ASSESSMENT FOR AMBULATORY OXYGEN THERAPY - GUIDELINE

This guidance does not override the individual responsibility of health professionals to make appropriate decisions according to the circumstances of the individual patient in consultation with the patient and /or carer. Health care professionals must be prepared to justify any deviation from this guidance.

Introduction

This document outlines the qualifying criteria and the clinical standards for the assessment and prescription of home ambulatory oxygen therapy, taken from the British Thoracic Society Home Oxygen Guideline Development group, as endorsed by the Royal College of Physicians (RCP), Association of Respiratory Nurse Specialists (ARNS), Association of Chartered Physiotherapists in Respiratory Care (ACPRC) and the Association for Respiratory Technology and Physiology (ARTP).

Assessments for ambulatory oxygen therapy depend on the short-term response to supplementary oxygen therapy when the patient is performing an exercise test, such as a six-minute walk test, or a shuttle walk test. All patients undergoing assessment for home oxygen must undergo a risk assessment which includes patient/ household smoking status, history of substance misuse and other risks such as fire, trips and falls (Suntharalingam *et al* 2017).

This guideline is for use by staff groups who are responsible for the assessment and prescription of Ambulatory Oxygen Therapy (AOT)

Specialist Respiratory Nurses
Specialist Respiratory Physiologists
Specialist Respiratory Physiotherapists
Home Oxygen Assessment and Review Nurses
Specialist COPD Respiratory Nurses (where trained)
Specialist COPD Physiotherapists (where trained)

Lead Clinician(s)

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Approved by Respiratory Directorate on: 28th September 2022

Approved by Medicines Safety Committee on: 14th December 2022

Review Date: 14th December 2022
This is the most current document and is to be used until a revised version is available

Key amendments to this guideline

Date	Amendment	By:
Feb 2013	Full review	L Dale
April 2015	Document reviewed with no changes for a further 2 years	L Dale
August 2017	Document extended for 12 months as per TMC paper approved on the 22nd July 2015	TMC
December 2017	Sentence added in at the request of the Coroner	
June 2018	Document extended for 3 months as per TLG recommendation	TLG
October 2019	Full review: updated guidelines on field walking tests in chronic respiratory disease and inclusion of risk assessment and mitigation.	NH
April 2022	Final amendments following circulation	NH
28/09/22	Approved by Respiratory Directorate	Dr Hooper
03/11/22	Amendments following comments from pharmacy	SA

ASSESSMENT FOR AMBULATORY OXYGEN THERAPY

Introduction

Ambulatory oxygen therapy (AOT) is defined as supplemental oxygen calculated to maintain peripheral saturations (SpO2) during exercise in patients who are found to desaturate on exertion. Desaturation is defined as a fall in SpO2 of >4% to a value of <90%. AOT has been shown to be effective in increasing exercise capacity and reducing breathlessness in patients with exercise induced arterial oxygen desaturation. (British Thoracic Society (BTS), 2006)

The purpose/aims of ambulatory oxygen therapy are to: -

- Optimise short term exercise capacity,
- Increase patient stamina and maintain muscle strength
- Increase quality of life through promotion of independence in activities
- Decrease the patient's perception of their own breathlessness

Ambulatory oxygen equipment can be provided for patients who qualify for long term oxygen therapy (LTOT) without AOT assessment to help achieve >15 hours or more of oxygen therapy per 24 hours and for those who qualify for LTOT but who need to be away from home for periods of time (BNF, 2022).

Indications

Ambulatory Oxygen Therapy is indicated for any chronic lung disease with exercise de-saturation, defined as a fall in S_pO_2 of 4% to a value <90% (BTS 2006), and includes the following conditions:

- Chronic Obstructive Pulmonary Disease (COPD)
- Pulmonary Vascular Disease
- Interstitial Lung Disease (ILD)
- Primary Pulmonary Hypertension (PPH)

Caution

Ambulatory oxygen therapy is **not** recommended in patients with chronic lung disease and mild hypoxaemia (not on Long Term Oxygen Therapy) without exercise de-saturation.
Ambulatory oxygen therapy is also **not** recommended for those with heart failure, COPD with mild or no hypoxaemia at rest, and for patients with COPD who smoke (BNF, 2022).

Patients should be advised of the increased risk of fire for patients who are to receive or be assessed for ambulatory oxygen therapy. Patients who smoke should be offered smoking cessation advice and should only be provided with ambulatory oxygen therapy when they have stopped smoking (BNF, 2022).

Absolute contra-Indications include

- History of unstable angina in the previous month prior to the assessment
- History of myocardial infarction in the previous month prior to the assessment
- Systolic BP of more than 180 mmHg
- Diastolic BP of more than 100 mmHg

Please see Appendix 1 for a full list of absolute and relative contraindications for respiratory field walking tests. (Holland, A. E. et al 2014)

Competencies Required/Criteria for Competence

This policy is limited to health care professionals with specialist knowledge of respiratory diseases, who are trained in the assessment and prescription of oxygen therapy and who are authorised to complete a Home Oxygen Order Form (HOOF) B.

To ensure safe practice and appropriate implementation staff undertaking this policy should be trained using the standard protocol and then supervised for several tests and deemed competent before performing alone.

Staff working under this protocol should have completed cardiopulmonary resuscitation training yearly as per Trust policy.

Criteria to guide referral for AOT assessment

Ambulatory oxygen assessment should be considered in patients who are found to be desaturating on peripheral saturations on exercise and exertion (BNF, 2022).
Assessment should also be considered in patients who find that their level of exercise is severely curtailed by breathlessness and where gas transfer (DLCOc) is <45% predicted on full lung function (where available). Lung function is **not** a pre-requisite for referral for ambulatory oxygen therapy.

While impaired mobility may not preclude referral for an ambulatory oxygen assessment, consider the risk factors and logistical difficulties inherent in a patient with walking aids also negotiating oxygen cylinders and equipment and if necessary, discuss with respiratory nurse specialists.

Details of Guideline

Assessment for Ambulatory Oxygen Therapy

Option 1 – (Incremental) Shuttle Walk Test

The Incremental Shuttle Walk Test is a simple yet valid and reliable form of assessing functional exercise capacity for patients with COPD and can be used in the assessment of patients with other forms of chronic lung disease. The test results can be utilised in assessing supplemental oxygen response in terms of distance covered, patient perception of breathlessness and continuity of walk (Holland, Spruit, Troosters *et al* 2015)

Incremental Shuttle Walk Test (evidence-based CD) uses an audio signal from a CD to direct the walking pace of the patient back and forth on a 10-meter course. The walking speed is increased every minute and the test ends when the patient cannot reach the turnaround point within the required time (ATS, 2002)

Patient recovery determines the gaps between tests.

Equipment

- Gym time –10-meter area marked with cones inset 0.5m from either end
- Incremental Shuttle Walk Test (ISWT) CD & CD player
- Stop watches x 2
- Patient's medical notes
- Ambulatory oxygen equipment, hired/supplied from Baywater
- Nasal Cannula
- Pulse Oximeter
- Sphygmomanometer
- Patient's own medications
- Cardiopulmonary resuscitation equipment nearby

Procedure	**Rationale**
Inform patient about the procedure in standardised wording (see *Appendix 2*) advise patient to stop walk immediately if anything compromises their safety e.g. chest pain, dizziness	To gain patient's consent as per professional and legal requirement, to gain co-operation, and to ensure patient safety
Check suitable clothing/ footwear, contraindications, clinical stability, appropriate environment	To ensure safety of patient during walk, and to ensure accuracy, reliability and reproducibility of walk
Practice walk test by the health care professional	To introduce the technology to the patient
Allow patient to rest near starting point, check/ document breathlessness score (BORG- *see Appendix 3*) SpO2, heart rate (and blood pressure if clinically indicated).	Baseline measurements to assess extent of change through exertion, to ensure baseline is stable before attempting walk for patient safety
Patient to hear full ISWT audio before walk during rest	To establish full understanding and cooperation and the opportunity to ask questions
Baseline walk test on air according to ISWT, measure SpO2 nadir and heart rate during walk	To standardise test and enable accurate assessment of changes to the patient caused by exertion
Patient to walk alone or to lead the walk if needs to be accompanied by health care professional	Most accurate testing of patients own functional capacity should be patient walking alone without influence
Instruct patient walk is to be terminated if patient becomes clinically unstable, e.g. SpO2 <80%	Based on 6 Minute Walk Test (6MWT) guidance as no evidence regarding ISWT safety criteria
Once patient has completed walk, record BORG immediately, record any stops or events and measure distance covered	To enable assessment for change in patient's condition pre and post supplemental oxygen intervention
Allow patient to rest and recover for 15- 30 minutes	To allow recovery of cardiovascular status before commencing second half of assessment on oxygen flow
Repeat walk on supplementary flow rate of 2L/m O2 with **patient carrying the ambulatory system.**	Aim to maintain the SpO2 above 90% where possible during exercise and assess impact of portable oxygen therapy

Measure SpO2 and heart rate during walk and patient perception of breathlessness immediately at stop of walk	at 2L/m upon patients SpO2, distance and perception of breathlessness.
If required, repeat walk on supplementary flow rate of 4L/m with patient carrying the ambulatory system following a period of rest for 30 mins Measure SpO2, heart rate, and distance	Aim to maintain the SpO2 above 90% where possible during exercise and assess impact of portable oxygen therapy at 4L/m upon patients SpO2, distance and perception of breathlessness.
Details of the procedure/assessment including informed consent, number of walk tests, oxygen flow rates attempted, and patient outcomes, to be documented in patient's notes. Conclude documentation with conclusion as positive or negative assessment	To maintain effective communication, for accuracy, for future reference and for professional/ legal requirements To avoid any ambiguity and allow for individual clinical judgement

Option 2 – Six Minute Walk Test

The six-minute walk test is a relatively simple test evaluating functional capacity by measuring the distance a patient can cover over 6 minutes. It can provide a valuable insight into patient ability to be able to cope with everyday activities and can be better tolerated than the ISWT. Self- paced it assesses the submaximal level of functional capacity which better reflects submaximal activities of daily living. Patients are permitted to slow down, to stop and rest as necessary, but resume walking as soon as possible if safe to do so (ATS, 2002).

Equipment

- Long, flat straight corridor- 30 meters in length. The corridor should be marked every 3 meters and the turnaround points marked with a cone. A starting line, which indicates the beginning and end of each lap 60-meter lap, should be marked on the floor.
- Cones x 2
- Stopwatch
- Lap counter
- Patient's medical notes
- Home ambulatory oxygen equipment, hired/supplied from Baywater
- Nasal Cannula
- Pulse Oximeter
- Sphygmomanometer
- Patient's own medications if indicated (e.g. GTN spray, Salbutamol inhaler)
- Cardiopulmonary resuscitation equipment nearby.
- Phone or means to summon help

Procedure	Rationale
Inform patient about the procedure, advise patient to stop walk immediately if anything compromises their safety e.g. chest pain, dizziness, instability	To gain patient's consent as per professional and legal requirement, to gain co-operation, and to ensure patient safety
Check suitable clothing/ footwear, contraindications, clinical stability, appropriate environment	To ensure safety of patient during walk, and to ensure accuracy, reliability and reproducibility of walk
Staff demonstration - walking a lap back and forth around the cones	To ensure understanding of expectations of patient for the walk
Document baseline SpO2, heart rate, and pre walk BORG score, blood pressure if clinically indicated	To enable assessment for change in patient's condition pre and post oxygen intervention. To establish clinical stability prior to performing walk
Patient to walk alone or to lead the walk if needs to be accompanied by health care professional	Most accurate testing of patients own functional capacity should be patient walking alone without influence
Set lap counter to zero and set stop clock to 6 minutes.	To ensure optimal accuracy of assessment and therefore reproducibility
Instruct patient to walk as far as possible in 6 minutes	To establish functional capacity, mobility, stability
Periodically check SpO2 monitor, stop if SpO2 <80% until recovered then resume walk. Record stops and reason for stops	To ensure patient safety and establish assessment criteria To gain holistic assessment of patient experience during exertion
Encourage patients with standardised comments (*see Appendix 4)*	To ensure reproducibility of test regardless of health care professional conducting test
Whether patient terminates walk or completes walk, record BORG immediately and monitor and record post walk SpO2 nadir during recovery period, and duration of recovery to baseline	Record impact of exertion on patient to compare once walk on oxygen is performed
Document distance walked and allow 15 -30 minutes rest before repeating walk on supplemental oxygen	To allow recovery of cardiovascular status before commencing second half of assessment on oxygen flow
Repeat walk on supplementary flow rate of 2L/m O2 *with patient carrying the ambulatory system.* Measure SpO2 and heart rate during walk and patient perception of breathlessness immediately at stop of walk	Aim to maintain the SpO2 above 90% where possible during exercise and assess impact of portable oxygen therapy at 2L/m upon patients SpO2, distance, perception of breathlessness and walking stability
If 2L is not sufficient to achieve >90% SpO2 allow patient to rest for 15- 30mins and repeat walk on supplementary flow rate of 4L/m O2 with patient carrying the ambulatory system. Measure SpO2 and heart rate during walk and patient perception of breathlessness immediately at stop of walk	Aim to maintain the SpO2 above 90% where possible during exercise and assess impact of portable oxygen therapy at 4L/m upon patients SpO2, distance, perception of breathlessness and walking stability

If required, repeat walk on supplementary flow rates of increasingly higher flow measuring SpO2, heart rate, minimum SpO2 and BORG score.	To optimise possibility of achieving SpO2 at >90% and reduce physiological impact of hypoxaemia, and reduce patient perception of breathlessness experienced during exertion
Details of the procedure/assessment including informed consent, number of walk tests, oxygen flow rates attempted, and patient outcomes, to be documented in patient's notes. End documentation with conclusion of positive or negative assessment	To maintain effective communication, for accuracy, for future reference and for professional/ legal requirements To avoid any ambiguity and allow for individual clinical judgement

Adapted from the ERS/ ATS Technical Standard: Field Walking Tests in Chronic Respiratory Disease, 2014.

Patient Outcomes and provision of ambulatory oxygen

- Increase in walking distance covered – 10% cut off
- Improvement in Borg score/ less breathlessness
- Functional improvement with less stops
- Resolution of instability related to exertional hypoxaemia

Consider
If there are any safety concerns, discussions must be had with allied respiratory teams, oxygen assessment team and referring Consultant Physician to either delay AOT or negotiate a home risk assessment review before oxygen is prescribed. Follow up review may need to be sooner based on discussions/ individual case history. Local risk assessment forms must be completed and decision making documented.

Review

6 months by Respiratory Specialist Nurses/ COPD Community Team/ Home Oxygen Assessment and Review Service, (HOS-AR)

1. Re-assessment of patient's activity levels
2. Record of patient's utilisation of the ambulatory system
3. Record of adherence to the prescription
4. Assessment of any increases in O_2 requirements
5. Review medical record that may influence change in prescription

Monitoring Tool

This should include realistic goals, timeframes and measurable outcomes.

How will monitoring be carried out?

Who will monitor compliance with the guideline?

Page/ Section of Key Document	Key control:	Checks to be carried out to confirm compliance with the policy:	How often the check will be carried out:	Responsible for carrying out the check:	Results of check reported to: *(Responsible for also ensuring actions are developed to address any areas of non-compliance)*	Frequency of reporting:
	WHAT?	**HOW?**	**WHEN?**	**WHO?**	**WHERE?**	**WHEN?**
	Documented evidence of the correct process of assessment for AOT via either the ISWT or the 6MWT and appropriate prescribing of flow	Spot Checks by Matron	quarterly	Matron To be added to job description	Divisional Quality Assurance team	quarterly

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Appendix 1

Absolute Contraindications for Field Walking Tests

Acute myocardial infarction (last 3 – 7 days)

Unstable angina

Uncontrolled symptomatic arrhythmias/ haemodynamic compromise

Syncope

Active endocarditis/ acute myocarditis or pericarditis

Symptomatically severe aortic stenosis

Acute pulmonary embolism/ pulmonary infarction/ thrombosis of lower extremities

Suspected dissecting aortic aneurysm

Pulmonary odema

Acute respiratory failure

Acute non-cardiopulmonary disorder (ie clinically unstable)

Mental impairment (inability to undertake assessment or safely manage oxygen)

Resting SpO2 on room air of <85%

Relative Contraindications

Left main coronary stenosis or equivalent

Moderate stenotic valvular heart disease

Severe untreated hypertension (>200mmHg systolic/ >120mmHg diastolic)

Tachyarrhythmias or bradyarrhythmias

High degree atrioventricular block

Hypertrophic cardiomyopathy

Electrolyte abnormalities

Orthopaedic impairment that prevents walking

Holland *et al* (2014) pg 1438

Appendix 2

Incremental Shuttle Walk Test Instructions

- The object of the progressive shuttle walking test is to walk as long as possible there and back along the 10- metre course, keeping to the speed indicated by the beeps on the audio recording. You will hear those beeps at regular intervals.
- You should walk at a steady pace, aiming to turn around the cone at one end of the course when you hear the first beep, and at the other end when you hear the next.
- At first your walking speed will be very slow but you will need to speed up at the end of each minute. Your aim should be to follow the set rhythm for as long as you can.
- Each single beep signals the end of a shuttle and each triple bleep signals an increase in walking speed.
- You should stop walking only when you become too breathless to maintain the required speed or can no longer keep up with the set pace.
- The test is maximal and progressive. In other words, it is easier at the start and harder at the end. The walking speed for the first minute is very slow. You have 20 seconds to complete each 10- metre shuttle, so don't go too fast.
- The test will start in 15 seconds, so get ready at the start now
- Level one, start with a triple bleep after the 4 second countdown

Holland, (2015) pg 133

Appendix 3

SCALE	SEVERITY
0	No Breathlessness* At All
0.5	Very Very Slight (Just Noticeable)
1	Very Slight
2	Slight Breathlessness
3	Moderate
4	Some What Severe
5	Severe Breathlessness
6	
7	Very Severe Breathlessness
8	
9	Very Very Severe (Almost Maximum)
10	Maximum

Modified BORG Scale

ATS (2002) pg 113

Appendix 4

Standardised Encouragement for 6MWT

1 min - you are doing well. You have 5 minutes to go

2 mins – keep up the good work. You have 4 minutes to go

3 mins – You are doing well. You are halfway

4 mins – Keep up the good work. You have only 2 minutes left

5 mins – You are doing well. You have only 1 minute to go

6 mins – Please stop where you are.

Holland, (2015) pg 135

Supporting Document 1 - Equality Impact Assessment Tool

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

		Yes/No	Comments
1.	**Does the policy/guidance affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Transgender	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment & mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	N/A	
4.	**Is the impact of the policy/guidance likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the policy/guidance without the impact?**	N/A	
7.	**Can we reduce the impact by taking different action?**	N/A	

If you have identified a potential discriminatory impact of this key document, please refer it to Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact Human Resources.

Supporting Document 2 – Financial Impact Assessment

To be completed by the key document author and attached to key document when submitted to the appropriate committee for consideration and approval.

	Title of document:	Yes/No
1.	Does the implementation of this document require any additional Capital resources	No
2.	Does the implementation of this document require additional revenue	No
3.	Does the implementation of this document require additional manpower	No
4.	Does the implementation of this document release any manpower costs through a change in practice	No
5.	Are there additional staff training costs associated with implementing this document which cannot be delivered through current training programmes or allocated training times for staff	No
	Other comments:	

If the response to any of the above is yes, please complete a business case and which is signed by your Finance Manager and Directorate Manager for consideration by the Accountable Director before progressing to the relevant committee for approval