements:

- Adequate oxygenation (PaO₂ greater than 60 mmHg on FiO₂ less than or equal to 0.4; PEEP less than or equal to 8 cmH₂O; P/F ratio greater than 150)
- Spontaneous inspiratory efforts
- Stable CVS (stable heart rate, rhythm, blood pressure on minimal hemodynamic support)
- Afebrile
- No significant respiratory acidosis (pH greater than 7.30)
- Stable metabolic status
- Adequate mentation (GCS greater than 9/11, easily arousable)

Subjective measurements:

- Resolution of acute phase of disease
- Adequate cough
- Minimal to moderate secretions
- Minimal sedation at time of SBT

SBT is to be performed by a respiratory therapist.

A SBT may last 30 minutes but not longer than 120 minutes, and may be terminated earlier if any of the following clinical events occur:

- a. Respiratory rate greater than 30 or less than 8 breaths per minute
- b. SpO₂ less than 92%
- c. HR increase more than 20% of baseline HR
- d. BP increase more than 20% of baseline BP
- e. Subjective patient discomfort
- f. Signs of respiratory distress (may include accessory muscle use, abdominal paradox, diaphoresis, marked dyspnea)
- g. Abrupt changes in mental status

Note: SBT may not be applicable for all mechanically ventilated patients. Those that have been ventilated for very short time may be able to go directly to extubation.

Types of SBT

T-piece SBT: patient is placed on a T-piece at a FiO₂ 0.05 – 0.10 higher than current ventilator setting, while being continuously monitored by nursing, and assessed by respiratory therapy.

Pressure Support SBT: patient remains on the ventilator with the following settings while being continuously monitored by nursing, and assessed by respiratory therapy:

- Pressure Support 5 cm H₂O
- CPAP 5 cm H₂O
- FiO₂ as previously set prior to performance of SBT

Roles and Responsibilities

Respiratory Therapists

- Works in conjunction with nursing to assess a ventilated patient's readiness for a SBT
- Initiates a SBT if patient meets criteria for SBT
- Assesses and monitors patient's vital signs and comfort level during a SBT and terminates SBT early if indicated
- Documentation of SBT on Adult Ventilation Monitoring form (#102354)
- Informs ICU attending physician or designate upon completion of SBT

Nursing

- Works in conjunction with respiratory therapy to assess a ventilated patient's readiness for a SBT
- Assesses and monitors patient's vital signs and comfort level during a SBT
- Alerts respiratory therapy if SBT needs to be terminated early
- Documentation of SBT on ICU Nursing Flow Sheet form (#101481)

Documentation

1. Time of SBT
2. Length of SBT
3. Respiratory settings
4. Tolerance of procedure

References

Department of Adult Critical Care: July, 2017