

	<p><b>Policies &amp; Procedures</b></p> <p><b>Title: CPAP/BiPAP-Non Invasive Ventilation (NIV) - Care and Monitoring of the Patient</b></p> <ul style="list-style-type: none"> <li>• Post-operative care</li> <li>• Acute respiratory failure</li> </ul> <p>Number: <b>1114</b></p>
<p>Authorization:</p> <p>[X] SHR Nursing Practice Committee</p>	<p>Source: Nursing</p> <p>Date Effective: January 2016</p> <p>Scope: <b>SHR Acute Urban</b></p>

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**Overview**

The following policy applies only to the use of NIV for adult patients with acute respiratory failure (see appendix A, post-operative patients and dyspnea in palliative care patients). It does not apply to the treatment of sleep disordered breathing, chronic, stable respiratory failure or pediatric patients.

**Definitions:**

**Non-Invasive Ventilation** is the provision of ventilatory support through the patient’s upper airway using a mask or similar device. For the purposes of this policy, both continuous positive airway pressure (CPAP) and bi-level positive airway pressure (BiPAP) will be generically referred to as non-invasive ventilation (NIV).

**Note:** See SHR policy 7311-60-024 <https://www.saskatoonhealthregion.ca/about/RWPolicies/7311-60-024.pdf> for the application of non-invasive ventilation for acute respiratory failure.

**Continuous Positive Airway Pressure (CPAP)** is a continuous positive airway pressure that is used to provide a patent airway during periods of sleep apnea. The patient must be able to initiate their own breath.

**Bi-level Positive Airway Pressure (BiPAP)** is a bi-level positive airway pressure support ventilation that uses either flow or time to cycle between inspiratory positive airway pressure (IPAP) and expiratory positive airway pressure (EPAP). BiPAP can be supported with supplemental oxygen and a backup respiratory rate. It may be used for obstructive sleep apnea for those patients who are obese or have central sleep apnea.

**End of Life Care** includes patients who have decided that no further medical intervention will take place and that they are to be made comfortable. The Physician’s/Practitioner’s Orders Resuscitation Care Plan form #102527 will state Do Not Call a Code: support natural death in the event of a cardiopulmonary arrest.

**1. PURPOSE**

- 1.1 To establish safe and uniform standard of practice for the application and monitoring of non-invasive ventilation (NIV) in adult patients.

- 1.2 To identify monitoring standards for acute respiratory failure (see appendix A) post-operative patients and dyspnea in palliative care patients. It does not apply to the treatment of sleep disordered breathing, chronic, stable respiratory failure or pediatric patients.

**2. POLICY**

Indications for NIV	<p><b>Post-operative respiratory care</b></p> <ul style="list-style-type: none"> <li>• Patient who uses home NIV to maintain a patent airway during periods of sleep may be asked to have their NIV equipment available to be used and applied immediately post-operatively.</li> </ul> <p><b>Acute respiratory failure</b> – See Appendix A.  <b>End of life.</b> NIV may be applied to help relieve dyspnea.</p>
Staff who will perform this procedure	<p><b>Care and monitoring of the patient</b></p> <ul style="list-style-type: none"> <li>• Registered Nurses (RNs)</li> <li>• Anesthesia assistants (A.A.)</li> <li>• Registered Respiratory Therapists(RRT)</li> <li>• Student Respiratory Therapists (SRT) under the supervision of an RRT</li> </ul> <p><b>Monitoring and adjustment of the NIV equipment</b></p> <ul style="list-style-type: none"> <li>• Registered Respiratory Therapists(RRT)</li> <li>• Student Respiratory Therapists (SRT) under the supervision of an RRT</li> <li>• Anesthesia assistants (A.A.)</li> </ul>
Practitioner order required	<p><b>Acute Respiratory Failure and Post-operative use</b></p> <ul style="list-style-type: none"> <li>• Practitioner will order NIV. ICU or Respiriology to be contacted for acute respiratory failure.</li> <li>• Practitioner will monitor the effectiveness of NIV and work with respiratory therapy and nursing in the management, weaning and discontinuation of NIV.</li> </ul>
Patient placement	<p><b>Post-operative use</b></p> <ul style="list-style-type: none"> <li>• NIV will be applied in the Post-Operative Care Unit (PACU) by the Registered Respiratory Therapist or Anesthesia assistant</li> <li>• Patient will be under constant observation by the RN with continuous pulse oximetry.</li> </ul> <p><b>Acute Respiratory Failure</b></p> <ul style="list-style-type: none"> <li>• NIV in this circumstance shall be applied in a fully monitored setting ( Emergency department, Intensive Care Unit, Coronary Care Unit ) or a ward observation unit with continuous pulse oximetry as the minimal acceptable level of monitoring.</li> <li>• In an emergent situation, NIV may be applied on any unit with a RN or RRT continuously observing the patient with continuous pulse oximetry. The patient will then be transferred to a higher level of care as indicated above.</li> </ul>
Special considerations	<p><b>End of Life Care</b></p> <ul style="list-style-type: none"> <li>• During end of life care, NIV may be applied to relieve dyspnea. The patient may remain on ward and be monitored as clinically indicated.</li> </ul>

**3. PROCEDURE**

- 3.1 The practitioner orders the NIV. The order must include:
- CPAP – pressure
  - BiPAP – IPAP, EPEP and if indicated a respiratory rate
  - Oxygen
  - In the post-operative setting, the physician will assesses requirements, may write “as per patients’ own settings”. It is recommended they should be written out.

- 3.2 The role of the RRT:

- 3.2.1 Perform initial assessment

3.2.2 Contact appropriate physician for orders upon initiation and with any changes outside original parameters set by physician

Acute respiratory failure

- Consult ICU physician if attending physician service has failed to do so
- Provide hospital NIV equipment required, set it up as ordered and ensure proper fit for patient

Post-operative NIV

- Consult with the anesthetist and anesthesia assistant to set up NIV to meet the needs of the patient during their recovery period

3.2.3 Perform mask fitting.

3.2.4 Perform mask trouble shooting.

3.2.5 Adjust settings as per orders.

3.2.6 Discontinue NIV on direction of physician.

3.2.7 Clean and disinfect NIV equipment upon discharge or discontinuation of therapy.

3.2.8 Document application and scheduled monitoring of NIV

3.3 The role of the RN:

Care & Monitoring of the Patient

3.3.1 Notify the RRT of the Practitioner order to initiate NIV and the type.

3.3.2 Monitor and assess for changes in respiratory status q1hr and prn.

3.3.3 Adjust oxygen as needed to keep oxygen saturation in the limits ordered by Practitioner and notify RRT with increasing O2 requirements.

**Note:** Machine settings to be performed by RRT only.

3.3.4 Notify the Practitioner and RRT of any acute change in patient status for reassessment.

3.3.5 Assist in re-applying, adjusting, repositioning and removing the mask interface as required.

3.3.6 Notify RRT with any concerns regarding the equipment and set up.

3.3.7 Perform oral and nasal suctioning prn.

Administration of Medications

3.3.8 Administer inhaled medication as ordered.

**Note:** Remove mask to administer MDIs as per policy #1023

<https://www.saskatoonhealthregion.ca/about/NursingManual/1023.pdf>  
Aerosolized medication for inhalation-adults

**Note:** If patient does not tolerate removal of mask for administration of medications per MDI consult RRT.

**Note:** Patients may be at high risk of aspiration or loss of seal with repeated removal and re-application of the mask.

3.3.9 Consult Practitioner prior to the administration of any oral medications.

**Note:** *The patient will be NPO for the first 24hrs of NIV. Medications that must be given orally can be maintained, but all others should be temporarily held or switched to IV route. After 24hrs, decisions regarding nutritional and oral intake will be made according to patient stability and likelihood of intubation.*

#### Skin integrity

3.3.10 Provide mouth care q 2-4 hours prn. Observe for nose dryness.

3.3.11 Assess skin frequently around mask. Provide daily skin care and apply appropriate barrier/dressing if needed where the device meets the patient's skin.

3.3.12 Wash patient's face before applying and after removing the mask.

3.3.13 Reposition the patient q1-2h if they are unable to do so on their own.

#### Nutrition

3.3.14 Consult physician prior to any oral intake.

**Note:** *The patient will be NPO for the first 24 hours of NIV. After 24 hours, decisions regarding nutrition and oral intake will be made according to patient stability and likelihood of intubation*

#### Documentation

3.3.15 Document respiratory status, vital signs and oxygen settings on flow meter q1hr and prn.

3.3.16 End of life care: monitoring frequency may be decreased at the discretion of the physician as goals for therapy change.

#### Transportation

3.3.17 Do not transport patients on the NIV device; they will require an alternate therapy to be transported. If required, an alternate source of respiratory support will be determined by physician, RRT and RN.

#### Code Blue

3.3.18 In the event of a cardio-respiratory arrest:

- initiate CPR and Call CODE BLUE
- remove NIV and apply O2 via manual ventilation device
- continue to perform CPR

#### 4. REFERENCES

Agency for Clinical Innovation. (2014). Non-invasive Ventilation Guidelines for Adult Patients with Acute Respiratory Failure. SHPN (ACI) 140008.

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Keenan, S., Sinuff, T., Burns, K., Muscedere, J., Kutsogiannis, J., Mehta, S., Cook, D., Dodek, P. (2011) Clinical practice guidelines for the use of noninvasive positive-pressure ventilation and noninvasive continuous positive airway pressure in the acute care setting. *Canadian Medical Association Journal*. 183(3).

(Dr. Claudio Martin, Intensivist, personal communication, November 2, 2015)

(Dr. Denny Laporta, Intensivist, personal communication, November 2, 2015)

(Richard Milo, RRT, professional practice leader, personal communication, November 2, 2015)

#### Related Policies:

SHR Regional Policy & Procedure Manual:

Application of Non Invasive Ventilation for Acute Respiratory Failure, #7311-60-024

SHR Nursing Policy & Procedure Manual:

Medication Administration # 1170

Aerosolized medication for inhalation-adults #1023

## Appendix A

### Indications for NIV Use in Acute Respiratory Failure- Patient Selection

Strongly consider NIV in the following circumstances:

- Acute Exacerbation of COPD, with dyspnea and pH < 7.35, PaCO<sub>2</sub> >45
- Cardiogenic Pulmonary Edema (CPAP or BiPAP)
- Immunocompromised Patient with diffuse pulmonary infiltrates
- Facilitate extubation in patients with COPD

NIV can be cautiously tried in the following circumstances:

- Post-extubation failure in patients with COPD or pulmonary edema
- Non-specific Hypoxemic respiratory failure (particularly if hypercapneic or underlying COPD)
- Asthma
- Cystic Fibrosis
- Prevention of Post operative respiratory failure in thoracic surgery

**NOTE:** NIV is contraindicated after upper airway or esophageal surgery. While NIV has shown benefit in patients post-op from major abdominal surgery, it may be problematic in upper GI surgery that has disrupted bowel wall integrity, particularly if an ileus develops.

- Patients with "do not intubate" directive

Absolute Contraindications:

- Need for immediate intubation
- Cardio respiratory Arrest
- Hemodynamic Instability or unstable arrhythmias
- Unable to protect airway
- Post-op upper airway surgery
- Facial trauma.

Relative Contraindications:

- Decreased Level of Consciousness (GCS < 11);  
\*(CO<sub>2</sub> narcosis in COPD is the only exception)
- Excessive Secretions
- Post-operative gastrointestinal surgery
- Aspiration risk, nausea or vomiting
- Uncooperative patient.
- Poor mask fit

Predictors of NIV Success

- Younger age
- Lower acuity of illness
- Neurologically intact and cooperative
- Synchronous breathing with machine
- Good mask seal
- Moderate Hypercapneic respiratory failure at baseline  
\*(PaCO<sub>2</sub> 45 mmHg – 90 mmHg and pH 7.25 – 7.35)
- Improvement within two hours, as measured by respiratory rate and ABG

#### Predictors of NIV Failure

- More severely ill
- RR > 34 breaths per minute
- Copious secretions
- Diagnosis other than COPD exacerbation
- Impaired consciousness (GCS < 11)
- pH < 7.30 after 2 hours of NIV

#### **General Limitation of NIV**

Failure to show improvement in dyspnea, respiratory rate and ABG within the first two hours is predictive of eventual failure and need for intubation. More than 25% of patients will ultimately require intubation.

#### **Reducing Risk of Aspiration**

The patient will be NPO for the first 24 hours of NIV. Medications that must be given orally can be maintained, but all others should be temporarily held or switched to IV route. After 24 hours, decisions regarding nutrition and oral intake will be made according to patient stability and likelihood of intubation.