Practitioner Manual for Domiciliary Oxygen Program

A Manual devised by the SWEP Clinical Advisory Team to assist SWEP registered practitioners

Acknowledgements for information and use of images goes to: Air Liquide Healthcare

Images in this manual have been used to demonstrate the range and breadth of features available within this AT category. However, images provided should not be considered an endorsement of a particular product; nor should they be considered an exhaustive list of all products or features available. As a practitioner you need to use due diligence to ensure that the item and supplier you recommend is best suited to your consumer, their wishes and needs. SWEP will not be held liable for any mismatch of consumer and AT interface that has resulted from the use of Images or information in this manual.

Contents

Background

The State-wide Equipment Program (SWEP) Clinical Advisors have developed this resource manual to:

- Provide useful information for practitioners
- Give links to evidence-based practices
- Recommend assessments to assist with identifying successful oxygen solutions
- Outline potential risks to consider related to the consumer, support people and the environment
- Describe relevant items and provide links to a range of product types and options

Guidelines and application process

SWEP offers eligible practitioners a registration and credentialing process, whereby credentialing levels are assigned for specific areas of practice according to *The Standard*. For full details on all available credentialing pathways please refer to the relevant standard and information found below.

The Standards: https://swep.bhs.org.au/the-standard.php

Process for registration and credentialing: https://swep.bhs.org.au/registration-and-credentialing.php

SWEP also provides an online application portal to collect and manage requests for Oxygen items. This is integrated with the registration and credentialing framework to match AT Practitioner level with consumer and item complexity and establish the urgency of consumer need.

Please refer to the funding body for which your consumer is eligible to determine the relevant guidelines for what types of Oxygen items will be considered for funding, and whether or not the SWEP portal should be used to submit an application.

Products Supplied (summary)

The Domiciliary Oxygen Program fund

- Portable cylinders
- Stationery and portable concentrators
- Oxygen cylinder holders
- Oxymizer

SWEP Eligibility

A person is NOT eligible for SWEP funded oxygen equipment if:

- An inpatient of a public or private hospital
- The oxygen related issue is not or is not known to be of a permanent nature (not including ex prem infants with chronic lung disease)
- The consumer does not fall within the Thoracic Society Guidelines:
  - Adults: TSANZ Domiciliary Oxygen Guidelines
  - Children: TSANZ Domiciliary Oxygen Guidelines Infants with CNLD
- The consumer is a current smoker or has resumed active tobacco smoking (including e-cigarettes) once approved for domiciliary oxygen. Please see Relapsed Smoking for more information.
- The oxygen is to be used for occasional use, or for use with nebulisers, suctioning equipment or for occasional exacerbations of asthma.

Hospital Discharges

Public Hospitals

Public hospitals supply one month of oxygen equipment at no cost to the consumer on discharge. After 30 days the consumer is reassessed to determine if they require long term oxygen therapy. If appropriate, a SWEP application is completed and submitted at this time.

Private Hospitals

Consumers will be accepted to the program providing they are eligible for SWEP funding upon discharge from a private hospital. A 48-hour processing period is required to allow for initial processing of the application and for equipment delivery to be arranged. Eligible consumers will be “Provisionally Approved” until their 30-day post discharge review is received, and their continued eligibility is confirmed.

Annual Review

Annual clinical review is mandatory following commencement of therapy to ensure consumer stability, adherence and ongoing oxygen therapy requirements. Depending upon the consumer's clinical status, more frequent assessments may be required, and this is left to the discretion of the physician conducting the assessments.

SWEP sends the consumer an annual review form prior to the consumer's annual review due date. It is the consumer's responsibility to contact their specialist and arrange review and for the review form to be completed. We understand that it may take the consumer some time to see their specialist and have the review form completed. We ask that the consumer inform us of the review date if it is more than eight weeks after their due date to ensure that funding continues until the review is received.

As a minimum, SpO_2 after 10 min on room air, at rest, should be measured at annual review. SpO_2, ideally, should also be measured on currently prescribed O_2 flow/s to ensure O_2 requirements are being met. In some cases, arterial blood gases (e.g. known or at risk of hypercapnia, change in resting SpO_2 on air) and repeat walk assessments may be required (e.g. change in resting SpO_2, on or off supplemental O_2, from previous assessments).

The reviewing physician should review the current prescription and compare the current holdings against current usage to assess adherence with treatment. These will be provided on the Annual Review Form supplied to the consumer. Physicians are requested to confirm current prescription and holdings or update prescription and holdings on the Annual Review Form. SWEP can be contacted for current details, should they not be available at the time of consultation. If supplemental oxygen is no longer required, please document this on the Annual Review Form also.

If an annual review is not received by SWEP within a timely manner and all avenues have been exhausted to obtain an annual review update, the physician will be advised that funding cannot be continued.

Considerations for Practitioners/Equipment

Continuous Therapy

Long term continuous oxygen therapy (LTOT), ideally for supplementation > 18 hrs./day, is indicated to improve longevity when:

a. Stable daytime PaO2 is ≤ 55mmHg (7.3kPA) at rest; or

b. Stable daytime PaO2 is 56-59mmHg (7.4-7.8kPa) and there is evidence for hypoxic organ damage (including right heart failure, pulmonary hypertension or polycythaemia)

Flow should be set to maintain PaO2 >60mmHg (8kPa) (SpO2 > 90%) at rest, awake.

Arterial Blood Gases (current) **Date** _____

	Flow Rate	pH	PaCO2	PO2	SaO2	COHb	Hb
Air							
Intranasal O2							
Intranasal O2							

Echocardiogram **Date** _____ **RVSP** _____ mmHg **PASP** _____ mmHg

Please note: If COHb result is >3%, the physician should undertake a urinary cotinine test to confirm the client is not a current smoker.

Nocturnal Therapy

Nocturnal oxygen therapy may be prescribed:

1. For individuals who demonstrate SpO2 ≤ 88% for more than one third of the night due to their lung disease, particularly if they suffer sequelae such as pulmonary hypertension or polycythaemia.
2. In maximally treated chronic heart failure with symptomatic central sleep apnoea, or in patients intolerant of a continuous positive airway pressure device. Oxygen supplementation alone is not an appropriate first line therapy for nocturnal hypoxemia due to obstructive or central sleep apnoea. (Sleep study must be supplied)

Sleep Study **Date** _____ Percentage of sleep time SpO2 ≤ 88% _____

Intermittent Therapy

Intermittent oxygen supplementation may be prescribed for.

1. Consumers commencing long-term oxygen therapy (LTOT) who require portable oxygen for physical activities.
2. In occasional cases of consumers with chronic lung disease, where consumers do not have resting hypoxaemia severe enough to warrant LTOT, and in whom both exercise-related hypoxemia and measurable benefit have been demonstrated in outcomes such as exercise capacity or improvement in dyspnoea

To qualify for portable cylinders, the consumer must complete a 6-minute walk test or equivalent (Holland, et al., 2014) on both room air and on oxygen.

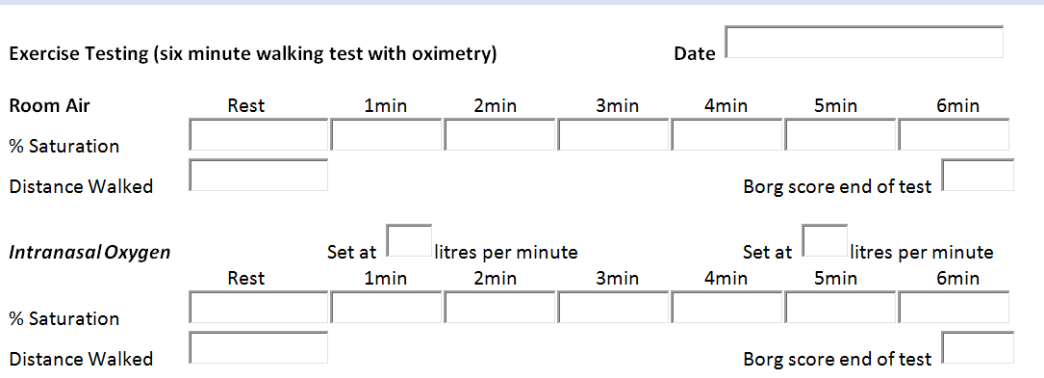
Reasons for Assessing Exercise Capacity (The Australian Lung Foundation, 2009)

Assessing exercise capacity in pulmonary rehabilitation patients is important because it allows the coordinator to:

- Determine the level of functional impairment and activity limitation
- Determine the factors that limit exercise capacity
- Provide information that will guide exercise prescription
- Identify oxygen desaturation during exercise and aid prescription of supplemental oxygen during training
- Evaluate the effectiveness of rehabilitation in altering exercise capacity and exertional dyspnoea

They must desaturate to ≤88% or below on room air and show a significant improvement in walk distance (>25m for distances >50m or >50% for distances <50m) and Sp02 with oxygen supplementation.

The exercise testing results are completed on the 2nd page of the Prescription Form:


Exercise Testing (six minute walking test with oximetry) Date

Room Air	Rest	1min	2min	3min	4min	5min	6min
% Saturation							
Distance Walked						Borg score end of test	

Intranasal Oxygen Set at litres per minute Set at litres per minute

	Rest	1min	2min	3min	4min	5min	6min
% Saturation							
Distance Walked						Borg score end of test	

For further resources and other information regarding the Borg score and/or the 6-minute walk test (or equivalent testing) please refer to The Australian Lung Foundation - Pulmonary Rehabilitation Toolkit

Paediatric Oxygen Prescription and Provision Guidelines

The equipment is essentially the same as that used for adults. However, low flow regulators and concentrators are used to deliver the required paediatric flow rates (0.125-1L/min). Continuous low flow regulators are used instead of conservation devices as children are unable to trigger the conservations devices.

All paediatric consumers eligible for the provision of continuous oxygen therapy and nocturnal therapy under the SWEP guidelines will be provided with an oxygen concentrator and portable cylinders (number of cylinders required is determined by the practitioner). This is to ensure that the child and family are able to access the community and to allow social development of the child.

Continuous Therapy

Paediatric consumers who meet the following criteria are eligible for continuous therapy.

- Oximetry monitoring whilst breathing room air demonstrates hypoxaemia with desaturation to ≤ 90% for ≥ 5% of the recording period (minimum recording period 1 hour or until persistent desaturation <90% at rest for > 1 minute or 30 seconds < 80%) and mean SpO2 ≤ 93%
- Oximetry monitoring whilst clinically stable and on oxygen, demonstrating improvement in oxygen saturation.

Please Note: The recordings should include periods of relaxed wake, sleep, feeding and activity.

Nocturnal Therapy

Paediatric consumers who meet the following criteria are eligible for nocturnal therapy.

- Full diagnostic Polysomnography (PSG) or limited sleep study whilst breathing room air, indicating nocturnal SpO2 ≤ 85% for ≥ 5% of the night and mean SpO2 ≤ 93%.
- Significant hypoxaemia characterised by repetitive nocturnal desaturations to ≤ 85% whilst breathing room air, associated with central apnoeas and/or hypopnoea that responds to oxygen.
- Objective evidence of improvement (e.g. improved mean nocturnal SpO2 on either a PSG or pulse oximetry) on nocturnal oxygen with/without PAP therapy to confirm the ongoing need for oxygen therapy.

Palliative Patients

Dyspnoea may not necessarily be associated with hypoxaemia and relief of hypoxaemia with oxygen therapy may not necessarily relieve dyspnoea. Therefore, Palliative consumers must meet the eligibility criteria for intermittent and continuous therapy.

Supplemental oxygen may provide symptomatic relief for people with intractable dyspnoea and significant hypoxaemia ($PaO_2 \leq 55mmHg$ or $SpO_2 \leq 88\%$ at rest) due to terminal illnesses, including late-stage lung disease.

Refer to Adult Oxygen Prescription and Provision Guidelines or Paediatric Oxygen Prescription and Provision Guidelines.

Relapsed Smoking

The risk of incineration whilst smoking (including e-cigarettes) and simultaneously using oxygen is very high and cannot be accepted by either SWEP or the supplier.

Smoking (including e-cigarettes) is a contraindication to supplemental oxygen therapy. Consumers must have ceased smoking at least 6-8 weeks prior to oxygen assessment being conducted and application for SWEP funding being submitted.

In the case of a patient on subsidised oxygen who commences smoking or relapses, subsidised oxygen funding will cease, and equipment be withdrawn immediately following notification to the consumer and the prescribing physician. It is recommended that in such circumstances the patient makes an early appointment to discuss further management with their prescribing physician and/or GP.

Evidence such as urinary cotinine, exhaled or serum COHb may be required prior to commencement or recommencement of Oxygen funding and therapy. NB: use of these methods as evidence of cessation of smoking is confounded by the following: cotinine may be detected in consumers using nicotine replacement therapy; COHb may be high for reasons other than smoking – e.g. exposure as a result of incomplete combustion of gases from home heater. Thorough history and counselling of patient is important to determine that smoking has ceased.

Please note: A Hospital admission date is not a valid cessation date.

Product Range and Features

The State-wide Equipment Program offers the following equipment. A comprehensive oxygen assessment by a Registered SWEP Practitioner is required to ascertain the most appropriate equipment and flow rate to meet the needs of the consumer.

1. Stationary Concentrators

Stationary concentrators produce oxygen by removing nitrogen from the room air. They do this by drawing air through molecular sieves (filters) – allowing oxygen to pass through, but not nitrogen. The sieves empty on a regular basis, returning nitrogen back to the room air. It is important that they are used in a well-ventilated area. The machine is about the size of half a standard chair. A long length of tubing 15m or 10.7m (50' or 35') allows movement throughout the house. Stationary concentrators are available in three flow ranges: up to 2L/min (most often used for paediatrics), 5L/min & 8L/min. Stationary concentrators provide a continuous flow of oxygen. SWEP funds concentrators for continuous & nocturnal therapy only. Concentrators are not available for clients who require intermittent therapy.

Individuals using stationary oxygen concentrators in their private homes should be registered with their electricity provider as having a piece of life support equipment in their home. Where the account holder holds particular concession cards, the account holder may also be entitled to a rebate on their electricity bill.

For further information, go to the Department of Human service website:
http://www.dhs.vic.gov.au/for-individuals/financial-support/concessions/energy/life-support-machine-electricity-concession

2. Portable Cylinders

Practitioners may request portable oxygen for intermittent usage only or in addition to a stationary concentrator. Portable cylinders are provided with a trolley or a bag to assist mobility and to allow access to the community. For patients using walkers or wheelchairs,

dedicated oxygen cylinder holders are available for use (see Oxygen Cylinder Holders for further details).

Rather than supplying cylinders with a standard oxygen regulator and flow metre, portable oxygen is generally supplied with an oxygen conserving device. The oxygen conserving device delivers a pulse of oxygen at the start of inhalation so that oxygen is not wasted during the expiratory phase of the respiratory cycle. As a result, the life of a cylinder is longer than if the cylinder was used with continuous flow.

The length of time it takes for a cylinder to empty depends on the cylinder size, pulsed or continuous flow, the setting/flow selected and the respiratory rate of the individual. It is important to consider the consumer's oxygen flow when assessing the number and size of cylinders they may require (refer to OCD Consumption table). Portable cylinders will be supplied as CH size (460 litre) unless otherwise stated on the application form.

A maximum of 8 cylinders per month will be provided to eligible consumers, though most require fewer than 8 in order to achieve their desired mobility away from home. Consumers should be made aware that they are to replenish their supply every month and not use their allocated number of cylinders over a number of months.

If a consumer is not using their monthly allocation, the package will be reduced to meet their current needs. The consumer should discuss their ongoing requirements with their prescribing physician. SWEP monitor this regularly and liaise with consumers to ensure their continued needs are met.

If a consumer requires an increase in their cylinder allocation they should contact SWEP. If it is determined that a practitioner needs to reassess a consumer, e.g. consumer requests increase from 4 to 8 cylinders, then SWEP will advise the consumer to contact their physician prior to the increase to ensure that the consumer is using their oxygen supply correctly and that their condition has not changed.

Both Metro and Regional consumers will have set days/delivery routes that they will deliver to the consumers. Regional clients will be advised of these details upon setup.

OCD Consumption Table:

Flow Rate	'B' 160L	'CH' 460L	'CL' 760L
1	10.2	29.5	48.7
2	5.8	16.6	27.5
3	4.0	11.6	19.2
4	3.0	8.5	14.1
5	2.4	7.0	11.5
6	2.0	5.6	9.3

**Estimated oxygen duration in hours for different cylinder sizes at settings 1-6 using an OCD at a rate of 20 breaths per minute.*

3. Portable Concentrators

Regardless of how many cylinders a consumer is using a month (max of 8 per month), the practitioner may request a portable Oxygen Concentrator (POC). However, SWEP is unable to fund portable oxygen cylinders AND a portable oxygen concentrator (POC).

A 6MWT must be completed on the requested POC as cylinders are measured by litres per minute (lpm) and the portable oxygen concentrators are measured by settings (1-5).

SWEP is able to fund both a stationary and portable concentrator in conjunction so long as this does not exceed the annual funding cap.

Portable concentrators operate on the same principle as a stationary concentrator but have significantly smaller molecular sieves and therefore are unable to generate the same volumes of oxygen per minute as a stationary concentrator. To overcome this, portable concentrators primarily deliver oxygen as a pulsed (on-demand) dose rather than continuous flow. There are some models available that are also able to deliver continuous flows up to 3 L/min. A portable concentrator should not replace a stationary concentrator as they are not designed for extended periods of use. As Portable concentrators provide a pulse dose, they are not recommended for nighttime or continuous use.

IMPORTANT: When operating in pulsed mode, a setting of 2 is not necessarily equivalent to a continuous flow of 2 L/min. In addition, output oxygen concentrations may vary

depending on the selected setting and the respiratory rate of the client. Hence, SWEP requires that a client be assessed using the same model of portable oxygen concentrator that they will be provided with to ensure the unit meets their needs and to document the settings appropriate for maintenance of oxygen saturation during exertion. The results of the assessment should be recorded on the Oxygen Prescription form.

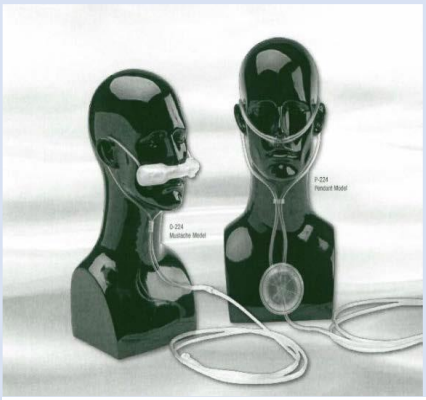
Please ensure the type of machine that the client was tested on is noted on the application. Contributing factors that would justify client eligibility for a portable concentrator should also be included on the form.

4. Backup Cylinders

SWEP provides a backup cylinder (E size – 4300 litres) for consumers who live in regional/remote areas and where medical assistance is not accessible. Back up cylinders are also provided to consumers who are on continuous therapy and reside in an area prone to frequent power outages and/or blackouts. SWEP will assess each request for a back-up cylinder to determine if it is reasonable to supply the back-up cylinder upon installation of equipment. As E-size cylinders are not portable, the technician will ensure that the cylinder is appropriately stored and secured upon setup.

Oxymizer

Oxymizers are worn similarly to nasal prongs but include a small reservoir (either immediately adjacent to the nose or as a pendant on the chest) that fills with oxygen during the expiratory phase of the respiratory cycle allowing a bolus dose of oxygen to be inhaled with the next breath. Oxymizers are used in conjunction with continuous flow equipment stationary concentrator or portable cylinders with standard regulator).



Oxymizer Pendant and Moustache Models

Oxygen Requirements with Standard Nasal Cannula	Oxygen Requirements with OXYMIZER Devices	Resulting Oxygen Savings
2.0 lpm	0.5 lpm	75.0%
3.0 lpm	1.0 lpm	66.67%
3.5 lpm	1.5 lpm	57.14%
4.0 lpm	2.0 lpm	50.00%
5.0 lpm	2.5 lpm	50.00%
5.5 lpm	3.0 lpm	45.45%
6.0 lpm	3.5 lpm	41.67%
6.5 lpm	4.0 lpm	38.46%
7.0 lpm	4.5 lpm	35.71%
7.5 lpm	5.0 lpm	33.33%
8.0 lpm	5.5 lpm	31.25%
8.5 lpm	6.0 lpm	29.41%
9.0 lpm	6.5 lpm	27.78%
9.5 lpm	7.0 lpm	26.32%
10 lpm	7.5 lpm	25.00%

Designed as a conserving device (able to achieve target oxygen saturations at lower oxygen flows), oxymizers are generally used in consumers with higher oxygen requirements for assistance in maintaining target saturations at lower flows. Oxymizers are disposable, single-patient use devices and should be replaced monthly.

If an Oxymizer is requested with any SWEP funded package, the flow required must be supplied to SWEP. Please note: Where an Oxymizer is requested, SWEP can fund up to a package of 8 portable cylinders or a stationary concentrator and 5 cylinders due to the funding cap.

Oxygen Cylinder Holders

SWEP will fund an oxygen cylinder holder to be fitted to either a walker or wheelchair. You will need to provide the details of the walker or wheelchair (if not SWEP owned) when requesting a cylinder holder. The request and details should be documented on the Oxygen Prescription Form. Please note that SWEP will provide a holder for either a walker or wheelchair, not both. CL cylinders (760litres) cannot be used in a cylinder holder as they are too large and will cause the equipment to fall over.

Example of a cylinder holder for 4 Wheel walker

Example of a cylinder holder for Manual Wheelchair

Contract/Tender Details

After a rigorous and robust evaluation process, SWEP has a single provider contracted for Oxygen Equipment. This has ensured that the equipment selected has been certified under the relevant Australian Standards, meets the specifications required by our consumer group and has been secured at the best value for money.

References

The Australian Lung Foundation. (2009, August). *Reasons for Assessing Exercise Capacity*. Retrieved from The Austrlian Lung Foundation - Pulmonary Rehabilitation Toolkit: http://www.pulmonaryrehab.com.au/index.asp?page=17

Anne E. Holland, Martijn A. Spruit, Thierry Troosters et al. An official European Respiratory Society/ American Thoracic Society technical standard: field walking tests in chronic respiratory disease. Eur Respir J 2014; 44: 1428–1446 | DOI: 10.1183/09031936.00150314

Abernethy AP, McDonald CF, Frith PA, Clark K, Herndon JE, Marcello J, Young IH, Bull J, Wilcock A, Booth S, Wheeler JL, Tulsky JA, Crockett AJ, Currow DC. Effect of palliative oxygen versus room air in relief of breathlessness in patients with refractory dyspnea: a double-blind, randomised controlled trial. Lancet 2010; 376(9743):784-793

Sara Booth*, Shakeeb H Moosavi and Irene J Higginson. The etiology and management of intractable breathlessness in patients with advanced cancer: a systematic review of pharmacological therapy. Nature clinical practice ONCOLOGY 2008; 5(2):90-100. http://www.nature.com/nrclinonc/journal/v5/n2/full/ncponc1034.html

Relevant Articles

Thoracic Society Guidelines

Children:

https://www.mja.com.au/journal/2008/189/10/infants-chronic-neonatal-lung-disease-recommendations-use-home-oxygen-therapy?0=ip_login_no_cache%3D127a5891934b5eb380167bd9f1fb2338

Adults:

http://www.thoracic.org.au/journal-publishing/command/download_file/id/33/filename/TSANZ-DomiciliaryOxygen-Guidelines-2016-web.pdf

MASS Qld

https://www.health.qld.gov.au/mass/documents/guidelines-oxygen.pdf

Victorian Aids and Equipment Program Guidelines

https://swep.bhs.org.au/other-relevant-documents.php