

National COPD Audit Programme



Pulmonary rehabilitation: An exercise in improvement

National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme:
Clinical and organisational audits of
pulmonary rehabilitation services in
England and Wales 2017

**National report
April 2018**

Prepared by:



**Royal College
of Physicians**

In partnership with:



**British
Thoracic
Society**

Commissioned by:



Working in wider partnership with:



Royal College of
General Practitioners

The Royal College of Physicians

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Royal College of Physicians

Care Quality Improvement Department
11 St Andrews Place
Regent's Park
London NW1 4LE

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REPORT AT A GLANCE

GO!

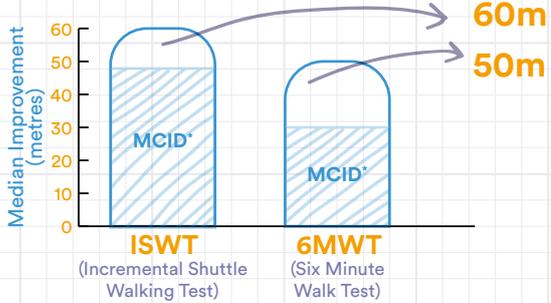
PARTICIPATION

7,476 patients included in the clinical audit from 184 services (79% of all eligible patients)

187 services included in organisational audit (96% of all eligible organisations)

GOOD NEWS!

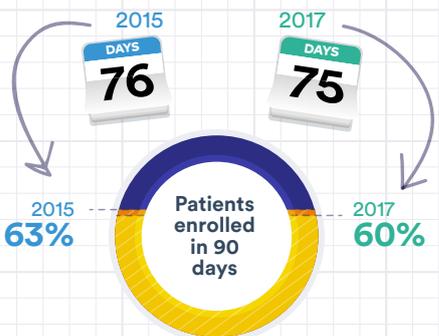
Clinical outcomes from patients who complete therapy remain excellent



Enrolment to PR within 90 days of receipt of referral is a nationally agreed quality standard

ACCESS TO PR

1



NATIONAL QI AIM

Services should endeavour to enrol **85%** of those referred for PR within 90 days

2

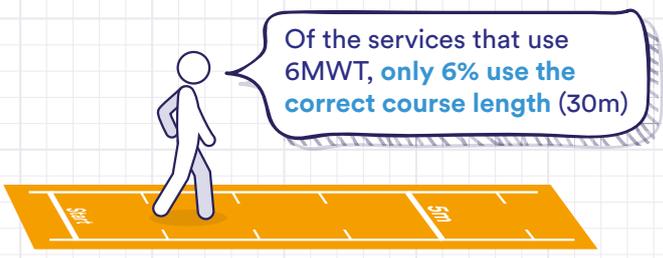
QUALITY OF PR SERVICES

68% of patients do not complete a recommended practice exercise test



NATIONAL QI AIM

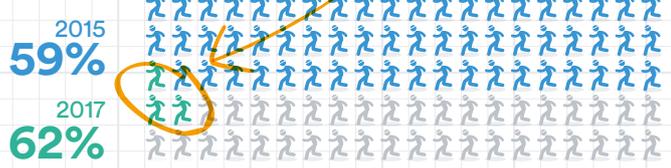
Services should ensure **all exercise assessments** are performed to accepted technical standards



Overall completion of PR programmes has improved

OUTCOMES OF TREATMENT

3



NATIONAL QI AIM

Services should aim for patient completion rates of **70%** or more following assessment for PR



*Minimal clinically important difference

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How to use this report

This report outlines the summary findings of the second round of the pulmonary rehabilitation (PR) component of the National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme, which comprises snapshot audits of:

- the resources and organisation of PR services across England and Wales conducted between 3 January and 28 April 2017
- the process and clinical outcomes of treatment in patients with COPD assessed for PR between 3 January and 31 March 2017.

The report summarises key findings, mapped to the appropriate [2014 British Thoracic Society \(BTS\) Quality Standard \(QS\)](#)¹ where relevant, and priorities for quality improvement (QI) presented under three broad categories:

- access to PR
- quality of PR services
- outcomes of treatment.

More detailed recommendations and QI opportunities are also provided for:

- patients and carers/families
- PR services
- primary and secondary care providers
- system leaders such as commissioners and sustainability and transformation partnerships (STPs).

The full methodology and data analysis for these audits can be found in two online data reports, www.rcplondon.ac.uk/an-exercise-in-improvement. All of the results highlighted in this report are followed by references directing the reader to either the clinical audit analyses and results (CDAR) or the organisational audit analyses and results (ODAR). Although these data are available to the interested reader, it is not necessary to review them to appreciate the key messages. The data are presented largely in tabular form, with explanatory notes throughout.

Direct comparisons with the 2015 audits^{2,3} are provided where possible and relevant.

Nationally benchmarked results for individual PR services have been provided within the online data reports www.rcplondon.ac.uk/an-exercise-in-improvement. The indicators chosen are in support of the recommendations made within this report in addition to aligning with national guidelines and standards. These data will also be made publicly available on www.data.gov.uk, in line with the government's transparency agenda.

Summary

Pulmonary rehabilitation (PR) is one of the most effective and high value interventions for people suffering with COPD.⁴ In this report we present the second round of both clinical and organisational PR audits, which follow the first rounds conducted in 2015.^{2,3} Both the current and 2015 audits measured performance against the 2013 BTS clinical guidelines⁵ and quality standards¹ (provided in full in [Appendix A](#)).

The 2015 audits demonstrated the substantial and clinically important health benefits associated with completion of PR, including a reduced risk of subsequent admission to hospital.⁶ However, they also emphasised the key problem of under-referral and non-completion of PR. For example, approximately 40% of patients assessed for PR did not go on to complete the treatment course.³ Deficiencies in some care processes were also identified in the 2015 audits, for example, the number of patients that performed a practice exercise test at PR assessment was low (only 26% for the incremental shuttle walk test (ISWT) and 24% for the 6-minute walk test), despite evidence that outcomes are worse for patients who do not undertake one.^{3,7,8}

The 2017 audit reiterates the successes of PR services in England and Wales in delivering considerable health benefits such as improvements in exercise performance and health status, for patients who complete treatment. It also highlights some key successes; rates of completion have improved marginally to 62% in 2017 compared with 59% reported in 2015. There have also been improvements in provision of written discharge exercise plans (84% in 2017 versus 65% in 2015), the assessment of muscle strength (27% in 2017 versus 15% in 2015) and in the numbers of programmes with a written standard operating procedure (84% in 2017 versus 67% in 2015). However, the findings also highlight the need for improvement in care delivery and outcomes. Therefore, in this report we **recommend actions** that PR services, primary care and hospital teams and system leaders should take to address these needs. We also identify **three national quality improvement targets** relating to waiting times for PR, conduct of exercise assessments and completion rates.

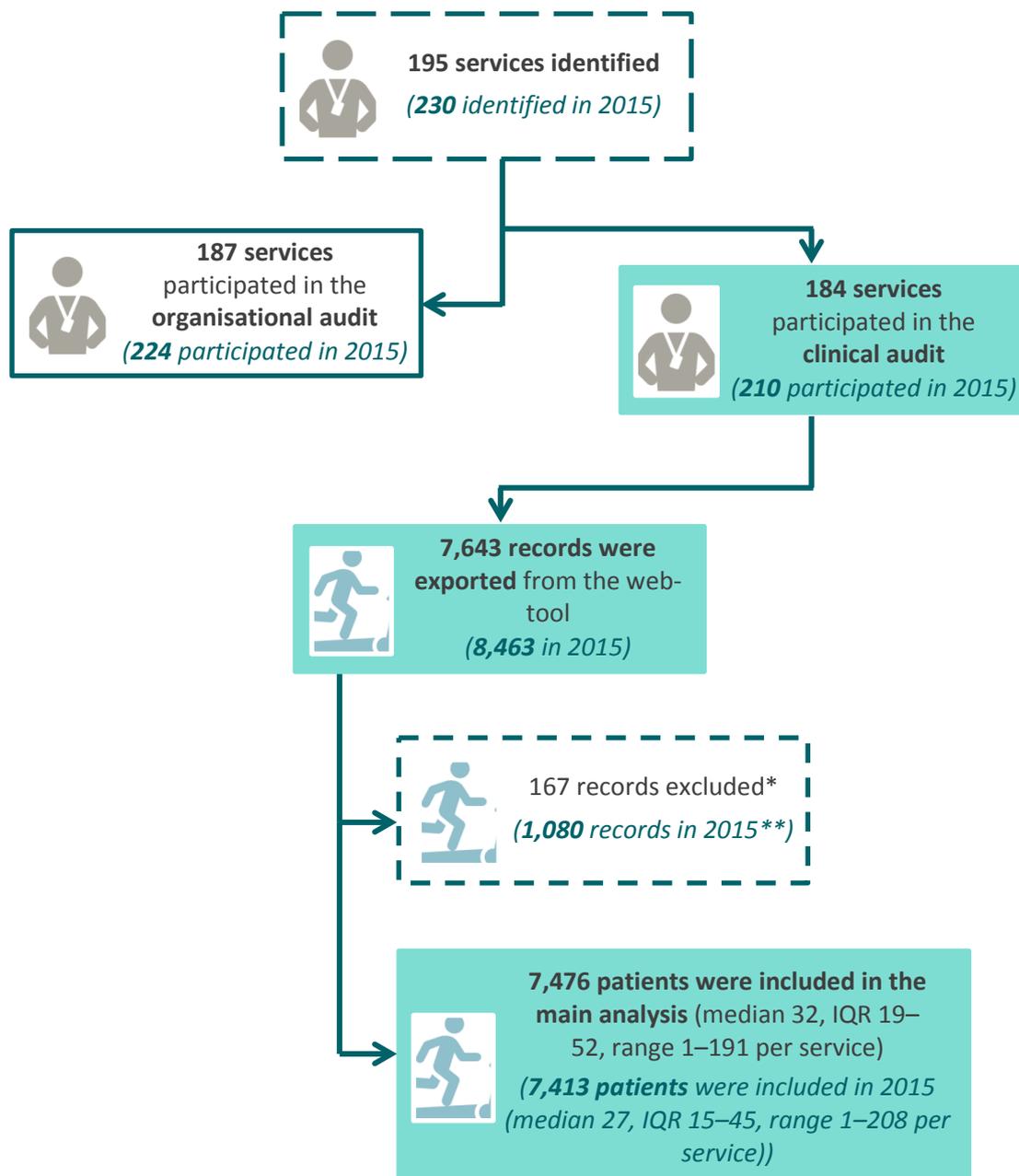
We believe that the improvement targets we have set are achievable by PR services with the support of local system leadership. If these are achieved they will enhance access to treatment, improve the quality of care and deliver significant benefits to patients and the NHS.

Results and quality improvement priorities



Participation

All identified PR services in England and Wales were invited to participate in both the organisational and clinical audits of PR. An [interactive map](#) of PR services in England and Wales was developed as part of the PR service recruitment process.⁹ In keeping with the methodology for the 2015 audit, individual patient consent was required to permit identifiable data to be uploaded to the audit.¹⁰



* In the 2017 audit, records were excluded as follows: 96 because they were duplicates, 61 because they were earlier dates for PR, 3 because they were later dates for PR, and 8 because the record was almost entirely incomplete.

** In the 2015 audit, records were excluded as follows: 1,056 were duplicates for use in a reliability analysis, 17 because they were triplicates, and 7 because they were later dates for PR.



Access to PR

To see the data analysis in full, please access the data analysis and results reports available at www.rcplondon.ac.uk/an-exercise-in-improvement.

Key findings

- **Waiting times** for enrolment to PR from receipt of referral are similar to those reported in the 2015 audit and remain too long for such an effective and high value therapy:
 - The median waiting time was **75 days**, with 60% (4,213/6,965) of patients enrolled within 90 days in 2017, compared with 2015 when a median waiting time of 76 days was reported with 63% (3,800/5,986) enrolled within 90 days (**QS1¹**). (CDAR, 1.9.1)
 - There was an increase in the proportion of patients being enrolled to **rolling programmes**; 58% (4,116/7,051) in 2017, compared with 53% (3,357/6,319) in 2015. (CDAR, 1.10)
 - Waiting times remained longer for **cohort programmes** (median of **89 days**) compared with those of **rolling programmes** (median of **66 days**). (CDAR, 1.10.1)
- **29%** of services did not offer early post-discharge PR for patients following discharge from hospital for acute exacerbation of COPD (AECOPD). Possibly as a result, post-exacerbation PR (vs PR for patients with stable COPD) remained a very small proportion of PR service caseloads (3%) (**QS3¹**). (ODAR, 1.5)
- It is encouraging that the vast majority of services (**92%**, 172/187) **accepted those patients with more severe disability** and self-reported breathlessness MRC grade 5* compared with **81%** in 2015 (182/224) (**QS1¹**). A minority of services (**5%**, 9/187) continued not to accept active smokers. (ODAR, 1.1, 1.2)
- The majority of services accepted patients with **conditions other than COPD** (eg asthma, lung cancer, heart failure), however, a small number (**5%**, 9/187) continued not to (**QS2¹**). (ODAR, 1.4)
- Services estimated that 33% of referrals for 2015/16 did not attend an initial PR assessment.
- 19% (31/167) of services were operating under a fixed term of funding. In 60% (18/30) the funding term was for 2 years or less. (ODAR, 4.2, 4.2.1)
- There was a reduction in the **whole-time equivalent (WTE) staffing levels** per service. A median of **2.53 staff** was reported for 187 services in 2017, compared with a median of **2.90 staff** for 224 services in 2015. (ODAR, 5.3.2)
 - 23% of PR service leads did not have protected management time within their jobs to devote to service development and leadership. (ODAR, 5.2)
- Ratios of total referrals and total initial assessments per staff increased:
 - Median **total referrals per 1.0 WTE was 134**, compared with 104 in 2015.
 - Median **total initial assessments per 1.0 WTE was 89**, compared with 70 in 2015. (ODAR, 5.3.2)

*Medical Research Council breathlessness scale measuring perceived respiratory disability



QI priority: Reduce waiting times for enrolment to PR (from receipt of referral) with an achievement target of 85% of patients being enrolled within 90 days for each PR programme.

How this priority was derived:

The BTS quality standard 1b states that people referred for pulmonary rehabilitation should be enrolled on PR within 3 months of receipt of referral.¹ The current audit indicates that patients referred for PR often had to wait too long for treatment. We note also the high risk of admission to hospital among the population assessed for PR (approximately 30% at 6 months). Reducing waiting times will lower the risk of admission impeding uptake of the referral. This is of potential high importance given that the completion of PR was associated with reduced subsequent risk of admission to hospital.⁶

This aim may appear challenging for some services, but the upper 25% of services for this outcome enrolled **88% or more of referred patients within 90 days**. This is therefore an achievable target for all programmes, which will deliver substantial benefits to patients.⁶

Tips on how to achieve this:

Although cohort[†] programmes had similar outcomes to rolling[‡] programmes, they had significantly longer waiting times. We therefore suggest that services that solely run cohort programmes and struggle with waiting times consider a change to a rolling design (or to a combination of the two) to deliver this objective.



Quality of PR services

To see the data analysis in full, please access the data analysis and results reports available at www.rcplondon.ac.uk/an-exercise-in-improvement.

Key findings

- Conduct of exercise testing by the majority of programmes was not in line with accepted standards (**QS8**¹):
 - Numbers of patients that had a practice exercise test remained low (<50%). There was however an improvement in the number of practice **ISWTs** performed; **39%** (1,369/3,551) in 2017 compared with 26% (1,004/3,811) in 2015. These figures did not improve for the 6-minute walk test (6MWT); **26%** (822/3,181) in 2017, compared with 24% (668/2,835) in 2015. (CDAR, 2.11.1)
 - Of those programmes using the 6MWT, only 6% (8/127) were using the recommended walking course length of 30m or more. (ODAR, 2.7.2)

[†] A cohort programme is where all patients start and finish the programme at the same time.

[‡] A rolling programme is a continuing cycle of sessions, with patients joining when there is a space and leaving after completing a programme of sessions.

- **10%** (18/184) of services did not offer **individually prescribed aerobic[§] or resistance^{**} training** and an additional **30%** (55/184) estimated exercise intensity only from perceived exertion score^{††} (**QS5¹**). (ODAR, 2.4.1)
- **84%** (157/186) of services in 2017 reported routinely providing a **written discharge exercise plan**, which is notably better than the **65%** (145/224) reported in 2015. (ODAR, 3.5)
 - Data analysed from the clinical audit supports this finding, with **81%** (3,739/4,637) of patients provided with a written exercise discharge plan, compared with **73%** (3,198/4,353) in the 2015 audit (**QS7¹**). (CDAR, 4.1.2)
- **27%** (2,006/7,476) of patients had an **assessment of muscle strength** at baseline; this has improved considerably since the 2015 audit, where only **15%** (1,094/7,413) was reported. (CDAR, 2.14)
- The recording of key clinical information such as body mass index (BMI) and spirometry did not significantly change since the 2015 audit:
 - **BMI** was reported for **70%** (5,259/7,476) of patients in 2017, compared with **66%** (4,898/7,413) in 2015. (CDAR, 2.9)
 - **Spirometry** was reported for **60%** of patients in both 2017 and 2015 audits. (CDAR, 2.4 to 2.6)
- It is encouraging that more services had a standard operating procedure detailing local policies; **84%** (157/187) in 2017, compared with **67%** (150/224) in 2015 (**QS10¹**). (OADR, 6.1)



QI priority: Each PR service should ensure that *all* exercise assessments are performed to recommended technical standards. This includes the routine conduct of practice walks and the use of walking course lengths appropriate to the test used.

How this priority was derived:

Accurate measurement of baseline is critical for exercise prescription and outcome assessment. However, only a minority of programmes undertook a practice test for the ISWT or the 6MWT. Data from the 2015 audit suggest that overall outcomes of PR were better in programmes that undertook practice walks during testing.¹¹ Importantly, if patients were asked to undertake tests as part of their treatment, it is expected that such tests would be conducted according to recommended standards. This will ensure such assessments are reliable, ensure exercise training can be accurately prescribed, and that outcome assessments following PR are unbiased.

Tips on how to achieve this:

Space limitations may restrict walking course lengths for the 6MWT. For programmes where this is the case, consider a switching to using the ISWT, which requires only a 10m course.

[§] Aerobic training refers to endurance (or submaximal) whole body exercise most commonly performed using walking (treadmill or corridor) or on an exercise bike.

^{**} Resistance (or strength) training refers to the generation of force by specific muscle groups (either free weights or using a multi-gym) with the aim of improving muscle strength.

^{††} This data cannot be directly compared with data from the 2015 audit as the question was rephrased in the 2017 audit.



Outcomes of treatment

To see the data analysis in full, please access the data analysis and results reports available at www.rcplondon.ac.uk/an-exercise-in-improvement.

Key findings

- **Overall rates of completion** of the PR programme have improved; **62%** (4,637/7,476) of patients completed in 2017, compared with 59% (4,353/7,413) in 2015. (CDAR, 4)
- **Clinical outcomes of treatment** (proportions meeting minimal clinically important differences (MCID) for the relevant exercise capacity and health status measures) for patients who complete therapy **were excellent**, as per those seen in clinical trials.¹² The table below provides more information. (CDAR, 4.3.2)

	Patients (n)	Difference between initial assessment and discharge, median (IQR) change	Patients achieving the MCID or higher (%)
Walk tests			
ISWT (m)	2,324	60 (20, 100)	58% (≥ 48 metres)
6MWT (m)	1,989	50 (20, 90)	68% (≥ 30 metres)
St George's Respiratory Questionnaire (SGRQ)			
Total score	248	-5 (-13, 2)	54% (≥ 4 points)
Chronic Respiratory Questionnaire (CRQ) average scores			
Dyspnoea	1,801	0.8 (0, 1.6)	61% (≥ 0.5 points)
Fatigue	1,768	0.7 (0, 1.5)	59% (≥ 0.5 points)
Emotion	1,767	0.5 (0, 1.3)	53% (≥ 0.5 points)
Mastery	1,767	0.5 (0, 1.5)	56% (≥ 0.5 points)
COPD Assessment Test (CAT)			
Total score	2,927	-2 (-6, 1)	56% (≥ 2 points)

- There was no significant difference in clinical outcomes between patients enrolled on cohort programmes compared with rolling programmes. (CDAR, 4.6.4)



QI priority: PR programmes should achieve patient completion rates of 70% or more following assessment for PR.

How this priority was derived:

There are substantial patient-centred benefits of completing PR, namely a marked improvement in exercise capacity and health status. However, the audit highlights significant patient dropout rates between referral for PR and the assessment appointment, as well as between assessment and completion (38%).

The 2015 PR outcomes report demonstrated that PR completion was associated with lower

Tips on how to achieve this:

There are actions programmes can take to influence completion rates. PR services should review their completion rates in detail, identifying and assessing factors resulting in non-completion. For example, reducing waiting times between assessment and enrolment to PR (**QI priority 1**) could in turn assist with achievement of this key priority.¹³

We suggest that PR services develop systems/checklists to identify patients at high

hospital admission rates at 180 days. Enhancement of completion rates therefore has the potential for substantial health benefit to patients and to the NHS.⁶

The upper quartile of completion rates for PR programmes across the audit in 2017 was 75% or higher, so this is an achievable target for all programmes.

risk of exacerbation and hospital admission, for example those with previous admissions, active smokers, or with more advanced disease. PR services should work in partnership with local specialist and/or community COPD teams to ensure evidence-based exacerbation prevention strategies are implemented (for example, ensuring correct diagnosis, optimising drug treatment, managing comorbidities and promoting smoking cessation and winter vaccination) as these may also be effective in enhancing PR completion rates.¹¹

QI case study

Below is an example of a small test of change^{14,15} implemented by BreathingSpace, Rotherham to improve their patient completion rates (QI priority 3).



Developing a new patient information leaflet to raise awareness of pulmonary rehabilitation

BreathingSpace, Rotherham

Background

Results from the 2015 PR audit showed that BreathingSpace, Rotherham reported that **11% of patients who were assessed were then not enrolled to PR**. Therefore, to take steps to reduce dropout rates BreathingSpace utilised a communication tools quality improvement methodology.

Aim

Evidence suggests that one of the reasons for non-attendance and non-completion is uncertainty and a lack of understanding of the benefits of PR.^{11,16}

To increase patient uptake and completion of PR by providing patients, their families and carers with clear, comprehensive and consistent communication which is focused on improving the quality of the care they receive.

Process

An outdated information leaflet was being used across the trust. It was recognised that the leaflet lacked patient input and did not address the aspects of PR that patients felt were most important.

A patient focus group was conducted with those patients already engaged with PR to help understand what they expected the leaflet to explain and to include any concerns that they had prior to attending PR. It was recognised that some patients were unsure about what the term 'rehabilitation' would involve, so this was identified as a potential barrier to uptake. In addition to the focus group, telephone interviews were conducted with patients who had been identified as having either declined after the initial assessment or enrolled and not completed PR. Both these methods helped to broaden the depth of information that was included in the leaflet.

Outcomes

The new patient information leaflet was distributed trust-wide. **Its success can be measured by the reduction in the percentage of patients assessed for PR, who were then not enrolled on a course**. Results from the 2017 audit showed that **only 2% of patients** fell into this category at BreathingSpace, Rotherham (compared with 11% reported in the 2015 audit). Patients who received the leaflet and healthcare professionals providing it were asked to rate the value of its effectiveness. Results showed that 80% of patients rated the leaflet as 'useful' or 'very useful'. 85% of health and care professionals rated it as a useful tool to issue to patients when introducing the idea of referral to PR. Governance procedures have been put in place to routinely review and revise the document. Copies of the outdated leaflet have now been withdrawn.



Recommendations

Patients and carers/families

- If your **breathing** is preventing you from **undertaking normal physical tasks** (such as walking on flat ground), or if you have been admitted to hospital for a flare-up of your COPD, ask any **healthcare professional involved with your respiratory care to refer you to PR.**
- You should expect to start **PR treatment within 90 days** of the service **receiving your referral.**

PR programmes

- **All patients referred for PR** should be enrolled to the programme **within 90 days of receipt of the referral (QI priority 1).**
 - PR services that solely run **cohort programmes** could consider **switching to rolling programmes** (or using a combination of both) to reduce waiting times.
- **Care processes** should be reviewed to ensure that they meet **BTS guidelines and quality standards.** Particular attention should be paid to ensure that:
 - **exercise testing** at assessment is performed to **accepted standards (QI priority 2)**
 - **exercise training** is **accurately prescribed** from an exercise test performed at assessment
 - patients are provided with a **written, individualised exercise plan at discharge from PR.**
- Patients at **high risk of exacerbation** and **hospital admission** should be **identified at assessment for PR** and evidence-based **exacerbation prevention strategies** implemented by **developing integration and referral pathways.** Key interventions may include:
 - ensuring **correct diagnosis**
 - promoting **smoking cessation** and **vaccination**
 - optimising **drug therapy**
 - managing **comorbidities.**

Primary and secondary healthcare teams

- Practices should **review COPD registers** to ensure **all eligible patients** are **offered PR** and that this offer is considered at each **annual review.**
- **Hospital discharge teams** should ensure that **local discharge care bundles** include the offer of **early post-discharge PR**, accompanied by **information about the benefits of PR.**
- **Hospital and community specialist COPD healthcare teams** should work with PR programmes to arrange **review of individual patient exacerbation prevention measures.**

System leaders (clinical commissioning groups/STPs)

- Should ensure that PR services receive **funding of sufficient quantity and duration** to enable them to **recruit and retain highly trained staff** and develop processes to ensure that **all patients are enrolled to PR within 90 days of receipt of referral.**
- Should ensure that there is an **accessible PR service** that can offer **early post-discharge PR** for patients leaving hospital after an **exacerbation of COPD.**
- Prioritise measures to **enhance referral and completion of PR**, including developing **integrated referral pathways** between PR services and other healthcare teams managing COPD.

Additional quality improvement opportunities

For PR services

- Record baseline exercise measures accurately (QI priority 2) and record exercise intensity prescribed during PR, including how it is calculated. If resistance exercise training is undertaken, record maximum strength and ensure it is measured at baseline, including how the resistance training loads are calculated.
- Review discharge assessment processes and ensure the provision of a discharge exercise plan is included and recorded.
- Develop referral pathways in collaboration with specialist hospital or community COPD teams in order to facilitate engagement in implementing exacerbation prevention strategies.

For primary and secondary healthcare teams

- Review practice COPD registers to ensure that all patients with significant exercise limitation (MRC grade 3 or worse) have had a proactive offer of PR. Record referral rates for PR on patient records and set specific targets for improvement.
- Include referral to PR as part of your discharge care bundle for AECOPD and record these referral rates. If patients choose to decline PR when leaving hospital, recommend that the offer is made again later (during or following recovery) by healthcare teams that are taking over care after discharge, and record that this recommendation has been made.

For system leaders

- Discuss resource needs directly with local programme leads and develop business plans to deliver these resources. Support participation in ongoing audits to demonstrate that these resources are meeting local and national QI objectives and delivering improvements in patient care.

Appendix A: BTS Summary of Quality Standards for Pulmonary Rehabilitation in Adults (2014)

No.	Quality statement
1	Referral for pulmonary rehabilitation: a. People with COPD and self-reported exercise limitation (MRC dyspnoea 3–5) are offered pulmonary rehabilitation. b. If accepted, people referred for pulmonary rehabilitation are enrolled to commence within 3 months of receipt of referral.
2	Pulmonary rehabilitation programmes accept and enrol patients with functional limitation due to other chronic respiratory diseases (for example bronchiectasis, ILD and asthma) or COPD MRC dyspnoea 2 if referred.
3	Referral for pulmonary rehabilitation after hospitalisation for acute exacerbations of COPD: a. People admitted to hospital with acute exacerbations of COPD (AECOPD) are referred for pulmonary rehabilitation at discharge. b. People referred for pulmonary rehabilitation following admission with AECOPD are enrolled within 1 month of leaving hospital.
4	Pulmonary rehabilitation programmes are of at least 6 weeks duration and include a minimum of twice-weekly supervised sessions.
5	Pulmonary rehabilitation programmes include supervised, individually tailored and prescribed, progressive exercise training including both aerobic and resistance training.
6	Pulmonary rehabilitation programmes include a defined, structured education programme.
7	People completing pulmonary rehabilitation are provided with an individualised structured, written plan for ongoing exercise maintenance.
8	People attending pulmonary rehabilitation have the outcome of treatment assessed using as a minimum, measures of exercise capacity, dyspnoea and health status.
9	Pulmonary rehabilitation programmes conduct an annual audit of individual outcomes and process.
10	Pulmonary rehabilitation programmes produce an agreed standard operating procedure.

British Thoracic Society. *BTS quality standards for pulmonary rehabilitation in adults*. London: BTS, 2014.

www.brit-thoracic.org.uk/standards-of-care/quality-standards/bts-pulmonary-rehabilitation-quality-standards/

Appendix B: Document purpose

Document purpose	To disseminate the results of the national clinical and organisational audits of pulmonary rehabilitation services in England and Wales 2017.
Title	<i>Pulmonary rehabilitation: An exercise in improvement. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Clinical and organisational audits of pulmonary rehabilitation services in England and Wales 2017.</i>
Authors	Steiner M, McMillan V, Lowe D, Saleem Khan M, Holzhauer-Barrie J, Mortier K, Riordan J, Roberts CM (on behalf of the National COPD Audit Programme: pulmonary rehabilitation workstream)
Publication date	12 April 2018
Audience	Healthcare professionals, NHS managers, chief executives and board members, service commissioners, policymakers, COPD patients, their families/carers, and the public.
Description	<p>This is the fourth of the COPD pulmonary rehabilitation audit reports, and the first reporting on data collected in 2017, published as part of the National COPD Audit Programme.</p> <p>This combined report details national data relating to the resources and organisation of PR services across England and Wales in 2017 and the clinical outcomes of treatment in patients with COPD assessed for PR between January and April 2017. It also documents attainment against relevant pulmonary rehabilitation guidelines and quality standards as published by the British Thoracic Society (BTS) in 2013 and 2014.</p> <p>The report is relevant to anyone with an interest in COPD. It provides a comprehensive picture of pulmonary rehabilitation services, and will enable lay people, as well as experts, to understand how PR services function currently, and where change needs to occur.</p> <p>The information, key findings and recommendations outlined in the report are designed to provide readers with a basis for identifying areas in need of change and to facilitate development of improvement programmes that are relevant not only to pulmonary rehabilitation services, but also to commissioners and policymakers. There is no scheduled review date for the report.</p>
Supersedes	<ul style="list-style-type: none"> Steiner M, Holzhauer-Barrie J, Lowe D, Searle L, Skipper E, Welham S, Roberts CM. <i>Pulmonary Rehabilitation: Time to breathe better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Resources and organisation of Pulmonary Rehabilitation services in England and Wales 2015. National organisational audit report.</i> London: RCP, November 2015. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-time-breathe-better Steiner M, Holzhauer-Barrie J, Lowe D, Searle L, Skipper E, Welham S, Roberts CM. <i>Pulmonary Rehabilitation: Steps to breathe better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Clinical audit of Pulmonary Rehabilitation services in England and Wales 2015. National clinical audit report.</i> London: RCP, February 2016. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-steps-breathe-better Steiner M, McMillan V, Lowe D, Saleem Khan M, Holzhauer-Barrie J, Van Loo V, Roberts CM. <i>Pulmonary rehabilitation: Beyond breathing better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Outcomes from the clinical audit of pulmonary rehabilitation services in England 2015.</i> London: RCP, December 2017. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-beyond-breathing-better
Contact	pulmrehab@rcplondon.ac.uk

Appendix C: References

- 1 British Thoracic Society. *BTS quality standards for pulmonary rehabilitation in adults*. London: BTS, 2014. www.brit-thoracic.org.uk/standards-of-care/quality-standards/bts-pulmonary-rehabilitation-quality-standards/ [Accessed January 2018].
- 2 Steiner M, Holzhauser-Barrie J, Lowe D, Searle L, Skipper E, Welham S, Roberts CM. *Pulmonary Rehabilitation: Time to breathe better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Resources and organisation of Pulmonary Rehabilitation services in England and Wales 2015*. National organisational audit report. London: RCP, November 2015. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-time-breathe-better [Accessed January 2018].
- 3 Steiner M, Holzhauser-Barrie J, Lowe D, Searle L, Skipper E, Welham S, Roberts CM. *Pulmonary Rehabilitation: Steps to breathe better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Clinical audit of Pulmonary Rehabilitation services in England and Wales 2015*. National clinical audit report. London: RCP, February 2016. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-steps-breathe-better [Accessed January 2018].
- 4 British Thoracic Society Reports, Vol 4, Issue 2, 2012. IMPRESS Guide to the relative value of COPD interventions. www.respiratoryfutures.org.uk/knowledge-portal/impress-documents/guide-to-the-relative-value-of-copd-interventions/ [Accessed January 2018].
- 5 British Thoracic Society. *BTS guideline for pulmonary rehabilitation in adults*. London: BTS, 2013. www.brit-thoracic.org.uk/standards-of-care/guidelines/bts-guideline-on-pulmonary-rehabilitation-in-adults/ [Accessed January 2018].
- 6 Steiner M, McMillan V, Lowe D, Saleem Khan M, Holzhauser-Barrie J, Van Loo V, Roberts CM. *Pulmonary rehabilitation: Beyond breathing better. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Outcomes from the clinical audit of pulmonary rehabilitation services in England 2015*. National supplementary report. London: RCP, December 2017. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-beyond-breathing-better [Accessed January 2018].
- 7 Dyer F, Marriner P, Cheema K and Bott J. Is a practice incremental shuttle walk test really necessary? *Chron Respir Dis* 2001;8(3):201–205. doi: 10.1177/1479972311415128 <http://journals.sagepub.com/doi/pdf/10.1177/1479972311415128> [Accessed January 2018].
- 8 Griffiths TL, Burr ML, Campbell IA, et al. Results at 1 year of outpatient multidisciplinary pulmonary rehabilitation: a randomised controlled trial. *Lancet* 2000;355:362–8 <https://pdfs.semanticscholar.org/4059/328b782e144d96442633654bd88c0c07dc11.pdf> [Accessed January 2018].
- 9 Pulmonary rehabilitation site locations map. www.nacap.org.uk/nacap/welcome.nsf/map.html [Accessed January 2018]
- 10 Pulmonary rehabilitation workstream: audit resources. www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-workstream-audit-resources [Accessed January 2018].
- 11 Hakamy A, McKeever TM, Steiner MC, Roberts CM, Singh S.J and Bolton CE. The use of the practice walk test in pulmonary rehabilitation program: National COPD Audit Pulmonary Rehabilitation Workstream. *Int J Chronic Obstr Pulm Dis* 2017;12:2681–6. www.dovepress.com/the-use-of-the-practice-walk-test-in-pulmonary-rehabilitation-program-peer-reviewed-article-COPD [Accessed November 2017].
- 12 Puhan MA, Gimeno-Santos E, Cates CJ, Troosters T. Pulmonary rehabilitation following exacerbations of chronic obstructive pulmonary disease. *Cochrane Database Syst Rev* 2016;12 <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005305.pub4/full> [Accessed September 2017].

13 Keating A, Lee A, Holland AE. What prevents people with chronic obstructive pulmonary disease from attending pulmonary rehabilitation? A systematic review. *Chron Respir Dis* 2011;8(2):89–99. doi: 10.1177/1479972310393756.

14 Institute for Quality Improvement. Science of improvement: Testing changes. www.ihq.org/resources/Pages/HowtoImprove/ScienceofImprovementTestingChanges.aspx [Accessed December 2017].

15 Royal College of Physicians. COPD audit: regional QI workshops. www.rcplondon.ac.uk/projects/outputs/copd-audit-regional-qi-workshops [Accessed December 2017].

16 Lewis A, Bruton A, Donovan-Hall M. Uncertainty prior to pulmonary rehabilitation in primary care: A phenomenological qualitative study in patients with chronic obstructive pulmonary disease. *Chron Respir Dis* 2014 Jun 30; 11(3): 173–180. Published online 30 June 2014. doi: 10.1177/1479972314539981.



For further information on the overall audit programme or any of the workstreams, please see our website or contact the national asthma and COPD audit team directly:

National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (NACAP)
formerly National COPD Audit Programme
Royal College of Physicians
11 St Andrews Place
Regent's Park, London NW1 4LE

Tel: +44 (020) 3075 1526
Email: pulmrehab@rcplondon.ac.uk
www.rcplondon.ac.uk/nacap

@NACAPaudit
#COPDaudit #COPDPRaudit
#COPDPRbreathebetter

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