Graham Delves, South of England (East) HOS Project Manager, enlightens us on key differences between the old and the new oxygen contracts and what we can expect, in terms of both the quality and the cost of our service now.

The new Home Oxygen Contract is written in a different manner to the old contract and offers the opportunity for both quality and cost improvements. At present there is still some work to ensure that all the benefits are being realised to the maximum extent and it is recognised that we are unlikely to be at a steady state operation until the end of September 2012.

Quality of service

There are five principal quality differences between the old and new home oxygen contracts as follows:

1. Ordering of Oxygen

Under the new contract the clinician will provide the Home Oxygen Order Form (HOOF) for ordering of Oxygen;

Response times required are: Urgent response (4hrs); hospital discharge/assessment (1day); new orders (3days); refills (1day).

All new patients will be required to complete a Home Oxygen Consent Form (HOCF). This will include consent for the relevant information to be shared with Fire and Rescue Services and the electricity suppliers;

Patients are able to notify the suppliers of a change of address without a new HOOF;

The suppliers must respond to HOOF rejections within fixed periods of time;

Patient orders to be delivered in full and on time on every occasion;

Patients don’t have to be present to receive refills if suitable prior arrangements have been agreed.

2. Customer Contact Centre

· A transition plan to be provided to ensure appropriate resources and data capture for the call centre on service commencement.

· Call centre staff are obliged to answer the large majority of patients’ calls within 30 seconds.

· All telephone calls will be recorded for training, monitoring and dispute resolution.

· All calls and correspondence to the contact centre need to be captured, and all contact history maintained.

· This will be linked to individual patient’s records.

(Continued on page 3)
3. Equipment Selection

- The clinician will be responsible for selecting the equipment profile for the patient via the HOOF - previously the supplier selected equipment based on the hours and flow rate.
- A wider range of equipment is available to clinicians under the new contract. This includes: cylinders (static, standard and lightweight), concentrators (static, transportable, portable and self-fill) and liquid oxygen.
- The suppliers will be required to report the number of concentrator pipes completed.
- Both patient training and a means of securing large static cylinders in homes where children are present will be available as routine.

4. Secondary Supply

- Patients will be able to arrange secondary supply (e.g., for holidays, respite care or use at work/school) without the need for a new HOOF providing the equipment is exactly the same as that used at home (the primary supply).
- Patients will be required to give three days’ notice for secondary suppliers; which is exactly the same as for a standard order.
- Installations will be provided on Saturdays;
- The supplier of the home oxygen supply will coordinate all the patient’s orders even if a secondary supply is via another provider.
- Suppliers are required to follow clear protocols when communicating and processing patient orders between one another.

5. Electricity Reimbursement

- Quarterly payments for electricity reimbursement will be made to patients. This will consist of two concentrator meter readings and two estimates (based on historical usage), per annum;
- A clear protocol and process has been adopted to ensure accurate payments to patients; These represent the price that patients are paying for their local electricity supplies.
- If a patient does not notify the company of their payment tariff, then NHS have directed the supplier to reimburse them at the lowest known tariff for the area.
- Clear communication and information will be provided to patients to support their electricity payments; This will include a written quarterly statement.

Cost Differences

Under the previous contract, the cost was driven by an all encompassing daily charge for the modality type (long-term oxygen, short-burst, or ambulatory), determined by the flow-rate required and number of hours oxygen is used each day. Under the new contract, there are two components to the cost: a daily equipment hire charge (this will be determined by the lifestyle of the patient, along with the flow-rate and duration required), plus a charge for each service delivered (installations, deliveries, removals, servicing and risk assessments), with some variation in the service charge depending on the type of equipment).

Although the previous contract had reached the end of its duration, the re-procurement offered an opportunity to minimise the costs of the home oxygen service to the NHS for the forthcoming five years. As we became aware of the issues during the drafting stage of the new contractual framework, we were able to realise some savings prior to contract commencement.

There were two factors responsible for the cost savings prior to March 2012:

1. Better clinical management of patients
   e.g. assessment of new patients and reviews of existing patients, with clinically correct prescription of oxygen and as cost effective ordering as possible.

2. Better contractual management of home oxygen supplier
   e.g. asset audit and KPI monitoring.

   It would have been impossible to manage one effectively without the other and the best estimate is that these were equally responsible for the savings realised. This led to a saving of 14% for 2011-12 compared to 2010-11.

Although it is a little early to be looking at annual forecast out-turns for 2012-13 at this stage, early indications are of a first year saving of around 40% across the region compared with the spend for 2011-12. This bears a reasonable first comparison to calculations in the bid evaluation document presented to the Home Oxygen Service Project Board in July 2011. Further work is underway to verify the accuracy of the costs and move towards steady state.

This does not take into account the likely 20% plus annual saving in electricity reimbursement costs as old concentrators are swapped with more efficient new equipment in the first six months of the new contract.
### Relative Ambulatory Oxygen Costs for Frequently Used Flowrates and Durations

Based on 12 Months' Usage

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<td>Portable Concentrator 2l/min</td>
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1. **All assume patient is already on LTOT via a concentrator**
2. **Excludes installations, servicing, risk assessments and removals**
3. **Cost expressed as multiples of units, 1 unit is the annual cost of Concentrator plus static cylinder**
4. **Faint colours mark modalities intended for competent users of conserver or pulsed-flow oxygen**
5. **Black colour: not feasible using this modality**
Ore Okosi, National Lung Improvement Programme (LIP) Lead for Oxygen, gives us his 5 top tips for a successful Home Oxygen Service Assessment and Review (HOS-AR), derived from lessons learned from the LIP oxygen projects that have been undertaken around the country.

1. Implement Home Oxygen Service - Assessment and Review (HOS-AR) in line with nationally identified good practice.

**Why** - In order to ensure quality of care, safe use of oxygen and the avoidance of waste.

**How** - Review the learning from the national COPD projects improving home oxygen service workstream available here. Liaise with SHA clinical leads for respiratory medicine and make use of the national HOS-AR Good Practice Guide and the Department of Health commissioning specification for HOS-AR in order to construct a business case and devise a service specification.

2. Use both clinical and oxygen supplier (Dolby Vivisol) data systematically to support the assessment and review process.

**Why** – Data review enables the identification of patients who may potentially require therapy rationalisation or the supported withdrawal of oxygen. It also helps identify sources of inappropriate prescribing and maintain tight cost control.

**How** – Provide HOS-AR teams with access to oxygen usage data from suppliers and ensure they work collaboratively with managers and information specialists to routinely review the usage, flow rate, duration and equipment of home oxygen patients.

3. Integrate HOS-AR within the wider respiratory care pathway and coordinate activities with non-respiratory specialties.

**Why** - Oxygen therapy assessment and ongoing review provides the opportunity to optimise all other aspects of patients COPD management (or their other long term conditions).

**How** – Undertake process mapping and also demand and capacity analysis to understand the whole pathway and identify opportunities for new ways of working. Ensure that HOS-AR is explicitly detailed within the respiratory service specification and that the HOS-AR team activities are aligned with other respiratory services such as pulmonary rehabilitation. Ensure coordination exists with non-respiratory services such as Cardiology, Neurology and Palliative care.

4. Promote the message that ‘Home oxygen is a treatment for chronic hypoxaemia and NOT a treatment for breathlessness’

**Why** - Oxygen is a drug and should only be prescribed where clinically indicated otherwise it is of NO benefit and potentially harmful to some patients.

**How** – Establish ongoing and effective communication between the HOS-AR team, primary and secondary care and also patients groups through education sessions and Forum meetings. A continuing dialogue should occur in respect of best practice, treatment goals and HOS-AR referral criteria.

5. Work collaboratively to formalise policies and procedures around the safe use of home oxygen.

**Why** - Oxygen therapy is highly flammable and can result in serious injury or even death if not used safely.

**How** - Ensure patients and carers receive instruction in the safe use of home oxygen during the assessment and review process and provide support to stop smoking. Work in partnership with oxygen suppliers (Dolby Vivisol in SEC) and local Fire Rescue Services to promote consistent messages around the safe use of oxygen and to establish risk identification, risk management and clinical governance policies and procedures.
Kath Plumbe

Clinical Oxygen Transition Lead takes us through a step-by-step guide to getting HOS-AR in our area on the commissioning agenda.

If you don’t already have one in your area, there could be no better time to start putting together your case for commissioning a HOS-AR. The new national contract is in place (explained beautifully in Graham Delves’ article) and nearly every region has appointed their oxygen supplier, with Dolby Vivisol being our provider in the SEC region.

The first hurdle which many people face is getting a meeting with the appropriate people within the commissioning arm of the service. Whilst many commissioners will understand that there have been great changes with oxygen over the past two years, many will have other much larger projects occupying their every thought. Our role as respiratory specialists, especially if you are in a key leadership role, is to get oxygen onto the agenda and keep it there. That takes tenacity, perseverance and a comprehensive understanding of both the financial and clinical components of a HOS-AR.

In my particular case back in 2006, it took many meetings with senior management within the provider organisation to get the issue supported from the top before we actually got a service level agreement in place. However, we did it and the service has run successfully since that time.

Of course, much of the ‘raising the profile’ work has been done at a national level with the production of the much needed HOS-AR Good Practice Guide and the work of the Lung Improvement Programme.

In addition, I am sure that many of you are aware that we have been working hard in the South of England (East) SHA to raise the profile of the importance of commissioning a HOS-AR.

To that end, I was asked to prepare a short and ‘to the point’ presentation which could be used by anyone in the region to aid their discussions with commissioners when the opportunity arose.

The presentation is available by clicking here. What follows below is an overview of the key points to be used alongside the presentation.

**Be prepared!**

Once you manage to get ‘an audience’ with the commissioners, don’t waste it!! If you attempt such a meeting unprepared it will have the opposite effect, potentially disappearing from their agenda altogether, or at least falling to the bottom of the pile! You must be prepared to be challenged on both a clinical and financial level; the degree to which you can master the questions and challenges the better the outcome. The ‘to the point argument’ covers the following important aspects:

**Headline Statistics**

Kick off with some key facts/headline statistics to make people sit up and listen to the rest of the session, such as the fact that 85,000 people in England use oxygen which financially equates to £110 million spent per annum. Of these 24-43% of people do not use either their oxygen or clinically need it. Unless an effective HOS-AR is commissioned, it is unlikely that these patients will be discovered and reviewed. Oxygen is paid for whether it is used or not, so the cost of oxygen will continue to rise. A good HOS-AR offers the potential to save a lot of money which can be used elsewhere in the health system, whilst pushing up the quality of care for patients.

**Where a commissioned HOS-AR fits**

Recommendation 14 of The Outcome Strategy for COPD and Asthma in England states that: ‘all patients with COPD should be clinically assessed for LTOT and be reviewed at intervals, and existing registers should be reviewed’; the NICE Clinical Standards CG101, 2010 state that: ‘patients should be assessed and reviewed annually’. So the need for a HOS-AR is firmly embedded in national guidance at the highest level.

**Current situation**

There is inconsistency in access to HOS-AR nationally. Whilst some PCTs have an established HOS-AR, which may have been in existence for some years, many regions do not have a properly commissioned service. Depending on what is available, or what staff are tying to provide without commissioning, patients are either not formally assessed and reviewed, or are

(Continued on page 6)
being seen on an ‘ad hoc’ basis by staff trying to assess patients oxygen needs on top of their ‘day job’. This can lead to provision of assessment to only some patients, or provide an unsatisfactory level of quality, as the full, clinically correct protocol is very time-consuming. There may be confusion or even conflict regarding whether acute or community staff provide this ‘service’. This can lead to both patient and clinician dissatisfaction. One of the government drives is to reduce inequity in service provision and patients must have equal access to a service, which should be at a good and nationally agreed standard.

**What a HOS-AR is and what it involves**

Although some commissioners have a clinical background, many will not fully understand the vital purpose or practicalities of running a HOS-AR. Key principles which need conveying are: the importance of the clinical decisions which are made during the assessment process and the logistics of providing the service. Clinical risk is potentially present for all patients, especially those who demonstrate hypoxaemia and hypercapnia. This is why you need senior staff to oversee the clinic and why the assessment can take a long time, for example when several flow rates need to be tested. Health and safety risk is ever present, so I would advise explaining also why a clinic is the best setting for the service. The equipment is cumbersome and is preferably housed statically; this limits damage to the equipment, which can occur during transport, and to staff who otherwise have major manual handling challenges, especially from concentrators which are extremely heavy and cannot easily be lifted in and out of cars. Moving equipment therefore should be discouraged or at least risk assessed if it is essential. Additionally, if ‘sharps’ are being transported there needs to be adequate planning to ensure there can be no spilling of contents!

**Cost versus savings**

Whilst I would ensure that the focus of any argument for a HOS-AR concentrates of the clinical benefit, the potential savings which can be made are an important factor as these can be re-directed into the wider healthcare system. The anticipated national savings as well as the local savings should be highlighted. Of course the service itself will cost money to set up and run and so these figures need to be discussed also.

**Clinical**

I would advise that the final piece of information given is about patient care and the clinical benefits of the service. These include: correcting chronic hypoxaemia (and its associated problems); reducing exercise hypoxaemia; reducing breathlessness; prolonging survival (MRC,1981 and NOTT, 1980); and improving patients’ quality of life. It is also a good idea to point out the non-respiratory benefits of improved oxygen delivery to the vital organs, thereby reducing the risk of organ damage and/or failure, including:

- **Renal function**: LTOT can improve renal blood flow, decreasing activation of renin angiotensin system, so reducing salt and water retention;
- **Sleep quality**: COPD patients often have poor sleep quality with frequent waking; LTOT can improve sleep quality by correcting nocturnal desaturation.

Finally, I would end your mission by focusing on a memorable statement; mine was:

*In a nutshell, oxygen stops people dying as early from their COPD*  
(Nott, 1980, MRC, 1981)

**References:**

This is a quick update and I will refer you back to Breathing Matters Issue 7 July 2011 which you may want to re-read! Click here!

Two key points I would like to re-iterate here are:

**Point 1**

Minimising the risk of oxygen toxicity, by working to ‘target saturation’ and using controlled oxygen devices (Venturi). Oxygen toxicity leads to acidicotic, hypercapnic respiratory failure that may require Acute NIV or intubation and ventilation, both of which lead to increased use of resources and longer length of stay. The BTS emergency oxygen guidelines help us here.

In my trust the new drug chart encourages the practice of using target oxygen saturations:

However, both national and local audits consistently continue to show 20-35% of patients requiring acute NIV have evidence of oxygen toxicity on the initial blood gas, i.e. 1st PaO2 is higher than normal. I’m sure you will all have seen initial PaO2s of 18kPa or more, probably even in the last few days! If you have not done so already, I would encourage you to audit this within your own trust. This may lead to joint initiatives with your emergency departments. If anyone has examples of how they have reduced the incidence of oxygen toxicity in their organization we would be really keen to hear about them!

Email us: eva.lazar@southeastcoast.nhs.uk

**Point 2**

Give Enough Oxygen.

This relates to point 1 and, again, using the target saturation scheme helps us. People with no previous respiratory pathology, but who are hypoxic in an emergency situation, should be given enough oxygen by whatever means to bring their SpO2 into the 94-98% range. For people at risk of oxygen toxicity who are acutely unwell, aim for the lower 88-92% range. Don’t be so worried about exacerbating hypercapnia that you leave a patient significantly hypoxaemic, in distress, and at risk of hypoxic arrest! Some patients will develop acidicotic respiratory failure despite correct management and if that happens, it is time to organise assisted ventilation, either non-invasively (NIV), or by intubation and mechanical ventilation on ICU, depending on the clinical situation.
Long Term Oxygen Therapy (LTOT)
The Clinical Assessment Process

Kath Plumbe, Clinical Oxygen Transition Lead
and Julia Bott, Clinical Oxygen Lead

It’s very important that all appropriate patients are given a full and formal LTOT assessment by a HOS-AR, to ensure that a) they really do need oxygen (O₂), b) that it actually provides clinical benefit, and c) that it is ordered (prescribed) at the right flow-rate (FR) and duration, and with the right equipment, for their clinical needs and lifestyle.

Identifying ‘appropriate’ patients

To this end, prior to referral, an initial assessment is required, to identify correctly those with a true potential need. This avoids either unnecessary time wasting, or giving patients the wrong impression of their O₂ needs. All too often patients are told incorrectly ‘a little oxygen may help’, or those with a genuine need are totally overlooked.

Initial Assessment Process

This will often be carried out by a primary care clinician (GP/Practice Nurse) or a member of the community respiratory service; or it may be identified by a secondary care clinician at an outpatient visit. Following a recent admission is a difficult time to make that call, since, by definition, if they were exacerbating, then the patient is not stable. At times, however, it will be ‘barn door’ that the patient is and always will be hypoxaemic. Where possible and reasonable, however, order a temporary supply in this instance and arrange a full LTOT assessment 5 weeks from discharge.

To be eligible for the full LTOT assessment, the patient should demonstrate an O₂ saturation (SpO₂) <92%, consistently over a period of several weeks. They should be ‘well’, or as well as they ever are, and should be optimised in terms of treatment by eg NICE guidance 2010 if they have COPD. A confirmed diagnosis should have been given, with evidence of recent spirometry.

The Specialist Assessment Process

All the aforementioned criteria for initial assessment need to be checked. A review of their respiratory history should be conducted to ensure that the patient is indeed optimised and that their diagnosis is correct. The patient’s medication should also be reviewed, including in particular whether they are taking any anticoagulants e.g. Warfarin, for obvious reasons! A full explanation of the procedure should be given to the patient, including giving them the opportunity to ask questions. You also need to consider whether the patient is going to consent to having LTOT if deemed appropriate, as there is little point putting them through an invasive procedure if they are not going to agree to treatment based on the results of the test!

The patient is required to rest for 30 minutes (30’). Consideration needs to be given to any break in this period e.g. a trip to the toilet. If this happens the 30’ will need to start again. Once the 30’ has elapsed, the patient’s SpO₂ should be checked. If it is >92% then the patient should be sent home to be monitored - if borderline (92-93%), at 6 monthly intervals, more frequently if fluctuating. If, however, it is still <92%, then a capillary or arterial blood gas (CBG or ABG) is taken on room air, analysed via a blood gas machine and the results interpreted by the clinician.

LTOT or not?

The PaO₂ needs to be 7.3 kPa, or below, to meet the criteria for LTOT, except in special circumstances*. Of course PCO₂ should also be checked to see if the patient is retaining. It is wise to check the acid-base balance too. If the patient meets the criteria, oxygen should be administered, preferably via the equipment which you are intending to recommend, which needs to be rented from the supplier. Depending on the resting SpO₂, either 1 or 2 L/min would be your starting Flow Rate (FR). Whilst the patient rests for 30’ on O₂, their SpO₂ should be monitored, as well as any symptoms of CO₂ retention (headache, sleepiness, confusion, hand-flap). When this 30’ has elapsed, a further blood gas sample will be taken and analysed. This process may need to be repeated with increasing FRs until a PaO₂ at or >8 kPa is
achieved. Rarely is more than 4L/min required for resting LTOT and, as often as not, a small amount proves adequate. You do not want your patient over-oxygenated and risk oxygen toxicity so the lowest FR to do the job is the best one.

Once you have achieved a PaO₂ at or >8 kPa, with no resultant rise in CO₂, then you have found the required FR. If only it were this simple every time! If at this stage the patient starts to retain CO₂, then you will need to reduce the FR for a further 30’ and repeat the test. In some cases it is impossible to correct hypoxaemia without an associated rise in CO₂. If this occurs then you will need to discuss this with their respiratory physician and consider whether long term NIV is an option.

Special Considerations

*If a patient also has peripheral oedema, polycythaemia and/or pulmonary hypertension (abnormal ECG), then the cut-off for LTOT is <8kPa rather than <7.3kPa (R 62 NICE).

Non-COPD patients

Since the evidence for the long-term survival benefit of LTOT is from studies of patients with COPD only¹², the fact that the recommendations include other patient groups is based solely on pragmatic extrapolation, by and large. Patients with COPD will form the majority of those requiring LTOT, but it is reasonable to offer it to those with hypoxaemia due to other conditions if it proves helpful.

Patients with interstitial pulmonary fibrosis (IPF) may gain considerable symptomatic and functional benefit, and are at low risk of oxygen sensitivity/CO₂ retention. This is since the hypoxaemic respiratory failure (RF) they develop, due to diffusion problems, will progress to hypercapnic RF most commonly only near the very end of life, if ever. Commonly in IPF, hypoxaemia commences on exertion only and ambulatory oxygen alone may be required initially, gradually leading to LTOT as the patient’s condition deteriorates.

Smokers

The safety of home O₂ for current smokers needs to be considered. There are as yet no national guidelines advising on this issue. Until this is offered, we have to use best clinical judgement. Clearly if the patient has diminished responsibility for any reason and O₂ in the home may put them or others at risk, a wider clinical group should make the decision.

Service Considerations

Who should do LTOT assessment?

Staff should be respiratory specialists; band 6 nurses or physiotherapists can be very competent to do it, but would need to be under the supervision (in their service not necessarily at each assessment) of at least a band 7 or 8 clinician. In practice, it makes for a more ‘seamless service’ if the same service offers the full complement of care for the patient at home. Individuals performing the assessment should be appropriately trained and competent to take the blood gas sample and to interpret the results. An ABG/CBG sampling policy should be in place to ensure clinical governance and best practice. CBGs are less invasive and generally preferred by patients. Any comparative studies must use the same technique since ABGs and CBGs will not give identical results.

Home or clinic?

Clearly, LTOT assessment is a time-consuming procedure and can’t be hurried. A clinic setting therefore is the most time and cost efficient way of assessing patients, since one can manage several patients at a time, arriving at staggered times, to allow for individuals to be at various stages of the assessment process at one time, eg one sitting ‘resting’ on room air, while another might be having gases taken and a third breathing O₂. Of course, certain individuals will be unable to attend a clinic easily or at all, and for some reviews it may be as efficient to see the patient at home, combined with a chat about the use of O₂ with them and their carer(s), or with a risk assessment.

References


As with LTOT ordering, it’s important that most patients deemed potentially eligible for ambulatory oxygen (AO) are given a full and formal assessment, to ensure that a) they really do desaturate on exertion, b) that if they do, supplementary oxygen (O₂) actually provides clinical benefit, and c) that it is ordered (prescribed) at the right flow-rate (FR) and duration, and with the right equipment, for their clinical needs and lifestyle. The testing is done preferably via the equipment which you are intending to recommend, which needs to be rented from the supplier. Consideration needs to be given as to how the patient will transport it, since it is no use the test demonstrating that when YOU carry the oxygen the patient gains benefit! Do bear in mind that, if a patient is hypoxaemic at rest, this will usually INCREASE on activity; therefore think carefully before ordering LTOT and not testing for AO requirements.

The exception to the formal assessment process is the end stage patient already on LTOT, or a palliative care patient, for whom ambulating is reduced to in and out of the house and car only. In this instance, a pragmatic assessment will suffice and is kinder; more on that later.

**Identifying potentially eligible patients**

If exertional hypoxaemia is suspected as giving rise to symptoms or functional disability, an initial screening assessment during your usual interaction with the patient is optimal. You can identify whether they have any desaturation during normal activity, such as walking and, if so, to what degree. In a clinic setting, or in their own home, you can walk the patient to or from the clinic room, or another room in the house, wearing an oximeter. If there is no desaturation on modest exertion and they are not particularly breathless, consider taking them where they can exert themselves more, e.g., up a flight of stairs or an incline. This may help you appreciate that some individuals who are not hypoxaemic at rest may prove to desaturate (some quite profoundly) on exertion only. If you find this to be the case, then formal assessment is required. Don’t skip this, as about 20% of patients with exertional hypoxaemia gain no clinical benefit from oxygen! I have observed a patient (with IPF due to RA) dropping to 74% and having no benefit whatsoever, either objective or subjective, from even 6L/min. She did respond to oxygen eventually—about 18 months later.

Following a recent admission is not a good time to make that call, since they may be hypoxaemic now, but not in a few weeks. At times, however, for safety, it will be necessary to send the patient home with AO, although in most cases you would do well to let them know it may be temporary and refer them for formal assessment in a few weeks time. Exactly as for LTOT, patients should be ‘well’, or as well as they ever are, at the time of formal assessment, and should be optimised in terms of treatment by e.g. NICE guidance 2010 if they have COPD. As with LTOT, a confirmed diagnosis should have been given, with evidence of recent spirometry.

From a practical perspective, at Pulmonary Rehabilitation (PR) assessment is a good time to do AO assessment, because the patient will need to perform walking tests for both and it saves duplication of time and effort. Moreover, recent work has shown that patients (with exertional hypoxaemia only) who respond to oxygen at baseline, will gain a good deal more benefit from PR if they use AO during PR¹. For time efficiency, if a patient has been identified as potentially needing AO and PR, we may start the process in an AO clinic and complete it in PR assessment.

**Very disabled or palliative care patients**

In the home, for the more disabled or for palliative care patients, for whom a formal exercise test is inappropriate, it is acceptable to perform a pragmatic, functional ‘test’ to establish whether they gain benefit from oxygen. Some simple ways include: a sit-to-stand test or a simple endurance walk (how far someone can walk before needing to stop) or maybe up and down stairs. Order the same prescription as LTOT only if a patient has no real functional mobility; i.e. they are totally homebound or make car transfers only. For many patients, a higher flow rate is required on exertion.

**The Ambulatory Oxygen (AO) Assessment Process**

**Stage 1**

Exactly as for LTOT, the patient is required to rest for 30minutes (30’) breathing room air (RA). However, in this instance, if they are already an LTOT user, then the rest is on their usual LTOT flow rate (FR) as that becomes the baseline. Consideration needs to be given to any break in this period e.g. a trip to the toilet. If this happens the 30’ will need to start again. It is important to appreciate, too, that performing e.g. spirometry, requires the patient to rest again before undergoing assessment as the effort may well have altered the patient’s oxygenation. Once the 30’ has elapsed, the patient’s SpO₂ should be documented as the baseline.

**Stage 2**

The first exercise test is then performed; this can be an Incremental Shuttle Walking Test (ISWT), an Endurance Shuttle Walking Test
(ESWT) - only possible if you have done an ISWT first in the recent past, or a six-minute Walking Distance Test (6MWD). Monitor SpO₂, breathlessness (e.g. Borg score), HR, RR and recovery time.

Stage 3

Repeat the process – i.e., 30mins rest minimum and then another baseline walking test. Why? Because a practice is required on ALL tests, since performance improves with learning. The distance walked may increase by >10% on the second walk, a clinically significant increase despite no intervention. This would give you a false positive effect for AO if the oxygen walk were the second one. If SpO₂ drops by > 4% and to < 90% on the second walk, then go on to stage 4. If it does not, there is no need to continue; the patient doesn’t meet the criteria and they should be sent home and monitored.

Stage 4

Rest again for 30’ breathing room air, or their usual LTOT FR for 30’s minimum. Confirm the resting SpO₂ as the baseline and repeat the exercise test with an increased FiO₂ e.g., 2 L/ min above their baseline FR. You may need to repeat the test (after 30’ rests) with increasing FiO₂ until optimum SpO₂ (at least >90%) is achieved where possible.

Titration of oxygen flow rate

There are three schools of thought regarding the titration of the AO FR that I am aware of (there could be others I am not) and the HOS-AR Good Practice Guide is suitably vague on this score. One (probably the most ‘pure’ method) is to perform successive walks with increasing FRs until you find the one that increases SpO₂ to >90% on the walk. This of course, if you increase even by 2L/min increments and your patient ends up needing 6L/min, could mean undertaking 5 walks (2 baseline on air and 3 with oxygen), each with a 30’ rest in between! This is time consuming and cannot be done in one session as, even with rests, your patient will become increasingly tired and your results would not be valid.

The second is to start the first oxygen walk at a reasonable minimum, say 2L/min (above their baseline FR) and walk behind the patient, noting their saturation every few metres; as soon as it slips below 90%, titrate up by 2 L/min. This requires the flow meter to be easily accessible to you while you and the patient are on the move.

The third is to make a best guess as to what the FR will need to be and perform the oxygen walk on that FR. In all likelihood, the greater the desaturation on the baseline walk, the greater the FR needed to abolish it. So for example, someone who desaturates to only 88% may be fine on 2L/min, whereas another who drops to 82% may require 4 or 5 L/min and those who drop to the 70s% will almost inevitably need 6L/min.

High flow rate users

The maximum FR that you can give in normal circumstances for AO is 6L/min. This is simply because firstly, you cannot give more via nasal cannula or you will risk airway mucosa desiccation and secondly, more than 6L/min is impractical to deliver by the available ambulatory systems, none of which can hold sufficient gas to supply that amount over any reasonable period. In a few unusual circumstances masks may be used to supply a greater FR, but only if your patient can transport the high number of devices needed to supply the oxygen. One farmer with IPF needed a 40% venturi mask and carried large quantities of cylinders in his tractor! It allowed him almost another year of working life and improved his quality of life immensely. Another patient with end stage IPF secondary to RA needed 12 L/min to just get up and down his stairs before the stair lift could be installed. He used 6 L/min LOX via cannula and another 6 L/min from the concentrator and a mask.

When is Ambulatory Oxygen indicated?

Basically, when exercise tolerance and/ or symptoms improve by a clinically relevant amount for the patient. Interestingly, this is currently not identified, but a pragmatic approach is following the old RCP guidelines, which specified a 10% increase in exercise tolerance or decrease in breathlessness. In practical terms this works well since, if there is no demonstrable benefit, patients are reluctant to cart AO around! As with LTOT, if the patient meets the criteria, oxygen should be ordered with consideration given to the acceptability of the system the patient is able to, and will, use at home. NB. No conserver should be ordered for high FR users as their inspiratory capacity will exceed the flow capability of the device and they will not get adequate flow.

Of course, it goes without saying that, for either LTOT or AO patients, discussion as to the benefits and risks of oxygen use, the practicalities and so on need to be outlined, and agreement for the assessment for the therapy and consent for the order need to be obtained for every patient. (Continued on page 12)
As many of you know, Rachel Collins left to go on Maternity Leave. Jo, Jo and Julia are very fortunate to be supported now by Eva Lazar, the new Programme Coordinator. Eva is the main point of contact for the programme, providing admin and project management support to the clinical leads. Eva has a background in events management and more recently has been working with the Community Respiratory Team in East Surrey, so she has a lot of clinical knowledge that you wouldn't normally expect a programme coordinator to have! She has also just completed her PRINCE2 project management training. We hope that in the near future Eva will be joined by a Programme Manager.

To find out more please refer to the [DH Good Practice Guide to Home Oxygen Assessment and Review](#) or contact any of the respiratory programme team for advice.

References:
1. Dyer F, Callaghan J, Cheema K, Bott J. Ambulatory oxygen improves the effectiveness of Pulmonary rehabilitation in selected patients with Chronic Obstructive Pulmonary Disease. Chronic Respiratory Disease 2012 9 (2) 83-91

**Why is CO₂ not a concern with AO?**

When active, ventilation is increased; this increases CO₂ washout, so the risk of CO₂ retention is reduced for any patient.

**NB.** If the FR is higher for AO then LTOT, you must impress upon the patient the need to turn the FR back to the LTOT levels at all times when at rest. Ensure your patient is safe and capable of adjusting the concentrator if it is used this way.

**In patients with type 1 (hypoxaemic) respiratory failure, such as in IPF, ventilation is NOT the problem, but diffusion is, so these individuals will expel the CO₂ fine anyway, as it diffuses much better than O₂ - about 20 times better!**

**Did you know the Respiratory Programme has a website?**

NHS Networks provides a free website resource for clinicians, commissioners, care professionals, managers, staff, leaders, followers and anyone who works in and around the health and social care.

How members can use the website?

- Keep in touch with your own networks
- Join other networks of interest
- Have one username and password to access all open networks
- Discover case studies, good practice and other useful information
- Find people working through similar, difficult issues

- Share your success, news and ideas
- Connect with other groups who are making a difference and driving change
- Contribute content via the network lead, your thoughts, your discoveries
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Twitter is a social networking and microblogging service that allows users to answer the question ‘What are you doing? / Thinking?’ in short (140 character) messages. These messages are called Tweets and can be read by your friends or Followers.

We try to keep our distribution list as up to date as possible.

If you would like to subscribe or unsubscribe from Breathing Matters or your role has changed and you would like to let us know, please email: eva.lazar@southeastcoast.nhs.uk

**Welcome Eva!**

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