Oxygen Audit Presentation

Audit Group: Helen Bonwick, Anthony Thompson, Claire Robinson, Sue Oakes, Aileen Scott

Audit Support: Damian Cullen

External Expert: Dr Martin Ledson
Audit group

• Dr Helen Bonwick, MCHL and LHCH
• Dr Anthony Thompson, Willowbrook Hospice
• Dr Aileen Scott, RLUH
• Dr Claire Robinson, MCHL
• Sue Oakes, LHCH

Meetings

• 18th October 2012  13th June 2013
• 12th December 2012  25th July 2013
• 29th January 2013  22nd August 2013
Outline of presentation

• Objectives
• Introduction and overview
• Literature review
• Related guidelines
• Survey results
  – Units
  – Professionals
  – Patients
• Proposed standards and guidelines
• Comments from external expert
Objectives

To provide guidance on appropriate and safe use of oxygen in patients known to Specialist Palliative Care Services

Questions to be answered

Which patients benefit from oxygen?

What protocols should services have in place to ensure safe use of oxygen?
Oxygen

Martin Ledson
Literature reviewed

- NICE COPD 2010
- BTS ‘Emergency oxygen use in Adult patients’ 2008
- General dabble on Google and pub-med
What is oxygen for?

• Oxygen is used to treat hypoxia, not dyspnea.

• Dyspnea
  – Is subjective and involves the perception of breathlessness and the person’s reaction to it. Anxiety is often a major component of dyspnea.
New Oxygen system 2006

- Air liquide
- Respiratory Specialist
  - GP only in emergencies
- Oxygen less than 7.3 Kpa
  - 7.3-8Kpa if polycythaemia or Pul Hypertension
  - 2 occasions 3 weeks apart
  - LTOT 15 hours per day
Oxygen therapy

- Long term Oxygen Therapy
- Short Burst Oxygen Therapy
- Ambulatory Oxygen Therapy
- Travel Oxygen
Ambulatory equipment

- Small portable cylinders 3.4kg, lasts 3.5 hrs
- ‘Lightweight cylinders’
- Liquid Oxygen cylinders, lasts 8 hours
- Oxygen conserving devices, 3.6kg, lasts 11 hours
# Home Oxygen Order Form (HOOF)

**PART A (Before Oxygen Assessment – Non-Specialist or Temporary Order)**

All fields marked with an ‘*’ are mandatory and the HOOF will be rejected if not completed.

## 1. Patient Details

<table>
<thead>
<tr>
<th>1.1 NHS Number</th>
<th>1.7 Permanent address</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Title</td>
<td>1.8 Date of birth</td>
</tr>
<tr>
<td>1.3 Surname</td>
<td>1.9 Tel no.</td>
</tr>
<tr>
<td>1.4 First name</td>
<td>1.10 Mobile no.</td>
</tr>
<tr>
<td>1.5 DoB*</td>
<td>2.2 Tel no.</td>
</tr>
</tbody>
</table>

## 2. Caretaker Details

<table>
<thead>
<tr>
<th>2.1 Name</th>
<th>2.3 Mobile no.</th>
</tr>
</thead>
</table>

## 3. Clinical Details

<table>
<thead>
<tr>
<th>3.1 Clinical Code(s)</th>
<th>4.1 Main Practice name*</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.2 Patient on BiPAP</td>
<td>4.2 Practice address</td>
</tr>
<tr>
<td>3.3 Paediatric Order</td>
<td>4.3 Postcode*</td>
</tr>
</tbody>
</table>

## 4. Patient’s Registered GP Information

<table>
<thead>
<tr>
<th>4.4 Telephone no.</th>
</tr>
</thead>
</table>

## 5. Assessment Service (Hospital or Clinical Service)

<table>
<thead>
<tr>
<th>5.1 Hospital or Clinic Name</th>
<th>5.2 Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3 Postcode</td>
<td>5.4 Tel no.</td>
</tr>
</tbody>
</table>

## 6. Ward Details (if applicable)

<table>
<thead>
<tr>
<th>6.1 Name</th>
<th>6.2 Tel no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.3 Discharge date:</td>
<td>/</td>
</tr>
</tbody>
</table>

## 7. Order*

<table>
<thead>
<tr>
<th>Litres / Min</th>
<th>Hours / Day</th>
<th>Type</th>
<th>Quantity</th>
<th>Nasal Cannulae</th>
<th>Mask % &amp; Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A.1 Static Concentrator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A.2 Static Cylinder(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For more than 2 hours/day it is advisable to select a static concentrator.
A single cylinder will last for approximately 8hrs at 4/min.

## 8. Equipment*

<table>
<thead>
<tr>
<th>Litres / Min</th>
<th>Hours / Day</th>
<th>Type</th>
<th>Quantity</th>
<th>Nasal Cannulae</th>
<th>Mask % &amp; Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A.1 Static Concentrator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A.2 Static Cylinder(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A single cylinder will last for approximately 8hrs at 4/min.

## 9. Consumables*

<table>
<thead>
<tr>
<th>Litres / Min</th>
<th>Hours / Day</th>
<th>Type</th>
<th>Quantity</th>
<th>Nasal Cannulae</th>
<th>Mask % &amp; Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A.1 Static Concentrator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A.2 Static Cylinder(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A single cylinder will last for approximately 8hrs at 4/min.

## 10. Delivery Details*

<table>
<thead>
<tr>
<th>10.1 Standard (3 Business Days)</th>
<th>10.2 Next (Calendar) Day</th>
<th>10.3 Urgent (4 Hours)</th>
</tr>
</thead>
</table>

## 11. Additional Patient Information

<table>
<thead>
<tr>
<th>11.1 Name</th>
<th>12.1 Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>11.2 Tel no.</td>
<td>12.2 Tel no.</td>
</tr>
</tbody>
</table>

## 12. Clinical Contact (if applicable)

<table>
<thead>
<tr>
<th>12.1 Name</th>
<th>12.3 Mobile no.</th>
</tr>
</thead>
</table>

## 13. Declaration*

I declare that the information given on this form for NHS treatment is correct and complete. I understand that if knowingly provide false information, I may be liable to prosecution. I also confirm that I am the correctly named patient and that I am the named healthcare professional responsible for the patient's care to sign the Oxygen Consent Form.

Name: __________________________

Profession: ______________________

Date: ___________________________

Referred for assessment: [ ] Yes [ ] No

Signature: _______________________

Fax back no. or NHS email address for confirmation / corrections:


<table>
<thead>
<tr>
<th>CODE</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Chronic obstructive pulmonary disease (COPD)</td>
</tr>
<tr>
<td>2</td>
<td>Pulmonary vascular disease</td>
</tr>
<tr>
<td>3</td>
<td>Pulmonary edema</td>
</tr>
<tr>
<td>4</td>
<td>Interstitial lung disease</td>
</tr>
<tr>
<td>5</td>
<td>Cystic fibrosis</td>
</tr>
<tr>
<td>6</td>
<td>Bronchiectasis (not cystic fibrosis)</td>
</tr>
<tr>
<td>7</td>
<td>Pulmonary malignancy</td>
</tr>
<tr>
<td>8</td>
<td>Palliative care</td>
</tr>
<tr>
<td>9</td>
<td>Non-pulmonary palliative care</td>
</tr>
<tr>
<td>10</td>
<td>Chest wall disease</td>
</tr>
<tr>
<td>11</td>
<td>Neuromuscular disease</td>
</tr>
<tr>
<td>12</td>
<td>Neurological</td>
</tr>
<tr>
<td>13</td>
<td>Obstructive sleep apnoea syndrome</td>
</tr>
<tr>
<td>14</td>
<td>Pulmonary fluid overload</td>
</tr>
<tr>
<td>15</td>
<td>Pulmonary interstitial lung disease</td>
</tr>
<tr>
<td>16</td>
<td>Chronic respiratory failure</td>
</tr>
<tr>
<td>17</td>
<td>Paediatric interstitial lung disease</td>
</tr>
<tr>
<td>18</td>
<td>Paediatric cardiac disease</td>
</tr>
<tr>
<td>19</td>
<td>Chronic respiratory disease</td>
</tr>
<tr>
<td>20</td>
<td>Other primary respiratory disease</td>
</tr>
<tr>
<td>21</td>
<td>Other</td>
</tr>
<tr>
<td>22</td>
<td>Other</td>
</tr>
</tbody>
</table>
Oxygen for relief of dyspnea in mildly or non hypoxic patients with cancer: a systematic review and meta-analysis

- Lancet double blind RCT, MRC greater than 3, terminal condition, air or oxygen for 7 days. No difference in breathlessness scores or quality of life.
- 5 small studies (n=148)
- No symptomatic benefit from oxygen therapy
Update on the role of palliative oxygen

Curr Opin Support Palliat Care 2011;5:87-91

• On the basis of the findings of this review, the routine use of palliative oxygen therapy without detailed assessment of pathogenesis, and reversibility of symptoms cannot be justified. Promoting self management strategies should be considered before oxygen therapy. If not hypoxic……. Review after 3 days.
Causes

- COPD
- Pleural Effusion
- Cardiac-failure/Arrhythmia
- Anaemia
- Pericardial effusion
- Cancer
Effects of dyspnea

- Physical - fatigue, loss of appetite, insomnia
- Emotional - anxiety, depression, anger, helplessness
- Decreased function
- Social - isolation, employment
Non pharmacological management

- Cool room, open window, fan
- Relaxation and breathing techniques
- Encourage exercise
- Adapt environment, ADL, Expectations
- Encompass Psychological, social and spiritual wellbeing
Pharmacological

- Opioids
- Benzodiazepines
- Oxygen
OXYGEN
NO SMOKING
NO OPEN FLAMES

Fire Triangle
Oxygen
Heat
Chemical Reaction
Fuel

Reality.

Marie Curie Cancer Care
Devoted to Life
Adverse effects

- Psychological dependence
- Social restriction
- Resp failure (Type 2)
- Drying of airways
Oxygen services

- The Liverpool Heart and Chest Hospital Oxygen Assessment Service offer patients an individualised assessment for the provision of oxygen treatment, including ambulatory (portable) oxygen therapy where appropriate, for all patients in whom oxygen therapy is considered.
That's all Folks!
Literature Review

Dr Claire Robinson
The aim is to investigate the role of oxygen in palliative care. This will be achieved by examining evidence from previously conducted trials.
Method

• A literature search was conducted on 20/03/2013 using NHS Evidence Healthcare Database.

• This searched :-
  – AMED (1985-current)
  – EMBASE (1980-current)
  – HMIC(1979-current)
  – Medline(1950-current)
  – PsychINFO(1806-current)
  – BNI(1992-current)
  – CINAHL(1981-current)
  – Health Business ELITE(1922-current)
Method

- Terms ‘palliative’ AND ‘oxygen’ were searched in the title. This retrieved 60 results. Once duplicates were removed this left 25 results.
- The search was expanded to include title and abstract however this retrieved 1003 results, which was felt too large for the scope of this literature review.
- The same terms were searched using Proquest. This retrieved 7 results (1 x duplicate)
- On 25/07/2013 to find further articles we combined terms ‘terminal’ AND ‘oxygen’ in title and retrieved 292 results. Once duplicates were removed this gave 98 results.
- A further search was performed on 26/07/2013 using terms ‘end of life’ and ‘oxygen’ in title. We retrieved 13 results. Once duplicates were removed this gave 5 results.
Search Results

Total articles: 372

Once duplicates removed: 134

Once articles excluded: 21
Article Exclusions

• Some articles were not suitable for analysis

• Reasons for exclusion were :-
  • Foreign Language (French/German/Japanese)
  • Inappropriate topic (biochemistry, paediatric, specific condition e.g COPD, alternative gas (NO))
# Hierarchy of Evidence

<table>
<thead>
<tr>
<th>Systematic Review/Meta-analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomised Controlled Trial (RCT)</td>
</tr>
<tr>
<td>Cohort Studies</td>
</tr>
<tr>
<td>Case-Control Study</td>
</tr>
<tr>
<td>Cross sectional survey</td>
</tr>
<tr>
<td>Case Report</td>
</tr>
<tr>
<td>Expert opinion</td>
</tr>
</tbody>
</table>
Results

21

8 Literature review

6 RCT

3 Cohort

4 Survey
<table>
<thead>
<tr>
<th>RCT's</th>
<th>Length of study</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Participant details</th>
<th>Blinding?</th>
<th>Outcome Measurement</th>
</tr>
</thead>
</table>
| Abernethy 2010 | 7 days | Age 18+ | Lifelimiting Illness  
Refractory Dyspnoea  
PaO2>7.3 kPa  
Life Expectancy 1 month + | Anaemia  
MMSE<24/30  
Hypercapnic Respiratory Failure.  
Resp/Cardiac event in last 1 week. | Outpatients.  
Clinics in UK/Australia/USA | Double-blind | Twice daily dyspnoea score (0-10)  
Quality of Life score (McGill quality of life questionnaire) |
| Ahmedzai 2004 | 1 day | Age 18+ | Lung Cancer  
Dyspnoea on exertion  
(Borg score 3+)  
Life expectancy 3 months + | Hb < 10.0  
Hypercapnic Respiratory Failure  
Hx Psych/seizures/ CNS disorder  
Chemo/radiotherapy within 4 weeks | Outpatients.  
Age 53-78  
Caucasian  
47-104kg | Double-blind and crossover | Borg score (0-10)  
6 minute walk test  
Respiratory Rate  
Tympanic Temp  
SaO2 |
| Bruera 1992 | 1 day | Cancer | Nil stated | Baseline SaO2 = 85% | Crossover and Double blind | VAS |
| Bruera 1993 | 1 day | Advanced Cancer | SaO2 < 90%  
MMSE>24/30 | COPD | All already receiving O2 at < 4L/min  
Age 49-79 | Double-blind and crossover | Respiratory rate  
SaO2  
Visual Analogue Scale (0-100) |
| Bruera 2003 | 1 day | Advanced Cancer | Dyspnoea at rest  
Hb >10.0  
Normal cognition | Acute Respiratory Distress  
Use of oxygen within 4 weeks  
SaO2<90% | Outpatients | Double-blind and crossover | 6 minute walk test  
Dyspnoea score (0-10)  
SaO2 |
| Philip 2006 | 1 day | Cancer | Dyspnoea (30/100) | Acute Respiratory Distress | Australia Inpatients and Outpatients | Double-blind and crossover | VAS (0-100)  
SaO2 |
<table>
<thead>
<tr>
<th>Study</th>
<th>Participants</th>
<th>Oxygen Received</th>
<th>Outcome</th>
<th>Side Effects</th>
<th>Statistical Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abernethy 2010</td>
<td>239</td>
<td>2L/min 15 hours/day</td>
<td>AM score: O2 0.9, Air 0.7; PM score: O2 0.3, Air 0.5</td>
<td>Drowsiness 10% O2 13% air, Nasal irritation 2% oxygen 6% air, Epistaxis 1 oxygen</td>
<td>Used programme SAS version 9.1. No significant difference between oxygen and air. Both improved dyspnoea (non-significant)</td>
</tr>
<tr>
<td>Ahmedzai 2004</td>
<td>12 (crossover)</td>
<td>28% oxygen Heliox (72% helium 28% oxygen)</td>
<td>VAS 59.3, Air 47.0 Oxygen 40.2 Heliox</td>
<td>None</td>
<td>Used ANOVA. Significant (p&lt;0.05) reduced dyspnoea and increased exercise tolerance with heliox. No significant difference with Oxygen vs Air</td>
</tr>
<tr>
<td>Bruera 1992</td>
<td>1</td>
<td>5L/min O2 or air via face mask</td>
<td>Baseline O2 11.0, Air 9.4 With Gas O2 -9.1, Air 0.5</td>
<td>None</td>
<td>Paired T-test. No significant difference</td>
</tr>
<tr>
<td>Bruera 1993</td>
<td>14 (crossover)</td>
<td>Oxygen and Air at 5L/min for 5 min then VAS score.</td>
<td>Baseline O2 11.0, Air 9.4 With Gas O2 -9.1, Air 0.5</td>
<td>None</td>
<td>T-test. RR/SaO2 and VAS all significantly better with oxygen than air</td>
</tr>
<tr>
<td>Bruera 2003</td>
<td>34 (crossover)</td>
<td>Oxygen and Air at 5L/min for 5 minutes then perform 6 minute walk test</td>
<td>3 min score O2 3.7, Air 3.8; 6 min score O2 -4.5, Air – 4.9</td>
<td>None</td>
<td>T-test. No significant difference</td>
</tr>
<tr>
<td>Philip 2006</td>
<td>51 (crossover)</td>
<td>Oxygen or air at 4L/min for 15 minutes then dyspnoea score.</td>
<td>Air first VAS O2 10 Air 3; Oxygen first VAS O2 11.5 Air 11.0</td>
<td>None</td>
<td>Pearson’s chi squared test – no significant difference</td>
</tr>
</tbody>
</table>
Abernethy

- Current guidelines for O$_2$ funding
  - Derived from data in COPD where benefit is measured in terms of survival
  - Not relative palliative population
  - Demonstrable benefit – must be either decreased dyspnoea or improved ADLs
  - Often offered as therapeutic trial, poorly defined end-point.
Cohorts

- **Clemens**\(^7\) 46 patients
  - No significant difference oxygen (dyspnoea score)
  - Significant reduction with opioids (some at 30mins, most marked at 90 and 120mins)

- **Currow**\(^8\) 4 year study
  - 5862 patients, 413 had oxygen and pre and post data
  - Measured dyspnoea score (0-10) at 1 week and 2 weeks
  - Baseline 5.3, 1 week 5.1, 2 week 5.1

- **Currow**\(^9\)
  - 5203 community patients
  - 11.8% prescribed O2 lived alone
  - 20.6% prescribed O2 had carer
Survey

• **Stringer**

  • Telephone survey 21 respiratory and general medical physicians
  • Cases ? Would prescribe O2
  • Agreed in 44% of cases
  • Increased prescribing in hypoxic patients regardless of whether dyspnoea was present/absent
  • Found oxygen prescribing guidelines not applicable in palliative care setting (based on COPD LTOT improve survival)
Survey

- Jaturapatporn\textsuperscript{11} 8 patients
  - 50% dyspnoea improved. 50% resolved
  - 5/8 felt increased functional capacity
  - All qualitative
- Perceived benefits: skin colour, appetite, decreased nausea. Improved dyspnoea
- Perceived burdens: Mobility, tubing (safety concern), Nasal/ear discomfort, Hard to transport oxygen, waiting for oxygen delivery
- “I am willing to put up with the nuisance for the benefit of oxygen; the burden does not mean much.”
Breaden\textsuperscript{12} surveyed 51 community palliative care nurses

O2 seen as second line therapy for dyspnoea

**Psychology**
“It may or may not really be helpful and managing this continues to be a challenge because it’s about psychological dependence and anxiety”

**Review**
“If someone was dyspnoeic and I put oxygen in I would get them to phone me if things hadn’t resolved”

**Alone**
“for people who live on their own, that index of caution is ratcheted up a little bit higher”

**Variance – smoking**
“some patients are sensible and go outside to smoke”
“we never prescribe oxygen to people who continue to smoke”

**Carers**
It is sometimes easier to initiate home oxygen when not indicated to “treat the caregivers anxiety”

Carer – “I need to give up work because what if the oxygen failed”
Cochrane review

• Oxygen therapy for dyspnoea in adults
  – 8 studies, 144 participants
  – Cancer (97), heart failure (35), kyphoscoliosis (12)
• Failure to demonstrate beneficial effect of oxygen over air in cancer or heart failure
  – Limited by small number of studies and participants, and methods used
• Some cancer patients appeared to feel better during oxygen inhalation
Expert opinion

- 6 articles

- “Those who do benefit from oxygen should receive it, those who do not should not be burdened with its disadvantages. Individualised care is paramount.” (Booth\textsuperscript{14})

- Side-effects and burdens widely acknowledged
Expert opinion

• Hanlon\textsuperscript{15}
  – Consideration of withholding versus withdrawing
  – If oxygen is to be used, we should consider how much
• Lorenzo\textsuperscript{16}
  – Early evaluation of whether oxygen is beneficial recommended
• Goody\textsuperscript{17}
  – Education re fire risks required
  – Patients need to be aware what hospices can and can’t provide
Davidson\textsuperscript{18}

- Interesting thoughts on the cultural significance of oxygen
  - Symbolism as ‘life-saving’
  - Provides carers with something to do
  - Indiscriminate use of oxygen reinforces placebo effect
  - Suggests utilising other ways to manage dyspnoea
Home oxygen and fire risk

• Searched “home oxygen” AND smok*
  – 130 results
  – 87 once duplicates removed
  – 79 once foreign language articles removed
  – 13 relevant articles
Home oxygen and fire risk

- 6 case series describing a total of 106 patients who had burn injuries related to home oxygen \(^{19-24}\)
- 16 deaths
- Time periods of 2-10 years
- 3 papers reported increase in incidence in this type of injury
- ?under-reporting of these types of injuries
Home oxygen and fire risk

- Estimated that 10-51% patients with LTOT continue to smoke
- Edelman\textsuperscript{21} and Kathawalla\textsuperscript{25} suggest oxygen should not be provided to patients who continue to smoke
- Robb\textsuperscript{20}, Murabit\textsuperscript{22} and Lindford\textsuperscript{24} recommend more aggressive patient education
- Edelman\textsuperscript{21} and Litt\textsuperscript{25} suggest guidelines should do more to address this issue
Davidson\textsuperscript{26}

Survey of home oxygen provision in London

100 respondents

- 75% LTOT prescribed in secondary care yet follow up arranged in only 35%
- 70% Community Teams informed “Not at all” or “Only sometimes” of patients commenced on oxygen
- Fire safety officers informed of persistent smokers in 16%
- Only 35% had local guidance on fire risk
- 3 units denied LTOT to smokers
Literature review

• Strengths
  – Variety of literature reviewed
  – Comprehensive database search

• Limitations
  – Trials of short duration
  – Small numbers of participants
  – Limited evidence

• Uncertainties
  – Role of heliox
  – Role of pressurised air
  – Ability to apply N of 1 assessment for patients


16. Lorenzo et al. Relieving terminal dyspnoea: oxygen or air. RT: For decision makers in respiratory care.
18. Davidson and Johnson. Update on the role of palliative oxygen. Current Opinion in Supportive and Palliative Care 2011;5(87-91)
Review of Existing Guidelines

Dr Aileen Scott

- COPD
  - Evidence for and against using oxygen for palliation of breathlessness at rest
- Advanced cancer
  - May be helpful for some patients, but little evidence to predict which ones
- Heart failure
  - Insufficient evidence for use of oxygen
APM

• Oxygen therapy may be one part of palliative or supportive care but is never a complete treatment in itself.

• Oxygen therapy in palliative care is more complex than the simple correction of hypoxaemia.

• The adverse effects of oxygen therapy need to be part of the assessment for each individual.

• LTOT for chronic respiratory illness should only be instigated by a respiratory physician.
Only in exceptional circumstances should oxygen be instigated for long-term, continuous use without a formal assessment of efficacy for breathlessness or quality of life.

Such assessment is probably most usefully done over a pre-determined period of time.

Treatment strategy may change and may need frequent reassessment.
British Thoracic Society Guidelines for Emergency oxygen use in adult patients

• Oxygen is a treatment for hypoxaemia, not breathlessness.
• Pulse oximetry must be available in all locations where emergency oxygen is used.
• The target saturation should be written on the drug chart.
• Oxygen should be administered by staff who are trained.
• Oxygen should always be prescribed or ordered on a designated document.
BTS Guidelines

• In breathlessness due to lung cancer, oxygen therapy may be beneficial and a trial of oxygen therapy is recommended.

• Aim at an oxygen saturation of 94-98% unless there is co-existing COPD.

• However, monitoring of oxygen saturation is not necessary when the patient is in the last few days of life.
For most patients with known COPD or other risk factors for hypercapnic respiratory failure, a target saturation of 88-92% is suggested.

It is recommended that the following delivery devices should be available in prehospital settings where oxygen is administered:

- Non-rebreath mask
- Nasal cannulae or simple face mask
- 28% Venturi mask
- Tracheostomy mask
RCP Domiciliary oxygen therapy services (1999)

- Domiciliary oxygen therapy can be prescribed for palliation of dyspnoea in pulmonary malignancy and other causes of disabling dyspnoea due to terminal disease.

- SBOT should be considered for episodic breathlessness not relieved by other treatments in patients with severe COPD, interstitial lung disease, heart failure and those in palliative care. Studies suggest this is most beneficial where dyspnoea is associated with hypoxaemia.
It is recommended that the patient receives education and written information about the principles of oxygen therapy and the reason for oxygen prescription.

This subject requires priority in undergraduate and postgraduate education programmes.
There are considerable dangers in the use of LTOT while a patient is continuing to smoke.

Patients are unreliable in their admission of cigarette smoking so objective measurement may be obtained.

Smoking cessation techniques should be optimised prior to any assessment or prescription.

In view of absence of definitive evidence, it would seem inappropriate to provide LTOT to patients unwilling to give up smoking.

Patients and family members must be warned about the dangers of smoking in the presence of oxygen-related equipment.
NICE COPD Guidelines (2010)

• Clinicians should be aware that inappropriate oxygen therapy in people with COPD may cause respiratory depression.

• Oxygen may be used to palliate breathlessness not relieved by other therapies.

• Patients should be warned about the risks of fire and explosion if they continue to some when prescribed oxygen.
**MCPCNAG Breathlessness Guidelines**

- A trial of oxygen should be considered in patients known to be hypoxaemic (SaO$_2$ <90%).

- Care is required in patients with known COPD and Type 2 respiratory failure.

- Oxygen saturations monitoring should be available.
MCPCANG

• Recommends use of minimum concentration of oxygen required to relieve symptoms in patients who are proven to be hypoxic.

• The patient should use oxygen for whatever time period they gain benefit over.

• The use of continuous oxygen may be burdensome...therefore the effect should be assessed within 72 hours.
MCPCNAG Breathlessness Standards

• When oxygen is given in an inpatient setting it should be prescribed on the medicine chart.

• Pulse oximetry should be used to measure oxygen saturation and only if the patient is hypoxic should prescribed oxygen therapy be trialled.
Prospective data collection of current practice: Survey of in-patient units

Dr Helen Bonwick
Does your clinical area/institution have an oxygen policy?

- Yes: 75.0%
- No: 25.0%

Categories:
- Yes
- No
- In progress
- Don't know
Do you have access to an oxygen saturation probe in your clinical area?
How often do you usually check oxygen saturations of patients using oxygen therapy?

- 28.6% Four hourly
- 57.1% Daily
- 14.3% Weekly
- Greater than weekly
- Do not check
- Only if symptomatic
- Unable to check as no stats probe
Is oxygen prescribed on a drug chart or equivalent in your clinical area?

- Always: 50.0%
- Sometimes: 25.0%
- Rarely: 25.0%
- Never: 0.0%
According to your clinical policy, is oxygen prescribed as a range (eg: 24%-40% / 2-3 litres a minute) or a specific flow rate on a drug chart or equivalent?
In order to accept a patient to be cared for in your clinical area/institution, what is the maximum oxygen percentage/litres that you would be able to deliver?

- 62.5%: No limit
- 25.0%: Flow rate greater than 11 litres
- 12.5%: Flow rate 6-10 litres
- Oxygen rate greater than 60% (indicated but not quantified)
- Oxygen rate between 40-59% (indicated but not quantified)
- Oxygen rate less than 40% (indicated but not quantified)
- Don’t know
Are there circumstances in which you would be unable to accept patients to your clinical area because their oxygen requirements could not be met? (This does not include patients on NIV)
What consumables do you have access to on a regular basis? Tick all that apply.
Is there an oxygen service local to your unit, to which patients can be referred for a specialist oxygen assessment?

- Yes: 75.0%
- No: 25.0%
- Don’t know: 0%
Do you have access to information leaflets for patients about the use of oxygen?

- Yes: 37.5%
- No: 37.5%
- Don’t know: 25.0%
Prospective data collection of current practice: Patient-based data

Dr Anthony Thompson
What is the patient's age?

- <40yrs: 4
- 40-54yrs: 6
- 55-64yrs: 7
- 65-74yrs: 11
- >75yrs: 7
Where is the patient?

- Home: 45.7%
- Hospital In-patient: 31.5%
- Hospice IPU: 17.1%
- Hospital OPD: 5.7%
- Hospice OPD: 5.7%
- Day therapy: 5.7%
Was the patient already on oxygen?

- 45.7% Already on oxygen
- 54.3% Commenced on oxygen
- Don’t Know

(The Marie Curie Palliative Care Institute, Liverpool)
Was the indication for oxygen clearly documented?

- Yes: 91.4%
- No: 5.7%
- Don't Know: 2.9%
What was the indication for oxygen?

- Hypoxia: 28.6%
- Symptom control: 65.7%
- Hypoxia and symptom control: 5.7%
- Improve mobility: 8.6%
- Improve prognosis: Not documented
- Patient request: Not documented
- Family request: Not documented
For patients already on oxygen, was any documentation available as to what oxygen the patient had been prescribed?

87.5%

12.5%

Yes

No
Is there evidence that oxygen has been titrated?

- Yes: 23.5%
- No: 35.3%
- No need for titration: 41.2%
- Inappropriate: 0%
Was there any evidence of side-effects documented? (Select all that apply)

- None noted
- Dry nose/eyes/mouth
- Pressure sores to ears/nose
- Claustrophobia
- Drowsiness
- Social isolation
- Risk of falls
- Fire risk
- Loss of independence
- Reduced prognosis

Percentage: 90%
Prescription of Oxygen

Was oxygen clearly prescribed?

Was flow rate documented?

Was % documented?

Was system of delivery documented?
eg Face Mask, Nasal specs

88.9%  81.5%  46.2%  59.3%  
7.4%  11.1%  46.1%  33.3%  
7.4%  7.7%  7.4%  
0.0%  20.0%  40.0%  60.0%  80.0%  100.0%
Was a target saturation documented?

89.3%

10.7%
How often were oxygen saturations recorded?

- More than once daily: 35.7%
- Daily: 17.9%
- As per symptom: 10.7%
- Never: 35.7%
- Not appropriate to check: 0.0%
Was patient discharged on oxygen?

- Yes: 48.1%
- No - No longer necessary: 14.8%
- No - still an in-patient: 29.6%
- No - patient died: 3.7%
- Don’t Know: 3.7%
If home oxygen was ordered, did you encounter any of the following problems?
(Tick all that apply)
If home oxygen was ordered, was the GP given the following information?

- That the patient had been given home oxygen
- The type of oxygen supplied e.g. LTOT, ambulatory
- The flow rate or percentage prescribed

![Bar chart showing percentages of responses.]

- Yes: 60%
- No: 70%
- Don't Know: 30%
Was a patient information leaflet given?

- Yes: 71.4%
- No: 21.4%
- Don't know: 7.1%
Prospective data collection of current practice: Survey of professionals

Sue Oakes
Which clinical area do you work in?

- Hospital Acute: 50%
- Hospital Specialist Palliative Care: 27%
- Hospice: 14%
- Community SPCT: 9%
Do you provide oxygen based on any clinical guidelines?

- Yes: 41%
- No: 32%
- N/A - do not provide: 27%
In your main setting, if you were to provide oxygen for a patient, how would it be prescribed?

- Prescribed on drug chart: 52%
- Prescribed on another written order: 14%
- A verbal order: 19%
- Prescribed electronically: 10%
- N/A - do not provide: 5%
Do you feel confident in providing oxygen?

- Yes: 70%
- No: 10%
- N/A - do not provide oxygen: 20%
Have you received training in relation to completion of HOOF forms and equipment available?

- 41%: HOOF part A
- 18%: HOOF part B
- 32%: Both HOOF part A and B
- 9%: Neither HOOF part A or B
- N/A: do not order oxygen
Have you filled out the following HOOF forms to supply patients with oxygen?

- **50.0%**: HOOF Part A
- **13.6%**: HOOF Part B
- **13.6%**: Both HOOF Parts A and B
- **18.2%**: Neither HOOF Part A nor B
- **4.5%**: N/A Do not order oxygen
When a patient is newly commenced on oxygen therapy, do you reassess 72 hours post commencement?

- All of the time: 32%
- Most of the time: 26%
- Occasionally: 21%
- Never: 21%
For in-patients, do you routinely monitor daily oxygen saturations of patients on oxygen?

- All of the time: 44%
- Most of the time: 13%
- Occasionally: 13%
- Never: 31%
For which disease groups of patients do you currently order oxygen?
For which reasons/conditions would you suggest or prescribe oxygen in your setting?

- Hypoxic patient: 100%
- Breathlessness: 95%
- Terminal breathlessness: 70%
- Cough: 10%
- Cluster headaches: 15%
- Panic/anxiety: 30%
- Comfort: 65%
- Patient request: 50%
- Family request: 15%
- Pre-existing medical condition eg COPD/HF: 75%
- For use of nebuliser: 30%
- Fatigue: 5%
What clinical benefit would you expect for the patient when you arrange oxygen therapy?

- Symptom control: 45%
- Improve hypoxia: 40%
- Improve QOL: 15%
comments

- If they would be smoking in the same room as oxygen is.
- CO2 retaining patient
- If they were currently smoking.
- A patient with CO2 retention that has not had an oxygen assessment.

Are there any circumstances when you would not prescribe/order oxygen for a patient?
In what circumstances would you not order oxygen?

- Fire risk: 39%
- None of the above: 39%
- CO2 retention: 28%
- Smoker: 22%
- When advice is needed: 22%
- Not hypoxic: 11%
- When concentration of oxygen...: 6%
- Lack of space in the area: 0%
- Trip hazard: 0%
Comments

- Do not order oxygen
- Liaise with oxygen specialist service x2
- Suggest undertake risk assessment
- I have not prescribed oxygen to patients who are smokers
- Advise patients not to smoke whilst oxygen is on and document discussion
What problems do you regularly see in patients using oxygen? Tick as many as appropriate.
What checks/assessment would you undertake prior to considering prescribing/ordering oxygen?

- Arterial blood gas: 13%
- Shuttle test/6 minute walk test: 0%
- Breathlessness assessment tool: 19%
- Oxygen saturations: 69%
- Smoking risk assessment: 38%
- Past medical history: 81%
- Whether the patient has an alert card: 31%
- Positioning of patient: 6%
- Trip hazard: 6%
- Would not consider any: 6%
Based on your experience, overall how often do you find oxygen therapy helpful in relieving breathlessness in patients at the end of life?
Are you aware of how to order specialist oxygen equipment? eg ambulatory oxygen

- Yes: 67%
- No: 19%
- Not sure: 14%
Can you access a home oxygen assessment for your patients if needed?

- Yes: 55%
- Not sure: 9%
- Unaware that such a service exists in my area: 36%
Guidelines – General Principles

• Oxygen is commonly used in the management of breathlessness in palliative care.

• Breathlessness is a common symptom at the end of life, and the aetiology may be multifactorial.\textsuperscript{1,2,3}

• Patients with a variety of conditions, including Chronic Obstructive Pulmonary Disease (COPD), heart failure, neurological conditions as well as malignancy (which may or may not have a pulmonary component) may experience breathlessness.\textsuperscript{3}
• Traditionally, oxygen may have been considered a benign therapy with little potential to do harm.

• However, there are many potential side effects associated with oxygen, not all of which are physical. \(^3,4,5,6\)
Guidelines – General Principles

• Oxygen can have a symbolic association of being ‘life-saving’ which may lead to a psychological dependency.⁵

• Although long-term oxygen therapy (LTOT) has been shown to improve survival in patients with COPD, the literature on the symptomatic benefits of oxygen is lacking.⁷,⁸
• The research that has been done does not show that oxygen is more beneficial than medical air for symptomatic relief in palliative patients.

• However some patients may feel that their symptoms are relieved by oxygen. ⁸

• Provided risks and benefits are weighed up and the patient is counselled, a trial of oxygen for symptomatic benefit is reasonable. ⁶,⁹,¹⁰,¹¹ [Level 4]
• Before providing oxygen to a patient, consideration should be given to whether it would be appropriate to exclude reversible causes of their symptoms.

• Other strategies for symptom control can be utilised simultaneously (see MCPCNAG Breathlessness guidelines).¹²
• Palliative patients being considered for oxygen therapy for symptom control may undergo assessment using various tools, including BORG, VAS, MRC Dyspnea score.\textsuperscript{13} [Level 2]

• Measurement of oxygen saturations may also be used to inform decision-making around use of oxygen therapy. [Level 4]
Guidelines - Monitoring

• The British Thoracic Society recommends that, in patients with lung cancer and other cancers with pulmonary involvement, the target oxygen saturation should be 94-98%.

• Where appropriate, medical staff should determine target saturations for each patient on oxygen and document this.\textsuperscript{10} [Level 4]

• However, this may not be appropriate in some palliative patients, and in this instance oxygen can be titrated according to symptoms.\textsuperscript{10} [Level 4]
Guidelines - Monitoring

- Services should have access to appropriate equipment to measure saturations and a range of consumables to deliver oxygen at a particular flow rate or concentration.\(^ {10}\) [Level 4]

- It is recommended that when oxygen is commenced, patients should be reassessed after 72 hours, and the oxygen should be discontinued if it has not been beneficial.\(^ {6,12,14}\) [Level 3]
Guidelines – Table 1

### Side effects and risks of oxygen therapy

- Dry nose/eyes/mouth
- Pressure sores to ears or nose
- Drowsiness
- Hypercapnic respiratory failure
- Claustrophobia
- Loss of independence
- Psychological dependence
- Social isolation
- Risk of falls
- Fire risk
Inappropriate oxygen therapy in patients with COPD and some other disorders (see Table 2) may lead to hypercapnic respiratory failure and respiratory depression. Monitoring oxygen saturations is of particular relevance in patients with COPD, and all staff should be aware of the potential problems associated with these patients.\textsuperscript{15} [Level 2]
Patients at risk of hypercapnic respiratory failure

- COPD
- Neuromuscular disorders
- Severe kyphoscoliosis
- Overdose of opioids or benzodiazepines
- Severe scarring from old tuberculosis
Guidelines – Side effects and risks

- Patients who continue to smoke while provided with oxygen are at greater risk of adverse consequences, including causing fires and burn injuries.\(^{16,17,18,19}\)

- In this circumstance, the patient warned of the risks. Health professionals should undertake a full risk assessment and inform the appropriate authorities. This issue should be addressed in the local policy.\(^{16,20,21}\) [Level 4]
Guidelines - Prescribing

- Oxygen is a drug, and should be prescribed appropriately. This may be on a handwritten drug chart or via an electronic prescribing system.¹⁰ [Level 4]

- Prescribers should be trained on the oxygen systems available in the community and how to order these.¹¹ [Level 4]

- When a patient is to be discharged with oxygen therapy, referral to the local oxygen service for assessment should also be considered. [Level 4]
Standards

1. Services should have a policy for the use of oxygen. [Grade D]

2. Services should have equipment available to measure oxygen saturations. \(^ {10,12} \) [Grade D]

3. The indication for the use of oxygen should be clearly recorded in the patient documentation. [Grade D]
4. Oxygen should be prescribed, including flow rate or percentage and system of delivery.\textsuperscript{10} [Grade D]

5. If it is appropriate to measure oxygen saturations in a patient using oxygen, a target range for saturations should be documented.\textsuperscript{10} [Grade D]
6. Use of oxygen should be reviewed within 72 hours of it commencing. If it has not been beneficial, consider whether it should be discontinued.\textsuperscript{12} [Grade D]

7. A patient information leaflet should be given to all patients commenced on oxygen.\textsuperscript{11,15} [Grade D]
8. Training should be given to all staff involved in administering or prescribing oxygen. [Grade D]

9. If oxygen is provided for a patient who continues to smoke, a risk assessment should be carried out and the patient should be counselled on the risks. This should be clearly documented. [Grade D]
10. For patients who are discharged on oxygen, the GP should be provided with information on the equipment supplied, the flow rate or percentage of oxygen and the delivery system used. [Grade D]
References

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12. Merseyside and Cheshire Palliative Care Network Audit Group. Guidelines for the management of intractable breathlessness in palliative care.
Comments from Dr Ledson