

COPD, Hypercapnia and Oxygen:

- All patients who require medically-supervised resuscitation should receive 100% oxygen via non-rebreather reservoir mask (NRRM). Oxygen MUST be prescribed on the ED flimsy / drug kardex.
- After the immediate resuscitation period, continuous oxygen therapy should only be given when prescribed by a doctor. The prescription should include the concentration of oxygen to be administered. Empirical starting concentration for clinically hypercapnic patients should be 28%. All should have FiO_2 adjusted after ABG check 30 mins later –aim for $PO_2 >8$ and $PCO_2 < 7.5$
- *Hypercapnia is characterised by altered level of consciousness/drowsiness, muscle twitching or tremor (this can be very marked), and reduced rate or depth of **respiration**. In COPD patients it will usually be associated with cyanosis caused by concomitant hypoxia.*
- Refer COPD patients with pH of 7.35 –7.25 to medical team re non-invasive ventilation. Patients with profound acidosis (pH<7.25) may require anaesthetic assessment regarding intubation and ventilation.
- Asthmatic patients must receive 100% oxygen by NRRM.
- Hypoxic or hypercarbic patients must have frequent clinical assessment blood gas monitoring.

NON-INVASIVE VENTILATION (NIV)**a) When to use non-invasive ventilation****1. Patients**

- COPD
- Cardiogenic pulmonary oedema unresponsive to CPAP
- Chest wall deformity, neuromuscular disorder, decompensated OSA

2. Blood gases

- Respiratory acidosis ($PaCO_2 >6.0$ kPa, pH <7.35 or $H^+ >45$ nmol/l) which persists despite maximal medical treatment and appropriate controlled oxygen therapy (patients with pH <7.25 or $H^+ >56$ nmol/l respond less well and should be managed in an HDU/ICU).
- Low A–a oxygen gradient (patients with severe life threatening hypoxaemia are more appropriately managed by tracheal intubation).

3. Clinical state

- Sick but not moribund, few co-morbidities
- Able to protect airway, conscious and co-operative
- Haemodynamically stable
- No excessive respiratory secretions

b) Contraindications / Exclusions**1. Premorbid state**

- Potential for recovery to quality of life acceptable to the patient
- Patient's wishes considered

2. Contraindications to NIV

- Facial trauma/burns
- Recent facial, upper airway, or upper gastrointestinal tract* surgery
- Fixed obstruction of the upper airway
- Inability to protect airway*
- Life threatening hypoxaemia*
- Haemodynamic instability*
- Severe co-morbidity*
- Impaired consciousness*
- Confusion/agitation*
- Vomiting
- Bowel obstruction*
- Copious respiratory secretions*
- Focal consolidation on chest radiograph*
- Un-drained pneumothorax*

***NIV** may be used, despite the presence of these contraindications, if it is to be the "ceiling" of treatment

c) Management of Patients in Respiratory Failure

1. Each patient should have an Arterial Blood Gas (ABG) if:
 - SpO₂ <93% Room Air
 - Abnormal Respiratory Rate
 - History of domiciliary Oxygen use
 - History of NIAS administered O₂ in transit to the ED
2. The concentration of Oxygen should be clearly documented.
3. CXR interpretation should be documented in the notes.
4. A repeat ABG should be checked 30 minutes after the first ABG of pH <7.35 and PaCO₂ > 6.5kPa
5. Referral for NIV should be made for
 - COPD patients with persistent respiratory acidosis.
 - LVF patients with pulmonary oedema and low saturations.