IMPRESS Guide to Pulmonary Rehabilitation
IMPRESS was set up in 2007 as a joint initiative between the British Thoracic Society (BTS) and the Primary Care Respiratory Society-UK (PCRS-UK) to provide clinical leadership to the NHS to stimulate improvement and integration in respiratory services. The IMPRESS team now works closely with representatives from primary and secondary care, nursing and medicine, public health, social care, providing and commissioning and the public. We have worked through many of the issues that local teams need to address to improve care across the system and provide practical and highly-regarded guidance through our website http://www.impressresp.com.

The British Thoracic Society (BTS) has over 2,600 members who are actively working in a variety of healthcare professions to improve the standards of care for people with lung diseases. Just over half the members are secondary care physicians and doctors in training and the remainder are respiratory nurse specialists, respiratory physiotherapists, respiratory technical and physiological measurement professionals, smoking cessation practitioners and staff working in primary care settings. The Society publishes treatment Guidelines and related educational materials; runs an annual Scientific Meeting and an annual conference and short course programme catering for the multi-professional team; publishes the journal Thorax; provides tools to assist individual and team review and performance improvement (including audit and peer review); and works with strategic partners such as PCRS-UK and patient organisations to raise the profile of the speciality and advocate for improvements in standards.

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Executive Summary

- Pulmonary rehabilitation (PR) reduces morbidity, mortality and hospital attendances in people with COPD disabled by their disease.

- PR should receive commissioning priority given its proven clinical and cost effectiveness and relative value compared to many of our other interventions for COPD.

- The more components of the COPD pathway working together in an integrated multi-faceted programme, including an interface with self-management support, quit smoking support and oxygen assessment, the more likely there is to be a positive effect.

- This paper reviews the evidence, explains what PR is, how it works, its value and why it should be commissioned.

- It supplements the Commissioning Pack for COPD to be issued by the DH England, including a section on PR (due early 2012).

- It answers the questions asked by commissioners who may have no current service, a service with insufficient capacity, one that does not meet patient's expectations, or one that is failing to achieve acceptable completion rates.

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## Contents

- Introduction ............................................. 5
- What is pulmonary rehabilitation? ....................... 5
- Why should I commission PR? What’s its value? ............ 6
- Impact on mortality ........................................ 6
- Impact on readmissions for COPD exacerbations .......... 6
- Cost-effectiveness .......................................... 6
- How generalisable is the literature? ....................... 7
- Bed days ..................................................... 7
- Getting the right service to the right people: modelling demand and capacity .......... 7
- What is the service specification? ......................... 9
- Should I commission maintenance programmes and repeat programmes? ................. 10
- How does PR differ from other activity advice? ............ 10
- What about referral? ....................................... 10
- What outcomes should commissioners expect? .......... 11
- What costs? ............................................... 12
- Evaluation .................................................. 12
- Key performance indicators (KPIs) and expectations ........ 12
- Coding ....................................................... 14
- To improve uptake ......................................... 14
- What might be the role for the use of personal budgets* and personal health budgets? ... 16
- Conclusions ............................................... 16
- APPENDIX 1: Impact on mortality – fuller information .......... 17
- APPENDIX 2: Example of a PR programme, from Tower Hamlets, London ............. 18
- APPENDIX 3: Example of dashboard report .................. 19
IMPRESS Guide to Pulmonary Rehabilitation

1. Introduction

Pulmonary rehabilitation (PR) reduces morbidity, mortality and admissions in people with COPD disabled by their disease.

This IMPRESS guide aims to complement the pulmonary rehabilitation element of the Commissioning Pack developed by the Department of Health, England (available early 2012) and is sufficiently generic to be appropriate for Wales, Scotland and Northern Ireland too. It aims to answer the questions that most healthcare commissioners and planners want answered. It has been produced by an expert task force of IMPRESS, including the IMPRESS Implementation Group comprising primary and secondary care doctors, nurses and physiotherapists nominated by the British Thoracic Society and the Primary Care Respiratory Society-UK, and also an invited expert group of representatives from the British Lung Foundation, BTS Public Liaison Committee, DH social policy, and NHS commissioning. As well as the Commissioning Pack and NICE guidance, it draws on the previously published work by IMPRESS.

2. What is pulmonary rehabilitation?

To quote from the IMPRESS 2008 guide PR is a “deliberate supervised therapeutic process of restoring a patient’s function through the process of formal rehabilitation.” It offers individualised tailored exercise training accompanied by support for long-term behaviour change. "Definitions of the process of pulmonary rehabilitation have been published but for the purposes of this paper it is better to describe the founding principles.

The features of a successful rehabilitation service are that it:

• Is an individually tailored, multi-disciplinary intervention for symptomatic patients, which is integrated into their overall care
• Aims to reduce symptoms, improve functional performance, improve quality of life, reduce healthcare utilisation and reduce health care costs
• Contains effective, individually tailored, physical exercise training together with structured self-help education sessions from experts about living with the disease
• Helps to address the social and psychological impacts of the disease on patients and those close to them
• Monitors progress with appropriate individual outcome measures and programme quality control
• Offers a service that encourages uptake and completion of the whole programme and is sensitive to local needs and issues (be that rurality, ethnicity, accessibility and so on).

3. Why should I commission PR? What’s its value?

Exacerbations of chronic obstructive pulmonary disease (COPD) are characterised by increased shortness of breath (dyspnoea), reduced quality of life and muscle weakness. COPD exacerbations are the second most common cause of emergency admission to hospital and the fifth commonest cause of readmission (DH). PR improves outcomes in these areas. PR should be provided as part of an integrated pathway but it is understood that due to financial and operational constraints it may not be possible to commission and/or implement the entire pathway in one instance. PR should receive commissioning priority given its proven clinical and cost effectiveness and relative value compared to many of our other interventions for COPD. However, it should be understood that the more components of the pathway working together in an integrated multi-faceted programme, including an interface with self-help support, including stop smoking support if needed, and oxygen assessment, the more likely there is to be a positive effect, that is, components of the Chronic Care Model.

The best evidence for the cost-effectiveness of PR comes from four sources, two of which are Cochrane reviews of the literature (Cochrane 2005, 2009, Griffiths 2001 and Seymour 2010).

1. Impact on mortality

There is evidence that post-admission pulmonary rehabilitation reduces mortality in COPD. In the 2009 (updated 2011) Cochrane Review of Pulmonary Rehabilitation (PR) following exacerbations of COPD, PR reduced mortality and admissions: one life was saved for every 6 treated, and one admission was avoided for every 4 treated. In all trials, pulmonary rehabilitation improved patients’ capacity to exercise. No adverse events were reported. Therefore effective discharge processes should include support for patients to attend PR in a timely manner once they have gone home.

2. Impact on readmissions for COPD exacerbations

Referral to and timely availability of pulmonary rehabilitation has been shown to reduce the three-month readmission rate in COPD from 33% to 7%. To date this is the only intervention that has been shown to alter the very high 3-month readmission rate seen in COPD. It should be noted that the team leading this work found it challenging to recruit patients to the study for a number of reasons (patients are by definition still quite sick on discharge; and the exclusion criteria include not having had PR in the last 12 months) so whilst the outcomes are impressive, the challenge for routine practice is considerable.

3. Cost-effectiveness

Griffiths et al. investigated the cost-effectiveness of an outpatient, multidisciplinary PR programme in Wales and claimed, based on 12 month follow-up, with 95 per cent probability the cost per QALY is below £17000, that is, well within the range which is usually deemed cost-effective by NICE and with 64 per cent probability it is cost saving. In addition, between 2 and 3 people need to be treated to save one from disabling breathlessness, fatigue, emotional distress, and to enable one person to gain mastery of their condition. Of the cost-effectiveness studies in PR, this is the one that uses an accepted outcome measure (SF-36) and describes a model similar to the one used by most PR services in the UK, and advocated by the Department of Health England in its commissioning pack.

For fuller details see Appendix 1.

4. How generalisable is the literature?

In all scientific treatment studies (drugs, surgery, physiotherapy, counselling etc) the patient needs to consent to become part of the trial and be informed of what will be given (or withheld). Some people choose not to join the study. In addition to this, most scientific studies exclude groups with comorbidities (e.g. elderly people, those with tobacco dependence) or specific medications.

This is equally true in studies of respiratory care and pulmonary rehabilitation. Hence people in trials are somewhat different to a general population. However in most branches of medicine this generalisability is assumed and pulmonary rehabilitation should be no different.

The research is strong and consistently shows benefits to patients and softer evidence (speaking to physiotherapists, clinicians and especially patients and patient groups) emphasises the benefits that many gain.

5. Bed days

We know that total bed days are reduced following pulmonary rehabilitation. Length of stay can also be influenced by co-morbidities, social support, presence of an early supported discharge team etc in addition to the benefits of pulmonary rehabilitation. Year of care tariffs are being tested in long term conditions. These may offer opportunities to capture total bed days as part of the outcomes required by commissioners. However, at present, in England the Payment by Results model does not capture bed day improvements. Whatever currency is used, it is imperative to have an accurate picture of the current baseline of services, because there is substantial variation across the country in terms of speed of adoption of these evidence-based interventions and some providers may have less scope to make further reductions.

6. Getting the right service to the right people: modelling demand and capacity

Whilst all people diagnosed with COPD should be given advice on exercise, current clinical guidance on pulmonary rehabilitation states that it is beneficial for all those whose breathlessness is assessed on the Medical Research Council (MRC) grading scale MRC3 and above or those who consider themselves disabled by their breathlessness. This means in practical terms that people who are aware of and bothered by their symptoms are likely to be suitable. Most existing PR services are designed for patients assessed as having a breathlessness score of MRC3-5, and people who are post-admission with a score of MRC2. It is not established the extent of benefit that these less symptomatic patients may gain by pulmonary rehabilitation. Therefore people with an MRC score of 2 or lower should be encouraged to exercise, stop smoking and eat healthily when diagnosed but do not need referral to PR.

However, we know that there are patients who have this level of breathlessness but are not yet diagnosed or have not been assessed or have breathlessness for other reasons and that there are others who have an assessment of MRC3 or higher but are not optimally medically managed. Therefore some people are missing out and others are unlikely to benefit to the extent claimed by the published studies. The Quality and Outcomes Framework (QOF) has now introduced within the COPD clinical areas recording of MRC level as part of the annual review. Clinical commissioners or localities should be able to assess the extent of MRC recording and using MIQUEST-type queries establish the proportion of patients at each MRC level within their locality. This should help in estimating the pulmonary rehabilitation capacity needed. There is a full model described in the DH England commissioning pack pulmonary rehabilitation section.

8. The National COPD Resources and Outcomes Project (NCROP) http://old.rcplondon.ac.uk/clinical-standards/ceeu/Current-work/ncrop/Pages/Overview.aspx
We also expect from experience (and national estimates) that about a third of those offered PR will turn down the offer first time round. Of those who receive an assessment (we would estimate current patterns are about 65% of those referred), a third may not complete the programme due to sickness, motivation (which will be influenced both by the quality of the provision and quality of information provided before committing to PR), or logistical problems. Rolling rather than cohort programmes may help to address this, allowing patients who have been unwell to pick up the programme where they left off. Commissioners need to ensure that referrers and providers receive local data and narrative that can inspire change in their referral behaviours. This may need to include mechanisms for educating providers about PR so that they can describe what it is to patients and why they should do it and using motivational interviewing skills to reduce this drop-out rate at each stage. In particular, they should ask providers how those who are at high risk of admission are being assisted to attend.

Location and access need to be tested, and transport needs identified and addressed (through siting services where there are good public transport routes and/or parking, and enabling eligible patients to use locally commissioned transport services). They may also wish to consider CQUINS (DH England Commissioning for Quality and Innovation payment) to incentivise the reliable encouragement and referral of people prior to discharge to pulmonary rehabilitation programmes such as the COPD Discharge Bundle developed by the NIHR CLAHRC in North West London: http://www.london.nhs.uk/what-we-do/our-current-projects/london-respiratory-team/tools-and-resources There has been an increase from zero GP referrals to 462 referrals in 12 months for their PR programme. http://www.hsj.co.uk/HSJBP2011

Logically, given the evidence, the priority would be to provide PR to all those patients at MRC2 or above who have had an admission for an exacerbation of COPD. However, these patients need a lot of support to agree to attend, and would not attend in sufficient and predictable numbers to enable providers to offer a cost-effective stand-alone service. Therefore, the service has to cater for both these patients and those chronic stable patients assessed as at MRC3 and above (that is, in a de-conditioning cycle) who have never had PR.

Some commissioned services also include people who request a repeat programme (see Paragraph 8). New services might wish to review uptake before considering this:

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<th>Phase 1</th>
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<tr>
<td>Post admission and MRC2 or more</td>
<td>Add chronic stable patients at MRC3 and above (that is, in a de-conditioning cycle) who have never had PR.</td>
<td>Review who hasn’t accepted but who would benefit; consider additional recruitment strategies: use cycle of change model – need to keep asking</td>
<td>Add repeat PR at annual intervals for those who have had it before (note the NICE model is limited to “first timers”. The repeat could be dependent on a further assessment (SW Essex model). Often driven by the patient: (“I’ve noticed I can’t do as much – this normally matches the professional assessment)</td>
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7. What is the service specification?

We recommend that you use the DH England service specification and adapt to your local situation. However, there are some essential elements:

Inclusion and exclusion

The DH specification gives a full definition in section C, Scope.

Content

PR is an active process that includes an initial restorative phase followed by a supported or self-sufficient maintenance of the benefit.

- PR must include an element of sports science assessment so a patient's skeletal muscles are trained including both lower limb strength (resistance) and endurance exercise. Individually prescribed lower limb physical training is therefore a mandatory component normally using walking or cycling as the method. This explains why singing and tai chi, where used, are adjuncts but not core to the main programme.

- The intensity or duration of training should progressively increase so that the relative intensity remains constant. Specific upper limb and respiratory muscle training may result in a patient's improved ability to carry out specific tasks. However since neither has been shown reliably to augment general exercise training they cannot yet be considered a mandatory component.

- The exercise component is individually prescribed for each patient so that the correct intensity is achieved to obtain the desired effect.

- Location and facilities are much less important for the outcome (but not perhaps the take-up) than the skills and enthusiasm of staff, and exercise that transfers to home activities which increases durability of the programme.10

- Referrers and providers should also use a behaviour change model, making repeated offers, since it is inappropriate to categorise people as "motivated" or "unmotivated". Breathless, scared people are in different states of readiness to accept a referral to an unfamiliar programme that includes exercise and group work but with motivational support, more will accept and more will complete.

- The programme should support patients to quit smoking and record entry and exit smoking status.

- For the present, the guidelines recommend that twice weekly, supervised rehabilitation should be provided for between 6-12 weeks. In future, it is likely that the duration of the programme should be determined by individual's achievement of competency but this has not yet been researched. Supervised sessions should be augmented by further daily home based sessions.

- Although physical training may be seen by some as the central focus of the programme, this needs to be accompanied by disease education and self-help advice, as within the research they are equally important.11,12

The education usually takes the form of topic-based talks and group discussions. Patients like written material as well as self-help plans and home training diaries.

- Since rehabilitation should be seen as part of the integrated COPD pathway, the opportunity can be taken to provide individuals with the specific physiotherapy, quit smoking, dietetic, occupational therapy or psychological support that they require.

- A psychologist is not essential but it is important that one of the sessions should address psychological issues. The team providing care would benefit from access to psychological advice to improve uptake by targeted patients. Up to 50% of PR programmes already include psychologist input routinely in some areas of the UK.9

An example of a programme is at Appendix 2.

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8. Should I commission maintenance programmes and repeat programmes?

There is marginal evidence for maintenance programmes run by the NHS post PR-programme, however patients themselves feel this is important and should be supplied and they are therefore provided in a number of places (see Appendix 2). There is also anecdotal evidence that people referred to mainstream gym programmes often do not continue due to the personal cost, and also due to lack of confidence to join with people who do not have COPD. There is much better evidence for the impact of repeat programmes, if a patient wishes – at one-yearly intervals. It should be based on an assessment, although in practice, the patient’s self assessment normally matches any professional assessment. US reimbursement is normally limited to 36 lifetime sessions; what is provided locally should be dependent on local need and availability of other services.

Where local walking and other schemes run by local patient groups and local authorities are available, these should be offered to “graduates” from the PR programmes.

9. How does PR differ from other activity advice?

[Adapted from IMPRESS, 2008 guide]

Maintenance of habitual physical activity has significant general health benefits. In patients with chronic lung disease, physical inactivity is common and is associated with cardiovascular and skeletal muscle de-conditioning, demotivation and functional decline. Retaining physical activity helps preserve patients' health status and is related to reduced risk of hospital admission. It is therefore desirable to encourage individual patients with lung disease to remain physically active. However, there is a distinction between encouraging an individual to remain active and the deliberate supervised therapeutic process of restoring function through the process of formal rehabilitation. This distinction is important to ensure that proper emphasis is placed upon the restorative nature of the rehabilitation programme rather than the maintenance health benefits of regular exercise. Pulmonary rehabilitation includes a variety of components that will not be available to those attending exercise programmes. These components are necessary to achieve the maximal health gains known to be possible with PR.

10. What about referral?

If there is already a programme locally, commissioners should review where referrals come from – is it mainly general practice or community services, or from the hospital? Ideally most people with COPD should be managed in primary care and therefore, with the exception of post-admission PR, referrals should come from GPs or their teams. Most areas now encourage general practice referral. Initially specialist referral was deemed necessary to ensure patients were medically optimised before referral, however the key issues is that patients are accurately diagnosed and optimally managed, not who refers. If, for example, you have commissioned a COPD discharge bundle [http://www.redhotirons.com/impress/impress_conference_2011.pdf], you might consider focusing on the referral routes from discharge. Referrers should aim to help a patient be ready to accept a referral, and should use language that conveys the message without being off-putting; it may be worth developing a local script. Most referrers tend to avoid over-emphasis on the word “exercise” and to overcome language problems we would advise showing pictures or a video [http://www.nhs.uk/Video/Pages/Pulmonaryrehabilitation.aspx] to explain. Expert patients can also help (Myhealth-London will be another source in December 2011).

Here is a suggestion from IMPRESS:

"Breathe better, feel good, do more"

Being with patients at a session of PR is a useful way to help referrers understand what they are sending their patients to do. Commissioners incentivising higher standards in primary care for COPD, might consider including evidence of attendance of the practice respiratory lead at a session. This can also act to establish key relationships between primary and secondary care teams.

*Thanks to Maria Buxton for this suggestion

11. What outcomes should commissioners expect?

The major benefits of rehabilitation come from the reversal of some of the secondary systemic effects that primarily result in skeletal muscle dysfunction. Three-quarters of patients will get a physical benefit after 3-4 weeks, but because PR is competence-based, others may take longer. Patients often consider it changes their life – it encourages them to confront fears and to make changes in their behaviour. Following a diagnosis of COPD many people are fearful of doing anything, especially exercise, that might make them get out of breath, and yet exercise will improve quality of life and activity.

The outcomes measured should include:

- A record for all starters and completers of smoking status and advice given (in whatever way is agreed locally). Note that this may not yet be a standard in some existing PR programmes.

- In addition, consider referral of smokers to stop smoking services - note that this may not yet be a standard in some existing PR programmes. However, a patient on the programme spends about two 2-hour sessions a week for 6 weeks. It would seem indefensible not to take the opportunity to help those who smoke to quit. NHS South West Essex expects 100% of smokers to be referred from the PR programme.

- A simple patient reported outcome measure (PROM) for use with pulmonary rehabilitation, rather than COPD services as a whole. There are a number of simple and validated tools. The interviewer-administered Chronic Respiratory Disease Questionnaire (CRQ) has been widely used. However two self-administered versions have been shown to be sensitive to change and less time consuming to administer. Recently the COPD assessment test (CAT) has also been shown to be simple and responsive to change. The Hospital Anxiety and Depression Scale (HADS) - http://www.gl-assessment.co.uk/health_and_psychology/resources/hospital_anxiety_scale/hospital_anxiety_scale.asp?css=1&gclid=CM3C09fG4awCFbQntAod4BznoQ. This scale is also sometimes used to identify those who may need additional support, rather than as an outcome measure of the core programme.

- Functional exercise capacity: of those entering the programme, 1 in 2 should have an improvement above the minimally clinical important difference in their exercise tolerance using a functional exercise test. We would advise that the Incremental Shuttle Walking Test (ISWT) is the most time-efficient. The alternative is the Six-Minute Walk Test. At the start of PR, either has to be done on two occasions within a week; with 30-minutes rest in between if done on the same day. However, by definition, the 6MWT takes 6 minutes per patient whereas the time for the incremental test varies depending on how long it takes the patient to become breathless or can no longer keep up with the beeps. In practice, it may take fewer than 6 minutes with some patients. The 6MWT is patient-paced, whereas the ISWT is externally-paced; the outcome of the ISWT also helps the healthcare professional to prescribe treadmill exercises where these are used. The Borg Scale for Rating of Perceived Exertion with Exercise or equivalent should accompany the exercise assessment to judge breathlessness and progress. NHS South West Essex includes this as part of the patient diary.

Individual outcomes should be reported back to the referrer with a copy to the GP.

12. What costs?

There is no tariff (in the English Payment by Results system) for PR. It is possible that in the future, instead of developing one, PR may be commissioned as part of a "year of care tariff"*, or equivalent. Meanwhile, the DH Commissioning Pack offers a way to model costs. The cost using the DH assumptions is £493 per completer and £216 for a non-completer. The costings of some existing services appear to vary from this. It can be adjusted depending on local assumptions and known costs. The model includes 1:1 pre- and post- assessment and all costs of the programme such as staffing (professional and administrative) with a ratio of staff:patients of 1:8 for exercise and 1:16 for education sessions, with a minimum of two supervisors in attendance one of whom must be a respiratory physiotherapist to supervise the exercise component (NB: greater staff: patient ratio is required if oxygen users are included); facilities (external facilities can cost about £35-40 per hour), staff transport and on-costs. As this model has not yet been tested in practice, we would encourage commissioners to work with providers to agree a feasible and affordable service. Commissioners should be clear how they would pay for patient transport, which will be essential for some patients. Some people with COPD should be eligible for generic patient transport options. Advocacy and interpreting costs should also be factored in if appropriate. Where programmes may include very disabled patients, the model may need to be adjusted to a higher staffing ratio. In some rural areas (eg Lothian) PR centres are connected by video for the education elements to reduce the costs of staff time and travel. PR uptake requires active marketing by clinicians to patients. Commissioners will need to agree who is responsible for this activity locally and if there are any associated costs.

13. Evaluation

Evaluation of bids

If you tender the provision of PR you need an evaluation framework and an evaluation process. In addition to asking bidders how they will meet the specification and at what cost, PR should be integral to a COPD service, and therefore you should ask:

- How will you communicate your information and integrate with other elements of the service (defined as how it feels to the patient)?
- Give examples of how you have integrated with other services in the past

PR services would be highly suitable for accreditation (like gastro-enterology services) that can then be an important part of the evaluation, but accreditation is not currently in place.

14. Key performance indicators (KPIs) and expectations

The way to protect patients is to ensure a good quality service and the way to achieve this is by actively commissioning the service against a specification and setting the right KPIs.

Commissioner performance

We would expect the commissioner to commission sufficient PR for the local need. Therefore, we offer some KPIs for the commissioner:

**Commissioner KPI1: know demand (community)** Commissioner can demonstrate that it has commissioned sufficient PR capacity for the percentage of population who are assessed as being at MRC3 or above in GP records (recorded by practices as part of QOF target COPD 13 but not reported), are optimally medically managed, and therefore eligible.

* A "year of care" tariff is in development with the DH England Long Term Conditions team as an alternative to the "Payment by Results" tariff. It is not yet formal policy. One use might be to agree a bundle of elements in a pathway for a particular long term condition and agree a tariff for that bundle. Ultimately it might reflect what a whole year of care might include. Refer to www.impressresp.com for further developments.
**Commissioner KPI2: know demand (acute)** Commissioner has the data available from the acute provider of an annual number of patients admitted for an exacerbation of COPD coded J44.1 and J44.2 in first or second position whose level of breathlessness is assessed as MRC2 or higher.

**Provider KPI**

**KPI Post-exacerbation referral to PR:** Percentage of patients admitted with COPD exacerbation coded J44.1 and J44.2 in first or second position who are referred to PR who have not previously done PR. (Note, that coding of COPD exacerbations is not consistent, and so should be audited before forming the foundation of a new KPI). It should be remembered that these patients might need considerable support to agree to PR. In London this has been included in the COPD discharge bundle developed by the NIHR CLAHRC in North West London and has also been adapted as a CQUIN: [http://www.london.nhs.uk/what-we-do/our-current-projects/london-respiratory-team/tools-and-resources](http://www.london.nhs.uk/what-we-do/our-current-projects/london-respiratory-team/tools-and-resources)

**KPI Referral rates:** The DH England specification models a referral rate of 40% of the total diagnosed COPD population. In some places it is hard to achieve these figures. Work in City and Hackney, London in a deprived, multi-ethnic population, suggests that it is not necessary to segment the population and have a large range of different programmes to suit each segment’s needs once the community has awareness of, and confidence in, PR.¹⁹ Videos such as NHS Choices [http://www.nhs.uk/Video/Pages/Pulmonaryrehabilitation.aspx](http://www.nhs.uk/Video/Pages/Pulmonaryrehabilitation.aspx), or taster sessions may be helpful in different settings; or the assessment could take place in the same location as the programme so patients can see what to expect. We would expect referrals to come from hospital clinicians managing people with COPD, practices at COPD reviews, and, depending on local provision, community services. Pulmonary rehabilitation services should be able to review where referrals come from and remedy gaps in referral through a variety of means including feedback of data, promotion, education and so on. This may need to be described in the specification.

**KPI Completion of assessment:** The DH England specification recommends 85% of those booked for assessment as an ambition. However, at present, figures are more usually 65%.

**KPI Completion rates of programme:** PR is an active therapy and therefore not everyone will want to participate or complete. It is also a programme for people with severe COPD who are reasonably likely to suffer an exacerbation and therefore miss sessions through sickness. Therefore the target of 75% completion, defined by the DH England is tough but reasonable. The current national average is less than 50%. An alternative definition is 4 out of 6 weeks of exercise, taken from evidence that at 4 weeks a beneficial effect will have been produced. This is likely to be best achieved using a rolling, rather than cohort programme. If a rolling programme is used we recommend that completion is defined as 75% complete within 3 months of starting.

**KPI outcomes**

**KPI Referral of smokers to stop smoking services:** Smoking prevalence of starters and completers and advice given. Number and as percentage of smokers who attend PR.

**KPI Patient reported outcome measure:** Improvement in scores (see paragraph 11)

**KPI Measure of mental health status:** (Hospital Anxiety and Depression (HAD) Scale) where appropriate: improvement in scores

**KPI Functional exercise capacity:** Improvement in scores by minimally clinically important difference

**KPI Readmissions:** We would expect the commissioner to monitor admission and readmission rates. However, there are many variables in relation to admissions and readmissions of long term conditions, including COPD and so this will not be easy. It needs to be done in conjunction with respiratory teams.

**KPI Patient satisfaction:** Using a validated survey tool

**KPI Waiting time:** This must comply with the referral to treatment targets in operation (currently 18 weeks in England). The DH England specification proposes 10 weeks from initial referral to assessment. This should be negotiated locally with commissioners. However, commissioners may want to specify shorter periods for people in the post discharge group, where there is evidence of a reduction in acute admissions.

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In order for there to be sufficient capacity to meet waiting time targets, the provider and commissioner may wish to review the figures in the DH model. This suggests that 40% of the COPD registered population would be eligible for COPD. We would advise checking local QOF data tested for robustness where possible to confirm this. The model builds up as follows:

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<tr>
<td>Numbers of COPD patients post-admission at MRC2</td>
<td>PLUS numbers disabled by COPD at MRC 3-5. The DH model combines this with column 1 to get an estimate of 40%. Note that GP registers may have a higher figure of 40-50% of patients recorded as MRC3-5 but not all will be optimally medically managed when their breathlessness is assessed therefore use a locally agreed figure</td>
<td>Multiplied by total likely to take up rehabilitation referral (70%)</td>
<td>Mechanism to cope with drop-outs and new entries from programme. Plan for figure in column 3 but only 50% may complete without improvements in the service to reduce drop-out – although aim for 75%</td>
</tr>
</tbody>
</table>

### 15. Coding

There is increasing emphasis on the importance of good quality electronic data to review clinical quality. The commissioners should require providers to deliver a reporting system that allows for both data extraction and linkage to GP systems. Currently coding of PR is poor. There is a treatment function code 342 and there are also Read codes but they need consistent use. Although it is feasible to document in a paper form, there are opportunities to code both referral, entry and completion, along with other parameters such as exercise capacity, smoking status and quality of life questionnaires. These issues need to be considered at the commissioning phase.

**Read Codes for Pulmonary rehabilitation for use in general practice and by community services with access to GP systems:**

- Pulmonary rehabilitation 8FA
- Pulmonary rehabilitation programme commenced 8FA1
- Pulmonary rehabilitation programme completed 8FA2
- Referral to pulmonary rehabilitation 8H7u
- Pulmonary rehabilitation declined 8IA9

### 16. To improve uptake

**Stratification**

We recommend stratification of patients with COPD by MRC score and multiple attempts to encourage those at greatest risk to enrol and complete a programme. Clinicians are interested if the DOSE index of severity is a useful tool here. We would argue that the MRC score (one of the four items within DOSE) is probably sufficient. It should already be recorded as part of QOF COPD 13. The commissioner would need to consider what the extra advantage was of applying the DOSE index to improve uptake.

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Financial incentives
Ultimately we would want a tariff based on best practice, year of care or bed days since this would capture the benefit of PR better, and offer a greater incentive to commission it. See paragraph 6 for details of a CQUIN in London. We are not aware of any other PR CQUINs, but it is a potential tool.

Outreach
We know which patients with COPD are admitted from the recent work of Sarah Purdy,21
• People living in deprived areas
• Smokers
• Areas with higher local acute hospital bed supply
• Proximity to emergency department
• Urban practices
• Higher prevalence
• Lower than average QOF scores

Whilst these factors are not necessarily an indication of severity of disease they may well indicate areas within the health care community where pulmonary rehabilitation should be made more available in comparison to other geographical areas. Similarly, language support may need to be considered in many areas. Commissioners will need assurance that all those eligible for PR are being helped to access it (including those less likely to be referred such as those who do not speak English or those with mental health problems) which will require agreement between commissioners, referrers and providers about where responsibilities lie.

Transport
Transport is often described by patients as a barrier to attendance. It should be explored whether this is the real reason rather a socially acceptable reason to explain a reluctance to attend. It would be sensible to agree how to address this locally, including access to generic transport schemes, budgets and venues that take account of public transport and parking. A course run in a place that patients cannot attend without great difficulty is a course that is likely to have a low completion rate and waste NHS resource.

Sustainability
Commissioners should consider how to engage referrers to ensure appropriate referral at a rate commensurate with service provision. This may involve targeting specialist and generalist clinicians with a variety of educational and reminder interventions to encourage this, including offering opportunities to visit the service. Similarly, many clinicians are persuaded by positive patient stories linked with good quality evidence and easy systems of referral to change their practice.22,23

Setting
Pulmonary rehabilitation has been successfully conducted in a number of settings. These include community facilities, hospital inpatient, hospital outpatient, even the patient’s own home. There does not appear to be any particular best solution. The choice of rehabilitation site is probably a matter for the local health community to decide after consideration of facilities, costs and geography. These decisions are not always straightforward. For example, more expensive hospital inpatient rehabilitation may be an acceptable solution when great distances are involved. Hospital outpatient rehabilitation may be cost effective but inaccessible if the transport links are poor. Home rehabilitation may be effective but lack the group support that some patients may need, and is intensive on staff time and may affect staff productivity unless innovative solutions are developed (eg TeleScot http://www.telescot.org/copd.html and Leicester http://www.lunguk.org/research_and_grants/researchprojectsreworked/researchprojects2006/canwemakeit). Many communities will require a multifaceted approach and send complex or severe cases to a hospital based programme and manage the majority in a community setting. The choice of setting for rehabilitation is a less important determinant of success than the application of an individually prescribed and appropriate content.

17. What might be the role for the use of personal budgets* and personal health budgets?

Personal budgets in social care, established in 1997, (http://www.parliament.uk/depositedpapers/2010/DEP2010-0810.pdf), now cover around 340,000 people receiving community-based services in England. Emerging evidence is they give more choice and improved outcomes for people than traditional commissioning, as well as better value for money. Personal health budgets have been piloted since 2009 and will be extended to all people receiving continuing care by 2014. There are clear opportunities for joint working between the NHS and social care.

Generic questions for commissioners responsible for commissioning respiratory services include: do you know the cost of the service being commissioned? What component is health care and what social care? Are you sure in using a personal budget there is a range of local services that people can choose from?

IMPRESS would argue that programmed quality-assured PR should be a mandatory element of a good COPD service, given its effect on mortality and morbidity, not an optional extra and it would not be cost-effective or realistic to offer a choice of suppliers. However, maintenance exercise might be a suitable candidate for a personal health budget.

Conclusions

Many areas will have some form of pulmonary rehabilitation in their healthcare community already and it is important to clarify the amount spent, the value and the outcomes that are currently achieved. Providers could audit their services against the DH England specification. When planning to commission a new service there are increasingly good estimates to inform commissioners, taking into account local geography and specific health needs.

There is no doubt that pulmonary rehabilitation improves the quality of life significantly in many who are significantly disabled – and can reduce hospital admission and death rates.

Therefore IMPRESS would recommend that pulmonary rehabilitation is a core component of quality COPD care in any healthcare community. Commissioners can learn from many examples around the UK, and adapt to local need.

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* Known as individual budgets in Scotland http://www.selfdirectedsupportscotland.org.uk/
APPENDIX 1

1. Impact on mortality – fuller information

There are three interventions that reduce mortality in COPD (stop smoking, LTOT and post-admission pulmonary rehabilitation):

To assess the effects of pulmonary rehabilitation after COPD exacerbations on future hospital admissions (primary outcome) and other patient-important outcomes (mortality, health-related quality of life and exercise capacity). Searches were current as of March 2010. We identified nine trials involving 432 patients. Pulmonary rehabilitation significantly reduced hospital admissions (pooled odds ratio 0.22 [95% CI 0.08 to 0.58], number needed to treat (NNT) 4 [95% CI 3 to 8], over 25 weeks) and mortality (OR 0.28; 95% CI 0.10 to 0.84), NNT 6 [95% CI 5 to 30] over 107 weeks). Effects of pulmonary rehabilitation on health-related quality of life were well above the minimal important difference when measured by the Chronic Respiratory Questionnaire (MD for dyspnea, fatigue, emotional function and mastery domains between 0.81 (fatigue; 95% CI 0.16 to 1.45) and 0.97 (dyspnea; 95% CI 0.35 to 1.58)) and the St. Georges Respiratory Questionnaire total score (MD -9.88; 95% CI -14.40 to -5.37); impacts domain (MD -13.94; 95% CI -20.37 to -7.51) and for activity limitation domain (MD -9.94; 95% CI -15.98 to -3.89)). The symptoms domain of the St. Georges Respiratory Questionnaire showed no significant improvement. Pulmonary rehabilitation significantly improved exercise capacity and the improvement was above the minimally important difference (six-minute walk test (MD 77.70 meters; 95% CI 12.21 to 143.20) and shuttle walk test (MD 64.35; 95% CI 41.28 to 87.43)). No adverse events were reported in three studies.


2. Impact on readmissions for COPD exacerbations

Referral to and timely availability of pulmonary rehabilitation has been shown to reduce the three-month readmission rate in COPD from 33% to 7%. To date this is the only intervention that has been shown to alter the very high 3-month readmission rate seen in COPD. The proportion of patients re-admitted to hospital with an exacerbation was 33% in the usual care (UC) group compared with 7% in those receiving post-exacerbation PR (PEPR). (OR 0.15, 95% CI 0.03 to 0.72, p=0.02). The proportion of patients that experienced an exacerbation resulting in an unplanned hospital attendance (either admission or review and discharge from the emergency department) was 57% in the UC group and 27% in those receiving PEPR (OR 0.28, 95% CI 0.10 to 0.82, p=0.02).


3. Cost-effectiveness

Griffiths et al. investigated the cost-effectiveness of an outpatient, multidisciplinary PR programme in Wales. "The programme resulted in an increase in the mean number of QALYs generated of 0.03 per patient (95% CI 0.002-0.058) per patient (p=0.03) ….The probability of the true incremental cost/utility ratio of the programme being below £0 per QALY is 0.64. The probability that the true cost per QALY is below £3000 is 0.74, the probability that the cost per QALY is below £10,000 is 0.90, and the probability that the cost per QALY is below £17 000 is 0.95. … Numbers needed to treat: dyspnoea (NNT = 2.3, cost £1730), fatigue (NNT = 2.5, cost £1880), emotion (NNT = 2.2, cost £1654), and mastery (NNT = 2.9, cost £2181).

APPENDIX 2

Example of a PR programme, from Tower Hamlets, London
Action East Cardio-respiratory rehabilitation

Our service provides self-help programmes for chronic respiratory conditions, heart failure and intermittent claudication. We are commissioned to provide pulmonary rehabilitation as part of the COPD pathway, although we accept people with any chronic respiratory disease. We have a service level agreement which is monitored by a monthly dashboard to ensure the service is meeting its targets and standards. Our service is designed around NICE, BTS and ATS/ERS guidelines and standards. We complete an annual audit to ensure we are meeting these standards.

We are a multidisciplinary team consisting of physiotherapists, psychology, OT, dietitian and bilingual support workers.

Our pulmonary rehabilitation programme is a rolling programme over 8 weeks. Each session lasts for 2 hours, the first hour is for tailored exercises and the second for a discussion session on subjects relating to living with breathlessness. We have printed literature to give out which covers all the topics in the education sessions, which ranges from smoking cessation to action plans.

The classes are held in community centres, church halls, GP surgeries, and local gyms as well as a hospital-based class. Patients are given a choice of venue at their assessment; they usually choose the closest venue or one on a bus route.

We run both a traditional circuit-based class and a tai chi plus endurance exercise class. This is because we have found some people do not want to participate in conventional exercises. Our results have shown the same results from both programmes.

Our exercises are all reproducible at home except for the exercise bike. This is due to the facilities available at each venue but also because people are more likely to exercise at home if they can follow the same programme as they do in the class.

The class consists of a warm up, 8 circuits, which include strength and endurance exercises and a cool down. Both warm up and cool down include stretches. Examples of the exercises include endurance walking, step-ups, sit to stand, bicep curls, punches and leg extensions.

Patients are referred by GPs, consultants, practice nurses, respiratory team or any health professional. The majority of our referrals come from GPs.

Our referral form asks for optimisation of medical management prior to starting.

We complete an assessment for each individual asking for their PMHX, recent spirometry, current medications etc.

Our outcome measures include
- Incremental shuttle walk test or 6 minute walk test
- Chronic respiratory questionnaire self reported
- Hospital anxiety and depression scale
- MRC breathlessness score and Borg breathlessness score
- Physiological measures BP, HR, pulse oximetry
- Individual goals identified and met
- Patient satisfaction survey.

We also provide a home programme for people who are unable to leave their house. This is more goal-oriented and is aimed at encouraging people to join one of the group sessions.

We do run an 8-week, once weekly maintenance class post rehab which includes only exercise and then people are signposted to local leisure activities.

Ange Price, Barts and the London NHS Trust
APPENDIX 3 – Example of dashboard report.

Thanks to Ange Price and colleagues, Barts and the London NHS Trust.
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