

Opinion

Routine use of oxygen in Primary care

Principles for administering oxygen

Oxygen is a medication. It is prescribed and administered for the treatment of hypoxia both in emergency situations, and in more chronic conditions such as COPD and lung fibrosis. More controversially, it is sometimes used in conditions such as cluster headaches where the evidence is weaker.

Whilst there is good evidence of benefit when oxygen is given to hypoxic patients, there is no evidence that its use for breathlessness without hypoxia is anything more than an expensive placebo.¹ To address the exponential rise in costs for oxygen treatment, current recommendations therefore advocate the use of target saturations measured with pulse oximetry to ensure that those requiring oxygen receive it and that those that do not are supported to manage their symptoms in other ways.²

Pulse oximetry

Pulse oximetry should be available in all settings where emergency oxygen is used and to identify people with chronic conditions who would benefit from further assessment.³ Oxygen saturations of between 94–98% are considered normal. Visual observation of cyanosis is unreliable and oxygen saturations measurements are essential.³

Emergency situations

In an emergency, such as acute severe or life threatening asthma, where oxygen saturations are $\leq 92\%$, oxygen should always be administered using high flow oxygen (40–60%) via a high flow mask. (i.e. Hudson mask) Target saturations of between 94–98% are recommended for acutely ill patients although 88–92% is sufficient for those at risk of hypercapnic respiratory failure.⁴

When administering nebulised β_2 -agonists with oxygen for acute asthma the flow rate required is 6 litres/minute, therefore a high flow regulator must be fitted to the oxygen cylinder.⁵

Chronic conditions

For chronic respiratory conditions people with oxygen saturations $< 92\%$ breathing room air, should be considered for a formal oxygen assessment with referral made to the local home oxygen assessment service.

It is worth noting that saturation level of $< 90\%$ correlate poorly with arterial blood gas oxygen levels.⁶

For some chronic conditions, such as emphysema, the changes are gradual and it is important to recognise other signs of hypoxaemia such as reduced exercise capacity, cardiac arrhythmias, fatigue and confusion.⁷ The only disease area where there is a proven survival benefit from the use of Long Term Oxygen Therapy (LTOT) is in patients with severe COPD and chronic resting arterial hypoxemia proven by arterial blood gas assessments.^{8,9}

Assessment and oxygen provision

Long Term Oxygen Therapy (LTOT)

LTOT is indicated for the management of confirmed chronic hypoxaemia defined as a resting arterial blood gas oxygen level (PaO_2) at or below 7.3 Kilo Pascals (kPa) with oxygen saturations of $< 90\%$. Evidence supports LTOT being administered for at least 15 hours a day: and should include night time use as arterial hypoxaemia worsens during sleep.^{8,9}

- Following an acute episode, a period of recovery is required before a formal LTOT assessment takes place. After a period of clinical stability of at least five weeks, two separate assessments are made two weeks apart. Sometimes oxygen may be prescribed temporarily whilst the patient recovers after a hospital admission, but primary care clinicians need to be aware that this should not be continued unless the formal assessments suggest it is appropriate.
- The assessment includes measuring acid base status, carbon dioxide and oxygen levels in arterial or ear lobe capillary blood gas whilst at rest. The initial test is performed breathing room air, and is then repeated following the introduction of supplementary oxygen. Oxygen tension on treatment should be raised to above 8kPa.
- If LTOT is ordered the person should be reviewed on a regular basis by a respiratory specialist.
- LTOT is provided through a concentrator usually via nasal prongs. Depending on the results of the assessment the flow rate is usually between 2–4 litres.⁶
- For those people with COPD or known

respiratory failure following formal oxygen assessment lower saturation levels may be accepted.

- Smokers are strongly advised to stop smoking, though failure to quit is not an absolute contra-indication to provision of LTOT.

LTOT can be prescribed for people with chronic hypoxaemia and a clinically stable PaO_2 between 7.3kPa and 8kPa with the presence of either of the following:

- Secondary polycythaemia
- Pulmonary hypertension confirmed by echocardiogram

Ambulatory Oxygen (AO)

AO assessment is for those people who show arterial oxygen de-saturation on exercise, (defined as a fall in SpO_2 of 4% to below 90%) AND have the motivation to use AO. Formal assessment should be undertaken, including a walk tests initially on air and then on oxygen demonstrating an improvement in SpO_2 and an improvement in exercise capacity.

AO may be used for people

- on LTOT who are active outside the home

- People who desaturate on exercise

Ambulatory oxygen aims to:

- Enable people to leave their home
- Improve quality of life
- Increase everyday activities
- Improve exercise capacity
- Reduce breathlessness
- Enhance rehabilitation
- Increase the number of hours of LTOT use

Portable systems or liquid oxygen (for those people with a high usage) are available.⁶

Intermittent Oxygen therapy also known as Short Burst (SBOT)

Traditionally, short burst oxygen has been prescribed to relieve periods of breathlessness. To date, there is no evidence to support the use of oxygen in this manner. Causes of breathlessness should be excluded and if $\text{SaO}_2 < 92\%$, and LTOT assessment should be considered.

Oxygen is often administered for palliation of breathlessness at the end of life care, but evidence suggests that, unless the patient is hypoxic, any moving air on the face (an open window, a hand-held fan) may provide similar subjective relief.¹⁰

How to prescribe

Re-procurement of home oxygen service contracts are being established in each region. The service includes:

- A new patient Home Oxygen Consent Form (HOCF). With the first order for oxygen, the patient is required to sign a HOCF allowing information to be shared with the contractor.
- A new Home Oxygen Order Form (HOOF). The clinician completing the HOOF will specify the exact equipment the patient requires
 - Part A for non specialist services
 - Part B for post assessment specialist Oxygen assessment

Part A. To be used for non specialist ordering

Home Oxygen Order Form (HOOF)
Part A (Before Oxygen Assessment - Non-Specialist or Temporary Order)

1. Patient Details

1.1 NHS Number* 1.2 Permanent address* 1.3 Tel no. 1.4 Title

1.3 Surname* 1.5 First name* 1.6 Gender Male Female 1.8 Postcode* 1.9 Tel no. 1.10 Mobile no.

2. Carer Details (if applicable)

2.1 Name 2.2 Tel no. 2.3 Mobile no.

3. Clinical Details

3.1 Clinical Code(s) 4.1 Main Practice name* 4.2 Practice address* 4.3 Postcode* 4.4 Tel no.

3.2 Patient on NIV/CPAP Yes No 4.3 Practice address* 4.3 Postcode* 4.4 Tel no.

3.2 Paediatric Order Yes No

5. Assessment Service (Hospital or Clinical Service)

5.1 Hospital or Clinic Name 6.1 Name 6.2 Tel no. 6.3 Fax no. 6.4 Reference date / /

5.2 Address 6.5 Reference date / /

5.3 Postcode 5.4 Tel no.

7. Order* 8. Equipment* 9. Consumables*

Lines/Min Hours / Day Per min for 2 hours (as it is not a concentrator) Type Delivery Method Container How to and Type

8.1 Size Concentrator 8.2 Size Cylinder (range of sizes) 8.3 Size Cylinder (range of sizes)

10. Delivery Details*

10.1 Standard (3 Business Days) 10.2 Standard (5 Days) 10.3 Urgent (4 Hours)

11. Additional Patient Information 12. Clinical Contact (if applicable)

12.1 Name 12.2 Tel no. 12.3 Mobile no.

13. Declaration*

I declare that the information given on this form for NHS treatment is correct and complete. I understand that if I knowingly provide false information, I may be liable for prosecution or civil proceedings. I confirm that I am the registered healthcare professional responsible for the information provided. I have explained to the patient his need and signed the Home Oxygen Consent Form.

Name: _____ Profession: _____
Signature: _____ Date: _____ Referred for assessment: Yes No

For back No. or NHS email address for confirmation / correction:

14. Clinical Code

| CODE | Condition | CODE | Condition |
|------|--|------|-------------------------------------|
| 1 | Chronic obstructive pulmonary disease (COPD) | 12 | Nocturnal hypoxaemia |
| 2 | Pulmonary vascular disease | 13 | Obstructive sleep apnoea syndrome |
| 3 | Severe chronic asthma | 14 | Chronic heart failure |
| 4 | Idiopathic lung disease | 15 | Paediatric respiratory lung disease |
| 5 | Cystic fibrosis | 16 | Chronic neonatal lung disease |
| 6 | Bronchiectasis (not cystic fibrosis) | 17 | Paediatric cardiac disease |
| 7 | Pulmonary malignancy | 18 | Cluster headache |
| 8 | Pulmonary care | 19 | Other primary respiratory disorder |
| 9 | Non-pulmonary palliative care | 20 | Other |
| 10 | Chest wall disease | 21 | Not known |
| 11 | Neuromuscular disease | | |

What is different?

Part 5 - New section for recording assessment centre details

Part 7 - PART A can only order basic domiciliary oxygen modalities

Part 11- Can be used if standard ambulatory is required

AM or PM delivery can be requested

There is a rental fee for each piece of equipment and activity based charge for installation, risk assessments, replenishments and servicing. Therefore good clinical assessment and correct ordering is essential. Ideally patients should be referred to specialist home oxygen assessment services who are able to assess the patient suitability for a range of modalities for oxygen provision.⁶

The supplier will contact the patient to carry out a telephone safety assessment this will be followed up with a field based risk assessment. The contractor will deliver the

oxygen systems directly to the patient; install the system according to the oxygen requested on the HOOF, and give instruction on safety and how to use the equipment.

The supplier will arrange a 2 week phone call to all patients following installation and alert the Fire Brigades of new a installation within 2 days.

For any subsequent changes to oxygen treatment a 're-HOOF' is required. Copies of the HOOF should be available in the GP records, the Home Oxygen Service and the relevant PCT.

Education

The health professional should provide education and written information for the patient and carer. This should cover diagnosis and management, the reason and frequency of oxygen use. It should explain how the flow rate has been set following assessment and the length of time oxygen should be used and the reasons for follow up assessments.

The supplier will provide written information on the oxygen equipment. The engineer will discuss home servicing, electricity reimbursement, when to use the back up oxygen cylinder and emergency breakdown contact numbers.

Risks

These are mostly associated with open flames, smoking (especially the lighting of cigarettes), heat sources ie candles, gas and the use of combustible/flammable product such as creams containing petroleum. Patients should also be instructed to turn the oxygen supply off when not in use.

Travel

For travel in the UK there is no requirement for a holiday HOOF – unless there is a change in requirements. The patient or carer should inform the supplier of the dates of the holiday and the holiday address (this must be within England & Wales). The Supplier will forward the original HOOF to the supplier of the region being visited by the patient within four hours of receipt. This will be completed within a 3 day service level agreement – please advise the patient to give as much notice as possible. Holiday weekend installations are available.

People with a resting oxygen saturation of less than 94% may be hypoxic if they travel by air and should be referred for formal flight oxygen assessment. Information about travelling with oxygen is available from the web-site of the European Lung Foundation (www.european-lungfoundation.org)

Assessing the effectiveness of oxygen therapy

All patients using LTOT or ambulatory oxygen should be routinely monitored as rec-

ommended in the BTS guidelines.² Monitoring oxygen saturations using a pulse oximeter is a useful guide of the state of oxygenation, remembering that caution should be used in ensuring COPD patients are not over-oxygenated. Arterial blood gas analysis is the gold standard in measuring the results of oxygen therapy and provides accurate information on the pH, PaCO₂ and PaO₂. The clinical response of the patient in terms of physical comfort, sleep, and mobility, must also be evaluated on a regular basis.

Oxygen sensitivity

Patients who are known to retain CO₂ or have type 2 respiratory failure should be given an oxygen alert card to ensure that they are given controlled oxygen rather than high flow in an acute situation.²

What materials / resources are available?

A number of professional resources are available as listed in the references. An NHS website for public and professionals is available www.homeoxygen.nhs.uk. In addition, information for people using oxygen will be provided by the company and further patient information can be sourced at the British Lung Foundation website. www.lunguk.org

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