NON-INVASIVE POSITIVE PRESSURE VENTILATION (NIPPV) INITIATION AND MANAGEMENT ON INPATIENT UNITS AT BCCH

DOCUMENT TYPE: PROCEDURE

PLEASE NOTE: THIS DOCUMENT IS CURRENTLY UNDER REVIEW AND IS TO BE CONSIDERED FOR APPROVAL AT THE C&W BEST PRACTICE MEETING ON JANUARY 7, 2020

Document Owner:
Inpatient Units at BCCH

Purpose of Document(s):
Procedure for NIPPV

Applicability
Inpatient Units at BCCH

Version History

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Applicability

Management of NIPPV occurs in the following areas:

- Inpatient units (T6, T7 and T8)
- Pediatric Intensive care Unit (PICU),
- Emergency Department (ED),
- Sunny Hill Health Centre (SHHC). For management at Sunny Hill Health Centre, refer to “NIPPV Management at Sunny Hill” policy # CC.09.46

PICU - The NIPPV machine is not to be turned on / turned off unless there is a Respiratory Therapist (RRT) present at the bedside.

Set up, weaning and changes to the NVPPV will be performed by the Respiratory Therapist in consultation with the Attending Physician.

A Respiratory Therapist will perform assessment of the child and site to source checks of the system every 3 hours or more often if clinically indicated and will address any questions or problems with the system.

Set up, weaning and changes to the NIPPV will be performed by the Home Tracheostomy and Ventilation Team Respiratory Therapist (HTV Team RT) and/or delegate RT in consultation with the Attending Physician.

Family education will be provided by the Home Tracheostomy and Ventilation Team Respiratory Therapist and/or delegate Respiratory Therapist.

NIPPV is not to be used for escalation of care on the medical inpatient units. Patients with increasing respiratory distress or respiratory failure or unable to maintain their SpO2 above 92% (or as per prescribed targets) will be transferred to the PICU for possible escalation of therapy (i.e. intubation and ventilation).

Practice Level/Competencies

Registered Respiratory Therapist (RRT).

Set-up and management of NIPPV are foundational competencies for Registered Respiratory Therapists.

Monitoring and ongoing care are considered foundational competencies for Nursing.

Family members, who have been taught the required competencies to safely apply, maintain and remove NIPPV in the home environment.

Background Information

Patients requiring NIPPV therapy on medical inpatient units and the must be consulted by Respirology within 24 hours.

NIPPV therapy uses a machine to provide positive airway pressure(s) through a mask interface. The prescribed pressure(s) will help the patient by reducing their work of breathing and improving their ability to exchange oxygen and carbon dioxide. NIPPV provides support to patients with upper airway obstruction, hypoventilation, sleep apnea and respiratory distress.

The patients admitted to the inpatient units requiring NIPPV are/will be managed at home on their ventilator. The Home Tracheostomy and Ventilation Team will be responsible for providing family members with the required education to safely apply, maintain and remove NIPPV in the home environment. To be admitted to the inpatient units they must not have undergone a procedure that
would compromise the patient and require escalation of respiratory support. They must meet either A or B requirements and one of the C categories:

A. admitted on the same stable parameters as managed at home by the parents OR stable child admitted from home for initiation of NIPPV.
B. no increase in ventilation requirements (pressure or O2) in the 12 hours prior to transfer
C. able to manage time off the ventilator without episodes of significant respiratory distress
   i. child < 2 years: can be off at least 2 hours without episodes
   ii. child > 2 years: can be off at least 4 hours without episodes

*Note: Episode is defined and a deterioration in the child’s respiratory Status when taken off the ventilator.

**Equipment & Supplies**
- Appropriate device to provide NIPPV
- Appropriate type and sized mask interface
- Appropriate securing head gear for mask
- Appropriate humidification device to provide patient with humidified gas mixture
- NIPPV tubing
- Oxygen Tubing (optional)
- Oxygen saturation monitor if ordered

The Respiratory Therapist is responsible for determining the appropriate NIPPV set up for patient application based upon individualized patient needs. This is done in consultation with the Attending Physician.

**Procedures**

**Steps & Rationale**

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<tr>
<th>SET UP AND MANAGEMENT BY REGISTERED RESPIRATORY THERAPIST (RRT)</th>
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<tbody>
<tr>
<td><strong>1. CHECK</strong> chart for prescriber order and target saturations for NIPPV administration.</td>
<td><strong>Ensures appropriate patient support and sets targets and goals of administration.</strong></td>
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<tr>
<td><strong>2. DETERMINE &amp; OBTAIN</strong> appropriate NIPPV delivery device</td>
<td><strong>Ensures that the NIPPV device will provide pressure accurately.</strong></td>
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<tr>
<td><strong>3. DETERMINE &amp; OBTAIN</strong> appropriate sized mask and headgear for NIPPV</td>
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<tr>
<td><strong>4. CONNECT</strong> all circuit tubing to the NIPPV device.</td>
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<tr>
<td><strong>5. ENSURE</strong> humidification is set-up appropriately for the device. Ensure the humidification device is <strong>TURNED ON.</strong></td>
<td><strong>Ensure adequate humidification delivered to the patient.</strong></td>
</tr>
<tr>
<td><strong>6. ATTACH</strong> oxygen if required. Set up according to the device manual.</td>
<td><strong>Ensures that patient’s oxygen needs are met.</strong></td>
</tr>
<tr>
<td><strong>7. CONNECT</strong> NIPPV device to power source and ensure the power cable is securely connected to the NIPPV device.</td>
<td><strong>Prepares system.</strong></td>
</tr>
<tr>
<td><strong>8. TURN ON</strong> NIPPV device and set appropriate mode and settings. Perform leak check and confirm pressure remains stable.</td>
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<tr>
<td><strong>9. SUCTION</strong> patient (if required) before placing mask on patient’s face.</td>
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10. **ATTACH** the circuit tubing to the patient’s t mask.
**CONFIRM** there is flow before applying the mask to the patient’s face.

Carefully assess the mask position (check for leaks and assess the position of the mask on the patient’s face.)

11. **ATTACH** the mask to the patient’s face and secure headgear.

Allows early identification and prompt intervention for patient deterioration.

12. **COMPLETE** a site-to-source check once headgear is secure and device is on the patient.

Ensures patency of upper airways

13. **PARAMETER CHANGES & WEANING**: weaning occurs in consultation with the Attending Physician.

14. **CLEANING & RE-CIRCUITING** – Upon discontinuation of NIPPV the RT will clean device and re-circuit the set-up.

To ensure NIPPV device is ready at all times.

**MONITORING AND ON-GOING CARE: NURSING AND RESPIRATORY THERAPY**

1. **COMPLETE** a site-to-source check with every monitor and parameter change.

2. **MONITOR** Respiratory Therapist and Nursing will monitor the patient as per protocol.

Allows early identification and prompt intervention for patient deterioration.

3. **ASSESS** skin under NIPPV mask Q6H. The RN and RRT are both responsible for assess the patient’s skin under the mask.

Pressure from the mask and straps can lead to development of pressure sores and skin break down.

4. **DO NOT** turn the non-invasive ventilator off or place in stand-by unless there is an RRT present. Silencing is acceptable. If there are any concerns contact Respiratory Therapist.

**Documentation**

**Nursing**: Document on appropriate records (patient care flowsheet, nurse’s notes):
- method of NIPPV delivery
- prescribed pressures
- SpO₂ readings as per orders
- HR, RR and respiratory effort hourly
- BP, Temperature, breath sounds Q4H and prn
- NIPPV site to source check Q4H
- oxygen delivery system Q4H if in use
- patient’s response to treatment
- assess the mask skin interface Q6H

**Respiratory Therapy**: Document on appropriate records (RT flowsheet)
- date and time NIPPV therapy initiated
- FiO₂ and pressures (set and measured)
- clinical findings (breath sounds, HR, RR, SpO₂ readings) every 3 hours
- patient response to therapy
- any changes in patient status
- site to source check Q3H
- assess the mask skin interface Q6H
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References
Perretta, Julianna S. (2014) E.F. Davis, Neonatal and Pediatric Respiratory Care (A Patient Case Method)

Definitions
Non-invasive positive pressure ventilator (NIPPV) support is a technology utilized to support oxygenation and ventilation in a patient without an artificial airway.

BiLevel: Supports spontaneous respiration by providing a positive pressure on inspiration (IPAP-inspiratory positive airway pressure) and a lower positive pressure on expiration (IEAP – expiratory positive airway pressure). (The term BiPAP maybe use when referring to BiLevel, BiPAP is a term that is trade name used by a specific company.)

CPAP: Spontaneous breathing around a continuous positive pressure (similar to PEEP or positive end expiratory pressure) during inspiration and expiration. No enhanced inspiratory breaths.

IPAP: Inspiratory Positive Airway Pressure
EPAP: Expiratory Positive Airway Pressure
Mode: the mode in which the ventilatory device is set (S, ST, T)
S: Spontaneous mode of ventilator
ST: Spontaneous Timed, where a spontaneous breath is assisted and a timed mandatory breath is delivered
T Timed mode: in which a spontaneous breaths are delivered according to a set rate.
BMP: Breaths Per Minute
I Time (Ti): Inspiratory Time
Ramp: the amount of time taken for the machine to achieve a set pressure

Order sets/preprinted orders:
- For transfer of Stable Long Term Ventilation Patients from PICU (order set PTN# TCUPv1)
- RESP – Initiation and Management of Non Invasive Positive Pressure Ventilation for Stable Patients on Inpatient Medical Wards. (draft awaiting final approval)
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