Irish Guidelines on Long Term Oxygen Therapy (LTOT) in Adults 2015

RESPIRATORY NURSES ASSOCIATION OF IRELAND
ANÁIL

IRISH SOCIETY OF CHARTERED PHYSIOTHERAPISTS

its
Irish Thoracic Society

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1.0 Guideline Statement

Currently in Ireland there are approximately ten thousand people living with some form of home oxygen therapy. (There is no data collection being done on these patients nationally so it is difficult to obtain further information). The Respiratory Nurses Association of Ireland (Anáil) identified a lack of clear guidelines in Ireland during their yearly conference in 2013. Anáil established a working group with the Irish Thoracic Society (ITS) to develop the guidelines seen herein. Despite many centres identifying the cost effectiveness of dedicated oxygen clinics there is no specific funding for the running of clinics as yet. It is hoped that with clear guideline provision this may change.

These guidelines provide concise evidence based recommendations for the referral, assessment, prescribing and follow up of potential patients requiring home oxygen therapy. Details on ordering processes and delivery modalities are also included.

2.0 Purpose

The aim of this guideline is to offer a standardised guide that can be adopted in all areas where home oxygen is being provided. They articulate most recent evidence from the British Thoracic Society[5] and serve to:

- Promote best practice
- Provide clarity in clinically difficult situations i.e. patient's continuing to smoke
- Standardise service delivery and care of patients requiring LTOT
- Reduce inappropriate prescribing
- Act as a basis for audit and evaluation of current service provision
- Encourage improved interaction between secondary and primary care to ensure continuity of care for this patient group.

During the development of this guideline the group compiled a list of recommendations for the HSE to further improve oxygen assessment and provision services (Appendix I). It is hoped that with the establishment of a National Reform Programme for Respiratory Therapies that provision of home oxygen equipment will be standardised throughout Ireland.

3.0 Scope

The majority of evidence for home oxygen comes from patients with Chronic Obstructive Pulmonary Disease (COPD). The scope of this guideline is to cover all adults (15+ years) meeting criteria for LTOT regardless of disease process present. It is to be utilised by all health care professionals dealing with patients requiring home oxygen in both primary and secondary care, public and private medicine.

4.0 Glossary of Terms and Definitions

4.1 Abbreviations

	ABG	Arterial Blood Gas
	Anáil	Respiratory Nurses Association of Ireland
	AOT	Ambulatory Oxygen Therapy
	BTS	British Thoracic Society
	CBG	Capillary Blood Gas
	CH	Cluster Headaches
	CIT	Community Intervention Team
	CF	Cystic Fibrosis
	CNS	Clinical Nurse Specialist
	COPD	Chronic Obstructive Pulmonary Disease
	CPA	Collaborative Practice Agreement
	CPAP	Continuous Positive Airway Pressure
	CSAHS	Central Sleep Apnea – Hypopnea Syndrome
	CSBS	Cheyne – Stokes breathing syndrome
	DPS	Drugs Payment Scheme
	ESWT	Endurance Shuttle Walk Test
	FEV_1	Forced Expiratory Volume in one second
	GP	General Practitioner
	HCT	Hypoxic Challenge Test
	HSE	Health Service Executive
	HOOF	Home Oxygen Order Form
	ILD	Interstitial Lung Disease
	kPa	Kilo Pascal (unit of measurement of pressure) 1kPa=7.5mmHg
	L/Min	Litres per minute
	LTOT	Long Term Oxygen Therapy
	mmHg	Millimetres of mercury (unit of measurement of pressure)
	NIV	Non Invasive Ventilation
	NOT	Nocturnal Oxygen Therapy
	O_2	Oxygen
	OSAHS	Obstructive Sleep Apnea- Hypopnea Syndrome
	PaO_2	Arterial oxygen tension (partial pressure)
	$PaCO_2$	Arterial carbon dioxide tension (partial pressure)

	PCCC	Primary Community and Continuing Care
	pH	Unit of measurement for the acidity of the blood (normal range 7.35-7.45)
	PHN	Public Health Nurse
	POC	Portable Oxygen Concentrator
	POT	Palliative Oxygen Therapy
	PPPG	Policy, Procedure, Protocol or Guideline
	RNP	Registered Nurse Prescriber
	$Sp0_2$	Oxygen saturation level measured by pulse oximetry
	SBOT	Short Burst Oxygen Therapy
	SDB	Sleep Disordered Breathing
	SHVS	Sleep Hypoventilation Syndrome
	Symbols:	> Greater than or above < less than or below ≤ Less than or equal to ≥ Greater than or equal to
	TOSCA	Transcutaneous monitoring system for pCO_2 and SpO_2
	VBG	Venous Blood Gas
	WHO	World Health Organisation
	6MWT	Six Minute Walk Test

4.2 Guidelines

A guideline is defined as a principle or criterion that guides or directs action.[1] Guideline development emphasizes using clear evidence from the existing literature, rather than expert opinion alone, as the basis for advisor materials.[2]

4.3 Scope

This includes both the target users and target population (only refer to a target population if the PPPG is referring to specific groups for example all service users aged 16 years and over) of the policy, procedure, protocol or guideline. It identifies to whom the policy, procedure, protocol or guideline applies.

4.4 Clinical Governance

Clinical governance is described as the system through which healthcare teams are accountable for the quality, safety and experience of patients in the care they have delivered. For health care staff this means: specifying the clinical standards you are going to deliver and showing everyone the measurements you have made to demonstrate that you have done what you set out to do.[3]

5.0 Roles and Responsibilities

5.1 Roles

- It is the role of all health professionals involved in the prescribing of Long Term Oxygen Therapy to do so in accordance with recognised guidelines.
- Oxygen is a drug and as such practitioners should be familiar with how it is to be delivered to the patient and to ensure that patients are made aware of the implications of this treatment.
- Only once careful assessment as described herein has been carried out along with patients consent should oxygen be prescribed.
- All staff involved in the care of patient's requiring long term oxygen therapy should utilise this guideline.
- Audit and review of current practices involving this patient group should be carried out to ensure best practice is taking place.

5.2 Responsibility

- Each health professional involved in the prescribing of long term oxygen therapy is accountable for their practice. This means being answerable for decisions he/she makes and being prepared to make explicit the rationale for those decisions and justify them in the context of legislation, case law, professional standards and guidelines, evidence based practice, professional and ethical conduct.
- It is the responsibility of all staff to ensure patients are supported at every opportunity with smoking cessation.
- Very careful assessment of patients requiring LTOT who are current smokers is recommended.
- It should be recognised that this guideline represents a statement reflecting an expected standard of care and could be introduced in law as evidence of the standard of care expected. There may be occasions when it is acceptable to deviate from the guidelines but clinical judgement in such a decision must be clearly documented.
- The public may request access to guidelines and public bodies may be called on to publish such documents under Freedom of Information Act (1997) and appropriate legislation.

5.3 Individual responsibility

5.3.1 General Practitioners:

- To refer patients meeting outlined criteria for LTOT to a Respiratory Service familiar with oxygen assessment.
- Patients with borderline oxygen saturations (i.e. 93-94%) should have their oxygen saturations monitored at least yearly or sooner along with exacerbations of their underlying disease.

5.3.2 Respiratory Consultants:

- To provide clinical governance for the domiciliary oxygen service.
- Provide on-going medical support for Respiratory Clinical Nurse Specialists/Physiotherapists and Registered Nurse Prescribers involved in LTOT care.
- To ensure guidelines are adhered to and updated regularly.

5.3.3 Respiratory Clinical Nurse Specialists (CNSs):

- Respiratory nurses are involved in almost all care programmes for patients with respiratory disease. They play a crucial and specific role in the care, education and self-management of patients within such programmes; they monitor and treat patients, and ensure that patients adhere to agreed therapy.[4]
- Where there is local agreement with the Respiratory Consultant and hospital management, Respiratory CNSs can potentially develop dedicated home oxygen assessment clinics. During these clinics patients would have comprehensive assessment, education and follow-up.
- Within this local agreement CNSs can prescribe and withdraw home oxygen therapy as is indicated by their thorough assessment of the patient, using the guidelines herein to guide their practice.

5.3.4 Registered Nurse Prescribers (RNPs)

- RNPs that have long term oxygen therapy as part of their Collaborative Practice Agreement (CPA) are also well placed to develop dedicated oxygen clinics.

5.3.5 Specialist Respiratory Physiotherapists

- Respiratory physiotherapists are extensively involved in the care of patients with respiratory disease. They have a role not only in the traditional airway clearance and exercise, but also in assessment and monitoring of the patient as well as education and promoting self-management.
- Where there is local agreement with the Respiratory Consultant and hospital management, Respiratory Physiotherapists can potentially develop dedicated home oxygen assessment clinics. During these clinics patients would have comprehensive assessment, education and follow-up.
- Within this local agreement the specialist physiotherapist can prescribe and withdraw home oxygen therapy as is indicated by their thorough assessment of the patient, using the guidelines herein to guide their practice.
- Community Physiotherapists also have a role to play in continuing to monitor and assess patients in the community.

5.3.6 Public Health Nurses (PHNs)

- The majority of PHNs do not have access to oxygen saturation probes so would find it difficult to monitor if a patient's oxygen levels are therapeutic.
- If they are to be involved in the continued care of this patient group more education and equipment would need to be provided to them.
- However, PHNs are ideally placed to follow-up patients at home to monitor their understanding and use of oxygen equipment.
- If there is a specific need for a PHN to monitor a patient, training could be provided by specialist nursing or physiotherapy staff.

6.0 Procedure

6.1 Referral and assessment of patients for LTOT

Long Term Oxygen Therapy (LTOT) is defined as oxygen used by patients with proven hypoxaemia for a minimum of 15 hours per day. Up to 24 hours per day confers a mortality benefit and improvement in physiological indices.[5]

6.1.1 Referral

- Measurement of oxygen saturation using a pulse oximeter is widely available and presents a possible tool to be used for screening patients who might be candidates for oxygen assessment.
- Patients with resting stable oxygen saturation (SpO_2) of ≤ 92% should be referred for a blood gas assessment in order to assess eligibility for LTOT.[5]
- In patients with clinical evidence of peripheral oedema, polycythaemia (haematocrit ≥55%) or pulmonary hypertension, referral for LTOT assessment may be considered at SpO_2 levels ≤94% to identify patients with a resting PaO_2 ≤8 kPa.[5]
- Patients who have borderline saturations (i.e. 93–94%) should have their oxygen saturations monitored at their annual review with their GP or practice nurse, or sooner if they experience an exacerbation in the interim.[5]
- The date of the patient's last exacerbation should be included in the referral request to the home oxygen assessment service.
- Written and/or verbal information should be given to patients referred to home oxygen assessment services at the time of referral.

6.1.2 Formal assessment

- Assessment should be carried out by staff experienced in the obtaining and interpreting of ABGs and exercise testing.
- Patients potentially requiring LTOT should not be assessed using pulse oximetry alone. All such patients should undergo ABG sampling on room air for at least 30 minutes.
- Patients with stable disease and a resting PaO_2 ≤7.3 kPa should be considered for LTOT, which offers survival benefit and improves pulmonary haemodynamics.[5]

- Patients with stable disease and resting PaO_2 ≤8 kPa with evidence of peripheral oedema, polycythaemia (haematocrit ≥55%) or pulmonary hypertension should also be considered for LTOT.[5]

- The presence of resting hypercapnia is not a contraindication for LTOT if they fulfil all other criteria for LTOT.

- Patients should undergo formal assessment for LTOT after a period of stability of at least 8 weeks from their last exacerbation.[5]

- Patients who exacerbate frequently and are unable to achieve a period of stability lasting 8 weeks may need to be assessed at an earlier stage after exacerbation. If LTOT is ordered for such patients, they should be counselled that in the future LTOT may no longer be required once they achieve a more stable state.

- Patients assessed for LTOT during a period of apparent clinical stability should undergo two ABG measurements at least 3 weeks apart, before the need for LTOT can be confirmed.[5]

6.1.3 LTOT and Exacerbations

- Patients should not normally have LTOT ordered at the time of an acute exacerbation of their underlying condition.

- However, if home oxygen is ordered (e.g. at hospital discharge), it should be limited to patients with SpO_2 of ≤92%, who are breathless and unable to manage off oxygen. These patients should undergo a blood gas assessment, a 6MWT and be counselled that in the future LTOT may not be required after formal re-assessment.[5]

- Patients post exacerbation discharged on LTOT should have a formal re-assessment around 8 weeks post discharge.

6.1.4 Titration

- It is recommended that the starting dose for LTOT should be 1L/min.[5]

- Titration should then be carried out after 30 minutes in 1L/min increments until SpO_2 >90%. It is preferable to carry out titration with an oxygen concentrator to more accurately reflect how a patients arterial oxygen tensions will be corrected at home.[6]

- Patients undergoing LTOT assessment should be re-assessed with an ABG after oxygen titration is complete to determine whether adequate oxygenation (i.e. PaO_2 ≥8kPa) has been achieved without precipitating respiratory acidosis and/or worsening hypercapnia.[5]

- For oxygen titration during LTOT assessment, capillary blood gas (CBG) sampling or TOSCA can be used in place of ABG sampling for re-measuring $PaCO_2$ and pH at different oxygen flow rates.

- Overnight SpO_2 can decrease due to reduced minute ventilation and impaired ventilatory response so the patient's oxygen prescription may need to be increased at night. Overnight oximetry may be used to ensure adequate oxygenation during sleep.[5]

6.1.5 Hypercapnia

- Patients with baseline hypercapnia should be monitored for the development of respiratory acidosis and worsening hypercapnia using CBGs after each titration of flow rate, as well as ABG sampling after oxygen titration is complete.

- Patients who develop a respiratory acidosis and/or a rise in $PaCO_2$ of >1 kPa (7.5 mm Hg) during an LTOT assessment may have clinically unstable disease. These patients should undergo further medical optimisation and be re-assessed after around 4 weeks. [5]

- Patients who develop a respiratory acidosis and/or a rise in $PaCO_2$ of >1 kPa (7.5 mm Hg) during an LTOT assessment on two repeated occasions, while apparently clinically stable, should only have LTOT ordered in conjunction with nocturnal ventilatory support.[5]

6.1.6 Prescribing LTOT

- Patients requiring LTOT should be prescribed a flow as has been indicated from their titration for 15 hours/day minimum. Up to 24 hours per day confers a mortality benefit and improvement in physiological indices and should be encouraged. LTOT will be provided to them via an oxygen concentrator. (Appendix IV)

- Care should be taken when requesting Ambulatory oxygen as discussed in 6.3.

- Contact details of the prescriber or clinic must be legible. All details must be fully completed or the order may be delayed or not processed.

- As oxygen is a drug the order form should be treated like any other prescription, details must be sent to the G.P. and a copy or original filed in the patient's medical notes.

6.2 Nocturnal Oxygen Therapy (NOT)

NOT is oxygen administered overnight alone without additional oxygen therapy during awake or daytime hours. Before daytime resting hypoxaemia develops, many patients develop nocturnal or sleep time oxygen desaturation due to a combination of worsening V/Q mismatch in a supine posture and lack of drive to ventilator muscles during sleep.[5]

6.2.1 NOT in COPD:

When administered to patients who are either normoxaemic or have baseline arterial blood gas levels above the threshold for LTOT, nocturnal oxygen therapy does not show consistent improvements in pulmonary health leading to overall improved survival. It therefore should not be prescribed in patients who do not meet LTOT criteria but other causes of nocturnal desaturation in COPD should be investigated i.e. obesity hypoventilation or obstructive sleep apnoea. [5]

6.2.2 NOT in Cardiac Disease:

Sleep disordered breathing (SDB) consists of three distinct clinical syndromes, namely, obstructive sleep apnea-hypopnea syndrome (OSAHS), central sleep apnea-hypopnea syndrome (CSAHS) including Cheyne-Stokes breathing syndrome (CSBS), and sleep hypoventilation syndrome (SHVS). Each syndrome has diagnostic criteria. These syndromes frequently co-exist with heart failure. NOT should be prescribed for patients with severe heart failure, who do not fulfil the criteria for LTOT but have evidence of SDB, after other causes of nocturnal desaturation have been excluded. It should be prescribed at a low flow rate of 2-4 L/min and response should be assessed by a reduction of daytime symptoms.

6.2.3 NOT in Cystic Fibrosis (CF):

Patients with CF who have nocturnal hypoxaemia alone and do not meet LTOT criteria should not have NOT prescribed. It can be considered in patients with evidence of established ventilatory failure, where it should be provided with Non Invasive Ventilation (NIV) support.

6.2.4 NOT in ILD:

Patients with ILD who experience nocturnal hypoxaemia and who do not fulfil the criteria for LTOT should not be prescribed NOT. Close and frequent monitoring of this patient group is recommended as decline can be rapid.

6.2.5 NOT in neuromuscular weakness:

Patients with neuromuscular weakness can develop progressive weakness of all muscle groups, including respiratory muscle weakness. If this occurs they may develop nocturnal desaturation prior to developing daytime type respiratory failure. The use of NOT alone in these patients is not recommended. It should be considered in patients with evidence of established ventilatory failure, where it should be given in conjunction with non-invasive ventilation.

6.2.6 NOT in Obstructive Sleep Apnoea, Obesity Hypoventilation and Overlap Syndrome:

Patients with these conditions may have sustained nocturnal hypoxaemia. NOT should be considered in patients with evidence of established ventilatory failure and should be given *in conjunction* with non-invasive ventilation. Nocturnal oxygen is not recommended as a stand-alone treatment for patients with these conditions.

6.3 Ambulatory Oxygen Therapy (AOT)

AOT is defined as the use of supplemental oxygen during exercise and activities of daily living.[5]

6.3.1 Assessment

- Patients should be assessed for AOT taking into account daily activities, treatment regimens and active lifestyles.
- If a patients SpO_2 drops >=4% to <90% during a baseline endurance shuttle walk test (ESWT) or 6 minute walk test (6MWT) they meet the criteria for AOT.[5]
- If a drop in saturations is evident a repeat test should be carried out on ambulatory oxygen after 20 minutes rest. Where improvement in exercise tolerance and/or improvement in dyspnoea is demonstrated AOT can be prescribed.[5]
- Discussion with the patient is paramount to assess the likelihood of compliance with AOT. The use of an AOT diary card (Appendix II) is recommended to assist in assessing concordance with treatment.
- Agree appropriate oxygen delivery device, flow rate and if patient intends to carry it, wheel it, or other.
- For patients with high respiratory rate common in ILD /CF a Venturi mask will deliver a more accurate oxygen concentration.

6.3.2 AOT in patients eligible for LTOT

AOT should be offered to patients on LTOT who are mobile outdoors, for family occasions and hospital appointments etc. AOT may be supplied to 24 hour LTOT users to allow them to mobilise outside their home, improve exercise capacity and allow immobile patients to leave their home in wheelchairs etc. AOT has also been shown to assist patients achieve daily usage of 15 -24 hours.

6.3.3 AOT in patients not eligible for LTOT

AOT should not be routinely prescribed for patients who de-saturate on 6MWT but do not meet criteria for LTOT.[5] Compliance in this patient group is often low and there is limited data demonstrating survival benefit. AOT should be offered to patients who de-saturate (SpO_2 drops >=4% to <90%) on exercise for use during Pulmonary or Cardiac Rehabilitation Programmes supplied by staff. AOT can then be prescribed in patients who demonstrate good benefit and compliance with AOT.

6.3.4 Oxygen Delivery and Conserving Devices

Below is a brief overview of oxygen delivery systems, for further images of devices and consumables see appendices III-VI.

- An oxygen concentrator(Appendix IV) is an electrically driven device which takes room air and passes it through a filtering system, removing nitrogen to supply an oxygen enriched gas mixture (usually 85-96% oxygen).

- Oxygen concentrators deliver flow rates of up to 5 L/min, adjustable 0.5 L/min increments. If low flow rates are needed, for example in paediatric, a low flow metre can be added to the standard concentrator.

- High flow concentrators are also available these can deliver flow rates up to 9L/min. When very high flow rates are required concentrators can be joined via a T-piece and each concentrator must be set to the same flow, for example 12 L/min required would need two high flow concentrators both set at 6 L/min.

- In patients where there is rapid and significant de-saturation on minimal exertion (as in ILD) an oxygen concentrator for use around the home may be more practical than cylinders. Particularly if the patient requires a higher flow i.e. >4L/min.

- There is also a home 'home fill' concentrator available this is concentrator which can also be used to refill small portable cylinders at home.

- Oxygen cylinders (Appendix III) are a strengthened mental container containing compressed gas held in high pressure safely for use via its regulator (tap). Oxygen cylinders are available in various sizes and hence capacity, ranging from small portable cylinders to large static cylinders. Oxygen cylinders are coloured coded to distinguish them from other medical gases. Currently, oxygen cylinders are white with writing denoting the content down the side, and black with a white shoulder. The flow rate can be fixed or variable depending on the patient requirements. Static cylinders are used as back up cylinders if there is a power cut or concentrator failure or for cluster headache patients. Light weight cylinders (example weight 8kgs/3.6lbs) and standard ambulatory cylinders (example weight 3.2kg/7lb) are available for ambulatory use. When transporting cylinders in cars, they should be secured either with a seat belt or in the foot-well or car boot, possibly using a cylinder box.

- Oxygen conservers (Appendix III) deliver oxygen during inspiration only via nasal prongs. Patients who are active outside the home following AOT assessment should be considered

for oxygen conserving devices as well as patients requiring high flow oxygen. This will enable cylinders to last longer than if they were on a constant flow rate.

- Oxygen conservers differ in their capacity to maintain SaO_2 levels during exercise and some patients struggle to trigger them, individual assessment is essential.

- Nasal cannulae (Appendix VI) are recommended as the first choice delivery system for patients on AOT. They supply variable oxygen concentrations when used at the same flow rate for different patients.

- Some patients especially those breathing through their mouth may benefit or prefer a facemask (e.g. Oxymask®) (Appendix VI) or continuous flow via nasal prongs.

- A Venturi mask system may be required for patients at risk of hypercapnia and patients with raised resting respiratory rate.

- Patients can benefit from the provision of trolleys, wheeled carts or backpacks to enable them to carry home oxygen equipment. This can improve compliance with oxygen therapy.

- Liquid oxygen (Appendix V) is oxygen that is cooled so that it condenses from a gas to a liquid which can be stored in insulated containers. The length of time these can last will depend on the flow rate and the size of the flask. When choosing this system the individual patient's dexterity, visual acuity and strength need to be considered. Liquid oxygen Dewar flask can only be installed on a ground floor due to venting and safety considerations.

- Transportable concentrators (Appendix IV) are similar to home concentrators but smaller in size and more portable. They come with batteries as well as a mains attachment, allowing use outside. The battery for use outside the home does limit the time they can be used without recharging and will depend on the flow rate and whether on continuous or pulse mode. They can also be used and charged in cars. The majority of portable oxygen concentrators provide pulsed oxygen only. Therefore, they are not suitable for use when sleeping. Portable concentrators have numerical settings, for example setting 2 does not equate to 2 L/min so patients need to be titrated to ensure that the portable oxygen concentrator can supply their oxygen requirements.

- Heated humidified high flow oxygen is a technique that can deliver high concentrations of heated humidified oxygen at a maximum flow of 60 L/min via appropriate interface. The device has an air/oxygen blender allowing the provision of precise concentrations of oxygen. The adjustable flow means that the patients respiratory demand can be met. This system is often utilised in patients with high oxygen and respiratory demands i.e. ILD.

6.4 Palliative Oxygen Therapy

6.4.1 Palliative Oxygen Therapy (POT) is defined as the use of oxygen to relieve the sensation of refractory persistent breathlessness in advanced disease or life-limiting illness irrespective of underlying pathology.[5] Refractory breathlessness is defined as breathlessness at rest or on limited exertion that persists despite optimal treatment of the underlying conditions, in advanced chronic disease, or towards the end of life.[7]

This stage of disease can be clinically challenging and from the evidence presented in the new BTS guidelines[5] POT should not be routinely prescribed in patients who are not hypoxic. However several recommendations are made for patients with intractable breathlessness covering non-pharmacological methods, opioids and oxygen. Taking a palliative care approach to this patient group can be very worthwhile, further support can be found in the Palliative Care Competency Framework.[8]

6.4.2 Integrated care between Specialist Palliative care and the Specialist consultant may provide the answer to providing this complex patient group with the best possible care.[9,10,11] Some palliative care services have specific breathlessness management clinics that can offer the patient modifying strategies to equip them with skills to manage their breathlessness. Input from Occupational Therapists, Physiotherapists, Specialist Palliative nursing and Medical staff will assist in providing those strategies. The specialist consultant and team should still continue to provide full active input on disease management and oxygen therapy as disease trajectory can be unpredictable.

6.4.3 Monitoring severity of distress and intensity of breathlessness should occur regularly to ascertain benefit of all therapies. In particular where oxygen, benzodiazepines and opioids are used as harm can occur from incorrect usage.

6.4.4 Flow rates prescribed in these patients should be driven by symptomatic relief and not saturations. Patients requiring higher flow rates will need to be monitored for hypercapnoea. CBGs or TOSCA are adequate for this.

6.4.5 POT may be considered in **non-hypoxaemic patients** where all other treatments have been futile. A review of the effectiveness of this should be made to ascertain any improvement in quality of life or breathlessness.

6.4.6 Follow-up and assessment of POT can occur after 3 days of use. Introduction of home oxygen can be stressful for the patient and their family at an already stressful time. If it is not deemed as necessary it should not be introduced and removed if not required.[5]

6.5 Short Burst Oxygen Therapy (SBOT)

- SBOT does not improve exercise tolerance or reduce breathlessness when administered either before or following exercise to hypoxemic or non-hypoxaemic patients with moderate to severe COPD.[5]
- SBOT does not improve health-related quality of life or reduce healthcare utilisation when ordered for patients following an acute exacerbation of COPD.[5]
- SBOT should not be ordered for use prior to or following exercise in hypoxaemic or normoxic patients.
- SBOT should not be ordered on discharge from hospital for non-hypoxaemic patients.

6.5.1 Cluster headaches (CH)

- SBOT delivering high flow oxygen (12 L/min via a non-re-breather mask) is a first line effective treatment for acute CH attacks.[12]
- Currently in Ireland there is no provision for emergency supply of oxygen for cluster headaches so a permanent home supply is the only option. Patients are provided with a large cylinder capable of supplying 15 L/min along with a non-re-breathe oxygen mask. They should be instructed to remain on the oxygen for 15-20 minutes and slowly reduce the flow for a further 5-10 minutes after the attack has settled.[12]
- Cluster headaches are rare; oxygen therapy should only be prescribed by health care professionals working in the specialty.

6.6 Air travel and oxygen

Many patients on oxygen therapy will often wish to travel by air. For most patients this is entirely possible but assessment pre-flight is necessary. At 8000 feet (2438 m) the partial pressure of oxygen falls to the equivalent of breathing 15.1% oxygen at sea level.[13] Air travel is safe for most patients with chronic respiratory failure who are on long term oxygen. They should ideally be able to maintain an in-flight PaO_2 of at least 6.7kPa (50mmHg). Studies indicate that this can be achieved in those with moderate to severe hypoxaemia at sea level by supplementary oxygen at 3L/min by nasal cannula. Those with a resting PaO_2 at sea level >9.3kPa (70mmHg) are likely to be safe to fly without supplemental oxygen.[14] Careful considerations should be given to patients with other co-morbidities that may aggravate hypoxaemia.[14] The studies examined for this section[14, 15, 16] were based on patients with COPD. Caution is recommended in patients with other disease modalities.

6.6.1 How to assess patients for Air Travel

- When carrying out a pre-flight assessment of patients already on oxygen there are two main considerations. Firstly is the patient going to be fit enough to fly and secondly if they are, is their current prescription adequate for altitude.

- The hypoxic challenge test (HCT) is used to assess whether patients need in-flight oxygen and can be used on patients already on oxygen. This would be considered the GOLD standard of testing if there is significant doubt over a patient's fitness to fly.[15] Only three hospitals in Ireland have access to this test in their respiratory laboratory so an alternative testing method needs to be considered.

- A resting ABG on the patient's current prescription of oxygen should be performed to ensure the patient is adequately titrated on their oxygen at sea level. If there is concern that a patient may become hypoxic in flight, despite being well titrated at sea level on oxygen, their flow rate needs to be increased. If it is necessary to increase the patient's usual prescription for use during flight a repeat ABG should be performed on this higher flow.

- If patients are to use a portable oxygen concentrator during their holiday, they will require titrating on the device using a 6MWT to assess what settings they require as L/min is not adequate.

- Where arrangements are being made for oxygen to be supplied at the patient's destination a prescription of their requirements may be requested by the supplier.

6.6.2 Contraindications to commercial air travel[13]

- Infectious tuberculosis.
- On-going pneumothorax with persistent air leak.
- Major Haemoptysis.
- Usual oxygen requirement at sea level at a flow rate exceeding 4 L/min.

6.6.3 Patients who must have assessment pre-flight

If there is doubt about the patient's fitness to fly and if there are co morbidities affecting fitness (such as cardiovascular disease or immunosuppressant therapy), assessment is advised. In general the patient should be stable and have recovered from any recent exacerbation before travel. It is recommended that those with the following conditions should be assessed with history and examination as a minimum: [13]

- Previous air travel intolerance with significant respiratory symptoms (dyspnoea, chest pain, confusion or syncope).
- Severe COPD (FEV1 <30% predicted) or asthma.
- Bullous lung disease.
- Severe (vital capacity <1 litre) restrictive disease (including chest wall and respiratory muscle disease), especially with hypoxemia and/or hypercapnia.
- Cystic fibrosis.
- Co morbidity with conditions worsened by hypoxemia (cerebrovascular disease, cardiac disease or pulmonary hypertension).
- Pulmonary tuberculosis.
- Within 6 weeks of hospital discharge for acute respiratory illness.
- Recent pneumothorax.
- Risk of or previous venous thromboembolism.
- Pre-existing requirement for oxygen, CPAP or ventilator support.

6.6.4 Logistics of travel with oxygen

- Most airlines will permit a portable oxygen concentrator (POC) to be taken and used on board once agreed in advance. Some HSE areas will loan one to a patient with a medical card for the duration of their holiday, but this needs to be requested well in advance. Most portable oxygen concentrators can be used in flight but considerations need to be made for battery life and adequate titration. Patients may need to pay for spare batteries if required.

- Patients should check with their travel insurance company if their equipment is insured against loss and/or damage.

- All airlines differ and it is vital patients check with the airline before booking a flight. Any patient new to oxygen should be advised to discuss flying with oxygen well in advance with their primary physician or oxygen clinic.

- If oxygen is required in flight and a POC is not adequate, it is usually supplied by the airline and must be booked in advance. Usually 2 or 4L/min continuous or intermittent flow can be accommodated. This is not available on every route and may incur additional cost, so patients need to be strongly encouraged to contact the special assistance office of their airline *before* booking.

- Patients are responsible for arranging LTOT to be set up at their destination. Portable oxygen concentrators may be supplied but are not sufficient for long term or overnight use. Patients should check with the company that supplies their oxygen at home for advice on travelling with oxygen. They can advise on how to get equipment into hotels, cost etc.

- Where arrangements are being made for oxygen to be supplied at the patient's destination a prescription of their requirements may be requested by the supplier.

- Most airlines require a medical information form stating that the patient is fit to fly and a detailed prescription on which equipment the patient is travelling with.

6.7 Safety and home oxygen therapy.

6.7.1 This section of the guideline aims to address the issues of LTOT regarding safety concerns and smoking. Safety should be a factor when making decisions regarding home oxygen. Education and written information should be provided to the client and their family or carers regarding the safe use of oxygen and its equipment. For all professionals, practice must always entail ethical decision-making within professional codes of conduct.

6.7.2 Clients should be educated on the reason for home oxygen therapy, the prescribed flow rate and hours of use. The patient / carer should be informed of the importance of not adjusting the oxygen flow rate without seeking appropriate clinical advice and assessment.

6.7.3 Very oxygen sensitive or hypercapnic patients should be issued with an alert card and appropriate oxygen mask and tubing for use in ambulance transfers[5]. The Beaumont Passport[17] is a useful tool for COPD patient's on oxygen to carry with them. The Passport is available through most COPD outreach programmes and is endorsed by the COPD Clinical Care Programme.

6.7.4 There is increasing recognition of the risk of fires and personal injury associated with smoking and the use of home oxygen therapy. This presents a significant safety issue given the number of clients across Ireland on home oxygen therapy.

6.7.5 LTOT patients can be enabled to achieve smoking cessation, but despite these necessary interventions, many clients continue to smoke. In addition, the clinician's assessment of smoking status relies mainly on client's testimony and evidence has shown that this can be inaccurate[18]

6.7.6 Smoking cessation should be discussed and written education given to all patients and / or persons living with them prior to ordering home oxygen and at each subsequent review. They should be strongly warned of the associated dangers of smoking in the presence of oxygen[5].

6.7.7 Patients should never smoke whilst using their medical oxygen equipment and never allow any other person to smoke in the vicinity of the patient using their medical oxygen equipment[19].

6.7.8 The risks of prescribing to active smokers should be considered on a case-by-case basis. The service provider should be informed of the client's smoking status initially. Particular consideration needs to be given to risks to children and risks to neighbours in multiple occupancy dwellings. A risk assessment should be performed before installation of the oxygen in the client's residence; a decision not to install the oxygen to smokers may be made if the risks are judged to be too high[5].

6.7.9 Clients who continue to smoke or live with other household smokers should be informed that the order for home oxygen will be reviewed and evidence of increased risk may lead to withdrawal of home oxygen therapy[5].

6.7.10 Clients should be made aware that they should not use e-cigarettes and chargers within the vicinity of their home oxygen as they can support combustion in the presence of oxygen[5].

6.7.11 As part of their contract oxygen service providers are responsible for the safe installation of all oxygen products, and for regular maintenance of the equipment, including filter changes, at least every six months[5]. A homecare field-based risk assessment (Appendix VII) is conducted in each client's residence at the initial instalment. The oxygen supplier shall retain a copy of such field-based assessment and contact the prescriber with any concerns.

6.7.12 During this assessment the supplier shall check for the presence of an operational smoke detector and / or recommend installation[5].

6.7.13 All clients should be advised by the oxygen provider to maintain a safe distance from fires and naked flame appliances and regarding oxygen enrichment of clothing and the environment[19]

6.7.14 Oxygen must be positioned and stored as directed by the oxygen provider[5].

6.7.15 Patients and family or carers should be instructed not to remove the fire breaks from the tubing. Only equipment oxygen tubing and connections supplied by the oxygen company should be used[19].

6.7.16 Currently in Ireland there is no obligation to inform the local fire service of clients using home oxygen but going forward this is an area that should be addressed, particularly where there is concern regarding clients who continue to smoke.

6.7.17 Patients and carers should be aware that tubing should be checked on a daily basis to minimise risks of falls. Positioning of the tubing should be checked, ensuring that there are no kinks. Current oxygen tubing must be of an appropriate length as per oxygen provider guidelines[19].

6.7.18 Clients are advised to use the back-up oxygen cylinder only if there is power failure to the concentrator.

6.7.19 Patients should be advised never to use the ambulatory unit under clothing. Where an ambulatory unit is carried in a bag or holder, it must be specifically designed for the medical oxygen container, be made from appropriate material, provide adequate ventilation and reduce the possibility of oxygen enrichment.[19] Never cover any medical oxygen equipment with any material or store it adjacent to curtains as they may become oxygen enriched. Patients should be educated on unnecessary oxygen enrichment of the air.[19]

6.7.20 Clients should be advised not to use oil based emollients such as Vaseline® on their nostrils, and to ensure that hands are adequately dried after the use of alcohol gels, due to the risk of combustion. Water contact with the oxygen supply needs to be avoided[5].

6.7.21 Clients are provided with information leaflets/ booklets on the home oxygen therapy including contact details for the oxygen provider who generally provide a 365 day per annum/ 24 hours per day. They are advised to contact them with any queries regarding the equipment or if replacement cylinders are required[19].

6.8 Process of prescribing Oxygen Therapy in Ireland

6.8.1 Order Forms: Currently in Ireland there is a diverse range of Home Oxygen Order Forms (HOOF) in use. Within this guideline there is a draft example of a generic HOOF (Appendix VIII), until a generic order form is developed by the HSE these forms can be adapted for use.

6.8.2 Basic Oxygen Package: This consists of a concentrator (delivers up to 4-5 L/min) and portable oxygen cylinders (0-4 L/min pulsed or continuous flow) with 6 cylinders per month allowance regardless of size. This package is available from both suppliers regardless of area.

6.8.3 High Flow Oxygen Supply: Patient's requiring high flow oxygen supply need to be closely assessed to find the right equipment suitable for them. A high flow concentrator is capable of delivering up to 9 L/min in the home, with two concentrators up to 18L/min.

6.8.4 Medical Card Patients will require funding approval from the HSE or PCCC depending on location. Order forms are to be completed and faxed to the relevant officers in your area. (See appendix IX for full listing.) Once funding is approved the order form is to be immediately sent to the

relevant company. This process should take no longer than three days, please highlight need for quicker approval/delivery where appropriate i.e. to facilitate discharge from hospital.

6.8.5 Non-Medical Card patient orders are to be sent directly to the preferred company. Patients claim back money paid for oxygen under the drugs payment scheme (DPS €144 per month). They are required to pay the company first, retain the invoice and claim back each month. DPS refund claim form found on this website https://www.sspcrs.ie/portal/dpssuite/printforms.jsp requested at Local Health Office or by calling 1890-252-919. As prices may change/vary depending on package required it is recommended to request a quote from both companies prior to ordering.

6.8.6 Electricity bills will increase with the introduction of an oxygen concentrator. Patients should be made aware of this at the point of ordering. If they are struggling financially their local Community Welfare Officers may be able to offer a social welfare grant to help with costs. Patients or their relatives will need to seek this out themselves, but supporting letters from clinicians may be required. Patients should inform their electricity supplier that they are on oxygen so they will be placed on a priority support list.

6.8.7 Good practice point: Errors on order forms cause delay in delivery. If contact details are not clear the HSE/PCCC are not obliged to contact the prescriber for clarity. A copy of the prescription needs to be filed in the patient's notes, sent to the General practitioner and PHN. Where oxygen is ordered on discharge from hospital details of the prescription must be put on the patient's discharge letter.

6.9 Follow up and monitoring of patients on home oxygen.

6.9.1 Formal arrangements are required for the follow up of patients using home oxygen therapy to:

- Ensure LTOT adequately corrects hypoxaemia
- Ensure there is good compliance with LTOT and ambulatory therapy.
- Detect clinical deterioration.
- Ensure continuing requirement for domiciliary oxygen.
- Ensure patients are adequately titrated

6.9.2 Hospital (Specialist) Follow up

- All patients should be reviewed by an appropriate specialist within three months of the initial LTOT prescription (in association with the next out-patient appointment).

- Patients should have arterial blood gas and 6 MWT whilst on oxygen at the prescribed flow rate, using the same equipment provided in the home. That is unless oxygen was prescribed during an exacerbation and is possibly no longer required.

- It is recommended that all LTOT patients have a repeat assessment on a yearly basis. Where patients continually fail to attend for their follow-up reviews the GP would be required to monitor the patient.

- Patients on LTOT should be referred for re-assessment to the hospital specialist when there is clinical deterioration, under correction of the SaO_2, symptoms of worsening hypercapnia i.e. morning headache. Measurement of SaO_2 is a guide as to whether further assessment is required with blood gas assessment.

6.9.3 Home Follow Up

It is recommended that all patients on LTOT should be visited at home within 4 weeks of the LTOT prescription by a Respiratory CNS/ Physiotherapist (depending on local arrangements) who are experienced in the provision of domiciliary oxygen therapy. Education should be provided on oxygen therapy and optimisation of disease modifying therapies.[5]

- COPD outreach teams are ideally placed to visit patients newly commenced on LTOT on discharge from hospital.
- Where it is not possible for a home visit to be carried out a follow up appointment or phone call should be scheduled by the prescriber.

6.9.4 Oxygen Supplier Follow-up

- The oxygen supplier should educate the family and where possible, the patient on the oxygen therapy equipment.

- They carry out risk assessments (Appendix V) on all patient homes. If and when apparent, the supplier should highlight to the prescriber patients who are not using their oxygen therapy, are not renewing their portable oxygen cylinders or are deemed to be high risk for harm to themselves or others.

6.9.5 The PHN, Community Physiotherapist or Community Intervention Team (CIT) may be available to support patients newly commenced on LTOT. They should be made aware that the patient is on oxygen therapy with details of the prescription. It is anticipated that they could:

- Follow up within 10 days post discharge from hospital.
- Highlight initial issues with oxygen adherence to the prescriber.
- Contact oxygen supplier if issues with equipment.
- Any acute deterioration to contact prescriber or General Practitioner.

6.9.6 General Practitioner (GP)

The GP should be made aware that the patient is on oxygen therapy, a copy of the assessment and prescription should be sent to the GP so they have baseline information. If the GP feels the patient requires an increase in oxygen therapy requirements they must contact the prescriber.

6.9.7 Checklist for home visit

During follow up visits particular attention needs to be paid to the following:

- Concentrator and tubing location
- Nasal cannula/masks hygiene
- Requirements for back up cylinders
- Check usage with patients and their understanding of adequate compliance
- Provide contact numbers
- Reinforce that no smoking while using oxygen therapy is essential
- Offer referral to smoking cessation in persistent smokers
- Assess use of ambulatory devices

6.9.8 Follow up of patients on ambulatory oxygen therapy

- Ambulatory oxygen is often used in conjunction with LTOT and the use of ambulatory oxygen equipment can be reviewed at LTOT follow up visits.

- Patients whom are on ambulatory oxygen alone should have oxygen assessment on a yearly basis, as oxygenation has the potential to deteriorate in this patient group.[5]

- In the event of symptomatic deterioration prior to yearly assessment, repeat assessment with exercise tests may be required sooner.

- For patients on AOT alone a review 8 weeks post commencement is recommended to check compliance and the patients AOT diary (Appendix II).

- The patient's oxygen supplier can be contacted to verify usage. Discuss device issues, inconsistencies, safety and oxygen prescription with the patient as required.

- Patients commenced on AOT during exacerbations need re-assessment to check if it is still indicated.

6.9.9 Oxygen Equipment Removal

It may be required to remove the oxygen equipment under the following circumstances.

Clinical

- Death of a patient.

- Clear evidence of abuse/misuse of oxygen equipment where harm to the patient or others around them has occurred.

- No further requirements due to the improvement in PaO_2. This applies to patients where LTOT may have been prescribed for a limited period of time following an episode of respiratory failure, respiratory tract infection, patient with sleep apnoea on CPAP therapy, patients using home ventilatory support for a chest wall disease.

- Following review by the respiratory consultant, LTOT may be withdrawn following a complete oxygen re-assessment on room air.

- All patients where LTOT has been discontinued must have repeat assessments three monthly to yearly where appropriate.

Adherence

- Patients who despite education and/or home visits are repeatedly not using their oxygen therapy. (Requires consultation with Consultant prior to the removal of the oxygen therapy).

Safety

- In situations where patients continue to smoke whilst on oxygen therapy, particularly where a risk has been highlighted; consultation is required involving the patient, family members, the prescribing physician and the oxygen provider regarding the patient's safety

- If the home situation is deemed inappropriate for LTOT to be provided i.e. alcohol or drug misuse, safety issues / fire hazard.

- A risk assessment can be carried out by the oxygen supply company if there is any question in relation to safety.

- A cancellation form should be faxed to the HSE/PCCC when the decision to discontinue LTOT or ambulatory oxygen therapy has been made.

7.0 References

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8.0 Appendices

Appendix I	List of recommendations from LTOT working group
Appendix II	AOT diary card
Appendix III	Portable oxygen cylinders and conservers
Appendix IV	Oxygen concentrators
Appendix V	Liquid oxygen and home fill
Appendix VI	Oxygen delivery devices
Appendix VII	Sample risk assessment form
Appendix VIII	Draft generic Home Oxygen Order form
Appendix IX	HSE/PCCC contact sheets for ordering oxygen

Appendix I Current issues identified with provision of home oxygen in Ireland.

	Current Practice/Issue	Suggested solutions
1.	**No funding available for dedicated oxygen clinics**. Many clinics are run from of out-patient clinics. Patient's often commenced on oxygen and never re-assessed.	Ring-fenced funding to develop more dedicated clinics. Monies saved from dedicated clinics should be re-invested into clinics, to provide improved services.
2.	**Community staff not always informed** about patients being commenced on oxygen or details of the prescription.	Copy/details of prescription attached to equipment in the home. Copy of oxygen prescription to be sent to PHN and G.p
3.	**6 Cylinders per month allowance.** Some patients only require portable cylinders for hospital appointments/G.p visits etc. so don't use allowance of 6 per month. Some patients require more than allowance and are frequently requesting letters etc. from DRs/CNSs for increase in their allowance.	-Give a yearly allowance of 6-10 per year instead for low users -Offer more flexibility during initial 3 months until patients have clearer indication of how much is required.(Patient diary)
4.	Currently if **patient is non-compliant** with oxygen or not collecting cylinders no-one informed by the companies. Companies are slow to collect equipment from patients RIP.	Obligation onto suppliers to inform prescriber/appliance managers that patient is not requesting cylinders. Maybe a written report for first 3 months. Set time line for collection i.e. 4 weeks once order is cancelled.
5.	**Multiple order forms** in use and oxygen can be requested by any Doctor in some cases without any assessment.	-Develop generic oxygen order form. -Patient must have had relevant checks carried out as stipulated on the form.
6.	**Prescriber is responsible for selecting** which company supplies the oxygen. Not all prescribers are aware of what equipment is available and cost of same.	Give increased autonomy regarding supplier selection to appliance managers.
7.	**Multiple cost centres** to order equipment from.	Have one centralised number/area that will authorise funding, retain statistics, review compliance, audit/monitor suppliers etc. (Provincial/National)
8.	**Different equipment** available in different areas i.e. Travel Oxygen	Have a clear policy on what is available and equal access to all equipment and holiday oxygen.
9.	**Non-medical card holders have to apply for refunds monthly** to pay for their equipment. Despite oxygen being deemed a life-long therapy once prescribed correctly, these patients have to continually apply for refunds.	Once patient is paying their DPS they should not have to pay up front for their oxygen again.
10.	**Cost** of oxygen equipment for **non-medical card** holders is **considerably higher**.	Negotiate a standardised cost for non-medical card holders
11.	**Concentrators not always getting serviced**	Who audits the suppliers to ensure servicing is carried out? Who reviews the risk assessments?

Appendix II

Ambulatory Oxygen Therapy AOT diary

Name: _____ MRN: _____

Date: _____

	How many times did you use your AOT today?	How long did you use the AOT (hours & minutes)	How long did you use the AOT around the house today? (hours & minutes)	Did the AOT help you with activities? (Yes / No)	Did the AOT help control your breathlessness? (Yes / No)	Comments
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						
Monday						
Tuesday						
Wednesday						
Thursday						
Friday						
Saturday						
Sunday						
Monday						

Appendix III

CYLINDERS	These are examples only and size & weight will vary with the different manufacturers equipment	SIZE	WEIGHT
Standard portable cylinders i.e. B2 or CD		53 cm (20.8 ins) height 10cm (3.9 ins) diameter	Full 3.2 Kg – 3.7 Kg (7lb – 8lb)
Lightweight i.e. ZA or B1		43 cm (16.9 ins) height 8.5 cm (3.3 ins) diameter 	Full 2.1Kg 2.6Kg (4.6lb – 5.7lb)
Conserver devices for cylinders			
Trolley/ Wheeled Cart		Fits both standard and lightweight cylinders	

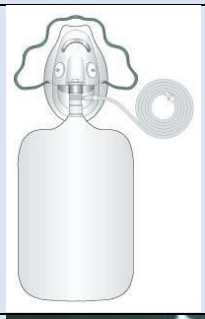
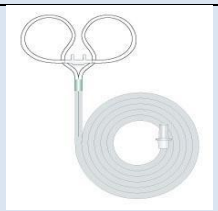
Appendix IV **Concentrators**	**These are examples only and size & weight will vary with the different manufacturers equipment**	**SIZE**	**WEIGHT**
Standard		68 cm (26.7in) height 38cm (14.9ins) width 28 cm (11in) depth	24.5 Kg (54lb)
High flow concentrator			24Kgs
Lightweight/ smaller		57 cm (22.4)height 34 cm(13.3 ins) width 28cm (11in) depth	13Kg (28.6 lb)
Transportable		49 cm (19.3in) height 31.2cm (12.3 in) width 18cm (7 in) depth	8.1Kg (17.8 lb)

Appendix V

<table>
<tr>
<td>Liquid Oxygen
Large LOX Dewar and refillable portable unit</td>
<td> 

 </td>
<td colspan="3">Home fill system
 
0-5L/min from concentrator
0-3L/min when filling (2L/min required to fill cylinder)
Can fill cylinder and deliver O_2 at same time.</td>
</tr>
<tr>
<td>Portable LOX unites Picture above under B10 cylinder</td>
<td> 
</td>
<td>38 cm height</td>
<td>Full 2.5–3.9Kg</td>
<td>516 – 1058 litres</td>
</tr>
</table>

Appendix VI

Oxygen Delivery		Concentration	Flow
Non-rebreathing mask		**60% - 80% (variable)**	**10 – 15 L/min**
Medium Concentration Mask	 The OxyMask® uses a small diffuser, comprised of a cup and pin, to concentrate and direct oxygen toward the nose and mouth.		**1– 15 L/min**
Venturi mask	 	**24% - 60% Depending on venture used (accurate %)**	**Depends on venture used: flow stated on barrel**
Nasal Cannulae		**24% - 60% (variable)**	**1 L/min – 15L/min depending on nasal canullae used** **1 – 4 L/min** **4 – 8 L/min** **8 – 15 L/min**

APPENDIX VII: SAMPLE RISK ASSESSMENT TOOLS*

*The risk assessment templates provided have not been validated.

FIELD BASED RISK ASSESSMENT REPORT TEMPLATE AS USED BY HOME OXYEN PROVIDER COMPANY

Written confirmation that the risk assessment has been conducted at the Patient's home at the due date and report of the findings of the assessment shall include, but not necessarily be limited to, the following information:-

Patient Name		Patient Number		
Patient Address		Job Type		
Potential Risks	YES	NO	Comments / Observations	
Initial Desk Based Assessment Completed				
Property Access				
Suitable parking, good surface condition and safe access to property				
Suitable access using path/stairs (not too steep or narrow)				
Is a Lift/Escalator available?				
Patient / Carer				
Are there any language barriers, does the Patient/carer understand the safety demonstration?				
Does the Patient/carer understand and are they able to operate the Equipment provided?				
Does Patient / Carer smoke or is there evidence of smoking in the Patient's residence?				
Is any other Equipment used in combination with the oxygen therapy Equipment?				
Is the Patient able to replace the filter autonomously?				
Oxygen Equipment usage and storage				
Is Equipment used / stored in Workshop, Garage or Kitchen?				
Is Equipment used / stored within 3m of open flame 1.5m of electrical appliance, flammable material, Paint, oils or grease?				
Is usage / storage area safe, suitable, clean and adequately ventilated in relation to the Patients safety and the safety of other people that have authorised access to the location?				
Is usage/storage etc adequate where there is more than one Patient using Oxygen e.g. care homes				
Can Equipment be located to allow a maximum of 15m free line without causing obstructions/hazards when in use?				
If delivery is made in the absence of Patient/carer, has suitable, safe, secure storage been agreed?				
Concentrator installations – Has mains outlet socket passed safety test?				
Does the Patient need to use stairs in the property				
Can the Patient safely climb stairs whilst using oxygen?				
Is there a working smoke detector or alarm in the home?				
Is the Patient using a pre–paid electricity meter?				
Does the crush resistant tubing need to be replaced?				
Oxygen concentration Testing				
Filters checking and cleaning				
Location where Equipment to be installed				
Electricity meter reading as at installation date				
Assessors Other Comments / Concerns / Other Potential Risks				
Assessor's Name (Print)				
Assessor Signature		Date		

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Draft Home Oxygen Order Form

Appendix VIII

1. Patient Details:		
Medical Record Number:	Permanent address	Tel No:
GMS no.		Mobile no:
Title: Mr. / Mrs. / Ms.		E-mail :
Surname:		**2. Carer/NOK Contact Details:**
First name:		Name:
D.O.B:	First Language if not English:	Tel no.:
Gender: Male ☐ Female ☐		Mobile no.:

3. Clinical Details/Diagnosis:	4. Patient's GP Information:
Clinical Indication: (See example list in section 11 on page 2)	GP Name:
Paediatric Order ☐ Yes ☐ No Palliative ☐ Yes ☐ No	Address: _____ _____ Phone no:
Patient on NIV / CPAP ☐ Yes ☐ No Oxygen entrained ☐ Yes ☐ No _____L/Min	**ABG's**: ☐ Yes ☐ No Date: _____ PCO_2 _____ PO_2 _____ **Target O_2 saturation levels:** pH _____ SaO_2 _____ **_____% - _____%**

5: Discharging Hospital	6: Smoking Status:
Hospital Tel no.: Ward EXT Fax no: _____ Discharge date:	Smoker: Yes ☐ No ☐ Ex (> 6 month quit) ☐ Family's smoking status in home: Smoker Yes ☐ No ☐ Smoking cessation advise given: Yes ☐ No ☐ N/A ☐ Fire safety precautions discussed: Yes ☐ No ☐ N/A ☐

7. Prescription Details:	8. Equipment:	9. Consumables:
O_2 Flow Rate: _____ L/Min	Static Oxygen Concentrator ☐	
Duration:_____Hrs/Day Nocte ☐ Exercise only ☐	Portable Oxygen Concentrator ☐ ***Portable concentrator type:** **1.** Sequel Eclipse ☐ Pulsed setting (1-6) _____ Continuous setting (0-2L/min) _____ **2.** Inogen ☐ Pulsed only Setting (1-4) _____	Nasal Cannula ☐ Mask ☐ ____% Type _____ Other: (please specify) _____
Humidification ☐ Yes ☐ No **AIRVO:** Heated Humidifier ☐ Flow Setting: _____ L/Min	Portable Cylinders Size: Standard CD/B2 ☐ Small ZA/B1 ☐ Other ☐ _____**? Liquid Oxygen ☐ Home Fill System ☐** Conservator Device ☐ Carrier Bag/Back pack ☐ Trolley ☐ Back Pack for Inogen one G3 ☐ **Other :**_____	**AIRVO** Consumables ☐ - Optiflo Nasal Cannula ☐ - Optiflo Tracheostomy Interface ☐ Other: _____

10. Healthcare Professional Declaration

I declare that the information given on this form for HSE treatment is correct and complete. I confirm that I am the registered healthcare professional responsible for the information provided. I also confirm that the patient has read and signed the Home Oxygen Consent Form on pg. 2

Prescribers Name: **PIN/ IMC:**	**Signature:**	**Date:**

Refer patient to for follow up Oxygen Assessment ☐ **Yes** ☐ **No** **Details**_____

11. Clinical Condition/Indication for LTOT (please circle below)

1	Chronic obstructive pulmonary disease (COPD)	8	Obstructive sleep apnoea syndrome	15	*Paediatric interstitial lung disease*
2	Pulmonary vascular disease	9	Other primary respiratory disorder	16	*Chronic neonatal lung disease*
3	Severe chronic asthma	10	Chronic heart failure	17	*Paediatric cardiac disease*
4	Interstitial lung disease	11	Cluster headache		
5	Cystic fibrosis	12	Neuromuscular disease	18	Not known
6	Bronchiectasis (not cystic fibrosis)	13	Chest wall disease	19	Other - *please specify*
7	Pulmonary malignancy	14	Palliative care		

12. Home Oxygen Patient Consent:

Information Provided to Patient:	Tick:	Comments:
Fire safety precautions have been discussed as per company booklet (BOC / Air Liquide)	☐ Yes ☐ No	
The oxygen company's information & safety booklet was provided	☐ Yes ☐ No	
Advised to never use oxygen concentrator or cylinders near a naked flame	☐ Yes ☐ No	
Advised to never smoke while using oxygen concentrators or cylinders	☐ Yes ☐ No	
Advised to complete ESB priority support customer registration form and same provided	☐ Yes ☐ No	
Advised to inform my home insurance company that I am currently using oxygen therapy	☐ Yes ☐ No	
Advised to inform my car insurance company that I am currently using oxygen therapy	☐ Yes ☐ No	

- I have been provided with and understand the education on the safe use of oxygen therapy as outlined above.
- I understand as part of the arrangements for providing oxygen at home that my contact details and information regarding my medical condition will be shared with the oxygen provider.
- I understand that a review may be performed of my oxygen requirements following its installation.
- Note: If at this time or any other time in the future my Doctor deems that oxygen therapy is no longer necessary I agree to have the oxygen cancelled and allow the oxygen company to remove the equipment from my home.

Patient/ NOK Signature: _____

Family Signature: _____

Name (PRINT): _____

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Health Care Professional obtaining consent and providing information

Name: _____ **Date:** ____/____/____

For Office use only: ☐ BOC ☐ Air Liquide

Copy x 4 to GP/ PHN / Chart / Oxygen clinic

Appendix IX

HSE/PCCC Contact list for LTOT orders

HSE/PCCC	Telephone Number	Fax Number
HSE Dublin Area 1	01 2843579	01 2808785
HSE Dublin Area 2	0404 60695	0404 60671
HSE Dublin Area 3 & 5	01 6206341	01 6206344
HSE Dublin Area 4 & 9	045 981805	045 981870
HSE Dublin Area 6	01 8975129	01 8975199
HSE Dublin Area 7	01 8467204	01 8467527
HSE Dublin Area 8	01 8661424	01 8661445
HSE Dublin Area 10	0404 60695	0404 60671
Carlow & Kilkenny	056 77849728	056 7764172
Cavan	049 4361822	049 4361877
Clare	065 6863785	065 6863746
(Cork) Bantry – West Cork	027 50133	02752964
(CORK)North Lee – North of Cork City	021 4923875/2	021 4923972
(CORK)South Lee – South Cork & South of Cork City	021 492 3981/3883	021 4923972
(CORK)Mallow – North County Cork	022 58700/39	022 58708
Donegal	074 9109696	074 9109695
Galway	091 546214	091 546362
Kerry	066 7184513/76	066 7184543
Kildare	045 981805	045 981870
Leitrim	071 7650300	071 9620517
Limerick	061 483995	061 483757
Louth	042 9332287	042 9381148
Longford	044 935078	044 9394999
Mayo	094 9042213	094 9021131
Monaghan	047 30452/39097	047 82595
Navan	046 9037705	046 9059035
North Tipperary (Under 65yrs)	067 46766	067 46758
North Tipperary (Over 65)	067 46471	067 37791
Offaly	057 9359542	057 9359565
Portlaoise	057 8692504	057 8621940
Roscommon	0906 637544	0906 628121
South Tipperary	052 6177114	052 6126690
Sligo	071 9155100	071 9155129
Waterford	051 842878	051 842811
Westmeath	044 9395013	044 9394998
Wexford	053 9174318/9185642	053 9174311