

Emergency Oxygen Use in GP Practices Adult Guideline

1. Hypoxia is an indication that oxygen therapy should be started
2. If blood oxygen levels are not low, oxygen will not treat breathlessness

In most emergency situations, oxygen is given to patients immediately without a formal prescription or drug order. The lack of a prescription should never preclude oxygen being given when needed in an emergency situation. However, a subsequent written record must be made of what oxygen therapy has been given to every patient (in a similar manner to the recording of all other emergency treatment).

In an emergency situation e.g. in critical illness such as peri-arrest

- Immediate assessment of airway patency, breathing and circulation is essential
- If the patient is hypoxic - high-concentration oxygen should be commenced via reservoir mask at 10-15L/min, with continuous monitoring of pulse oximetry and prescription of an appropriate target range once the patient's condition is stabilised or arrives at hospital for a full assessment
- The target saturation range is prescribed according to the risk of type 2 (hypercapnic) respiratory failure pending arterial blood gas measurement.
 - For most patients, a target of 94-98% is appropriate
 - For those at risk of carbon dioxide retention (hypercapnia), a target of 88-92% ensures safe levels of oxygenation and minimises risk of respiratory acidosis. Those at risk include patients with:
 - Chronic obstructive pulmonary disease (emphysema)
 - Neuromuscular and chest wall disorders
 - Cystic fibrosis
 - Morbid obesity

Pulse oximetry must be available in all settings where emergency oxygen is used. It is essential to:

- Record inspired oxygen (FiO₂), delivery device and oxygen saturations
- Monitor and document the effect of any changes to administered oxygen therapy

Delivery devices

Emergency oxygen should be available in primary care medical centres, preferably using oxygen cylinders with integral high-flow regulators. Alternatively, oxygen cylinders fitted with high-flow regulators (delivering over 6 l/min) must be used.

The amount of oxygen delivered by variable-performance devices (also known as uncontrolled oxygen systems) is dependent on the:

- Oxygen flow rate;
- Patient's inspiratory volumes;
- Respiratory rate;
- Proportion of room air added during breathing.

Cylinder Valves

Cylinders with integral valves are now in common use and require several steps before oxygen starts to flow. Typically this involves removing a plastic cap, turning a valve and adjusting a dial.

NHS Improvement issued a Patient Safety Alert in January 2018, highlighting the risk of death and severe harm from failure to obtain and continue flow from oxygen cylinders. The cylinder design can cause confusion and the following should be noted:

- there may not be a clear indicator on the valve showing the open and closed positions
- the plastic cap can be hiding controls
- the green indicator showing a full cylinder can be misinterpreted as an indicator of active flow
- when the flow rate dial is operated on cylinders that have previously been used, but not vented before next use, a 'hiss' of flowing oxygen can be heard for a few seconds even with the valve closed. This can reinforce a member of staff's belief that they have turned the flow on

Reservoir mask (non-rebreathing mask)

- Oxygen at 10-15L/min via a reservoir mask delivers oxygen at concentrations of 60-85% and is recommended for short-term use in patients who are critically ill.
- The reservoir bag must be filled with oxygen before use and the mask positioned to ensure a close fit on the patient's face.
- A one-way valve prevents exhaled air entering the bag.
- Oxygen via a reservoir mask cannot be humidified, and patients will be more comfortable if they can be maintained within target range on a humidified system once they are more stable.

Equipment List

- Pulse oximeter
- Oxygen cylinder with high-flow regulator
- Reservoir mask (non-rebreathing mask)
- 28% Venturi mask (for patient with COPD)

Where can oxygen and equipment be ordered from?

Company Name	Contact Details
Air Liquide	John.condes@airliquide.com 07970234285
Baywater Healthcare	ccc@baywater.co.uk 0845 602 0776
BOC	Bocmedical-uk@boc.com 0161 930 6218

Emergency Oxygen therapy procedure before the arrival of an ambulance

1. Ensure pulse oximetry is available to monitor response to oxygen therapy
2. Document baseline observations including saturations, respiratory rate, blood pressure and pulse (see appendix 1)
3. Note respiratory effort, colour, level of consciousness
4. Where there is no known risk of carbon dioxide retention (target 94-98%), start oxygen therapy using a reservoir mask at 10-15L/min. Where there is a risk of carbon dioxide retention (target 88-92%), start oxygen therapy using a 28% Venturi device and mask
5. Ensure delivery device is connected via tubing to oxygen supply and turned on to the appropriate flow rate (if cylinder, check fill level of cylinder, the valve is open and be aware of duration time)
6. Explain procedure to the patient and gain consent where possible. In patients who are acutely sick, this may not be possible and clinicians should act in the patient's best interests
7. Place the oxygen mask on the patient's face, adjusting the nose clip and elastic straps to ensure a close fit
8. Because oxygenation is reduced in the supine position, fully conscious hypoxaemic patients should ideally be allowed to maintain the most upright posture possible (or the most comfortable posture for the patient) unless there are good reasons to immobilise the patient (eg, skeletal or spinal trauma)
9. Reassure the patient – if the patient is very breathless, oxygen masks can feel very claustrophobic
10. Continuously monitor response to oxygen therapy – recheck oxygen saturations, vital signs, colour and level of consciousness
11. Titrate oxygen according to oxygen saturations to maintain saturations within prescribed target range. Allow five minutes at each dose before further adjustment. Sudden withdrawal of oxygen in a patient with hypercapnia leads to rebound hypoxaemia
12. Document all adjustments to inspired oxygen (F_iO_2), with saturations recorded

Basic Competencies

- Be aware of, and understand, local oxygen policy/guidelines
- Demonstrate a basic understanding of oxygen physiology, normal and abnormal values
- Be able to discuss the indications for oxygen and the potential risks
- Demonstrate an ability to use oxygen equipment safely, including an awareness of fire risks and cylinder use
- Demonstrate an ability to use a pulse oximeter to determine oxygen saturations
- Demonstrate accurate monitoring and recording of oxygen therapy
- Be able to recognise changes in a patient's respiratory status
- Understand how to use oxygen in emergency situations, for example, cardiac arrest

Storage and Maintenance Contract

The advice of the supplier on the operation, maintenance, safe storage and handling of the equipment must be followed.

- There should be documented evidence that the oxygen cylinder is checked regularly for obvious signs of leakage. This should include a physical check of the oxygen level against paperwork: check the level is at least half full
- Do not smoke or allow anyone else to smoke around the oxygen equipment. Also, E-cigarettes should not be used near oxygen. Naked flames, for example, candles, open fires should not be allowed near oxygen
- Statutory hazard notices must be in place for areas where oxygen is stored or used. There must be an oxygen/oxygen cylinder warning sign and the sign for "no smoking or naked flames (lights)"
- Oxygen cylinders must be stored securely in clean, dry areas and not subject to extremes of temperature
- Cylinders must be kept out of direct sunlight
- Oxygen must not be stored in areas which would block any exits or fire escape routes
- Oxygen must not be stored with any combustible material, for example, paraffin, flammable liquids
- Oxygen must not be stored or used near sources of heat, for example, fires, radiators
- Oxygen cylinders must be secured to prevent unauthorised removal and to prevent the cylinder from falling which can cause damage to the cylinder and/or injury to staff or patients
- Oxygen cylinders should only be moved using the appropriate cylinder trolley, as advised by the supplier, unless they are designed to be portable
- Oxygen equipment should be kept clean using the method recommended by the supplier
- Care should be taken to ensure that tubes and masks are kept clean and in good condition and that the tube is not crushed or kinked. Tubing and masks/nasal cannula should be replaced on a regular basis as advised by the supplier
- Any oxygen cylinders which are no longer required should be returned to the supplier. Cylinders which are empty or passed their expiry date should also be returned to the supplier
- Staff should not attempt to repair oxygen cylinders. Any problems should be reported promptly to the supplier

Emergency use of oxygen in the patient's home

In patients' homes, oxygen is usually provided for long-term therapy with an oxygen concentrator and an ambulatory supply with lightweight cylinders (or a portable liquid oxygen system). In some circumstances, there may be a supply of cylinders for short-term/short-burst therapy or palliative use.

The existing home oxygen supply may be used by a patient or general practitioner in an emergency situation before the arrival of an ambulance using the patient's existing interface. If a GP is attending a patient at home with oxygen, ideally, the use of oxygen should be guided by pulse oximetry. The existence of any oxygen alert card should be asked for so that the emergency services attending can be aware of the target saturation and oxygen supply titrated accordingly.

The patient/carers should be made aware of the following Health and Safety recommendations:

- All cylinders should be stored on a cylinder trolley or suitably secured so they cannot be knocked over.
- There should be no trailing oxygen tubing.
- A green warning triangle for "compressed gas" should be displayed by the front door (warns emergency services in the event of a fire).
- The minimum number of cylinders should be stored in the house.
- There should be no smoking in the vicinity of oxygen cylinders.
- Cylinders must be checked regularly for obvious signs of leakage.
- Cylinders must be kept out of direct sunlight.
- Oxygen must not be used near a naked flame or source of heat.

References

- CQC Statement accessed 17 01 2017: <http://www.cqc.org.uk/content/nigels-surgery-1-agreed-principles-defibrillators-oxygen-and-oximeters>
- NHS Improvement. Patient Safety Alert: Risk of Death and Severe Harm from Failure to Obtain and Continue Flow from Oxygen Cylinders. 9th January 2018. Alert reference number: NHS/PSA/W/2018/001
- O'Driscoll BR, Howard LS, Davison AG, et al. (2008). BTS guideline for emergency oxygen use in adult patients. *Thorax* 2008; 63 (Suppl 6):vi1–68.
- Olive S, (2016). Practical procedures: oxygen therapy. *Nursing Times*; 112: 1/2, 12-14.
- Resuscitation Council (UK), 2015

Appendix 1

Recording Sheet: Emergency Oxygen Therapy

Practice name		Patient Name	
Name of staff in attendance and recording patient response		NHS Number	
Staff Signature			

Baseline observations	Oxygen saturation	Respiratory Rate	Blood Pressure	Pulse Rate	Respiratory effort	Colour	Level of consciousness

Ongoing observations	Oxygen saturation	Respiratory Rate	Blood Pressure	Pulse Rate	Respiratory effort	Colour	Level of consciousness
Monitor according to patient response to oxygen therapy							

Please Note

Where there is no known risk of carbon dioxide retention (target 94-98%), start oxygen therapy using a reservoir mask at 10-15L/min.
 Where there is a risk of carbon dioxide retention (target 88-92%), start oxygen therapy using a 28% Venturi device and mask