Royal College of Physicians | NACAP

National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (NACAP)

Pulmonary rehabilitation clinical audit 2019

Clinical audit of pulmonary rehabilitation services in England, Scotland and Wales. Patients assessed between 1 March and 31 May and discharged by 31 August 2019.

Clinical audit interim report

Published July 2020

In association with:

ARNS Association of Respiratory Nurse Specialists

asthma UK | British Lung Foundation

THE ASTHMA UK AND BRITISH LUNG FOUNDATION PARTNERSHIP

British Thoracic Society

Imperial College London

PCRS Primary Care Respiratory Society UK

RCGP Royal College of General Practitioners

Commissioned by:

HQIP Healthcare Quality Improvement Partnership

The Royal College of Physicians

The Royal College of Physicians (RCP) plays a leading role in the delivery of high-quality patient care by setting standards of medical practice and promoting clinical excellence. The RCP provides physicians in over 30 medical specialties with education, training and support throughout their careers. As an independent charity representing over 38,000 fellows and members worldwide, the RCP advises and works with government, patients, allied healthcare professionals and the public to improve health and healthcare.

Healthcare Quality Improvement Partnership

The National Asthma and Chronic Obstructive Pulmonary Disease (COPD) Audit Programme (NACAP) is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit (NCA) Programme. HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh government and, with some individual projects, other devolved administrations and crown dependencies. To find out more about the HQIP visit: **www.hqip.org.uk/national-programmes**.

National Asthma and Chronic Obstructive Pulmonary Disease (COPD) Audit Programme

NACAP is a programme of work that aims to improve the quality of care, services and clinical outcomes for patients with asthma and COPD in England, Scotland and Wales. Spanning the entire patient care pathway, NACAP includes strong collaboration with asthma and COPD patients, as well as healthcare professionals, and aspires to set out a vision for a service which puts patient needs first. To find out more about the NACAP visit: **www.rcplondon.ac.uk/nacap**.

Pulmonary rehabilitation: 2019 interim audit report

This report was prepared by the following people, on behalf of the COPD advisory group (the full list of members can be found on the NACAP resources page here): **www.rcplondon.ac.uk/nacap-resources**.

Prof Sally Singh, pulmonary rehabilitation clinical lead, NACAP, Care Quality Improvement Department (CQID), RCP, London; and head of pulmonary/cardiac rehabilitation and consultant clinical scientist, University of Leicester
Mr Matt Legg, programme manager, NACAP, CQID, RCP
Ms Neena Garnavos, project manager, NACAP, CQID, RCP
Ms Kirsty Maclean-Steel, NACAP deputy programme manager, CQID, RCP
Ms Rachael Andrews, NACAP deputy programme manager, CQID, RCP
Ms Natasha Long, NACAP programme coordinator, CQID, RCP
Mr Philip Stone, research assistant in statistics/epidemiology, National Heart & Lung Institute, Imperial College London
Mr Alex Adamson, research assistant in medical statistics, National Heart & Lung Institute, Imperial College London
Dr Jennifer Quint, reader in respiratory epidemiology, National Heart & Lung Institute, Imperial College London; honorary respiratory consultant, Royal Brompton and Imperial NHS Trusts
Professor C Michael Roberts, senior clinical lead, NACAP, CQID, RCP, London; programme clinical lead, National COPD Audit Programme; and clinical academic lead for population health, UCLPartners.

Citation for this document: Singh S, Legg M, Garnavos N, Maclean-Steel K, Andrews R, Long N, Stone P, Adamson A, Quint J, Roberts CM. *National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (NACAP). Pulmonary rehabilitation clinical audit 2019. Clinical audit of pulmonary rehabilitation services in England, Scotland and Wales. Patients assessed between 1 March and 31 May and discharged by 31 August 2019.* Interim report. London: RCP, 2020.

Copyright

ISBN: 978-1-86016-805-5 | eISBN: 978-1-86016-806-2

Royal College of Physicians
Care Quality Improvement Department
11 St Andrews Place, Regent's Park, London NW1 4LE

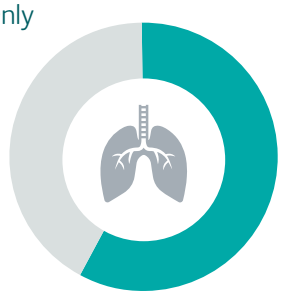
Registered charity no 210508
www.rcplondon.ac.uk/nacap
@NACAPaudit #PRAudit #pulmrehab

Contents

Report at a glance

Waiting times for pulmonary rehabilitation (PR)

Only



58.0%

of patients with stable COPD started PR within 90 days of receipt of referral.

National QI priority*

Ensure

85.0%

of patients referred for PR start it within 90 days of receipt of referral.

Practice walk tests

National QI priority*

Services should ensure

all

exercise assessments are performed to accepted technical standards.

Of those completing an incremental shuttle walk test (ISWT) or 6-minute walk test (6MWT) at initial assessment:

only

41.8%

of patients **performed** a practice walk test.

Discharge assessment / completion of PR

69.3%

of **patients assessed** between 1 March and 31 May 2019 and discharged by 31 August 2019 had a discharge assessment.

National QI priority*

Ensure

70.0%

of patients enrolled for PR go on to have a discharge assessment.

Outcomes of PR

59.8%

of patients experienced an **improvement in exercise capacity**†

58.0%

of patients experienced an **improvement in health status**‡

* All national QI priorities align with the **quality standards for PR**

† As measured using the minimal clinically important difference (MCID) for **incremental shuttle walk test (ISWT)** or **6-minute walk test (6MWT)**

‡ As measured using the MCID for **COPD assessment test (CAT)**

How to use this report

1. Scope and data collection

This report presents the results from an analysis of data derived from the pulmonary rehabilitation (PR) clinical audit component of the National Asthma and COPD Audit Programme (NACAP). This continuous audit captures the process of treatment in patients who are treated by PR services in England, Scotland and Wales for chronic obstructive pulmonary disease (COPD). The continuous audit was launched in March 2019.

This report, which is the first to use continuous data collection, presents data for patients that were assessed between 1 March and 31 May 2019 and discharged by 31 August 2019. The data represent over 6,000 patients assessed for PR within a 3-month time period and includes patients who:

- completed an initial assessment but were not enrolled on a PR programme, or
- enrolled and completed the PR programme by 31 August 2019, or
- enrolled but were known to have dropped out of their PR programme.

This audit works under a consent model, so only data from patients who consented to be part of the audit have been reported.

Individuals who were assessed between 1 March and 31 May 2019, but who had not completed the PR programme before 31 August 2019 were excluded. The most likely reason that individuals would not have completed their PR programme before 31 August was because of delays between assessment and commencing PR.

As such, this report may not reflect as accurately the current status of PR services against key metrics, as a longer data capture period may have allowed, ie by incorporating data from patients with higher than expected waiting times. In future PR audit reports, a longer data capture period will be applied to better represent the status of services.

The data provide information about the delivery of rehabilitation and on the quality improvement (QI) targets for PR services.

Contributing to the overarching national QI objectives of NACAP, this report aims to empower stakeholders to use audit data to facilitate improvements in the quality of care.

2. Report structure

The data are presented largely in tabular form with explanatory notes where appropriate. These data will also be made publicly available at PR service level on **www.data.gov.uk**, in line with the government's transparency agenda.

Details of the statistical, data collection and information governance methodologies employed are provided in **Appendix A.**

Nationally benchmarked results for participating services across England, Scotland and Wales have been provided in Section 9 of this report. The median values for each service are presented alongside the national medians for each indicator. The indicators have been selected based on national guidelines and standards. The service results for each indicator are colour coded in accordance with whether the service falls above, within the middle two, or below the lower quartile.

Details of the methodology employed are also provided (**Appendix A**).

3. Report coverage

National breakdowns are given for England, Scotland and Wales, as well as 'All' figures.

NACAP follows rules on suppression of small numbers in national reporting where it may be possible to identify an individual patient in any data presented. In this report, it was deemed appropriate and safe to include small numbers in national data tables without suppression for the following reasons:

- These data are presented at national aggregate level. It is not possible to combine this national aggregate data in any way which could identify an individual.
- These data are of a sample of the eligible patients that could have been included in the audit; it is not possible to ascertain which eligible patients were included, and which were not, in the data presented here.

4. Audience and links to relevant guidelines and standards

The report is intended to be read by healthcare professionals; NHS managers, chief executives and board members, as well as service commissioners; policymakers; and voluntary organisations. A separate report has been produced for patients and the public and is available at: **www.rcplondon.ac.uk/nacap-PR-interim**.

References to the appropriate British Thoracic Society (BTS) Quality Standards (**Appendix C**) are provided at the beginning of each section. Copies of our dataset, our good practice repository, and all other resources can be found via our website: **www.rcplondon.ac.uk/nacap-pr-resources**.

Foreword by Sally Singh, pulmonary rehabilitation audit clinical lead

Welcome to the first report of the National Asthma and Chronic Obstructive Pulmonary Disease (COPD) Audit Programme (NACAP) pulmonary rehabilitation (PR) continuous clinical audit. This report describes data entered for over 6,000 patients assessed for PR within a 3-month period (1 March – 31 May 2019) and discharged by 31 August 2019.

The data provide an insight into the processes of PR, the clinically important outcomes and the characteristics of populations most likely to complete a discharge assessment. The clinical outcomes for those completing a programme of PR are positive, with the majority of patients achieving important gains in exercise capacity and/or health status. The data also describe the characteristics associated with achieving the minimal clinically important difference (MCID) for a walking test and a health status measure. The audit data explored the impact of deprivation on uptake and outcomes, and it appears that those living within the least deprived areas of England, Scotland and Wales were more likely to attend their discharge assessment (odds ratio (OR) = 1.86 (95% confidence interval (CI) = 1.49–2.33)) compared with those within the most deprived areas. This inequality is a challenge that PR services must acknowledge and strive to even out.

The audit data identify areas for improvement. There are still delays in patients accessing PR in a timely manner, with only 58.0% of patients starting a PR programme within the 90-day (from receipt of referral) target. Access to rehabilitation for the potentially sicker post-hospitalisation population is also poor. The report shows that just 383 (6.3%) patients assessed for PR were those referred after admission for an acute exacerbation of COPD. This suggests that either the offer of PR is not being made by teams in secondary care at the time of discharge or the offer is not being taken up by patients. We must endeavour to improve the rate of referrals to PR services and to ensure patients and clinical colleagues understand the benefits.

Of course, this report would not be possible without the participation of the PR services across England, Scotland and Wales. We are delighted at the high level of participation (90.1% of PR services across England, Scotland and Wales) and we would like to thank services for their support of the audit and dedication to improving patient care. We hope this data will provide valuable insight into the provision and outcomes of rehabilitation and support services to continue to improve the standard of the PR programmes offered to patients.

This report will be followed be a combined clinical and organisational audit report in late 2020.

Recommendations

National

Services, providers and patient charities should work together to increase uptake of PR in patients with chronic obstructive pulmonary disease (COPD) after hospitalisation for an acute exacerbation of COPD.

For providers of pulmonary rehabilitation services

This report outlines three key QI priorities for providers of PR. They were chosen because of the strong evidence base for their effectiveness in improving patient care and outcomes.

National QI priority 1: Services should endeavour to enrol 85% of those referred for PR within 90 days (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 1b***).[1]

National QI priority 2: Services should ensure all exercise assessments are performed to accepted technical standards, including ensuring all patients undertake a practice exercise test at their initial PR assessment (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standards 8 and 9***).[1]

National QI priority 3: Ensure 70% of patients enrolled for PR go on to complete the programme and have a discharge assessment (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 4***).[1]

For commissioners / health boards / sustainability and transformation partnerships / integrated care systems

Services should work with commissioners to ensure that patients are seen in a timely manner (quality improvement (QI) priority: starting pulmonary rehabilitation (PR) within 90 days of receipt of referral) (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 1b***).[1]

Ensure that your local PR services are participating in the National Asthma and COPD Audit Programme (NACAP) PR audit.

Ensure that all staff are adequately trained and aware of national and, where relevant, international guidance, ie ***BTS quality standards for pulmonary rehabilitation in adults (2014)***.[1]

For providers of primary and secondary COPD care

Ensure that all eligible patients are offered a referral for PR (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 1***).[1]

Ensure that all staff working with patients with COPD are aware of the benefits of PR.

For people living with COPD and their families and carers

When you visit your GP / practice nurse, make sure that you ask for information on pulmonary rehabilitation (PR) and discuss whether a referral to your local PR service maybe beneficial to you (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 1***).[1]

If you are admitted to hospital with a worsening of your chronic obstructive pulmonary disease (COPD), make sure arrangements are made to refer you to your local PR service (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 3***).[1]

Section 1: Audit participation

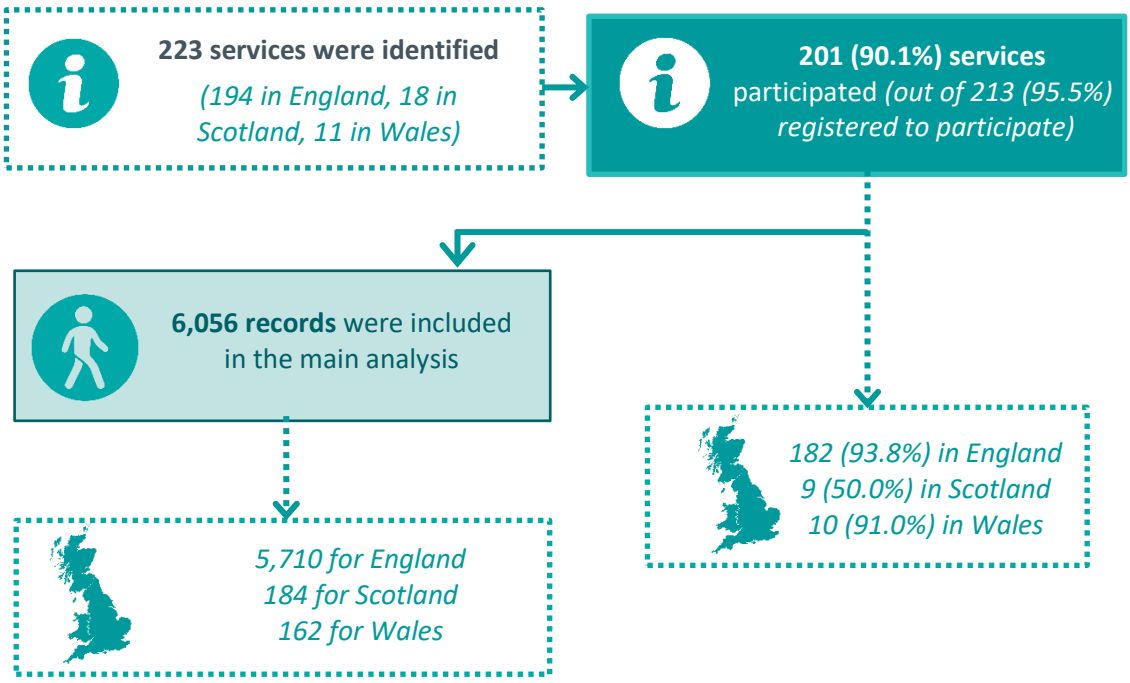
Back to contents

Key findings

- A high proportion (90.1%) of services are participating in the PR continuous clinical audit.
- Very few services either did not register (4.0%) or registered but did not submit any data (7.5%).

1.1 Audit participation

Audit participation	Total number of PR services identified	Number of PR services registered to participate in the audit	Number of PR services registered participating in the audit	Number of services identified but not registered
England	194	191 (98.5%)	182 (93.8%)	3 (1.5%)
Scotland	18	11 (61.1%)	9 (50.0%)	7 (38.9%)
Wales	11	11 (100%)	10 (91.0%)	0 (0.0%)
All	223	213 (95.5%)	201 (90.1%)	10 (4.5%)



Section 2: General information

Back to contents

Key findings

- The median age at referral was 70 years (interquartile range (IQR) 64–76).
- The proportion of males (51.7%) and females (48.2%) being assessed was similar.
- In total, 6,056 patients were assessed for PR between 1 March and 31 May 2019 and discharged by 31 August 2019.
- Patients within the most deprived areas (quintile 1) in England (25.9%) represented a higher proportion of those assessed for PR. However, patients in quintile 2 represented the higher proportions of those assessed for PR in Scotland (24.3%) and Wales (28.1%).

Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

2.1 Age

	2019			
Age at assessment (years)	**England (n=5,710)**	**Scotland (n=184)**	**Wales (n=162)**	**All (n=6,056)**
Median (IQR*)	71 (64–76)	67 (62–74)	69 (62–74)	70 (64–76)

** Interquartile range*

2.2 Gender

	2019			
Gender	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Male	2,967 (52.0%)	80 (43.5%)	81 (50.0%)	3,128 (51.7%)
Female	2,737 (47.9%)	104 (56.5%)	81 (50.0%)	2,922 (48.2%)
Transgender	1 (0%)	0 (0.0%)	0 (0.0%)	1 (0%)
Other*	2 (0%)	0 (0.0%)	0 (0.0%)	2 (0%)
Not recorded / preferred not to say	3 (0.1%)	0 (0.0%)	0 (0.0%)	3 (0%)

2.3 Socioeconomic status

2.3.1 Index of Multiple Deprivation measures by national quintile in England, Scotland and Wales

		% of audit sample living in each quintile of English, Scottish or Welsh Index of Multiple Deprivation 2019				
Index of Multiple Deprivation		Q1 (most deprived)	Q2	Q3	Q4	Q5 (least deprived)
England (IMD*)	2019 (n=5,634)	1,459 (25.9%)	1,138 (20.2%)	1,116 (19.8%)	1,040 (18.5%)	881 (15.6%)
Scotland (SIMD**)	2019 (n=181)	42 (23.2%)	44 (24.3%)	32 (17.7%)	36 (19.9%)	27 (14.9%)
Wales (WIMD***)	2019 (n=160)	33 (20.6%)	45 (28.1%)	32 (20.0%)	23 (14.4%)	27 (16.9%)

Indices of multiple deprivation are not directly comparable between countries.[a]
**Index of Multiple Deprivation, England*
*** Scottish Index of Multiple Deprivation*
**** Welsh Index of Multiple Deprivation*

[a] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf

Section 3: Programme referral

Back to contents

Key standards

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 1b]: [1] Referral for PR: b. If accepted, people referred for PR are enrolled to commence within 3 months of receipt of referral.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 3b]: [1] Referral for PR after hospitalisation for acute exacerbations of COPD: b. People referred for PR following admission with AECOPD are enrolled within 1 month of leaving hospital.

NICE 2016 QS10 [QS5], statement 5: [2] People admitted to hospital for an acute exacerbation of COPD start a PR programme within 4 weeks of discharge.

Key findings

- Overall, the highest proportion of patients (64.9%) were referred from primary care or the community with stable COPD.
- A small proportion of patients (6.3%) were referred after admission to hospital for an acute exacerbation of COPD (AECOPD).
- Overall, 58.0% of patients with stable COPD commenced PR within 90 days of receipt of referral. Waiting times were longest in Wales (median 136 days).
- 17.3% of patients referred after admission to hospital for AECOPD started PR within 30 days of referral.

Navigation

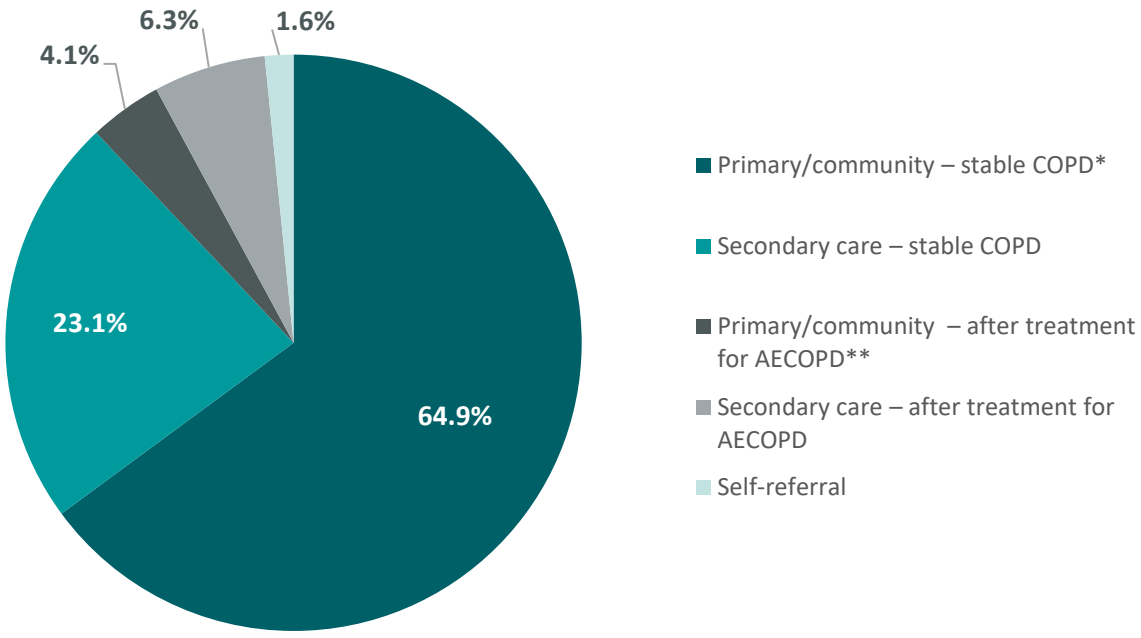
This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

3.1 Source of patient referral

	2019			
Patients referred from	**England (n=5,710)**	**Scotland (n=184)**	**Wales (n=162)**	**All (n=6,056)**
Primary/community – stable COPD*	3,741 (65.5%)	116 (63.0%)	76 (46.9%)	3,933 (64.9%)
Secondary care – stable COPD	1,280 (22.4%)	35 (19.0%)	81 (50.0%)	1,396 (23.1%)
Primary/community – after treatment for AECOPD**	239 (4.2%)	10 (5.4%)	1 (0.6%)	250 (4.1%)
Secondary care – after admission for AECOPD	363 (6.4%)	16 (8.7%)	4 (2.5%)	383 (6.3%)
Self-referral	87 (1.5%)	7 (3.8%)	0 (0.0%)	94 (1.6%)

** Chronic obstructive pulmonary disease (COPD)*
***'Primary/community – after treatment for acute exacerbation of COPD (AECOPD)' – includes referrals for patients treated at home or in a community location for AECOPD, this includes referrals from primary care after AECOPD*

Fig 3.1 Source of patient referral



** Chronic obstructive pulmonary disease (COPD)*
***'Primary/community – after treatment for acute exacerbation of COPD (AECOPD)' – includes referrals for patients treated at home or in a community location for AECOPD, this includes referrals from primary care after AECOPD*

3.2 Waiting times

3.2.1 Length of time from receipt of referral to start date for PR

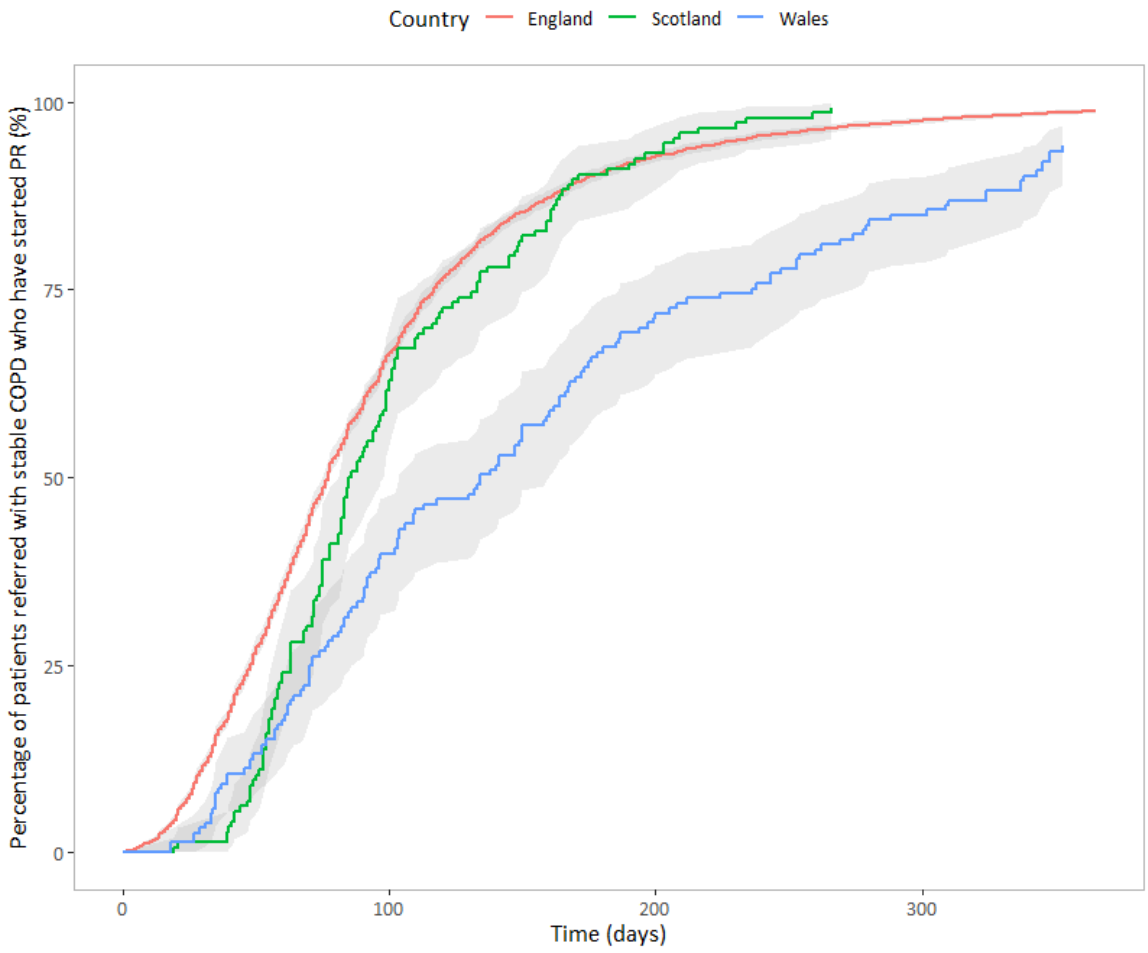
	2019			
Time from referral to start date for PR (days) for patients with stable COPD	**England (n=4,525)**	**Scotland (n=139)**	**Wales (n=153)**	**All (n=4,817)**
Median (IQR*)	77 (49–117)	84 (63–132)	134 (71–236)	78 (49–119)

**Interquartile range*

3.2.2 Did people with stable COPD start PR within 90 days of receipt of referral?

	2019			
PR started within 90 days	**England (n=4,525)**	**Scotland (n=139)**	**Wales (n=153)**	**All (n=4,817)**
Yes	2,667 (58.9%)	74 (53.2%)	51 (33.3%)	2,792 (58.0%)

Fig 3.2 Waiting times for patients with stable COPD*



**Denominator for Fig 3.2 is all those patients who started pulmonary rehabilitation*

3.2.3 Length of time from initial assessment to start date for PR

	2019			
Days from assessment to start date for PR (days) for patients with stable COPD	**England (n=4, 585)**	**Scotland (n=145)**	**Wales (n=155)**	**All (n=4,885)**
Median (IQR*)	14 (7–27)	9 (7–16)	14 (6–23)	14 (7–27)

**Interquartile range*

3.2.4 Did people with AECOPD start PR within 30 days of referral?

	2019			
PR started with 30 days of referral	**England (n=537)**	**Scotland (n=25)**	**Wales (n=5)**	**All (n=567)**
Yes	96 (17.9%)	2 (8%)	0 (0.0%)	98 (17.3%)

1 **National QI priority:** Ensure 85% of patients referred for PR start it within 90 days of receipt of referral (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standard 1b***).[1]

Rationale

The British Thoracic Society (BTS) quality standard for pulmonary rehabilitation (PR) in adults (2014) 1b states that people with stable chronic obstructive pulmonary disease (COPD) who are referred for PR should start it within 3 months of receipt of referral. This audit reported 58.0% of patients with stable COPD started PR within 90 days of receipt of referral. Longer waiting times for PR have been linked with an increased risk of admission to hospital.[3] Therefore ensuring patients start PR within 90 days is of the utmost importance.

Tips to achieve this priority

- Incorporate a process of monitoring the data to check waiting times.
- Have a list of patients willing to attend at short notice if there is a cancellation.
- Ensure there is capacity in the class to reduce wait times into rehabilitation after assessment (rolling vs cohort programmes).

Section 4: Key clinical information at time of assessment

Back to contents

Key standards:

NICE 2013 QS43 [QS1]:[4] People are asked if they smoke by their healthcare practitioner, and those who smoke are offered advice on how to stop.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 5]:[1] Pulmonary rehabilitation programmes include supervised, individually tailored and prescribed progressive exercise training, including both aerobic and resistance training.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 8]:[1] People attending pulmonary rehabilitation have the outcome of treatment assessed using as a minimum, measures of exercise capacity, dyspnoea and health status.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 1a]:[1] Referral for PR: a. People with COPD and self-reported exercise limitation (MRC dyspnoea 3–5) are offered PR.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 2]:[1] PR programmes accept and enrol patients with functional limitation due to other chronic respiratory diseases (for example bronchiectasis, interstitial lung disease (ILD) and asthma) or COPD MRC dyspnoea 2 if referred.

Key findings

Of patients assessed for PR:

- A large proportion were either ex-smokers (70.0%) or current smokers (20.7%).
- The majority had either a Medical Research Council (MRC) score 3 (35.5%) or 4 (31.5%).
- 52.4% had a measure of FEV1/FVC ratio and 63.1% had a measure of FEV1.
- 35.6% had a history of cardiovascular disease and 35.9% a history of lower limb or lower back musculoskeletal disorders.
- 18.6% had a history of mental illness.

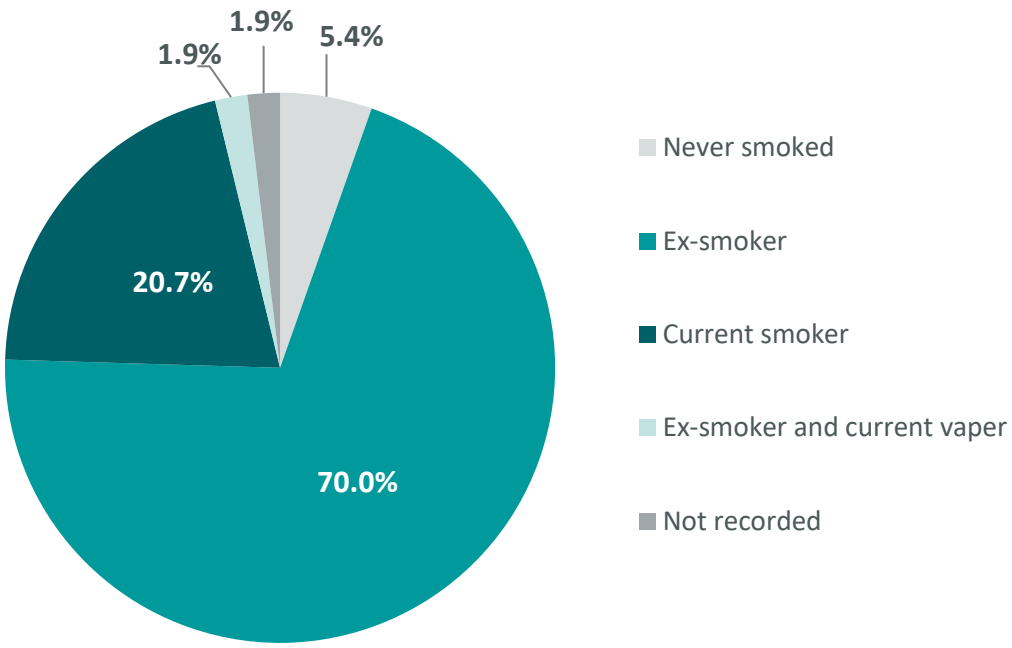
Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

4.1 Smoking status

	2019			
Smoking status	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Never smoked	312 (5.5%)	8 (4.3%)	7 (4.3%)	327 (5.4%)
Ex-smoker	4,009 (70.2%)	115 (62.5%)	115 (71.0%)	4,239 (70.0%)
Current smoker	1,177 (20.6%)	49 (26.6%)	30 (18.5%)	1,256 (20.7%)
Ex-smoker and current vaper	96 (1.7%)	10 (5.4%)	8 (4.9%)	114 (1.9%)
Never smoked and current vaper	4 (0.1%)	0 (0.0%)	0 (0.0%)	4 (0.1%)
Not recorded	112 (2.0%)	2 (1.1%)	2 (1.2)	116 (1.9%)

Fig 4.1 Smoking status*



** Due to the small numbers 'Never smoked and current vaper' has not been included in this figure.*

4.2 Spirometry

	2019	
Spirometry	**Number of patients with a recorded value**	**Median (IQR*) value**
FEV1% predicted		
England (n=5,710)	3,601 (63.1%)	56 (41–70)
Scotland (n=184)	40 (21.7%)	54 (46–65)
Wales (n=162)	117 (72.2%)	51 (38–65)
All (n=6,056)	3,758 (62.1%)	55 (41–70)
FEV1/FCV ratio		
England (n=5,710)	2,990 (52.4%)	0.56 (0.44–0.67)
Scotland (n=184)	19 (10.3%)	0.59 (0.42–0.69)
Wales (n=162)	103 (63.6%)	0.53 (0.43–0.63)
All (n=6,056)	3,112 (51.4%)	0.56 (0.44–0.67)

** Interquartile range*

4.3 Patient's body mass index (BMI)

	2019			
BMI	**England (n=5,710)**	**Scotland (n=184)**	**Wales (n=162)**	**All (n=6,056)**
Number of patients with a recorded value	3,748 (65.6%)	52 (28.3%)	108 (66.7%)	3,908 (64.5%)
Median (IQR*)	27.3 (23.4–31.9)	28.0 (23.1–33.0)	28.0 (23.5–33.1)	27.3 (23.4–32.0)

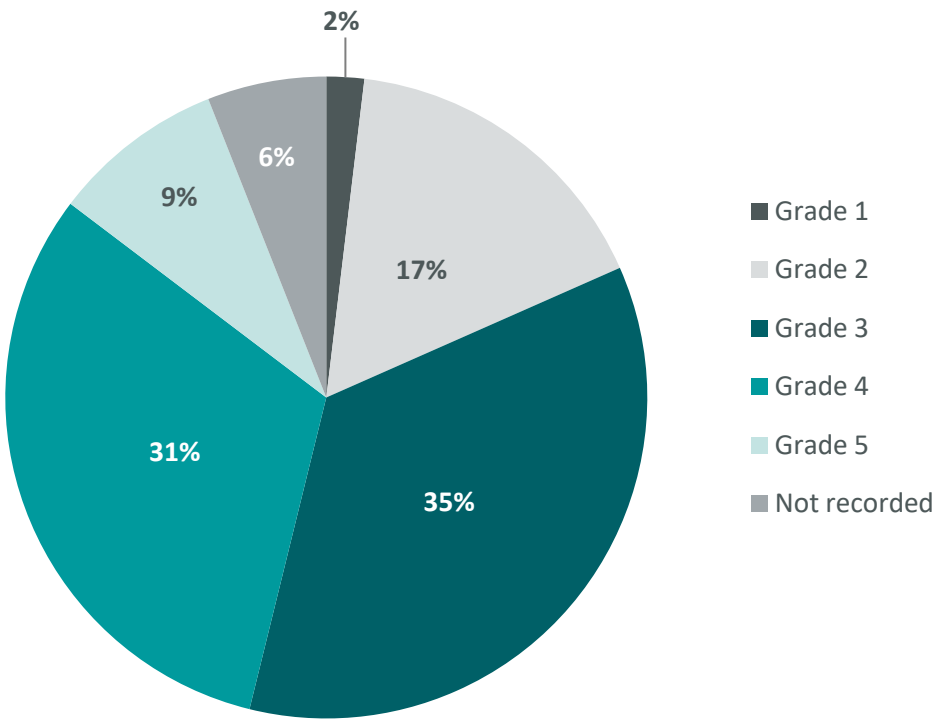
** Interquartile range*

4.4 What was the patient-reported Medical Research Council (MRC) score at assessment?

	2019			
MRC score *	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Grade 1	112 (2.0%)	3 (1.6%)	1 (0.6%)	116 (1.9%)
Grade 2	946 (16.6%)	30 (16.3%)	22 (13.6%)	998 (16.5%)
Grade 3	2,046 (35.8%)	66 (35.9%)	35 (21.6%)	2,147 (35.5%)
Grade 4	1,772 (31.0%)	69 (37.5%)	67 (41.4%)	1,908 (31.5%)
Grade 5	483 (8.5%)	9 (4.9%)	32 (19.8%)	524 (8.7%)
Not recorded	351 (6.1%)	7 (3.8%)	5 (3.1%)	363 (6.0%)

** Grade 1 – not troubled by breathlessness or strenuous exercise*
Grade 2 – short of breath when hurrying or walking up a slight hill
Grade 3 – walks slower than contemporaries on level ground because of breathlessness or has to stop for breath
Grade 4 – stops to breathe after walking 100 metres (109 yards) or after a few minutes walking on level ground
Grade 5 – too breathless to leave the house or breathless when dressing or undressing

Fig 4.2 MRC score at assessment



4.5 Physical comorbidities

	2019			
Was a history of physical illness recorded for this patient?	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Cardiovascular disease*	2,053 (36.0%)	51 (27.7%)	54 (33.3%)	2,158 (35.6%)
Lower limb or lower back musculoskeletal disorder**	2,014 (35.3%)	90 (48.9%)	68 (42.0%)	2,172 (35.9%)

** Including but not limited to, angina, atrial fibrillation, myocardial infarction, stroke, peripheral vascular disease or heart failure*
*** Including but not limited to, osteoarthritis in the knee, hip or ankle, or lower back pain*

4.6 Mental health comorbidities

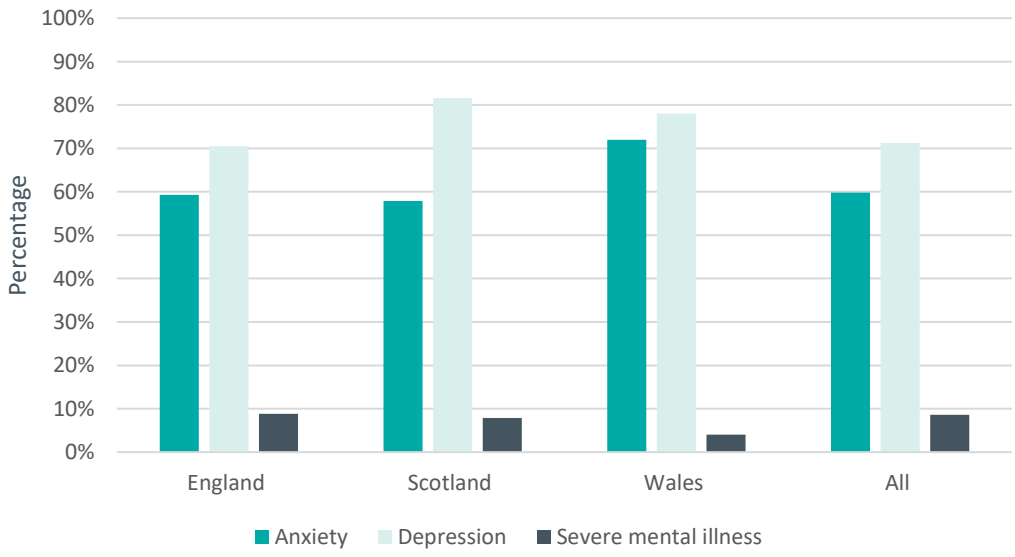
	2019			
History of mental illness recorded	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Mental illness	1,041 (18.2%)	38 (20.7%)	50 (30.9%)	1,129 (18.6%)

4.6.1 Type of mental illness recorded

	2019			
Type of mental illness recorded	England (n=1,041)	Scotland (n=38)	Wales (n=50)	All (n=1,129)
Anxiety	617 (59.3%)	22 (57.9%)	36 (72.0%)	675 (59.8%)
Depression	734 (70.5%)	31 (81.6%)	39 (78.0%)	804 (71.2%)
Severe mental illness*	92 (8.8%)	3 (7.9%)	2 (4.0%)	97 (8.6%)

** Severe mental illness includes clinically diagnosed psychosis; schizophrenia-spectrum disorders, including schizophrenia schizoaffective disorder; severe mood disorders, including bipolar disorder; personality disorders; and behavioural disorders, including eating, sleep or stress disorders.*

Fig 4.3 Types of mental illness in those with a recorded history of mental illness



Section 5: Assessment tests and questionnaires

Back to contents

Key standards

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 8]: [1] People attending PR have the outcome of treatment assessed using as a minimum, measures of exercise capacity, dyspnoea and health status.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 9]: [1] PR programmes conduct an annual audit of individual outcomes and progress.

Technical standard: field walking tests in chronic respiratory disease[5]

Key findings

Of patients assessed for PR:

- 92.3% completed an incremental shuttle walk test (ISWT) or a 6-minute walk test (6MWT); 7.7% of patients completed neither test.
- 52.0% of those completing an ISWT and 30.2% of those completing a 6MWT test performed a practice walk test at assessment.

Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

5.1 Walk tests

5.1.1 Walk tests recorded at initial assessment

	2019			
Test recorded at initial assessment	**England (n=5,710)**	**Scotland (n=184)**	**Wales (n=162)**	**All (n=6,056)**
Incremental shuttle walk test (ISWT)	2,333 (40.9%)	59 (32.1%)	26 (16.0%)	2,418 (39.9%)
6-minute walk test (6MWT)	2,399 (42.0%)	99 (53.8%)	124 (76.5%)	2,622 (43.3%)
ISWT + endurance shuttle walk test (ESWT)*	526 (9.2%)	23 (12.5%)	0 (0.0%)	549 (9.1%)
Neither ISWT or 6MWT**	452 (7.9%)	3 (1.6%)	12 (7.4%)	467 (7.7%)

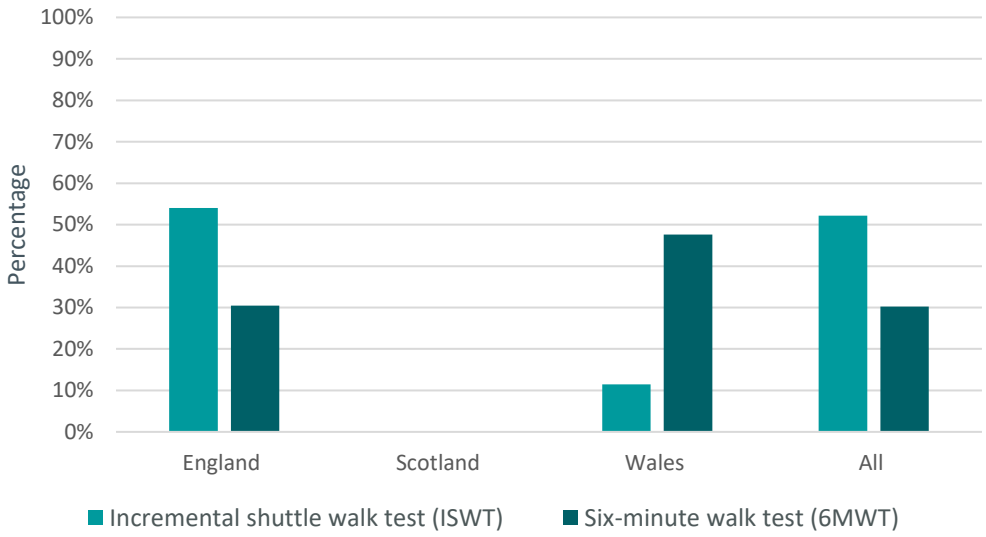
**99.5% of those who did both tests did the ISWT*
***Two people who did neither the ISWT or the 6MWT did however do the endurance test*

5.1.2 Walk test values at initial assessment

	2019			
Walking test values at assessment (metres)	**England (n=2,856)**	**Scotland (n=82)**	**Wales (n=26)**	**All (n=2,964)**
ISWT				
Median (IQR*)	200 (120–280)	185 (103–298)	190 (130–335)	200 (120–290)
Practice walk test completed	1,543 (54%)	0 (0.0%)	3 (11.5%)	1,546 (52.2%)
	England (n=2,402)	**Scotland (n=99)**	**Wales (n=124)**	**All (n=2,625)**
6MWT				
Median (IQR*)	250 (168–330)	200 (140–280)	245 (168–311)	250 (162–330)
Practice walk test completed	733 (30.5%)	0 (0.0%)	59 (47.6%)	792 (30.2%)
	England (n=528)	**Scotland (n=23)**	**Wales (n=0)**	**All (n=551)**
ESWT				
Median (IQR)	225 (144–371)	135 (91–190)	0 (0-0)	220 (141–366)

**Interquartile range*

Fig 5.1 Percentage of patients who performed a practice walk test*



* No services in Scotland performed a practice test

2 **National QI priority:** Ensure *all* patients undertake a practice exercise test at their initial PR assessment (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standards 8 and 9***)[1]

Rationale

Accurate measurement of baseline is critical for exercise prescription and outcome assessment. However, only 52.0% of patients who performed an ISWT and 30.2% of patients who performed a 6MWT undertook a practice walk test.

Ensuring that walk tests are conducted to recommended standards, including performing a practice walk test, will ensure:

- assessments are reliable
- exercise can be accurately prescribed
- that outcome assessments following PR are unbiased.[5]

Tips to achieve this priority

- Ensure adequate assessment time for patients to complete a practice walk test.
- Ensure the order of tests and questionnaires allows adequate rest between walk tests.
- Ensure patients understand the importance of the practice walk to optimise benefits of rehabilitation.

5.2 Health status questionnaires

5.2.1 Health status questionnaires recorded at initial assessment

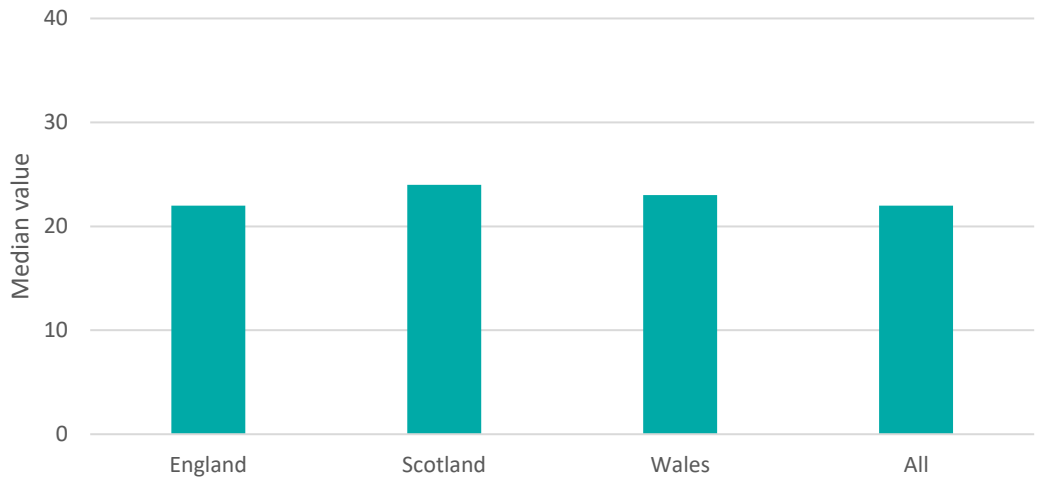
	2019			
Health status questionnaire completion	**England (n=5,710)**	**Scotland (n=184)**	**Wales (n=162)**	**All (n=6,056)**
COPD assessment test (CAT)	4,089 (71.6%)	102 (55.4%)	144 (88.9%)	4,335 (71.6%)
Chronic respiratory questionnaire (CRQ)	2,031 (35.6%)	45 (24.5%)	30 (18.5%)	2,106 (34.8%)

5.2.2 COPD assessment test (CAT) values at initial assessment

	2019			
COPD assessment test (CAT)*	England (n=4,089)	Scotland (n=102)	Wales (n=144)	All (n=4,335)
Median (IQR)**	22 (16–27)	24 (19–29)	23 (17–30)	22 (16–27)

** COPD assessment test values: 0–40*
*** Interquartile range*

Fig 5.2 COPD assessment test (CAT) values at initial assessment



5.2.3 Chronic respiratory questionnaire (CRQ) values at initial assessment

	2019			
CRQ values at assessment	England (n=2,031)	Scotland (n=45)	Wales (n=30)	All (n=2,106)
Dyspnoea average score (1.0–7.0)				
Median (IQR*)	2.6 (2.0–3.4)	2.4 (2.0–3.0)	2.8 (2.2–3.8)	2.6 (2.0–3.4)
Fatigue average score (1.0–7.0)				
Median (IQR*)	3.2 (2.2–4.2)	3.2 (2.0–3.8)	2.7 (1.9–3.9)	3.2 (2.2–4.2)
Emotion average score (1.0–7.0)				
Median (IQR*)	4.1 (3.2–5.3)	4.1 (3.3–5.1)	4.1 (2.9–5.3)	4.1 (3.2–5.3)
Mastery average score (1.0–7.0)				
Median (IQR*)	4.2 (3.2–5.5)	4.2 (3.0–5.2)	3.6 (3.2–5.2)	4.2 (3.2– 5.5)

** Interquartile range*

Section 6
Key information relating to the programme

Back to contents

Key findings

- After the initial assessment 91.6% of patients were enrolled onto a PR programme.
- The majority of PR programmes offered were centre-based (98.2%).
- 66.0% of PR programmes were rolling programmes.

Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

6.1 Post assessment, was the patient enrolled onto a PR programme?

	2019			
Post-assessment, was the patient enrolled onto a PR programme?	England (n=5,710)	Scotland (n=184)	Wales (n=162)	All (n=6,056)
Yes	5,213 (91.3%)	177 (96.2%)	160 (98.8%)	5,550 (91.6%)
No – clinically unsuitable	214 (3.7%)	3 (1.6%)	1 (0.6%)	218 (3.6%)
No – patient choice	283 (5.0%)	4 (2.2%)	1 (0.6%)	288 (4.8%)

6.2 Where is the patient's PR programme located?

	2019			
Programme location	England (n=5,213)	Scotland (n=177)	Wales (n=160)	All (n=5,550)
Centre-based	5,114 (98.1%)	177 (100.0%)	160 (100.0%)	5,451 (98.2%)
Home-based	71 (1.4%)	0 (0.0%)	0 (0.0%)	71 (1.3%)
Both	28 (0.5%)	0 (0.0%)	0 (0.0%)	28 (0.5%)

6.3 Type of centre-based PR

	2019			
If centre-based,* what type of programme?	England (n=5,114)	Scotland (n=177)	Wales (n=160)	All (n=5,451)
Rolling	3,352 (65.5%)	156 (88.1%)	92 (57.5%)	3,600 (66.0%)
Cohort	1,762 (34.5%)	21 (11.9%)	68 (42.5%)	1,851 (34.0%)

** Excludes patients who were enrolled in both centre-based and home-based programmes*

6.4 Total number of supervised centre-based PR sessions scheduled

	2019			
Total number of supervised PR sessions scheduled*	England (n=5,114)	Scotland (n=177)	Wales (n=160)	All (n=5,451)
Median (IQR**)	12 (12–13)	12 (12–14)	13 (12–14)	12 (12–14)

** Excludes patients who were enrolled in both centre-based and home-based programmes*
*** Interquartile range*

6.4.1 Group and individual centre-based sessions

	2019			
Group and individual centre-based sessions*	England (n=5,114)	Scotland (n=177)	Wales (n=160)	All (n=5,451)
Patients who received centre-based group sessions	4,786 (93.6%)	166 (93.8%)	158 (98.8%)	5,110 (93.7%)
Patients who received centre-based individual sessions	485 (9.5%)	29 (16.4%)	8 (5.0%)	522 (9.6%)

**Some patients had group sessions and 1:1 sessions so numbers may add up to more than 100%*

6.5 Number of supervised centre-based PR sessions received*

	2019			
Number of supervised centre-based PR sessions received Median (IQR*)	England (n=5,114)	Scotland (n=177)	Wales (n=160)	All (n=5,451)
Group sessions**	11 (7–12)	12 (6–13)	11 (8–14)	11 (7–12)
1:1 sessions***	1 (1–2)	2 (2–2)	1 (1–2)	1 (1–2)
Total	11 (6–12)	12 (6–14)	11 (8–14)	11 (6–12)

** Interquartile range*
*** Excludes patients who had both group and 1:1 sessions*
**** Out of those who did at least one session*

6.6 Total number of home-based PR sessions scheduled*

A small number of patients participated in home-based PR (n=71, 1.3%). The median (IQR) range of supervised sessions scheduled in the home was 4 (4–6). All home-based PR was delivered in England.

*Excluding those who were enrolled in both centre-based and home-based

6.6.1 Method of home-based PR sessions

The majority of the home-based PR sessions were supervised in person (n=56, 78.9%). Other home-based contact included:

- telephone calls (n=37, 52.1%)
- technology based PR (video conferencing) (n=1, 1.4%)
- other digital communication (n=6, 8.5%).

No services offered group-based video conferencing sessions. These home-based programmes were all based in England.

6.7 Number of home-based PR sessions received*

The median (IQR) number of in person home-based supervised sessions received was 3 (1–4), phone supervision was 2 (1–3) and digital communication was 1 (1–2). No services selected video conferencing – group sessions.

*Out of those who did at least one session

Section 7:
Key information at discharge

Back to contents

Key standards

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 4]: [1]
PR programmes are of at least 6 weeks duration and include a minimum of twice-weekly supervised sessions.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 7]: [1] People completing PR are provided with an individualised structured, written plan for ongoing exercise maintenance.

Key findings

Of patients assessed between 1 March and 31 May 2019 and discharged by 31 August 2019:

- 69.3% had a discharge assessment.
- of those with a history of cardiovascular disease (OR = 0.85 (95% CI = 0.74–0.97)) and depression (OR = 0.73 (95% CI = 0.59–0.50)) there was reduced likelihood of completing a discharge assessment
- those in the least deprived areas of England, Scotland and Wales were more likely to attend their discharge assessment (OR = 1.86 (95% CI = 1.49–2.33)) compared with those in the most deprived areas
- 79.3% of patients received an individualised discharge plan.

Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

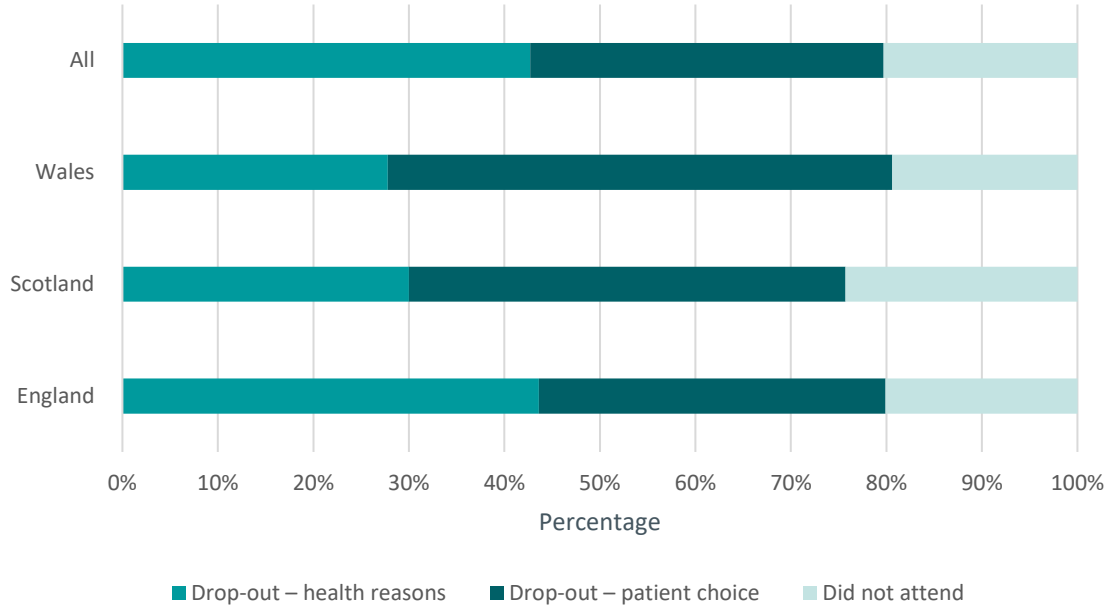
7.1 Discharge assessment

7.1.1 Discharge assessment performed

	2019			
Discharge assessment performed	**England (n=5,213)**	**Scotland (n=177)**	**Wales (n=160)**	**All (n=5,550)**
Yes	3,617 (69.4%)	107 (60.5%)	124 (77.5%)	3,848 (69.3%)
No	1,596 (30.6%)	70 (39.5%)	36 (22.5%)	1,702 (30.7%)
Completion ratio*	2.3:1	1.5:1	3.4:1	2.3:1

**Ratio of patients who started PR to those completing a discharge assessment*

Fig 7.1 Reason for not performing a discharge assessment



7.1.2 Discharge assessment by programme type: rolling and cohort

	2019			
Discharge assessment by programme type	**England (n=3,352)**	**Scotland (n=156)**	**Wales (n=92)**	**All (n=3,600)**
Discharge assessment performed: rolling programmes				
Yes	2,262 (67.5%)	95 (60.9%)	66 (71.7%)	2,423 (67.3%)
	England (n=1,762)	**Scotland (n=21)**	**Wales (n=68)**	**All (n=1,851)**
Discharge assessment performed: cohort programmes				
Yes	1,301 (73.8%)	12 (57.1%)	58 (85.3%)	1,371 (74.1%)

For home-based programmes a smaller proportion of patients completed a discharge assessment compared with either cohort- or centre-based rolling programmes (n=38, 53.5%). These were all completed in England. For patients who received a hybrid model of home and centre-based sessions 16 (57.1%) completed a discharge assessment. This model was only delivered in England.

7.1.3 Likelihood of completing a discharge assessment based on demographic characteristics

	2019			
Variable	**Unadjusted odds ratio***	**Unadjusted odds ratio 95% confidence interval**	**Adjusted odds ratio****	**Adjusted odds ratio 95% confidence interval**
Female	0.85	0.76–0.96	0.90	0.79–1.02
Quintile of Index of Multiple Deprivation, England (IMD) / Welsh Index of Multiple Deprivation (WIMD) / Scotland (SIMD)				
1 (most deprived)	1	-	1	-
2	1.40	1.17–1.68	1.30	1.08–1.56
3	1.73	1.43–2.09	1.52	1.25–1.85
4	1.74	1.44–2.11	1.47	1.21–1.79
5 (least deprived)	2.27	1.83–2.81	1.86	1.49–2.33
Age				
35–44	0.28	0.16–0.50	0.38	0.21–0.69
45–54	0.44	0.34–0.57	0.55	0.42–0.72
55–64	0.57	0.49–0.66	0.66	0.56–0.78
65–74	1	-	1	-
75–84	1.19	1.01–1.39	1.09	0.93–1.28
85+	0.71	0.53–0.95	0.62	0.46–0.84
Comorbidities				
Cardiovascular history	0.94	0.83–1.07	0.85	0.74–0.97
Musculoskeletal history	0.82	0.73–0.94	0.89	0.78–1.01
Serious mental illness	0.44	0.28–0.69	0.66	0.41–1.05
Anxiety	0.61	0.51–0.74	0.95	0.76–1.18
Depression	0.52	0.44–0.61	0.73	0.59–0.90
CAT score at initial visit**				
0–10	1.75	1.32–2.30	1.46	1.10–1.94
11–20	1.65	1.39–1.94	1.45	1.23–1.72
21–30	1	-	1	-
31–40	0.51	0.41–0.63	0.59	0.47–0.72

** Centre remains as a random intercept to account for clustering*
*** Adjusted for all other variables in the model*
**** COPD assessment test*

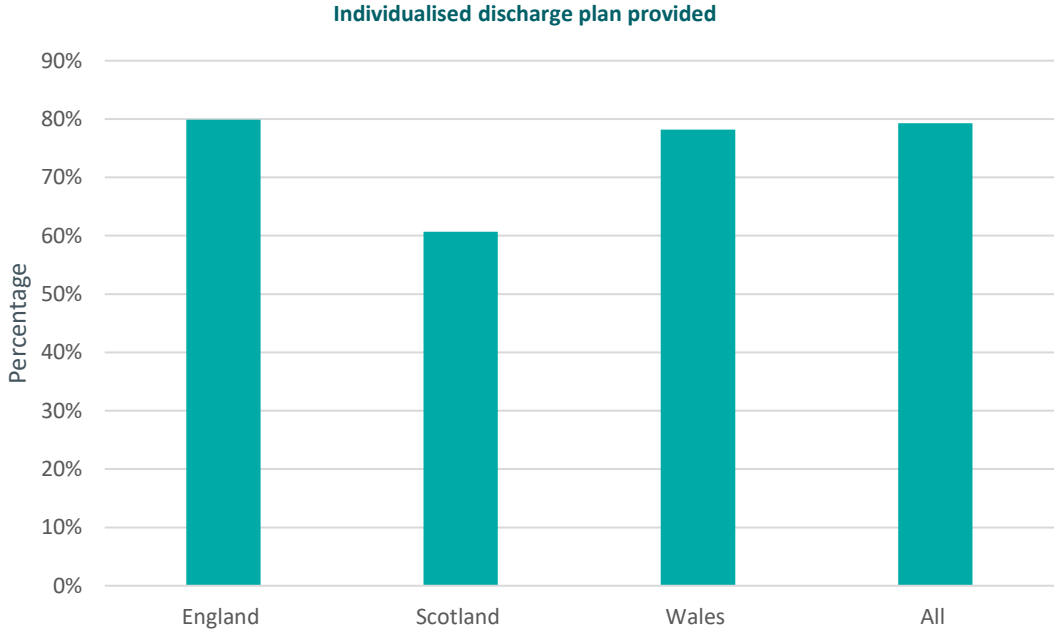
In the unadjusted analyses, those with a higher IMD score, a higher age (except for those aged 85+) and a lower CAT score were more likely to attend their discharge assessment in both the adjusted and unadjusted analyses. Those with a cardiovascular disease history, musculoskeletal disease history, serious mental illness, anxiety or depression, were less likely to attend their discharge assessment in the unadjusted analyses. However, after adjusting for all other variables, only a history of cardiovascular disease and depression remained statistically significant. In the unadjusted analysis, those who were female were less likely to attend their discharge assessment; however, this association did not reach statistical significance in the adjusted analysis.

7.1.4 Number of patients receiving an individualised discharge plan*

	2019			
Patients receiving individualised discharge plan	**England (n=3,617)**	**Scotland (n=107)**	**Wales (n=124)**	**All (n=3,848)**
Yes	2,890 (79.9%)	65 (60.7%)	97 (78.2%)	3,052 (79.3%)

** Of those patients who had a discharge assessment*

Fig 7.2 If discharge assessment performed, % of patients receiving an individualised written discharge exercise plan

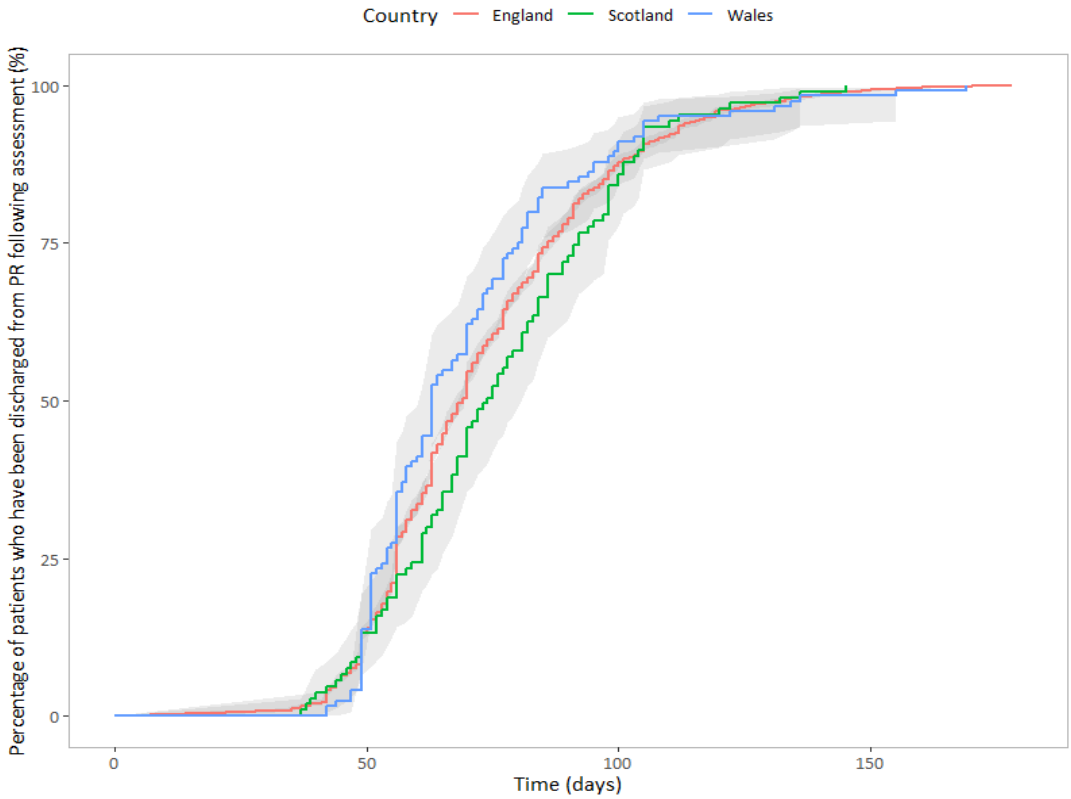


7.1.5 Days from initial assessment to discharge assessment*

	2019			
Days from initial assessment to discharge assessment	**England (n=3,617)**	**Scotland (n=107)**	**Wales (n=124)**	**All (n=3,848)**
Median (IQR)**	69 (56–86)	74 (61–92)	63 (54–80)	69 (56–86)

** Refer to table 3.2.1 for the referral to start time for PR to understand were the blocks may be*
*** Interquartile range*

Fig 7.3 Percentage of patients who have been discharged from PR following assessment*



**Denominator for Fig 7.3 is all those patients discharged from pulmonary rehabilitation.*

3 **National QI priority:** Ensure 70% of patients enrolled for PR go on to have a discharge assessment. (***BTS quality standards for pulmonary rehabilitation in adults (2014). Standards 4***)[1]

Rationale

There are substantial patient-centred benefits of completing PR, namely a marked improvement in exercise capacity and health status. There is also an association between PR completion and lower hospital admission rates at 180 days.[3]

Tips to achieve this priority

- Incorporate a process to contact patients who have stopped attending to encourage completion.
- Involve graduates from rehabilitation with the programme to support completion.
- Ensure the patient receives clear information about the rehabilitation programme and the required commitment.

Section 8: Discharge tests

Back to contents

Key standards

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 8]:[1] People attending PR have the outcome of treatment assessed using as a minimum, measures of exercise capacity, dyspnoea and health status.

BTS quality standards for pulmonary rehabilitation in adults (2014) [Standard 9]: [1] PR programmes conduct an annual audit of individual outcomes and progress.

Key findings

Of patients completing a discharge assessment:

- for those with a medical research council (MRC) score reported at initial and discharge assessment, 41.9% reported an improved score.
- 67.2% who performed the 6-minute walk test (6MWT) achieved improvements in exercise capacity and 53.4% who performed the incremental shuttle walk test (ISWT) achieved improvements.
- 58.0% who completed the COPD assessment test (CAT) achieved improvements in health status and 58.6% who completed the dyspnoea domain of the chronic respiratory questionnaire (CRQ) achieved improvements.

Navigation

This section contains the following tables and graphs. If you are viewing this report on a computer, you can select the table that you wish to see from the list below.

8.1 What was the patient-reported Medical Research Council (MRC) score at discharge?

	2019			
MRC score*	England (n=3,617)	Scotland (n=107)	Wales (n=124)	All (n=3,848)
Grade 1	184 (5.1%)	2 (1.9%)	6 (4.8%)	192 (5.0%)
Grade 2	940 (26.0%)	10 (9.3%)	33 (26.6%)	983 (25.5%)
Grade 3	1,061 (29.3%)	19 (17.8%)	32 (25.8%)	1,112 (28.9%)
Grade 4	521 (14.4%)	7 (6.5%)	38 (30.6%)	566 (14.7%)
Grade 5	66 (1.8%)	1 (0.9%)	3 (2.4%)	70 (1.8%)
Not recorded	845 (23.4%)	68 (63.6%)	12 (9.7%)	925 (24.0%)

** N = people who received a discharge assessment*

8.1.1 MRC score at assessment and at discharge

The answers in the table below have been calculated using the answers to 7.1 (MRC score at discharge) and 3.5 (MRC score at initial assessment).

MRC grade was known at both initial and discharge assessments for 2,892 patients. In 1,211 (41.9%) patients the MRC grade improved (green shading), in 1,503 (52.0%) it stayed the same (orange shading) and in 178 (6.2%) it was worse (red shading).

Score at discharge (top) Score at initial assessment (left)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Not recorded
Grade 1	44	23	1	1	0	11
Grade 2	91	403	57	9	0	152
Grade 3	40	392	618	64	5	327
Grade 4	14	136	373	392	18	214
Grade 5	0	19	49	97	46	45
Not recorded	3	10	14	3	1	176

8.2 Walk tests

8.2.1 Walk tests recorded at discharge assessment

	2019			
Test recorded at discharge assessment	England (n=3,534)	Scotland (n=107)	Wales (n=120)	All (n=3,761)
Incremental shuttle walk test (ISWT)	1,541 (43.6%)	30 (28.0%)	20 (16.7%)	1,591 (42.3%)
6-minute walk test (6MWT)	1,521 (43.0%)	56 (52.3%)	96 (80.0%)	1,673 (44.5%)
Incremental shuttle walk test (ISWT) + Endurance shuttle walk test (ESWT)	363 (10.3%)	0 (0.0%)	0 (0.0%)	363 (9.7%)
None	109 (3.1%)	21 (19.6%)	4 (3.3%)	134 (3.6%)

8.2.2 Difference in walk test values between initial assessment and discharge assessment

	2019			
Median difference (IQR)*, **	**England (n=3,534)**	**Scotland (n=107)**	**Wales (n=120)**	**All (n=3,761)**
ISWT (mins) (n=1,952)	50 (10–90)	50 (20–85)	60 (40–90)	50 (10–90)
6MWT (mins) (n=1,675)	50 (20–97)	40 (9–90)	40 (18–66)	50 (20–92)
ESWT (secs) (n=393)	239 (80–581)	70 (23–175)	0 (0–0)	225 (73–564)

** Interquartile range. N = people who received any test (including those who received ESWT but not ISWT or 6MWT).*
*** It is important to note that the data in this table only refers to those who received a discharge assessment and performed a walk test at discharge.*

8.3 Difference between initial assessment and discharge assessment in walk test values: tests meeting MCID

The scientific evidence provides thresholds for changes in these outcome measures that are judged important by patients (termed the minimal clinically important difference (MCID)).[5, 6] For the ISWT the MCID is 48 metres[b] and for the 6MWT the MCID is 30 metres. For the ESWT the scientific evidence for the MCID is less clear and is therefore not reported in this audit.

8.3.1 ISWT and 6MWT scores meeting MCID

	2019			
ISWT and 6MWT meeting MCID	**England (n=1,902)**	**Scotland (n=30)**	**Wales (n=20)**	**All (n=1,952)**
ISWT				
Yes	1,013 (53.3%)	16 (53.3%)	14 (70.0%)	1,043 (53.4%)
	(n=1,523)	**(=56)**	**(n=96)**	**(n=1,675)**
6MWT				
Yes	1,030 (67.6%)	35 (62.5%)	61 (63.5%)	1,126 (67.2%)

[b] Although some evidence now suggests that this is actually 35–36 metres (**Thorax. 2019 Oct;74(10):994–95**)

8.3.2 Relationship between demographic characteristics and meeting at the MCID for exercise

	2019			
Variable	**Unadjusted odds ratio***	**Unadjusted odds ratio 95% confidence interval**	**Adjusted odds ratio***	**Adjusted odds ratio 95% confidence interval**
Female	1.01	0.88–1.16	0.96	0.83–1.1
Quintile of Index of Multiple Deprivation, England (IMD) / Welsh Index of Multiple Deprivation (WIMD) / Scotland (SIMD)				
1	1	-	1	-
2	1.15	0.92–1.45	1.18	0.94–1.48
3	1.00	0.80–1.26	1.06	0.84–1.33
4	0.93	0.74–1.17	1.01	0.80–1.27
5	0.84	0.66–1.07	0.92	0.72–1.17
Age				
35–44	1.42	0.57–3.51	1.41	0.57–3.51
45–54	1.73	1.20–2.51	1.70	1.17–2.48
55–64	1.26	1.03–1.54	1.25	1.02–1.53
65–74	1	-	1	-
75–84	0.86	0.73–1.02	0.88	0.74–1.04
85+	0.88	0.61–1.28	0.89	0.62–1.29
Comorbidities				
Cardiovascular history	0.95	0.82–1.10	0.97	0.83–1.13
Musculoskeletal history	1.25	1.07–1.45	1.27	1.09–1.48
Serious mental illness	1.32	0.68–2.55	1.04	0.54–2.03
Anxiety	1.17	0.91–1.49	1.00	0.76–1.32
Depression	1.21	0.96–1.53	1.06	0.81–1.38
CAT score at initial visit				
0–10	0.96	0.72–1.27	1.04	0.78–1.38
11–20	0.85	0.71–1.02	0.91	0.76–1.09
21–30	1	-	1	-
31–40	0.99	0.73–1.33	0.92	0.68–1.25

**Centre remains as a random intercept–account for clustering*
***Adjusted for all other variables in the model*

People with musculoskeletal disease history and those who were younger tended to be more likely to meet their MCID for a walk test. It is worth noting that the analysis does not include those who did not receive a discharge assessment, and so variables associated with an increased likelihood of meeting the MCID may in fact also be associated with an increased likelihood of not completing a discharge assessment.

8.4 Health status questionnaires

8.4.1 Health status questionnaires recorded for those patients who completed at both initial and discharge assessments

	2019			
Health status questionnaire recorded at discharge assessment	**England (n=2,552)**	**Scotland (n=47)**	**Wales (n=109)**	**All (n=2,708)**
COPD assessment test (CAT)	2,552 (95.6%)	47 (94.0%)	109 (98.2%)	2,708 (95.7%)
Chronic respiratory questionnaire (CRQ)	**(n=1,372)**	**(n=31)**	**(n=22)**	**(n=1,425)**
CRQ	1,372 (97.7%)	31 (91.2%)	22 (100.0%)	1,425 (97.6%)

8.4.2 Difference in health status questionnaire values between initial assessment and discharge assessment

	2019			
Mean difference (95% CI*)	**England (n=2,552)**	**Scotland (n=47)**	**Wales (n=109)**	**All (n=2,708)**
CAT values (n=2,708)	–2 (–6–1)	–3 (–6.5–2)	–3 (–7–1)	–2 (–6–1)
CRQ	**(n=1,372)**	**(n=31)**	**(n=22)**	**(n=1,425)**
CRQ – Dyspnoea (n=1,425)*	0.8 (0.0–1.6)	1.0 (-0.2–1.7)	0.1 (-0.4–1.6)	0.8 (0.0–1.6)
CRQ – Fatigue (n=1,425)*	0.7 (0.0–1.5)	0.8 (-0.4–1.6)	0.8 (0.0–1.4)	0.7 (0.0–1.5)
CRQ – Emotion (n=1,425)*	0.6 (0.0–1.3)	0.6 (0.1–1.0)	0.2 (-0.2–1.1)	0.6 (0.0–1.3)
CRQ – Mastery (n=1,425)*	0.7 (0.0–1.5)	0.5 (0.3–1.1)	0.0 (-0.3–0.6)	0.5 (0.0–1.5)

** 95% confidence interval*

8.5 Difference between initial assessment and discharge assessment in health status questionnaire values: change data in relation to MCID

The scientific literature provides thresholds for changes in these health status outcome measures that are judged important by patients (termed the minimal clinically important difference (MCID).[7 8] For the CAT the MCID is a reduction in 2 points and for the CRQ the MCID is an increase in 0.5 points for each domain.

8.5.1 Health status questionnaire scores meeting MCID

	2019			
Meeting MCID	**England (n=2,552)**	**Scotland (n=47)**	**Wales (n=109)**	**All (n=2,708)**
CAT values	1,481 (58.0%)	27 (57.4%)	63 (57.8%)	1,571 (58.0%)
CRQ	**(n=1,372)**	**(n=31)**	**(n=22)**	**(n=1,425)**
Dyspnoea values	809 (59.0%)	18 (58.1%)	8 (36.4%)	835 (58.6%)
Fatigue values	810 (59.0%)	18 (58.1%)	13 (59.1%)	841 (59.0%)
Emotion values	739 (53.9%)	17 (54.8%)	9 (40.9%)	765 (53.7%)
Mastery values	808 (58.9%)	16 (51.6%)	6 (27.3%)	830 (58.2%)

8.5.2 Association between demographic characteristics and meeting MCID for at least one health status

	2019			
Variable	Unadjusted odds ratio*	Unadjusted odds ratio 95% confidence interval	Adjusted odds ratio**	Adjusted odds ratio 95% confidence interval
Female	1.03	0.88–1.21	0.99	0.84–1.17
Quintile of Index of Multiple Deprivation, England (IMD) / Welsh Index of Multiple Deprivation (WIMD) / Scotland (SIMD)				
1	1	-	1	-
2	1.16	0.90–1.51	1.26	0.97–1.64
3	0.98	0.76–1.27	1.06	0.82–1.38
4	0.92	0.71–1.19	1.09	0.84–1.43
5	0.86	0.66–1.14	1.05	0.79–1.39
Age				
35–44	2.91	0.81–10.43	2.61	0.68–9.96
45–54	0.79	0.53–1.18	0.61	0.40–0.92
55–64	0.90	0.72–1.12	0.78	0.62–0.98
65–74	1	-	1	-
75–84	0.82	0.68–0.98	0.87	0.72–1.06
85+	0.79	0.53–1.18	0.88	0.58–1.33
Comorbidities				
Cardiovascular history	1.15	0.97–1.36	1.11	0.93–1.32
Musculoskeletal history	1.26	1.06–1.49	1.15	0.97–1.38
Serious mental illness	3.29	1.24–8.74	3.16	1.13–8.87
Anxiety	1.18	0.89–1.55	0.87	0.63–1.20
Depression	1.50	1.14–1.96	1.30	0.95–1.78
CAT score at initial visit				
0–10	0.24	0.17–0.32	0.24	0.17–0.32
11–20	0.62	0.51–0.76	0.63	0.51–0.76
21–30	1	-	1	-
31–40	2.33	1.61–3.37	2.34	1.61–3.42

**Centre remains as a random intercept to account for clustering*
***Adjusted for all other variables in the model*

Analyses show the association between each variable and the likelihood of meeting at least one MCID at discharge assessment. In the unadjusted analyses, a history of musculoskeletal disease, depression, and serious mental illness (SMI), and a higher CAT score at initial assessment were associated with an increased likelihood of meeting the MCID. In the analysis in which variables were adjusted for the effect of other variables, only a history of SMI and a higher CAT score at initial assessment remained associated with meeting the MCID. This may be because those with more serious disease and disease history find PR of greater benefit with regards to their perceived health status than those with milder disease and disease history. It is worth noting that the analysis does not include those who did not receive a discharge assessment, and so variables associated with an increased likelihood of meeting the MCID may in fact also be associated with an increased likelihood of not completing a discharge assessment.

Section 9:
Benchmarked key indicators

Back to contents

9.1 Benchmarking of key indicators for participating services

The process and outcome performance indicators identified in the dashboard (**Table 2**) have been chosen as they are:

- objective and easily recordable
- map to accepted quality standards (**Appendix B**)
- have been discriminatory in the current audit cycle
- can be quantitatively compared with national data.

Table 1. Rationale for each process and outcome measure

Benchmarking dashboard performance indicator	Rationale
Process items	
Start date offered within 90 days of receipt of referral (if known)	> Poor current performance nationally. > Maps to **QS1**.[1] > Improvement is likely to enhance patient outcomes, particularly PR uptake rates.
Patients undertaking practice walk test (for incremental shuttle walk test (ISWT) or 6-minute walk test (6MWT))	> Poor current performance nationally. > Maps to **QS8**. [1] > Performance of practice tests linked to better uptake and outcome in sub-analysis of 2015 audit.[3, 4] > Likely to improve clinical outcomes through more accurate exercise prescription.
Patients assessed for PR who go on to have a discharge assessment	> Substantial numbers of patients currently do not complete PR. > Improvement in completion rates would extend benefits of PR to larger number of patients. > Could reduce subsequent hospitalisation rates as suggested by 2015 outcomes report.[3] > Causes of non-completion are multifactorial and therefore will prompt quality improvement activity across the system.
Patients with a discharge assessment who receive a written discharge exercise plan	> Poor current performance nationally. > Maps to **QS7**. [1] > Improvement will increase the likelihood of benefits of PR being maintained in longer term.
Outcome items	
Patients experience an improvement in exercise capacity (evidenced by achieving the minimal clinically important differences (MCID) for ISWT or 6MWT)	> Key patient-centred measure of outcome. > May identify services where care processes are suboptimal. > Maps to **QS8.**[1]
Patients experience an improvement in health status (evidenced by achieving at least one health status MCID)	> Key patient-centred measure of outcome. > May identify services where care processes are suboptimal. > Maps to **QS8.**[1]

Table 2 shows the median, lower quartile and upper quartile for the key indicators that have been presented in the unadjusted benchmarking of services (**Table 3**). The values presented in Table 2 have been derived by the method shown visually in the box and whisker plot (**Fig 1**). More specifically, to create the 'box', data for each key indicator were ordered numerically from smallest (whisker; P0), to largest (whisker; P100) to find the median (P50), the middle point of the values, the data is divided into two halves. These two halves are then divided in half again, to identify the lower quartile (P25) and the upper quartile (P75).

Table 2. The median and interquartile ranges for each key indicator

	Process items				Outcome items	
Median and interquartile ranges %[c]	Start date within 90 days of receipt of referral*	Patients undertaking practice walk test	Patients assessed for PR who go on to have a discharge assessment	Patients with a discharge assessment who receive a written discharge exercise plan	Improvement in exercise capacity	Improvement in health status
Lower quartile	29	0	59	52	46	50
Median	63	10	71	98	61	72
Upper quartile	84	88	84	100	75	90

** This metric is only reported for non-AECOPD patients. Data is not directly comparable to the 2017 snapshot audit, as data was reported for all patients in 2017.*[9]

The colours refer to the quartile in which each result lies:

Red = Result equal to or below lower quartile for that indicator

Amber = Result above lower quartile but below upper quartile for that indicator

Green = Result equal to or above upper quartile for that indicator

<5 = Sample size too small for meaningful interpretation (<5 records)

[c] The cut-points for the third and fifth indicator suggest excessive clustering at the extremes.

Fig 1. Box and whisker plot

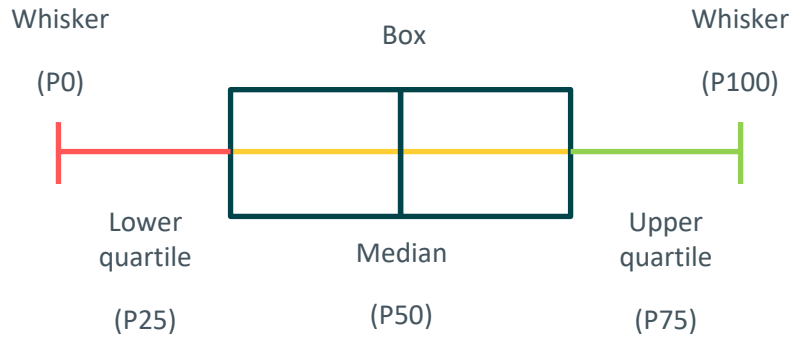


Table 3. Unadjusted benchmarking of key indicators for participating services in England, Scotland and Wales

This benchmarking data is provided for patients that were assessed between 1 March and 31 May 2019 and discharged by 31 August 2019. The data represents in total over 6,000 patients. This table provides service data for four process and two outcome performance indicators that map onto the BTS quality standards.[1]

Process

- Start date within 90 days of receipt of referral
- Patients undertaking practice walk test
- Patients enrolled for PR who go on to have a discharge assessment
- Patients with a discharge assessment who received a written individualised exercise plan

Outcomes

- Improvement in exercise capacity
- Improvement in health status

These outcomes have been selected based on previous data reports and allow a comparison with the national medians and performance.

It is important to note that the wait times as presented in this report may be shorter than might be reported from a longer data capture period. Patients with a protracted journey through the programme have be excluded from the analysis in this report. This is because, while individuals may have been assessed between 1 March and 31 May 2019, they may not have completed the PR programme before 31 August 2019, and this is likely to be because of delays between assessment and commencing PR.

However, data for the other process and outcomes indicators will be representative of the patient cohort reported and can be used to help PR services to understand their performance against these indicators. We hope that services will use this data to check whether their performance has improved in the next report.

For some services the number of patients entered is very low and makes interpretation at a local level difficult. Services with less than five data points to analyse have been included in the table in name only; their data has been supressed as per the NACAP policy for supressing small numbers if there is a risk of individual patients being identified.

Table 3. Benchmarked key indicators for pulmonary rehabilitations services 2019

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
England														
Airedale NHS Foundation Trust	Airedale, Wharfedale and Craven Pulmonary Rehabilitation Service	20	6	33%	<5	-	13	68%	10	77%	8	67%	6	46%
Anglian Community Enterprise Community Interest Company (ACE CIC)	ACE Pulmonary Rehabilitation Service	34	18	62%	21	66%	21	68%	21	100%	7	37%	18	90%
Atrium Health Ltd	Atrium Coventry and Warwickshire Pulmonary Rehabilitation Service	11	10	100%	0	0%	10	91%	10	100%	5	50%	8	89%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Barnet, Enfield and Haringey Mental Health NHS Trust	Enfield Respiratory Service	13	<5	-	7	54%	6	50%	6	100%	<5	-	<5	-
Barts Health NHS Trust	Tower Hamlets Pulmonary Rehabilitation Service	14	8	67%	9	64%	8	67%	8	100%	5	62%	<5	-
Bedford Hospital NHS Trust	Bedford Hospital Pulmonary Rehabilitation	89	71	92%	<5	-	49	60%	49	100%	26	62%	23	47%
Berkshire Healthcare NHS Foundation Trust	Berkshire West Cardiac and Respiratory Specialist Services	47	5	13%	0	0%	28	61%	28	100%	10	36%	15	54%
Birmingham Community Healthcare NHS Foundation Trust	BCHC Community Respiratory Service	21	12	60%	20	100%	16	76%	16	100%	7	47%	15	94%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Blackpool Teaching Hospitals NHS Foundation Trust	Pulmonary Rehabilitation Service Fylde and Wyre	30	17	68%	0	0%	19	63%	19	100%	11	65%	-	-
BOC LTD	Blackpool Pulmonary Rehabilitation Service	27	22	85%	0	0%	23	85%	8	35%	19	83%	15	65%
BOC LTD	Bradford Pulmonary Rehabilitation Service	47	29	74%	0	0%	27	69%	26	96%	18	67%	13	48%
BOC LTD	East Staffordshire Pulmonary Rehabilitation Service	6	5	83%	6	100%	<5	-	0	0%	<5	-	<5	-
BOC LTD	Hounslow Community Respiratory Team	13	7	88%	7	54%	12	92%	12	100%	8	67%	5	45%
BOC LTD	Newcastle Healthy Lungs Programme	30	19	95%	15	56%	25	93%	<5	-	23	96%	18	72%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
BOC LTD	Nottingham West Pulmonary Rehabilitation	12	<5	-	0	0%	12	100%	<5	-	10	83%	8	67%
BOC LTD	Somerset Pulmonary Rehabilitation Service	28	16	76%	0	0%	23	96%	22	96%	17	74%	14	61%
BOC LTD	South East Staffordshire Pulmonary Rehabilitation Service	27	23	85%	26	96%	18	67%	<5	-	14	78%	9	50%
BOC LTD	The North Lincolnshire Respiratory Service	17	14	93%	0	0%	15	88%	13	87%	14	93%	8	53%
BOC LTD	West Norfolk BOC Pulmonary Rehabilitation Service	40	24	77%	0	0%	25	76%	0	0%	16	67%	8	35%
Bristol Community Health	Bristol Community Respiratory Service	62	13	27%	44	77%	39	72%	36	92%	33	87%	21	81%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Bromley Healthcare	Bromley Pulmonary Rehabilitation	58	34	61%	0	0%	42	75%	41	98%	27	64%	37	88%
Buckinghamshire Healthcare NHS Trust	Buckinghamshire Pulmonary Rehabilitation Services	79	6	9%	0	0%	62	95%	8	13%	33	53%	36	60%
Calderdale and Huddersfield NHS Foundation Trust	Calderdale Pulmonary Rehabilitation Service	25	15	75%	<5	-	20	91%	19	95%	10	50%	19	95%
Cambridgeshire and Peterborough NHS Foundation Trust	Huntingdon Pulmonary Rehabilitation	10	7	70%	0	0%	10	100%	0	0%	8	80%	5	56%
Cambridgeshire Community Services NHS Trust	Luton Community Respiratory Service	18	10	100%	0	0%	12	71%	0	0%	5	42%	6	50%
Care Plus Group	Hope Street Specialist Service	52	29	67%	0	0%	28	54%	28	100%	16	59%	13	50%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		-		-		-	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Central and North West London NHS Foundation Trust	Camden COPD and Home Oxygen Service	23	15	79%	18	82%	15	65%	15	100%	9	60%	11	73%
Central and North West London NHS Foundation Trust	Milton Keynes Community Pulmonary Rehabilitation Service	28	8	31%	0	0%	19	68%	19	100%	15	83%	10	53%
Central London Community Healthcare NHS Trust	Barnet COPD Respiratory Service	40	33	94%	32	89%	24	65%	24	100%	15	62%	11	46%
Central London Community Healthcare NHS Trust	Harrow COPD Respiratory Service	14	9	100%	14	100%	11	79%	10	91%	9	82%	10	91%
Central London Community Healthcare NHS Trust	Merton Pulmonary Rehabilitation Service	36	27	96%	28	97%	12	43%	<5	-	8	67%	8	73%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Central London Community Healthcare NHS Trust	West Hertfordshire Community Respiratory Service	66	34	57%	6	10%	48	77%	45	94%	18	42%	22	47%
Cheshire and Wirral Partnership NHS Foundation Trust	Cheshire and Wirral Partnership Respiratory Service	32	6	19%	<5	-	26	81%	26	100%	14	58%	22	85%
City Health Care Partnership CIC	East Riding Pulmonary Rehabilitation Programme	11	<5	-	<5	-	9	82%	5	56%	<5	-	7	78%
City Health Care Partnership CIC	Hull Pulmonary Rehabilitation Team	5	0	0%	<5	-	<5	-	<5	100%	<5	100%	<5	100%
Cornwall Partnership NHS Foundation Trust	Integrated Community Respiratory Team East Cornwall (ICRTEC)	17	<5	-	7	41%	13	76%	13	100%	12	92%	13	100%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Cornwall Partnership NHS Foundation Trust	Mid, West, North Cornwall Pulmonary Rehabilitation Programme	9	0	0%	0	0%	<5	-	<5	50%	0	0%	<5	-
County Durham and Darlington NHS Foundation Trust	Darlington Pulmonary Rehabilitation	<5	<5	100%	0	0%	<5	100%	<5	100%	0	0%	0	0%
County Durham and Darlington NHS Foundation Trust	Durham Dales Easington and Sedgefield (DDES) Pulmonary Rehabilitation Programme	32	20	71%	0	0%	25	78%	11	44%	11	46%	11	48%
County Durham and Darlington NHS Foundation Trust	North Durham Pulmonary Rehabilitation	6	5	83%	<5	-	5	83%	0	0%	5	100%	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
Croydon Health Services NHS Trust	Croydon Pulmonary Rehabilitation Programme	38	20	80%	16	46%	16	53%	14	88%	10	62%	13	93%
CSH Surrey	CSH Surrey Pulmonary Rehabilitation Programme	29	6	23%	18	62%	18	62%	13	72%	12	67%	11	61%
CSH Surrey	North West Surrey Respiratory Care Team	15	<5	-	15	100%	13	93%	0	0%	9	69%	13	100%
Derbyshire Community Health Services NHS Foundation Trust	North Derbyshire Community Respiratory Service	14	0	0%	<5	-	10	71%	9	90%	8	89%	9	90%
Doncaster And Bassetlaw Teaching Hospitals NHS Foundation Trust	Doncaster Pulmonary Rehabilitation Services	60	41	84%	0	0%	33	60%	15	45%	20	62%	24	92%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Dorset County Hospital NHS Foundation Trust	Dorset Pulmonary Rehabilitation service	33	21	88%	25	81%	25	86%	19	76%	15	62%	12	50%
Dorset Healthcare University NHS Foundation Trust	Dorset Healthcare Pulmonary Rehabilitation Programme	63	16	41%	32	76%	23	57%	0	0%	14	74%	12	71%
East Cheshire NHS Trust	East Cheshire Pulmonary Rehabilitation Service	10	7	88%	0	0%	8	80%	8	100%	<5	-	<5	-
East Lancashire Hospitals NHS Trust	ELHT Pulmonary Rehabilitation Service	24	10	56%	0	0%	15	62%	8	53%	9	69%	-	-
East Suffolk and North Essex NHS Foundation Trust	East Suffolk Pulmonary Rehabilitation Service	84	29	41%	46	55%	58	70%	29	50%	33	57%	33	57%
East Sussex Healthcare NHS Trust	Regional East Sussex Pulmonary Service (RESPS)	35	14	42%	31	91%	22	67%	22	100%	5	23%	15	68%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Essex Partnership University NHS Foundation Trust	EPUT Pulmonary Rehabilitation Programme	23	12	57%	<5	-	19	83%	0	0%	7	37%	11	58%
First Community Health and Care CIC	First Community Health and Care – Surrey Community Respiratory Service	12	<5	-	11	100%	8	73%	8	100%	<5	-	<5	-
Frimley Health NHS Foundation Trust	AIR Service	44	14	78%	25	61%	26	81%	26	100%	21	81%	24	92%
Gateshead Health NHS Foundation Trust	Gateshead Acute Pulmonary Rehabilitation Service	24	<5	-	0	0%	8	67%	0	0%	<5	-	5	83%
George Eliot Hospital NHS Trust	George Eliot Hospital Pulmonary Rehabilitation – Physiotherapy	10	5	62%	0	0%	10	100%	7	70%	8	80%	5	71%
Gloucestershire Care Services NHS Trust	One Gloucestershire Respiratory Service	40	21	66%	<5	-	29	74%	<5	-	17	59%	23	82%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Guy's and St Thomas' NHS Foundation Trust	St Thomas' Hospital Pulmonary Rehabilitation Programme	55	15	48%	37	80%	18	46%	18	100%	8	44%	5	28%
Harrogate and District NHS Foundation Trust	Harrogate Respiratory and Cardiac Physiotherapy	18	10	71%	<5	-	12	86%	12	100%	10	91%	10	100%
Hertfordshire Community NHS Trust	Hertfordshire Community Pulmonary Rehab Service	96	50	64%	28	29%	56	62%	54	96%	32	59%	40	73%
Homerton University Hospital NHS Foundation Trust	Homerton Adult Cardiorespiratory Enhanced and Responsive service (ACERs)	18	6	43%	15	88%	7	41%	7	100%	<5	-	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Hounslow and Richmond Community Healthcare NHS Trust	Richmond Respiratory Care Team	15	12	86%	15	100%	11	73%	11	100%	6	55%	5	45%
Imperial College Healthcare NHS Trust	Central and West London Pulmonary Rehabilitation Service	26	<5	-	25	96%	19	76%	19	100%	7	37%	18	95%
Imperial College Healthcare NHS Trust	Hammersmith & Fulham Cardio-Respiratory Service	20	6	40%	18	100%	6	40%	6	100%	<5	-	6	100%
Isle of Wight NHS Trust	St Mary's Hospital Pulmonary Rehabilitation Programme	13	<5	-	0	0%	12	92%	0	0%	<5	-	6	50%
James Paget University Hospitals NHS Foundation Trust	BEET: Breathing, Exercise, Education Training	22	15	71%	-	-	19	86%	14	74%	-	-	13	93%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Kent Community Health NHS Foundation Trust	Kent Community Health Pulmonary Rehabilitation Team	147	29	25%	127	95%	105	81%	104	99%	56	54%	50	50%
Kettering General Hospital NHS Foundation Trust	Rocket Team Kettering General Hospital	70	43	75%	30	97%	35	51%	35	100%	15	88%	19	59%
King's College Hospital NHS Foundation Trust	King's College Hospital Pulmonary Rehabilitation Team	34	<5	-	0	0%	16	53%	12	75%	8	50%	8	53%
Lancashire Care NHS Foundation Trust	Blackburn with Darwen Pulmonary Rehabilitation Team	10	5	83%	<5	-	7	78%	7	100%	<5	-	<5	-
Lancashire Care NHS Foundation Trust	Central Lancashire Pulmonary Rehabilitation Service	53	22	49%	37	71%	32	60%	32	100%	15	48%	17	89%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Leeds Community Healthcare NHS Trust	Leeds Community Healthcare, Community Respiratory Service	23	5	38%	0	0%	15	75%	15	100%	7	47%	7	70%
Leicestershire Partnership NHS Trust	Leicestershire Partnership Pulmonary Rehabilitation Team	54	28	54%	51	94%	45	83%	45	100%	19	45%	39	89%
Lewisham and Greenwich NHS Trust	Guy's and St Thomas' NHS Foundation Trust	21	16	84%	19	90%	6	32%	0	0%	5	83%	5	83%
Lincolnshire Community Health Services NHS Trust	Lincolnshire Community Health Services Pulmonary Rehabilitation Service	12	<5	-	12	100%	12	100%	12	100%	<5	-	11	92%
Liverpool Heart and Chest Hospital NHS Foundation Trust	Knowsley Community Respiratory Service	28	12	57%	17	74%	14	64%	13	93%	7	78%	9	75%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Liverpool Heart and Chest Hospital NHS Foundation Trust	The Breathe Programme	56	40	87%	0	0%	25	50%	21	84%	7	50%	-	-
Liverpool University Hospitals NHS Foundation Trust	Aintree Pulmonary Rehabilitation Programme	<5	<5	100%	<5	100%	0	0%	-	-	-	-	-	-
Livewell Southwest	Livewell SW Community Respiratory Service	23	18	86%	0	0%	16	70%	15	94%	14	93%	9	60%
Locala Community Partnerships CIC	Greater Huddersfield Pulmonary Rehabilitation Service	14	10	83%	0	0%	10	71%	6	60%	<5	-	6	86%
London North West University Healthcare NHS Trust	Brent Pulmonary Rehabilitation Service	<5	<5	100%	<5	100%	<5	100%	<5	100%	<5	100%	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
London North West University Healthcare NHS Trust	Ealing Pulmonary Rehabilitation service	<5	<5	100%	<5	-	<5	-	<5	100%	<5	100%	<5	100%
Luton and Dunstable University Hospital NHS Foundation Trust	Luton and Dunstable Hospital Pulmonary Rehabilitation Service	70	36	63%	13	19%	53	76%	52	98%	26	49%	30	57%
Maidstone and Tunbridge Wells NHS Trust	West Kent Pulmonary Rehabilitation Service	41	7	21%	33	82%	34	85%	33	97%	10	29%	19	56%
Manchester University NHS Foundation Trust	Manchester Community Respiratory Service	36	21	88%	0	0%	14	54%	5	36%	7	54%	9	69%
Manchester University NHS Foundation Trust	Manchester Integrated Lung Service – Central site	24	13	76%	0	0%	10	43%	<5	-	7	78%	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
Manchester University NHS Foundation Trust	Manchester Royal Infirmary Pulmonary Rehabilitation Service	9	5	83%	<5	-	<5	-	<5	50	<5	-	<5	100%
Medway Community Healthcare	Medway Community Respiratory Team	45	19	43%	45	100%	32	73%	32	100%	23	74%	24	75%
Mersey Care NHS Foundation Trust	Sefton Community Respiratory Service	24	6	32%	0	0%	15	62%	15	100%	12	80%	10	67%
Mid Cheshire Hospitals NHS Foundation Trust	Central Cheshire Integrated Care Partnership Pulmonary Rehabilitation Service	32	<5	-	0	0%	27	84%	14	52%	12	44%	0	0%
Mid Yorkshire Hospitals NHS Trust	Mid Yorkshire Therapy Services – Community Pulmonary Rehabilitation	49	33	85%	49	100%	24	49%	24	100%	15	65%	22	96%
Midlands Partnership NHS Foundation Trust	Midland Partnership South Respiratory Team	23	17	100%	11	48%	20	87%	20	100%	11	55%	15	75%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
Midlands Partnership NHS Foundation Trust	Midlands Partnership – North Staffordshire and Stoke on Trent Pulmonary Rehabilitation Team	102	29	41%	25	26%	57	61%	57	100%	47	82%	48	84%
Norfolk and Norwich University Hospitals NHS Foundation Trust	Norfolk and Norwich Pulmonary Rehabilitation Service	6	0	0%	6	100%	<5	-	0	0%	<5	-	<5	-
Norfolk Community Health and Care NHS Trust	Norfolk Community Pulmonary Rehabilitation Service	75	44	60%	0	0%	74	99%	0	0%	46	63%	56	76%
North Bristol NHS Trust	North Bristol Lung Exercise and Education Programme (LEEP)	46	23	66%	0	0%	30	67%	30	100%	23	79%	28	93%
North Cumbria Integrated Care NHS Foundation Trust	Community COPD Team Carlisle	26	11	61%	25	100%	18	69%	17	94%	7	41%	15	83%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
North Cumbria Integrated Care NHS Foundation Trust	North Cumbria Hospitals Pulmonary Rehabilitation Programme	12	<5	100%	6	100%	<5	-	<5	100%	0	0%	<5	100%
North Cumbria Integrated Care NHS Foundation Trust	Solway Community Respiratory Team	11	0	0%	8	80%	7	78%	7	100%	<5	-	<5	100%
North Cumbria Integrated Care NHS Foundation Trust	West Cumbria Community Respiratory Team	38	6	22%	37	97%	29	78%	28	97%	13	45%	20	74%
North East London NHS Foundation Trust	Havering Respiratory Team	24	22	100%	23	96%	13	54%	13	100%	10	83%	5	38%
North East London NHS Foundation Trust	Integrated Respiratory Service – Basildon, Brentwood and Thurrock	8	<5	-	<5	-	7	88%	0	0%	<5	-	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
North East London NHS Foundation Trust	Redbridge Respiratory Service	30	<5	-	0	0%	10	67%	10	100%	<5	-	6	60%
North East London NHS Foundation Trust	Respiratory Services - Barking and Dagenham	14	<5	-	<5	-	6	43%	<5	-	5	83%	-	-
North East London NHS Foundation Trust	Waltham Forest Pulmonary Rehabilitation Service	34	20	71%	0	0%	8	28%	8	100%	<5	-	<5	-
North Somerset Community Partnership Community Interest Company	North Somerset Pulmonary Rehabilitation	36	8	24%	0	0%	25	76%	25	100%	15	62%	24	96%
North Tees and Hartlepool NHS Foundation Trust	North Tees and Hartlepool Pulmonary Rehabilitation Service	75	36	59%	0	0%	40	56%	40	100%	21	54%	17	44%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
North West Anglia NHS Foundation Trust	Peterborough Pulmonary Rehabilitation Service	25	16	64%	0	0%	14	56%	14	100%	14	100%	10	71%
North West Boroughs Healthcare NHS Foundation Trust	St. Helens Pulmonary Rehabilitation Service	62	37	74%	<5	-	27	44%	25	93%	8	38%	17	65%
Northampton General Hospital NHS Trust	Restart Team – Northampton General Hospital	28	10	71%	0	0%	19	68%	19	100%	10	62%	11	69%
Northern Devon Healthcare NHS Trust	North Devon Pulmonary Rehabilitation Service	9	<5	-	0	0%	7	88%	5	71%	<5	-	<5	-
Northumbria Healthcare NHS Foundation Trust	Northumbria Healthcare Pulmonary Rehabilitation Service	81	29	83%	53	88%	32	59%	28	88%	27	84%	29	91%
Nottingham Citycare Partnership	Nottingham Integrated Respiratory Service	59	39	68%	51	86%	44	75%	44	100%	26	62%	30	68%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Nottinghamshire Healthcare NHS Foundation Trust	Mansfield and Ashfield Respiratory Service	21	13	87%	0	0%	18	90%	18	100%	5	38%	12	80%
Nottinghamshire Healthcare NHS Foundation Trust	Nottingham North and East Adult Community Services	14	6	43%	10	71%	10	71%	10	100%	7	70%	9	90%
Nottinghamshire Healthcare NHS Foundation Trust	Rushcliffe Cardiorespiratory service	21	<5	-	17	89%	12	75%	12	100%	8	73%	10	83%
Oxford Health NHS Foundation Trust	Oxfordshire Pulmonary Rehabilitation Service	59	6	12%	<5	-	50	86%	30	60%	27	59%	23	50%
Oxleas NHS Foundation Trust	Greenwich Pulmonary Rehabilitation Team	17	9	100%	12	100%	8	89%	8	100%	6	75%	-	-
Pennine Acute Hospitals NHS Trust	Acute Respiratory Assessment Service (ARAS) COPD support team – North Manchester	40	18	50%	0	0%	16	42%	16	100%	15	94%	13	81%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Pennine Acute Hospitals NHS Trust	Enhanced Respiratory Service (ERS) – Rochdale Infirmary	<5	-	-	0	0%	<5	100%	<5	100%	<5	-	-	-
Pennine Acute Hospitals NHS Trust	Pennine Lung Service	51	14	29%	14	27%	23	47%	18	78%	13	57%	14	67%
Pennine Acute Hospitals NHS Trust	Pennine Pulmonary Rehabilitation – Fairfield Hospital	6	0	0%	0	0%	5	83%	0	0%	<5	-	<5	-
Pennine Care NHS Foundation Trust	Trafford Pulmonary Rehabilitation Service	38	10	29%	<5	-	25	68%	25	100%	18	75%	17	85%
Provide	Provide – Cambridgeshire Pulmonary Rehabilitation	15	14	93%	0	0%	15	100%	0	0%	9	60%	7	47%
Provide	Provide – Mid-Essex Pulmonary Rehabilitation	33	19	95%	29	94%	29	94%	14	48%	12	44%	17	61%
Respiricare Limited	Swale Pulmonary Rehabilitation	14	-	-	14	100%	13	93%	13	100%	10	77%	10	77%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Royal Berkshire NHS Foundation Trust	Royal Berkshire Hospital Pulmonary Rehabilitation Service	6	<5	-	6	100%	<5	-	<5	100%	<5	-	<5	100%
Royal Brompton & Harefield NHS Foundation Trust	Harefield Hospital Pulmonary Rehabilitation	78	46	96%	78	100%	51	70%	51	100%	19	37%	48	94%
Royal Brompton & Harefield NHS Foundation Trust	Royal Brompton Pulmonary Rehabilitation Service	<5	<5	100%	<5	100%	<5	100%	0	0%	0	0%	<5	100%
Royal Devon and Exeter NHS Foundation Trust	Royal Devon and Exeter Pulmonary Rehabilitation/Physiotherapy Service	7	<5	-	<5	-	7	100%	7	100%	<5	-	5	83%
Royal Surrey County Hospital NHS Foundation Trust	Royal Surrey Pulmonary Rehabilitation Programme	24	17	81%	24	100%	22	92%	22	100%	15	68%	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		-		-		-	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Royal United Hospitals Bath NHS Foundation Trust	RUH Respiratory Outpatient Department	<5	<5	100%	0	0%	<5	100%	0	0%	<5	-	-	-
Salford Royal NHS Foundation Trust	Salford's Breathing Better Pulmonary Rehabilitation Programme	25	12	71%	0	0%	21	95%	21	100%	8	38%	19	90%
Salisbury NHS Foundation Trust	Salisbury Lung Exercise and Education Programme (LEEP)	14	0	0%	13	93%	8	57%	7	88%	<5	-	8	100%
Sandwell and West Birmingham Hospitals NHS Trust	Sandwell and West Birmingham Community Respiratory Service	27	16	73%	27	100%	18	67%	17	94%	10	56%	17	94%
Sheffield Teaching Hospitals NHS Foundation Trust	Sheffield Community Pulmonary Rehabilitation Service	73	47	90%	5	8%	34	51%	34	100%	14	45%	14	58%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Shropshire Community Health NHS Trust	Shropshire Pulmonary Rehabilitation	30	12	44%	0	0%	26	90%	<5	-	18	75%	19	73%
Sirona Care & Health	South Gloucestershire Pulmonary Rehabilitation	15	12	92%	0	0%	10	67%	7	70%	8	80%	9	90%
Solent NHS Trust	Hampshire Pulmonary Rehabilitation Programme	<5	<5	-	0	0%	<5	100%	<5	100%	<5	-	<5	-
Solent NHS Trust	Portsmouth Pulmonary Rehabilitation Programme	<5	<5	-	0	0%	<5	-	<5	100%	0	0%	0	0%
Solent NHS Trust	Southampton Integrated COPD Team	60	40	91%	40	75%	31	63%	29	94%	21	68%	20	80%
South Tyneside and Sunderland NHS Foundation Trust	South Tyneside Pulmonary Rehabilitation Programme (Acute)	25	19	90%	0	0%	12	50%	12	100%	7	64%	5	42%

			Process items								Outcome items			
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
South Tyneside and Sunderland NHS Foundation Trust	Sunderland Community Pulmonary Rehabilitation Programme	18	10	83%	0	0%	7	54%	6	86%	<5	100%	<5	-
South Warwickshire NHS Foundation Trust	South Warwickshire Physiotherapy Services	9	<5	-	0	0%	7	78%	7	100%	<5	-	-	-
South West Yorkshire Partnership NHS Foundation Trust	South West Yorkshire Cardiac and Pulmonary Rehabilitation Service	32	27	87%	26	87%	27	84%	27	100%	23	96%	27	100%
Southend University Hospital NHS Foundation Trust	South East Essex Pulmonary Rehabilitation Service	92	73	96%	0	0%	72	79%	72	100%	54	77%	51	72%
Southern Health NHS Foundation Trust	West Hampshire Community Integrated Respiratory Service	60	40	70%	34	59%	40	69%	40	100%	23	68%	16	41%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Southport and Ormskirk Hospital NHS Trust	West Lancashire Pulmonary Rehabilitation	5	5	100%	0	0%	5	100%	5	100%	<5	100%	5	100%
St George's University Hospitals NHS Foundation Trust	Wandsworth Pulmonary Rehabilitation Service	7	<5	100%	5	71%	5	71%	<5	-	<5	-	<5	-
Stockport NHS Foundation Trust	Stockport Pulmonary & Heart Failure Rehabilitation Service	40	19	59%	0	0%	23	64%	22	96%	12	55%	8	38%
Sussex Community NHS Foundation Trust	COPD Coastal Service	<5	0	0%	0	0%	<5	-	0	0%	0	0%	<5	100%
Sussex Community NHS Foundation Trust	Crawley Horsham and Mid Sussex COPD Adult Community Services	43	28	85%	41	100%	22	63%	22	100%	<5	-	15	71%
Sussex Community NHS Foundation Trust	Sussex Community Respiratory Service Brighton and Hove	23	17	89%	21	95%	12	63%	12	100%	6	50%	9	75%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Sussex Community NHS Foundation Trust	The High Weald Lewis and Haven Community Respiratory Service	20	12	80%	18	100%	9	56%	<5	-	6	67%	8	100%
Tameside and Glossop Integrated Care NHS Foundation Trust	Tameside and Glossop Pulmonary Rehabilitation	14	0	0%	7	88%	<5	-	<5	100%	<5	-	<5	100%
The Dudley Group NHS Foundation Trust	Dudley Pulmonary Rehabilitation Programme	53	39	87%	33	66%	39	76%	38	97%	15	41%	36	95%
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	The Newcastle Hospitals Respiratory Services	15	7	70%	0	0%	8	57%	8	100%	5	62%	<5	-
The Rotherham NHS Foundation Trust	Rotherham Breathing Space	71	30	58%	69	99%	55	77%	53	96%	34	63%	41	75%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
The Royal Bournemouth And Christchurch Hospitals NHS Foundation Trust	The Bournemouth Hospital's Pulmonary Rehabilitation Service	<5	<5	100%	<5	100%	0	0%	-	-	-	-	-	-
The Royal Marsden NHS Foundation Trust	Sutton Community Respiratory Service	40	34	92%	37	92%	27	69%	27	100%	17	63%	25	93%
The Royal Wolverhampton NHS Trust	Wolverhampton Pulmonary Rehabilitation Service	8	8	100%	0	0%	<5	-	0	0%	<5	-	-	-
Torbay and South Devon NHS Foundation Trust	Torbay and South Devon Pulmonary Rehabilitation Programme	8	<5	-	0	0%	6	75%	6	100%	<5	-	5	83%
University Hospital Southampton NHS Foundation Trust	University Hospital Southampton Pulmonary Rehabilitation Programme	6	<5	-	5	83%	<5	-	<5	100%	<5	-	<5	100%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
University Hospitals Birmingham NHS Foundation Trust	Solihull Community Respiratory Team	42	16	73%	29	88%	14	47%	14	100%	12	86%	14	100%
University Hospitals Birmingham NHS Foundation Trust	University Hospitals Birmingham HGS Pulmonary Rehabilitation Programme	72	14	25%	65	96%	33	52%	32	97%	19	58%	29	94%
University Hospitals of Derby and Burton NHS Foundation Trust	Derby and Burton ImpACT+	54	13	28%	0	0%	37	70%	32	86%	25	74%	32	100%
University Hospitals of Leicester NHS Trust	Glenfield and Leicester Hospitals Pulmonary Rehabilitation Programme	91	13	35%	45	90%	26	52%	23	88%	10	43%	19	90%
Virgin Care Ltd	Surrey Heath Respiratory Care Team	14	<5	-	14	100%	12	86%	12	100%	-	-	10	83%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Virgin Care Ltd	Virgin Care Community Respiratory Service - Bath and North East Somerset	24	11	55%	0	0%	16	73%	6	38%	7	44%	7	64%
Walsall Healthcare NHS Trust	Walsall Pulmonary Rehabilitation Service	<5	<5	-	<5	-	0	0%	-	-	-	-	-	-
Warrington and Halton Hospitals NHS Foundation Trust	The Warrington & Halton Pulmonary Rehabilitation Service	69	40	65%	<5	-	45	66%	44	98%	18	43%	20	48%
West Suffolk NHS Foundation Trust	West Suffolk Pulmonary Rehabilitation Service	44	20	49%	8	20%	39	89%	23	59%	18	50%	28	72%
Western Sussex Hospitals NHS Foundation Trust	St Richards Hospital Pulmonary Rehabilitation	32	27	87%	32	100%	24	75%	24	100%	20	83%	19	79%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Western Sussex Hospitals NHS Foundation Trust	Worthing and Southlands Pulmonary Rehabilitation Programme	34	21	72%	34	100%	22	69%	22	100%	9	41%	17	85%
Whittington Health NHS Trust	Whittington Health Pulmonary Rehabilitation	54	42	98%	45	85%	34	72%	19	56%	22	65%	31	91%
Wiltshire Health and Care	Wiltshire Community Respiratory Team	27	11	50%	20	77%	17	77%	15	88%	8	47%	7	44%
Wirral University Teaching Hospital NHS Foundation Trust	Wirral COPD, Pulmonary Rehabilitation & Oxygen Service	56	27	56%	<5	-	42	79%	35	83%	16	40%	25	60%
Worcestershire Acute Hospitals NHS Trust	Worcestershire COPD Team	58	22	50%	45	83%	36	68%	36	100%	19	53%	22	61%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Wrightington, Wigan and Leigh NHS Foundation Trust	Wrightington Wigan & Leigh tier 2 Respiratory Services	<5	0	0%	0	0%	0	0%	-	-	-	-	-	-
Wye Valley NHS Trust	Herefordshire Pulmonary Rehabilitation Programme	19	<5	-	0	0%	17	94%	11	65%	9	53%	8	47%
York Teaching Hospital NHS Foundation Trust	York and Selby Pulmonary Rehabilitation	<5	0	0%	0	0%	<5	-	0	0%	<5	-	<5	100%
Your Healthcare	Your Healthcare Pulmonary Rehabilitation Service	16	11	69%	16	100%	16	100%	16	100%	13	81%	16	100%
Scotland														
NHS Grampian	Aberdeen City Health and Social Care Partnership pulmonary rehabilitation	41	12	50%	0	0%	32	78%	5	16%	16	50%	-	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			85%		100%		70%		-		-		-	
National result			2,792	58%	2,338	42%	3,848	69%	3,052	79%	2,169	60%	2,438	70%
NHS Grampian	Aberdeenshire Health and Social Care Partnership pulmonary rehabilitation	<5	<5	-	0	0%	<5	100%	0	0%	<5	-	-	-
NHS Grampian	Moray Health and Social Care Partnership pulmonary rehabilitation	5	<5	-	0	0%	<5	-	<5	100%	<5	100%	-	-
NHS Greater Glasgow, Clyde	Greater Glasgow and Clyde Pulmonary Rehabilitation Service	54	36	88%	0	0%	23	46%	23	100%	17	77%	15	65%
NHS Highland	Lochaber Pulmonary Rehabilitation Service	<5	-	-	0	0%	<5	100%	0	0%	<5	100%	<5	100%
NHS Highland	Raigmore Pulmonary Rehabilitation Service	<5	0	0%	0	0%	<5	100%	<5	67	<5	-	<5	100%
NHS Lanarkshire	Larnarkshire Self-Management and Pulmonary Rehabilitation	24	14	64%	0	0%	8	33%	0	0%	<5	-	<5	-

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
NHS Lothian	Lothian Community Pulmonary Rehabilitation Service	29	<5	-	0	0%	19	73%	19	100%	<5	100%	14	100%
NHS Tayside	Perth and Kinross Pulmonary Rehabilitation Service	23	5	28%	0	0%	15	65%	14	93%	8	57%	12	80%
Wales														
Aneurin Bevan University Local Health Board	Newport Pulmonary Rehabilitation	10	6	67%	0	0%	10	100%	0	0%	5	56%	8	89%
Aneurin Bevan University Local Health Board	Ysbyty Aneurin Bevan Pulmonary Rehabilitation	6	0	0%	0	0%	<5	-	0	0%	<5	-	<5	100%
Betsi Cadwaladr University Local Health Board	BCUHB – Centre Pulmonary Rehabilitation Service	29	<5	-	29	100%	19	66%	19	100%	11	58%	16	84%

			Process items						Outcome items					
Trust / health board name	Service name	Cases audited	Start date within 90 days of receipt of referral*		Patients undertaking practice exercise test		Patients enrolled for PR who go on to have a discharge assessment		Patients with a discharge assessment who received a written individualised exercise plan		Improvement in exercise capacity		Improvement in health status	
National QI aim			**85%**		**100%**		**70%**		-		-		-	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Betsi Cadwaladr University Local Health Board	BCUHB – East Pulmonary Rehabilitation Service	22	<5	-	18	95%	17	77%	17	100%	13	81%	12	71%
Betsi Cadwaladr University Local Health Board	BCUHB – West Pulmonary Rehabilitation Service	26	16	64%	15	75%	19	76%	19	100%	10	56%	5	36%
Cardiff & Vale University Local Health Board	University Hospital Llandough Pulmonary Rehabilitation Service	9	<5	-	0	0%	8	89%	0	0%	8	100%	5	62%
Cwm Taf Morgannwg University Local Health Board	Cwm Taf UHB Pulmonary Rehabilitation Service	10	10	100%	0	0%	8	80%	<5	-	7	88%	<5	-
Hywel Dda University Local Health Board	Carmarthenshire Pulmonary Rehabilitation Programme	11	0	0%	0	0%	10	91%	10	100%	8	80%	5	50%

			Process items						Outcome items					
Trust / health board name	**Service name**	**Cases audited**	**Start date within 90 days of receipt of referral***		**Patients undertaking practice exercise test**		**Patients enrolled for PR who go on to have a discharge assessment**		**Patients with a discharge assessment who received a written individualised exercise plan**		**Improvement in exercise capacity**		**Improvement in health status**	
National QI aim			**85%**		**100%**		**70%**		**-**		**-**		**-**	
National result			**2,792**	**58%**	**2,338**	**42%**	**3,848**	**69%**	**3,052**	**79%**	**2,169**	**60%**	**2,438**	**70%**
Powys Teaching Local Health Board	Powys Pulmonary Rehabilitation Service	7	<5	-	0	0%	<5	-	<5	100%	<5	-	<5	100%
Swansea Bay Local Health Board	Swansea Bay University Health Board Pulmonary Rehabilitation Service	32	11	39%	0	0%	27	87%	27	100%	10	45%	13	50%

** This metric is only reported for non-AECOPD patients. Data is not directly comparable to the 2017 snapshot audit, as data was reported for all patients in 2017.*[9]

9.2 Non-participating services in England, Scotland and Wales

Trust / health board / organisation	Service
Bolton NHS Foundation Trust	Bolton Pulmonary Rehabilitation Programme
Cross Plain Health Centre	Sarum Community Based Pulmonary Rehabilitation Team
East London NHS Foundation Trust	East London Pulmonary Rehabilitation Service
Gloucestershire Hospitals NHS Foundation Trust	Gloucestershire Respiratory Team
Hywel Dda University Local Health Board	Pembrokeshire Pulmonary Rehabilitation Programme
Kettering General Hospital NHS Foundation Trust	Rocket Team Kettering General Hospital
Mid Yorkshire Hospitals NHS Trust	North Kirklees Pulmonary Rehabilitation Programme
Milton Keynes University Hospital NHS Foundation Trust	Milton Keynes Hospital Pulmonary Rehabilitation Programme
North East Hampshire and Farnham (NEH&F) Pulmonary Rehabilitation Service	BOC LTD
NHS Ayrshire and Arran	Ayrshire and Arran Pulmonary Rehabilitation Service
NHS Borders	Borders Pulmonary Rehabilitation
NHS Dumfries and Galloway	Dumfries and Galloway Pulmonary Rehabilitation Service
NHS Fife	Integrated Care Team
NHS Forth Valley	Forth Valley Pulmonary Rehabilitation Service
NHS Highland	East Caithness Pulmonary Rehabilitation Service
NHS Tayside	Dundee Pulmonary Rehabilitation Service
NHS Tayside	Angus Pulmonary Rehabilitation Service
NHS Western Isles	Western Isles Pulmonary rehabilitation
Royal Papworth Hospital NHS Foundation Trust	Papworth Hospital PR Programme
Swindon Borough Council (Unitary)	Swindon Healthy Lives Pulmonary Rehabilitation Programme
University Hospitals of Morecambe Bay NHs Foundation Trust	South Lakes Community Respiratory Service
Warrington and Halton Hospitals NHS Foundation Trust	Halton Pulmonary Rehabilitation service

Appendix A: Methodology

Back to contents

NACAP's pulmonary rehabilitation (PR) continuous clinical audit is built upon the learning from the National COPD Audit Programme snapshot clinical audit.[5] The structure of the dataset is similar to that used in 2017, however, it has been considerably streamlined to account for the change in methodology from snapshot (in 2017) to continuous audit which commenced in March 2019. This is the first report since the start of continuous data collection and presents the results of the cohort of patients assessed between 1 March and 31 May and discharged by 31 August 2019.

All PR services in England, Scotland and Wales that treated patients with COPD (n=223) were eligible to participate in the audit. A total of 201 services (90.1%) participated in this period of the audit. A full list of participating hospitals, including those hospitals that did not enter any data for the audit period are listed in **Section 9**.

The clinical audit operates on a patient consent model; eligible patients were required to provide written consent (using the forms available on the audit website **www.rcplondon.ac.uk/projects/outputs/national-asthma-and-copd-audit-programme-nacap-pulmonary-rehabilitation-workstream**) prior to their data being included in the audit. Data from patients that did not provide consent was not included in the audit.

Participating PR services were required to enter clinical data into a secure online web tool. A total of 6,056 patient records have been included in this report.

Recruitment

There was a single recruitment process for both the PR clinical and organisational audits, which began in 2018, using the following channels:

- partner and stakeholder channels (such as the British Thoracic Society's eBulletin, the British Lung Foundation's BreatheEasy networks, the Primary Care Respiratory Society UK's membership bulletin, and the Association of Respiratory Nurse Specialist's newsletter)
- Twitter and the audit's own newsletter
- communication with services that participated in the 2017 audit.

To identify new services, or services where the management had changed, a Freedom of Information request was sent to all CCGs, asking them for the names and contact details of the PR services used by their healthcare providers. Where identified, these services were sent an approaching email asking them to participate in the audits.

The reasons provided to participate were as follows:

- the status of the audit as part of NHS Quality Accounts, and as a National Clinical Audit, meaning all providers of NHS care in England and Wales were required to participate.
- to build on previous audit results and facilitate local improvement.

Services were asked to complete a registration form, nominating an 'audit lead' and adding any other team members that would form part of the audit team. It was made clear to prospective participants that the 'audit lead' role took ultimate responsibility of the data entered for the service.

Once a service had submitted their registration form, they were then sent a Caldicott Guardian letter and form to complete. Only after the Caldicott Guardian form was received by the audit team at the RCP was the service considered 'fully registered', and at that point, they were registered on the web tool.

There were 229 PR services identified for participation in the audit, and we believe this to be a comprehensive picture of services in England, Scotland and Wales, but we cannot rule out the possibility that PR services exist that were not identified, and therefore did not participate in the audit. A total of 218 services are registered to participate in the audit, with 201 submitting data for this report. Reasons for non-participation included:

- lack of local resource to complete the data collection and entry; and
- no eligible patients during the audit period (ie services ran cohort (rather than rolling) programmes, and all their assessments took place prior to the audit period starting).

Information governance and patient consent

The audit involved the collection of patient identifiable data for the purpose of linkage with data from other sources (such as Hospital Episode Statistics and Office for National Statistics data for readmission and mortality data), and the audit operated on a patient consent model on advisement from the Health Research Authority's Confidentiality Advisory Group (CAG 2-03(PR3)/2014). The rationale for this was the comparative low acuity of the patient cohort, combined with the fact that the patient interaction with their PR service is prolonged, both of which meant that seeking consent was viable. In addition, the 2015 and 2017 audits found that requesting patient consent proved to have no significant impact on the number of patients included (81% of patients approached gave consent).

To support the process, a patient consent form, patient information leaflet as well as guidance for the staff involved, were made available on the project (**www.rcplondon.ac.uk/nacap-pr-resources**) and web tool webpages (beyond participants' logins). The forms and guidance were updated following the launch of NACAP in March 2018 and feedback from the 2015 and 2017 audits, in order to make the language clearer and to incorporate comments from external groups.
The patient information leaflets, and consent form were ratified by NHS Digital Data Access Request Service (Information Governance section), the British Lung Foundation's patient think tank, as well as the Royal College of Physicians' Ethics Committee.

Participating services were asked to approach all eligible patients for written consent. It was recommended this be done at their initial assessment and made clear that no data whatsoever should be entered onto the web tool until the patient had provided consent. Any delay in obtaining consent risked the patient dropping out of their PR programme before consent was obtained, in which case their data could not be used.

Audit question development and pilot

To ensure PR care was audited against accepted standards, audit questions were mapped to the British Thoracic Society (BTS) PR quality standards. A specific effort was made to ensure that each question could be mapped to a quality standard, and conversely that each quality standard was represented within the audit datasets.

The audit datasets were based on the 2017 equivalents. They were developed iteratively by the audit programme team and clinical lead, in consultation with the workstream group, in particular the representatives from the British Thoracic Society.

The datasets and web tool were then tested (in a pilot) in November 2018. The pilot services were asked to contribute feedback on the web tool, the audit questions and help notes. These findings were discussed by the team and the workstream group, and the datasets were finalised.

The clinical audit questions included demographic data about the patients being included, and also questions on:

- the patient's referral process,
- their assessment and assessment performance,
- time from referral to start of PR, and
- their discharge and discharge performance.

The clinical datasets are available to download in full from our website:
www.rcplondon.ac.uk/nacap-pr-resources

Data entry

Services were required to enter data via the audit programme's bespoke web tool, created by Crown Informatics Ltd (available at **www.copdaudit.org**).

Documentation to support participation in the audit was posted on the PR audit website and web tool, including audit instructions, data collection sheets, datasets with help notes, patient consent documentation, and copies of newsletters.

Regular email updates and newsletters were sent to participants throughout the data collection period, with reminders of timelines and any answers to frequently asked questions.

Towards the end of the clinical data entry period, reminders were sent to the services that had not entered many cases. Additionally, large numbers of draft records were queried.

Data storage, security, and transfer

Data were collected on the audit's bespoke web tool. These data were stored and processed at a secure data centre, owned by Aimes Grid Services, located in Liverpool, UK. It operates to ISO 27001 certification (2015). The servers are owned and operated by Crown Informatics Ltd and are held in a secure locked rack, accessible to named individuals. All access is logged, managed and supervised.

This data centre provides N3 aggregation in collaboration with NHS Digital. Data is stored in secured databases (software by IBM) and encrypted on disc (AES256 standard) and additionally in the database where required. Backups are encrypted at AES256, held in dual copies, and stored securely.

Crown Informatics Ltd operate secure SSL at 256 bit, using SHA256 (SHA2) signatures and 4096 bit certificates. Crown Informatics Ltd's certificate is an 'OV' certified by a respected global certifier (Starfield/GoDaddy). In addition, 'Qualsys' using 'SSL Labs' have given the audit site an 'A' rating.

At the end of the data collection period, the data was extracted from the web tool by the central audit team, using an 'extract' provision developed by Crown. It was then transferred securely (using the RCP Mimecast system) to the team at Imperial College London for analysis. The extract function did not include patient identifiers.

Technical and email support

The audit programme team at the RCP provided a helpdesk every working day during office hours, available on both telephone and email, so that participants could come directly to the team with any questions they had.

Data cleaning and analysis methodology

The data were analysed at Imperial College London (National Heart & Lung Institute) in R version 3.6.2. The patient's Index of Multiple Deprivation[6] quintile was linked using the patient's lower layer super output area (LSOA). The dataset contained 8,324 records, of which 6,077 were assessed between 01/03/2019 and 31/05/2019. There were no data inconsistencies or assessment date/start date/discharge date order issues. After removing those with invalid NHS numbers (n=1) and duplicate records (n=20), 6,056 records remained suitable for analysis. New variables were created as follows:

- 'Days from referral to start date' created by subtracting the referral date from the start date
- 'Days from initial assessment to start date' created by subtracting the initial assessment date from the start date
- 'Days from start date to discharge date' created by subtracting the start date from the discharge date
- 'Start date offered within 90 days for non-AECOPD patients' created by categorising non-AECOPD patients into <90 days and >=90 days from referral to start date
- 'Start date offered within 30 days for AECOPD patients' created by categorising AECOPD patients into <30 days and >=30 days from referral to start date
- Difference in test values (ISWT, 6MWT, ESWT, CAT, CRQ domains) were calculated by subtracting the initial test result from the discharge test result
- MCID variables for ISWT, 6MWT, CAT, and CRQ domains were then created by categorising the test value difference variables into those who achieved the MCID and those who didn't, with MCID achieved defined as: >=48 for ISWT, >=30 for 6MWT, <= –2 for CAT, >=0.5 for CRQ domains.

Summary statistics for patient N and % were created using the 'table' and 'prop.table' commands. Medians and interquartile ranges were calculated using the 'quantile' command. Odds ratio calculations and logistic regression was carried out using the 'glmer' command from the 'lme4' package in R. Kaplan–Meier curves were created using the 'survfit' command from the 'survival' package and the 'plot_survfit' command from the 'survsup' package in R.

Appendix B: Definitions

Back to contents

- **Service** means a pulmonary rehabilitation service with a shared pool of staff and central administration where referrals are received. A provider may run one or more services, and a service may operate at several sites.
- **Programme** means the course of classes that the patient is referred to.
- **Site** means the physical location where the pulmonary rehabilitation services are provided, eg a hospital gym or church hall.
- **Date of assessment** is the date the patient attends an appointment to be assessed before beginning pulmonary rehabilitation sessions. If there was no separate assessment appointment, please enter the date of the first appointment/session.
- **Date of first pulmonary rehabilitation session** is the first session that the patient attends with the pulmonary rehabilitation service.

Appendix C: BTS Quality Standards for Pulmonary Rehabilitation in Adults (2014)

Back to contents

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 exacerbation 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 progress.
10	Pulmonary rehabilitation programmes produce an agreed standard operating procedure.

References

1. British Thoracic Society (BTS). Quality Standards for Pulmonary Rehabilitation in Adults 2014. London: BTS 2014. **www.brit-thoracic.org.uk/quality-improvement/quality-standards/pulmonary-rehabilitation/** [Accessed February 2020].

2. National Institute for Health and Care Excellence. Chronic obstructive pulmonary disease in adults. NICE Quality Standard 10 (QS5). London: NICE 2016. **www.nice.org.uk/guidance/QS10** [Accessed February 2020].

3. Steiner M, McMillan V, Lowe D, Saleem Khan M, Holzhauer-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/pulmonaryrehabilitation-beyond-breathing-better** [Accessed January 2018].

4. National Institute for Health and Care Excellence. Smoking: supporting people to stop. NICE Quality Standard 43 (QS43). London: NICE 2013. **www.nice.org.uk/guidance/QS43** [Accessed February 2020].

5. Holland EA, Spruit A, Troosters T *et al.* An official European Respiratory Society/American Thoracic Society technical standard: field walking tests in chronic respiratory disease *Eur Resp J* 2014;44(6):1428–46.

6. Singh SJ, Jones PW, Evans R, Morgan MDL. Minimum clinically important improvement for the incremental shuttle walking test. *Thorax* 2008;63**:**775–7.

7. Gupta N, Pinto LM, Morogan A, Borbeau J. The COPD assessment test: a systematic review. *Eur Resp J* 2014;44(4):873–84.

8. Chauvin A, Rupley L, Meyers K, Johnson K, Eason J. Outcomes in Cardiopulmonary Physical Therapy: Chronic Respiratory Disease Questionnaire (CRQ). *Cardiopulm Phys Ther J* 2008;19(2):61–7.

9. Steiner M, McMillan V, Lowe D, Holzhauer-Barrie J, Mortier K, Riordan J, Roberts CM. *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. London: RCP, April 2018. **www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-exercise-improvement-combined-clinical-and-organisational** [Accessed July 2020].

National Asthma and COPD Audit Programme (NACAP)

Royal College of Physicians
11 St Andrews Place
Regent's Park
London NW1 4LE

Tel: +44 (0)20 3075 1526
Email: pulmrehab@rcplondon.ac.uk

www.rcplondon.ac.uk/nacap
@NACAPaudit
#pulmrehab
#PR

Royal College of Physicians | NACAP