## Inclusions

- Oxygen concentrator (with standard supply of nasal cannulae and extension tubing)
- Rental of one (1) backup (D-size) cylinder as an emergency backup for clients on continuous oxygen (24 hours/day) living > 2 hours from their closest hospital if requested and supported with justification.
- Ongoing rental of two (2) portable (C-size) oxygen cylinders with regulator flow meter or conserver device under special circumstances (see portable oxygen criteria)
- Cylinder oxygen may be considered when the required flow rate cannot be delivered by an oxygen concentrator

## Exclusions

- Intermittent, episodic oxygen or emergency therapy (except in special circumstances)
- The first 3 months supply of Short Term Oxygen Therapy for palliative care clients (these need to be managed by the LHN; local health network policies and procedures apply)
- The first month’s supply of STOT for all other clients (these need to be managed by the discharging hospital)
- Neonatal oxygen therapy (0 – 6 months are to be supplied by neonatal units)
- Alternate oxygen delivery systems (e.g. face masks)
- Cost of refilling portable (C-size ) cylinders and ongoing delivery charges
- STOT (D/C oxygen) for clients discharged from private hospital
- Portable systems when the prescription is for nocturnal use only
- STOT (D/C oxygen) for clients discharged from private hospital
- Conserver devices will not be provided except for older children following trial which confirms appropriate triggering
- Provision of additional oxygen equipment specifically for use at school.

## Other Supply Information

<table>
<thead>
<tr>
<th>Contracts in place</th>
<th>313 Home Oxygen (valid 2011)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of equipment under other services</td>
<td>Consumers receiving services from any of the following are not eligible to receive support from EnableNSW: Residential health care facilities In receipt of third party compensation Other funding bodies i.e. Younger People in Residential Aged Care (YPIRAC)</td>
</tr>
<tr>
<td>Eligible Prescribers</td>
<td>Paediatric sleep, respiratory or palliative care physician.</td>
</tr>
<tr>
<td>Recommended review timeline</td>
<td>Review should be carried out between 2-3 months from initiation of oxygen and annually, unless otherwise stated in the guideline document</td>
</tr>
<tr>
<td>Transition to adult service consideration</td>
<td>Transition to adult services should commence between the ages of 16-18, and should be completed by the age of 18. New patients older than 16 should apply for equipment through the adult home oxygen guidelines.</td>
</tr>
<tr>
<td>Other Consideration</td>
<td>Complete separate applications for each type of equipment requested. For example, an existing CPAP client requiring bi-level and oxygen will need to submit a separate application for bi-level and oxygen. For existing clients already on LTOT or PAP therapy, requesting either additional therapies due to deterioration, only an application for the new therapy will need to be submitted. Under exceptional circumstances, where the consumer lives in a remote area and does not have ready access to specialist services, other evidence to support the ongoing need for oxygen may be considered i.e. oximetry.</td>
</tr>
</tbody>
</table>

## Equipment Eligibility Criteria

**Domiciliary oxygen may be funded by EnableNSW when:**

This guideline refers to the provision of oxygen therapy equipment for clients < 16 years of age,
deemed clinically stable and can be safely managed in the community (at least 4 weeks out from acute exacerbation). This includes clients prescribed oxygen long term from clinic rooms.

1 Short Term Oxygen Therapy (STOT)

All clients eligible for the provision of STOT oxygen under the EnableNSW STOT guidelines will be provided with an oxygen concentrator as the primary device.

For the application of portable oxygen cylinders in addition to the concentrator device (for clients prescribed 24 hour oxygen), a justifying letter from the prescriber is required.

The prescription should include the means of oxygen delivery, duration and the rate of oxygen flow. The rate of oxygen flow prescribed should aim to achieve PaO$_2$ ≥ 60 mmHg (or ≥ 90% at rest). In addition, clients should use therapy as prescribed (≥ 16hrs/day continuous or ≥ 6hours nocturnal).

1.1 STOT for clients with hypoxaemia on discharge from hospital

Clients should be advised to use therapy for as much of the day as possible (≥ 16 hours/day).

STOT may be provided on the treating physicians request for those clients with chronic lung disease who meet ALL of the following criteria:

i. in hospital with an acute exacerbation AND

ii. in the recovery phase of their exacerbation (within 1 or 2 days of discharge) AND

iii. A prolonged recording (i.e. oximetry) whilst breathing room air demonstrates hypoxaemia with SpO$_2$ ≤ 90% for more than a third of the artefact free recorded time OR ≤ 80% for more than 10% of the artefact free recorded time AND

iv. At least the first 4 weeks of oxygen has been funded by the discharging hospital

Review Recommendation

Clients are required to return to their prescribing physician/team for clinical review and blood gases whilst breathing room air and in a stable state. Clinical assessment should be performed within 4 weeks before the end of the STOT provision period, to determine the need for ongoing therapy and preparation for LTOT application. Where the client is unable to access a specialist directly, details of the client’s clinical history, blood gases and need for ongoing therapy should be directed to an appropriate specialist by the client’s local doctor for approval.

If the client meets the criteria for LTOT for hypoxaemia (see below) an application for LTOT should be made by the prescribing physician to EnableNSW.

1.2 STOT for treatment of nocturnal hypoxaemia on discharge from hospital

Positive pressure devices (usually CPAP) are the treatment of choice for clients with upper airway obstruction leading to nocturnal oxygen desaturation. If PAP therapy is indicated, treatment studies must be performed whilst on PAP therapy.

STOT may be provided on the treating physicians’ request for clients who meet ALL the following criteria:
Paediatric Home Oxygen Prescription and Provision Guidelines

Developed in collaboration with LTCSA and the NSW ACI – Respiratory Network

i) Significant hypoxaemia characterised by repetitive nocturnal desaturations to ≤ 85% during artefact free recording (i.e. polysomnography or oximetry) whilst breathing room air, associated with central apnoeas and/or central hypopnoea that responds to oxygen OR

ii) A prolonged recording (i.e. polysomnography or oximetry) whilst breathing room air including periods of wakefulness and sleep, demonstrating hypoxaemia confined to sleep with SpO₂ ≤ 90% for more than a third of sleep time OR ≤ 80% for more than 10% of sleep time (artefact free recording) that responds to oxygen AND

iii) Objective evidence that improved oxygenation due to oxygen therapy is not associated with significant CO₂ retention ≥ 15 mmHg (i.e. Bicarbonates, blood gas or prolonged CO₂ recording) AND

iv) In hospital with an acute exacerbation AND

v) In the recovery phase of their exacerbation (within 1 or 2 days of discharge) AND

vi) At least the first 4 weeks of oxygen has been funded by the discharging hospital

Review Recommendation

Clients are required to return to their prescribing physician/team for clinical review and blood gases whilst breathing room air and in a stable state. Clinical assessment should be performed within 4 weeks before the end of the STOT provision period, to determine the need for ongoing therapy and preparation for LTOT application. Where the client is unable to access a specialist directly, details of the client’s clinical history, blood gases and need for ongoing therapy should be directed to an appropriate specialist by the client’s local doctor for approval.

If the client meets the criteria for LTOT for nocturnal hypoxaemia (see below) an application for LTOT should be made by the prescribing physician to EnableNSW.

2 Long Term Oxygen Therapy (LTOT)

All clients eligible for the provision of LTOT under the EnableNSW LTOT guidelines will be provided with an oxygen concentrator as the primary device.

The prescription should include the means of oxygen delivery, duration and the rate of oxygen flow. The rate of oxygen flow prescribed should aim to achieve PaO₂ ≥ 60 mmHg (or ≥ 90% at rest). In addition, clients should use therapy as prescribed (≥ 16hrs/day continuous or ≥ 6 hours nocturnal).

Most children can be considered for cessation of oxygen therapy once stable on 0.125L/min. LTOT will be continued if clients continue to meet the prescription eligibility criteria.

LTOT may be provided on the treating physicians’ request for clients who meet the following criteria from EITHER section 2.1 or 2.2 and where

2.1 LTOT for chronic hypoxaemia

LTOT may be provided on the treating physician’s request for clients who meet ALL of the following criteria;

i. Prolonged oximetry monitoring (6-12 hours) whilst breathing room air, demonstrates hypoxaemia with desaturation to ≤ 90% for ≥ 5% of the artefact free recording period.
**AND** mean $\text{SpO}_2 \leq 93\%$. This recording should include periods of relaxed wake, sleep, feeding and activity **AND**

ii. Prolonged monitoring (6-12 hours) report whilst clinically stable and on oxygen, demonstrating objective improvement in oxygen saturation. This recording should include periods of relaxed wake, sleep, feeding and activity **AND**

iii. Objective evidence that improved oxygenation is not associated with significant $\text{CO}_2$ retention (i.e. Bicarbonates, blood gas or prolonged $\text{CO}_2$ recording) **AND**

iv. Investigations of oxygenation were carried out during a period of clinical stability i.e. at least 4 weeks out from an acute exacerbation

**Recommended Review**

A review of the client is recommended at 4-8 weeks after commencement of oxygen therapy, then subsequent review annually. During the review, compliance with the therapy prescription should be considered (i.e. ≥16hrs/day), attainable through meter readings from the oxygen supply company.

### 2.2 LTOT for nocturnal hypoxaemia

Positive pressure devices (usually CPAP) are the treatment of choice for clients with upper airway obstruction leading to nocturnal oxygen desaturation. If PAP therapy is indicated, treatment studies must be performed whilst on PAP therapy.

Some clients with other disorders (e.g. cystic fibrosis, obstructive sleep apnoea, sickle cell disease) may show oxygen desaturations repetitively to ≤ 90% during sleep.

To be considered eligible for provision of oxygen equipment by EnableNSW, **at least one** of the investigation modalities submitted to support the application must be a full polysomnographic study. The exception to this is Palliative care where submission of limited studies to support the application is sufficient.

However, nocturnal oxygen may be provided on the treating physician’s request for those clients with nocturnal desaturation who meet **ALL** of the following criteria:

i. Full diagnostic PSG or limited sleep study whilst breathing room air, indicating nocturnal $\text{SpO}_2 \leq 85\%$ for ≥ 5% of the night **AND** mean $\text{SpO}_2 \leq 93\%$ **OR**

ii. Significant hypoxaemia characterised by repetitive nocturnal desaturations to ≤ 85% during artefact free recording whilst breathing room air, associated with central apnoeas and/or hypopnoea that responds to oxygen **AND**

iii. Objective evidence of improvement (e.g. improved mean nocturnal $\text{SpO}_2$ on either a PSG or pulse oximetry) on nocturnal oxygen with/without PAP therapy to confirm the ongoing need for oxygen therapy **AND**

iv. Objective evidence documenting that no significant or unexpected rise in nocturnal $\text{CO}_2$ levels (≥ 15mmHg) occurred from oxygen therapy (i.e. blood gas, bicarbonates or prolonged $\text{CO}_2$ recording) **AND**

v. Nocturnal investigations of oxygenation were carried out during a period of clinical stability i.e. at least 4 weeks out from an acute exacerbation

**Recommended Review**

A clinical review is recommended at 2-3 months then annually following commencement of therapy to ensure client stability, compliance and the need for ongoing oxygen therapy. For
continuation of oxygen therapy, compliance with the therapy prescription should be confirmed (i.e. ≥ 6hrs/day), attainable through meter readings from the oxygen supply company.

### 3 Portable Oxygen

Portable oxygen therapy may be prescribed for children who require continuous (24 hr) long term oxygen therapy. Justification is required such as a letter from the prescriber indicating the need for portable oxygen therapy.

<table>
<thead>
<tr>
<th>Social/care criteria</th>
<th>It is the responsibility of the Prescribing physician/clinical teams to submit/organise and ensure the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client and/or relevant users (family/carers) must be capable of using the equipment safely and appropriately, including basic equipment care and minor troubleshooting.</td>
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</tr>
<tr>
<td>Client is aware that they will be required to self fund the costs of portable cylinder refills including delivery charges.</td>
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</tr>
<tr>
<td>Client/primary carer should retain a copy of prescription settings which should be attached as a clearly visible and dated card on the device and updated where indicated by prescribing clinical team. Client must be willing to comply with device usage as prescribed by their treating physician and aware of data collection regarding compliance with therapy.</td>
<td></td>
</tr>
<tr>
<td>Provide client with information about their ongoing treatment plan, clinical review and assessment requirements in relation to oxygen therapy. This may include information about regular follow-up as per the prescription of home oxygen.</td>
<td></td>
</tr>
<tr>
<td>Client and/or carer must be aware of emergency procedures in the event of respiratory equipment failure. Emergency procedures may include presentation to hospital. NB: EnableNSW and contracted equipment suppliers do not provide a 24 hour equipment support contact line.</td>
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<td></td>
<td></td>
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<tr>
<td>Client and other residents in the home do not smoke in close vicinity to the client and/or oxygen equipment and have been educated regarding the risks of using oxygen in the home while using electrical and gas appliances.</td>
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</tr>
<tr>
<td>Notification of EnableNSW if the equipment is no longer required or the client does not comply with documented prescription</td>
<td></td>
</tr>
<tr>
<td>Life style issues should be addressed and appropriate referrals made</td>
<td></td>
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<tr>
<td></td>
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</tr>
<tr>
<td>Environmental Factors</td>
<td>It is the responsibility of EnableNSW to ensure the following:</td>
</tr>
<tr>
<td>Ensure oxygen equipment prescribed is compatible with all other equipment prescribed or in use.</td>
<td></td>
</tr>
<tr>
<td>Client has received information on the safe use of equipment following Occupational Health &amp; Safety guidelines.</td>
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</tr>
<tr>
<td>Equipment Factors</td>
<td></td>
</tr>
<tr>
<td>In most clients delivery will be via nasal prongs. These should be extra soft in cases of continuous use.</td>
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</tr>
<tr>
<td>At flow rates above 3L/min, an alternate delivery device (e.g. face mask or oximiser) may be more comfortable. However, monitoring of the client is required to ensure rebreathing is not occurring. Alternate devices are not provided by EnableNSW.</td>
<td></td>
</tr>
</tbody>
</table>
EnableNSW will ensure the equipment supplier arrangements as per the NSW Home Oxygen contract (313) include:

i) Delivery of the device/s to the client or Health Service
ii) Equipment that complies with the Therapeutic Goods Act and have a valid Australian Register of Therapeutic Goods (ARTG) number
iii) If equipment is to be removed for repair, maintenance or testing an equivalent loan unit will be available to the client. This loan unit will have a current Safety and performance Safety Test according to the most current version of CAS/NZS:3551 Technical management programs for medical devices.
iv) The service supplier has provided contact details that are known to the client or carer and the contact number is clearly displayed for accessing repairs, maintenance and/or replacement device with a safe turnaround time for response.
v) Serial numbers and service history of the device will be maintained by EnableNSW
vi) Durability and lifespan (typically 10 years) of the equipment is appropriate for the documented/proposed environment.

In addition, oxygen concentrator run hours and cylinder usage and reordering patterns will be collected by the supplier and reviewed by EnableNSW on a 6 monthly basis. EnableNSW will notify the consumer and the prescriber if the consumer is not achieving satisfactory compliance or cylinder reordering rates. EnableNSW will notify the consumer and prescriber if non-compliance or low cylinder usage is determined in the review.

**Additional resources:**

**Prompts for clinical decision making**

**How do you make a clinical decision about which piece of equipment is most suitable?**

Generally oxygen is only required for a limited period of time in children with improvement over time as opposed to adults who are more likely prescribed oxygen for deteriorating conditions.

Low levels of oxygen are associated with poor growth, neuro-developmental delay (including effects on cognition and behaviour) and the development of secondary pulmonary hypertension.

Blood gases are less commonly used for assessment in the paediatric population where reliance is far more on the results of continuous transcutaneous carbon dioxide and oximetry monitoring. However blood gases are important in the assessment of hypoventilation to monitor daytime hypercarbia.

Equipment varies from that used in adults – low flow meters are frequently used (0.125-1L/min) while conserver devices are not used on portable systems.

Portable systems are more essential to allow normal functioning of the family within the community to allow social development of the child.

Suitability for long-term oxygen therapy should be assessed by a paediatric respiratory or palliative care physician and must include an assessment of the home environment and the parents/carers ability to manage all daily cares of the client whilst on oxygen therapy.

**Home oxygen therapy**

Paediatric clients requiring home oxygen therapy will fall into one of the following groups:

**Respiratory Disease**

**Chronic lung disease**

CLD is the main indication for oxygen therapy in younger children. With increased survival of very low birth weight the incidence of this condition has increased.

Oxygen therapy should be given to reduce or prevent pulmonary hypertension.
intermittent desaturations thereby reducing airways resistance and to promote growth and development.

Oxygen therapy should be targeted to reduce desaturations and therefore reduce the risk of pulmonary hypertension, treat reversible obstructive lung disease and reduce the complications of poor growth and altered neuro-development.

**Interstitial lung disease**
These conditions are rare in children but are related to altered gas exchange and many children suffering from these conditions require LTOT.

**Obliterative bronchiolitis**
While the underlying cause of this condition is often unknown, LTOT may be required to reduce the effects of the resultant obstructive lung disease if hypoxia is present.

**Bronchiectasis (cystic fibrosis/other)**
Monitoring of CO$_2$ levels should be performed when LTOT therapy is initiated for hypoxic children with these conditions.

**Chest wall disorders**
Infants with disorders of the chest wall (e.g. severe congenital kyphoscoliosis and thoracic dystrophy) are associated with restrictive lung disease and may have resultant hypoxaemia. LTOT should be considered in these conditions.

**Neuromuscular disorders**
Nocturnal hypoventilation should be treated with non-invasive ventilation in the first instance. In some children, adequate oxygenation cannot be maintained with NIV alone and LTOT may be required.

**Palliative care hypoxemia**
Oxygen therapy will be considered for hypoxaemia during palliative care treatment.

**Other lung conditions**
Other less common conditions that may require LTOT include pulmonary hypoplasia, congenital pneumonia and meconium aspiration. Damage to the lungs may also be seen post repair of congenital diaphragmatic hernia.

**Non-cardiac intrapulmonary shunting**
Whilst there are no relevant publications regarding the benefits of LTOT in this condition, it may be considered if there is documented improvement associated with long term continuous treatment of oxygen desaturation.

**Cardiac/Vascular Disease**

**Pulmonary hypertension (cardiac or pulmonary origin)**
Secondary pulmonary hypertension common in neonatal lung diseases as a consequence of chronic hypoxia. LTOT reduces or reverses the progress of these hypoxia related changes.

Primary pulmonary hypertension may also be associated with sleep related hypoxia secondary to hypoventilation which may be treated with LTOT.

**Congenital heart disease**
In general, LTOT is only indicated for those with secondary pulmonary hypertension, where oxygen saturation may need to be maintained at higher levels. Cyanotic congenital heart disease is rarely altered by the use of LTOT unless there are accompanying respiratory conditions.
Other considerations:
Prolonged measurement of oximetry (6-12 hours) including periods of sleep are advised to support the requirement for continuous oxygen therapy.

A one off measurement of PaO$_2$ does not accurately reflect oxygen levels throughout the day but morning PaCO$_2$ levels (arterial or capillary sample) may be necessary to accurately assess control of hypoventilation in sleep for those clients on nocturnal ventilation.

Oxygen should be titrated to maintain mean oxygen saturations ≥92% with no more than 10% of the artefact free recording period spent <90%. Exceptions need clinical justification.

Children should be able to cope with short periods off oxygen therapy without rapid deterioration to ensure safety in case of dislodgement of their oxygen therapy.

Children should otherwise be stable with no other conditions requiring continued monitoring in hospital.

Bibliography: