NHS

Primary Care Commissioning

Home Oxygen Service - Assessment and Review

Good practice guide

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Appendices

Introduction: Good Practice Guide

1. A broad range of stakeholders including the Department of Health, the British Lung Foundation, patient representatives, and professional groups such as the Primary Care Respiratory Society, the British Thoracic Society and the British Paediatric Respiratory Society has developed this Good Practice Guide. The Guide reflects current good practice in home oxygen in the assessment and review of patients.

2. This Guide sets out the current model of service provision. With the passage of the Health and Social Care Bill currently before Parliament, it is likely that structures will change with the abolition of PCTs and SHA's, and changes to commissioning of services. This guide will be updated during the course of the year to reflect the new architecture for the NHS, and any new arrangements that are put in place for the management of home oxygen.

The Home Oxygen Service: overview

3. Most patients who are prescribed oxygen have respiratory disease, typically chronic obstructive pulmonary disease (COPD), cystic fibrosis or pulmonary fibrosis. People with chronic asthma or sleep disordered breathing may also benefit. Oxygen therapy is also an effective treatment for some people with cardiac or neurological disease (eg cluster headaches) and is an important element in palliative medicine. Pre-term babies with chronic lung disease are dependent on oxygen until their lungs have developed sufficiently and are normally looked after in hospitals and specialist units.

4. Currently 85,000[1] patients in England have oxygen at home at a cost to the NHS of around £110 million a year[2]. Yet between 24 and 43%[3] of the oxygen that is prescribed to these patients is not used or derives no clinical benefit. However, the NHS is currently charged for each patient who is supplied with oxygen, whether it is used or not. This leads to waste and poor quality care.

5. At present, oxygen therapy may be considered for people who already have an established diagnosis and are under the care of a specialist (such as a cardiologist or a neurologist). Oxygen is also prescribed to people without a pre-existing diagnosis by a range of healthcare professionals including nurses, GPs and specialists. In light of this, it is important that home oxygen should not be prescribed on a long-term basis unless a clinical assessment has been undertaken and, where prescribed, a regular review undertaken to ensure that people continue to derive a clinical benefit. Such a review would also identify under and over-use of the prescription by assessing the patient's usage, and provide an opportunity to discuss the ongoing safety requirements for the provision and use of oxygen in the home. It is considered that prescribing SBOT probably does not benefit the majority of patients with severe COPD and should be avoided.

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[1] Source: Unpublished DH data

[2] Source: Unpublished DH data

[3] Source: DH data. The lower percentage for non-use of oxygen is based on the assumption (untested) that LTOT prescriptions apply 5 days per week, with ambulatory oxygen on the other 2 days. This assumes that patients will not be using both types of oxygen at once and is therefore more conservative. See footnote 8 for further information.

HOS Vision

6. People prescribed oxygen and clinicians alike should be well informed about the nature, scope and capability of the home oxygen service. The service should
   - Have quality at its core: in other words, be accessible, safe, effective and responsive to patients;
   - Be evidence-based, clinically-led and continually strive to improve outcomes for patients; and
   - Be affordable and represent good value for money.

7. A home oxygen service assessment and review (HOS-AR) service supports this vision by providing all patients with easy access to an assessment procedure carried out by an appropriately qualified and trained healthcare professional, using appropriate diagnostic equipment. Service quality will be improved through more effective and speedier diagnosis, leading to a higher standard of clinical treatment and improving outcomes. By targeting the service on those who will benefit from home oxygen, affordability and value for money will be strengthened. This is particularly important as the NHS prepares to make significant efficiency savings in the coming years.

8. The HOS vision, based on the introduction of systematic assessment and review, supports the aims and objectives of the Department of Health's Strategy for Chronic Obstructive Pulmonary Disease[4], by facilitating good-quality early diagnosis (Objective 2), and therefore promoting high-quality care and support following diagnosis (Objective 3). It also supports recommendation 14 - `All patients with COPD and hypoxaemia should be clinically assessed for long-term oxygen therapy and reviewed at regular intervals, and existing home oxygen registers should be reviewed'. Similar benefits arise for patients with other conditions e.g. pre-term babies and some cardiac patients, where home oxygen is integral to the patient's care pathway. Home oxygen can be an important element of end-of-life care, and therefore supports Objective 4 of the COPD strategy – `improving access to end-of-life care services.'

9. This document sets out the core components of a high quality assessment and review service for home oxygen. The service will promote quality and productivity across the NHS. This Guide is not prescriptive and does not set national targets or milestones. Instead, the objective is to ensure the service is implemented to reflect existing clinical guidelines from the British Thoracic Society, while meeting the needs and preferences of local people and communities. Several PCT's have already put in place assessment and review services for home oxygen and these have proved very effective: the intention is to identify and disseminate those elements which should, from a clinical perspective, be common to all such services in order to establish consistent minimum standards for all patients; and to identify and disseminate learning from the different models of delivery/implementation.

[4] Consultation on a Strategy for Services for COPD in England – Department of Health England, February 2010

10. Introduction of a HOS-AR will be an integral part of the whole HOS: linking with, and supporting, the process of reprocuring and managing effectively the new oxygen supply contracts. Under the new procurement arrangements, applying from 2011 onwards, the clinician will decide on the appropriate equipment, after discussion and in conjunction with the patient and his/her carer, to improve compliance and levels of satisfaction. Overall, the new procurement arrangements increase the importance of introducing effective assessment and review services.

Perspective of patients

11. Findings from the 2009 survey of patients and research undertaken by the Department of Health[5] confirmed that patients have generally high levels of satisfaction with the existing service. Patients rated their overall satisfaction with the service at 95%, with ease of use of equipment also at 95%, and reliability of equipment at 94%. Convenience of deliveries was assessed at 84%, and confidence that deliveries would arrive on time was at 83%. Concerns typically centred on the type of oxygen equipment provided, and the reliability and timeliness of deliveries of oxygen. Greater education could, however, help to raise awareness among patients and their carers about the quality of service that it was reasonable to expect.

[5] Unpublished DH survey data

Section 1:

1. **Summary:**
    - Proactive monitoring and management are critical in ensuring good compliance with the contract specification
    - Local engagement with clinicians and patients will maintain a focus on delivering good quality outcomes
    - Assessment and review services will maximise delivery of clinical and financial benefits
    - Different pathways are necessary for different cohorts of patients
    - Benchmarking data are available at a local and regional level
2. Many patients are incorrectly prescribed oxygen because they suffer from breathlessness. Oxygen therapy should not normally be prescribed simply for the relief of breathlessness (though it may be considered if other interventions have been shown to be ineffective) and should not be prescribed at all for patients who are not hypoxaemic (where the patient's oxygen saturation level is greater than 92% SpO2).
3. In practice, once prescribed it can be difficult to remove oxygen from a person, even where it is clear that it provides no clinical benefit. It is important, therefore, to establish control over the initial provision of oxygen, to ensure that only those who will benefit clinically are prescribed oxygen. Where oxygen is no longer clinically needed, protocols should also be developed locally for its removal.

4. The regular concordance reports supplied by the oxygen supply companies to PCTs/ commissioners should identify those patients who are not making use – or not making sufficient use – of their oxygen. Clinical assessment should then be carried out to establish whether oxygen is actually an essential part of the management of their clinical condition, or could be safely removed. If the former, steps need to be taken to attempt to improve patient concordance with oxygen therapy.

Cost Benefit analysis

5. Quality and productivity in the home oxygen service can be improved significantly. Gross savings of up to 40% - equivalent nationally to £45 million a year, or £300,000 per PCT – can potentially be achieved according to recent analysis carried out by the Department of Health. This analysis used the same benchmarking data that the oxygen providers make available to commissioners in their 'concordance' reports, and found at least 15,000 patients with no recorded oxygen usage in a 6-month period, and at least 22,000 patients on Short Burst Oxygen Therapy (SBOT). The cost of providing oxygen to these patients was, respectively, £13m and £11m per annum[6].

6. To achieve these savings, PCTs should consider:
   a. Conducting an audit on their concordance report to identify errors and ensure regular reviews of data are maintained to eliminate incorrect charges.
   b. Taking steps to ensure that home oxygen is prescribed only for those shown likely to benefit clinically from the service
   c. Introducing home oxygen service assessment and review (HOS-AR)
   d. Whether to commission HOS-AR on their own, or in partnership or consortia involving other PCTs.

7. Where there is currently no home oxygen service assessment and review, and a completely new team of staff needs to be recruited, initial costs are estimated (on average) at around £140,000 pa per PCT. This is a comprehensive cost estimate – including staff qualification costs, on-costs such as pensions, and a 15% Did Not Attend rate. Importantly, resources and cost will be freed up if fewer patients are referred for (and receive) home oxygen.

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[6] This costing formed one part of an analysis conducted by the Department of Health. 6 months of 2009 HOS usage data (covering 71,000 patients) was gathered from the "concordance" reports made by the oxygen companies to PCTs. Where patients were prescribed long-term oxygen therapy (LTOT) together with ambulatory oxygen, an assumption was made that the LTOT was prescribed for use five days per week and the ambulatory oxygen for the other two days. This is a conservative assumption, because LTOT and ambulatory oxygen cannot be used at the same time, and results in lower estimates of prescription. The overall estimate was that 24% of prescribed home oxygen was not used. If no such assumption was made, the estimate of under-usage rose to 43%. The costs of under-usage were then derived using the current pricing system. They compare favourably with the potential costs of assessment and review. In a first approach, assuming that usage was proportional to total cost, it was calculated that savings could be achieved nationally of between £26 million pa (low estimate of under-usage) and £47 million pa (high estimate of usage) – equivalent to 24% and 43% of the total cost of the service.
In a second approach, it was found that 16,567 patients had not used their oxygen at all in the six-month period. Using the currently available tariffs, the oxygen prescribed for these patients was costed at £13m pa. In addition, 22,644 patients were only on SBOT or SBOT plus ambulatory oxygen, at a cost of £11m pa for the oxygen prescribed to them. (Together, these costs total £20m pa as some patients fall into both groups). More broadly, patients on SBOT (or SBOT plus ambulatory) or using 20% or less of their prescribed oxygen cost £32m pa (£34m without the weighting assumption); patients on SBOT (or SBOT plus ambulatory) or using 40% or less of their prescribed oxygen cost £36m pa (£40m without the weighting assumption)

8. The above estimate of initial costs may be high. A separate study, by the Primary Care Respiratory Society (PCRS), estimated set-up costs at £56,000 per PCT. It is worth noting that cost-neutral options may be achievable through imaginative service redesign solutions.

9. By investing in home oxygen service assessment and review, PCTs can improve service quality through more effective and speedier diagnosis, leading to a higher standard of clinical treatment and better outcomes. Productivity, affordability and value for money will be strengthened by ensuring that the home oxygen service is delivered only to those who will benefit clinically from it – and in this way can be seen to contribute to the larger quality improvement and productivity (QIPP) programme.

10. It is estimated that 40% of the Global Initiative for Obstructive Lung Disease (GOLD) stage 4 COPD patients should be LTOT users, whereas only an estimated 20% of GOLD stage 4 COPD patients are current LTOT users. Hence, there is potentially an unmet need in 20% (30,000) of COPD GOLD stage 4 patients, and this group of patients requires a HOS clinical assessment to determine the need for Home Oxygen Therapy[7].

11. When commissioning HOS-AR, commissioners will wish to ensure that they are not paying twice for the service – through the PBR tariff, as well as through a newly established service if provided by secondary care.

NHS Newcastle and NHS Blackburn with Darwen are two examples where the PCT benefited from the recommended improvements and could demonstrate significant initial savings as well as continuing clinical and service improvements for patients.

In the first six months of the service, NHS Newcastle saw a saving of in excess of £150k due to the withdrawal of oxygen, amendments to HOOF to correct prescription, transfer of patients to correct (other) PCT and new patients assessed as not requiring oxygen. Similarly, NHS Blackburn with Darwen has saved £40k through a successful combination of ensuring all patients are assessed and reviewed and additional elements such as limiting professionals completing HOOFs; rationalising orders (ie duplicate modalities, removals from the deceased); and monthly invoice reconciliation.

[7] Consultation Impact Assessment for COPD Strategy – DH – Feb 2010

The case for change

12. Currently around 85,000 people in England are in receipt of home oxygen – an average of nearly 600 patients per PCT. About 4 per cent are children. The home oxygen service in England costs £110 million each year (2010) - around £0.75 million pa on average per PCT.

13. Evidence provided by the oxygen supply companies shows that a significant number of patients – nearly one in three – makes little or no use of the oxygen currently prescribed. Because payment is currently based on oxygen provision, not on usage, costs are incurred even where the oxygen is not used.

14. Under-usage of oxygen therapy may arise for various reasons. Most commonly, patients are prescribed oxygen where there is no clinical benefit – as a treatment for breathlessness, for example. To avoid inappropriate prescribing, a diagnosis of the patient's condition must first be obtained and an assessment made of the oxygen saturation level in the patient's blood.

15. Oximeters, which measure a patient's oxygen saturation level, non invasively described as Sp2, are now cheap (under £100), simple to use and readily available. Many primary care practices already use oximeters, and it is reasonable to assume that in time all practices will have invested in them. Good clinical practice suggests that oxygen therapy is not appropriate in patients whose oxygen saturation level has been shown by oximetry to be above 92% SpO2.

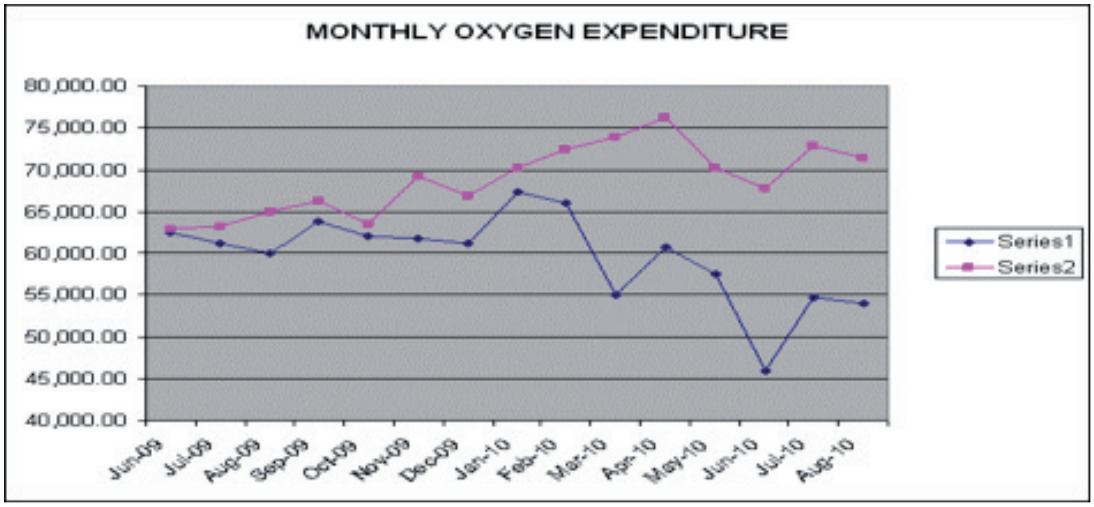
Implementation

16. This Good Practice Guide sets out current governance arrangements for the home oxygen service (Appendix 2). Commissioners may therefore wish to consult with their regional oxygen lead (who is responsible for monitoring current oxygen supply contracts, and liaises with PCTs' home oxygen service leads), supported by regional commercial support units, clinical governance leads and SHA respiratory leads, in determining what service design is appropriate for their PCT/PCTs. The regional oxygen leads hold data about the numbers of patients receiving oxygen, and their usage rates.

17. To help determine what level of clinical need might be expected based on local demography, commissioners may wish to estimate the probable numbers of service recipients by undertaking a local needs assessment.

18. To help to ensure that the home oxygen service is delivered only to those benefiting clinically from it, commissioners may wish to introduce an effective and accessible assessment and review service. This document sets out what good practice in the provision of such services might look like. It also contains links to PCTs that have already set up effective and high quality services in this area.

> Hammersmith and Fulham runs an integrated nurse-led service for a PCT population of 179,000 with about 160 patients on home oxygen. The service works to promote health through self-management, which reduces the number of hospital admissions, A&E attendances and GP consultations from this group, with a consequent reduction in costs. The Community Respiratory Nurse team consists of four nurses split geographically across the PCT in order to cover all practices.



This graph shows the difference between Newcastle PCT and a neighbour. The costs are for one PCT (Newcastle is the blue line) with an assessment service and a neighbouring PCT with the same population and demographics without a service.

19. Assessment of new patients' needs to be linked with regular reviews of those already prescribed oxygen, to ensure that oxygen is provided only for those benefiting clinically from it. Data already made available to PCTs by the oxygen supply companies will identify those people who currently make little or no use of the oxygen they are currently prescribed. These people should be called for review; and where there is no evidence of clinical benefit from oxygen therapy the patient can be given advice and counselling with a view to giving up the therapy.

20. In a few instances, patients who have a clinical requirement for oxygen may not take advantage of the oxygen therapy available to them: where regular reviews are in place, these people can be identified and the reasons for the under-usage can be established and overcome.

21. Based on such information, commissioners will wish to consider whether to commission HOS-AR on their own or in partnership/ consortia involving others. Local circumstances will determine the extent to which it is feasible for commissioners to form consortia in other regions, but it is worth noting that economies of scale apply to the home oxygen service, as to other NHS services, and cost reductions can be expected where consortia arrangements are adopted.

22. PCTs will also want to consider how to balance the opposing objectives of providing ease of access to assessment and review with the need for sufficient throughput to underpin service quality.

23. Similarly, commissioners will wish to consider where services might be provided, and what facilities they should provide. Modest investment in the provision of pulse oximeters for example (one per practice at less than £100 per oximeter) would enable general practice to screen patients and if the Sp02 is equal to or less than 92%, there is no need for a specialist assessment. An increasing number of specialists provide regular clinics in such settings, which facilitate rapid assessment. Further modest investment in the provision of pulse oximeters and blood gas analysers for arterial or capilliary blood gas measurement enables a full assessment to be made, following diagnosis, of each individual's need for oxygen; the equipment which best suits the individual's needs can then be demonstrated selected (following discussion with the individual) and ordered.

Governance

24. An outline governance structure for the current home oxygen service, showing lines of accountability between the local level and the Home Oxygen Service Programme Board is attached at Appendix 2.

25. At a local level, the home oxygen service leads, working with SHA respiratory leads, will have an important role in ensuring that appropriate clinical governance arrangements are in place and in organising the provision of assessment services, possibly shared between different PCTs/commissioners.

Quality and monitoring

26. Commissioners are currently both clinically and financially responsible for responding to the key performance indicator data provided to them by the oxygen supply companies. They will wish to consider what further indicators of quality and productivity should be monitored in relation to HOS-AR, and included in a good service specification. Examples are given at Appendix 1 of the Good Practice Guide. These will need to be tested and evaluated over time. In this way, the indicators can be modified and improved in line with the evidence of effectiveness.

Quality assurance

27. It will be important to build in systems for assuring the quality of the assessment and review service. This may be achieved through inclusion of HOS/HOS-AR quality standards within the Care Quality Commission's inspection regime, or by extending clinical audit.

28. A quality assurance system should cover all aspects of the service including the equipment, processes, personnel and service organisation. It might include:
    - A formal management system
    - Clarity about service standards and consistency in their application (including, for example, sampling and measuring in relation to blood gas services)
    - Clarity about the other expectations which a high quality organisation should meet
    - A clear process in relation to the setting, implementation and review of standards, and the defining of key performance indicators (it is important to note that most existing KPIs[8] are sent every month (the exception being concordance reports, which are sent quarterly) - as are invoices which go to local HOS leads); explicit arrangements for regular self assessment and for clinical audit)
    - Checks to ensure that HOOFs are completed correctly
    - Systems to ensure Commissioners do not pay twice for assessment and review (NB current tariff code for "oxygen assessment and monitoring DZ38Z - £350 per patient)

[8] Existing KPIs comprise: the concordance report, HOOF rejections, failed deliveries, service failures. Invoices must be reconciled monthly.

Monitoring

29. Once arrangements for home oxygen service assessment and review are in place, it will be important to monitor their effectiveness by ensuring that:
    a. Contracts are managed effectively at local level
    a. Quality measures/indicators are being met
    a. The objectives of the assessment and review service are being achieved

Operational links with other services

30. 30. It will be important to ensure that the home oxygen service assessment and review has good operational links with related services: chiefly COPD and other respiratory services (including lung function), but also other specialties such as pulmonary rehabilitation services, paediatrics, cardiology, neurology, care of the elderly and palliative care services. This highlights the importance of ensuring good integration between oxygen assessment and review and a number of different patient pathways. Good communication between all staff – multidisciplinary and multiprofessional - is essential: the patient's record needs to be up-to-date, and ideally, there should be a register in every PCT of all patients' prescribed home oxygen.

31. Where patients/carers are smokers, good links are needed with local smoking cessation services – as well as with the local fire service.

32. Fire services must be notified where oxygen is used or stored in a person's home, especially where any occupant of the property is a smoker. The fire service should conduct a risk assessment of the premises to ensure that all safety requirements are in place. If necessary, the fire service will install smoke alarms and take such other precautions to minimise the risk of fire.

33. In order to minimise the risk of hypercapnic respiratory failure, the ambulance service should also be notified to avoid the administration of too high a concentration of oxygen in the event of emergency transport to hospital. Recommendation 18 of the COPD Strategy is relevant "All people with COPD in respiratory failure should be issued with Oxygen Alert cards, and ambulance staff should be able to recognize and respond appropriately to respiratory failure in COPD".

Summary of general requirements for home oxygen assessment and review

- Clear governance structure, including clinical governance
- Compliance with clinical guidelines (NICE, BTS, NSFs)
- Compliance with safeguarding and protection policies
- Clinical audit and evaluation of service outcomes
- Integration with all relevant pathways – cardiac, neurological, paediatric, palliative, pulmonary rehabilitation
- Good record keeping
- Good information and communication
- A comprehensive list of the components of a good quality home oxygen assessment and review service (as set out at Appendix 6).

Important elements to remember

34. Remember to:
    - Set up an effective register;
    - Liaise with suppliers and review/make use of the Key Performance Indicators data;
    - Look for cost efficiencies, and how to achieve them;
    - Consider how a "new" service might be configured, think about service redesign and partnership working;
    - Learn from others: PCT neighbours, NHS networks
    - Review the good practice information and fact sheet held on the Lung Improvement Website[9]

Where to find guidance on clinical good practice including patient pathways

35. Clinical good practice is set out in section 3 of this Good Practice Guide.

Service requirements

36. Skills/competences: the assessment process should be carried out - or at least supervised - by a Band 7 health professional with a suitable clinical qualification - see Appendix 3 for a description of the skills/competences required. He/she should have appropriate administrative support (Band 3, 4 or 5), and operate within a clear clinical accountability structure. The health professional should have knowledge of other conditions causing hypoxaemia.

37. Premises: the assessment should take place within premises that are in accordance with appropriate physiology testing facilities especially with respect to infection control, risk assessment and health & safety policy; and are spacious enough to allow for the patient's capacity for exercise to be assessed safely[10] when assessment of ambulatory oxygen requirement is performed. Co-location with other diagnostic facilities (eg chest x-ray) would be advantageous. .The assessment can also be carried out in the patient's own place of residence, provided that infection control, risk assessment and health and safety policy are adhered to.

38. Equipment: the assessment requires measurement of arterial or capillary blood gases as well as oximetry and spirometry, and such equipment, properly maintained, must be available. In addition, a variety of oxygen equipment, both for LTOT and Ambulatory use, must be available in order to assess the patient and ensure they are given the most appropriate equipment for their needs.

[9] www.improvement.nhs.uk/lung/

[10] See ARTP website for guidance on specification of rooms

Section 2:

A Guide for Clinicians: clinical good practice

Casemix

1. Patients with COPD make up the majority of those requiring oxygen therapies, but it is an effective treatment for others with respiratory disease and for some people with cardiac or neurological disease. It is also essential for pre-term babies with chronic lung disease.

2. Oxygen can also be an effective part of end-of-life care.

HOS assessment and review: the care pathway (adults)

3. For a patient who is referred for a home oxygen assessment, the first step on the care pathway is pulse oximetry, to determine whether the individual is hypoxaemic (a pre-requisite for long-term oxygen therapy). It is reasonable to assume that pulse oximetry is routinely available in general practice.

4. Patients whose oxygen saturation level is satisfactory (above 95%) can be referred back to their GP. Patients whose level is borderline (between 92 and 95%) should be monitored and oximetry carried out every six months in order to determine any subsequent deterioration in their condition. Individuals who show intermittent or fluctuating hypoxia will need to be followed up and assessed more frequently.

5. Where the patient is shown by oximetry to be poorly saturated/hypoxaemic (SpO2 at or below 92%), a full assessment should be carried out. This should include spirometry and measurement of arterial blood gases. The assessment should be undertaken by a suitably qualified and trained healthcare professional – see Appendix 3.

6. If oxygen therapy is indicated, the safety, flow rate and duration of oxygen should be determined for each patient (usually a minimum of 15 hours per day for long term oxygen therapy - only in special cases may one use less, such as overnight only). A further assessment may be needed to determine the patient's capacity for exercise, and whether he/she should be prescribed additional ambulatory oxygen and referred for pulmonary rehabilitation. It would also be for consideration whether a referral to social services would be required.

7. Following consultation with the patient, the clinician will identify the nature of the equipment/delivery system most suited to the patient's lifestyle. Once identified, this equipment is made available to patients by the oxygen supply companies and specified in their contracts with the Department of Health/NHS. From 2011 these contracts will impose an obligation on companies to ensure that any improvements or innovation in relation to such equipment are adopted rapidly. A brief description of these equipment requirements is at Appendix 4.

8. Time should be allowed for discussion with patients and their carers, so as to ensure they understand how to use the oxygen equipment and manage their treatment. Where likely to be of benefit, training should be offered to the patient/carer. Information about safety should be provided and repeated at every opportunity. Finally, a home oxygen order form (HOOF) should be completed and

sent to the relevant oxygen supplier, and details of the plan for managing the patient's condition should be sent to his/her GP and, where appropriate, consultant physician and home care team.

9. Where a patient is prescribed oxygen therapy, a follow-up home visit should be undertaken ideally at four weeks by a healthcare professional that is competent to assess and advise the patient. The review should consider the patient's ambulatory therapy requirements as well as the functioning and appropriateness of the oxygen equipment. A patient who is stable should then be reviewed every six months. A patient whose condition is less stable will require more frequent review and follow-up, including blood gas measurement.

10. Before referral for assessment or review the patient should be referred directly for specialist assessment.

11. Where the review indicated that the patient was no longer deriving clinical benefit from the oxygen (either because the patient was not hypoxaemic or they gain no benefit from the therapy), discussion should take place about withdrawing it. Where the patient is not using the oxygen as prescribed, but still clinically needs it, further education may be required or a reduction in the prescribed use should be considered. Some commissioners have already developed effective protocols for withdrawing oxygen from patients, for example Newcastle PCT: see Appendix 8.

12. This care pathway, in the form of an algorithm, is at Appendix 5.

The care pathway: children

13. It is important to remember that children's need for supplemental oxygen can be very different from that of adults, and services must be planned and delivered in ways that are appropriate to children and their needs. A care pathway for children is also at Appendix 5.

Referral for home oxygen assessment

14. Wherever possible, patients should have a known clinical diagnosis before referral. This should not be a problem in respect of patients referred from secondary care, and for a number of patients referred from primary care (such as those with long-term conditions).

15. Where patients present in primary care with breathlessness and there is no established diagnosis, wherever possible pulse oximetry should be carried out in order to establish the level of oxygen saturation in the blood. If the SpO2 level is below 92%, or if is fluctuating around that level, the individual should be referred for a full assessment. If the reading is borderline the patient should be asked to return for repeat oximetry after five weeks.

16. It is important to establish whether the patient is in a stable condition: in other words, whether the results from oximetry readings are consistent over the five-week period. For an unstable patient, if oximetry is below 92% on even one occasion then the patient should be referred for assessment. It is important for the GP to decide that the patient is stable and not having an exacerbation that can induce temporary hypoxaemia.

17. Where oximetry indicates that referral for full assessment is appropriate and the patient's condition is stable, the patient should be referred to a home oxygen assessment and review service (HOS-AR) for the appropriate tests. Where the patient's diagnosis is unclear, then referral should be made to a specialist respiratory physician.

Assessment for long-term oxygen therapy

18. Oxygen therapy is appropriate for a clinically stable patient where the arterial blood oxygen measurement is at or below 7.3 kPa (or under 8kPa if oedema present). In such circumstances, supplemental oxygen should be provided for at least 30 minutes with the objective of raising the patient's arterial blood oxygen to at least 8.0 without significant rise in arterial CO2.

19. Where appropriate the patient may need to be referred onwards for specialist medical assessment. Any patient needs to be referred where there is no confident clinical diagnosis, as these patients are often complex. Patients' suitability for pulmonary rehabilitation should be considered as a matter of routine.

20. Unless onward specialist medical referral is indicated, the assessing clinician should discuss with the patient what home oxygen equipment best meets the patient's needs and preferences. Examples of the different types of equipment should be available to demonstrate to the patient, not only to facilitate informed choice but also to help the patient to understand how to operate it. Once chosen, the clinician should complete a home oxygen order form (HOOF).

Assessment for ambulatory oxygen

21. In addition, the patient may require ambulatory oxygen, to support him/her in daily living. Using oximetry, the level of oxygen desaturation during exercise should be measured. Ambulatory oxygen is appropriate where the SpO2 reading falls below 90% and the patient must demonstrate a 4% drop to less than 90%. The main purpose of ambulatory oxygen is for those on long-term oxygen therapy who want to leave the home. In these patients, a simple titration of the oxygen flow rate to minimise oxygen desaturation during a relevant activity is all that is required.

22. There will be a few people who are not hypoxaemic at rest and who desaturate on exertion only and could improve their performance. However in the absence of a practical improvement in physical activity we do not know whether this has any benefit (in terms of survival or other parameter). Patients should be asked whether they are willing to try supplementary oxygen.

23. Supplemental oxygen should then be given to the patient, and the short-term response to exercise (such as a six-minute walking distance or a shuttle walk test) should be assessed. This process should establish the appropriate oxygen flow rate to correct the patient's level of desaturation on exercise to above 90%.

24. A minimum interval of 30 minutes should be provided between walk tests.

25. Assessment should also be made of the distance which the patient can walk, both with and without the supplemental oxygen; and the level of his/her dyspnoea on resting and on conclusion of the exercise should be measured using a visual analogue score/modified Borg score. Improvements in these parameters sufficient to warrant the patient using oxygen during exertion need to be demonstrated.

26. On conclusion of a positive assessment the clinician should demonstrate the types of ambulatory equipment available and agree with the patient what would best meet his/her needs and preferences. The clinician should have confidence that the patient will make sufficient use of any ambulatory equipment provided, and ensure that he/she has the capacity – with adequate training – to operate it effectively (if necessary with the help of a carer). A HOOF should then be completed.

27. Portable oxygen should be made available for all children, especially infants, because they will need to be taken out of the home by parents/carers.

Follow up and review

28. Once home oxygen is prescribed following assessment, a home visit should be undertaken within four weeks of commencement of treatment. The purpose of the visit is to assess the patient's clinical status, compliance with the oxygen therapy regime (including the appropriateness of the equipment) and to determine whether further action is necessary (eg referral back to a specialist clinician – whether respiratory or the patient's main specialty - or social services). If any adjustment of the oxygen therapy is required, an amended HOOF will need to be completed. Compliance with the BTS Guidelines is also important: they advocate more frequent review of young children.

29. Patients in receipt of home oxygen should be regularly reviewed; every six weeks after admission or exacerbation; every six months oximetry should be carried out and clinical status should be reviewed; every twelve months patients should have their arterial blood gases measured in order to assess their oxygenation and hypercapnia.

Withdrawal of oxygen therapy

30. Where it is clear on review that the patient is not hypoxaemic, yet is in receipt of home oxygen (eg SBOT) he or she should be advised to discontinue and other appropriate therapies for breathlessness should be discussed. See para 11 earlier in this section for protocols which might be used to support this discussion.

31. Where the patient is significantly hypoxaemic but is not compliant with the prescribed oxygen therapy, he or she should be counselled on the merits of the therapy and encouraged to increase usage to the recommended level.

Appendices

Appendix 1: High Quality Care Indicators

For use by commissioners and providers in local self-assessments, in order to identify gaps or duplication in service provision and underpin a local commissioning strategy.

1. Oxygen assessment as part of a wider clinical pathway
    - All home oxygen patients have a confirmed diagnosis , with an integrated care plan to manage their clinical condition
    - Awareness of diagnoses other than respiratory disease which can lead to hypoxaemia
    - Oxygen assessments form part of a wider care pathway
    - If CO2 retention, consider non-invasive ventilation (NIV)
    - All elements of the pathway are fully integrated ensuring continuity of care for the patient
    - As part of the wider care team, there are links to the relevant local health services as required

2. Gateway to home oxygen therapy
    - Oxygen is not ordered on a long-term basis until patients have had a full assessment of their clinical need.
    - All patients referred for an assessment have had a pulse oximetry test at a minimum, which demonstrates hypoxaemia
    - All patients must be clinically stable for at least 5 weeks prior to assessment, with optimisation of all other treatments

3. Appropriate skilled and trained workforce
    - Clinicians ordering oxygen for patients are experienced and competent, trained with specialist respiratory knowledge to enable comprehensive patient assessment, including undertaking and interpreting the required diagnostic tests
    - Clinicians are knowledgeable about the currently available options for oxygen therapy equipment, in order to facilitate the ordering of appropriate equipment for individual patients. Respiratory clinicians and respiratory paediatricians should probably take the lead on oxygen services but they also need to link with other specialists – eg cardiology, paediatrics.

4. Diagnostics
    - Patients receive the right tests before being ordered oxygen, which should include (but not limited to): pulse oximetry, arterial/capillary blood gas analysis and exercise tests to assess the patient's requirements for ambulatory oxygen equipment.
    - The correct diagnostics ensure that appropriate equipment is ordered for patients relevant to their clinical and lifestyle needs
    - Clinicians have access to the relevant quality assured equipment to conduct the appropriate diagnostics

5. Patient oxygen therapy review
    - All patients on home oxygen are subject to regular review in line with the COPD and oxygen therapy care pathway
    - Information and results on the patient's progress are fed back to the wider care team
6. Patient perspective (including rights of carers)
    - Patients are assessed to ensure that they need oxygen and are set the correct flow and duration in line with their clinical requirements
    - Patients are provided with the correct equipment that meets their clinical and lifestyle requirements
    - Patients are informed about the potential dangers and how to use oxygen safely
    - Patients are aware of oxygen assessments and know when they need to be reviewed
    - Carers of patients are informed and are part of the care team supporting the patient
    - Patients/parents/carers should be strongly discouraged from smoking
7. Standards & Guidelines
    - The PCT is aware of all relevant guidelines on home oxygen therapy, and implements their service in accordance with these guidelines
8. Monitoring
    - The PCT has the ability to monitor the service it is providing to patients through relevant key performance indicators
    - The PCT should undertake regular patient surveys to ensure that patients experience a quality service
    - The NHS captures good practice and shares all lessons learnt
    - The consent form should invite patients to agree that anonymised data from the HOOF could be used to build up and maintain a mandatory national clinical database.

Appendix 2

Department of Health Home Oxygen Programme Board

- SRO*
- SHA*
- DH Policy Lead
- Clinical Lead
- PCT Director of Commissioning
- PICD rep
- SHA CSU rep
- SHA clinical governance lead
- Primary Care Commissioning
- Patient representative
- Individual working groups as appropriate

Regional Board (to be decided locally but recommended)

- SHA Medical Director
- SHA Respiratory Clinical Lead
- SHA Clinical Governance Lead
- PCT Commissioning Lead
- CSU (procurement and contract management)
- Patient representative

Local Board (to be decided locally but recommended)

- PCT respiratory/clinical lead
- PCT clinical governance lead
- HOS Commissioning lead
- HOS procurement/contract management lead
- Patient representative

Appendix 3

Workforce Development to support the Home Oxygen service as part of the National Strategy for COPD

In order to support the Strategy for Services for people with COPD published last year by the DH, a workforce strategy has been developed and will be published shortly on the Skills for Health website that will:

- Establish current status
- Define workforce issues for delivery of the National Strategy for COPD
- Define an action plan

The workforce development will help to ensure that all those at risk of or with a diagnosis of COPD receive high quality evidence based care in an appropriate setting, delivered by competent healthcare professionals.

The strategy will not define in which setting care should be delivered, nor by whom, but will seek to ensure that high quality care becomes the guiding principle of healthcare delivery.

To support the delivery of the workforce strategy, there are some tools under development (for example e-learning packages) which will include strands that relate to Home Oxygen.

The tools are illustrated below:

Competence development

In conjunction with Skills for Health (the sector skills council) a comprehensive Competence Framework has been developed which defines the competence requirements for the workforce who are required to have expertise in the assessment , delivery and monitoring of oxygen to patients who require it.

The titles of the relevant units of competence are listed below:

Assessment for oxygen therapy

- Undertake measurements to determine the efficiency of gas exchange in respiratory system
- Estimation of oxygen saturation using pulse oximetry
- Determine blood gas status – arterial method
- Determine blood gas status – capillary method
- Administering oxygen therapy safely and effectively within respiratory services
- Assess response to oxygen therapy
- Prescribing of oxygen, medical devices, medication and products, safely and effectively
- Hypoxic challenge testing
- Providing advice and guidance to individuals/carers on safe and effective oxygen therapy

Appendix 4

Oxygen equipment

Once the decision is made that home oxygen is required, and the amount and duration of oxygen therapy has been agreed, the clinician and the patient should discuss what equipment would best suit the patient.

At present there are three main categories of equipment:

- Cylinders
- Liquid oxygen
- Concentrators

Some types of equipment are portable; other types are "ambulatory" – ie light enough for a patient to carry around.

Depending on lifestyle, patients will require more than one category of equipment. Many factors will affect the decision reached, for example:

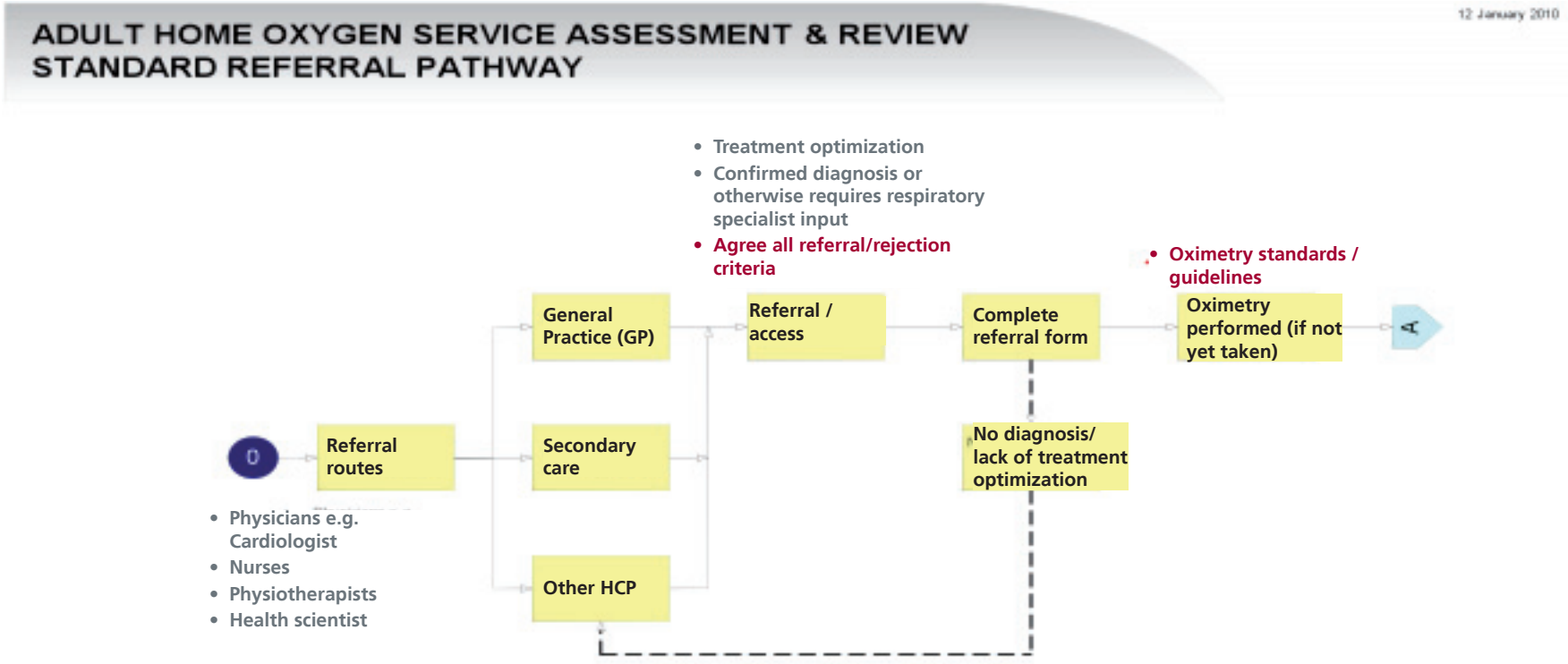
- Weight of equipment
- Ease of adaptation of home
- Noise level
- Length of interval between top-ups/recharging
- Appearance and transportability of ambulatory oxygen equipment

Once the decision is made, it is ordered via the Home Oxygen Order Form.

Under the new contracts with suppliers, a new obligation will be included requiring suppliers to ensure that innovations in equipment are rapidly adopted and made available to patients.

Appendix 5

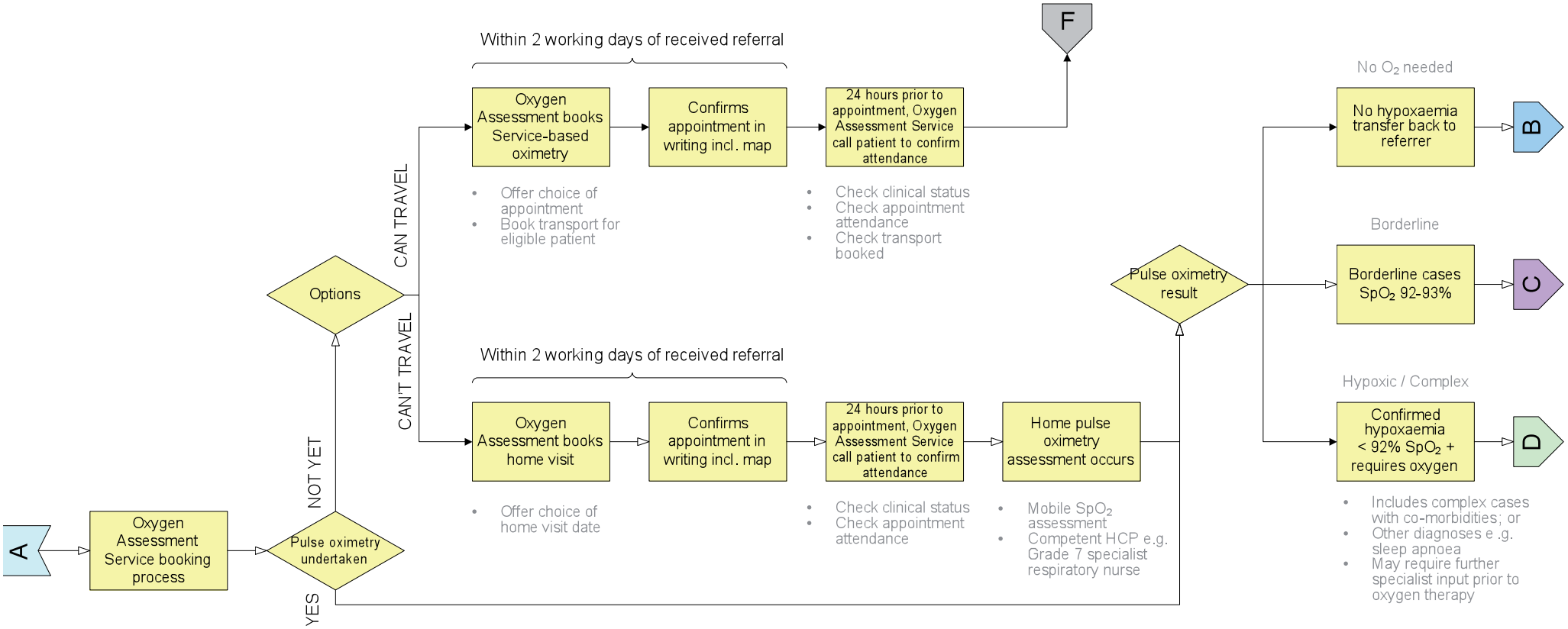
Care pathway



OVERALL CLINICAL ACCOUNTABILITY LIES WITH GP / REFERRER

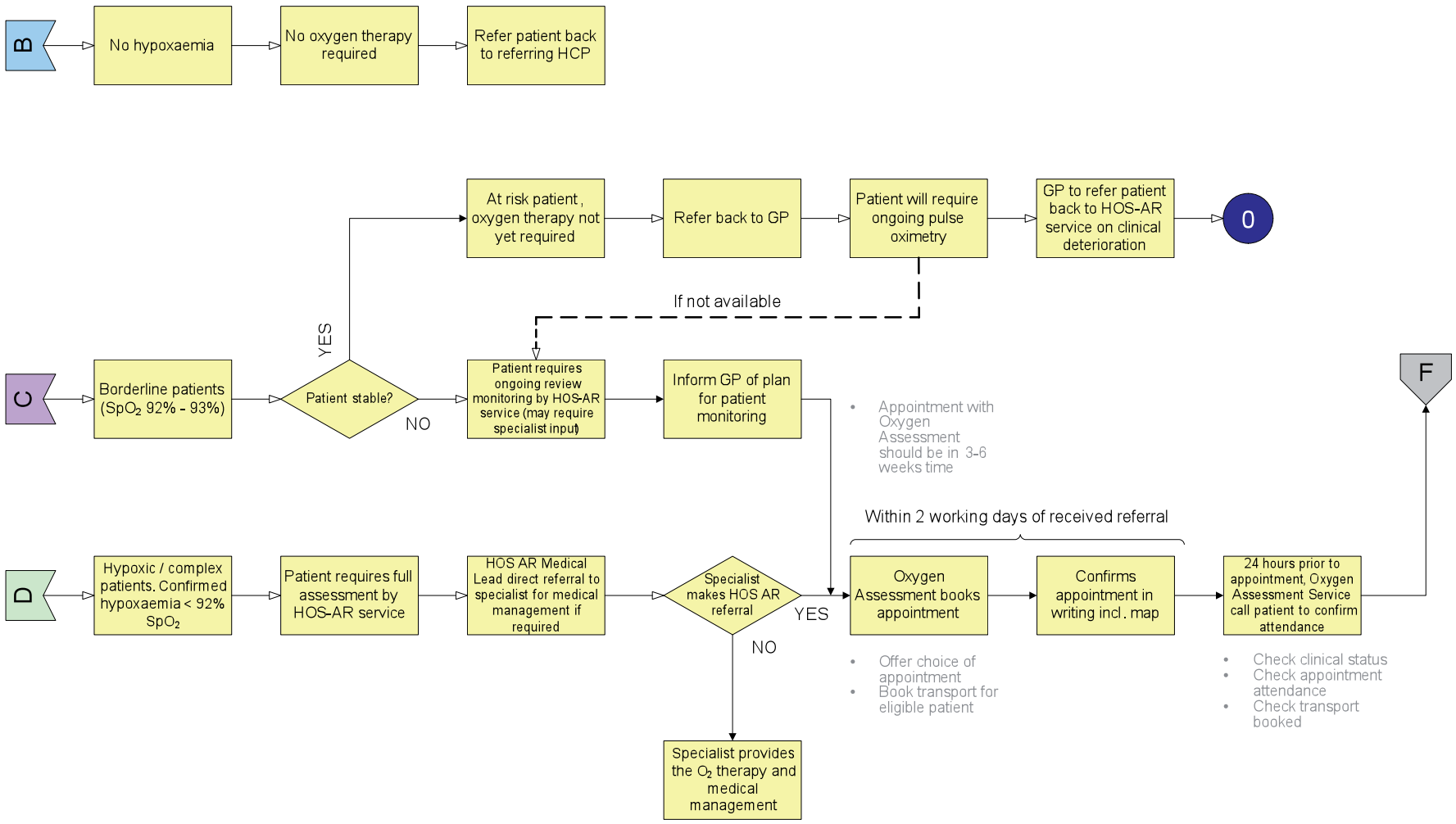
12 January 2010

ADULT HOME OXYGEN SERVICE ASSESSMENT & REVIEW OBTAIN OXIMETRY RESULTS FOR THOSE WITHOUT THEM



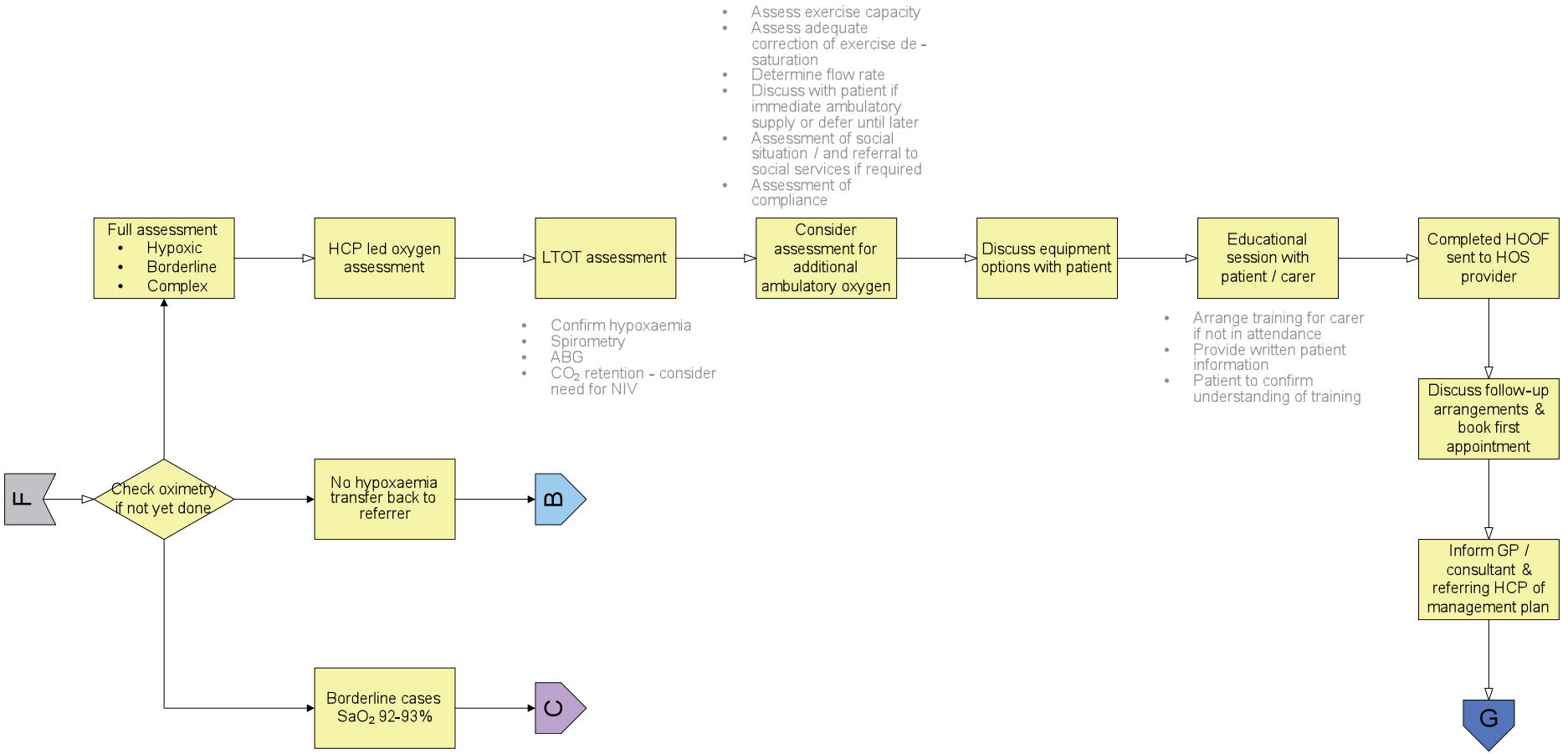
12 January 2010

ADULT HOME OXYGEN SERVICE ASSESSMENT & REVIEW
OXIMETRY ASSESSMENT (PATIENT CATEGORIES)



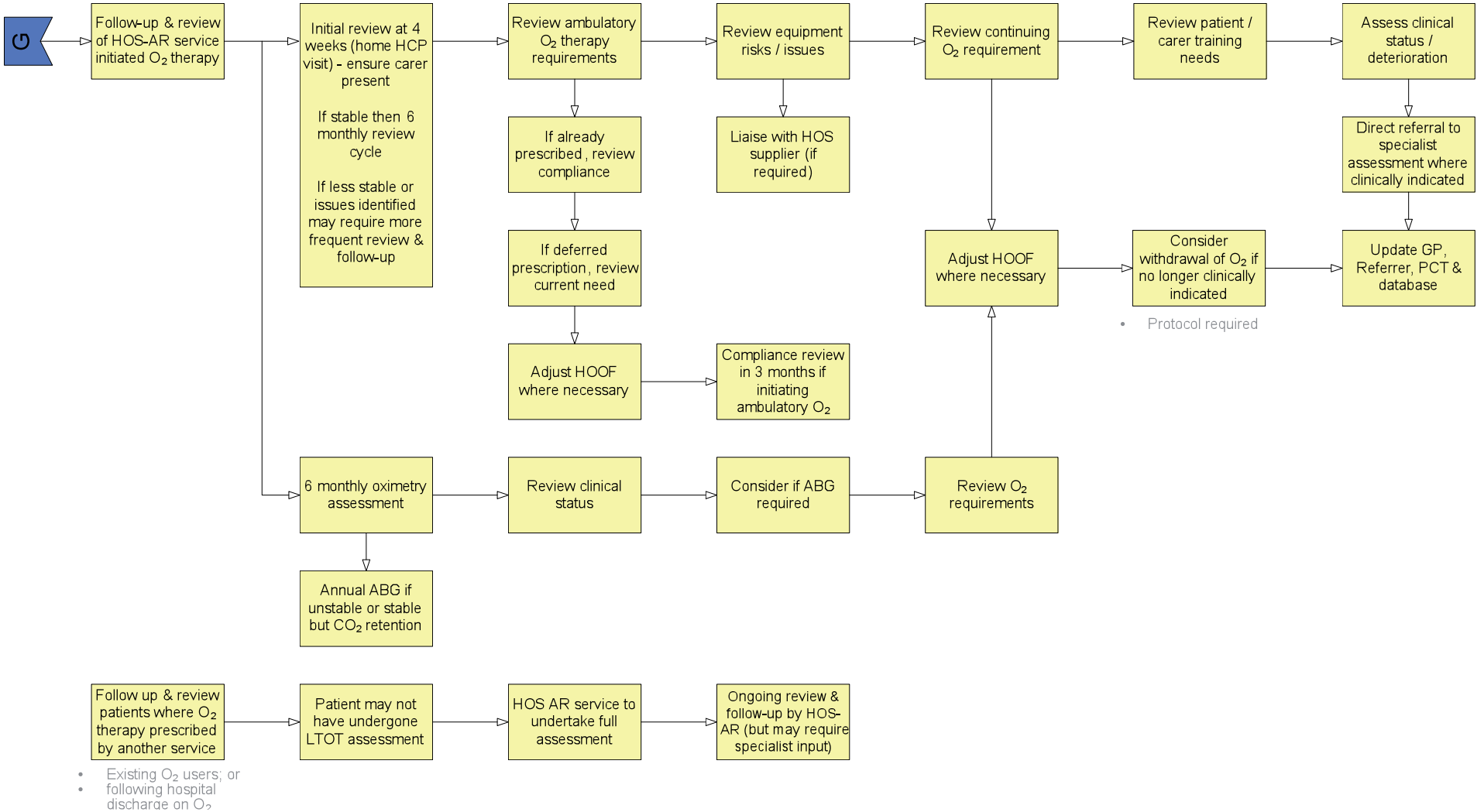
12 January 2010

ADULT HOME OXYGEN SERVICE ASSESSMENT & REVIEW
FULL INITIAL OXYGEN ASSESSMENT



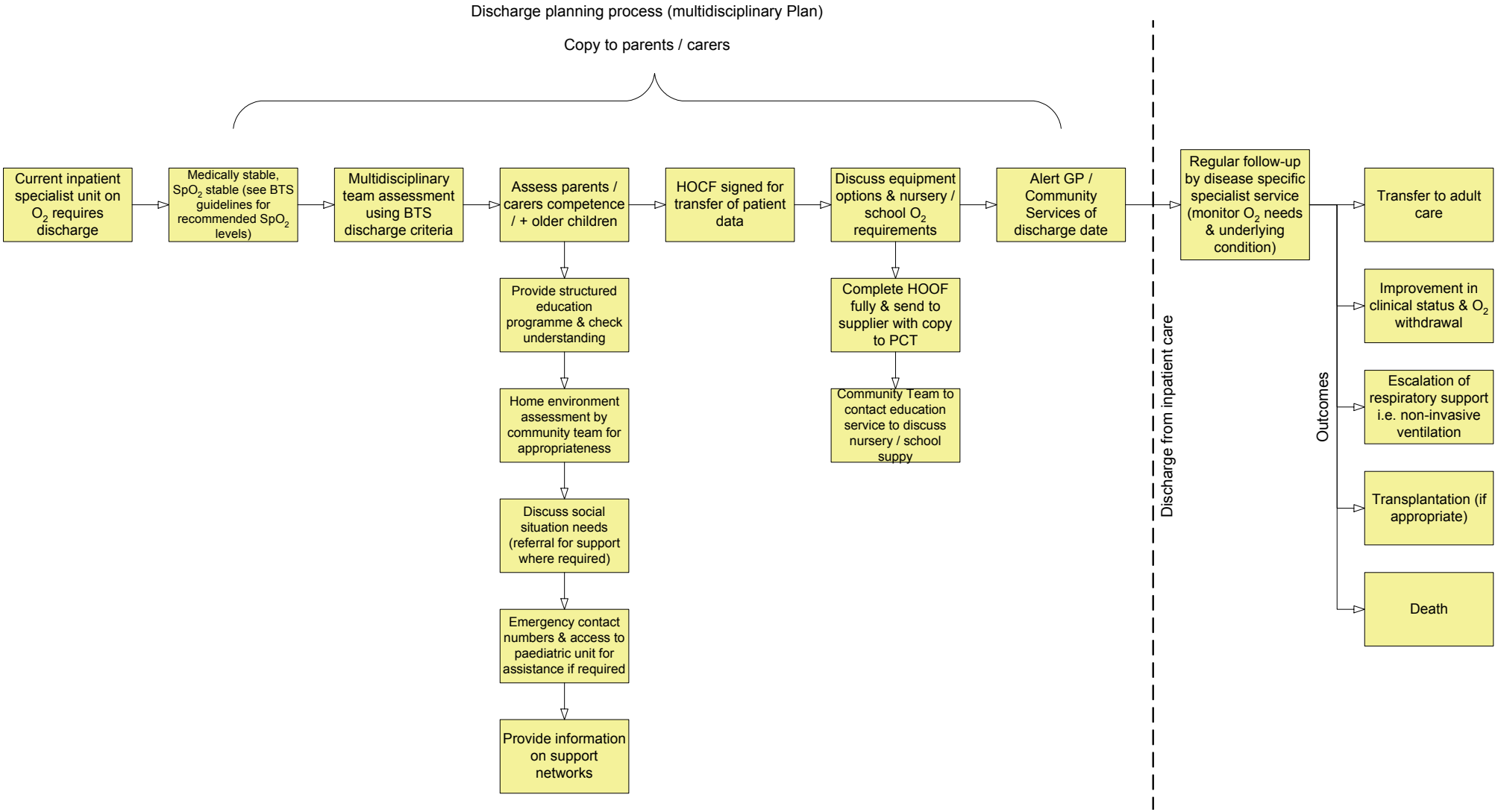
12 January 2010

ADULT HOME OXYGEN SERVICE ASSESSMENT & REVIEW
FOLLOW-UP & REVIEW



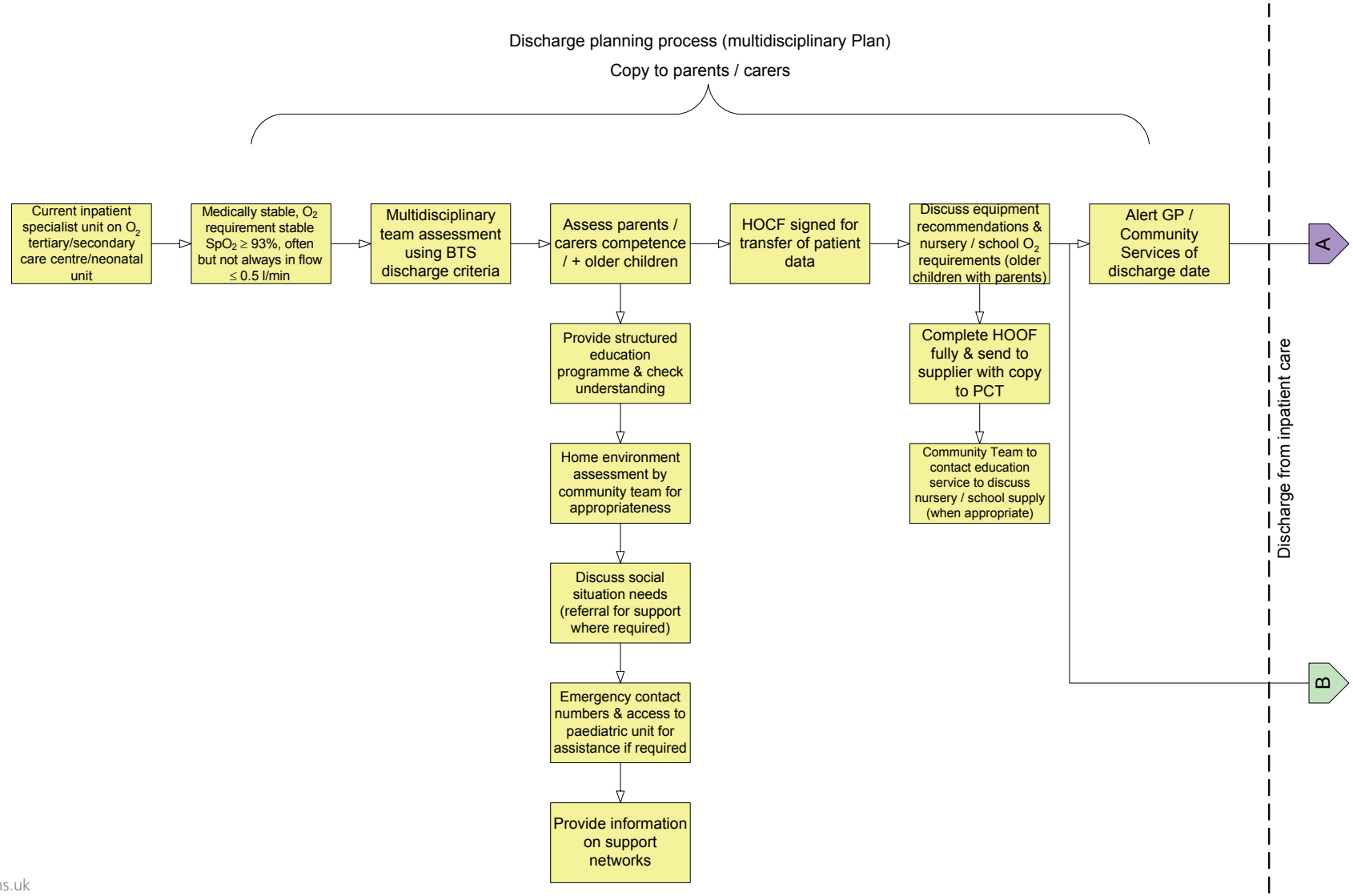
PAEDIATRIC PATHWAY FOR HOME OXYGEN THERAPY WITHDRAWAL NOT ANTICIPATED

23 February 2010



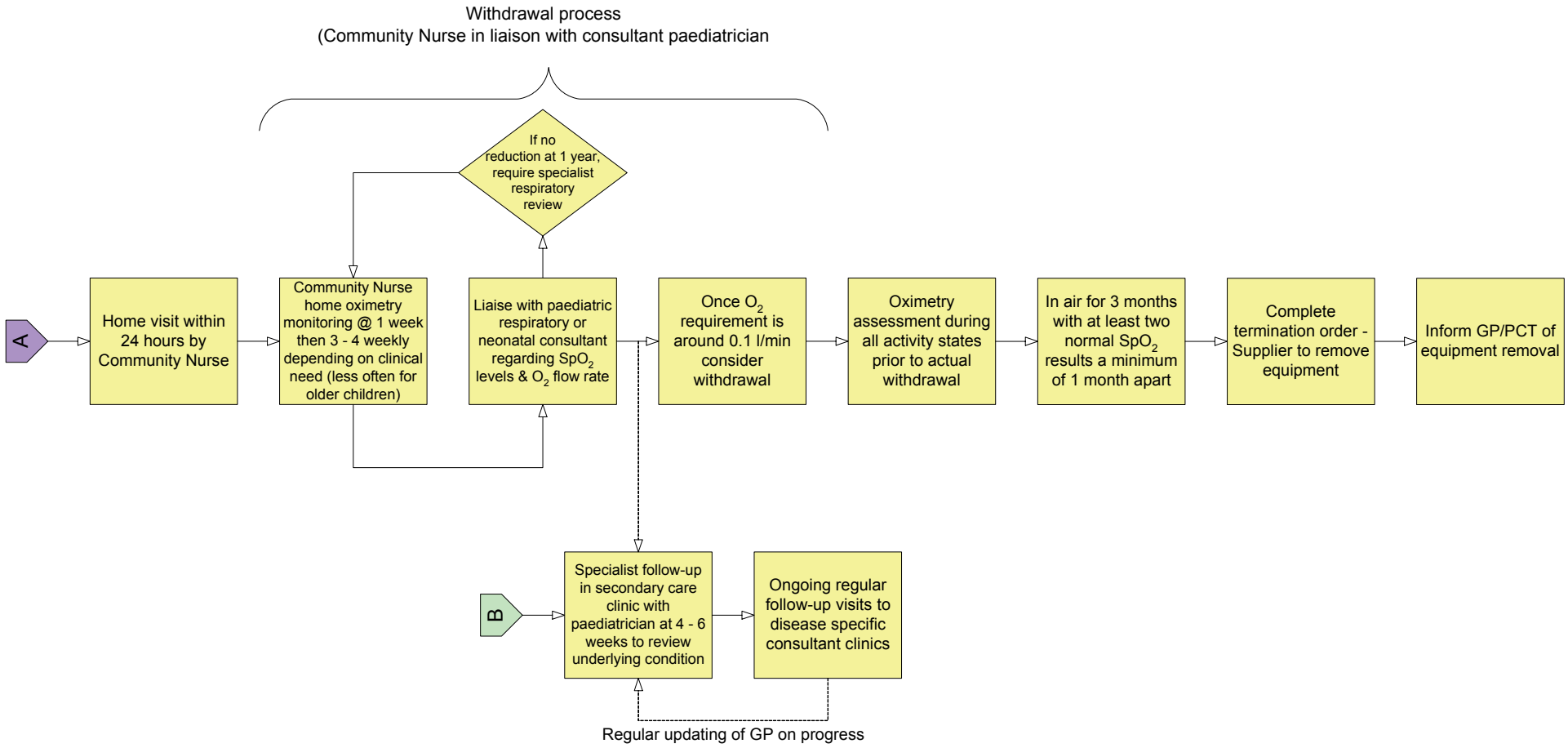
PAEDIATRIC PATHWAY FOR HOME OXYGEN THERAPY WITHDRAWAL ANTICIPATED (e.g. CHRONIC NEONATAL LUNG DISEASE)

23 February 2010



PAEDIATRIC PATHWAY FOR HOME OXYGEN THERAPY WITHDRAWAL ANTICIPATED (e.g. CHRONIC NEONATAL LUNG DISEASE)

23 February 2010



Appendix 6

Components of a Home Oxygen Assessment and Review Service

Case-mix: Clinical indications for referral and disease types	• Known Chronic Hypoxaemia < 92% SaO2 at rest • COPD – approx. 70% of patients • Severe chronic asthma • Cystic fibrosis • Interstitial lung disease • Bronchiectasis • Pulmonary vascular disease • Primary pulmonary hypertension • Pulmonary malignancy • Chronic heart failure • Nocturnal hypoventilation as adjunct to ventilatory support techniques (NIV or CPAP) • Neuromuscular/spinal/chest wall disease • Chronic neonatal lung disease
Governance: Clinical accountability for service and patient safety	• appropriate framework/arrangements • compliance with national legislation and statutory regulations (CQC) • compliance with published clinical standards and guidance (NICE, BTS, NSFs) • clear patient pathway that integrates the service within the healthcare community • clear clinical accountability and leadership • Medical oversight/stewardship of the service • Audit and evaluation of service outcomes • Integration with other relevant care providers • Quality assurance systems • Information governance • Monitoring and management of risk • Evidence-based policies and procedures

	• Trained and competent staff • Child and vulnerable adult protection procedures for safeguarding • Patient and public involvement • Learning from untoward incidents and complaints – continuous improvement cycle
Access to service: Criteria for access to assessment service	• Known clinical diagnosis • Optimisation of other therapeutic measures • Known Chronic Hypoxaemia > 92% SpO2 at rest or exercise de-saturation > 4%, tested through pulse oximetry • 5 weeks of clinical stability • Service locations are accessible and convenient for patients/carers
Assessment for LTOT:	• Completion of a Home Oxygen Consent form (HOCF) for all patients when first assessed • Measured arterial blood gas tensions – PaO2 at or below 7.3 kPa breathing air, when clinically stable • Assessment of impact on PaO2 following supplemental oxygen being administered for at least 30 min – aim for at least 8kPa • Assessment for hypercapnia • Onward referral to medical specialist if required, for specialist assessment or stabilisation • Onward referral to social services if required • Feedback to referrer/GP on outcome of assessment and oxygen orders • Assessment and training using equipment that patient will use within the home, ensuring safe use • Safety check • Completion of a HOOF

Assessment for AOT	• Assessment for use of oxygen therapy during exercise and activities of daily living • Exercise oxygen desaturation of fall in SpO2 of 4% to a value of <90% • Short term response to use of oxygen when undertaking exercise tests such as 6 minute walk test or shuttle walk test • Determine oxygen flow rate required to correct exercise desaturation (SpO2 above 90%) • Gap of 30 min rest between walk tests is recommended • Assessment of walking distance and measurement of resting/end exercise dyspnoea using a visual analogue score/ Borg score • Assessment of likely compliance • Patient and carer training • Safety check • Completion of a HOOF
Review and follow-up	• Home visit within 4 weeks of commencement of treatment, carer to be present if appropriate • Review equipment risks and issues • Assessment of further education needs of both patient and carer • Review of clinical status and continuing oxygen requirements • Referral to specialist services if appropriate – for stabilisation or medical management • Review of ambulatory oxygen requirements and compliance • Assessment of patients home situation and requirement for social services support • Adjustment via HOOF of oxygen therapy order if requirements have changed • Consideration of removal if no longer required

	• 6 Monthly oximtry assessment with review of clinical status. Consider ABG if unstable • Annual ABG to assess oxygenation and hypercapnia; more frequent if clinical indications • Safety check
Workforce: Skills and competence of staff	• Appropriately recruited and inducted staff (including all pre-employment checks) with appropriate qualifications and professional registration • Assessment by HCPs with specialist respiratory knowledge, competency and understanding of relevant clinical guidance, disease management and home oxygen therapy • Skills to undertake and interpret oxygen saturation and arterial blood gas assessments • Skills in supervising safely and accurately the performance of an exercise test for AOT assessment • Evidence of competence and appraisal systems • Access to a multi-disciplinary team for support and advice on management of individual patient needs • Continuous professional training and education to ensure staff maintain competence • Clinical supervision for all staff • Promote awareness amongst other HCPs of assessment, treatment and equipment options
Equipment: Types	• Assessment and training using equipment that patient will use within the home, ensuring safe use • Spirometry, oximetry, blood gas analysis • Staff – medical device competencies • Mobile equipment to meet needs of patient home visits • QA systems and processes to assure test results • Optimisation of innovation to meet patients specific needs

Patient data: Information management	• Development and maintenance of an accurate database of all patient receiving home oxygen within the region • Appropriate data capture and reporting systems • Compliance with national IM&T standards for management of patient information (data protection and confidentiality)
Integration: Liaison with other care providers	• service is integrated with other care pathways to ensure a holistic approach to managed care • Keeping referrer/GP informed following initial assessment and all ongoing reviews. Updates on changing clinical status, oxygen requirements and follow-up regime. • Liaison with HOS supplier over equipment issues • Referral into specialist medical services for specialist assessment, stabilisation or management of co-morbidities • Liaison with relevant patient support groups and networks • Liaison with palliative care teams • Liaison with specialist paediatric respiratory clinicians • Referral to smoking cessation service • Referral for pulmonary rehabilitation • Liaison with respiratory network • Liaison with early discharge teams
Patient records: Clinical records	• Comprehensive contemporaneous clinical records for each patient • Integrated record shared with all HCPs involved in the patients care
Patients and carers:	Patient and carer training to cover: • patients condition and reason for oxygen prescription • principles of low flow oxygen therapy • specific explanation of equipment choice and safe use • back up equipment for concentrators • explanation of the maintenance and servicing requirements of chosen equipment

	• use of consumables, replacements and hygiene issues • assessment for requirements for humidifier • safety check • dangers of smoking • contact numbers – HCP support • advice on travel with oxygen therapy • complaints and untoward incident management processes • review and follow-up processes • HOS supplier will also be providing patient training Ongoing evaluation of patient and carer experience through use of surveys
	Promotion of self-care opportunities
Clinical standards and protocols: Applicable standards and evidence based clinical guidelines	• BTS Guidelines 2006 • NICE COPD guidelines 2004 • Compliance with COPD Strategy 2010 • Compliance with 18 week pathway • National Service Framework for Long Term conditions • National Carer's Strategy • Clinical protocols for spirometry, oximetry and ABG monitoring • Clinical protocols for effective exercise testing • Clinical protocol for removal of oxygen therapy with clear criteria for removal
Palliative care: Palliation and end of life care	• Full assessment not always appropriate • Links with local palliative care network
Paediatrics: Specific applications to paediatrics	• Assessment, initiation of oxygen therapy and follow-up/review should be undertaken by an appropriate specialist with paediatric experience • Assessment will differ to that of adults • Equipment must allow for low oxygen flows • All children require the supervision of a parent or carer

	• Most children requiring LTOT will require AO • Oxygen requirements are likely to change over time
Measuring effectiveness: Assessing outcomes and effectives of service	• Utilisation of outcome measures (including clinical audit, KPIs) to determine effectiveness of treatment and impact on other primary and secondary care services (A&E, clinic and inpatient attendances) e.g. reduction in number of assessments undertaken in secondary care, reduction in number of patient exacerbations • Regular contract performance reporting and management • Patient and referrer satisfaction surveys • Consider patient's quality of life measures • Reporting to national audit programmes (COPD) or disease registers

Appendix 7

Home Oxygen in Palliative Care

Home Oxygen Services are defined as the range of oxygen therapies that can be provided long term for the patient in the home or on an ambulatory basis to correct chronic hypoxaemia for the various conditions that can lead to hypoxaemia (eg respiratory including cancer, cardiac, neurological).

The RCP guidelines (1999) on Domiciliary Oxygen Therapy is clear about prescription of home oxygen for palliative use and recommends use in hypoxaemia as in section 3.26.

3.26 Patients with pulmonary malignancy or who are terminally ill with other conditions eg heart failure, may develop severe disabling dyspnoea, with or without arterial hypoxaemia. In patients who are hypoxaemic, supplemental oxygen therapy will relieve the dyspnoea so these patients will need domiciliary LTOT for up to 24h per day for symptomatic relief. However, there are no studies of longer term or continuous administration of LTOT in patients with disabling breathlessness, and most studies have only investigated relatively short-term oxygen administration.

From the Clinical Component for the Home Oxygen Service in England and Wales (August 2005) – two statements on palliative care need review:

1. Domiciliary oxygen therapy can be prescribed for palliation of dyspnoea in pulmonary malignancy and other causes of disabling dyspnoea due to terminal disease (Bruera et al).

In this statement, the concept of using oxygen during palliative care for correction of hypoxaemia is not stated and needs adjustment. This may have led to an increase of prescriptions early on and even at the time of diagnosis of cancer. The paper by Bruera studied patients with Hypoximaemia. A recent systematic review concluded that oxygen is not beneficial to non-hypoxaemic patients with cancer (Uronis 2008) and in 2010 a randomised controlled trial (Jenkins et al) found that patients with non-hypoxaemic breathlessness gained no benefit from oxygen therapy.

Thus it is now suggested that Home Oxygen Therapy (Long Term Oxygen Therapy LTOT and ambulatory oxygen if appropriate) is provided to patients with cancer and coexistent chronic hypoxaemia. This will unusually be in patients with more advanced malignancy unless they have coexistent lung disease. Home Oxygen should not be routinely provided for lung cancer patients at diagnosis and should not be provided solely for the relief of breathlessness in cancer.

2. Short burst oxygen should be considered for episodic breathlessness, not relieved by other treatments in patients with the following conditions:

- severe COPD
- interstitial lung disease
- heart failure
- palliative care.

A recent systematic review concludes that oxygen is not beneficial to non-hypoxaemic patients with cancer (Uronis 2008)

We now recognise that short burst therapy is not beneficial for relief of breathlessness in the absence of hypoxaemia and thus should not be used. We have suggested the term "intermittent oxygen therapy" where patients may develop transient hypoxaemia eg in exacerbations of COPD, heart failure and also in cancer patients. These patients may develop intermittent hypoxaemia when they develop a chest infection or heart failure in the presence of underlying pulmonary malignancy. Patients who may require intermittent oxygen therapy will need specialist assessment.

Thus it is suggested that Home Oxygen Therapy (Long Term Oxygen Therapy (LTOT) and ambulatory oxygen if appropriate) is provided to patients with cancer and coexistent chronic hypoxaemia. This will usually be in patients with more advanced malignancy unless they have coexistent lung disease. Home Oxygen should not be routinely provided for lung cancer patients at diagnosis and should not be provided solely for the relief of breathlessness in cancer (on the Cancer Research UK web site, - How can I have oxygen at home – the text implies that oxygen is used to relieve breathlessness).

Severe intractable breathlessness in advanced non-malignant respiratory disease such as COPD may require palliation in the absence of terminal or end-of-life disease. In such patients oxygen is not effective in relieving breathlessness unless there is proven hypoxaemia. In patients with advanced non-malignant respiratory disease in whom death is imminent oxygen may be used where hypoxaemia cannot be proven without undue discomfort to the patient.

Home oxygen should not be prescribed solely to treat breathlessness and other pharmacological and non-pharmacological therapies are more appropriate. However there may be some patients that may develop intermittent hypoxaemia and for those an intermittent source of home oxygen probably in the form of oxygen cylinders may be appropriate.

[8] Existing KPIs comprise: the concordance report, HOOF rejections, failed deliveries, service failures. Invoices must be reconciled monthly.

References

- The RCP guidelines on Domiciliary Oxygen Therapy. 1999
- Clinical Component for the Home Oxygen Service in England and Wales (August 2005)
- Bruera E, de Stoutz N, Valsco - Leiva A, Schoeller T, Hanson J.Effects of oxygen on dyspnoea in hypoxaemic terminal-cancer patients. Lancet 1993; 342: 13-14.
- Uronis HE Currow DC McCrory DC Samsa GP Abernethy AP
- Oxygen for the relief of dyspnoea in mildly or non hypoxaemic patients with cancer:
- a systematic review and meta-analysis British Journal of Cancer 98 294-299

Prof Wisia Wedzicha. Christine Mikelsons. Dr Patrick White
March 2010

Appendix 8

Sample protocol for withdrawal of LTOT/ambulatory oxygen (Newcastle PCT)

All patients within the Newcastle PCT area who receive supplementary oxygen excluding palliative care and paediatrics will receive over the next 12 months their first annual oxygen review. This a new service provided by the Newcastle PCT with two full time oxygen liaison nurses integrated into the established CHEST service to provide support and advice for long term oxygen patients. As part of the annual review each patient will be assessed as to their continued suitability oxygen use. In the future it is planned that all new referrals for LTOT and ambulatory oxygen will have initial screening carried out by the two oxygen liaison nurses

It is felt that there will be two distinct groups of patients that differ greatly i.e. those patients who will be amenable to having to oxygen withdrawn if there is no continued clinical need, and those who will not be willing to have oxygen withdrawn. The protocol therefore will have to be adapted for those patients who are not willing to have their oxygen withdrawn compared to those who would be willing.

At present if the patients resting oxygen saturations are persistently above >94% (Spo2) breathing room air then it is considered safe for oxygen to be withdrawn. The process for this will be:

Visit one

Full annual review, if Spo2 is >94% after 15 minutes without oxygen the patient will require further assessment in 1-2 weeks.

Visit two 1-2/52

Patients will be asked to remove oxygen one hour prior to the visit, if a home visit and to sit for one hour without oxygen if attending a clinic. If Spo2 remains above >94% after one hour without oxygen the patient will require a further assessment.

Visit three 1-2/52

The patient will be asked to refrain from using oxygen for one whole week. During this period the patient may require further visits for reassurance, Spo2 monitoring and psychological support. The patient will be asked to record in a diary supplied, when, where etc that they have either used or felt they needed to use their oxygen. They will be given telephone numbers to contact for advice on matters concerning their oxygen during this period. If there is agreement with the patient and it is considered safe to do so based on resting oxygen Spo2 then their oxygen will be withdrawn.

Letters confirming this will be sent to their respective GP and Consultant. If the patient has concerns which have been recorded in their diary, these should be addressed and action taken accordingly e.g. addressing SOBOE which the patient feels is only relieved by oxygen. In this instance, ambulatory oxygen assessment must be performed.

If there is **not** agreement with the patient to have their oxygen withdrawn then this is the time when the team may encounter problems. There will be a small number of oxygen users who have a very high psychological reliance on oxygen. It is envisaged that these patients may require extensive support and alternative treatments to replace the oxygen. However, it is also felt that certain individuals with whatever support is available will still refuse to have oxygen withdrawn.

It is proposed that those patients will receive the same number of assessment as those who agree to have the oxygen withdrawn, in addition they could be offered one of or a combination of the following:

- Daily visits for a short period following the oxygen withdrawal to monitor Spo2, provide psychological support and to provide education.
- A referral to a Chest Physician to provide a more thorough review of that patient prior to oxygen being withdrawn
- An alternative HOOF either reducing their LTOT prescription or providing an ambulatory prescription following the appropriate assessment. If the patient continues to refuse to have oxygen withdrawn then it has been decided that they will remain on oxygen until at least all of the patients in the area have been assessed.

Appendix 9

Home Oxygen Service Assessment and Review (HOS-AR): analysis

Clinical Quality and Efficiency Analytical Team, Department of Health

This analytical document covers:

- The total need for home oxygen
- Current levels of prescribing/the savings that could be achieved by a HOS-AR service
- The indicative cost of operating a typical HOS-AR service

What is the total need for home oxygen?

It is important to distinguish the number of patients on oxygen at any one time (the stock) and the number newly prescribed oxygen in any one month (the flow).

Estimates of current usage:

- Current evidence suggests (on average) that there are 85,000 patients on home oxygen at any one time, with 5,000 new patients added to the service every month[11].

Estimates of the underlying need:

- Clinical advice has suggested that approximately 40% of COPD patients at GOLD Stage IV require home oxygen. It is estimated that there are 152,000 patients[12] diagnosed at GOLD Stage IV, implying that 60,800 of them require home oxygen.
- The Home Oxygen User Survey 2009 asked 2,845 respondents to specify 'the category that most closely describes the condition for which you are receiving oxygen'. DH analysis of the survey (using the supplied survey weights) finds that 58% of respondents report having COPD, with an additional 6.7 percentage points having ticked COPD alongside one or more other conditions[13]. A further 7 percentage points gave a reply of 'Not known' or 'Not stated'. Some of these 14% of patients are likely to be those with COPD; it is therefore reasonable to look at the share of COPD in all respondents who specified a single condition (85% of the sample). This share is 58%/85% = 68.5%.
- If 68.5% of the current 85,000 oxygen users have COPD, this equates to 58,225 COPD users. It was estimated above that approximately 60,800 COPD patients need home oxygen, which is a similar number to those estimated to receive it. However, DH analysis of Concordance data finds large numbers of patients (including those with COPD) who do not use their oxygen; if some COPD users are inappropriately prescribed home oxygen, it implies that there are others with unmet need. NERA (2007) also report unmet need (20% of GOLD Stage IV patients are reported to be oxygen users, leaving another 20% of unmet need).

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[11] Data obtained by DH from existing HOS suppliers, 2010.

[12] Department of Health. Consultation on a strategy for services for Chronic Obstructive Pulmonary Disease (COPD) in England, 2010. Impact Assessment Annex 1.

[13] The instructions stated that respondents should only tick one condition.

- In addition to the 60,800 COPD patients calculated above, oxygen will be needed for some patients with other conditions (e.g. heart failure, paediatric care and palliative care, e.g. relating to lung cancer). We do not currently have evidence of the total level of need amongst these patients, so do not know the overall level of need across all patients (although it must exceed the 60,800 for those with COPD).

How much of the underlying need will ultimately be referred, and therefore require, resources from the HOS-AR service?

- Not all of the underlying need identified above will necessarily be referred to the HOS-AR service. If there is unmet need at the moment, it is likely to continue if there is no change in referral practices for home oxygen.

Estimates of current levels of under-usage/inappropriate prescribing:

- DH analysis of Concordance data (covering 71,078 patients in 2009) suggests the following findings. These numbers are conservative in that (for those with both LTOT and ambulatory oxygen) it is assumed that LTOT prescriptions only apply to 5 days a week, and that ambulatory oxygen only applies to 2 days a week[14].
- Overall, an estimated 24% of all oxygen prescribed across England is not used (rising to 43% if the above 'weighting' assumption is dropped). This includes the following levels of significant under-use as well as some over-use. Under the 'weighting' assumption (which is more conservative), out of 71,078 patients:
    - 16,567 patients use no oxygen at all in the 6-month period covered by the data
    - 16,524 patients use some oxygen, but less than 20% of what has been prescribed
    - 5,142 patients use more than 20% but up to 40% of what has been prescribed
    - 22,644 patients are on SBOT only or SBOT plus ambulatory
    - The above numbers cannot be added up to give a total, as some SBOT users are also non-users and would therefore be double counted. Taking account of this using database software, 43,412 patients are (i) on SBOT or SBOT plus ambulatory and/or (ii) use 40% or less of what they have been prescribed. An alternative figure is that 40,233 patients are (i) on SBOT or SBOT plus ambulatory and/or (ii) use 20% or less of what they have been prescribed.

How should we resolve the issues of under-usage/inappropriate prescribing and unmet need when doing cost-benefit calculations?

- As noted above, any unmet need is likely to continue if there is no change in oxygen referral practices. It is logical to compare the benefits that a HOS-AR service will bring (from reduced under-usage/inappropriate prescribing) with the costs of that service. If PCTs choose to invest some of these savings in reducing unmet need, they may choose to do so, but it is treated as separate from the costs and benefits of a HOS-AR service.

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[14] The HOOF form asks prescribers to specify the flow rate and number of hours per day for both LTOT and ambulatory oxygen. Prescribers may not take account of the fact that LTOT and ambulatory oxygen are not used at the same time, therefore over-prescribing oxygen. The assumption set out above is an attempt to remove this effect from the results, which would otherwise show even greater under-usage.

How much could be saved using a HOS-AR service? (Both total and per PCT)

- Initial processes have now started to procure new home oxygen contracts that are based on equipment/usage (rather than the amount prescribed). However, the procurement is not yet at the stage where pricing has been decided, so it is not possible to estimate HOS-AR savings under the new contracts. The following text therefore considers data on current under-usage of home oxygen, and follows this through to the money that could be saved (under the current pricing system) if HOS-AR were to avert much of this under-usage.

- As noted in the previous section, it is estimated (through DH analysis of Concordance data) that 24% of all prescribed oxygen in England is not used. This is calculated under a 'weighting' assumption that makes the result more conservative; without the weighting assumption, the figure is 43%. These figures take account of the balance of those who are using more oxygen than has been prescribed, as well as those who are using less than has been prescribed.

- Financial data shows a current spend on Home Oxygen of £110m per annum[15]. Because of the way the current pricing system works (it is a fairly complex function of the flow rate, modality and number of hours), it is difficult to work out the exact cost of under-usage. Assuming that usage is proportional to total cost, 24% under-usage is equivalent to a cost of £26.4m (24% of £110m) per annum, with 43% under-usage being equivalent to a cost of £47.3m per annum. These cost estimates are rougher figures than those presented below because of the stated assumption, although (unlike below) they do take both under and over-usage into account.

- Using the data from the HOS Concordance reports, it is also possible to look at the estimated cost of those using less than a certain percentage of what they have been prescribed and/or those using only SBOT, as a HOS-AR service should be able to avert much of this expenditure. (SBOT is argued elsewhere to have no clinical benefit). These costs are likely to be underestimates, as the total estimated spend from this source only comes to £73m per annum (compared to £110m per annum from the financial data)[16]. Under the 'weighting' assumption from above (which is more conservative):
    - £13.29m/annum is the annualised cost of patients who use no oxygen at all in the 6-month period covered by the data
    - £17.35m/annum is the annualised cost for those who use some oxygen, but less than 20% of what has been prescribed
    - £6.22m/annum is the annualised cost for those who use more than 20% but up to 40% of what has been prescribed
    - £11.26m/annum is the cost for patients who are on SBOT only or SBOT plus ambulatory
    - As in the previous section, the above numbers cannot be added up to give a total, as some SBOT users are also non-users/low-users and would therefore be double counted. **Taking account of this using database software, an estimated £20.13m/annum is spent on patients who (i) are on SBOT or SBOT plus ambulatory and/or (ii) have zero recorded usage. Similarly,**

[15] NHS Business Services Authority, as supplied by Joe Clyne in DH Procurement Investment and Commercial Division

[16] Likely reasons for the under-estimation include: the data does not include patients who have been on the service for less than 6 months, it does not capture month-to-month variation in usage (as it looks at 6 month total usage), and holiday supply and emergency supply are excluded.

an estimated £32.22m/annum is spent on patients who are on (i) are on SBOT or SBOT plus ambulatory and/or (ii) are using less than 20% of the amount prescribed. Lastly, £35.96m/annum is spent on patients who are on (i) are on SBOT or SBOT plus ambulatory and/or (ii) are using less than 40% of the amount prescribed.

- It is unlikely that a HOS-AR service could eliminate all of the above under-usage/ inappropriate prescribing, as it is only seeing patients every six months. It should nonetheless be able to eliminate a substantial proportion.
  Maximum savings can be achieved when the patient is prescribed and managed within HOS-AR

Additional points:

- It would be useful if the Health Care Professional (HCP) has regular access to the patient's usage data (Concordance data).
- Following comments from existing Assessment services, serious consideration should be given to how the HOS-AR bookings and admin function can be integrated with the local PCT's other home oxygen tasks (e.g. database management such as removing deceased patients).

What staff would form a typical HOS-AR team and how much would this cost?

- Current clinical practice at two independent clinics suggests that the following staff can provide a good quality assessment and review service, given the workload set out later on.
  - Two Band 7 specialist nurses
  - Half the time of a Band 3 clerk
- The current Agenda for Change basic pay ranges for Band 7 are £29,789 to £39,273; for Band 3 they are £15,190 to £18,157[17]. These figures exclude hour's related pay, overtime, occupation payments, location payments and other payments including redundancy pay or payment of notice periods. Information Centre estimates of the mean basic pay for Band 7 and Band 3 are £36,000 and £17,000 respectively; after including the above factors, the estimates are £39,100 and £19,500 respectively[18]. Data from PSSRU (2009)[19] suggests that a Band 7 nurse's extra costs of employment (e.g. salary oncosts, qualification costs, overheads and capital overheads) amount to 54% of basic salary (40% if excluding qualifications).
- The PSSRU uplifts are applied to the basic pay means, with the extra costs (as listed above, e.g. including location payments) then added on top. This yields £58,540 per annum for each nurse (£53,500 excluding qualification costs) and £26,300 per annum for a full time clerk. **The overall total is £130,230 per annum for two Band 7 specialist nurses and half the time of a Band 3 clerk, or £120,150 per annum if the nurses' qualification costs are excluded.**

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[17] See http://www.nhscareers.nhs.uk/details/Default.aspx?Id=766

[18] See http://www.ic.nhs.uk/statistics-and-data-collections/workforce/nhs-staff-earnings/nhs-staff-earnings-october--december-2009

[19] Personal Social Services Research Unit (2009). Unit costs of health and social care (2009). See http://www.pssru.ac.uk/uc/uc2009contents.htm

How many patients (new patients and checkups of existing patients) would a typical HOS-AR team be able to handle?

Following clinical advice, the main tasks of the HOS-AR team would include:

- HOS-AR full assessments of patients thought to require home oxygen (following diagnosis and oximetry): the equivalent of 3-4 full assessments per half day per nurse (i.e. 6-8 per nurse day). These two hour sessions may be delivered in halves (e.g. one hour for LTOT equipment and one hour for ambulatory equipment) in order to make things easier for the patient to understand. Sessions can be run in parallel (as at the Royal Free Hospital – e.g. one patient may be doing a walking test whilst another patient is resting) in order to efficiently perform this volume of assessment within a half day.
- 4 week home checkups for new users of home oxygen: 4-5 per day per nurse, taking account of transport time
- 6-monthly checkups: 6 per day if at home, or 10 per day if based at HOS-AR. (The implicit travelling time in the at-home estimate is similar to that for the 4-weekly home checkups, given that these checkups last 30 minutes each). Making a conservative assumption that 75% of checkups take place at home, an average of 7 checkups can be carried out per nurse day.

The standard Agenda for Change working week is 37.5 hours (excluding lunchtimes). Using this and the above estimates, it can be shown that if the 10 nurse days were allocated in the following way each week:

- 1.75 nurse days of HOS-AR full assessment
- 2.75 nurse days of home checkups
- 4.5 nurse days of 6-month checkups
- 1 nurse day for the remaining tasks (home-based/HOS-AR based oximetry assessment for those referred without it, telephone calls for 3-month ambulatory reviews, follow-up of borderline patients, time spent meeting with a respiratory consultant for oversight purposes)

Using the midpoint of the ranges presented above (e.g. using 4.5 4-week checkups given that the range is 4-5), this would provide an average weekly mix (for the whole team) of:

- 12.25 HOS-AR full assessments
- 12.375 home checkups
- 31.5 6-month checkups

This mix has been specifically calculated such that the team have sufficient time to do the 6-month checkups and handle the smaller tasks as well as assess new patients:

- A constant flow of 12 new patients per week would equate to 12 HOS-AR full assessments per week and 12 home checkups per week. With a 41 week working year for those with 10 years' service[20] and allowing for a 15% Did Not Attend (DNA) rate, this equates to around 430 new patients per year and 1,098 6-month checkups per year.

[20] Allowing 29 days per annum for annual leave (these nurses will be experienced enough to have accrued extra days), 8 for statutory holidays, 5 for training and development and 12 days of sick leave (Unit Costs of Health and Social Care 2009; sick leave estimate is consistent with the more up-to-date experimental statistics at http://www.ic.nhs.uk/statistics-and-data-collections/workforce/nhs-sickness-and-absence/sickness-absence-rates-in-the-nhs-july--september-2009-experimental-statistics)

- In the 1 day of additional time, the team would likely need to carry out oximetry in around 7 new patients[21] (a small fraction of these would need to be home visits). They would need to conduct 3-month telephone reviews of ambulatory oxygen for the 7-8 patients per week that are given it[22] and would spend two hours speaking with the respiratory consultant (as part of the oversight process). Together with the 15% DNA assumption, there will also be some capacity to smooth over weekly variations in demand.

How many teams might be required and what would be the total cost of these HOS-AR teams? (Assuming that oxygen patient numbers remain similar to the current situation)

- (The scenario here is that the service's load remains similar to the current situation. In reality, it will likely decrease due to reduced inappropriate prescribing and little unmet need taking up the slack). Here, 140 teams (costing £18.23m per annum, or £16.82m per annum excluding nurses' qualification costs) would be able to cover 60,000 new patients per year (i.e. the current rate) and would be able to offer 153,689 6-month checkups (i.e. covering 76,844 users, the vast majority of the total). This volume of 6-month checkups should be sufficient given that some patients will have passed away before a 6-month checkup could be carried out.

- During the first 6 months, there will be sufficient time to perform 30-minute checkups on the vast majority of existing users (76,844 users, taking account of non-attendance). It may be reasonable to prioritise this, with low users and SBOT users going first.

What additional costs will be faced?

- **Cost of pulse oximetry outside of HOS-AR:** The HOS-AR service will encourage greater use of pulse oximetry prior to referral. The effect of this is difficult to cost as current levels of oximetry use are not recorded. Oximeters are available to buy for less than £100[23], and NICE costings estimate a cost of around £4 per patient[24]. Using the earlier clinical assumption that 70% of readings are likely to be hypoxic, and given 60,000 new patients per year, this would be a maximum cost of £345,000 even if no oximetry were conducted at the moment.

- **The cost of demonstration equipment for each HOS-AR team:** The equipment should be similar to what patients are actually provided with at home so that the demonstration is of maximum usefulness to patients. This is likely to be a mix of one-off costs (e.g. for the equipment) and recurring costs (e.g. to refill cylinders etc. with oxygen). These costs have not yet been identified, but should not be substantial. (The average home user currently costs around £1000 per annum; 140 HOS-AR teams at this unit cost would be £140,000 per annum).

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[21] Clinical advice suggests that 50-60% of GP referrals can be expected to have pulse oximetry readings, with 80% of secondary care referrals having Arterial Blood Gases (ABG) data. DH analysis of the Home Oxygen User Survey 2009 shows that around 25% of referrals are by GPs, with 72% from secondary care and 3% from community nursing, so overall around 70% of referrals can be expected to have oximetry or ABG data. Clinical advice also suggests that 70% of oximetry readings are likely to be hypoxic. Using these parameters and the assessment rate of 12 hypoxic patients per week, around 19 referrals would be made to HOS-AR per week, around five of which would not have oximetry data but are found to be hypoxic, and around two without oximetry data who are not found to be hypoxic.

[22] DH analysis of Concordance data from oxygen suppliers (2009) suggests that 65% of patients have some form of ambulatory oxygen.

[23] See the NHS Supply Chain website. https://my.supplychain.nhs.uk/catalogue/browse/14527/pulse-oximetry-monitor?page=1

[24] National Institute for Health and Clinical Excellence. Preoperative tests: the use of routine preoperative tests for elective surgery. Appendices, guidelines and information. Clinical guideline CG3. NICE, 2003. See www.nice.org.uk/

- **Testing costs:** The COPD consultation[25] estimates a £125 unit cost for a package of chest radiograph, full blood count, oxygen saturation, post-bronchodilator FEV1 and FVC ratio, and an echocardiogram. However, as nursing staff time has already been identified, the only costs relevant here are of other staff (e.g. pathology or x-ray), or equipment costs. The chest radiograph, full blood count and oxygen saturation test amount to £26. With 60,000 users per year, this would amount to £1.56m per annum. The cost of spirometry and ECG equipment would be on top of this if it is not already available. Additionally, annual ABGs are estimated to be needed for 10% of home oxygen users each year as part of their 6-month checkups, amounting to around 10,000 ABGs (a fairly minor additional cost).
- **Respiratory consultant oversight:** One respiratory consultant 'programmed activity' (4 hours) every other week for oversight and to discuss complex cases. Consultant time is costed by PSSRU at £100 per hour excluding qualification costs, yielding £10,400 per team per year, or £1.456 million per annum.
- **Cost of necessary treatment and office space:** treatment space is not included in the costings, but office space is. The cost of treatment space is likely to be an opportunity cost, i.e. the cost of not being able to use existing premises for something else, rather than the cost of building a new treatment space for this specific purpose.

What (therefore) would be the overall costs and benefits of HOS-AR?

- **HOS-AR would have a** cost of approximately £21.5m **per annum for the items quantified above.**
- **If patient numbers fall after introduction of the HOS-AR service (e.g. because under-usage is reduced, but not offset by any reduction in unmet need), staff time (and potentially cost) will be freed up. Additionally, it should be remembered that some PCTs already operate good HOS management practices; increased spend may not be necessary in those areas, or may only be necessary at a smaller scale.**
- **This compares fairly well with the magnitude of the benefit estimates, which suggest that up to around** £40m of savings could be achieved.

How do the above costings compare to other sources?

- The NHS collects Reference Cost data to inform the setting of the Tariff that is paid per procedure under the Payment by Results system. In the 2008/9 Reference Cost data, there are 20 submissions for an outpatient 'Oxygen Assessment and Review' service (currency code DZ38Z). These submissions will relate to various service set-ups, do not distinguish between oxygen assessment and oxygen review and will not typically have the scale of a full HOS-AR service. Nonetheless, their weighted average cost is £227 per procedure, with the lowest cost being £61.17 and the highest cost being £526.75. Given that the £21.5m HOS-AR service above is roughly evenly split between new patients and 6-month checkups (i.e. £10.75m for each), the service costs around £175 per new patient and around £69 per 6-month checkup. The HOS-AR service can be expected to have cheaper unit costs because of its scale, and the comparatively low resource usage of the half-hour 6-month checkups.

[25] Op cit.

How might HOS-AR costs be cut down?

- Having one band 6 and one band 7 nurse (instead of two band 7 nurses) would save £1.2m per annum; having two band 6 nurses would save £2.4m per annum.
- Halving consultant oversight time would save £700,000 per annum.
- Reducing the time of the three key meetings (HOS-AR assessment, 4 weekly checkups and 6-month checkups) to three quarters of their current value would enable one-third extra patients to be seen in a given period of time. This could cut the number of HOS-AR teams by a quarter, saving in the order of £4.5 million per annum.

Appendix 10

BTS Oxygen Alert Cards

The Oxygen Alert Card should be printed on card using a colour printer if possible.

Cut along the areas indicated, fold in half, glue the two backs together and place in wallet or purse.