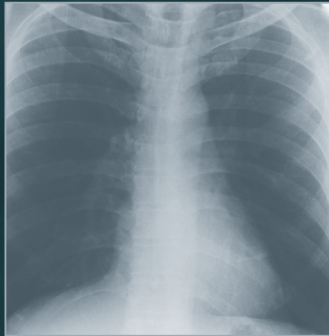


National COPD Audit Programme



Pulmonary rehabilitation: An exercise in improvement

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

**Clinical audit data
analysis and results
April 2018**

Prepared by:



**Royal College
of Physicians**

In partnership with:



**British
Thoracic
Society**

Commissioned by:



Working in wider partnership with:



Royal College of
General Practitioners

The Royal College of Physicians

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 34,000 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 COPD Audit Programme 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 has on healthcare quality in England and Wales. HQIP holds the contract to manage and develop the NCA Programme, comprising more than 30 clinical audits that cover 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 audits, also funded by the Health Department of the Scottish Government, DHSSPS Northern Ireland and the Channel Islands.

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How to use this report

This report provides the results of all the pulmonary rehabilitation (PR) services^a that participated in the 2017 national clinical audit of PR. Audit data was received from **187 services (out of the 195 identified)** and **592 sites**, in England and Wales. National averages are presented alongside the 2015 results, where these are available and appropriate.

The audit captured all consenting patients with a primary respiratory diagnosis of COPD who were assessed for (or if not assessed, began) PR between 3 January and 31 March 2017. Services had until 31 July 2017 to complete their data entry.

The clinical audit collected data on the following:

- the inclusion of patients in the clinical audit, and their referral pathway
- health status and exercise tests used at assessment
- completion, and the health status and exercise tests used at discharge.

The audit dataset was mapped against the BTS quality standards, a summary of which are available to view in [Appendix E](#). Please note that the data are arranged in this report in the order in which they appeared in the dataset. All datasets are available to download from our website www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-workstream-audit-resources.

Services have been provided with their own service level results in a bespoke report, comparing their results with the national average. Nationally benchmarked results for individual PR services have been provided within this report in [Appendix A](#). The indicators chosen are in support of the recommendations made in the report in addition to aligning with national guidelines and standards. This data will also be made publicly available on www.data.gov.uk, in line with the government's transparency agenda.

For the full key findings, recommendations and quality improvement opportunities please see the national report available at: www.rcplondon.ac.uk/an-exercise-in-improvement.

^a The 2017 national audit defined a PR service as one 'with a shared pool of staff and central administration where referrals are received'. An organisation may run one or more services, and a service may operate at several 'sites'.

Clinical audit participation

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Key findings

- The **case acquisition rate** has improved with an estimated 79% of eligible cases audited in 2017, compared with 73% in 2015.
- The **rate of consent** has improved from 2015 (90% of those approached in 2017 consented, compared with 87% in 2015).
- **Assessment appointments** were fairly evenly spread through the audit period.

*For the full key findings and recommendations, please see the national report *Pulmonary rehabilitation: an exercise in improvement*, available at www.rcplondon.ac.uk/an-exercise-in-improvement.*

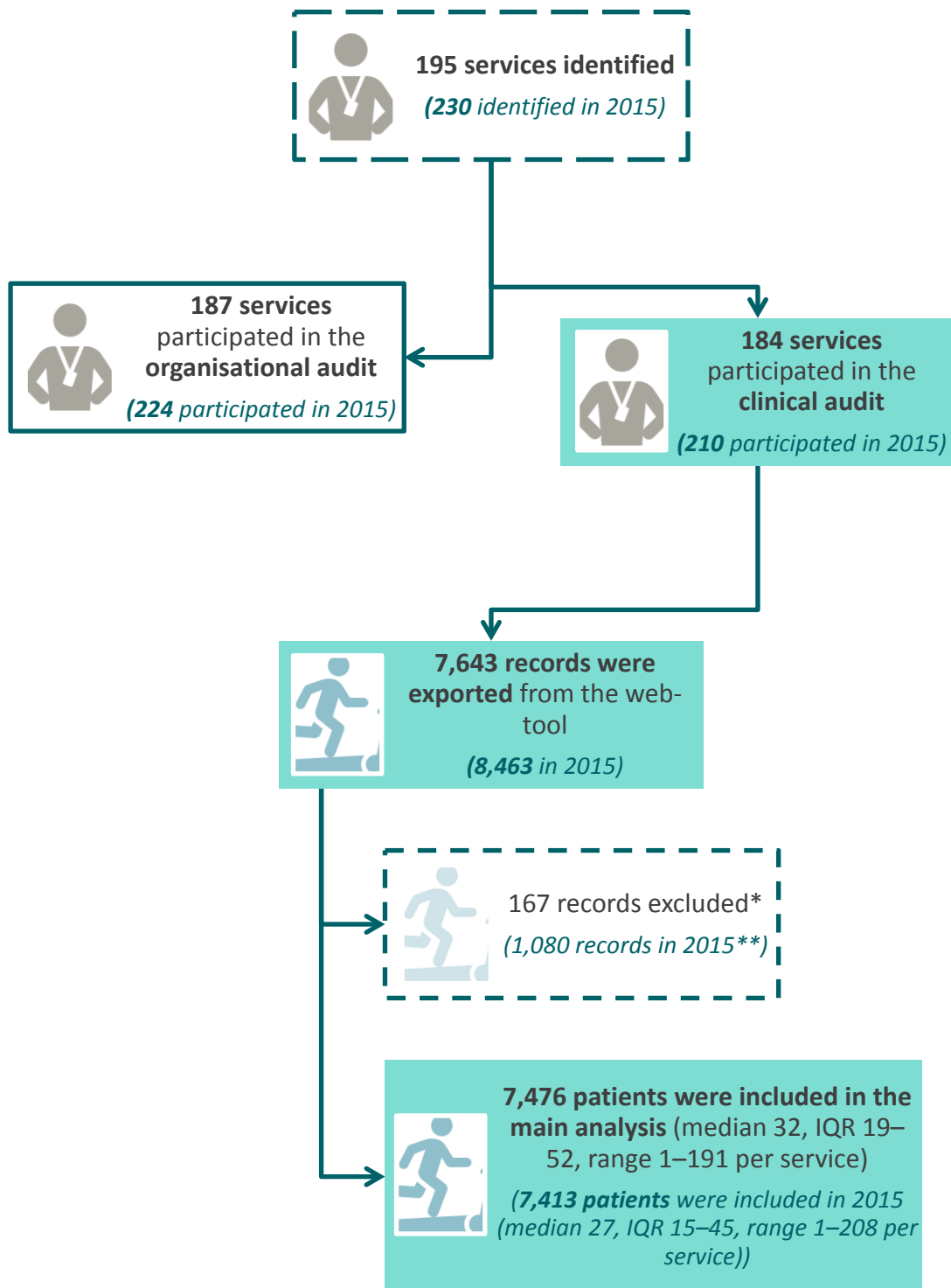
Navigation

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

- [Audit participation](#)
- [Case ascertainment](#)
- [Assessment appointments](#)

Audit participation

Participating services in the 2017 and 2015 audits



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

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

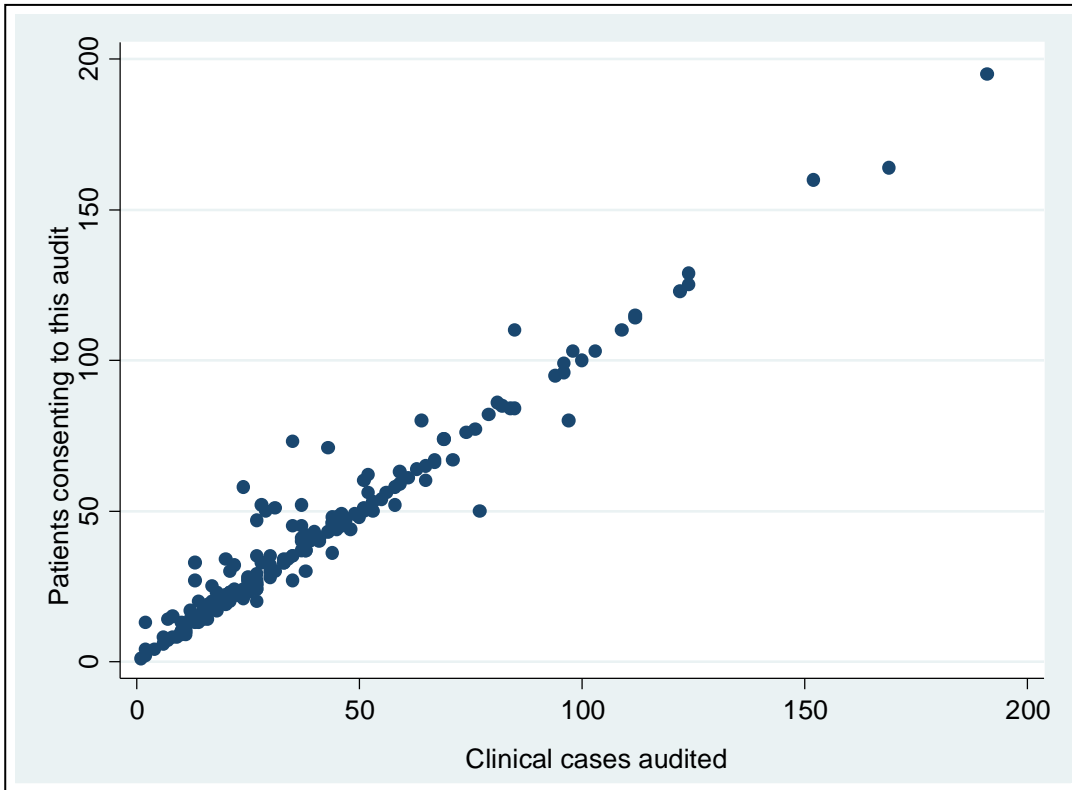
Case ascertainment



These numbers are based on those services that responded to all three relevant questions in the organisational audit (questions 7.1–7.3) and submitted data to the clinical audit.

The number of services that this applied to in 2015 was 195 (out of the 224 that participated in the organisational audit and 210 that participated in the clinical audit), and in 2017 it was 184 (187 participated in the organisational audit alone). However, **note that the final number of clinical records submitted from all participating services in 2015 was 7,413** (this includes the additional data entry not included in the numbers depicted above).

Service variation in number of patients audited compared with the number of patients who consented (each dot represents one programme)



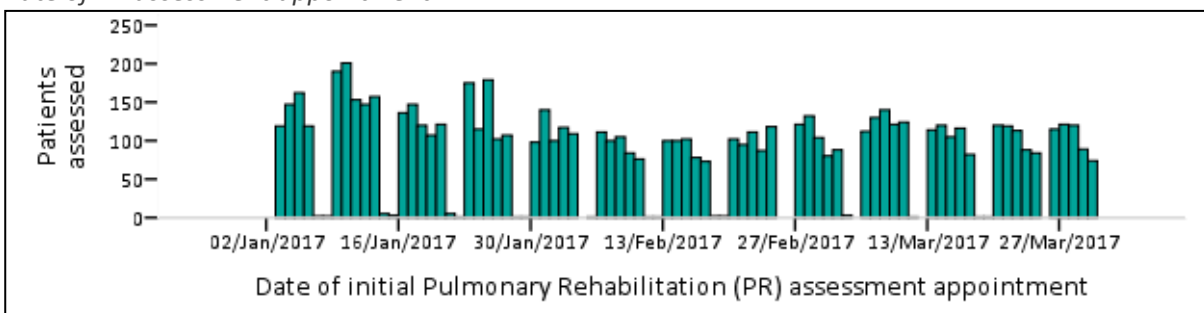
Most services audited nearly all the patients they obtained consent from, as indicated by the near straight line at 45° running diagonally across the scatter graph. There were, however, a few services that did not quite manage this, as shown by the dots (services) above and to the left of the diagonal line.

In addition, there were also several services (represented by the dots below and to the right of the diagonal line) that answered the relevant question in the organisational dataset (7.3 *how many patients gave consent to be included in this audit?*) with a slightly lower number than the number of patients they resulted in entering for the clinical dataset. This is **not** because they entered patient data without explicit consent, but instead represents an administrative discrepancy; the organisational and clinical audits had different final deadlines, and the differences between the numbers has been attributed to services underestimating their final number of patients for the first deadline, which was for the organisational audit.

Assessment appointments

Patients included in the audit had initial assessments between Tuesday 3 January 2017 and Friday 31 March 2017. The assessment appointments included in the audit were fairly evenly spread throughout the audit period.

Date of PR assessment appointment



Section 1: General information

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Key findings

- 29% of services did not offer early post-discharge PR for patients following discharge from hospital for acute exacerbation of COPD (AECOPD). Possibly as a result, post-exacerbation PR (vs PR for patients with stable COPD) remained a very small proportion of PR service caseloads (3%) (quality standard (QS) 3).
- **Waiting times** for enrolment to PR from receipt of referral are similar to those reported in the 2015 audit:
 - The median waiting time was **75 days**, with 60% (4,213/6,965) of patients enrolled within 90 days in 2017, compared with 2015 where a median waiting time of 76 days was reported with 63% (3,800/5,986) enrolled within 90 days (**QS1**).
 - There was an increase in the proportion of patients being enrolled to **rolling^b programmes**; 58% (4,116/7,051) in 2017, compared with 53% (3,357/6,319) in 2015.
 - Waiting times remained longer for **cohort^c programmes** (median of **89 days**) compared with those of **rolling programmes** (median of **66 days**).
- There is an apparent increase in the numbers of patients being **enrolled after assessment** (94% in 2017, compared with 85% in 2015), but this may be due to rephrasing of the questions for the 2017 audit, which asked whether an enrolment date was offered.

For the full key findings and recommendations, please see the national report *Pulmonary rehabilitation: an exercise in improvement*, available at www.rcplondon.ac.uk/an-exercise-in-improvement.

Navigation

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

- [1.2 Age](#)
- [1.3 Gender](#)
- [1.4 Socioeconomic status](#)
- [1.5 Ethnicity](#)
- [1.7 Median waiting time between date of receipt of referral and date of initial PR assessment appointment \(Quality standard \(QS\) 1b and 3b\)](#)
- [1.8 Where was the patient referred from?](#)
- [1.9 Was the patient offered a start date for their PR programme? \(QS1b and 3b\)](#)
 - [1.9.1 Length of time from a\) receipt of referral to the start date offered for PR, and b\) assessment to start date offered for PR](#)
- [1.10 What type of programme was the patient enrolled on? \(QS4\)](#)
 - [1.10.1 Referral date to start date](#)
 - [1.10.2 Service variation in referral and start date](#)

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

^c A cohort programme is where all patients start and finish the programme at the same time.

1.2 Age^d

Twenty-eight per cent (2,092) were aged under 65 years, 43% (3,224) were 65–74 years, 25% (1,875) were 75–84 years and 4% (283) were 85 years and older.

	2017 audit	2015 audit
Mean (standard deviation)	69 (9)	69 (9)
Median (interquartile range)	70 (64–76)	70 (64–76)

Patient age at initial appointment



1.3 Gender

The audit sample comprised **53%** (3,928) **males** and **47%** (3,548) **females**, the same percentages reported in the 2015 audit.

1.4 Socioeconomic status^e

England

The English Indices of Deprivation 2015 are based on the concept that deprivation consists of more than just poverty.¹ The most widely used of these is the Index of Multiple Deprivation (IMD), which combines other indices to give an overall score for the relative level of multiple deprivation experienced in every neighbourhood in England (7,128 postcodes in total).

Cohort	Q1 (most deprived)*	Q2	Q3	Q4	Q5 (least deprived)
2017 (using IMD 2015)	27% (1,897)	21% (1,531)	20% (1,397)	17% (1,244)	15% (1,059)
2015 (using IMD 2010)	27%	21%	20%	17%	15%

* Quintiles (20% categories) were calculated for the IMD 2015 by ranking the 32,844 small areas in England from most deprived (1) to least deprived (32,844) and dividing them into five equal groups.^f

^d 1.1 = NHS number.

^e As derived from home postcode.

^f 1–6,568 (most deprived quintile), 6,569–13,136, 13,137–19,704, 19,705–26,272, 26,273–32,840 (least deprived quintile).

Wales

The Welsh Index of Multiple Deprivation (WIMD) 2014 is the official measure of relative deprivation for small areas in Wales (279 postcodes in total). The index was developed as a tool to identify and understand deprivation in Wales, so that funding, policy, and programmes can be effectively focused on the most disadvantaged communities.²

	% of audit sample living in postcode areas in Welsh national quintiles*				
	Most deprived quintile Q1	Q2	Q3	Q4	Least deprived quintile Q5
Index of Multiple Deprivation (WIMD 2014)	23% (64)	23% (64)	22% (61)	20% (57)	12% (33)
2015 audit (using Welsh IMD 2011)	23%	27%	19%	21%	10%

* Quintiles (20% categories) were calculated for the WIMD 2014 by ranking the 1,909 small areas in Wales from most deprived (1) to least deprived (1,909) and dividing them into five equal groups.^g

Interpretation

If the PR audit samples from England and Wales were expanded to the joint nation as a whole, then we would expect 20% of the sample to live in postcode areas within each national quintile. However, from these data we can consider the sample to be relatively deprived since 48% and 46% of the COPD audit sample (in England and Wales, respectively) lived in postcode areas within the two 'most deprived' quintiles; and in both countries only 32% lived in areas within the two 'least deprived' national quintiles.

1.5 Ethnicity

Ethnicity was known for 92% (6,874). When known, 94% (6,443) were recorded as white British. This is roughly equivalent to 2015, where ethnicity was known for 94% of patients, with the same proportion (94%) recorded as white British.

1.7 Median waiting time between date of receipt of referral and date of initial PR assessment appointment (Quality standard (QS) 1b and 3b)^h

	2017 audit (7,476)	2015 audit (7,413)
Median (IQR), (cases)	55 (28–101), (7,404)	50 (26–100), (7,020)

1.8 Where was the patient referred from?

	2017 audit (7,476)	2015 audit (7,413)
Hospital consultant (or member of clinical team)	20% (1,520)	21% (1,521)
Hospital specialist COPD team	9% (637)	11% (841)
Following admission for acute exacerbation of COPD (AECOPD)	3% (220)	2% (174)**
Community services (community specialist respiratory services)	15% (1,124)	12% (903)***
GP/practice team	51% (3,788)	51% (3,810)
Other	3% (187)*	3% (219)

* 'Other' comprised: enrolment after 12-month follow-up or from within service (21 cases), referred from another PR service (4), referral from other allied health professional or team (91), patient self-referral (57), oxygen services (7), miscellaneous (2), not known (5).

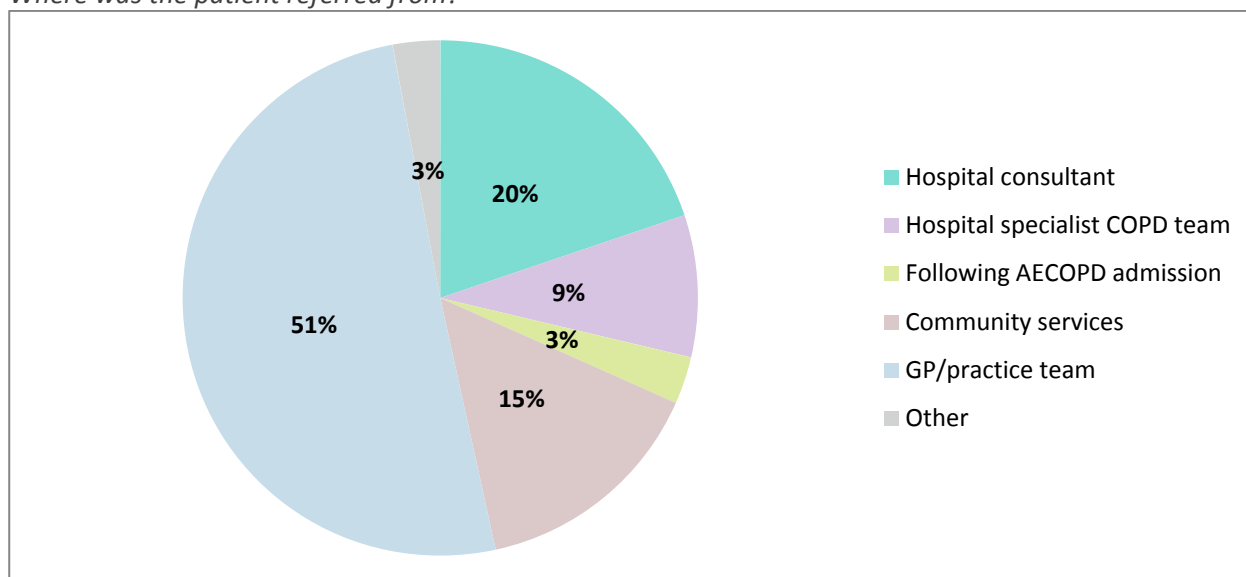
** Response option for 2015 audit was 'Specified post-AECOPD early PR pathway'.

*** Response option for 2015 audit was 'Community services'.

^g 1–382 (most deprived quintile), 383–764, 765–1,146, 1,147–1,528, 1,859–1,909 (least deprived quintile).

^h Derived from questions 1.6 (date of receipt of referral) and 1.7 (date of initial PR assessment).

Where was the patient referred from?



1.9 Was the patient offered a start date for their PR programme? (QS1b and 3b)

	2017 audit (7,476)	
	Yes	No
Was the patient offered a start date for their PR programme?	94% (7,040/7,475)	6% (435/7,475)
<i>If no, what was the reason?</i>		
The patient was deemed to be clinically unsuitable to attend PR	52% (227/435)	
The patient declined to start PR	44% (190/435)	
Not recorded	4% (18/435)	

1.9.1 Length of time from a) receipt of referral to the start date offered for PR, and b) assessment to start date offered for PR

	2017 audit (7,476)	2015 audit (7,413)
Days from receipt of referral to start date offered for PR: Median (IQR), (cases)	75 (45–122), (6,965)	76 (44–128), (6,319*)
Start date* offered within 90 days of receipt	60% (4,213/6,965)	63% (3,800/5,986)
Days from initial PR assessment appointment to start date offered for PR: Median (IQR), (cases)	11 (5–22), (7,032)	7 (2–21), (6,319*)

* The 2015 audit asked about date of enrolment, rather than start date offered.

1.10 What type of programme was the patient enrolled on? (QS4)

	2017 audit (7,476)	2015 audit (7,413)
Patient enrolled*	94% (7,063)	85% (6,319)
Rolling	58% (4,116/7,051)	53% (3,357)
Cohort	39% (2,767/7,051)	44% (2,766)
Other	2% (168/7,051)	3% (196)

* This was a direct question asked in the 2015 audit. In the 2017 audit this was inferred from the sum of responses to question 1.10 above and responses to sessions attended (3.1) or scheduled (3.2).

1.10.1 Referral date to start date

For both **2015** and **2017** audits the differences between rolling programmes were statistically significant: $P < 0.001$ Mann-Whitney test for receipt of referral; $P < 0.001$ Fisher's exact test for percentage of patients within 90 days.

<i>Enrolment</i>	2017			2015		
	All	Rolling programme	Cohort programme	All	Rolling programme	Cohort programme
Receipt of referral to start date – median (IQR) days	-	66 (40–110)	89 (59–144)	-	58 (36–98)	89 (51–147)
Percentage of patients offered a start date within 90 days (as per QS 1)*	60% (4,213/6,965)	66% (2,665/4,065)	52% (1,412/2,735)	63% (3,800/5,986)	72% (2,280/3,172)	52% (1,350/2,619)

* The **2015** audit asked about date of enrolment, rather than start date offered.

1.10.2 Service variation in referral and start date

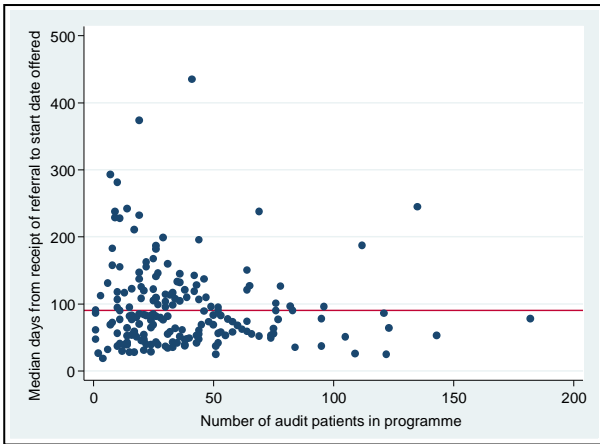
Left-hand panels: The scatter plots below show the median number of days from receipt of referral to start date offered (for each service). The red reference lines represent the quality standard of 90 days from receipt of referral.

Right-hand panels: The funnel plots below present the percentage of patients who were offered a start date within 90 days of receipt of referral for each participating service (QS1). The red reference line represents the overall percentage of services that achieved this standard for all patients. Control limits are often shaped like a 'funnel' and serve as boundaries. Any results that fall above the upper boundary or below the lower boundary are considered to be outliers. The likelihood of results being outside these limits due to chance alone is very small (5% for the inner and 0.2% for the outer limits), so when service results do fall outside, these are inconsistent with the overall national result in relation to their sample size. This implies that something else is happening that is non-random in nature, eg systematic organisational differences or quality of care etc.

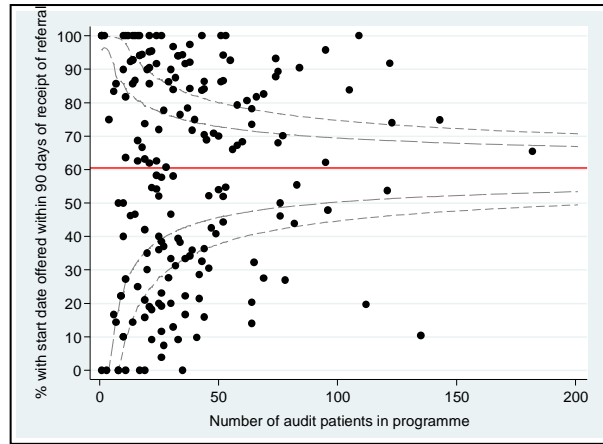
Both statistics are plotted against the number of audit patients in the programme. Data are presented for all patients and for patients enrolled to rolling and cohort programmes respectively.

All services

Median no. of days per service overall from receipt of referral to start date offered

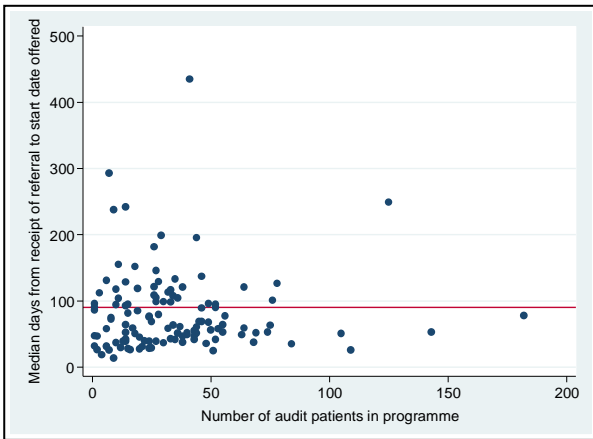


Overall % of service patients offered a start date within 90 days of receipt of referral

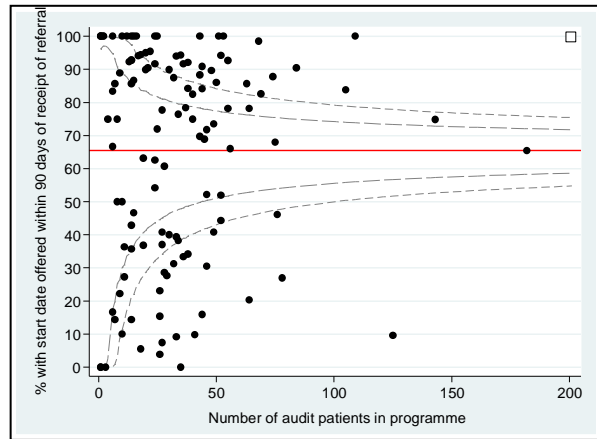


Rolling programmes

Median no. of days per rolling programme from receipt of referral to start date offered

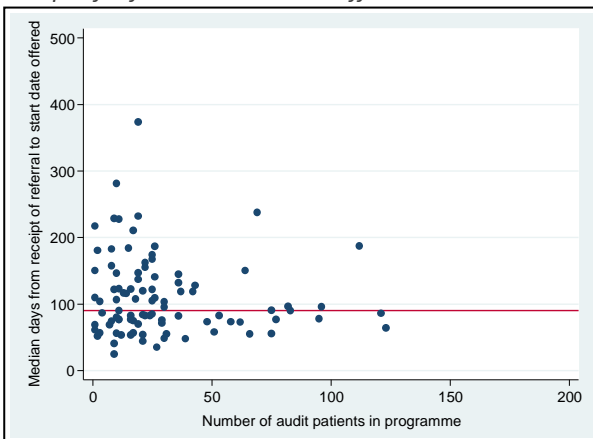


% of rolling programme patients offered a start date within 90 days of receipt of referral

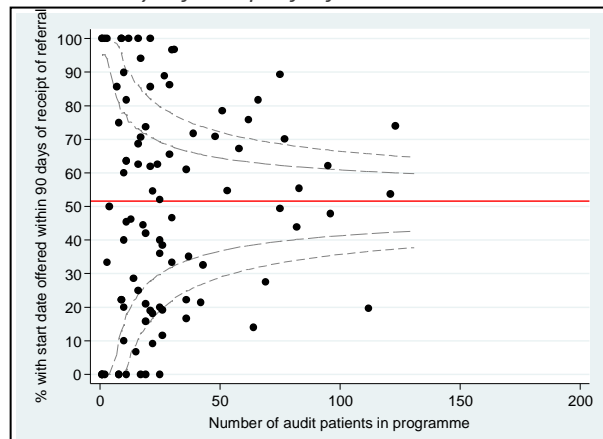


Cohort programmes

Median no. of days per cohort programme from receipt of referral to start date offered



% of cohort programme patients offered a start date within 90 days of receipt of referral



Section 2: Key clinical information at time of assessment

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Key findings

- The recording of key clinical information such as body mass index (BMI) and spirometry has not significantly changed since the 2015 audit:
 - **BMI** was reported for **70%** (5,259/7,476) of patients in 2017, compared with 66% (4,898/7,413) in 2015.
 - **Spirometry** was reported for **60%** of patients in both the 2015 and 2017 audits.
- Conduct of exercise testing by the majority of programmes was not in line with accepted standards (**QS8**):
 - Numbers of patients who have a practice exercise test remains low (<50%). There has been an improvement in the number of practice **incremental shuttle walk tests (ISWT)** performed; **39%** (1,369/3,551) in 2017, compared with 26% (1,004/3,811) in 2015. These figures have not improved for the 6MWT; **26%** (822/3,181) in 2017, compared with 24% (668/2,835) in 2015.
 - Of those programmes using the 6MWT only 6% (8) were using the recommended walking course length of 30m or more.
- Only **27%** (2,006/7,476) of patients had an **assessment of muscle strength** at baseline, although this has improved since the 2015 audit where only 15% (1,094/7,413) was reported.

For the full key findings and recommendations, please see the national report *Pulmonary rehabilitation: an exercise in improvement*, available at www.rcplondon.ac.uk/an-exercise-in-improvement.

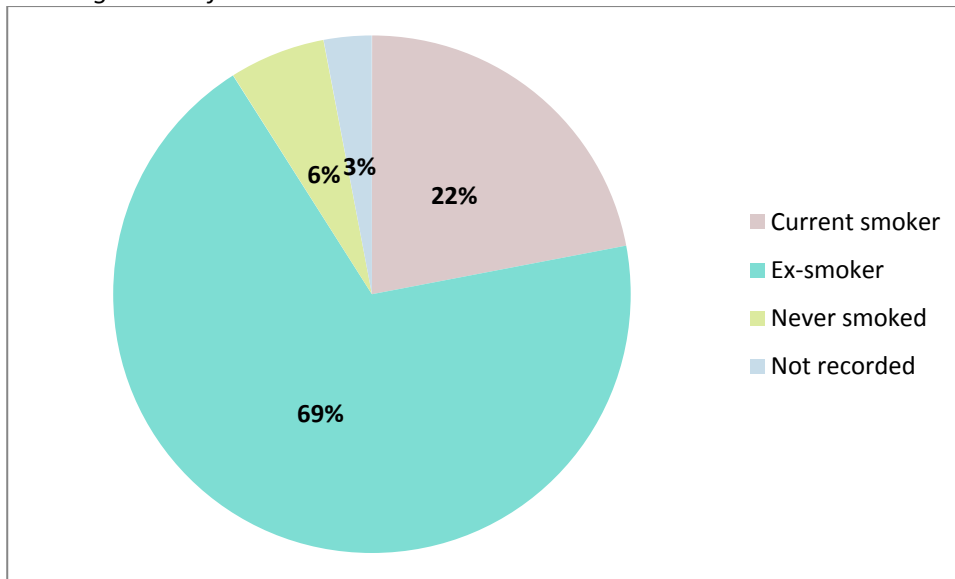
Navigation

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

- [2.1 Smoking status \(QS5 and QS6\)](#)
- [2.2 Was the patient receiving oxygen therapy at home at the time of assessment?](#)
- [2.3 Was the patient living alone at the time of assessment?](#)
- [2.4 to 2.6 Diagnostic confirmation: FEV₁, FEV₁% predicted and FEV₁/FVC ratio \(QS8\)](#)
- [2.9 What was the patient's most recent recorded BMI? \(QS8\)](#)
- [2.10 What was the patient-reported MRC dyspnoea score at assessment? \(QS1a and QS2\)](#)
- [2.11 Results of exercise tests at initial assessment \(QS8 and QS9\)](#)
 - [2.11.1 Practice test performed at initial assessment in rolling and cohort programmes](#)
- [2.14 Was muscle strength recorded at the initial assessment? \(QS8 and QS9\)](#)
- [2.15 Please indicate any health status questionnaires completed at initial assessment \(QS8 and QS9\)](#)

2.1 Smoking status (QS5 and QS6)

	2017 audit (7,476)	2015 audit (7,413)
Current smoker	22% (1,612)	22% (1,614)
Ex-smoker	69% (5,160)	70% (5,179)
Never smoked	6% (454)	6% (449)
Not recorded	3% (250)	2% (171)

Smoking status of audit cohort in 2017**2.2 Was the patient receiving oxygen therapy at home at the time of assessment?**

	2017 audit (7,476)	2015 audit (7,413)
Yes	7% (513)	8% (590)
No	92% (6,880)	90% (6,674)
Not known	1% (83)	2% (149)

2.3 Was the patient living alone at the time of assessment?

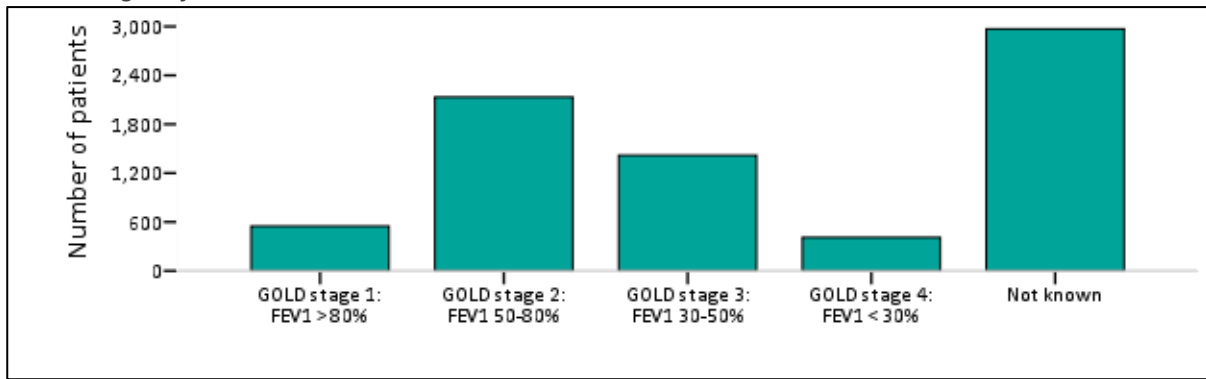
	2017 audit (7,476)
Yes	27% (2,054)
No	64% (4,820)
Not recorded	8% (602)

2015 audit: there was a range of response options offered in regard to the patient's living arrangements. One of these was 'House/flat alone' for which the response was 28%, with 8% not recorded.

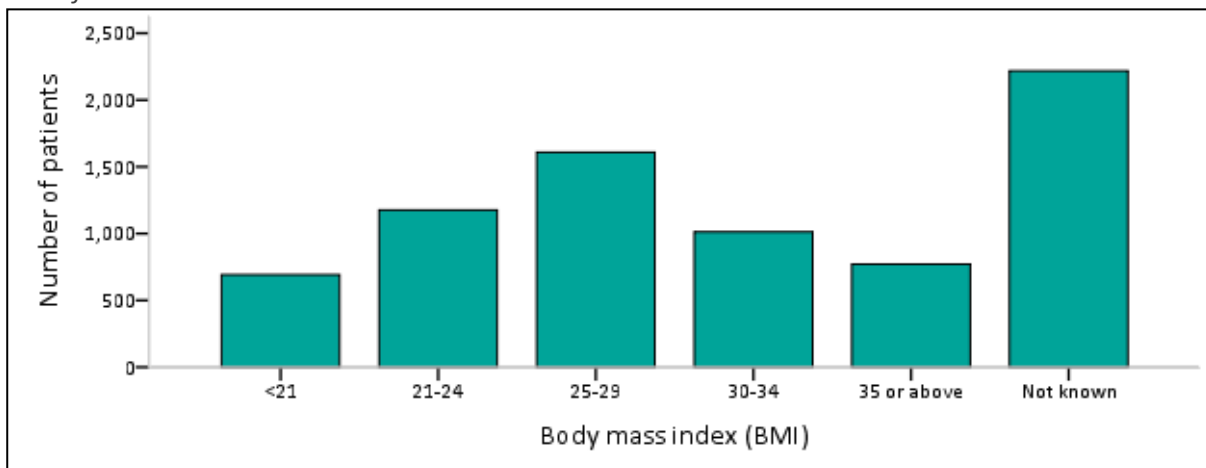
2.4 to 2.6 Diagnostic confirmation: FEV₁,ⁱ FEV₁% predicted and FEV₁/ FVC ratio (QS8)

Diagnostic test	2017 audit				2015 audit			
	Known	N	Median	IQR	Known	N	Median	IQR
FEV ₁ (L)	60%	4,503	1.3	0.90–1.80	60%	4,440	1.3	0.92–1.71
FEV ₁ % predicted	60%	4,507	55	40–69	62%	4,575	53	40–68
FEV ₁ / FVC ratio	46%	3,411	0.60	0.40–0.70	Not recorded			

ⁱ FEV₁ = the forced expiratory volume of air measured during the first second.

GOLD^j stages of the audit cohort**2.9 What was the patient's most recent recorded BMI? (QS8)^k**

	2017 audit				2015 audit			
	Known	N	Median	IQR	Known	N	Median	IQR
Patient's BMI	70%	5,259	27	23–32	66%	4,898	27	23–31

BMI of the audit cohort in 2017**2.10 What was the patient-reported Medical Research Council (MRC) dyspnoea score at assessment? (QS1a and QS2)**

	2017 audit (7,476)	2015 audit (7,413)
Grade 1	2% (127)	2% (115)
Grade 2	14% (1,071)	15% (1,080)
Grade 3	35% (2,648)	36% (2,656)
Grade 4	31% (2,301)	31% (2,328)
Grade 5	8% (598)	9% (643)
Not known / Not recorded	10% (731)	8% (591)

Grade 1 – not troubled by breathlessness or strenuous exercise

Grade 2 – short of breath when hurrying or walking up a slight hill

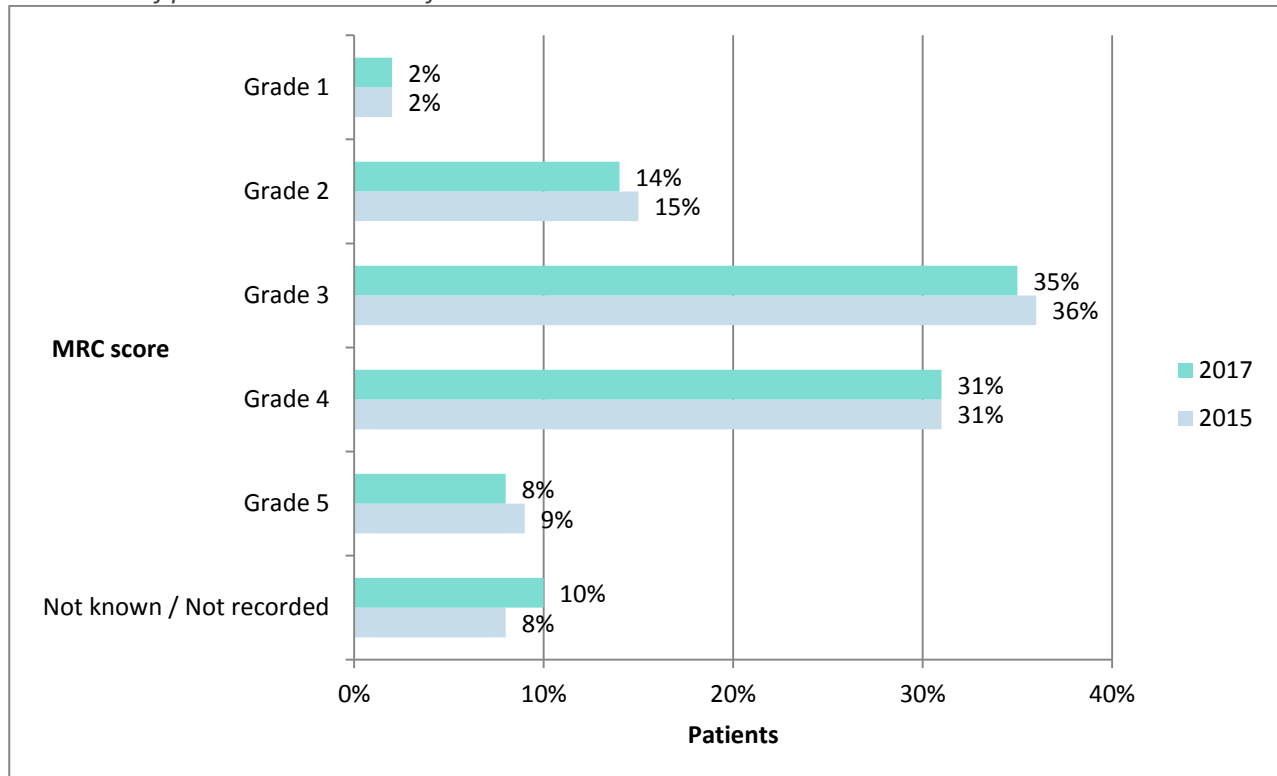
Grade 3 – walks slower than contemporaries on level ground because of breathlessness or has to stop for breath

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

^j GOLD (Global Initiative for Chronic Obstructive Lung Disease) stages refer to categories of lung function impairment based on measurement of FEV₁ compared with the predicted value. GOLD Stage 1: FEV₁ > 80%, GOLD Stage 2: FEV₁ 50–80%, GOLD stage 3: FEV₁ 30–50%, GOLD Stage 4 FEV₁ < 30%.

^k 2.7 and 2.8 were the patient's height and weight.

MRC score of patients at the time of assessment**2.11 Results of exercise tests at initial assessment (QS8 and QS9)¹**

Test	2017 audit				2015 audit			
	Recorded at initial assessment	Practice test performed	Test value N	Test value median (IQR)	Recorded at initial assessment	Practice test performed	Test value N	Test value median (IQR)
Incremental shuttle walk test (ISWT)	48% (3,623)	39% (1,369/3,551)	3,619	180 (100–280)	52% (3,819)	26% (1,004/3,811)	3,819	180 (90–270)
Endurance shuttle walk test (ESWT)	10% (775)	Not asked	773	213 (134–342)	10% (770)	Not asked	770	198 (132–316)
6-minute walk test (6MWT)	44% (3,278)	26% (822/3,181)	3,274	240 (155–330)	39% (2,863)	24% (668/2,835)	2,863	250 (160–336)
One or more of the above	91% (6,799)	n/a	n/a	n/a	90% (6,665)	n/a	n/a	n/a

¹ All questions/tables marked 2.11 include the answers to: *Were the following exercise tests recorded at the initial assessment? 2.11 Incremental shuttle walk test, 2.12 Endurance shuttle walk test and 2.13 6-minute walk test.*

2.11.1 Practice test performed at initial assessment in rolling and cohort programmes

Practice test	2017 audit		2015 audit	
	Rolling	Cohort	Rolling	Cohort
ISWT performed	38% (706/1,881)	38% (569/1,513)	29% (537/1,837)	23% (356/1,555)
6MWT performed	33% (632/1,943)	15% (170/1,155)	15% (201/1,383)	35% (389/1,109)

2.14 Was muscle strength recorded at the initial assessment? (QS8 and QS9)

	2017 audit (7,476)	2015 audit (7,413)
Yes	27% (2,006)	15% (1,094)
No	73% (5,457)	85% (6,271)
Not recorded	0.2% (13)	0.6% (48)

2.15 Please indicate any health status questionnaires completed at initial assessment (QS8 and QS9)^m

Questionnaire	2017 audit			2015 audit		
	Completed at initial assessment	Questionnaire value N	Questionnaire value median (IQR)	Completed at initial assessment	Questionnaire value N	Questionnaire value median (IQR)
St George's Respiratory Questionnaire (SGRQ, not SGRQ-C) Total score (1–100)	5% (350/7,410)	350	55 (43–66)	Not asked	366	56 (39–68)
COPD Assessment Test (CAT) Total score (0–40)	62% (4,601/7,468)	4,595	22 (16–28)	Not asked	3,915	22 (17–28)
Chronic Respiratory Questionnaire (CRQ)						
Dyspnoea average score (1.0–7.0)	38% (2,836/7,471)	2,757	2.6 (2.0–3.2)	n/a	2,443	2.6 (2.0–3.4)
Fatigue average score (1.0–7.0)		2,679	3.2 (2.3–4.2)	n/a	2,434	3.3 (2.3–4.3)
Emotion average score (1.0–7.0)		2,678	4.2 (3.1–5.4)	n/a	2,434	4.3 (3.3–5.3)
Mastery average score (1.0–7.0)		2,677	4.2 (3.2–5.5)	n/a	2,429	4.3 (3.3–5.5)
One or more of the above questionnaires	87% (6,509/7,449)	n/a	n/a	n/a	n/a	n/a

The 2015 audit asked an overall question about whether any health status questionnaires were completed at the initial assessment: 88% (6,490/7,413).

^m All questions/tables marked as 2.15 include: Please indicate any health status questionnaires completed at initial assessment and provide values if recorded: 2.15 St George's Respiratory Questionnaire, 2.16 Chronic Respiratory Questionnaire, 2.17 COPD Assessment Test.

Section 3: Key clinical information relating to the programme

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Key findings

- The median number of **supervised sessions attended** was **10**, with the median **scheduled** as **12**.
- The vast majority of patients (90%) **did not receive supplemental oxygen during exercise**.

For the full key findings and recommendations, please see the national report *Pulmonary rehabilitation: an exercise in improvement*, available at www.rcplondon.ac.uk/an-exercise-in-improvement.

Navigation

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

- [3.1 to 3.2 Sessions scheduled and attended \(QS4\)](#)
- [3.3 Did the patient receive supplemental oxygen during exercise? \(QS5\)](#)

3.1 to 3.2 Sessions scheduled and attended (QS4)

Overall, 85% (6,029) of those enrolled were scheduled to receive 12 or more sessions. In **2015**, this was 83% (5,239).

Of those with a discharge assessment, 87% (4,050/4,636) were scheduled to receive 12 or more sessions. In the **2015** audit this was 83% (3,627/4,353).

Sessions (all)	2017 audit		2015 audit	
	N	Median (IQR)	N	Median (IQR)
Total number of supervised PR sessions attended	7,029	10 (5–12)	6,306	11 (6–12)
Total number of supervised PR sessions scheduled	7,039	12 (12–14)	6,318	12 (12–14)
For those with a discharge assessment				
Total number of supervised PR sessions attended	4,636	12 (10–12)	4,351	12 (10–13)
Total number of supervised PR sessions scheduled	4,636	12 (12–14)	4,353	12 (12–14)
For those without a discharge assessment				
Total number of supervised PR sessions attended	2,348	2 (1–6)	1,895	4 (2–8)
Total number of supervised PR sessions scheduled	2,348	12 (12–14)	1,895	12 (12–16)

3.3 Did the patient receive supplemental oxygen during exercise? (QS5)

For those enrolled:

	2017 audit (7,063)	2015 audit (6,319)
Yes	8% (544)	9% (552)
No	90% (6,352)	90% (5,704)
Not recorded	2% (167)	1% (63)

Section 4: Key clinical information at discharge

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Key findings

- Rates of **discharge assessment were higher for cohort programmes**, similar to 2015.
- 84% (157/186) of services in 2017 report routinely providing a **written discharge exercise plan**, compared with only 65% (145/224) in 2015.
 - Data analysed from the clinical audit support this finding, with 81% (3,739/4,637) of patients being provided with a written exercise discharge plan, compared with 73% (3,198/4,353) in the 2015 audit (**QS7**).
- **Overall rates of completion** of the PR programme have improved only marginally; **62%** (4,637/7,476) in 2017, compared with 59% (4,353/7,413) reported in 2015.
- Median increases in exercise performance seen in those patients completing treatment remain clinically and statistically significant in line with 2015 data.
- Similarly, improvements in health status are similar to those seen in 2015.
- There was no significant difference in clinical outcomes between patients enrolled on cohort programmes compared with those on rolling programmes.
- It is encouraging that the **clinical outcomes of treatment** (proportions meeting minimal clinically important differences (MCID) for the relevant exercise capacity and health status measures) for patients who complete therapy **were excellent**, and comparable with those seen in the 2015 audit, and in clinical trials of PR.³
 - Rates of achieving the MCID for the 6MWT were higher than for the ISWT, likely reflecting the lower accepted MCID for the 6MWT.

*For the full key findings and recommendations, please see the national report *Pulmonary rehabilitation: an exercise in improvement*, available at www.rcplondon.ac.uk/an-exercise-in-improvement.*

Navigation

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

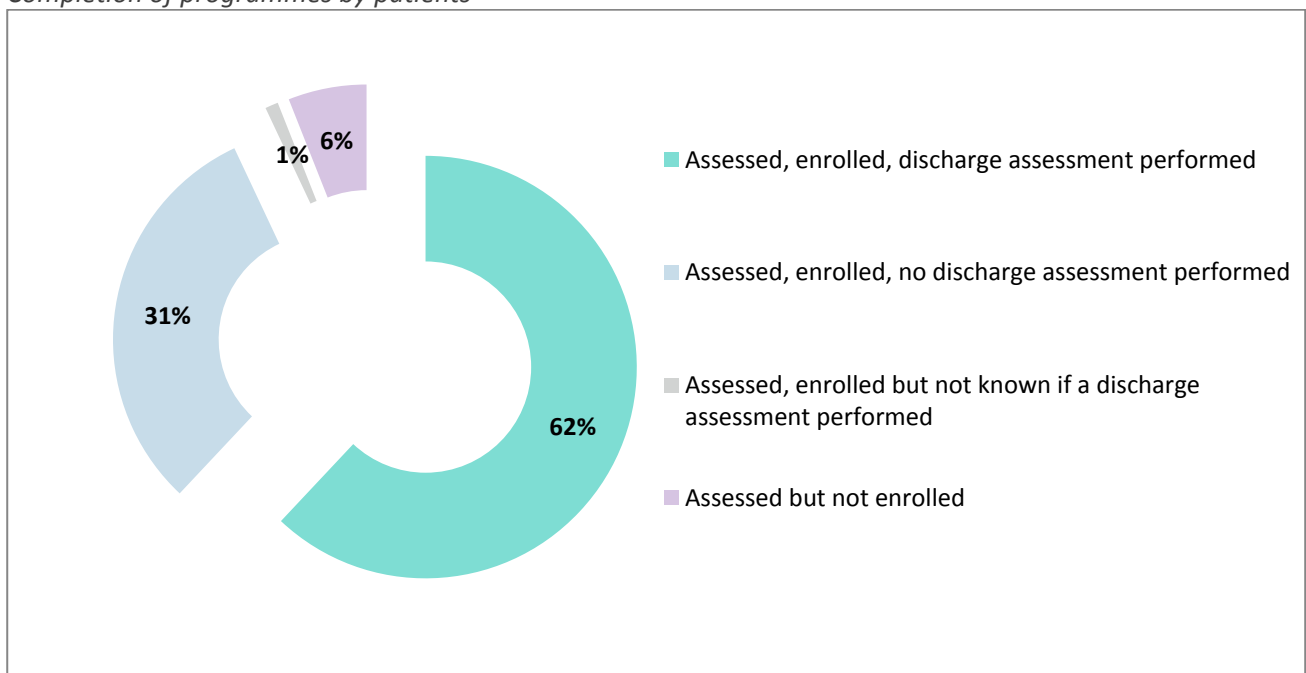
- [Completion of programme by patients \(i.e. a discharge assessment was performed\)](#)
- [4.1 Was a discharge assessment performed? \(QS4\)](#)
 - [4.1.1 Discharge assessment and rolling and cohort programmes](#)
 - [4.1.2 Was a written discharge assessment provided for the patient? \(QS7\)](#)
- [4.2 What was the patient-reported MRC dyspnoea score at discharge assessment? \(QS8 & QS9\)](#)
 - [4.2.1 MRC dyspnoea score at assessment and at discharge](#)
- [4.3 Exercise tests recorded at discharge](#)
 - [4.3.1 Difference between initial assessment and discharge in exercise test: change data](#)
 - [4.3.2 Exercise tests and reaching the MCID](#)
 - [4.3.3 Difference between initial assessment and discharge in exercise test: change data in relation to MCID](#)
 - [4.3.4 Service variation in exercise performance change](#)
 - [4.3.5 Rolling and cohort programme and change in exercise test score](#)
- [4.6 Health status questionnaires at discharge assessment](#)
 - [4.6.1 Difference between initial assessment and discharge in health status: change data](#)
 - [4.6.2 Difference between initial assessment and discharge in health status: change data in relation to MCID](#)
 - [4.6.3 Service variation in health status change](#)
 - [4.6.4 Rolling and cohort programmes and change in health status](#)

Completion of programme by patients (ie a discharge assessment was performed):

78% (1,828/2,334) of those enrolled but with no discharge assessment performed were offered a start date before the end of March 2017, 94% (2,186/2,334) before the end of April 2017 and 98% (2,283/2,334) before the end of May 2017.ⁿ

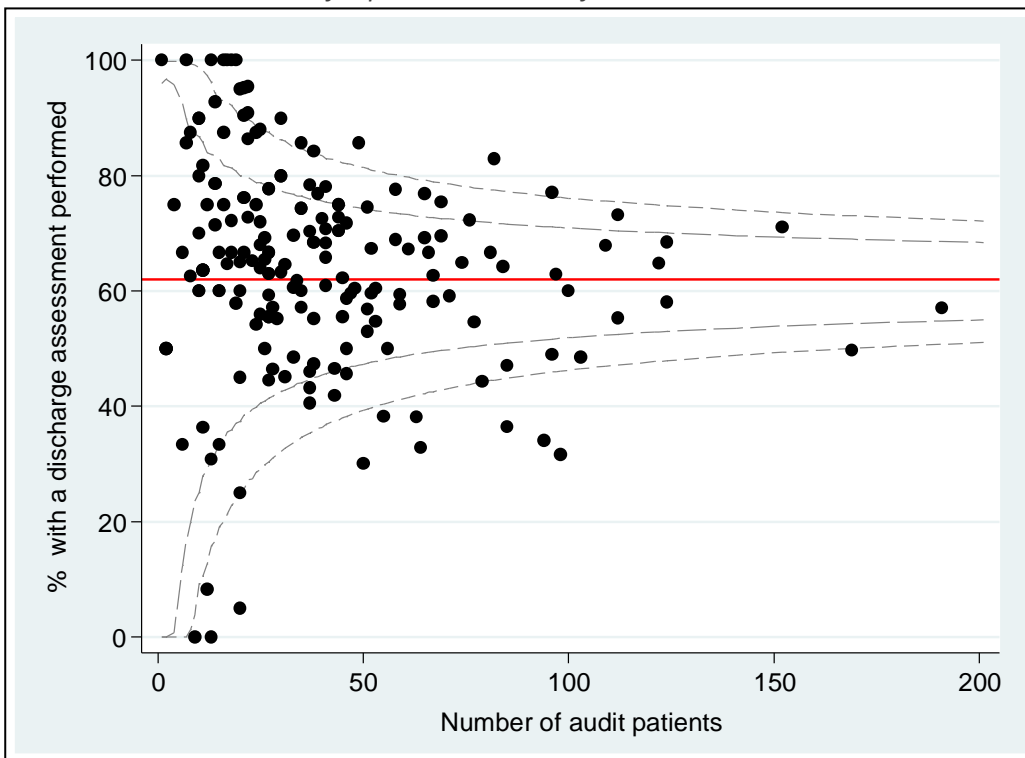
	2017 audit (7,476)	2015 audit (7,413)
Assessed, enrolled, discharge assessment performed	62% (4,637)	59% (4,353)
Assessed, enrolled, no discharge assessment performed	31% (2,348)	26% (1,895)
Assessed, enrolled but not known if a discharge assessment performed	1% (78)	1% (71)
Assessed but not enrolled	6% (413)	15% (1,094)

Completion of programmes by patients



ⁿ The argument for this was that almost all of these patients would have had the opportunity to finish their programme before the end of the audit data collection period at the end of July 2017.

Variation between services for patients assessed for PR



This graph shows the variation between services in the percentage of patients assessed for PR who subsequently had a discharge assessment performed. Each dot represents a service, and the red line represents the overall national percentage of 62%.

4.1 Was a discharge assessment performed? (QS4)

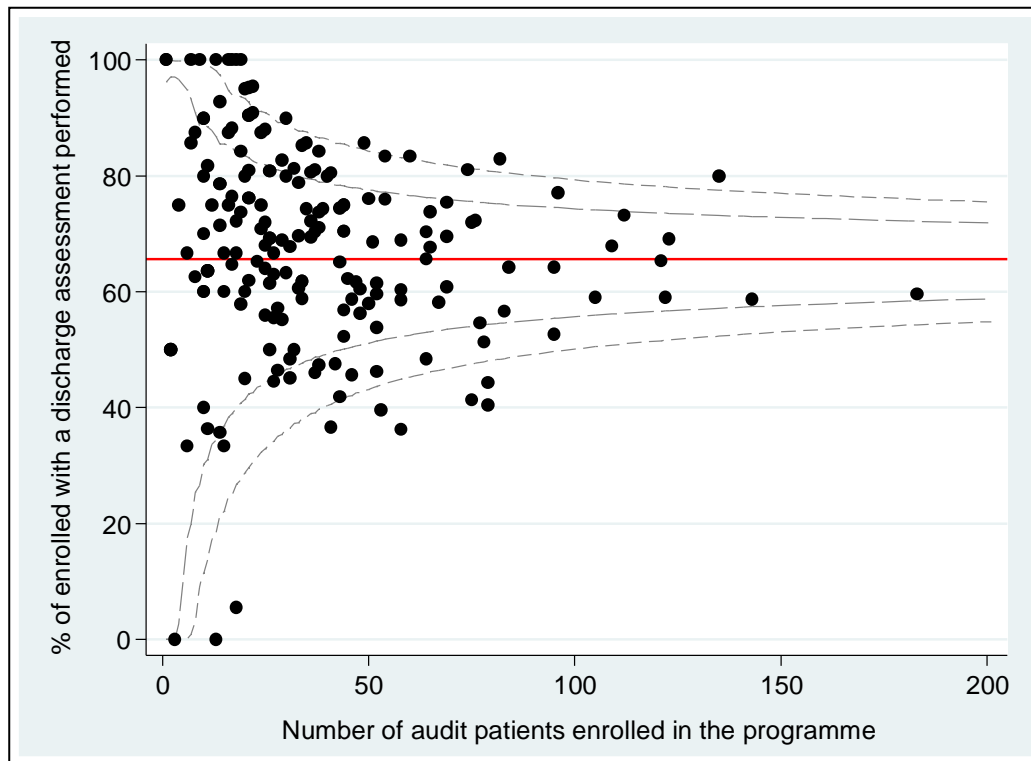
	2017 audit (7,063 enrolled)	2015 audit (6,319 enrolled)
Yes	66% (4,637)	69% (4,353)
No	33% (2,348)	30% (1,895)
Not recorded	1% (78)	1% (71)
Days from initial to discharge assessment:		
Median (IQR)	66 (54–84) (4,628)	65 (53–84) (4,353)

The 2015 audit had more response options that have been grouped to provide equivalent statistics: yes (arranged and attended), no (arranged but not attended, not arranged).

4.1.1 Discharge assessment and rolling and cohort programmes

	2017 audit		2015 audit	
	Rolling	Cohort	Rolling	Cohort
Discharge assessment performed	64% (2,564/4,007)	72% (1,985/2,752)	65% (2,156/3,311)	75% (2,066/2,741)

Variation between services for patients with a discharge assessment



The graph shows the variation between services in the percentage of patients enrolled for PR who subsequently had a discharge assessment performed. Each dot represents a service, and the red line represents the overall national percentage of 66%.

4.1.2 Was a written discharge assessment provided for the patient? (QS7)^o

Answer	2017 audit			2015 audit		
	All	Rolling	Cohort	All	Rolling	Cohort
Yes	81% (3,739/4,637)	83% (2,136/2,564)	77% (1,524/1,985)	73% (3,198/4,353)	73% (1,566/2,156)	74% (1,519/2,066)
No	16% (762/4,637)	13% (341/2,564)	21% (419/1,985)	25% (1,097/4,353)	26% (556/2,156)	25% (523/2,066)
Not recorded	3% (136/4,637)	3% (87/2,564)	2% (42/1,985)	1% (58/4,353)	2% (34/2,156)	1% (24/2,066)

The results from here are for the 4,637 patients who attended a discharge assessment only.

MRC score (QS8 and QS9)

4.2 What was the patient-reported MRC dyspnoea score at discharge assessment? (QS8 and QS9)

	2017 audit (4,637)	2015 audit (4,353)
Grade 1	5% (225)	4% (173)
Grade 2	23% (1,061)	23% (994)
Grade 3	31% (1,430)	28% (1,220)
Grade 4	14% (668)	13% (566)
Grade 5	2% (100)	2% (94)
Not known / Not recorded	25% (1,153)	30% (1,306)

See page 19 for an explanation of the grades

^o This was question 4.1.b in the clinical dataset.

4.2.1 MRC dyspnoea score at assessment and at discharge

The answers in the table below have been calculated using the answers to 4.2 (MRC score at discharge) and 2.10 (MRC score at assessment).

MRC grade was known at both initial and discharge assessments for 3,432 patients. In 40% (1,367) of patients the MRC grade improved (blue shading), in 54% (1,869) it stayed the same (green shading) and in 6% (196) it was worse (purple shading).

Score at discharge (top) Score at assessment (left)	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Not known/ not recorded	Total
Grade 1	49	9	4	2	0	15	79
Grade 2	95	474	63	12	0	129	773
Grade 3	56	424	822	74	7	332	1,715
Grade 4	21	132	463	457	25	263	1,361
Grade 5	2	12	51	111	67	52	295
Not known/not recorded	2	10	27	12	1	362	414
Total	225	1,061	1,430	668	100	1,153	4,637

2015 audit: 41% improved, 54% stayed the same and 4% got worse.

Exercise tests (QS8 and QS9)

4.3 Exercise tests recorded at discharge^{p,q}

Test	2017 audit (4,637)			2015 audit (4,353)		
	Recorded at discharge	Test value N	Test value median (IQR)	Recorded at discharge	Test value N	Test value median (IQR)
Incremental shuttle walk test (ISWT)	51% (2,367)	2,367	260 (160–360)	53% (2,299)	2,299	250 (160–360)
Endurance shuttle walk test (ESWT)	11% (518)	518	439 (262–955)	11% (490)	490	382 (227–684)
6-minute walk test (6MWT)	44% (2,020)	2,020	320 (240–390)	40% (1,720)	1,720	330 (240–400)
Any of the above	95% (4,387)	n/a	n/a	94% (4,078)	n/a	n/a

The 2015 audit asked an overall question about whether exercise performance was assessed at discharge: 97% (4,221/4,353) overall, which did include a small number of other exercise tests.

4.3.1 Difference between initial assessment and discharge in exercise test: change data

The scientific evidence provides thresholds for changes in these outcome measures that are judged important by patients (termed the minimal clinically important difference (MCID)).^{4,5,6,7} For the ISWT the MCID is 48 metres 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 used in this audit.

^p There is a difference between the exercise tests at assessment and discharge, because there are differing dropout rates for each of the tests. There was a 36% dropout rate in ISWT, a 34% dropout rate for those with ESWT, and a 39% dropout for those with 6MWT.

^q All questions/tables marked with 4.3 include the following questions: *Were the following exercise tests recorded at discharge? If yes, please provide values for all that apply.* 4.3 Incremental shuttle walk test, 4.4 Endurance shuttle walk test, 4.5 6-minute walk test.

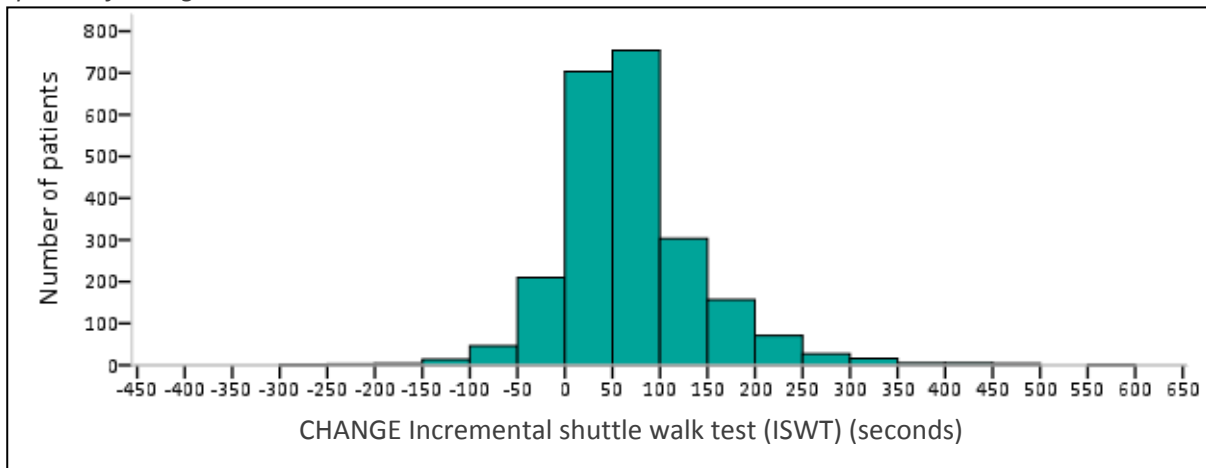
Test	2017 audit (4,637)			2015 audit (4,353)		
	Median	IQR	N	Median	IQR	N
ISWT (metres)	60	20–100	2,324	50	20–100	2,255
ESWT (seconds)	179	42–463	514	196	55–455	508
6MWT (metres)	50	20–90	1,989	50	20–90	1,685

Wilcoxon matched pairs tests for change gave $p < 0.001$ for each of the four exercise tests.

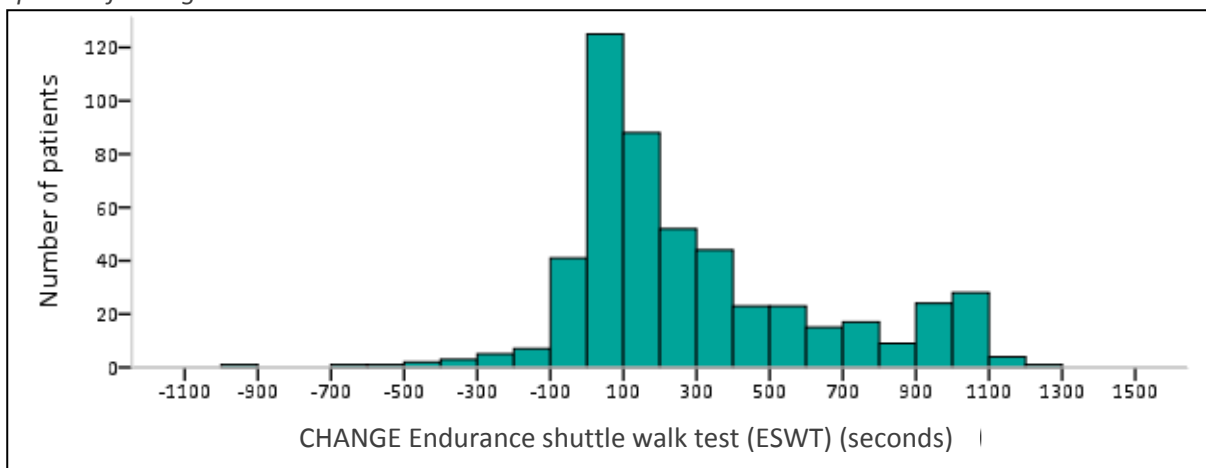
4.3.2 Exercise tests and reaching the MCID

	2017	2015
Reached the 48m MCID for ISWT	58%	57%
Reached the 30m MCID for 6MWT	68%	70%

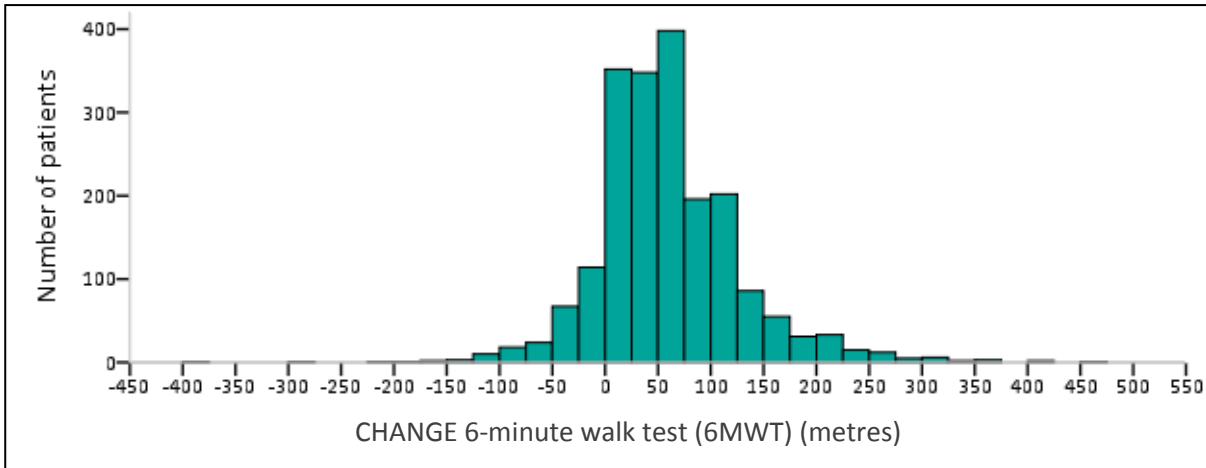
Spread of change in ISWT



Spread of change in ESWT



Spread of change in 6MWT



4.3.3 Difference between initial assessment and discharge in exercise test: change data in relation to MCID

	2017 audit (4,637)	2015 audit (4,353)
ISWT (metres):		
Reduction / no change in distance	18% (426)	18% (416)
Increased distance of <48 metres	24% (553)	25% (555)
Increased distance of at least 48 metres	58% (1,345)	57% (1,284)
6MWT (metres):		
Reduction / no change in distance	17% (332)	16% (271)
Increased time of <30 m	15% (302)	14% (233)
Increased distance of at least 30 m	68% (1,355)	70% (1,181)

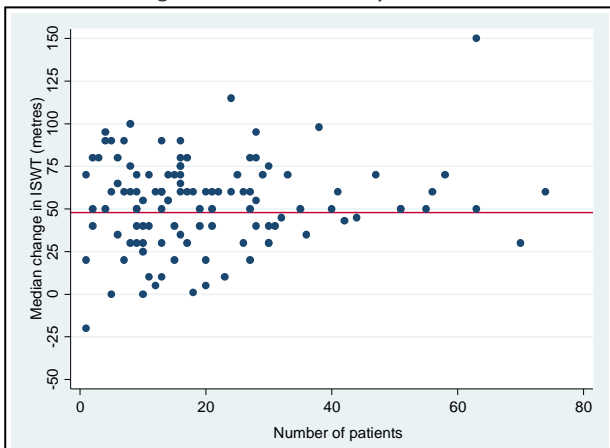
4.3.4 Service variation in exercise performance change

Left hand graphics: The scatter plots below show median changes in each exercise outcome measure plotted against the number of patients audited for each service. The horizontal red lines represent the MCID (where known).

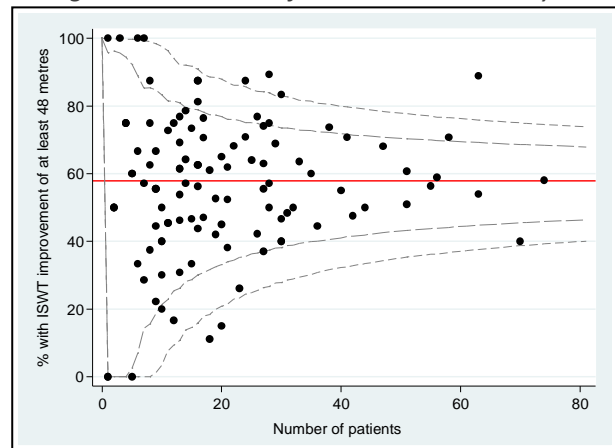
Right hand graphics: The funnel plots below show the numbers of patients reaching the MCID for the given measure plotted against the number of patients audited. The horizontal red lines represent the overall percentage reaching these MCIDs.

Exercise performance change: ISWT

Median change in ISWT result by service

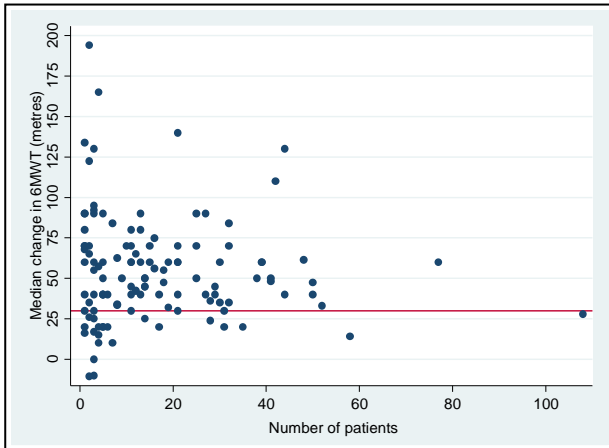


Change in ISWT result of at least 48 metres by service

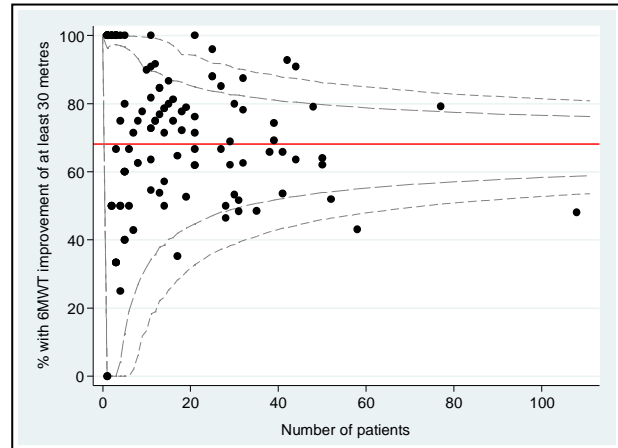


Exercise performance change: 6MWT

Median change in 6MWT result by service

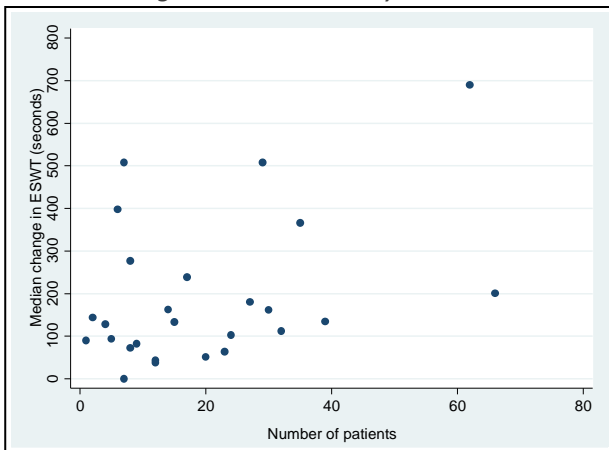


Change in 6MWT result of at least 30 metres by service



Exercise performance change: ESWT

Median change in ESWT result by service



4.3.5 Rolling and cohort programme and change in exercise test score

Test	2017 audit			2015 audit		
	Rolling	Cohort	Mann-Whitney Test P value	Rolling	Cohort	Mann-Whitney Test P value
ISWT (metres)	50 (10–100), n=1,224	60 (20–90), n=1,044	0.94	60 (20–100), n=1,130	50 (10–90), n=1,079	0.004
ESWT (seconds)	188 (59–584), n=247	174 (33–381), n=264	0.02	219 (61–451), n=280	179 (43–466), n=228	0.46
6MWT (metres)	50 (20–90), n=1,184	50 (15–90), n=800	0.13	50 (20–90), n=852	50 (20–91), n=810	0.99

Health status questionnaires (QS 8 and 9)

4.6 Health status questionnaires at discharge assessment^r

Questionnaire	2017 audit (4,637)			2015 audit (4,353)		
	Completed at discharge assessment	Questionnaire value N	Questionnaire value median (IQR)	Completed at discharge assessment	Questionnaire value N	Questionnaire value median (IQR)
St George's Respiratory Questionnaire (SGRQ, not SGRQ-C) Total score (1–100)	5% (252)	252	49 (35–62)	6% (263)	263	46 (33–59)
COPD Assessment Test (CAT) Total score (0–40)	65% (3,031/4,637)	3,031	19 (13–24)	57% (2,464)	2,464	18 (13–23)
Chronic Respiratory Questionnaire (CRQ)						
Dyspnoea average score (1.0–7.0)	40% (1,853/4,637)	1,820	3.6 (2.6–4.6)	36% (1,588)	1,569	3.6 (2.6–4.6)
Fatigue average score (1.0–7.0)		1,784	4.2 (3.3–5.2)		1,582	4.3 (3.5–5.3)
Emotion average score (1.0–7.0)		1,784	5.1 (4.0–6.0)		1,582	5.1 (4.1–6.0)
Mastery average score (1.0–7.0)		1,783	5.3 (4.0–6.2)		1,581	5.3 (4.3–6.3)
Any of the above questionnaires	93% (4,291/4,627)	n/a	n/a	87% (3,778)	n/a	n/a

4.6.1 Difference between initial assessment and discharge in health status: change data

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)).^{8,9,10,11,12} For the SGRQ the MCID is a reduction in 4 points (11), for the CRQ the MCID is an increase in 0.5 points for each domain (12) and for the CAT the MCID is a reduction in 2 points (13).

^r All questions/tables marked as 4.6 include the question: *Please indicate any health status questionnaires completed at discharge and provide values if recorded, 4.6 St George's Respiratory Questionnaire, 4.7 Chronic Respiratory Questionnaire, 4.8 COPD Assessment Test.*

<i>St George's Respiratory Questionnaire (SGRQ):</i>	2017 audit (4,637)			2015 audit (4,353)		
	Median	IQR	N	Median	IQR	N
Total score (1–100)	-5.0	-13.0, 2.0	248	-4.9	-12.0, 1.6	250
Chronic Respiratory Questionnaire (CRQ):						
Dyspnoea average score (1.0–7.0)	0.8	0.0–1.6	1,801	0.8	0.0–1.6	1,529
Fatigue average score (1.0–7.0)	0.7	0.0–1.5	1,768	0.7	0.0–1.5	1,543
Emotion average score (1.0–7.0)	0.5	0.0–1.3	1,767	0.5	0.0–1.2	1,543
Mastery average score (1.0–7.0)	0.5	0.0–1.5	1,767	0.5	0.0–1.3	1,543
COPD Assessment Test (CAT):						
Total score (0–40)	-2	-6, 1	2,927	-3	-6, 1	2,396

Wilcoxon matched pairs test for change gave $p < 0.001$ for each of the nine tests.

4.6.2 Difference between initial assessment and discharge in health status: change data in relation to MCID

	2017 audit (4,637)	2015 audit (4,353)
St George's Respiratory Questionnaire (SGRQ): Total score		
Increase / no change in score	31% (78)	30% (76)
Improvement of <4.0	15% (36)	18% (44)
Improvement of ≥ 4.0	54% (134)	52% (130)
Chronic Respiratory Questionnaire (CRQ): Dyspnoea average score		
Decrease / no change in score	27% (479)	29% (437)
Improvement of <0.5	13% (230)	13% (201)
Improvement of ≥ 0.5	61% (1,092)	58% (891)
Chronic Respiratory Questionnaire (CRQ): Fatigue average score		
Decrease / no change in score	29% (508)	31% (472)
Improvement of <0.5	12% (213)	10% (152)
Improvement of ≥ 0.5	59% (1,047)	60% (919)
Chronic Respiratory Questionnaire (CRQ): Emotion average score		
Decrease / no change in score	30% (534)	31% (481)
Improvement of <0.5	17% (293)	17% (266)
Improvement of ≥ 0.5	53% (940)	52% (796)
Chronic Respiratory Questionnaire (CRQ): Mastery average score		
Decrease / no change in score	33% (589)	34% (529)
Improvement of <0.5	11% (189)	9% (136)
Improvement of ≥ 0.5	56% (989)	57% (878)
COPD Assessment Test (CAT):		
Increase / no change in score	36% (1,066)	32% (775)
Improvement of 1	7% (219)	7% (167)
Improvement of ≥ 2	56% (1,642)	61% (1,454)

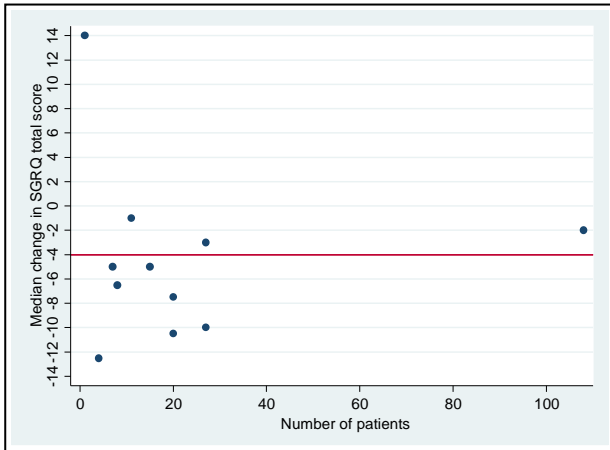
4.6.3 Service variation in health status change

Left hand panel: The scatter plots below show median changes in each health status outcome measure plotted against the number of patients audited for each programme. The horizontal red lines represent the MCID.

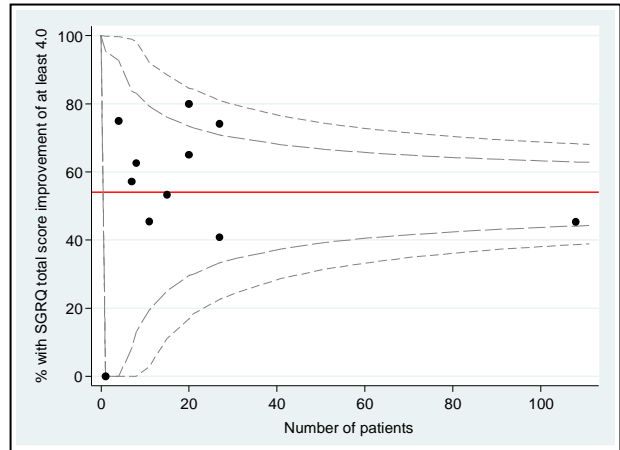
Right hand panel: These funnel plots show the numbers of patients reaching the MCID for the given health status measure plotted against the number of patients audited. The horizontal red lines represent the overall percentage reaching these MCIDs.

St George's Respiratory Questionnaire (SGRQ):

Median change on the SGRQ total score by service

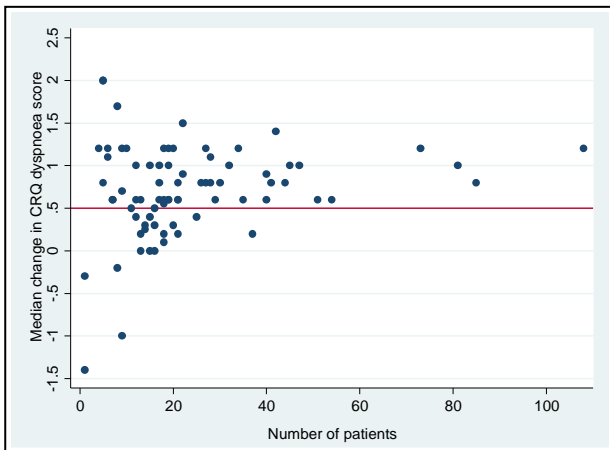


% improving by 4.0 or more on the SGRQ total score by service

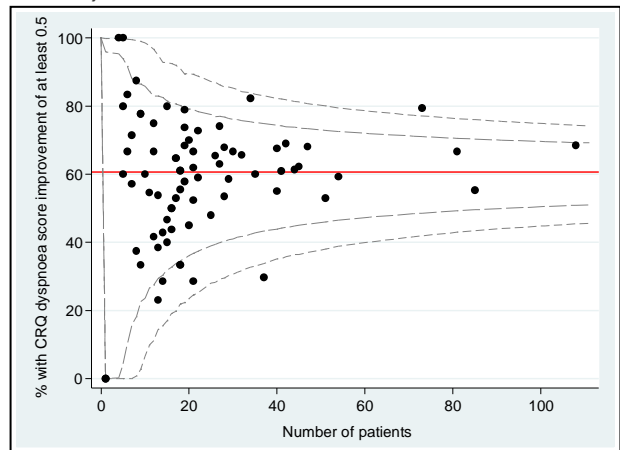


Chronic Respiratory Questionnaire (CRQ):

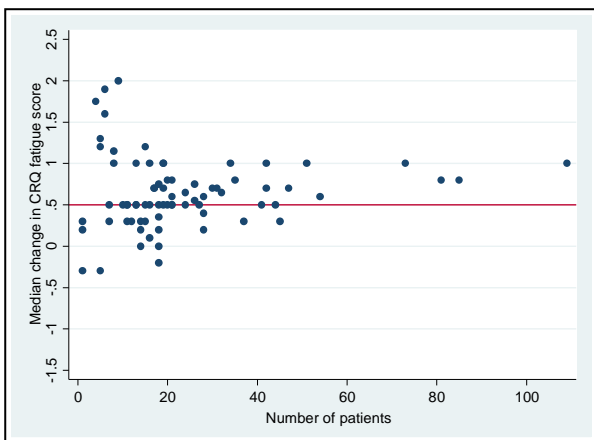
Median change on the CRQ dyspnoea score by service



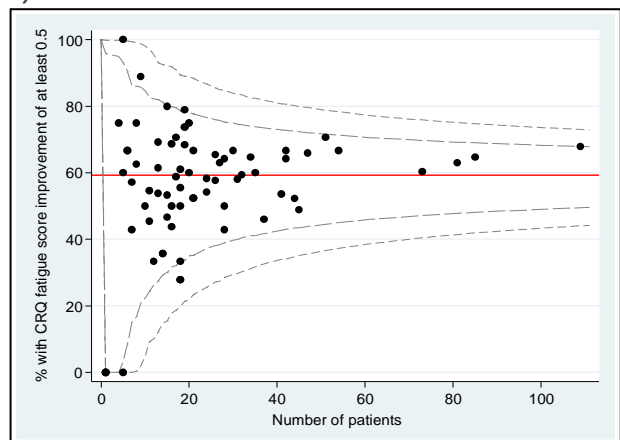
% improving by 0.5 or more on the CRQ dyspnoea score by service



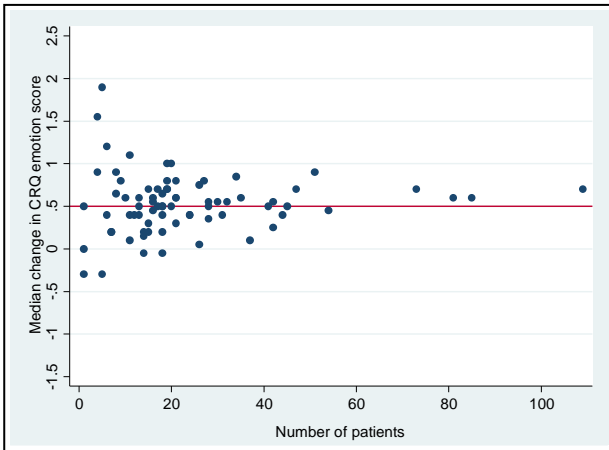
Median change on the CRQ fatigue score by service



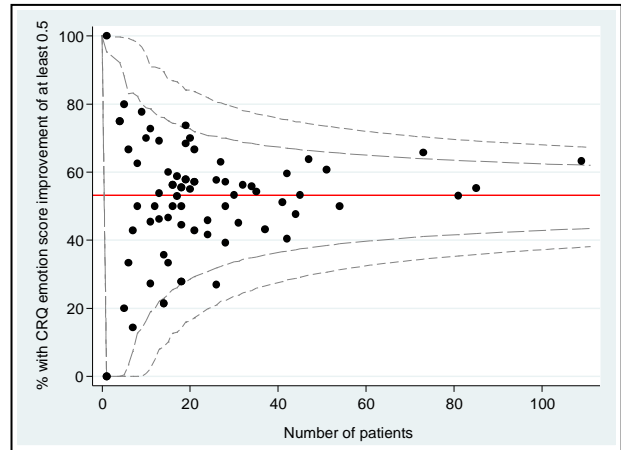
% improving by 0.5 or more on the CRQ fatigue score by service



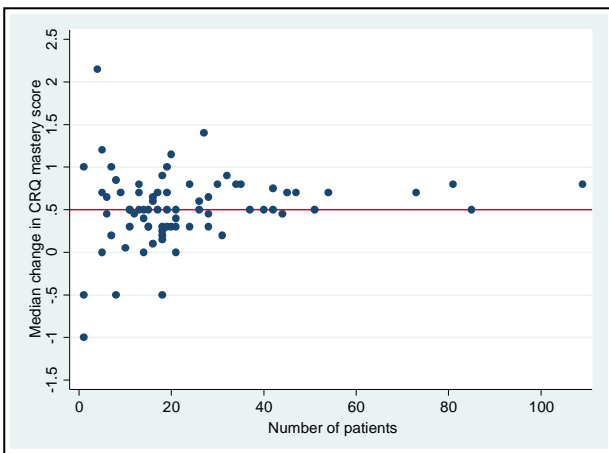
Median change on the CRQ emotion score by service



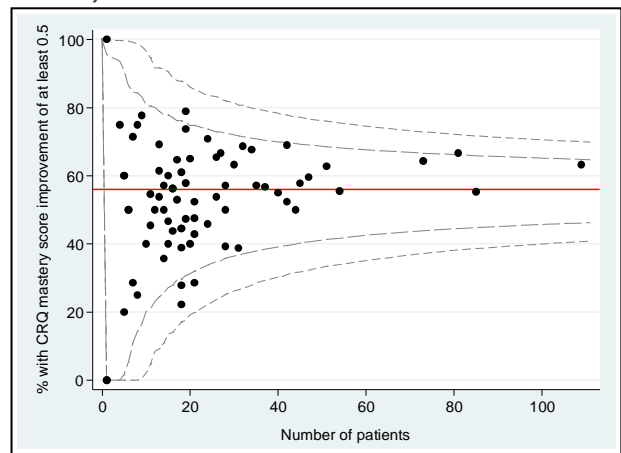
% improving by 0.5 or more on the CRQ emotion score by service



Median change on the CRQ mastery score by service

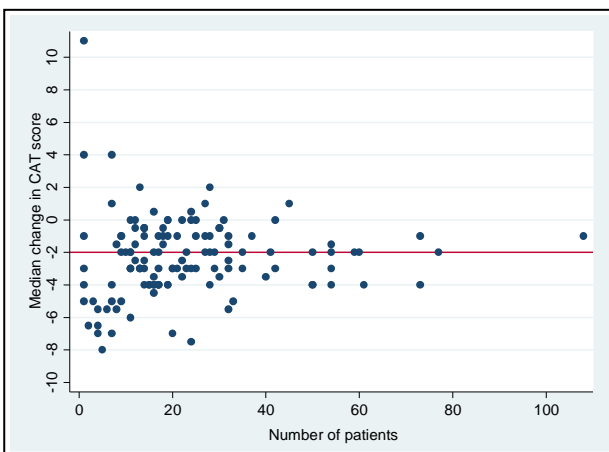


% improving by 0.5 or more on the CRQ mastery score by service

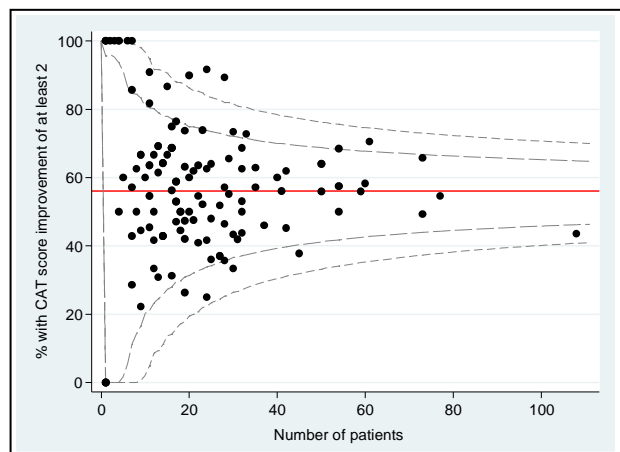


COPD Assessment Test (CAT):

Median change on the CAT score by service



% improving by 2 or more on the CAT score by service



4.6.4 Rolling and cohort programmes and change in health status

Questionnaire	2017 audit			2015 audit		
	Rolling	Cohort	Mann-Whitney Test P value	Rolling	Cohort	Mann-Whitney Test P value
St George's Respiratory Questionnaire (SGRQ):						
Total score	-5 (-13, 2), n=165	-5 (-13, 0), n=83	0.53	-6 (-15, 2), n=93	-4 (-11, 1), n=157	0.34
Chronic Respiratory Questionnaire (CRQ):						
Dyspnoea	0.8 (0.0–1.6), n=1013	0.8 (0.0–1.6), n=785	0.34	0.8 (0.0–1.6), n=808	0.6 (0.0–1.6), n=716	0.45
Fatigue	0.6 (0.0–1.5), n=974	0.7 (0.0–1.5), n=791	0.94	0.8 (0.0–1.5), n=816	0.6 (0.0–1.5), n=722	0.57
Emotion	0.6 (0.0–1.4), n=973	0.5 (0.0–1.3), n=791	0.14	0.6 (0.0–1.3), n=816	0.4 (-0.1–1.1), n=722	0.004
Mastery	0.5 (0.0–1.5), n=973	0.5 (0.0–1.5), n=791	0.50	0.8 (0.0–1.5), n=816	0.5 (0.0–1.3), n=722	0.003
COPD Assessment Test (CAT):						
Total score	-2 (-6, 1), n=1,639	-2 (-6, 1), n=1,221	0.36	-3 (-6, 1), n=1,127	-3 (-6, 1), n=1,204	0.62

Section 5: PR site venue and audit cohort

Question 3.4 in the clinical dataset asked services to select the site at which the patient was treated, choosing from the sites that had been entered by each participating service in the organisational audit. The questions in the organisational audit included some categorisation of the sites, and this enabled patient care to be measured against the PR site category. This analysis was not conducted in 2015.

The range between the site categories is varied and does not reveal much, if any, significant difference in the care patients receive. However, the analyses are presented here for the interested reader.

Navigation

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

- [5.1 PR site venue and number of patients](#)
- [5.2 PR site venue and demographics](#)
- [5.3 PR site venue and exercise test at initial assessment](#)
- [5.4 PR site venue and health status measure at initial assessment](#)
- [5.5 PR site venue, rolling programmes and supervised sessions scheduled and attended](#)
- [5.6 PR site venue and change in test score](#)
- [5.7 PR site venue and achievement of an MCID improvement](#)
- [5.8 PR site venue and change in test score \(SGRQ and CAT\)](#)
- [5.9 PR site venue and change in test score \(CRP\)](#)
- [5.10 PR site venue and change in test score, achieving MCID improvement](#)

5.1 PR site venue and number of patients

	Services (184)	Patients (7,476)
Acute hospital	33% (60)	18% (1,330)
Church or community hall	38% (69)	26% (1,922)
Community hospital	29% (54)	13% (965)
GP surgery	4% (7)	1% (104)
Health centre	16% (29)	7% (559)
Local leisure centre/gym	36% (67)	21% (1,575)
Other	16% (30)	6% (467)
Not stated/Not enrolled	54% (99)	7% (554)*

*413 patients of the 554 were not enrolled

5.2 PR site venue and demographics

	Patients	% Male	Median (IQR) age at initial assessment	% living in two most deprived national quintile areas	% living in two least deprived national quintile areas
Acute hospital	1,330	51	69 (63–76)	54	29
Church or community hall	1,922	53	70 (64–76)	42	36
Community hospital	965	51	71 (65–76)	40	37
GP surgery	104	56	71 (65–75)	51	31
Health centre	559	55	70 (63–75)	58	23
Local leisure centre/gym	1,575	51	70 (63–76)	47	33
Other	467	55	70 (64–76)	50	32
Not stated/Not enrolled	554	55	69 (62–74)	60	24
P value excluding 'not stated'		0.44*	0.19**	<0.001*	

*Chi-squared, **Kruskal Wallis

5.3 PR site venue and exercise test at initial assessment

	At initial assessment				
	Patients	% ISWT	% ESWT	% 6MWT	% none of the three
Acute hospital	1,330	57	5	39	9
Church or community hall	1,922	47	17	50	3
Community hospital	965	49	13	47	4
GP surgery	104	37	-	63	1
Health centre	559	48	14	48	5
Local leisure centre/gym	1,575	48	4	45	8
Other	467	55	12	42	4
Not stated/Not enrolled	554	28	12	19	53
P value* excluding 'not stated'		<0.001	<0.001	<0.001	<0.001

*Chi-squared

5.4 PR site venue and health status measure at initial assessment

	At initial assessment				
	Patients	% SGRQ	% CRQ	% CAT	% none of the three
Acute hospital	1,330	3	36	64	19
Church or community hall	1,922	8	47	55	7
Community hospital	965	1	35	67	10
GP surgery	104	0	55	91	1
Health centre	559	4	35	56	8
Local leisure centre/gym	1,575	3	36	71	7
Other	467	12	31	69	13
Not stated/Not enrolled	554	3	25	35	44
P value* excluding 'not stated'		<0.001	<0.001	<0.001	<0.001

*Chi-squared

5.5 PR site venue, rolling programmes and supervised sessions scheduled and attended

	Patients enrolled	% Rolling programme	Median (IQR) supervised PR sessions attended	Median (IQR) supervised PR sessions scheduled	% with 12 or more supervised PR sessions scheduled	% with a discharge assessment performed
Acute hospital	1,330	69	11 (4–12)	12 (12–15)	91	63
Church or community hall	1,922	61	11 (6–12)	12 (12–14)	88	69
Community hospital	965	56	10 (6–12)	12 (12–13)	80	70
GP surgery	104	40	9 (4–11)	12 (11–12)	65	63
Health centre	559	65	11 (4–12)	12 (12–14)	94	65
Local leisure centre/gym	1,575	50	9 (5–12)	12 (12–12)	80	64
Other	467	50	10 (3–12)	12 (12–14)	84	61
Not stated	141	45	10 (2–12)	12 (12–14)	92	52
P value excluding 'not stated'		<0.001*	<0.001**	<0.001**	<0.001*	<0.001*

*Chi-squared **Kruskal Wallis

5.6 PR site venue and change in test score

For those with a discharge assessment performed (4,637).

	Patients	CHANGE in test score: Median (IQR), N		
		ISWT	ESWT	6MWT
Acute hospital	840	51 (20–90), n=480	170 (6–401), n=31	50 (20–90), n=309
Church or community hall	1,330	60 (20–100), n=645	227 (54–527), n=228	50 (16–90), n=641
Community hospital	674	50 (10–90), n=323	241 (55–558), n=94	40 (10–80), n=281
GP surgery	66	65 (20–108), n=28	-	50 (19–103), n=38
Health centre	363	50 (10–100), n=171	109 (10–203), n=56	56 (20–105), n=148
Local leisure centre/gym	1,008	60 (20–100), n=483	116 (1–540), n=33	60 (30–100), n=443
Other	283	60 (10–100), n=157	156 (47–370), n=35	44 (18–70), n=117
Not stated	73	40 (0–85), n=37	139 (60–373), n=37	71 (-10–95), n=12
P value* excluding 'not stated'		0.40	0.02	<0.001

*Kruskal Wallis

5.7 PR site venue and achievement of a MCID improvement

	CHANGE in test score: achieved MCID improvement			
		% ISWT \geq 48m		% 6MWT \geq 30m
Acute hospital	59%	281/480	68%	211/309
Church or community hall	59%	380/645	65%	419/641
Community hospital	52%	168/323	61%	171/281
GP surgery	61%	17/28	68%	26/38
Health centre	56%	95/171	72%	107/148
Local leisure centre/gym	61%	295/483	75%	334/443
Other	58%	91/157	68%	79/117
Not stated	49%	18/37	67%	8/12
P value* excluding 'not stated'		0.28		0.002

*Chi-squared

5.8 PR site venue and change in test score (SGRQ and CAT)

	Patients	CHANGE in test score: Median (IQR), N	
		SGRQ total	CAT score
Acute hospital	840	-6 (-16, -1), n=35	-3 (-6, 1), n=541
Church or community hall	1,330	-5 (-13, 2), n=120	-2 (-5, 1), n=759
Community hospital	674	-3 (n/a), n=7	-3 (-6, 1), n=450
GP surgery	66	-	-2 (-7, 1), n=60
Health centre	363	-3 (-7, 1), n=20	-2 (-6, 2), n=199
Local leisure centre/gym	1,008	1 (-12, 4), n=29	-2 (-6, 0), n=694
Other	283	-4 (-13, 2), n=37	-3 (-6, 2), n=204
Not stated	73	-	-1 (-3, 1), n=20
P value* excluding 'not stated'		0.47	0.19

*Kruskal Wallis

5.9 PR site venue and change in test score (CRP)

	Patients	CHANGE in CRP test score: Median (IQR), N			
		Dyspnoea	Fatigue	Emotion	Mastery
Acute hospital	840	0.6 (0–1.6), n=291	0.5 (0–1.5), n=295	0.5 (-0.1–1.1), n=295	0.5 (0–1.3), n=295
Church or community hall	1,330	0.8 (0–1.6), n=629	0.7 (0–1.5), n=611	0.5 (0–1.3), n=610	0.5 (0–1.5), n=611
Community hospital	674	0.8 (0–1.8), n=234	0.5 (0–1.5), n=238	0.5 (0–1.3), n=238	0.5 (0–1.5), n=238
GP surgery	66	1.0 (0–1.5), n=39	0.6 (0–1.0), n=40	0.6 (0–1.1), n=40	0.6 (0–1.2), n=40
Health centre	363	0.5 (0–1.2), n=128	0.5 (0–1.3), n=126	0.6 (-0.1–1.4), n=126	0.5 (0–1.5), n=125
Local leisure centre/gym	1,008	0.8 (0–1.6), n=344	0.8 (0–1.5), n=321	0.6 (0–1.4), n=321	0.5 (0–1.5), n=321
Other	283	1.2 (0.4–2.4), n=83	1.0 (0–1.7), n=84	0.5 (-0.2, -1.6), n=84	0.7 (0–1.5), n=84
Not stated	73	1.0 (0.1–1.8), n=53	0.5 (0–1.1), n=53	0.9 (0–1.6), n=53	0.5 (0–1.5), n=53
P value* excluding 'not stated'		0.002	0.60	0.61	0.95

*Kruskal Wallis

5.10 PR site venue and change in test score, achieving MCID improvement

	CHANGE in test score: achieved MCID improvement					
	% SGRQ total ≥ 4.0	% CRQ dyspnoea ≥ 0.5	% CRQ fatigue ≥ 0.5	% CRQ emotion ≥ 0.5	% CRQ mastery ≥ 0.5	% CAT ≥ 2
Acute hospital	66% (23/35)	58% (168/291)	58% (170/295)	50% (148/295)	57% (168/295)	58% (316/541)
Church or community hall	58% (69/120)	61% (384/629)	58% (357/611)	53% (326/610)	56% (343/611)	54% (413/759)
Community hospital	43% (3/7)	62% (145/234)	57% (136/238)	51% (122/238)	58% (137/238)	57% (258/450)
GP surgery	-	69% (27/39)	58% (23/40)	53% (21/40)	55% (22/40)	55% (33/60)
Health centre	40% (8/20)	50% (64/128)	55% (69/126)	54% (68/126)	55% (69/125)	52% (104/199)
Local leisure centre/gym	41% (12/29)	61% (209/344)	64% (207/321)	55% (178/321)	52% (168/321)	57% (394/694)
Other	51% (19/37)	71% (59/83)	63% (53/84)	55% (46/84)	61% (51/84)	57% (117/204)
Not stated	-	68% (36/53)	60% (32/53)	58% (31/53)	58% (31/53)	35% (7/20)
P value* excluding 'not stated'	0.27	0.06	0.40	0.90	0.82	0.79

*Chi-squared

Appendix A: Results for individual PR services

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

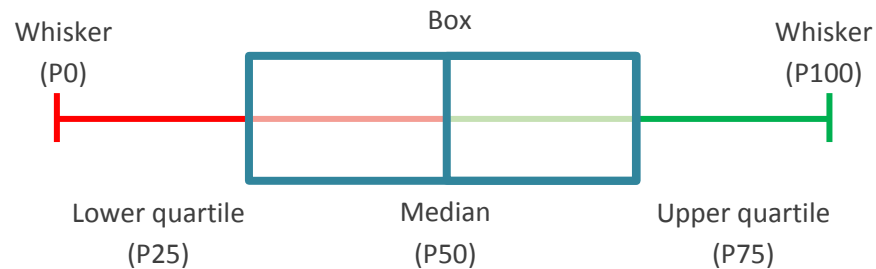
- objective and easily recordable,
- map to accepted quality standards,
- have been discriminatory in the current audit cycle,
- can be quantitatively compared with national data.

The detailed rationale for each process and outcome measure is provided in the table below:

Benchmarking dashboard performance indicator	Rationale
Process items	
Start date offered within 90 days of receipt (if known)	<ul style="list-style-type: none"> • Poor current performance nationally. • Maps to QS1. • Improvement is likely to enhance patient outcomes, particularly PR uptake rates.
Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)	<ul style="list-style-type: none"> • Poor current performance nationally. • Maps to QS8. • Performance of practice tests linked to better uptake and outcome in sub-analysis of 2015 audit.¹³ • Likely to improve clinical outcomes through more accurate exercise prescription.
Patients with a discharge assessment who received a written discharge exercise plan	<ul style="list-style-type: none"> • Poor current performance nationally. • Maps to QS7. • Improvement will increase the likelihood of benefits of PR being maintained in longer term.
Outcome items	
Patients assessed for PR who go on to have a discharge assessment	<ul style="list-style-type: none"> • 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.¹⁴ • Causes of non-completion are multifactorial and therefore will prompt quality improvement activity across the system.
At least one exercise MCID achieved for ISWT/6MWT	<ul style="list-style-type: none"> • Key patient-centred measure of outcome. • May identify services where care processes are suboptimal. • Maps to QS8.
At least one health status MCID achieved	<ul style="list-style-type: none"> • Key patient-centred measure of outcome. • May identify services where care processes are suboptimal. • Maps to QS8.

Table 1 illustrates the cut-points for the median and interquartile ranges for the metrics that have been used in the benchmarking table for all services (Table 2). These values have been represented graphically as a box and whisker plot (Figure 1). 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, which divide the data into two halves. These two halves were then divided in half again, to identify the lower quartile (P25) and the upper quartile (P75).

Figure 1. Box and whisker plot



The colour codes refer to the quartile in which each programme lies, as follows:

RED = result below the lower quartile for that metric

LIGHT RED = result equal or above the lower quartile, but below the median for that metric

LIGHT GREEN = result equal or above the median, but below the upper quartile (UQ) for that metric

GREEN = result equal or above the UQ for that metric

GREY = sample too small for meaningful interpretation (< 10 cases)

'Audit cases' refers to the case ascertainment for PR services which was derived from the total number of cases submitted by services to the clinical audit divided by the number of eligible patients as reported by services in question 7.1^s of the organisational audit dataset. Please note, the method of services self-reporting their total case numbers was used as no other third-party data source was available.

'De' in [Table 2](#) refers to the number of cases submitted to the audit for the metric at hand (ie the denominator). Where this is fewer than five cases the figure and corresponding percentage has been suppressed and replaced by a '<5' and a '-' in the percentage column. These suppressed figures have however been included when calculating the median and interquartile range values presented in [Table 1](#).

Table 1: The median and interquartile ranges for the metrics used in the benchmarking

		<i>Process items</i>				<i>Outcome items</i>		
		Audit cases ^t	Start date offered within 90 days of receipt	Patients undertaking practice exercise test ^u	Patients with a discharge assessment who received a written discharge exercise plan	Patients assessed for PR who go on to have a discharge assessment	At least one exercise MCID achieved for ISWT/6MWT	At least one health status MCID achieved
N	Services with valid records	180	184	181	184	182	178	175
	Services with missing records	4	0	3	0	2	6	9
Median and interquartile ranges % ^v	4th quartile	≤ 63	≤ 30	0	≤ 69	≤ 54	≤ 51	≤ 46
	3rd quartile	64 to 84	31 to 62	0	70 to 98	55 to 64	52 to 62	47 to 60
	2nd quartile	85 to 95	63 to 87	1 to 76	99	65 to 74	63 to 74	61 to 72
	Top quartile	96 to 100	88 to 100	77 to 100	100	75 to 100	75 to 100	73 to 100

Identified in the table above are the median and interquartile ranges for each of the metrics. These have been highlighted in the colours that are used in the dashboard of [Table 2](#).

^s How many patients were eligible for this audit? How many patients with a primary respiratory diagnosis of COPD attended an assessment appointment (or if no assessment appointment, attended their first session of PR) between 3 January 2017 and 31 March 2017.

^t Number of patients entered to the clinical audit/number of patients eligible entered in the organisational audit.

^u For ISWT or 6MWT only if one test done; for both if both tests done.

^v The cut-points for the third and fifth indicator suggest excessive clusterings at the extremes.

Table 2: All PR services that participated in the 2017 clinical and organisational audits, and their benchmarking against the selected metrics

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Abertawe Bro Morgannwg University Health Board PR Service	-	38/--	22	36	0	32	85	26	68	38	62	21	36	25
ABUHB PR	85	11/13	22	9	0	11	0	9	82	11	89	9	100	9
ACERs – Respiratory Medicine	87	33/38	88	32	97	33	94	16	48	33	31	13	43	14
Aintree PR Programme	100	13/13	100	10	92	12	-	<5	31	13	-	<5	-	<5
Airedale and Wharfedale PR Service	75	15/20	47	15	0	15	100	10	67	15	40	10	60	10
Anglian Community PR Service	93	40/43	0	35	87	39	100	29	73	40	37	27	86	28
ARAS Team	57	34/60	58	31	0	32	100	21	62	34	71	21	48	21
Atrium Health Limited	84	27/32	78	27	71	7	100	12	44	27	58	12	63	8
Barking and Dagenham PR Service	53	8/15	0	8	0	7	0	7	88	8	83	6	86	7
Barnet COPD Respiratory Service	79	44/56	70	44	76	38	100	31	70	44	30	27	43	30
Bassetlaw PR programme	22	21/95	100	21	0	21	100	19	90	21	53	19	68	19

^w Number of patients entered to the clinical audit/number of patients eligible entered in the organisational audit.

^x For the ISWT the MCID is 48 metres and for the 6MWT the MCID is 30 metres.

^y For the SGRQ the MCID was taken as a reduction of 4 points in the total score, for the CRQ the MCID was an increase of 0.5 points in the average of the four domain scores, and for the CAT the MCID was a reduction of 2 points.

^z For instances where the number of cases entered by services to the clinical audit was greater than that of the number of cases eligible reported in the organisational, the percentage has been capped at 100% as the figure provided in the organisational audit has been assumed to be an error (given that it was inputted prior to the end of the clinical audit).

^{aa} For instances in this column where a '--' appears as the denominator this is due to services not completing question 7.1 of the organisational audit dataset.

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
BCUHB PR Service – Centre	70	14/20	14	14	0	14	100	11	79	14	64	11	91	11
BCUHB PR Service – East	64	46/72	16	44	0	41	100	33	72	46	88	32	73	33
Bedford Hospital PR	96	103/107	96	95	0	94	100	50	49	103	64	44	56	50
BEET: Breathing Exercise Education Training	56	30/54	90	30	-	<5	96	24	80	30	-	<5	92	24
Berkshire East PR	97	38/39	33	36	33	36	100	26	68	38	88	24	68	25
Berkshire West PR	100	49/49	41	49	0	49	100	42	86	49	48	42	62	42
Birmingham Community Healthcare – PR Service	-	18/--	94	18	24	17	92	13	72	18	85	13	77	13
Blackburn PR Programme	87	41/47	92	36	92	36	96	25	61	41	96	25	48	21
Bournemouth and Christchurch PR	79	61/77	100	51	91	56	93	41	67	61	54	41	60	40
Breathing Space	100	53/53	44	52	100	52	100	32	60	53	50	32	44	32
Brent PR Service	85	28/33	100	26	100	26	100	16	57	28	73	15	45	11
Bristol Community Health Respiratory Team	87	96/110	55	83	69	64	100	47	49	96	93	42	55	42
Bromley Healthcare PR	78	51/65	54	50	0	50	97	38	75	51	66	38	41	37
Buckinghamshire PR Services	81	82/101	44	82	0	75	1	68	83	82	43	58	70	61
C&P NHST Community Respiratory Team/PR	39	13/33	46	13	36	11	0	13	100	13	54	13	31	13
Calderdale PR Service	100	38/37	38	34	0	37	90	21	55	38	52	21	80	20
Cambridgeshire PR Programme	100	84/84	90	84	0	77	93	54	64	84	51	51	50	54
Camden Community Respiratory	64	35/55	94	35	88	34	100	26	74	35	65	26	64	25

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Team														
Cannock Chase PR Programme	52	27/52	100	24	0	27	88	17	63	27	88	16	82	17
Cardiac/PR & Community COPD Team	82	37/45	94	33	77	31	100	26	70	37	88	25	73	26
Carmarthenshire PR Programme	63	22/35	0	19	0	14	100	19	86	22	69	16	87	15
Central Cheshire PR Service	83	30/36	47	30	0	30	100	27	90	30	63	27	41	27
Central Manchester Community Service	79	37/47	84	31	0	24	100	17	46	37	80	15	69	16
Chelsea and Westminster Hospital PR	88	15/17	100	11	0	14	44	9	60	15	56	9	67	9
City Healthcare PR Programme	-	50/--	36	39	81	31	67	15	30	50	23	13	62	13
Community Cardio-Respiratory Service	90	52/58	87	52	84	49	100	31	60	52	69	29	61	28
COPD & Heart Failure North	56	27/48	7	27	100	27	94	18	67	27	61	18	27	15
COPD Brighton & Hove	54	28/52	37	27	96	27	77	13	46	28	54	13	62	13
COPD Coastal Service	61	11/18	27	11	100	11	71	7	64	11	67	6	57	7
COPD Team Carlisle	100	44/44	36	44	24	41	94	31	70	44	20	25	54	28
Copeland & Allerdale Community PR Programme	90	43/48	29	42	100	42	0	20	47	43	45	20	22	18
Countywide COPD Team	80	69/86	78	64	2	66	100	48	70	69	79	48	68	47
Craven PR Service	100	10/10	90	10	0	10	100	9	90	10	67	9	44	9
Croydon PR Programme	90	37/41	61	28	0	24	80	15	41	37	79	14	85	13
CSH Surrey PR Programme	100	35/35	9	33	0	35	100	30	86	35	83	30	73	30

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
DDES PR Programme	54	41/76	84	38	0	39	17	29	71	41	69	29	64	14
Doncaster Community Respiratory Services – PR	100	85/84	68	75	0	75	23	31	36	85	57	28	44	25
Dorset County Hospital PR Service	87	26/30	92	24	0	24	94	17	65	26	88	16	53	17
Dorset Healthcare PR Programme	100	53/50	84	44	0	42	100	29	55	53	56	27	66	29
Dudley PR Programme	93	65/70	14	64	66	64	100	45	69	65	56	45	78	45
Ealing PR Service	84	41/49	97	38	83	41	100	28	68	41	89	28	89	28
East Lancashire Hospitals PR Programme	51	94/184	46	76	1	81	91	32	34	94	80	30	-	<5
East Riding PR Programme	79	31/39	28	29	0	22	0	20	65	31	35	17	50	18
Enfield Respiratory Service	90	37/41	55	22	48	27	0	16	43	37	67	15	67	15
First Community Respiratory Team	59	10/17	50	10	100	10	100	8	80	10	75	8	-	<5
Furness Respiratory Care Team	70	7/10	14	7	0	7	100	6	86	7	-	<5	83	6
Gateshead Community PR	64	25/39	52	25	0	22	100	16	64	25	81	16	69	16
Gateshead Foundation Trust PR	67	20/30	100	17	0	11	-	<5	5	20	-	<5	-	<5
GEH PR Physiotherapy	100	18/18	67	18	0	18	75	12	67	18	50	12	55	11
Glenfield and Leicester Hospitals PR Programme	70	98/140	81	62	69	64	97	31	32	98	47	30	72	25
Glenroyd Medical PR Service	44	27/61	100	16	0	19	0	15	56	27	67	15	57	7
Greater Huddersfield PR Service	100	10/10	10	10	0	9	100	6	60	10	100	6	-	<5
Greenwich PR	51	20/39	100	15	100	15	100	13	65	20	62	13	-	<5

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
			% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Halton PR service	100	48/44	43	47	13	48	100	29	60	48	62	29	55	29
Harefield PR Unit	94	109/116	100	109	99	109	100	74	68	109	58	74	81	73
Harrogate District Hospital	95	20/21	63	19	5	20	100	12	60	20	75	12	50	12
Harrow COPD Respiratory Service	100	21/21	95	21	100	21	100	20	95	21	65	17	60	20
Havering PR programme	84	46/55	30	46	91	46	90	21	46	46	100	21	90	20
Healthy Lives PR Programme	63	17/27	0	17	0	17	0	11	65	17	91	11	82	11
HEFT PR Programme	89	67/75	20	64	3	66	33	39	58	67	74	39	63	35
Herefordshire PR Programme	94	15/16	0	8	7	15	100	9	60	15	63	8	63	8
Hope Street Specialist Service	94	59/63	79	58	0	53	100	34	58	59	53	34	82	34
IMPACT Team	84	27/32	38	26	0	25	100	21	78	27	45	20	26	19
Integrated Community Respiratory Team East Cornwall (ICRTEC)	100	25/24	36	25	76	25	100	14	56	25	79	14	29	14
Kent Community Health PR Service	75	152/202	10	135	99	135	94	108	71	152	48	108	61	108
King's College Hospital PR Team	76	38/50	34	38	3	37	94	18	47	38	67	18	47	17
Kirklees PR Programme	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5
Knowsley Community Respiratory Service	50	43/86	75	40	26	38	100	18	42	43	79	14	69	16
Lancashire Clinic Based Services	85	51/60	70	50	20	5	97	29	57	51	82	28	76	17
Leeds Respiratory – PR (Long Term Conditions)	43	37/86	39	33	0	35	100	29	78	37	59	27	37	27
Leicestershire Community PR Programme	-	66/--	32	65	75	57	61	44	67	66	58	43	48	44

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
			%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Lewisham LEEP PR Programme	88	56/64	94	52	0	55	100	28	50	56	75	28	36	28
Lincolnshire County Wide PR Service	77	112/146	20	112	79	112	89	82	73	112	46	82	62	81
Liverpool PR programme	63	85/136	88	74	0	73	65	40	47	85	53	30	-	<5
Livewell SW Community Respiratory Service	94	46/49	21	42	0	44	4	23	50	46	70	23	41	22
Lung Exercise & Education Programme (LEEP)	91	21/23	62	21	100	21	100	16	76	21	81	16	81	16
Luton & Dunstable University Hospital PR Service	94	59/63	67	58	0	54	97	35	59	59	60	35	57	35
Luton Community Respiratory Service	52	11/21	64	11	0	8	0	7	64	11	-	<5	43	7
Manchester Hospital based PR	100	11/9	82	11	0	11	-	<5	36	11	-	<5	-	<5
Mansfield and Ashfield Respiratory Service	27	14/51	93	14	0	14	100	13	93	14	55	11	38	13
Medway Community Healthcare Community Respiratory Team	60	33/55	94	33	100	33	0	20	61	33	53	19	75	20
Mid West North Cornwall PR Programme	58	29/50	19	26	25	28	31	16	55	29	71	14	45	11
Milton Keynes Community PR Service	87	27/31	4	26	0	20	100	18	67	27	100	11	76	17
Milton Keynes Hospital PR Programme	83	15/18	93	14	0	13	-	<5	33	15	-	<5	-	<5
Musgrove Park PR Programme	77	10/13	40	10	0	10	100	9	90	10	22	9	22	9
My Therapy Services	95	79/83	27	78	100	75	100	35	44	79	49	35	77	35
Newark and Sherwood Respiratory Service	84	16/19	25	16	100	16	100	12	75	16	75	12	42	12

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
			%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Newcastle PR	94	45/48	84	43	0	43	92	25	56	45	88	25	74	23
Newport PR	100	16/16	69	16	100	16	100	16	100	16	44	16	87	15
Norfolk and Norwich PR Service	85	17/20	94	17	0	17	0	17	100	17	-	<5	64	11
Norfolk Community PR Service	99	124/125	74	123	0	120	100	85	69	124	79	77	64	85
North Bristol PR Service	96	44/46	100	43	0	44	100	32	73	44	50	28	78	32
North Cumbria Hospitals PR Programme	57	12/21	-	<5	-	<5	-	<5	8	12	-	<5	-	<5
North Devon PR Service	100	25/23	20	25	0	25	100	22	88	25	62	21	55	22
North Durham PR Programme	75	44/59	86	44	0	41	97	33	75	44	40	30	52	27
North Somerset PR	100	45/44	33	43	0	45	100	28	62	45	46	28	79	28
North Tees and Hartlepool Foundation Trust PR Service	100	169/169	75	143	0	136	100	84	50	169	72	71	56	59
North West Wales PR service	80	44/55	10	41	0	40	9	33	75	44	63	32	42	31
Northumbria Healthcare PR Service	90	100/111	93	74	64	77	85	60	60	100	71	51	78	54
Nottingham Integrated Respiratory Service	100	71/70	83	69	66	71	100	42	59	71	52	42	54	41
Nottingham North and East Adult Community Services	71	20/28	30	20	100	19	95	19	95	20	26	19	74	19
Nottingham West PR	39	14/36	100	14	0	14	0	11	79	14	82	11	45	11
NW Surrey Respiratory Care Team	100	11/11	0	11	100	11	100	7	64	11	-	<5	100	6
Oxfordshire PR Service	86	96/111	48	96	1	76	3	74	77	96	73	59	49	73
PACE Wiltshire Community PR	90	19/21	16	19	0	17	95	19	100	19	47	15	42	19

Service name	Audit cases ^w		Process items						Outcome items					
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			%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Programme														
Papworth Hospital PR Programme	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5
Pembrokeshire PR Programme	90	19/21	21	19	63	19	100	11	58	19	82	11	73	11
Pennine Care Community PR Team	43	6/14	17	6	0	6	-	<5	67	6	-	<5	-	<5
Pennine Lung Service	77	27/35	58	26	8	26	93	15	56	27	71	14	43	14
Pennine PR	52	16/31	63	16	0	16	100	14	88	16	79	14	43	14
Peterborough & Stamford Hospitals NHS Foundation Trust PR	70	26/37	23	26	0	24	100	13	50	26	75	12	33	12
Prince Charles Hospital PR Programme	100	20/19	87	15	0	15	-	<5	25	20	-	<5	-	<5
PR – St Richards Hospital	90	35/39	97	31	91	34	100	26	74	35	77	26	58	26
PR Gloucestershire Respiratory Team	93	69/74	28	69	3	69	4	52	75	69	52	52	65	51
PR HCT	98	122/124	54	121	14	120	99	79	65	122	55	77	55	77
PR Service	69	22/32	18	22	0	19	90	21	95	22	76	21	71	21
PR Service Fylde and Wyre	100	46/46	52	46	0	46	100	27	59	46	74	27	74	27
PR Service- Redbridge	81	22/27	74	19	0	17	100	16	73	22	50	12	56	16
PR Stockport	98	41/42	17	36	0	40	100	27	66	41	67	27	47	19
Regional East Sussex Pulmonary Service (RESPS)	42	21/50	42	19	56	16	100	14	67	21	50	14	64	14
Restart Team Northampton General Hospital	64	41/64	72	39	3	39	100	32	78	41	52	31	33	30
Richmond Respiratory PR Programme	100	27/26	90	21	-	<5	0	17	63	27	-	<5	53	17

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Rocket Team	93	124/134	92	122	0	35	82	72	58	124	11	18	64	50
Royal Brompton PR Service	11	2/18	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5
Royal Devon & Exeter Hospital PR Programme	50	7/14	86	7	0	7	100	7	100	7	100	7	29	7
Royal Free Hospital PR	13	1/8	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5
Royal Glamorgan Hospital PR Programme	75	9/12	-	<5	0	7	-	<5	0	9	-	<5	-	<5
Royal Surrey PR Programme	98	39/40	78	37	100	38	87	30	77	39	48	29	-	<5
Royal United PR Programme	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-	<5
Rushcliffe Cardio-respiratory service	100	24/21	58	24	96	24	94	18	75	24	56	16	50	18
S&SOT Community Respiratory Team	87	191/219	65	182	0	182	67	109	57	191	90	106	66	109
Salford's Breathing Better PR Programme	90	55/61	100	53	26	50	100	21	38	55	76	21	71	21
Sandwell and West Birmingham Community Respiratory Service	93	25/27	72	25	100	25	83	18	72	25	71	17	50	18
SEPT PR Programme	41	24/58	63	24	0	24	0	21	88	24	38	21	74	19
Sheffield Community PR Service	83	112/135	84	105	0	110	100	62	55	112	57	60	63	32
Shropshire PR	94	67/71	73	64	0	62	95	42	63	67	74	38	64	42
Solent Hampshire PR Programme	75	65/87	68	60	0	60	98	50	77	65	62	50	64	50
Solent Portsmouth PR Programme	55	21/38	35	20	0	20	100	16	76	21	75	16	69	16
Solihull Community Respiratory Team	100	27/25	54	24	28	25	33	21	78	27	67	21	57	14
Solway Community PR Programme	100	10/10	22	9	89	9	83	6	60	10	33	6	67	6

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
	% ^z	n/N ^{aa}	%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
South Doc Community PR Service	78	64/82	93	55	0	64	100	21	33	64	62	21	62	21
South Gloucestershire PR	71	12/17	100	12	83	12	56	9	75	12	50	8	78	9
South Lakes Community Respiratory Service	38	8/21	50	8	100	8	-	<5	63	8	-	<5	-	<5
South Manchester PR Programme	28	14/50	86	14	-	<5	100	10	71	14	40	10	29	7
South Tees PR Service	100	77/50	70	77	0	75	24	42	55	77	66	41	45	42
South Tyneside PR Programme (Acute)	61	31/51	20	30	0	26	93	14	45	31	54	13	64	11
South Warwickshire PR Programme	100	26/26	12	26	0	26	100	18	69	26	72	18	61	18
South West Surrey Respiratory Care Team	100	10/9	10	10	100	10	100	7	70	10	-	<5	57	7
Southampton Integrated COPD Team PR Programme	58	52/90	86	51	90	51	100	35	67	52	78	32	53	32
Southend PR Programme	98	58/59	66	56	0	58	30	40	69	58	69	39	46	37
Southport and Ormskirk Hospital PR service	95	20/21	90	20	0	13	0	9	45	20	13	8	50	8
St Mary's Hospital PR Programme	91	30/33	86	29	0	29	88	24	80	30	71	24	52	23
St Thomas' Hospital PR programme	94	63/67	52	52	79	57	100	24	38	63	55	22	64	22
St Helens PR Service	86	51/59	71	48	0	48	100	27	53	51	-	<5	70	27
Stafford PR Programme	72	18/25	94	17	0	18	100	18	100	18	72	18	61	18
Suffolk PR Team	100	97/82	62	95	63	82	90	61	63	97	61	59	58	60
Sunderland Community PR Programme	31	13/42	92	13	0	9	-	<5	0	13	-	<5	-	<5

Service name	Audit cases ^w		Process items						Outcome items					
			Start date offered within 90 days of receipt (if known)		Patients undertaking practice exercise test (for ISWT or 6MWT only if one test done; for both if both tests done)		Patients with a discharge assessment who received a written discharge exercise plan		Patients assessed for PR who go on to have a discharge assessment		At least one exercise MCID achieved for ISWT/6MWT ^x		At least one health status MCID achieved ^y	
			%	De	%	De	%	De	%	De	%	De	%	De
National mean (all services combined)	81	7,476/9,279	60	6,965	32	6,623	81	4,637	62	7,476	63	4,254	60	4,169
National QI aim	100		85		100				70					
Tier 2 Respiratory Service	100	24/24	19	21	0	17	100	13	54	24	62	13	69	13
Torbay PR Programme	44	27/62	86	21	0	22	100	16	59	27	63	16	57	14
Tower Hamlets PR Service	67	47/70	69	45	80	41	100	28	60	47	63	27	42	24
University Hospital Llandough PR Service	76	22/29	9	22	0	22	0	20	91	22	35	20	80	20
University Hospital Southampton PR Programme	30	6/20	83	6	50	6	-	<5	33	6	-	<5	-	<5
Walsall PR Service	86	30/35	33	30	0	30	100	19	63	30	-	<5	74	19
Waltham Forest PR	100	58/52	55	53	17	58	100	45	78	58	71	45	38	45
Wandsworth PR Service	71	35/49	31	32	67	33	5	21	60	35	62	21	31	16
Warrington PR Service	100	25/25	40	25	0	25	100	17	68	25	65	17	59	17
West Herts Community Respiratory Service	92	81/88	89	75	100	74	100	54	67	81	69	48	69	54
West Kent PR Service	81	76/94	50	76	86	76	100	55	72	76	61	51	57	54
Whittington PR	27	35/132	76	34	0	21	75	20	57	35	53	19	44	18
Wirral COPD PR & Oxygen Service	95	74/78	82	66	0	68	100	48	65	74	48	48	-	<5
Wolverhampton PR Service	100	23/22	95	22	0	23	0	15	65	23	47	15	53	15
Worthing & Southlands PR Programme	88	38/43	92	38	94	35	97	32	84	38	48	31	55	31
York PR	79	33/42	13	31	0	31	26	23	70	33	68	22	45	20

Appendix B: Report preparation

This report was written by the following, on behalf of the National COPD Pulmonary Rehabilitation Audit 2017 Workstream Group (the full list of workstream group members is included in [Appendix G](#)).

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Appendix C: Overview of the National COPD Audit Programme

The National COPD Audit Programme is a programme of work that aims to drive improvements in the quality of care and services provided for COPD patients in England and Wales. The programme looks at COPD care across the patient pathway, both in and out of hospital, bringing together key elements from the primary, secondary and community care sectors.

There are three programme workstreams:

- 1 Primary care: collection of audit data from general practice patient record systems in Wales. Delivered by the Royal College of Physicians (RCP) and NHS Digital, working with the Primary Care Respiratory Society UK, the Royal College of General Practitioners and the NHS Wales Informatics Service. The last national audit report was published in late 2017.
- 2 Secondary care: in 2014, there were snapshot audits of patients admitted to hospital with COPD exacerbation, plus organisational audits of the resourcing of COPD services in acute units. The 2014 audits were delivered by the British Thoracic Society (BTS), working with the RCP. A continuous audit of admission to hospital with COPD exacerbation commenced in 2017, and will report in 2018. An organisational audit was also conducted in 2017, and will be published in early 2018.
- 3 Pulmonary rehabilitation: audits of COPD patients attending pulmonary rehabilitation (including outcomes at 180 days), plus organisational audits of the resourcing of pulmonary rehabilitation services for COPD patients. The 2015 round of this audit was delivered by the BTS, working with the RCP. Another round of snapshot clinical and organisational audits took place in 2017, and reports in 2018.

The audit also delivered a 1-year development project to explore the potential/feasibility of future incorporation of a patient-reported experience measure (PREM) into the audit programme. This was delivered by the British Lung Foundation, working with the Picker Institute Europe.

The programme is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit (NCA) Programme. It is included in the list of national audits for inclusion in NHS trusts' quality accounts and also the NHS Wales Clinical Audit and Outcome Review Plan.

All the national reports are, or will be, available from the National Asthma and COPD Audit Programme website www.rcplondon.ac.uk/nacap.

Appendix D: Audit methodology

The methodology for the National COPD Audit Programme's pulmonary rehabilitation (PR) 2017 audits built upon the learning from the 2015 audits, and contained the same two elements:

- A **clinical audit**: an audit of all patients with a primary respiratory diagnosis of COPD who were assessed for (or if not assessed, began) PR between 3 January and 31 March 2017. Services had until 31 July 2017 to complete their data entry.
- An **organisational audit**: looking at the resourcing and organisation of PR services during the period of case ascertainment for the clinical audit. Services had from 3 January 2017 to 28 April 2017 to complete their data entry.

As per the 2015 audit, the clinical audit operated 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/pulmonary-rehabilitation-workstream-audit-resources) prior to their data being included in the audit. Data from patients who did not provide consent **were not** included in the audit.

Participating hospitals were required to enter both clinical and organisational data into a secure online web-tool.

The records of **187 services (out of the 195 identified) and 592 sites** were included in the organisational audit. The clinical audit captured the records of **7,476 patients**.

Recruitment

There was a single recruitment process for both the organisational and clinical audits, which began in early 2016, 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 2015 audit.

To identify new services, or services where the management had changed, a Freedom of Information request was sent to all clinical commissioning groups (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 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 (NCA), meaning all providers of NHS care in England and Wales were required to participate
- to enable comparison with the 2015 audit results, and facilitate local improvement.

Services were asked to complete a registration form, nominating an 'audit lead' and adding any other team members who would form part of the audit team. It was made clear to prospective participants that the 'audit lead' role took ultimate responsibility for the data entered for their 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 195 PR services identified for participation in the audit, and we believe this to be a comprehensive picture of services in England 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. There were 187 services that participated, with eight declining. 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 of 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 following the advice of 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 audit 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/projects/outputs/pulmonary-rehabilitation-workstream-audit-resources) and web-tool webpages (beyond participants' logins). The forms and guidance were updated following feedback from the 2015 audit, 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 ThinkTank, 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 that 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.

As part of the organisational audit, services were asked to record:

- how many patients were eligible for the audit
- how many patients were approached for consent
- how many consented.

Please note that there is no impartial record of PR service throughput available from external data sources, so the only way to obtain this information is via self-reporting.

Audit question development and pilot

To ensure PR care was audited against accepted standards, audit questions were mapped to the BTS PR quality standards.¹⁵ 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 2015 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 28 services between 22 August 2016 and 16 September 2016 (4 working weeks). The pilot services were asked to contribute feedback on the web-tool, the audit questions and helpnotes. These findings were discussed by the team and the workstream group, and the datasets were finalised.

The final **organisational audit** contained two parts:

- All participating services were asked to complete one record in Part 1 of the dataset (which contained questions on the content of their service, staffing and internal procedures);
- They were then asked to complete Part 2 as many times as needed for all sites at which they delivered PR (this contained site-specific questions, for example, on what emergency medical facilities were available, and the type of PR programme that was provided).

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
- how long they attended PR for
- their discharge and discharge performance.

The audit also included the facility for individual patients to be matched with the site at which they attended PR, if the PR service they were using operated out of several sites.

Both datasets are available to download in full from our website: www.rcplondon.ac.uk/projects/outputs/pulmonary-rehabilitation-workstream-audit-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.nacap.org.uk).

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 answers to frequently asked questions.

Towards the end of the organisational audit period, reminders were sent to PR services that had not answered all the questions in the dataset. Towards the end of the clinical data entry period, reminders were sent to the services that had not entered as many cases as they had reported having consented during the organisational audit. 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 Informatics Ltd. It was then transferred securely (using the RCP Mimecast system) to the team at Imperial for analysis. The extract function did not include patient identifiers. When linkage to HES and ONS is conducted in the future, Crown Informatics Ltd will provide the identifiable data directly to NHS Digital (ie no other party will view the patient identifiable information).

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.

Mapping

In February 2017, the audit team launched a publicly available map on the web-tool, containing live updates on all the PR sites included in the audit.

Analysis methodology

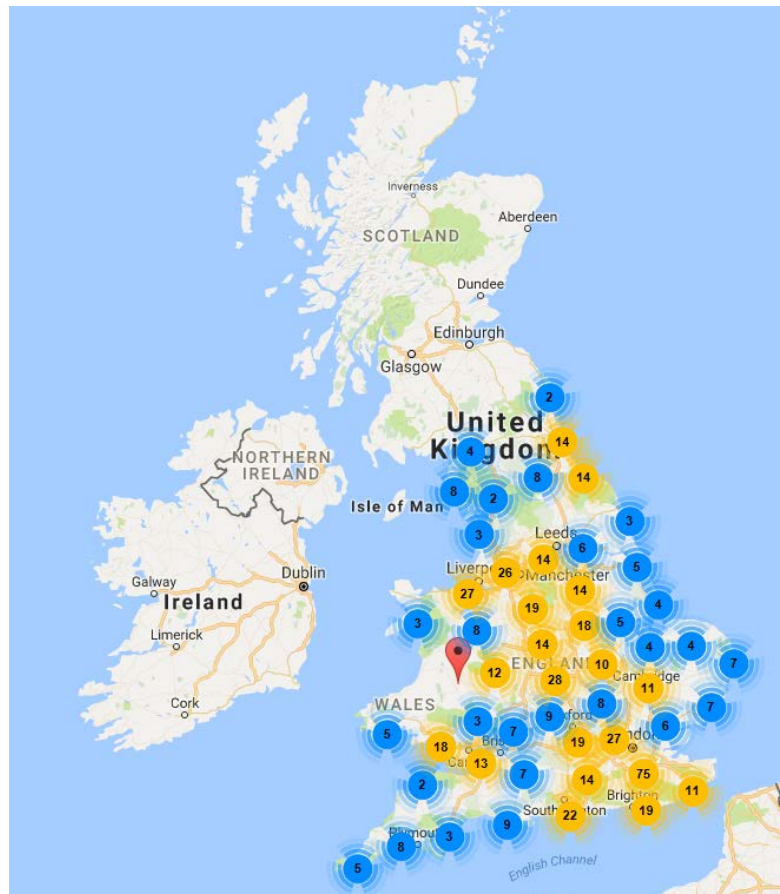
Organisational audit

The data were exported from the web-tool in Excel format. These were converted into SPSS for data management and analysis, and the dataset questions were incorporated as labels (so that cross-checking against the proforma was not required). In cases of missing or illogical data, clarifications were sought from participating services or were cleaned. There was a sizeable amount of data cleaning required of 'other' free-text entries, as some auditors gave free text that should have been recorded as one of the listed options. Occasionally there were missing data, resulting in data cells being blank.

In tables and text, please note that when categories are combined to give a combined percentage, it is the numbers that are added and not the percentages.

Data cleaning was conducted on multiple occasions, sometimes using further information provided by the service, or using contextual information. Examples include:

- For questions 5.1 (the service lead) and 5.3 (other staff funded to deliver the service), services were asked not to repeat their answer for 5.1 in 5.3. However, 17 services appeared to do just that (repeating a staff member with the same profession, grade and WTE). Services were asked to clarify their answers, and the data was cleaned based on their answers.
- For questions 5.1 and 5.3 (WTE of staff in the service), nine services included WTE of over 28 WTE and above. It was assumed these meant hours rather than WTE, and the values were converted



based on that assumption. In situations where the figure could have been either hours or WTE, clarification was sought from the service.

Clinical audit

The data were exported from the web-tool in Excel format. These were converted into SPSS for data management and analysis, and the dataset questions were incorporated as labels (so that cross-checking against the proforma was not required). The export included IMD and WIMD data, as well as patient age in years derived using the date of initial assessment (as per the 2015 round of audit).

There was some duplication of records (88 cases, including some triplicates and one quadruplicate) and in these cases one record was kept and the others discarded. If one of the duplicates was 'draft status' and the other was not then the 'draft status' duplicate was excluded. The dataset included a date and time of record modification by authors and where relevant (ie when all records had the same record status) the most recently updated record was kept. A total of 95 duplicate records were excluded.

There were a further 76 exclusions due to:

- initial assessment before 2017 (n=61)
- initial assessment after 31 March 2017 (n=3)
- no data other than referral receipt date and gender (n=8)
- unknown service code which turned out to be a test code not excluded before data export (n=4).

Little further cleaning was needed due to the lack of free text options in the dataset, and the validation rules that were in place on the web-tool during data collection (which prevented clinically impossible values and nesting inconsistencies from being entered). When a free text response had been permitted, these were either categorised or discounted by the clinical lead.

As the audit reporting was predominantly descriptive in nature any missing data was reported as missing – no imputation methods were applied.

Definitions

- **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 E: BTS Quality Standards for Pulmonary Rehabilitation in Adults (2014)

Summary of quality statements

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.

British Thoracic Society. *Quality Standards for Pulmonary Rehabilitation in Adults*. London: BTS, 2014.
www.brit-thoracic.org.uk/guidelines-and-quality-standards/pulmonary-rehabilitation-quality-standards/

Appendix F: Participating and non-participating providers, services and sites

Participating PR providers and services

Services that participated in the pilot are highlighted in grey.

Provider	Service	Sites
5 Boroughs Partnership NHS Foundation Trust	St Helens Pulmonary Rehabilitation Service	Low House HCRC Newton Hospital St Helens Hospital House Bound Service
Abertawe Bro Morgannwg University Health Board	Abertawe Bro Morgannwg University Health Board Pulmonary Rehabilitation Service	Ynysawdre Leisure Centre North Cornelly Community Centre Maesteg Leisure Centre Port Talbot Resource Centre Owain Glyndwr Community Centre Mayhill Community Centre Aberavon Leisure and Fitness Centre Forge Fach Gorseinon Institute Gendros Community Centre Gors Avenue Community Centre Sketty Community Centre Bridgend Recreation Centre
Aintree University Hospitals NHS Foundation Trust	Aintree Pulmonary Rehabilitation Programme	Aintree University Hospital
Airedale NHS Foundation Trust	Airedale and Wharfedale Pulmonary Rehabilitation Service	Keighley Leisure Centre
	Craven Pulmonary Rehabilitation Service	St John's Ambulance Hall
Aneurin Bevan University Health Board	ABUHB Pulmonary Rehabilitation	Nevill Hall Hospital (Monmouthshire) Ysbyty Aneurin Bevan (Ebbw Vale)
	Newport Pulmonary Rehabilitation	Newport Pulmonary Rehabilitation
Anglian Community Enterprise CIC	Anglian Community Pulmonary Rehabilitation Service	Coppins Hall Community Centre Stanway Victory Hall
Barnet Enfield and Haringey Mental Health Trust	Enfield Respiratory Service	Albany Leisure Centre Cumbria Villa Chase Farm Hospital
Barts Health NHS Trust	Tower Hamlets Pulmonary Rehabilitation Service	Newby Place Methodist Church Osmani Trust

Provider	Service	Sites
		St Paul's Church Swan Housing
Bedford Hospital NHS Trust	Bedford Hospital Pulmonary Rehabilitation	Flitwick Village Hall Jubilation Centre Sandy Village Hall
Berkshire Healthcare NHS Foundation Trust	Berkshire East Pulmonary Rehabilitation	Heatherwood Hospital St Mark's Hospital The Open Learning Centre, Bracknell Upton Hospital
	Berkshire West Pulmonary Rehabilitation	Riverside Community Centre St Michael's Church Hall Wokingham Masonic Centre
Betsi Cadwaladr University Health Board	BCUHB Pulmonary Rehabilitation Service – Centre	Royal Alexandra Hospital Porth Eirias Watersports Centre
	BCUHB Pulmonary Rehabilitation Service – East	Wrexham Maelor Hospital Gwersyllt Community Resource centre Mold Community Hospital Deeside Leisure Centre Holywell Community Hospital Chirk Community Hospital
	North West Wales Pulmonary Rehab Service	Ysbyty Gwynedd Ysbyty Alltwen Penrhos Stanley Hospital
Birmingham Community Healthcare NHS Foundation Trust	Birmingham Community Healthcare – Pulmonary Rehabilitation Service	Pannel Croft Village Gym St John's Church Hall
Blackpool Clinical Commissioning Group (CCG)	Glenroyd Medical Pulmonary Rehabilitation Service	Moor Park Health and Leisure Centre Blackpool Sports Centre Palatine Leisure Centre
Blackpool Teaching Hospitals NHS Foundation Trust	Pulmonary Rehabilitation Service Fylde and Wyre	Carleton Memorial Hall Trinity Baptist Church St Margaret's Church Wesham and Kirkham Scout Centre
BOC Healthcare	Nottingham West Pulmonary Rehabilitation	St Patrick's Community Hall The Pearson Centre
Bridgewater Community Healthcare NHS Trust	Tier 2 Respiratory Service	Wigan Health Centre Leigh Health Centre Platt Bridge Health Centre
Bristol Community Health	Bristol Community Health Respiratory Team	Brunel Fitness Centre Greenway Community Centre Henbury Leisure Centre South Bristol Sports Centre

Provider	Service	Sites
		St Pauls Community Sports Academy The Park, Knowle
Bromley Healthcare	Bromley Healthcare Pulmonary Rehabilitation	Beckenham Beacon Orpington Methodist Church The Willows Clinic
Buckinghamshire Healthcare NHS Trust	Buckinghamshire Pulmonary Rehabilitation Services	Prebendal Community Centre Aylesbury Thame Community Hospital Winslow Bowls Club Hilltop Community Centre High Wycombe Amersham Community Centre Chalfont Community Centre
Calderdale and Huddersfield NHS Foundation Trust	Calderdale Pulmonary Rehabilitation Service	Halifax Brighouse
Cambridgeshire and Peterborough NHS Foundation Trust	C&P NHST Community Respiratory Team/Pulmonary Rehabilitation	Brookfields Hospital Oak Tree Centre
Cambridgeshire Community Services	Luton Community Respiratory Service	Luton Community Respiratory Service
Cardiff and Vale University Health Board	University Hospital Llandough PR Service	University Hospital Llandough
Care Plus Group	Hope Street Specialist Service	Hope Street Specialist Service
Central and North West London Foundation Trust	Camden Community Respiratory Team	St Pancras Hospital Peckwater Centre
Central and North West London NHS Foundation Trust – Milton Keynes	Milton Keynes Community Pulmonary Rehabilitation Service	Sycamore Hall York House
Central London Community Healthcare NHS Trust	West Herts Community Respiratory Service	SportSpace Leisure Centre Watford central Leisure centre FurzeField Leisure Centre The Venue Leisure Centre YMCA St Albans Leisure Centre
	Barnet COPD Respiratory Service	Edgware Community Hospital Finchley Memorial Hospital East Barnet Health Centre
	Harrow COPD Respiratory Service	Honeypot Medical Centre
Central Manchester University Hospitals NHS Foundation Trust	Central Manchester Community Service	Arcadia Leisure Centre Moss Side Leisure Centre
	Manchester Hospital based Pulmonary Rehabilitation	Manchester Royal Infirmary
Central Surrey Health	NW Surrey Respiratory Care Team	Spelthorne Leisure Centre Walton Community Hospital
	South West Surrey Respiratory Care Team	Camberley Arena Leisure Centre

Provider	Service	Sites
Chelsea and Westminster Hospital Foundation Trust	Chelsea and Westminster Hospital Pulmonary Rehabilitation	Chelsea and Westminster Hospital Pulmonary Rehabilitation
City Health Care Partnership CIC	City Healthcare Pulmonary Rehabilitation Programme	Freedom Centre Hull Royal Infirmary
Cornwall Partnership NHS Foundation Trust	Integrated Community Respiratory Team East Cornwall (ICRTEC)	Dobwalls Memorial Hall, Lewannick Village Hall St Barnabas Community Hospital Millpool Centre Torpoint Council Chambers
	Mid, West, North Cornwall Pulmonary Rehabilitation Programme	Camborne Redruth Community Hospital Dragon Leisure Centre Falmouth Community Hospital Helston Community Hospital Penzance Leisure Centre St Austell Community Hospital
County Durham and Darlington Foundation NHS Foundation Trust	DDES Pulmonary Rehabilitation Programme	Richardson Community Hospital Bishop Auckland Hospital Sedgefield Community Hospital Woodhouse Close Methodist and Church of England Church
	North Durham Pulmonary Rehabilitation Programme	University Hospital of North Durham Chester-le-Street Community Hospital Shotley Bridge Community Hospital
Coventry and Rugby CCG	Atrium Health Limited	Centre for Exercise and Health
Croydon Health Services NHS Trust	Croydon Pulmonary Rehabilitation Programme	Purley Christ Church Thornton Heath Leisure Centre South Norwood Leisure Centre New Addington Baptist Church
CSH Surrey	CSH Surrey Pulmonary Rehabilitation Programme	Epsom Hospital
Cumbria Partnership NHS Foundation Trust	COPD Team Carlisle	Harraby Community Centre Brampton Community Centre
	Copeland & Allerdale Community Pulmonary Rehabilitation Programme	Whitehaven Miners & Social Club Workington Community Hall Cockermouth Community Hospital St Herbert's Church Hall,

Provider	Service	Sites
		Keswick Maryport Rugby Club St Michaels Church Hall, Egremont Cleator Moor Civic Hall Winscale Gym, Seascale
	Furness Respiratory Care Team	Hawcoat Park Millom Guide Hall Hoops Gym
	Solway Community Pulmonary Rehabilitation Programme	Wigton Community Hospital
	South Lakes Community Respiratory Service	Westmorland General Hospital Kendal Leisure Centre
Cwm Taf University Health Board	Prince Charles Hospital Pulmonary Rehabilitation Programme	Prince Charles Hospital
	Royal Glamorgan Hospital PR Programme	Ysbyty Cwm Rhondda
Doncaster & Bassetlaw Hospitals NHS Foundation Trust	Doncaster Community Respiratory Services – Pulmonary Rehabilitation	Doncaster Royal Infirmary Mexborough Montagu Hospital Vermuyden Centre
Dorset County Hospital NHS Foundation Trust	Dorset County Hospital Pulmonary Rehabilitation Service	Dorchester Cricket Pavilion Weymouth Community Fire Station
Dorset Healthcare University NHS Foundation Trust	Dorset Healthcare Pulmonary Rehabilitation Programme	Alderney Hospital – Woodlands Gym Blandford Hospital Bridport Hospital Hamworthy Fire Station Vale Lodge Wellness Clinic Wareham Hospital Yeatman Hospital
East Lancashire Hospitals NHS Trust	East Lancashire Hospitals Pulmonary Rehabilitation Programme	St Peter’s Centre Burnley Pendle Community Hospital Rossendale Primary Care Centre Clitheroe Community Hospital Springhill Community Centre Burnley General Hospital
East Sussex Healthcare NHS Trust	Regional East Sussex Pulmonary Service (RESPS)	Firwood House St. Richard Church Hall Concordia Hall
First Community Health and Care CIC	First Community Respiratory Team	East Surrey Hospital Oxted Therapies Unit
Gateshead Health NHS Foundation Trust	Gateshead Foundation Trust Pulmonary Rehabilitation	Queen Elizabeth Hospital
	Gateshead Community Pulmonary	Blaydon Leisure Centre

Provider	Service	Sites
	Rehabilitation	Heworth Leisure Centre Dunston Leisure Centre Gateshead Leisure Centre
George Eliot Hospital NHS Trust	GEH Pulmonary Rehabilitation Physiotherapy	George Eliot Hospital NHS Trust Nuneaton Newtown Centre Tithe Barn, Polesworth
Gloucestershire Care Services	Pulmonary Rehabilitation Gloucestershire Respiratory Team	Long Levens Community Centre Hesters Way Baptist Church Ashchurch Village Hall Matson Baptist Church Murry Hall Community Centre Brimscombe & Thrupp Social Centre Upper Rissington Village Hall Cam & Dursley Parish Council
Guy's and St Thomas' NHS Foundation Trust	St Thomas' Hospital PR Programme	St Thomas' Hospital PR Programme
Harrogate & District NHS Foundation Trust	Harrogate District Hospital	Ripon Community Hospital Harrogate District Hospital
Heart of England NHS Foundation Trust	HEFT Pulmonary Rehabilitation Programme	Good Hope Hospital Heartlands Hospital Kingstanding Wellbeing Centre Class Solihull Hospital
	Solihull Community Respiratory Team	St George's & Theresa's Church Hall, Dorridge North Solihull Leisure Centre, Chelmsley Wood
Hertfordshire Community NHS Trust	Pulmonary Rehabilitation HCT	Grange Paddocks Leisure Centre Hartham Leisure Centre Hatfield Leisure Centre Laura Trott Leisure Centre North Herts Stevenage Leisure Centre
Homerton University Hospital NHS Foundation Trust	ACERs – Respiratory Medicine	Britannia Leisure Centre Clissold Leisure Centre Homerton University Hospital St Leonard's Hospital
Hounslow and Richmond Community Healthcare NHS Trust	Richmond Respiratory Pulmonary Rehabilitation Programme	Richmond Rehabilitation Unit Teddington Memorial Hospital
Humber NHS Foundation Trust	East Riding Pulmonary Rehabilitation Programme	Ottringham Village Hall Emmanuel Church Christ Church with Trinity United Reform Church

Provider	Service	Sites
Hywel Dda University Health Board	Carmarthenshire Pulmonary Rehabilitation Programme	Glangwili Hospital Prince Philip Hospital Coleshill Day Centre Amanford Church
	Pembrokeshire Pulmonary Rehabilitation Programme	The Meads Leisure Centre, Milford Haven Fishguard Leisure Centre Tenby Leisure Centre
Imperial College Healthcare NHS Trust	Community Cardio-Respiratory Service	St Mary's Hospital Site Charing Cross Hospital St Charles Hospital
Ipswich Hospital NHS Trust	Suffolk Pulmonary Rehabilitation Team	Anselm Community Centre Haverhill Kesgrave Mildenhall Newmarket The Riverside Centre Trimley Memorial Hall Stowmarket Scout Hall Hartismere Hospital
Isle of Wight NHS Trust	St Mary's Hospital Pulmonary Rehabilitation Programme	St Mary's Hospital
James Paget University Hospital NHS Trust	BEET: Breathing Exercise Education Training	BWell Gym BWell Gym - Sole Bay Health Centre BWell Gym - Water Lane Leisure Centre
Kent Community Health NHS Trust	Kent Community Health Pulmonary Rehabilitation Service	Riverside Church Christ Church Hall St Mark's Church Hall Spring Lane Neighbourhood Centre The Baptist Church Folkestone St Mary's Village Hall Fairfield Leisure Centre Buckland Community Centre Betteshanger Sports and Social Club Riverside Centre The Howard Venue Ashford Rail Staff Club Fleetdown United Football Club
Kettering General Hospital NHS Foundation Trust	Rocket Team	Kettering General Hospital
King's College Hospital NHS Foundation Trust	King's College Hospital Pulmonary Rehabilitation Team	Brixton Recreation Centre Dulwich Leisure Centre

Provider	Service	Sites
		King's College Hospital
Lancashire Care NHS Foundation Trust	Blackburn Pulmonary Rehabilitation Programme	Cardio-Respiratory Service, Clinic Based Services, Innovation Centre
	Lancashire Clinic Based Services	Buckshaw Village Community Centre Minerva Health Centre
Leeds Community Healthcare NHS Trust	Leeds Respiratory – Pulmonary Rehabilitation (Long Term Conditions)	Woodhouse Health Centre Kentmere Community Centre Armley Leisure Centre Middleton Leisure Centre
Leicestershire Partnership NHS Trust	Leicestershire Community PR Programme	Brocks Hill Country Park Christ Church Hall, Coalville George Ward Centre, Barwell Loughborough Hospital Lubbenham Village Hall Measham Leisure Centre Polish Club, Melton Mowbray Rutland Memorial Hospital Syston Community Centre St Johns Community Centre
Lincolnshire Community Health Services	Lewisham LEEP Pulmonary Rehabilitation Programme	The Jenner Health Centre St John's Medical Centre South Lewisham Health Centre
	Lincolnshire County Wide Pulmonary Rehabilitation Service	Scredington Community Centre Elsea Park Community Centre Church of the Ascension Wings Meadow Activity Centre Surfleet Village Hall The Curlew Centre Trentside Rehabilitation Unit Bud Robinson Community Centre Sudbrooke Drive Community Centre Skegness Hospital Roughton Village Hall Ludford Village Hall St Barnabas Hospice Mablethorpe Community Hall
Liverpool Heart and Chest Hospital NHS Foundation Trust	Knowsley Community Respiratory Service	Kirkby Leisure Centre Whiston Hospital Stockbridge Leisure Centre Halewood Leisure Centre

Provider	Service	Sites
		Huyton Leisure Centre Whiston Town Hall
	Liverpool PR programme	Liverpool PR programme (Class 1) Walton Corner Stone The Breckfield and North Everton Sports Centre Liverpool PR programme (Class 2) Ellergreen Community & Early Years Centre Oakvale Church Ropewalks Health Centre Bridge Chapel Centre Speke Neighbourhood Health Centre
Livewell Southwest CIC	Livewell SW Community Respiratory Service	Brickfields Sport Centre The Elm Community Centre
Locala Community Partnerships CIC	Greater Huddersfield Pulmonary Rehabilitation Service	Jubilee Centre
London North West Healthcare NHS Trust	Brent Pulmonary Rehabilitation Service	Willesden Centre for Health & Care
	Ealing Pulmonary Rehabilitation Service	Greenford Hall St Mary's Church, Acton
Luton & Dunstable University Hospital NHS Foundation Trust	Luton & Dunstable University Hospital Pulmonary Rehabilitation Service	Inspire: Luton Sports Village Peter Newton Pavilion Stanbridge & Tilsworth Community Hall
Maidstone and Tunbridge Wells NHS Trust	West Kent Pulmonary Rehabilitation Service	Sevenoaks Community Centre The Mercure Hotel The Eden Centre The Tonbridge Methodist Church The Weald Sport's Centre, Cranbrook Aylesford Community Centre Territorial Army Centre
Medway Community Healthcare Trust	Medway Community Healthcare Community Respiratory Team	St Mary's Island Community Centre (SMICC) United Services Club (USC)
Mid Cheshire Hospitals NHSFT	Central Cheshire Pulmonary Rehabilitation Service	Eaglebridge Health Centre Ashfields Primary Care Centre Winsford Health Centre Victoria Infirmary
Mid Yorkshire Hospitals NHS Trust	My Therapy Services	Hemsworth Christian Fellowship Pontefract Hospital Wakefield Sports Club

Provider	Service	Sites
Milton Keynes University Hospital NHS Foundation Trust	Milton Keynes Hospital PR Programme	Milton Keynes Hospital PR Programme
Newcastle upon Tyne NHS Foundation Trust	Newcastle Pulmonary Rehabilitation	Royal Victoria Infirmary, Newcastle upon Tyne Freeman Road Hospital Benfield Park Healthcare and Diagnostic Centre
Norfolk Community Health & Care NHS Trust	Norfolk and Norwich Pulmonary Rehab Service	Norfolk and Norwich University Hospital
	Norfolk Community Pulmonary Rehabilitation Service	Chet Valley Medical Practice Dereham Community Hospital Diss Community Centre & Church Fakenham Sport & Fitness Centre Ketts Park Community Centre, Wymondham Norwich Community Hospital Riverside Fitness & Leisure Centre Splash Fitness & Leisure Centre Thetford Healthy Living Centre Victory Fitness & Leisure Centre
North Bristol NHS Trust	North Bristol Pulmonary Rehabilitation Service	Lung Exercise and Education Programme (LEEP)
North Cumbria University Hospitals NHS Trust	North Cumbria Hospitals PR Programme	North Cumbria Hospitals PR Programme
North East London NHS Foundation Trust	Barking and Dagenham Pulmonary Rehab Service	Porters Avenue
	Havering PR programme	Harold Hill Health Centre Hornchurch Sports Centre
	Pulmonary Rehabilitation Service – Redbridge	South Woodford Gym Redbridge Diabetes Centre Hainault Health Centre
	Waltham Forest Pulmonary Rehabilitation	Langthorne Health Centre Forest Road Medical Centre Hawkwell Court
North Somerset Community Partnership	North Somerset Pulmonary rehab	Everyone Active Gym For All Healthy Living Centre
North Tees and Hartlepool NHS Foundation Trust	North Tees and Hartlepool Foundation Trust Pulmonary Rehabilitation Service	Hartlepool College of Further Education Peterlee Community Hospital Seaham Leisure Centre Splash Leisure Centre Church Road University Hospital of

Provider	Service	Sites
		Hartlepool University Hospital of North Tees Hospital
Northampton General Hospital NHS Trust	Restart Team, Northampton General Hospital	Daventry Reach for Health Spencer Dallington Community Centre
Northern Devon Healthcare NHS Trust	North Devon Pulmonary Rehabilitation Service	Barnstaple Rugby Club Pip and Jims Church Hall
Northumbria Healthcare NHS Foundation Trust	Northumbria Healthcare Pulmonary Rehabilitation Service	Alnwick Infirmary Ashington Community Service Berwick Infirmary Blyth Community Hospital Hexham General Hospital North Tyneside Community Service North Tyneside General Hospital Wansbeck General Hospital
Nottingham Citycare Partnership CIC	Nottingham Integrated Respiratory Service	Beechdale Community Centre Clifton Cornerstone St Ann's Valley Centre Bulwell Riverside
Nottinghamshire Healthcare NHS Foundation Trust	Newark and Sherwood Respiratory Service	Rainworth Village Hall Salvation Army Ollerton Health Centre
	Mansfield and Ashfield Respiratory Service	Ashfield Health and Wellbeing Centre Mansfield Community Hospital
	Nottingham North and East Adult Community Services	Daybrook Baptist Church Hucknall Leisure Centre Park House Health and Social Care Centre
	Rushcliffe Cardiorespiratory service	Bingham Medical Centre Cotgrave Health Centre Lings Bar Hospital
	Bassetlaw PR programme	Bassetlaw Heath Partnership North Notts Arena
Oxford Health NHS Foundation Trust	Oxfordshire Pulmonary Rehabilitation Service	Spiceball Leisure Centre Kidlington and Gosforth Leisure Centre Carterton Leisure Centre Pirates Fitness, Witney OXSRAD Sports Centre, Marston Blackbird Leys Leisure Centre Rose Hill Community Centre Barton Leisure Centre

Provider	Service	Sites
		Anytime Fitness, Bicester Anytime Fitness, Abingdon White Horse Leisure Centre, Abingdon Willowbrook Leisure Centre, Didcot The Body Training Studio, Wallingford The Barn, Cholesey No Limits, Henley-on-Thames Faringdon Leisure Centre Wantage Leisure Centre
Oxleas NHS Trust	Greenwich Pulmonary Rehabilitation	The Eltham Centre Waterfront Leisure Centre
Papworth Hospital NHS Foundation Trust	Papworth Hospital PR Programme	Papworth Hospital NHS Trust
Pennine Acute Hospitals NHS Trust	ARAS Team	North City Fitness Centre East Manchester Leisure Centre North Manchester General Hospital
	Pennine Lung Service	Failsworth Health Centre Royton Health & Wellbeing Centre
	Pennine Pulmonary Rehabilitation	Bury Whitefield Bury Fairfield General Hospital Bury Community Central
Pennine Care NHS Foundation Trust	Pennine Care Community PR Team	Trafford General Hospital St Albans Church Hall Stretford Sports Village
Peterborough and Stamford Hospitals NHS Foundation Trust	Peterborough & Stamford Hospitals NHS Foundation Trust Pulmonary Rehabilitation	Werrington Sports Centre
Powys Teaching Health Board	Pulmonary Rehabilitation Service	South Locality, Ystradgynlais Community Hospital Mid Locality, Llandrindod Wells Community Hospital North Locality, Welshpool Community Hospital
Provide CIC	Cambridgeshire Pulmonary Rehabilitation Programme	Broomfield Hospital The Oasis Community Centre Brownsfield Community Centre The March Youth and Community Centre The Paradise Centre Brampton Memorial Centre
Royal Bournemouth and Christchurch NHS Foundation	Bournemouth and Christchurch Pulmonary Rehab	Christchurch Hospital Ferndown Leisure Centre

Provider	Service	Sites
Trust		Pelhams Leisure Centre Royal Bournemouth Hospital
Royal Brompton and Harefield NHS Foundation Trust	Harefield Pulmonary Rehabilitation Unit	Harefield Hospital Uxbridge Community Site Hayes Community Site Harrow Weald Community Site South Harrow Community Site
	Royal Brompton Pulmonary Rehabilitation Service	Royal Brompton Hospital Ethos Gym, Imperial College London
Royal Devon & Exeter NHS Foundation Trust	Royal Devon & Exeter Hospital PR Programme	Royal Devon & Exeter NHS Foundation Trust
Royal Free London NHS Foundation Trust	Royal Free Hospital Pulmonary Rehabilitation	Royal Free Hospital
Royal Surrey County Hospital NHS Foundation Trust	Royal Surrey PR Programme	Wilfrid Noyce Community centre
		Royal Surrey County Hospital
Royal United Hospital Bath NHS Trust	Royal United Pulmonary Rehabilitation Programme	Royal United Hospital
Salford Royal NHS Foundation Trust	Salford's Breathing Better Pulmonary Rehabilitation Programme	Eccles Fit City Worsley Pool Salford Sports Village
Salisbury NHS Foundation Trust	Lung Exercise & Education Programme (LEEP)	Salisbury District Hospital
Sandwell and West Birmingham Hospitals NHS Trust	Sandwell and West Birmingham Community Respiratory Service	Hurst Road Community Centre Sandwell Hospital Gym Tipton Leisure Centre
Sheffield Teaching Hospitals NHS Foundation Trust	Sheffield Community Pulmonary Rehabilitation Service	Graves Sports and Health Centre Shirecliffe Community Centre Springs Leisure Centre
Shropshire Community Health Trust	Shropshire Pulmonary Rehab	Bridgnorth Community Hospital Helena Lane Day Centre Louise House Market Drayton Medical Centre Oswestry Primary Care Centre Park Lane Centre Princess Royal Hospital
Sirona Care and Health CIC	South Gloucestershire Pulmonary Rehab	Bradley Stoke Leisure Centre
Sirona CIC	IMPACT Team	Bishop's Sutton Village Hall Southdown Methodist Church St Francis Church Hall St John the Baptist Church Hall

Provider	Service	Sites
Solent NHS Trust	Solent Hampshire Pulmonary Rehabilitation Programme	Gosport Bridgemary School Fareham Leisure Centre Basingstoke Leisure Centre Waterlooville Community Centre Bedhampton Social Hall Petersfield Community Centre Alton Cardiac Centre
	Solent Portsmouth Pulmonary Rehabilitation Programme	Eastney Health Centre Buckland Community Centre Cosham Health Centre
	Southampton Integrated COPD Team PR Programme	Bitterne Health Centre Adelaide Health Centre Royal South Hants Hospital / Community Health Campus Bitterne Health Centre (2nd PR class in afternoons)
South Doc Services Limited	South Doc Community Pulmonary Rehabilitation Service	West Heath Medical Centre The Hub Hazelwell The Kenrick Centre
South Essex Partnership University NHS Foundation Trust (SEPT)	SEPT Pulmonary Rehabilitation Programme	Latton Bush Centre St Margaret Hospital Saffron Walden Community Hospital
South Tees Hospitals NHS Foundation Trust	South Tees Pulmonary Rehabilitation Service	James Cook University Hospital East Cleveland Primary Care Hospital Guisborough Primary care Hospital One Life Centre Redcar Primary Care Hospital
South Tyneside NHS Foundation Trust	South Tyneside Pulmonary Rehabilitation Programme (Acute)	South Tyneside District Hospital
	Sunderland Community Pulmonary Rehabilitation Programme	South Tyneside District Hospital Grindon Primary Care Centre Houghton Primary Care Centre Bunny Hill Primary Care Centre Washington Leisure Centre (The Galleries) St Mary's and St Peter's Church Hall
South Warwickshire Foundation Trust	South Warwickshire PR Programme	Royal Leamington Spa Rehabilitation Hospital Stratford Hospital Warwick Hospital

Provider	Service	Sites
		Alcester Primary Care Centre
South West Yorkshire Partnership NHS Foundation Trust	Cardiac/Pulmonary Rehabilitation & Community COPD Team	Dorothy Hyman Sports Centre Hoyland Leisure Centre Recovery College
Southend University Hospital NHS Foundation Trust	Southend Pulmonary Rehabilitation Programme	Southend University Hospital The Paddocks Hockley Gym
Southport and Ormskirk Hospitals NHS Trust	Southport and Ormskirk Hospital Pulmonary Rehab service	West Lancashire Pulmonary Rehab service
St George's University Hospitals NHS Foundation Trust	Wandsworth Pulmonary Rehabilitation Service	Queen Mary's Hospital St George's Hospital Pulmonary Rehabilitation Wandle Pulmonary Rehabilitation Latchmere Pulmonary Rehabilitation
Staffordshire and Stoke on Trent Partnership NHS Trust	Cannock Chase PR Programme	Cannock Chase Leisure Centre Rugeley Leisure Centre
	S&SOT Community Respiratory Team	Tunstall Methodist Church St Johns Centre Bentilee Neighbourhood Centre Knutton Community Centre Vivienne Shelley Dance Studio Leek Moorlands Hospital
	Stafford PR Programme	Walton Village Hall
Stockport NHS Foundation Trust	Pulmonary Rehabilitation Stockport	Kingsgate Arthur Greenwood Centre
Sussex Community NHS Foundation Trust	COPD & Heart Failure North	Horsham Hospital Crawley Hospital Dolphins Leisure Centre
	COPD Brighton & Hove	Salvation Army Portslade Town Hall
	COPD Coastal Service	The Laurels
Swindon Borough Council	Healthy Lives Pulmonary Rehabilitation Programme	Haydon Centre
Taunton and Somerset NHS Foundation Trust	Musgrove Park PR Programme	Musgrove Park PR Programme
The Dudley Group of Hospitals NHS Foundation Trust	Dudley Pulmonary Rehabilitation Programme	Cradley Sports and Social Club Russells Hall, Physiotherapy Department St James Medical Practice Lion Health
The Mid Yorkshire Hospitals NHS Trust	Kirklees Pulmonary Rehabilitation Programme	Options Community Centre
The Rotherham NHS Foundation Trust	Breathing Space	Breathing Space
The Royal Wolverhampton NHS	Wolverhampton Pulmonary	Bilston Community Centre

Provider	Service	Sites
Trust	Rehabilitation Service	Bob Jones Hub New Cross Hospital Perton Civic Centre Wednesfield Community Centre and Library
Torbay and South Devon NHS Foundation Trust	Torbay Pulmonary Rehabilitation Programme	Torbay Hospital Newton Abbot Hospital
University Hospital of South Manchester NHS Foundation Trust	South Manchester Pulmonary Rehabilitation Programme	Woodhouse Park Lifestyle Centre Withington Community Hospital
University Hospital Southampton NHS Foundation Trust	University Hospital Southampton Pulmonary Rehabilitation Programme	Southampton General Hospital
University Hospitals of Leicester NHS Trust	Glenfield and Leicester Hospitals PR Programme	Leicester General Hospital National Centre for Sports and Exercise Medicine Glenfield Hospital
Walsall Healthcare NHS Trust	Walsall Pulmonary Rehabilitation Service	Walsall Pulmonary Rehabilitation Service
Warrington & Halton Hospitals NHS Foundation Trust	Halton Pulmonary Rehabilitation service	Halton Hospital Ditton Community Centre
	Warrington Pulmonary Rehabilitation Service	Health Services at Wolves
Western Sussex NHS Foundation Trust	Pulmonary Rehabilitation – St Richards Hospital	St Richards Hospital The Arena Leisure Centre
	Worthing & Southlands PR Programme	Southlands Hospital Worthing Hospital
Whittington Health NHS Trust	Whittington Pulmonary Rehabilitation	Holloway Community Health Centre Hornsey Central Lordship Lane
Wiltshire Health & Care	PACE Wiltshire Community PR Programme	Chippenham Community Hospital Trowbridge Community Hospital Warminster Community Hospital
Wirral University Teaching Hospital	Wirral COPD Pulmonary Rehabilitation & Oxygen Service	Albert Lodge, Victoria Central Hospital Arrowe Park Hospital Clatterbridge Hospital St Catherine's Hospital
Worcestershire Acute Hospitals NHS Trust	Countywide COPD Team	Batchley Community Centre Badsey Recreation Ground Archdales 73 Club Cardiac Rehab Gym
Wye Valley NHS Trust	Herefordshire Pulmonary	Ross Community Hospital

Provider	Service	Sites
	Rehabilitation Programme	Leominster Community Hospital Hereford County Hospital
York Teaching Hospitals NHS Foundation Trust	York Pulmonary Rehabilitation	Malton Community Hospital Scarborough Sports Centre (Everyone Active) Foxwood Community centre Selby War Memorial Hospital Wigginton Recreation Hall

Participating PR providers and services in the organisational audit only

Provider	Service	Sites
BOC Healthcare	BOC Pulmonary Rehabilitation (Manchester)	Tamworth District Activity Centre Burntwood Memorial Institute Life Church Lichfield
Tameside and Glossop Integrated Care NHS Foundation Trust	Tameside and Glossop Pulmonary Rehabilitation	Oxford Park Sports Centre Trust Shirehill Hospital
Your Healthcare CIC	Your Healthcare Pulmonary Rehabilitation	Surbiton Health Centre

Non-participating PR providers and services

Provider	Service	Reason
Brighton and Sussex University Hospitals NHS Trust	Royal Sussex Pulmonary Rehabilitation Programme	Declined to take part in both audits
Cheshire & Wirral Partnership NHS Foundation Trust	CWP Pulmonary Rehabilitation	Did not provide Caldicott Guardian approval
Derbyshire Community Health Services NHS Trust	Breathe Ability (South Derbyshire) PR Programme	Declined to take part in both audits
	Erewash PR Programme	Declined to take part in both audits
	North Derbyshire PR Programme	Declined to take part in both audits
Royal Bolton Hospital NHS Foundation Trust	Bolton Pulmonary Rehabilitation Programme	Declined to take part in both audits
Southern Health NHS Foundation Trust	Southern Health PR Programme	Declined to take part in both audits
Sutton Community Health Services	Sutton Community PR	Declined to take part in both audits

Appendix G: Members of the former pulmonary rehabilitation workstream group

- **Professor Michael Steiner**, National COPD Audit Programme Clinical Lead – Pulmonary Rehabilitation Workstream; Consultant Respiratory and Honorary Professor, NIHR Leicester Biomedical Research Centre – Respiratory, University Hospitals of Leicester NHS Trust, Glenfield Hospital, Leicester
- **Dr Noel Baxter**, National COPD Audit Programme Clinical Lead – Primary Care Workstream; and GP Clinical Lead, NHS Southwark CCG
- **Mrs Katy Beckford**, Community Respiratory Team Lead, Berkshire Healthcare NHS Foundation Trust, Bracknell
- **Dr Charlotte Bolton**, Senior Lecturer at the University of Nottingham; and Consultant Respiratory Physician, Nottingham City Hospital, Nottingham
- **Dr Sarah Elkin**, Consultant Respiratory Physician, St Mary’s Hospital, London
- **Mrs Sian Goddard**, Specialist Respiratory Physiotherapist, Royal Cornwall Hospitals NHS Trust, Truro
- **Mr Ashley Green**, Service Development Manager, British Lung Foundation, London
- **Ms Juliana Holzauer-Barrie**, National COPD Audit Project Manager, Care Quality Improvement Department, Royal College of Physicians, London
- **Professor Derek Lowe**, Medical Statistician, Care Quality Improvement Department, Royal College of Physicians, London
- **Dr Will Man**, Consultant Respiratory Physician, Harefield Hospital, London
- **Ms Viktoria McMillan**, National COPD Audit Programme Manager, Care Quality Improvement Department, Royal College of Physicians, London
- **Ms Kajal Mortier**, National COPD Audit Project Manager, Care Quality Improvement Department, Royal College of Physicians, London
- **Mr James Riordan**, National COPD Audit Programme Coordinator, Care Quality Improvement Department, Royal College of Physicians, London
- **Professor C Michael Roberts**, National COPD Audit Programme Clinical Lead; and Clinical Academic Lead for Population Health, UCL Partners
- **Miss Sophie Robinson**, National COPD Audit Programme Coordinator, Care Quality Improvement Department, Royal College of Physicians, London (group member from May 2016)
- **Ms Laura Searle**, Project Coordinator, National COPD Pulmonary Rehabilitation Audit, British Thoracic Society, London
- **Dr Louise Sewell**, Occupational Therapist; Senior Lecturer in Occupational Therapy, Coventry University
- **Professor Sally Singh**, Head of Pulmonary and Cardiac Rehabilitation, Glenfield Hospital, Leicester
- **Dr Rob Stone**, National COPD Audit Programme Clinical Lead – secondary care workstream; and Consultant Respiratory Physician, Taunton and Somerset NHS Foundation Trust, Musgrove Park Hospital, Taunton
- **Miss Victoria Van Loo**, National COPD Audit Programme Coordinator, Care Quality Improvement Department, Royal College of Physicians, London
- **Dr Paul Walker**, Consultant Respiratory Physician, Aintree University Hospital, Liverpool
- **Mrs Sandy Walmsley**, Respiratory Nurse Specialist, Heart of England NHS Foundation Trust, Birmingham
- **Miss Sally Welham**, BTS Deputy Chief Executive; and BTS Project Lead for the National COPD Pulmonary Rehabilitation Audit, British Thoracic Society, London

Appendix H: References

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

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#COPDaudit #COPDPRaudit
#COPDPRbreathebetter

If you would like to join our mailing list and be kept informed of updates and developments in the National Asthma and COPD Audit Programme, please send us your email address and contact details.

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