Non-Invasive Ventilation for Adult Patients with Acute Respiratory Failure

INDICATIONS & CONTRA-INDICATIONS

1	Prior to commencement of NIV patients are to be assessed for: • capacity to protect own airway; • level of consciousness (the exception being suitable "do not intubate" unconscious patients with hypercapnic COPD); • anticipated level of compliance with interface; • capacity to manage their respiratory secretions; and • potential to recover to a quality of life acceptable to the patient. Failure to meet any one of these criteria renders the patient ineligible for NIV and review of alternate care or escalation of therapy should be undertaken **Consensus**

INDICATIONS

- Severe (acute) exacerbation of COPD (pH<7.35 and relative hypercarbia)
- ACPO and ARF in the absence of shock or acute pulmonary syndrome requiring acute coronary revascularization
- Immunosuppressed patients with acute respiratory failure
- High risk recurrent acute respiratory failure after planned extubation (not indicated post extubation for low risk patients) .
- Weaning from mechanical ventilation, particularly in patients with a background of COPD.
- Acute respiratory failure post lung resection surgery or post abdominal surgery.
- Asthma
- Acute respiratory failure in selected 'not for intubation' patients
- Acute deterioration of disorders associated with sleep hypoventilation such as neuromuscular and chest wall restrictive disorders and obesity hypoventilation syndrome.
- Palliation for symptom relief, in combination with opioids and benzodiazepines to treat breathlessness. A medical team decision will be made when NIV is deemed no longer beneficial to the patient's management

CONTRAINDICATIONS

- Heliox therapy in combination with NIV for severe exacerbation of COPD
- Life threatening hypoxemia (PaO_2 <60mmHg on FiO_2 100%)
- CPAP in acute lung injury (ALI)
- Respiratory arrest
- Untreated pneumothorax
- Life threatening dysrhythmias
- Inability to protect own airway
- Copious, unmanageable respiratory secretions
- Facial burns/trauma/recent facial or upper airway surgery

Grading of Recommendations	
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation/s but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution
CONSENSUS	Expert opinion where consensus was set as a median of ≥ 7 (Likert 1-9)

ASSESSMENT

2	All patients receiving NIV are to have a documented plan of care. This plan is to be developed on commencement of NIV, reviewed on a regular basis (minimum of every 24 hours and on change in patient condition) and updated as required. Where available this care plan is to be developed by a critical care or respiratory medical officer or designated clinically qualified respiratory proxy. **Consensus**
3	All patients receiving NIV are to have a formal assessment and documentation of full body skin integrity at least daily. This includes the skin under the interface: that is nose, face and neck. **Consensus**

OBSERVATIONS

Baseline

Respiratory	• ABGs, RR, SpO2, Evaluate level of breathlessness (e.g. Borg scale
Cardiac	• HR, BP, Rhythm monitoring
Neurological	• Level of consciousness
Patient Comfort	• Pain Score

NB consider other systems as pertains to patient co-morbidities

Ongoing

Repeat ABGs	• After 1 hour of therapy and 1 hour after every subsequent setting change • After 4 hours or earlier if patient is not clinically improving
Frequent clinical monitoring of acutely ill patients	• Every 15 minutes in the first hour • Every 30 minutes in the 1-4 hour period • Then hourly
Observations	• RR, continuous pulse oximetry, HR, BP, AVPU, • Pain Score • Patient Comfort, including interface skin integrity • Chest wall movement, ventilator synchrony, accessory muscle use

INTERFACE

4	Assessment of mask fit, interface type, head strap tightness, skin integrity of mask contact point, ventilation synchrony and degree of mask leak are to be completed each time the interface is adjusted and minimally second hourly. **Consensus**
5	Interventions to prevent pressure injury secondary to the interface are to be implemented on commencement of NIV. **Consensus**
6	When deterioration in skin integrity is identified, immediate strategies are to be employed to reduce further injury. **Consensus**

The guideline can be found at http://aci.health.nsw.gov.au/networks/intensive-care/ic-manual

Factors affecting Patient Comfort & Compliance

- Choice of suitable interface.
- Levels of pressure applied.
- Position of the patient.
- Synchrony of Ventilation.
- Pharmacotherapy for dyspnoea, anxiety and pain.
- Humidification.
- Palliation of symptoms.

INITIATION & TITRATION OF THERAPY

7	a. Initial settings for Bilevel Positive Airway Pressure (BPAP) : Inspiratory Positive Airway Pressure (IPAP) of 10cmH_2O and Expiratory Positive Airway Pressure (EPAP) of 4-5cmH_2O= Pressure Support (PS) level of 5-6cm H_2O. **b.** Initial settings for Continuous Positive Airway Pressure (CPAP) 5cm H_20 . **Grade C**
8	Increases to IPAP of 2-5cmH_2O can be undertaken every 10 minutes or as clinically indicated, until therapeutic response is achieved. The maximum IPAP should not exceed 20 – 23 cmH2O. **Grade C**
9	The target tidal volume of 6-8mls/Kg (ideal body weight) is aimed for all adult patients. **Grade C**
10	Optimal Non-invasive Positive Pressure Ventilation (NIV) is the lowest pressure and lowest $Fi0_2$ that achieve $Sa0_2$ of 90% or $Pa0_2$ of 60mmHg without further clinical deterioration. **Consensus**

HUMIDIFICATION

11	All NIV circuits are to be actively humidified. **Grade C**
12	Heat Moisture Exchangers (HME's) ARE NOT to be used for humidification of NIV circuits. **Grade C**
13	Gas temperatures during NIV are to be based on patient comfort. **Consensus**

PATIENT COMFORT & COMPLIANCE

14	Assessment of patient comfort and pain is to be completed minimally second hourly and documented. **Consensus**
15	Assessment of patient tolerance for higher levels of NIV to be completed minimally hourly until highest level of compliance reached. **Consensus**
16	Patients receiving NIV are to be positioned to achieve maximal chest wall movement and prevent upper airway obstruction. **Consensus**
17	A total face mask or oronasal mask provide a similar clinical outcome and are preferred over the nasal mask in the acute setting The choice of mask is influenced by: • patient comfort • clinical effectiveness • equipment availability The helmet face mask could be considered; however due to the limited use in Australia and limited evidence of greater efficacy it is not the first line therapy. **Grade C**