

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

### **COPD clinical audit 2017/18**

(people with COPD exacerbations discharged from acute hospitals  
in England and Wales between September 2017 and 2018)

### **Data analysis and methodology report**

Published May 2019



In association with:



Commissioned by:



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

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

### **COPD: clinical audit 2017/18**

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

**Professor John Hurst**, COPD clinical lead, NACAP, Care Quality Improvement Department (CQID), RCP, London; and professor and honorary consultant in respiratory medicine, University College London/Royal Free London NHS Foundation Trust, London.

**Ms Viktoria McMillan**, programme manager, NACAP, CQID, RCP, London.

**Ms Kajal Mortier**, project manager, NACAP, CQID, RCP, London.

**Mr Liam Shanahan**, project manager, NACAP, CQID, RCP, London.

**Ms Myriam Moussaif**, programme coordinator, NACAP, CQID, RCP, London.

**Mr Alex Adamson**, research assistant in medical statistics, National Heart & Lung Institute, Imperial College London.

**Mr Philip Stone**, research assistant in statistics/epidemiology, National Heart & Lung Institute, Imperial College London.

**Dr Jennifer Quint**, analysis lead, NACAP, CQID, RCP, London; reader in respiratory epidemiology, National Heart & Lung Institute, Imperial College London; and honorary respiratory consultant, Royal Brompton and Imperial NHS Trusts.

**Professor C Michael Roberts**, senior clinical lead, NACAP, CQID, RCP, London; consultant integrated respiratory care, The Princess Alexandra NHS Trust; and clinical academic lead for population health, UCL Partners.

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### **Royal College of Physicians**

Care Quality Improvement Department

11 St Andrews Place, Regent's Park

London NW1 4LE

Registered charity no 210508

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## How to use this report

This report presents the results from an extensive analysis of the data from NACAP's latest round of the COPD clinical audit. The COPD clinical audit, which captures the process and clinical outcomes of treatment in patients admitted to hospital in England and Wales with COPD exacerbations, launched on 1 February 2017. This report, which is the second report post-launch of continuous data collection, presents the results of the cohort of patients discharged between 14 September 2017 and 30 September 2018. Details of the statistical, data collection and information governance methodologies employed are provided in [Appendix A](#).

The data are presented largely in tabular form with explanatory notes where appropriate. Although these data are available to the interested reader, it is not necessary to review them to appreciate the key messages, which can be found in the national report (via [www.rcplondon.ac.uk/copd-2017-18](http://www.rcplondon.ac.uk/copd-2017-18)). These data will also be made publicly available at hospital level on [www.data.gov.uk](http://www.data.gov.uk), in line with the government's transparency agenda. Comparisons to the results of the 2017 report ([www.rcplondon.ac.uk/working-together](http://www.rcplondon.ac.uk/working-together)) have been provided where appropriate. However, it should be noted that in 2017, in order for the report to be published in line with the National COPD Audit Programme's contract end date, the data were extracted prior to completion of a full year of data collection. Consequently, the 2017 data presented the results of a slightly truncated patient cohort (patients discharged over a 7.5 month period between 1 February and 13 September 2017).

Nationally benchmarked results for participating hospitals have been provided in [section 10](#) of this report. The indicators have been selected based on national guidelines and standards. The medians for each hospital are presented alongside the national medians. The hospital results for each indicator are colour coded in accordance with whether the hospital falls either above, within the middle two, or below the lower quartile.

This report's audience includes healthcare professionals; NHS managers, chief executives and board members; service commissioners; policymakers and voluntary organisations. A separate report has been produced for patients and the public and is available at: [www.rcplondon.ac.uk/copd-2017-18](http://www.rcplondon.ac.uk/copd-2017-18).

References to the appropriate National Institute for Health and Care Excellence (NICE) quality statements,<sup>\*</sup>† ([Appendix B](#)), clinical guidelines<sup>‡</sup> ([Appendix C](#)) and British Thoracic Society (BTS) non-invasive ventilation (NIV) quality standards<sup>§</sup> ([Appendix D](#)) are inserted throughout the key findings.

Copies of our datasets, our good practice repository, and all other resources can be found via our website: [www.rcplondon.ac.uk/nacap-copd-resources](http://www.rcplondon.ac.uk/nacap-copd-resources).

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\* National Institute for Health and Care Excellence. *Chronic obstructive pulmonary disease in adults. NICE Quality standard 10 (QS10)*. 2016 edition. London: NICE, 2016. [www.nice.org.uk/Guidance/QS10](http://www.nice.org.uk/Guidance/QS10) [Accessed December 2018].

† National Institute for Health and Care Excellence. *Chronic obstructive pulmonary disease in adults. NICE Quality standard 10 (QS10)*. 2011 edition. London: NICE, 2011. [www.nice.org.uk/Guidance/QS10](http://www.nice.org.uk/Guidance/QS10) [Accessed December 2018].

‡ National Institute for Health and Care Excellence. *Chronic obstructive pulmonary disease in over 16s: diagnosis and management. NICE guideline 115 (NG115)*. London: NICE, 2018. [www.nice.org.uk/guidance/NG115](http://www.nice.org.uk/guidance/NG115) [Accessed December 2018].

§ Davies M, Allen M, Bentley A *et al*. British Thoracic Society quality standards for acute non-invasive ventilation in adults. *BMJ Open Respiratory Research* 2018;5:e000283.



## Section 1: General information

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### Key findings

#### Admission and demographics

- A higher proportion of **COPD admissions** were females (53.3%) compared with 51.3% in 2017.
- The median **age at admission** was **73 years**, which remains unchanged since 2017.
- The highest proportion of **COPD admissions** were from the **most deprived areas in England (34.2%) and Wales (38.6%)** compared with 33.1% and 38.4% respectively in 2017.
- The **median time from arrival to admission** was **3.9 hours**, compared with 3.4 hours in 2017.
- **There were more admissions** for COPD during **weekdays than at weekends** with the busiest admission period across the week falling on a **Monday between 2pm and 8pm**.

#### Length of stay

- The **median length of stay** for admissions remained the same at **4 days**.

#### Inpatient mortality

- **Inpatient mortality remained stable** at 3.8% compared with 3.9% reported in 2017.

### Navigation

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

- **1.1 Age**
- **1.2 Gender**
- **1.3 Socioeconomic status**
  - **1.3.1 Index of Multiple Deprivation measures by national quintile in England and Wales**
    - **Fig 1. Percentage of the hospital population of COPD exacerbations in each IMD quintile**
- **1.4 Admission**
  - **1.4.1 Average number of admissions per hospital**
  - **1.4.2 Age at admission by gender**
  - **1.4.3 Average time, in hours, between arrival and admission**
  - **1.4.4 Day and time of admission to hospital**
- **1.5 Length of stay**
- **1.6 Inpatient mortality**

## 1.1 Age

	2017/18			2017
Age at admission	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Median (IQR <sup>**</sup> )	73 (65–79)	72 (64–78)	73 (65–79)	73 (65–80)

## 1.2 Gender

	2017/18			2017
Gender	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Male	33,685 (46.8%)	1,165 (44.4%)	34,850 (46.7%)	17,046 (46.9%)
Female	38,337 (53.2%)	1,458 (55.6%)	39,795 (53.3%)	19,295 (53.1%)

## 1.3 Socioeconomic status

### 1.3.1 Index of Multiple Deprivation measures by national quintile in England and Wales

		Percentage of audit sample living in each quintile of English or Welsh Index of Multiple Deprivation				
Index of Multiple Deprivation <sup>††</sup>		Q1 (most deprived)	Q2	Q3	Q4	Q5 (least deprived)
England (IMD) <sup>††</sup>	2017/18	24,351 (34.2%)	16,560 (23.3%)	12,682 (17.8%)	10,194 (14.3%)	7,390 (10.4%)
	2017	11,363 (33.1%)	8,196 (23.9%)	6,452 (18.8%)	4,902 (14.3%)	3,414 (10.0%)
Wales (IMD) <sup>§§</sup>	2017/18	1,043 (38.6%)	689 (25.5%)	455 (16.8%)	278 (10.3%)	239 (8.8%)
	2017	639 (38.4%)	433 (26.0%)	269 (16.2%)	175 (10.5%)	148 (8.9%)

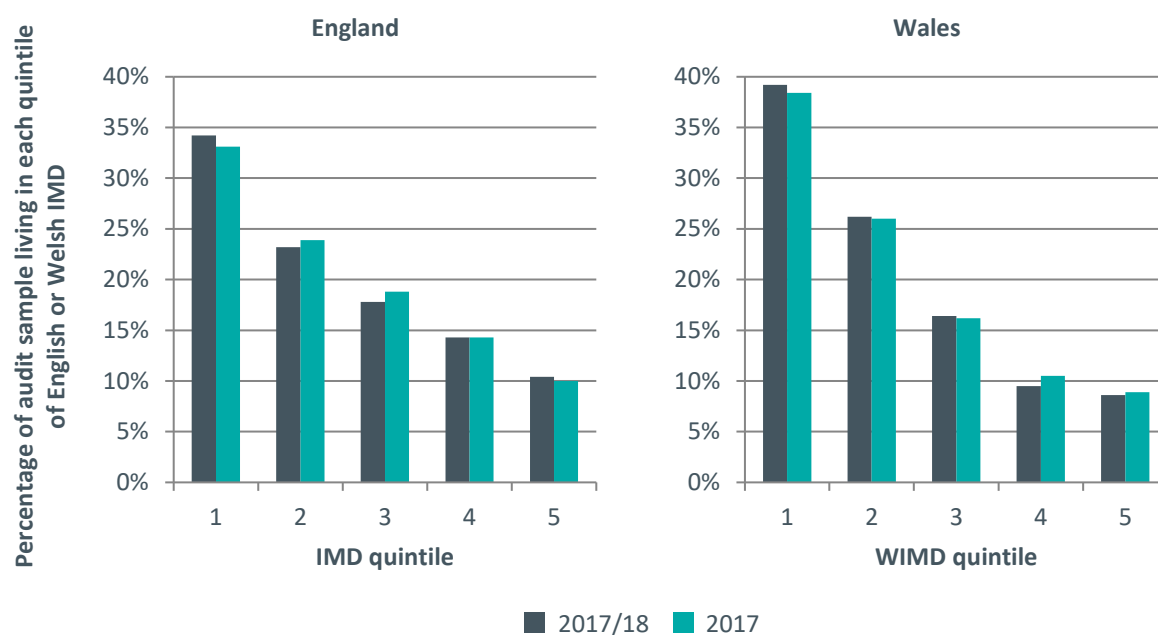
<sup>\*\*</sup> IQR = interquartile range.

<sup>††</sup> Index of Multiple Deprivation are not directly comparable between countries.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/465791/English\\_Indices\\_of\\_Deprivation\\_2015\\_-\\_Statistical\\_Release.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/465791/English_Indices_of_Deprivation_2015_-_Statistical_Release.pdf).

<sup>††</sup> Index of Multiple Deprivation, England. [www.gov.uk/government/statistics/english-indices-of-deprivation-2015](http://www.gov.uk/government/statistics/english-indices-of-deprivation-2015)

<sup>§§</sup> Welsh Index of Multiple Deprivation. <https://gov.wales/statistics-and-research/welsh-index-multiple-deprivation/?lang=en>

**Fig 1. Percentage of the hospital population of COPD exacerbations in each IMD quintile**

## 1.4 Admission

### 1.4.1 Average number of admissions per hospital

	2017/18			2017
Number of admissions	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Median (IQR)	387 (233–601)	128 (48–321)	367 (212–588)	179 (94–263)

### 1.4.2 Age at admission by gender

	2017/18						2017	
	England (N=72,022)		Wales (N=2,623)		All (N=74,645)		All (N=36,341)	
Age at admission by gender	Male (N=33,685)	Female (N=38,337)	Male (N=1,165)	Female (N=1,458)	Male (N=34,850)	Female (N=39,795)	Male (N=17,046)	Female (N=19,295)
Median (IQR)	73 (66–79)	73 (65–80)	72 (66–79)	71 (64–78)	73 (66–79)	73 (65–80)	73 (53–88)	73 (52–88)

### 1.4.3 Average time, in hours, between arrival and admission

	2017/18			2017
Time of arrival to admission, in hours	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Median (IQR)	3.9 (1.9–6.1)	2.5 (0.4–7.5)	3.9 (1.9–6.2)	3.4 (1.2–5.1)



## 1.4.4 Day and time of admission to hospital

Time admitted	Day patient admitted (N=74,645)						
	Monday (N=11,863)	Tuesday (N=11,526)	Wednesday (N=11,053)	Thursday (N=11,025)	Friday (N=10,576)	Saturday (N=8,922)	Sunday (N=9,680)
00.00–01.59	901 (7.6%)	958 (8.3%)	896 (8.1%)	898 (8.1%)	883 (8.3%)	802 (9.0%)	790 (8.2%)
02.00–03.59	713 (6.0%)	770 (6.7%)	684 (6.2%)	653 (5.9%)	682 (6.4%)	692 (7.8%)	662 (6.8%)
04.00–05.59	494 (4.2%)	597 (5.2%)	556 (5.0%)	515 (4.7%)	550 (5.2%)	495 (5.5%)	556 (5.7%)
06.00–07.59	390 (3.3%)	421 (3.7%)	407 (3.7%)	469 (4.3%)	417 (3.9%)	398 (4.5%)	402 (4.2%)
08.00–09.59	646 (5.4%)	596 (5.2%)	622 (5.6%)	575 (5.2%)	592 (5.6%)	470 (5.3%)	530 (5.5%)
10.00–11.59	920 (7.8%)	887 (7.7%)	845 (7.6%)	853 (7.7%)	847 (8.0%)	642 (7.2%)	749 (7.7%)
12.00–13.59	1,132 (9.5%)	1,010 (8.8%)	1,010 (9.1%)	1,028 (9.3%)	971 (9.2%)	821 (9.2%)	837 (8.6%)
14.00–15.59	1,466 (12.4%)	1,336 (11.6%)	1,340 (12.1%)	1,215 (11.0%)	1,208 (11.4%)	930 (10.4%)	989 (10.2%)
16.00–17.59	1,499 (12.6%)	1,360 (11.8%)	1,360 (12.3%)	1,362 (12.4%)	1,281 (12.1%)	954 (10.7%)	1,130 (11.7%)
18.00–19.59	1,417 (11.9%)	1,322 (11.5%)	1,251 (11.3%)	1,267 (11.5%)	1,180 (11.2%)	929 (10.4%)	1,017 (10.5%)
20.00–21.59	1,159 (9.8%)	1,097 (9.5%)	1,021 (9.2%)	1,118 (10.1%)	1,012 (9.6%)	856 (9.6%)	946 (9.8%)
22.00–23.59	1,126 (9.5%)	1,172 (10.2%)	1,061 (9.6%)	1,072 (9.7%)	953 (9.0%)	933 (10.5%)	1,072 (11.1%)

## Key

Highest (12.6%)

Lowest (3.3%)

## 1.5 Length of stay

Length of stay, days	2017/18			2017
	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Median (IQR)	4 (2–7)	4 (2–8)	4 (2–7)	4 (2–7)

## 1.6 Did the patient die as an inpatient in your hospital?

Inpatient mortality	2017/18			2017
	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Yes	2,738 (3.8%)	108 (4.1%)	2,846 (3.8%)	1,415 (3.9%)





## Section 2: Provision of timely care

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### Key findings

#### Acute physician review (*NICE [NG115] 1.1.31*)

- 86.2% of admissions were reviewed by an **acute physician of grade specialty trainee 3 (ST3) or above** (compared with 82.3% in 2017).

#### Respiratory team review (*NICE [QS10], statement 10, 2011*)

- 84.7% of admissions were **reviewed** by a member of the **respiratory team** compared with 78.0% in 2017. In addition, 64.0% of admissions were **reviewed within 24 hours** (54.8% in 2017).
- The median time from **admission to respiratory team review** was **15.0 hours** (16.2 hours in 2017).

### Navigation

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

- 2.1 Acute physician review
  - 2.1.1 Has the patient been reviewed by an acute physician of grade ST3 or above?
- 2.2 Respiratory team review
  - 2.2.1 Has a member of the respiratory team reviewed the patient during the admission?
  - 2.2.2 Was the patient reviewed by a member of the respiratory team within 24 hours?
  - 2.2.3 Average time, in hours, from admission to respiratory team review

### 2.1 Acute physician review

#### 2.1.1 Has the patient been reviewed by an acute physician of grade ST3 or above?

	2017/18			2017
Review by an acute physician of grade ST3 or above ***	England (N=69,961)	Wales (N=2,531)	All (N=74,645)	All (N=36,341)
Yes	62,714 (89.6%)	1,633 (64.5%)	64,347 (86.2%)	29,919 (82.3%)

\*\*\* Review by an acute physician of grade ST3 or above was not recorded in; 1,787 (4.9%) patients in 2017; 2,153 (2.9%) patients in 2017/18.

## 2.2 Respiratory team review

### 2.2.1 Has a member of the respiratory team reviewed the patient during the admission?

	2017/18			2017
Respiratory team review during admission	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Yes	61,364 (85.2%)	1,865 (71.1%)	63,229 (84.7%)	28,360 (78.0%)

### 2.2.2 Was the patient reviewed by a member of the respiratory team within 24 hours?

	2017/18			2017
Respiratory team review within 24 hours of admission	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Yes	46,630 (64.7%)	1,131 (43.1%)	47,761 (64.0%)	19,927 (54.8%)

### 2.2.3 Average time, in hours, from admission to respiratory team review

	2017/18			2017
Time, in hours, from admission to respiratory team review	England (N=61,364)	Wales (N=1,856)	All (N=63,229)	All (N=28,360)
Median (IQR)	14.9 (6.3–23.6)	18.3 (4.1–45.7)	15.0 (6.3–23.8)	16.2 (7.0–30.4)



## Section 3: Oxygen

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### Key findings

- **72.0%** of admissions **requiring oxygen** were **prescribed** it. (*NICE [NG115]1.3.28 / NICE [QS10]statement 6*)
- Only **2.7%** of admissions that had oxygen prescribed did **not have a target range stipulated**, compared with 3.2% reported in 2017.

### Navigation

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

- **3.1 Was oxygen prescribed for this patient?**
  - **3.1.1 If oxygen was prescribed was it to a stipulated target range?**
    - **Fig 2. Oxygen prescription, among those that required it**

### 3.1 Was oxygen prescribed for this patient?

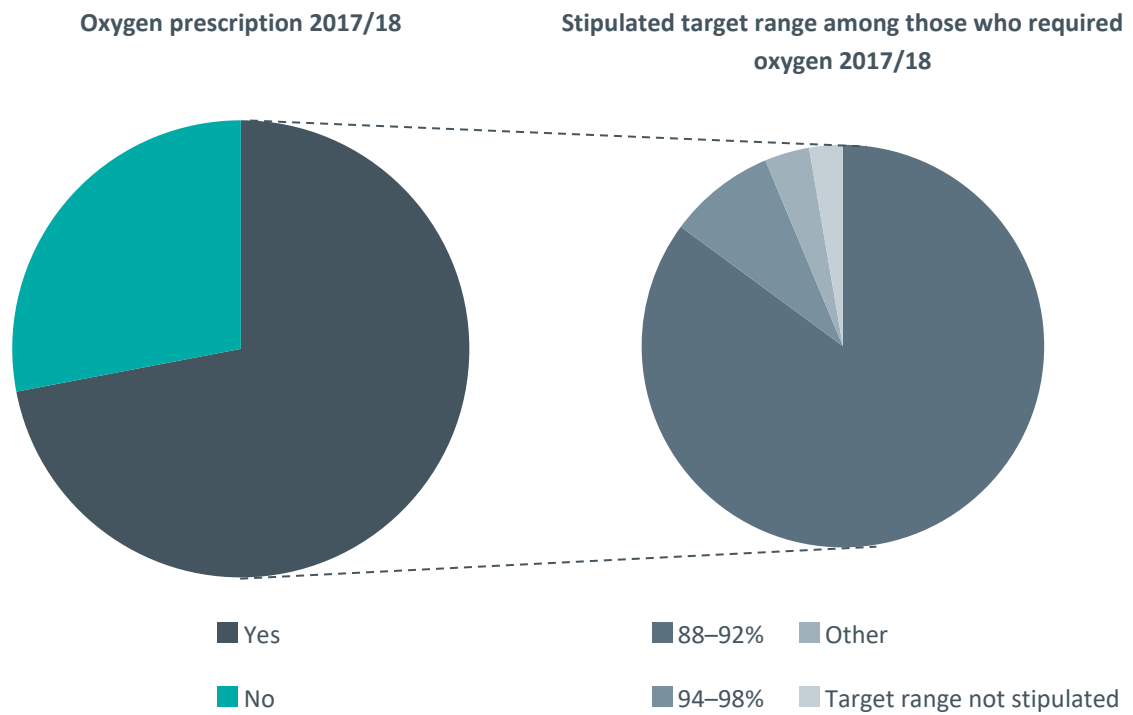
	2017/18		
Oxygen prescribed <sup>+++</sup>	England (N=57,235)	Wales (N=2,144)	All (N=59,379)
Yes, among those who required it	41,596 (72.7%)	1,140 (53.2%)	42,736 (72.0%)

#### 3.1.1 If oxygen was prescribed was it to a stipulated target range?

	2017/18			2017
Target range for oxygen prescription, among those prescribed	England (N=41,596)	Wales (N=1,140)	All (N=42,736)	All (N=20,829)
88–92%	35,336 (85%)	1,023 (89.7%)	36,359 (85.1%)	17,733 (85.1%)
94–98%	3,650 (8.8%)	28 (2.5%)	3,678 (8.6%)	1,700 (8.2%)
Other	1,525 (3.7%)	26 (2.3%)	1,551 (3.6%)	729 (3.5%)
Target range not stipulated	1,085 (2.6%)	63 (5.5%)	1,148 (2.7%)	667 (3.2%)

<sup>+++</sup> Supplemental oxygen was not required in 15,266 (20.5%) of patients in 2017/18. Comparative figures for 2017 have not been presented in the table as the analysis conducted previously did not exclude those patients that did not require oxygen.

**Fig 2. Oxygen prescription, among those that required it**





## Section 4: Non-invasive ventilation (NIV)

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### Key findings

- 10.3% of admissions **received acute treatment with NIV** compared with 10.9% in 2017. (*NICE [NG115] 1.2.70, 1.3.31*)
  - Of those that received it only **21.0% received it within 2 hours of arrival** at hospital.<sup>\*\*\*</sup>
- The median time from arrival at hospital to acute treatment with NIV was **4.6 hours** (4.3 hours in 2017); however the interquartile range was **1.8 to 13.4 hours** (1.7 to 13.6 hours in 2017) which suggests a high degree of variability. (*NICE [QS10] statement 7*)

### Navigation

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

- 4.1 Did the patient receive acute treatment with NIV?**
  - 4.1.1 If the patient received acute treatment with NIV, was it received within 2 hours of arrival?**
- 4.2 Time from arrival to acute treatment with NIV**
  - Fig 3. Cumulative percentage of patients that have received NIV**
- 4.3 Average time from arrival at hospital to acute treatment with NIV**

#### 4.1 Did the patient receive acute treatment with NIV?

	2017/18			2017
Acute treatment with NIV	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Yes	7,300 (10.1%)	390 (14.9%)	7,690 (10.3%)	3,955 (10.9%)

##### 4.1.1 If the patient received acute treatment with NIV, was it received within 2 hours of arrival?<sup>§§§</sup>

	2017/18		
Acute treatment with NIV received within 2 hours of arrival	England (N=7,300)	Wales (N=390)	All (N=7,690)
Yes	1,546 (21.2%)	72 (18.5%)	1,618 (21.0%)
No	4,173 (57.2%)	241 (61.8%)	4,414 (57.4%)
No time/date recorded	1,581 (21.7%)	77 (19.7%)	1,658 (21.6%)

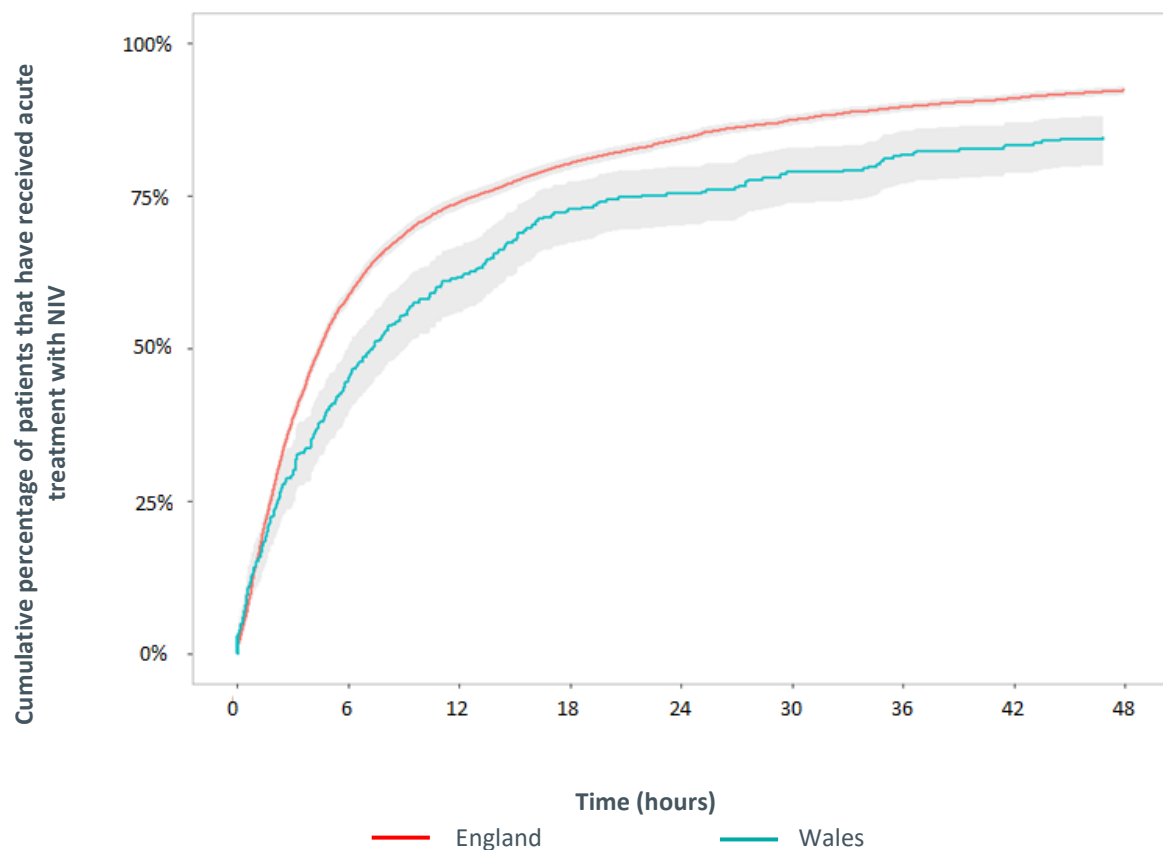
<sup>\*\*\*</sup> Comparative data from the 2017 audit cannot be reported here as the recommended time from arrival to acute treatment with NIV changed from 3 to 2 hours in line with new quality standards.

<sup>§§§</sup> There is no comparative data available for this table from the 2017 audit as this analysis was not conducted.

## 4.2 Time from arrival to acute treatment with NIV\*\*\*\*

Time, in hours, from arrival at hospital to acute treatment with NIV****	2017/18		
	England (N=5,719)	Wales (N=313)	All (N=6,032)
<2 hours	1,546 (27.0%)	72 (23.0%)	1,618 (26.8%)
2–24 hours	3,287 (57.5%)	164 (52.4%)	3,451 (57.2%)
>24 hours	886 (15.5%)	77 (24.6%)	963 (16.0%)

Fig 3. Cumulative percentage of patients that have received NIV



The grey shaded area in Fig 3 represents the uncertainty of the estimates at the 95% confidence level. The shaded area for Wales is much larger because the sample size is much smaller.

## 4.3 Average time from arrival at hospital to acute treatment with NIV

Time, in hours, from arrival at hospital to acute treatment with NIV	2017/18			2017
	England (N=5,719)	Wales (N=313)	All (N=6,032)	All (N=2,956)
Median (IQR)	4.5 (1.8–13.0)	7.3 (2.2–21.9)	4.6 (1.8–13.4)	4.3 (1.7–13.6)

\*\*\*\* There is no comparative data available for this table from the 2017 audit as this analysis was not conducted.

\*\*\*\* Denominators differ from table 4.1.1 as 1,658 patients had no time and/or date recorded for acute treatment with NIV.



## Section 5: Spirometry

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### Key findings

- A **spirometry** result was **not recorded for 59.5%** of admissions, compared with 60.3% in 2017. (*NICE [NG115] 1.1.4, 1.1.5 / NICE [QS10] statement 1*)
- 12.1%** of admissions with a spirometry result recorded had **no evidence of airflow obstruction despite being managed for COPD exacerbation**, similar to the 12.4% recorded in 2017.

### Navigation

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

- [5.1 Is a spirometry result available?](#)
- [5.2 Airflow obstruction](#)
- [5.3 If a spirometry result is available, what is the patients most recent FEV1?](#)

#### 5.1 Is a spirometry result available?

	2017/18			2017
Spirometry result available	England (N=72,014)	Wales (N=2,622)	All (N=74,636)***	All (N=36,341)
Yes	29,507 (41.0%)	686 (26.2%)	30,193 (40.5%)	14,410 (39.7%)

#### 5.2 The degree of airflow obstruction<sup>§§§§</sup>

	2017/18			2017
Airflow obstruction (FEV1/FVC ratio)	England (N=29,507)	Wales (N=686)	All (N=30,193)	All (N=14,410)
Yes (<0.7)	25,499 (86.4%)	588 (85.7%)	26,087 (86.4%)	12,354 (85.7%)
No (≥0.7)	3,554 (12%)	85 (12.4%)	3,639 (12.1%)	1,783 (12.4%)
Invalid ratio (<0.2 or >1)	454 (1.5%)	13 (1.9%)	467 (1.5%)	273 (1.9%)

FEV1 = forced expiratory volume; FVC = forced vital capacity.

#### 5.3 If a spirometry result is available, what is the patients most recent FEV1?

	2017/18			2017
Patient's most recent FEV1, in litres	England (N=29,507)	Wales (N=686)	All (N=30,193)	All (N=14,410)
Median (IQR)	0.9 (0.7–1.3)	1 (0.7–1.3)	0.9 (0.7–1.3)	0.9 (0.7–1.3)

\*\*\* There were 9 patients with missing data that were excluded from this analysis.

§§§§ Participants were asked in the dataset to record the value of the spirometric test: the patient's most recent FEV1 as well as their most recent FVC. These have been used to calculate the FEV1/FVC ratio (ie degree of airflow obstruction)





## Section 6: Smoking

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### Key findings

- **94.0%** of admissions had a **smoking status recorded** (90.9% in 2017). (*NICE [NG115] 1.2.2, 1.2.3*)
  - **32.3%** of admissions were **current smokers** (31.3% in 2017).
- 67.1% of current smokers were **offered smoking cessation pharmacotherapy** during their admission (61.0% in 2017).
  - 25.7% of those offered accepted (25.1% in 2017), however, 41.1% declined pharmacotherapy (35.9% in 2017).

### Navigation

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

- **6.1 What was the smoking status for this patient, as documented for the current admission?**
  - **6.1.1 If a current smoker, was the patient prescribed smoking cessation pharmacotherapy during the current admission?**

#### 6.1 What was the smoking status for this patient, as documented for the current admission?

	2017/18			2017
Smoking status	England (N=72,022)	Wales (N=2623)	All (N=74,645)	All (N=36,341)
Current smoker	23,125 (32.1%)	999 (38.1%)	24,124 (32.3%)	11,370 (31.3%)
Ex-smoker	42,430 (58.9%)	1,416 (54.0%)	43,846 (58.7%)	20,466 (56.3%)
Never smoked	2,136 (3.0%)	93 (3.5%)	2,229 (3.0%)	1,213 (3.3%)
Not known / not recorded	4,331 (6.0%)	115 (4.4%)	4,446 (6.0%)	3,292 (9.1%)

#### 6.1.1 If a current smoker, was the patient prescribed smoking cessation pharmacotherapy during the current admission?

	2017/18			2017
Prescribed smoking cessation pharmacotherapy during the admission	England (N=23,125)	Wales (N=999)	All (N=24,124)	All (N=11,370)
Yes	5,867 (25.4%)	327 (32.7%)	6,194 (25.7%)	2,855 (25.1%)
No	3,000 (13.0%)	221 (22.1%)	3,221 (13.4%)	1,848 (16.3%)
Not recorded	4,375 (18.9%)	340 (34.0%)	4,715 (19.5%)	2,590 (22.8%)
Offered but declined	9,883 (42.7%)	111 (11.1%)	9,994 (41.4%)	4,077 (35.9%)



## Section 7: Dyspnoea, eosinopenia, consolidation, acidaemia and atrial fibrillation (DECAF) score

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### Key findings

- A **DECAF score** was recorded in **17.5%** of admissions compared with 14.5% reported in 2017.
- The DECAF score was originally included as a dataset item to allow case mix adjustment. However as the score was so poorly completed it could not be used in this way.

### Navigation

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

- **7.1 Was a DECAF score recorded for this patient?**
  - **7.1.1 If yes, what was the recorded DECAF score?**

#### 7.1 Was a DECAF score recorded for this patient?

	2017/18			2017
DECAF score ****	England (N=72,014)	Wales (N=2,622)	All (N=74,636)*****	All (N=36,341)
Yes	13,045 (18.1%)	27 (1.0%)	13,072 (17.5%)	5,278 (14.5%)

#### 7.1.1 If yes, what was the recorded DECAF score?

	2017/18			2017
DECAF score, among those with a score recorded	England (N=13,045)	Wales (N=27)	All (N=13,072)	All (N=5,278)
0	2,672 (20.5%)	<5	2,675 (20.5%)	1,109 (21.0%)
1	4,426 (33.9%)	15 (55.6%)	4,441 (34.0%)	1,741 (33.0%)
2	3,621 (27.8%)	5 (18.5%)	3,626 (27.7%)	1,412 (26.8%)
3	1,734 (13.3%)	<5	1,737 (13.3%)	742 (14.1%)
4	495 (3.8%)	<5	496 (3.8%)	224 (4.2%)
5	91 (0.7%)	<5	91 (0.7%)	47 (0.9%)
6	6 (0%)	<5	6 (0%)	3 (0.1%)

\*\*\*\*\* It was not clear if a score was recorded for; 736 (2%) of patients in 2017; 1,903 (2.5%) of patients in 2017/18. 'Not clear', 'Patient self-discharged', 'Patient died', and 'Other' included in the denominator.

\*\*\*\*\* There were 9 patients with missing data that were excluded from this analysis.



## Section 8: Discharge processes

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### Key findings

#### Discharge

- The lowest number of discharges took place on a weekend (**8.3% on Saturdays and 6.4% on Sundays**).
- 67.2%** of admissions received a **discharge bundle** (53.0% in 2017). (*NICE [QS10] statement 8*)

#### Follow up

- 16.3% of admissions had 'no follow-up arrangements apparent'** selected as a response in the dataset (18.8% in 2017).

### Navigation

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

- 8.1 Day of discharge**
- 8.2 Has a British Thoracic Society (BTS), or equivalent, discharge bundle been completed for this admission?**
- 8.3 What follow-up arrangements have been made for this patient?**

### 8.1 Day of discharge

Day of discharge	2017/18			2017
	England (N=69,284)	Wales (N=2,515)	All (N=71,799)****	All (N=36,341)§§§§§
Monday	10,919 (15.8%)	430 (17.1%)	11,349 (15.8%)	5,759 (15.9%)
Tuesday	12,237 (17.7%)	475 (18.9%)	12,712 (17.7%)	6,472 (17.8%)
Wednesday	11,934 (17.2%)	448 (17.8%)	12,382 (17.2%)	6,086 (16.8%)
Thursday	11,379 (16.4%)	411 (16.3%)	11,790 (16.4%)	6,175 (17.0%)
Friday	12,517 (18.1%)	499 (19.8%)	13,016 (18.1%)	6,476 (17.8%)
Saturday	5,794 (8.4%)	137 (5.4%)	5,931 (8.3%)	3,043 (8.4%)
Sunday	4,504 (6.5%)	115 (4.6%)	4,619 (6.4%)	2,330 (6.4%)

\*\*\*\* Patients that died have been excluded from this analysis.

§§§§§ Patients that died were included in the 2017 analysis.

## 8.2 Has a British Thoracic Society (BTS), or equivalent, discharge bundle been completed for this admission?

	2017/18			2017
Discharge bundle completed for this admission	England (N=72,022)	Wales (N=2,623)	All (N=74,645)	All (N=36,341)
Yes	49,965 (69.4%)	219 (8.3%)	50,184 (67.2%)	19,275 (53.0%)
No	15,335 (21.3%)	2,215 (84.4%)	17,550 (23.5%)	13,008 (35.8%)
Not clear	2,773 (3.9%)	75 (2.9%)	2,848 (3.8%)	1,719 (4.7%)
Patient self-discharged	384 (0.5%)	6 (0.2%)	390 (0.5%)	213 (0.6%)
Patient died	2,738 (3.8%)	108 (4.1%)	2,846 (3.8%)	1,415 (3.9%)
Other *****	827 (1.1%)	<5	827 (1.1%)	711 (2.0%)

## 8.3 What follow-up arrangements have been made for this patient?

	2017/18			2017
	England (N=69,276)	Wales (N=2,514)	All (N=71,790) +++++	All (N=34,926)
Patient discharged under the care of an early/assisted discharge team or integrated care service	12,248 (17.7%)	194 (7.7%)	12,442 (17.3%)	5,276 (15.1%)
GP follow-up advised	12,522 (18.1%)	176 (7.0%)	12,698 (17.7%)	5,800 (16.6%)
GP follow-up arranged	1,645 (2.4%)	76 (3.0%)	1,721 (2.4%)	942 (2.7%)
Follow-up phone call scheduled	6,534 (9.4%)	74 (2.9%)	6,608 (9.2%)	2,786 (8.0%)
Community respiratory clinic follow-up advised	4,835 (7.0%)	46 (1.8%)	4,881 (6.8%)	2,016 (5.8%)
Community respiratory clinic follow-up arranged	11,598 (16.7%)	187 (7.4%)	11,785 (16.4%)	5,042 (14.4%)
Hospital respiratory clinic follow-up advised	3,439 (5.0%)	257 (10.2%)	3,696 (5.1%)	2,075 (5.9%)
Hospital respiratory clinic follow-up arranged	15,352 (22.2%)	792 (31.5%)	16,144 (22.5%)	8,614 (24.7%)
No follow up arranged, as discharged to other healthcare facility	929 (1.3%)	37 (1.5%)	966 (1.3%)	787 (2.3%)
Discharged for end-of-life care	312 (0.5%)	6 (0.2%)	318 (0.4%)	249 (0.7%)
Other	8,117 (11.7%)	408 (16.2%)	8,525 (11.9%)	4,374 (12.5%)
No arrangements apparent	10,878 (15.7%)	855 (34.0%)	11,733 (16.3%)	6,575 (18.8%)

\*\*\*\*\* Top four 'other' responses include: Discharge bundle completed at previous admission, 168 (20.9%); Will be completed by someone else (such as rapid access discharge service (RADS), 161 (20.0%); Too ill or in palliative care, 80 (10.0%); Mental health issues, 77 (9.6%).

+++++ There were nine patients with missing data that were excluded from this analysis.



## Section 9: Sub-analyses<sup>+++++</sup>

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This section presents associations between various metrics and:

- time from arrival to acute treatment with NIV
- review by a member of the respiratory team.

### Navigation

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

- **9.1 NIV**
  - **9.1.1 Time to acute treatment with NIV and associations with length of stay**
  - **9.1.2 Time to acute treatment with NIV and associations with inpatient mortality**
- **9.2 Respiratory specialist review**
  - **9.2.1 Time to respiratory specialist review and associations with length of stay**
  - **9.2.2 Time to respiratory specialist review and associations with inpatient mortality**
  - **9.2.3 Time to respiratory specialist review and associations with prescription of oxygen**
  - **9.2.4 Time to respiratory specialist review and associations with receiving NIV acute treatment within 2 hours of arrival**
  - **9.2.5 Time to respiratory specialist review and associations with smokers that received smoking cessation pharmacotherapy**
  - **9.2.6 Time to respiratory specialist review and associations with those receiving a discharge bundle**

### 9.1 NIV

#### 9.1.1 Time to acute treatment with NIV and associations with length of stay<sup>§§§§§</sup>

	2017/18	
	Time from arrival to acute treatment with NIV <2 hours (N=1,618)	Time from arrival to acute treatment with NIV 2–24 hours (N=3,451)
Length of stay ≤4 days	445 (27.5%)	819 (23.7%)
Length of stay >4 days	1,003 (62.0%)	2,269 (65.7%)

- Relative to patients who received acute treatment with NIV in under 2 hours, those who received it between 2–24 hours were 23% more likely (odds ratio (OR) = 1.23, (95% confidence interval (CI) = 1.07 to 1.41)) to have a length of stay greater than 4 days.

<sup>+++++</sup> Due to all outcomes other than mortality being quite common, odds ratios will not approximate risk ratios.

<sup>§§§§§</sup> Patients receiving acute treatment with NIV >24 hours after arrival have been excluded from this analysis.

**9.1.2 Time to acute treatment with NIV and associations with inpatient mortality**§§§§§

	2017/18	
	Time from arrival to acute treatment with NIV <2 hours (N=1,618)	Time from arrival to acute treatment with NIV 2–24 hours (N=3,451)
Died as inpatient	170 (10.5%)	363 (10.5%)

- There appeared to be no difference in the likelihood of dying as an inpatient if patients received acute treatment with NIV in under 2 hours from arrival compared with those who received it between 2–24 hours after arrival (OR = 1.00 (95% CI = 0.83 to 1.21)).

**9.2 Respiratory specialist review**\*\*\*\*\***9.2.1 Time to respiratory specialist review and associations with length of stay**

	2017/18	
	Received specialist review within 24 hours (N=47,761)	Did not receive specialist review in 24 hours (N=26,884)
Length of stay ≤4 days	27,010 (56.6%)	14,999 (55.8%)
Length of stay >4 days	19,028 (39.8%)	10,762 (40.0%)

- There was no difference in length of stay relative to being reviewed or not being reviewed by a specialist within 24 hours (OR = 0.98 (95% CI = 0.95 to 1.01)).

**9.2.2 Time to respiratory specialist review and associations with inpatient mortality**

	2017/18	
	Received specialist review within 24 hours (N=47,761)	Did not receive specialist review in 24 hours (N=26,884)
Died as an inpatient	1,723 (3.6%)	1,123 (4.2%)

- Patients who received a specialist review were 14% less likely to die as an inpatient (OR = 0.86 (95% CI = 0.78 to 0.95)) compared with those who did not receive a review within 24 hours.

**9.2.3 Time to respiratory specialist review and associations with prescription of oxygen**

	2017/18	
	Received specialist review within 24 hours and required oxygen (N=38,578)	Did not receive specialist review within 24 hours and required oxygen (N=20,801)
Oxygen prescribed	29,157 (75.6%)	13,579 (65.3%)

\*\*\*\*\* Did not receive specialist review within 24 hours includes both patients that did not receive any specialist review as well as those that received one more than 24 hours after they were admitted.

- Patients who received a specialist review within 24 hours and required oxygen were 65% more likely to receive an oxygen prescription (OR = 1.65 (95% CI = 1.59 to 1.71)) compared with those who did not receive a review within 24 hours.

### 9.2.4 Time to respiratory specialist review and associations with receiving NIV within 2 hours of arrival

	2017/18	
	Received specialist review within 24 hours and received NIV (N=5,733)	Did not receive specialist review within 24 hours and received NIV (N=1,957)
Received NIV within 2 hours of arrival	1,280 (22.3%)	338 (17.3%)

- Receiving a specialist review within 24 hours of arrival cannot cause the receipt of NIV within 2 hours of arrival because the specialist review may occur before or after the receipt of NIV. Therefore no statement of causality can be made.
- It may be that patients who receive NIV within 2 hours are more likely to receive a specialist review within 24 hours because they are deemed to be more urgently in need of a review. Alternatively, it may be that the quality of the hospital confounds the relationship between the two variables, with better-performing hospitals more likely to achieve targets for both NIV within 2 hours and specialist review within 24 hours.

### 9.2.5 Time to respiratory specialist review and associations with smokers that received smoking cessation pharmacotherapy

	2017/18	
	Received specialist review within 24 hours and a current smoker (N=13,780)	Did not receive specialist review within 24 hours and a current smoker (N=5,629)
Offered smoking cessation pharmacotherapy <sup>+++++</sup>	12,054 (87.5%)	4,134 (73.4%)

- Smokers who received a specialist review within 24 hours were 2.5 times more likely to be offered smoking cessation pharmacotherapy (OR = 2.53 (95% CI = 2.34 to 2.73)) compared with those who received a review after 24 hours.
- Smokers who received a specialist review at any time during their admission were over six times more likely to be offered smoking cessation pharmacotherapy (OR = 6.02 (95% CI = 5.44 to 6.66)) compared with those who did not receive a review.

<sup>+++++</sup> Response options for this question in the dataset 'yes' and 'offered but declined' combined to give a variable of 'smoking status offered'.



### 9.2.6 Time to respiratory specialist review and associations with those receiving a discharge bundle

	2017/18	
	Received specialist review within 24 hours and received a discharge bundle (N=45,328)	Did not receive specialist review within 24 hours and received a discharge bundle (N=25,254)
Received a discharge bundle*****	38,094 (84.0%)	12,090 (47.9%)

- Those who received a specialist review within 24 hours were nearly six times more likely to receive a discharge bundle (OR = 5.73 (95% CI = 5.54 to 5.94)) compared with those who received a review after 24 hours.
- Patients who received a specialist review at any time during their admission were over 30 times more likely to receive a discharge bundle (OR = 31.81 (95% CI = 29.9 to 33.83)) compared with those who did not receive a review.

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\*\*\*\*\* Excluding those patients that died or self-discharged.



## Section 10: Benchmarked key indicators

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### 10.1 Benchmarking of key indicators for participating hospitals

Table 1 shows the national (England and Wales combined) medians, lower quartiles and upper quartiles for the key indicators that have been presented in the unadjusted benchmarking of hospitals (Table 2). The values presented in Table 1 have been derived by the method shown visually in the box and whisker plot (Fig 4). More specifically, to create the 'box', data for each key indicator were ordered numerically from smallest (whisker; P0) to largest (whisker; P100) to find the median (P50), the middle point of the values. The data is divided into two halves, these two halves are then divided in half again to identify the lower quartile (P25) and the upper quartile (P75).

**Table 1. The median and interquartile ranges for each key indicator**

Median and interquartile ranges (%)	Key indicators						
	Length of stay (days)	Oxygen prescribed to those patients that required it (%)	Patient requiring acute treatment with NIV received it within 2 hours of arrival (%)	Spirometry result available (%)	Current smoker prescribed smoking cessation pharmacotherapy (%)	Patient received respiratory review within 24 hours of admission (%)	Discharge bundle completed for the admission (%)
Lower quartile	2	60	10	25	49	48	51
Median	4	72	19	37	67	62	78
Upper quartile	7	87	27	52	84	74	92

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

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

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

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

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

Fig 4. Box and whisker plot

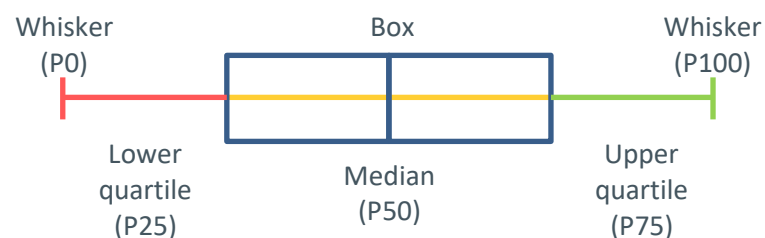


Table 2. Unadjusted benchmarking of key indicators for participating hospitals in England and Wales

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
National medians		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
England														
Addenbrooke's Hospital (N=729)	Cambridge University Hospitals NHS Foundation Trust	4	499	100%	18	27%	440	60%	167	84%	617	85%	675	97%
Airedale General Hospital (N=212)	Airedale NHS Foundation Trust	4	99	65%	<5	-	127	60%	43	60%	137	65%	120	72%
Arrowe Park Hospital (N=1,153)	Wirral University Teaching Hospital NHS Foundation Trust	4	503	67%	<5	-	686	59%	352	83%	783	68%	816	76%
Barnet General Hospital (N=440)	Royal Free London NHS Foundation Trust	5	241	97%	5	10%	210	48%	105	79%	303	69%	349	87%
Barnsley District General Hospital (N=776)	Barnsley Hospital NHS Foundation Trust	3	521	96%	16	36%	393	51%	167	67%	557	72%	575	76%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Basildon Hospital (N=709)	Basildon and Thurrock University Hospitals NHS Foundation Trust	5	608	87%	20	23%	201	28%	92	47%	487	69%	649	97%
Basingstoke and North Hampshire Hospital (N=139)	Hampshire Hospitals NHS Foundation Trust	5	8	6%	<5	-	17	12%	18	55%	66	47%	78	57%
Bassetlaw District General Hospital (N=198)	Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	4	66	56%	<5	-	78	39%	39	61%	118	60%	119	62%
Bedford Hospital (N=406)	Bedford Hospital NHS Trust	3	117	60%	12	27%	70	17%	76	77%	298	73%	321	83%
Birmingham City Hospital (N=364)	Sandwell and West Birmingham Hospitals NHS Trust	2	161	67%	6	23%	141	39%	75	57%	296	81%	328	93%
Birmingham Heartlands Hospital (N=442)	University Hospitals Birmingham NHS Foundation Trust	4	112	30%	9	18%	255	58%	143	94%	348	79%	336	79%
Bradford Royal Infirmary (N=859)	Bradford Teaching Hospitals Foundation Trust	2	313	37%	7	6%	38	4%	125	39%	186	22%	77	9%
Bristol Royal Infirmary (N=589)	University Hospitals Bristol NHS Foundation Trust	3	295	50%	20	31%	250	42%	111	53%	457	78%	473	88%
Broomfield Hospital (N=19)	Mid Essex Hospital NHS Foundation Trust	3	13	72%	<5	-	5	26%	<5	-	<5	-	<5	-
Calderdale Royal Hospital (N=312)	Calderdale and Huddersfield NHS Foundation Trust	1	150	55%	15	35%	238	76%	70	68%	292	94%	304	99%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Charing Cross Hospital (N=216)	Imperial College Healthcare NHS Trust	4	124	68%	15	42%	145	67%	42	58%	151	70%	207	99%
Chelsea and Westminster Hospital (N=246)	Chelsea and Westminster Hospital NHS Foundation Trust	3	196	83%	<5	-	<5	-	35	66%	88	36%	132	54%
Cheltenham General Hospital (N=126)	Gloucestershire Hospitals NHS Foundation Trust	4	111	93%	5	31%	45	36%	25	61%	85	67%	21	18%
Chesterfield Royal (N=466)	Chesterfield Royal Hospital NHS Foundation Trust	3	118	40%	13	28%	43	9%	151	85%	320	69%	375	84%
Chorley and South Ribble Hospital (N=234)	Lancashire Teaching Hospitals NHS Foundation Trust	4	146	94%	<5	-	86	37%	35	54%	53	23%	23	11%
Colchester General Hospital (N=796)	Colchester Hospital University NHS Foundation Trust	4	689	87%	24	38%	78	10%	147	71%	367	46%	515	76%
Conquest Hospital (N=80)	East Sussex Healthcare NHS Trust	3.5	39	49%	<5	-	<5	-	19	95%	59	74%	78	100%
Countess of Chester Hospital (N=342)	Countess of Chester Hospital NHS Foundation Trust	4	149	81%	<5	-	152	44%	35	36%	115	34%	119	38%
County Hospital Stafford (N=100)	University Hospitals of North Midlands NHS Trust	4	84	84%	<5	-	58	58%	19	79%	69	69%	76	78%
County Hospital Hereford (N=309)	Wye Valley NHS Trust	4	274	93%	8	26%	162	52%	64	62%	135	44%	193	79%
Croydon University Hospital (N=311)	Croydon Health Services NHS Trust	4	57	26%	6	18%	24	8%	76	70%	213	68%	257	84%
Cumberland Infirmary (N=101)	North Cumbria University Hospitals NHS Trust	5	69	75%	6	33%	27	27%	36	97%	46	46%	26	27%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Darent Valley Hospital (N=668)	Dartford and Gravesham NHS Trust	6	385	72%	18	20%	181	27%	99	51%	286	43%	453	72%
Darlington Memorial Hospital (N=758)	County Durham and Darlington NHS Foundation Trust	4	174	33%	22	22%	260	34%	143	67%	557	73%	692	95%
Diana, Princess of Wales Hospital (N=379)	Northern Lincolnshire and Goole NHS Foundation Trust	8	188	57%	7	21%	120	32%	83	64%	176	46%	333	91%
Doncaster Royal Infirmary (N=585)	Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	3	381	89%	28	33%	284	49%	191	94%	450	77%	506	94%
Dorset County Hospital (N=272)	Dorset County Hospital NHS Foundation Trust	3	178	82%	11	38%	95	35%	30	38%	124	46%	171	69%
Ealing Hospital (N=91)	London North West Healthcare NHS Trust	5	77	85%	<5	-	40	44%	30	97%	48	53%	77	92%
East Surrey Hospital (N=389)	Surrey and Sussex Healthcare NHS Trust	4	170	64%	6	19%	48	12%	55	60%	143	37%	199	55%
Eastbourne District General Hospital (N=113)	East Sussex Healthcare NHS Trust	4	60	54%	<5	-	5	4%	28	100%	80	71%	107	99%
Epsom Hospital (N=344)	Epsom and St Helier University Hospitals NHS Trust	4	165	57%	<5	-	109	32%	64	86%	231	67%	273	90%
Fairfield General Hospital (N=721)	The Pennine Acute Hospitals NHS Trust	1	175	99%	13	34%	185	26%	83	32%	182	25%	304	46%
Friarage Hospital (N=72)	South Tees Hospitals NHS Foundation Trust	3	31	54%	<5	-	53	74%	6	30%	33	46%	66	93%
Frimley Park Hospital (N=479)	Frimley Health NHS Foundation Trust	3	281	88%	10	18%	54	11%	102	67%	320	67%	291	64%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Furness General (N=388)	University Hospitals Of Morecambe Bay NHS Foundation Trust	5	154	57%	9	17%	164	42%	83	73%	240	62%	331	91%
George Eliot Hospital (N=210)	George Eliot Hospital NHS Trust	6	109	58%	<5	-	110	52%	53	91%	130	62%	180	92%
Glenfield Hospital (N=917)	University Hospitals of Leicester NHS Trust	4	456	60%	14	20%	379	41%	288	88%	883	96%	801	89%
Gloucestershire Royal Hospital (N=148)	Gloucestershire Hospitals NHS Foundation Trust	3	104	83%	5	45%	24	16%	29	59%	111	75%	22	33%
Good Hope General Hospital (N=442)	University Hospitals Birmingham NHS Foundation Trust	5	76	20%	9	16%	205	46%	85	77%	290	66%	286	72%
Grantham and District Hospital (N=131)	United Lincolnshire Hospitals NHS Trust	5	69	73%	<5	-	13	10%	37	86%	73	56%	72	67%
Harrogate District Hospital (N=243)	Harrogate and District Foundation Trust	2	165	69%	7	15%	167	69%	41	57%	141	58%	139	65%
Hillingdon Hospital (N=324)	The Hillingdon Hospitals NHS Foundation Trust	3	173	79%	6	15%	223	69%	42	47%	255	79%	260	82%
Hinchingbrooke Hospital (N=380)	North West Anglia NHS Foundation Trust	3	190	51%	9	27%	87	23%	76	74%	190	50%	238	65%
Homerton Hospital (N=167)	Homerton University Hospital NHS Foundation Trust	3	94	64%	<5	-	87	52%	44	58%	66	40%	64	41%
Horton General Hospital (N=169)	Oxford University Hospitals NHS Foundation Trust	4	95	84%	<5	-	50	30%	33	82%	88	52%	156	98%
Hull Royal Infirmary (N=1,349)	Hull University Teaching Hospitals NHS Trust	3	408	30%	10	6%	100	7%	489	96%	1023	76%	760	58%



Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		<b>4</b>	<b>42,736</b>	<b>72%</b>	<b>1,618</b>	<b>19%</b>	<b>30,193</b>	<b>37%</b>	<b>6,194</b>	<b>67%</b>	<b>47,761</b>	<b>62%</b>	<b>50,184</b>	<b>78%</b>
James Cook University Hospital (N=372)	South Tees Hospitals NHS Foundation Trust	2	206	74%	12	21%	45	12%	107	73%	332	89%	356	99%
James Paget Hospital (N=206)	James Paget University Hospitals NHS Foundation Trust	4	129	63%	<5	-	71	34%	31	53%	75	36%	78	38%
John Radcliffe Hospital (N=456)	Oxford University Hospitals NHS Foundation Trust	3	255	88%	13	29%	161	35%	134	92%	328	72%	434	100%
Kettering General Hospital (N=162)	Kettering General Hospital NHS Foundation Trust	3	130	82%	<5	-	36	22%	19	45%	117	72%	117	73%
King George Hospital (N=655)	Barking, Havering and Redbridge University Hospitals NHS Trust	4	433	98%	12	14%	288	44%	179	92%	444	68%	500	80%
King's College Hospital (N=75)	King's College Hospital NHS Foundation Trust	3	31	48%	<5	-	50	67%	28	93%	57	76%	71	96%
King's Mill Hospital (N=613)	Sherwood Forest Hospitals NHS Foundation Trust	4	358	70%	15	17%	114	19%	151	69%	398	65%	438	74%
Kingston Hospital (N=428)	Kingston Hospital NHS Foundation Trust	4	262	76%	11	17%	149	35%	66	56%	234	55%	221	58%
Leicester Royal Infirmary (N=46)	University Hospitals of Leicester NHS Trust	3	14	47%	<5	-	7	15%	6	46%	10	22%	10	23%
Leighton Hospital (N=159)	Mid Cheshire Hospitals NHS Foundation Trust	3	64	72%	<5	-	43	27%	26	45%	71	45%	<5	-
Lincoln County Hospital (N=467)	United Lincolnshire Hospitals NHS Trust	4	315	68%	<5	-	168	36%	119	72%	306	66%	346	78%
Lister Hospital (N=859)	East and North Hertfordshire NHS Trust	5	635	95%	39	41%	295	34%	223	99%	815	95%	822	100%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Luton and Dunstable Hospital (N=632)	Luton and Dunstable University Hospital NHS Foundation Trust	4	133	31%	<5	-	304	48%	171	78%	518	82%	608	100%
Lymington New Forest Hospital (N=25)	Southern Health NHS Foundation Trust	2	<5	-	<5	-	7	28%	5	62%	19	76%	<5	-
Macclesfield District General Hospital (N=313)	East Cheshire NHS Trust	4	271	91%	<5	-	140	45%	57	59%	222	71%	196	69%
Maidstone General Hospital (N=314)	Maidstone and Tunbridge Wells NHS Trust	3	299	96%	16	32%	168	54%	28	35%	151	48%	215	73%
Manchester Royal Infirmary (N=632)	Manchester University NHS Foundation Trust	5	524	87%	<5	-	297	47%	140	44%	467	74%	560	93%
Manor Hospital (N=637)	Walsall Healthcare NHS Trust	4	82	19%	<5	-	247	39%	56	28%	380	60%	117	19%
Medway Maritime Hospital (N=575)	Medway NHS Foundation Trust	5	327	80%	25	25%	21	4%	140	94%	354	62%	558	99%
Milton Keynes University Hospital (N=380)	Milton Keynes University Hospital NHS Foundation Trust	6	107	43%	<5	-	154	41%	94	84%	206	54%	278	77%
Musgrove Park Hospital (N=328)	Taunton and Somerset NHS Foundation Trust	4	180	84%	14	50%	246	75%	73	94%	191	58%	262	82%
New Cross Hospital (N=548)	The Royal Wolverhampton NHS Trust	2.5	351	85%	18	30%	312	57%	117	59%	478	87%	415	83%
Newham General Hospital (N=22)	Barts Health NHS Trust	6	22	100%	5	50%	<5	-	9	82%	16	73%	19	100%
Norfolk and Norwich Hospital (N=542)	Norfolk and Norwich University Hospitals NHS Foundation Trust	3	369	87%	<5	-	266	49%	121	72%	422	78%	387	74%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
North Devon District Hospital (N=271)	Northern Devon Healthcare NHS Trust	4	150	85%	8	36%	45	17%	36	40%	118	44%	88	35%
North Manchester General Hospital (N=609)	The Pennine Acute Hospitals NHS Trust	2	366	75%	15	27%	196	32%	102	40%	318	52%	199	34%
North Middlesex University Hospital (N=10)	North Middlesex University Hospital NHS Trust	10	5	50%	<5	-	<5	-	<5	-	<5	-	5	50%
Northampton General Hospital (N=697)	Northampton General Hospital NHS Trust	4	92	16%	21	25%	214	31%	79	41%	276	40%	495	76%
Northern General Hospital (N=1,154)	Sheffield Teaching Hospitals NHS Foundation Trust	3.5	811	98%	41	40%	622	54%	453	95%	1075	93%	1046	95%
Northumbria Specialist Emergency Care Hospital (N=759)	Northumbria Healthcare NHS Foundation Trust	5	382	60%	39	42%	348	46%	223	91%	656	86%	734	99%
Northwick Park Hospital (N=261)	London North West University Healthcare NHS Trust	4.5	175	88%	8	23%	68	26%	50	71%	144	55%	200	78%
Nottingham City Hospital (N=1,154)	Nottingham University Hospitals NHS Trust	3	939	91%	<5	-	337	29%	284	71%	992	86%	842	75%
Peterborough City Hospital (N=874)	North West Anglia NHS Foundation Trust	3	520	60%	10	14%	421	48%	<5	-	148	17%	157	19%
Pilgrim Hospital (N=427)	United Lincolnshire Hospitals NHS Trust	4	226	53%	<5	-	198	46%	30	22%	255	60%	311	77%
Pinderfields General Hospital (N=991)	The Mid Yorkshire Hospitals NHS Trust	4	884	89%	85	50%	749	76%	281	76%	864	87%	944	97%
Poole General Hospital (N=459)	Poole Hospital NHS Foundation Trust	4	202	66%	5	25%	326	71%	67	52%	437	95%	401	99%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Princess Alexandra Hospital (N=269)	Princess Alexandra Hospital NHS Trust	5	249	96%	<5	-	175	65%	83	86%	261	97%	249	100%
Princess Royal University Hospital (Bromley) (N=11)	King's College Hospital NHS Foundation Trust	8	10	91%	<5	-	<5	-	<5	-	<5	-	10	91%
Queen Alexandra Hospital (N=948)	Portsmouth Hospitals NHS Trust	4	722	99%	51	39%	652	69%	241	89%	826	87%	867	99%
Queen Elizabeth Hospital, Edgbaston (N=691)	University Hospitals Birmingham NHS Foundation Trust	5	581	94%	<5	-	382	55%	144	58%	535	77%	657	97%
Queen Elizabeth Hospital, Gateshead (N=457)	Gateshead Health NHS Foundation Trust	3	157	65%	<5	-	170	37%	100	78%	319	70%	313	72%
Queen Elizabeth Hospital, King's Lynn (N=328)	The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust	3	180	95%	16	48%	9	3%	23	35%	57	17%	77	26%
Queen Elizabeth the Queen Mother Hospital (N=452)	East Kent Hospitals University NHS Foundation Trust	4	234	60%	19	18%	176	39%	131	82%	348	77%	381	87%
Queens Hospital (N=487)	Burton Hospitals NHS Foundation Trust	4	138	66%	<5	-	112	23%	121	98%	356	73%	432	93%
Rotherham General Hospital (N=145)	The Rotherham NHS Foundation Trust	2	116	85%	<5	-	6	4%	31	84%	25	17%	<5	-
Royal Albert Edward Infirmary (N=688)	Wrightington, Wigan and Leigh NHS Foundation Trust	2	409	72%	20	22%	35	5%	131	59%	382	56%	118	18%
Royal Berkshire Hospital (N=568)	Royal Berkshire NHS Foundation Trust	4	372	89%	10	17%	192	34%	139	79%	393	69%	426	81%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		<b>4</b>	<b>42,736</b>	<b>72%</b>	<b>1,618</b>	<b>19%</b>	<b>30,193</b>	<b>37%</b>	<b>6,194</b>	<b>67%</b>	<b>47,761</b>	<b>62%</b>	<b>50,184</b>	<b>78%</b>
Royal Blackburn Teaching Hospital (N=1,642)	East Lancashire Hospitals NHS Trust	2	924	79%	14	8%	387	24%	357	62%	898	55%	1213	78%
Royal Bolton Hospital (N=149)	Bolton NHS Foundation Trust	2	97	70%	<5	-	45	30%	19	34%	83	56%	24	17%
Royal Bournemouth General Hospital (N=629)	The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	4	497	94%	23	35%	589	94%	137	71%	477	76%	531	94%
Royal Cornwall Hospital (N=162)	Royal Cornwall Hospitals NHS Trust	3	115	80%	<5	-	49	30%	31	46%	55	34%	<5	-
Royal Derby Hospital (N=1,139)	Derby Teaching Hospitals NHS Foundation Trust	3	924	81%	11	14%	542	48%	238	66%	990	87%	972	88%
Royal Devon and Exeter Hospital (N=277)	Royal Devon and Exeter NHS Foundation Trust	5	181	68%	5	31%	135	49%	70	91%	220	79%	258	94%
Royal Free Hospital (N=242)	Royal Free London NHS Foundation Trust	7	191	84%	<5	-	105	43%	77	79%	170	70%	190	82%
Royal Hampshire County Hospital (N=148)	Hampshire Hospitals NHS Foundation Trust	6	57	39%	5	21%	50	34%	38	73%	98	66%	118	83%
Royal Lancaster Infirmary (N=368)	University Hospitals Of Morecambe Bay NHS Foundation Trust	3	227	82%	17	25%	237	64%	110	89%	273	74%	291	83%
Royal Liverpool University Hospital (N=711)	Royal Liverpool and Broadgreen University Hospitals NHS Trust	5	361	65%	<5	-	401	56%	286	89%	509	72%	608	91%
Royal London Hospital (N=89)	Barts Health NHS Trust	5	78	91%	6	50%	68	76%	24	86%	77	87%	74	85%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Royal Oldham Hospital (N=564)	Pennine Acute NHS Hospitals Trust	2	340	62%	5	12%	213	38%	59	39%	184	33%	189	35%
Royal Preston Hospital (N=429)	Lancashire Teaching Hospitals NHS Foundation Trust	4	180	88%	7	15%	166	39%	133	79%	216	50%	259	63%
Royal Stoke University Hospital (N=561)	University Hospitals of North Midlands NHS Trust	3	418	81%	<5	-	351	63%	164	89%	510	91%	483	96%
Royal Surrey County Hospital (N=256)	Royal Surrey County Hospital NHS Foundation Trust	3	112	66%	<5	-	93	36%	72	77%	170	66%	197	80%
Royal Sussex County Hospital (N=190)	Brighton and Sussex University Hospitals NHS Trust	4	163	95%	7	26%	30	16%	65	96%	161	85%	189	99%
Royal United Hospital Bath (N=350)	Royal United Hospitals Bath NHS Foundation Trust	4	235	71%	17	33%	92	26%	102	82%	262	75%	301	89%
Royal Victoria Infirmary (N=50)	The Newcastle upon Tyne Hospitals NHS Foundation Trust	5	19	54%	<5	-	35	70%	<5	-	28	56%	26	53%
Russells Hall Hospital (N=338)	The Dudley Group NHS Foundation Trust	2	119	62%	6	38%	296	88%	55	63%	272	80%	254	76%
Salford Royal Hospital (N=529)	Salford Royal NHS Foundation Trust	2	488	96%	<5	-	232	44%	169	71%	403	76%	412	81%
Salisbury District Hospital (N=168)	Salisbury NHS Foundation Trust	6	133	85%	<5	-	122	73%	26	70%	84	50%	151	95%
Sandwell District General Hospital (N=560)	Sandwell and West Birmingham Hospitals NHS Trust	4	175	42%	9	20%	237	42%	88	51%	382	68%	489	91%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Scarborough General Hospital (N=332)	York Teaching Hospital NHS Foundation Trust	5	218	75%	<5	-	231	70%	70	67%	206	62%	332	100%
Scunthorpe General Hospital (N=607)	Northern Lincolnshire and Goole NHS Foundation Trust	5	433	96%	10	18%	378	62%	168	82%	301	50%	491	86%
Solihull General Hospital (N=256)	University Hospitals Birmingham NHS Foundation Trust	4	72	40%	<5	-	119	46%	61	100%	187	73%	189	78%
South Tyneside District Hospital (N=453)	South Tyneside NHS Foundation Trust	3	252	76%	<5	-	153	34%	76	57%	337	74%	263	63%
Southampton General Hospital (N=230)	University Hospital Southampton NHS Foundation Trust	4	71	41%	<5	-	111	48%	43	56%	137	60%	136	66%
Southend Hospital (N=630)	Southend University Hospital NHS Foundation Trust	5	378	75%	16	19%	503	80%	108	68%	345	55%	452	76%
Southmead Hospital (N=862)	North Bristol NHS Trust	4	602	78%	8	12%	532	62%	161	71%	674	78%	750	92%
Southport and Formby District General (N=402)	Southport and Ormskirk Hospital NHS Trust	4	271	86%	19	36%	161	40%	67	68%	122	30%	35	9%
St George's Hospital (N=351)	St George's University Hospitals NHS Foundation Trust	3	316	94%	7	23%	88	25%	81	90%	209	60%	274	82%
St Helier Hospital (N=347)	Epsom and St Helier University Hospitals NHS Trust	4	123	40%	8	21%	270	78%	79	87%	272	78%	313	98%
St Mary's Hospital, Newport (N=160)	Isle of Wight NHS Trust	3	103	68%	<5	-	50	31%	35	97%	76	48%	93	69%



Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
St Marys Hospital, Paddington (N=249)	Imperial College Healthcare NHS Trust	4	207	95%	20	36%	106	43%	69	91%	179	72%	218	92%
St Peter's Hospital (N=340)	Ashford and St Peter's Hospitals NHS Foundation Trust	3	265	82%	<5	-	57	17%	53	63%	194	57%	164	50%
St Richard's Hospital (N=245)	Western Sussex Hospitals NHS Foundation Trust	2	191	89%	<5	-	87	36%	47	59%	107	44%	134	56%
St Thomas' Hospital (N=551)	Guy's and St Thomas' NHS Foundation Trust	2	115	39%	17	22%	399	72%	242	92%	498	90%	504	97%
Stepping Hill Hospital (N=499)	Stockport NHS Foundation Trust	4	37	12%	22	22%	190	38%	149	70%	200	40%	277	59%
Stoke Mandeville Hospital (N=492)	Buckinghamshire Healthcare NHS Trust	4	379	93%	16	20%	175	36%	96	76%	252	51%	386	88%
Sunderland Royal Hospital (N=549)	City Hospitals Sunderland NHS Foundation Trust	3	401	88%	6	10%	246	45%	67	41%	278	51%	124	24%
Tameside General Hospital (N=842)	Tameside and Glossop Integrated Care NHS Foundation Trust	3	565	72%	19	26%	85	10%	60	27%	288	34%	138	17%
The Great Western Hospital (N=617)	Great Western Hospital Foundation NHS Trust	3	129	58%	18	32%	218	35%	114	67%	371	60%	471	79%
The Ipswich Hospital (N=465)	East Suffolk and North Essex Foundation Trust	3	341	99%	14	31%	284	61%	92	62%	205	44%	253	56%
Torbay Hospital (N=781)	Torbay and South Devon NHS Foundation Trust	2	514	84%	10	20%	375	48%	76	46%	341	44%	7	1%
Tunbridge Wells Hospital (N=210)	Maidstone and Tunbridge Wells NHS Trust	5	186	89%	<5	-	83	40%	42	66%	123	59%	179	91%
University College Hospital (N=418)	University College London Hospitals NHS Foundation Trust	4	223	72%	6	12%	345	83%	127	85%	286	68%	362	90%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
National medians		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
University Hospital Aintree (N=1,080)	Aintree University Hospital NHS Foundation Trust	3	589	99%	32	23%	563	52%	185	43%	733	68%	837	81%
University Hospital Coventry (N=711)	University Hospitals Coventry and Warwickshire NHS Trust	4	447	75%	18	27%	510	72%	88	39%	426	60%	282	41%
University Hospital Lewisham (N=146)	Lewisham and Greenwich NHS Trust	5	75	69%	<5	-	15	10%	43	96%	77	53%	130	92%
University Hospital of North Durham (N=1,231)	County Durham and Darlington NHS Foundation Trust	4	907	92%	22	19%	520	42%	268	81%	959	78%	1053	91%
University Hospital of North Tees (N=1,113)	North Tees and Hartlepool NHS Foundation Trust	2	647	83%	45	29%	257	23%	412	92%	655	59%	681	65%
Victoria Hospital (N=263)	Blackpool Teaching Hospitals NHS Foundation Trust	4	164	62%	<5	-	49	19%	44	47%	67	25%	58	24%
Warrington District General Hospital (N=329)	Warrington and Halton Hospitals NHS Foundation Trust	5	161	94%	<5	-	155	47%	121	99%	255	78%	310	100%
Warwick Hospital (N=318)	South Warwickshire NHS Foundation Trust	5	196	64%	6	18%	119	37%	30	41%	202	64%	247	82%
Watford General Hospital (N=205)	West Hertfordshire NHS Hospitals Trust	4	45	38%	<5	-	21	10%	16	27%	114	56%	188	96%
West Middlesex University Hospital (N=73)	Chelsea and Westminster Hospital NHS Foundation Trust	3	36	77%	<5	-	33	45%	5	23%	23	32%	15	21%
Weston General Hospital (N=249)	Weston Area Health NHS Trust	3	191	92%	<5	-	53	21%	34	47%	114	46%	131	56%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Wexham Park Hospital (N=416)	Frimley Health NHS Foundation Trust	4	288	79%	8	19%	9	2%	90	63%	219	53%	271	68%
Whiston Hospital (N=392)	St Helens and Knowsley Teaching Hospitals NHS Trust	3	179	67%	5	17%	189	48%	39	23%	214	55%	200	59%
Whittington Hospital (N=174)	Whittington Health NHS Trust	7	173	99%	<5	-	143	82%	52	72%	92	53%	123	75%
William Harvey Hospital (N=473)	East Kent Hospitals University NHS Foundation Trust	3.5	275	74%	10	13%	128	27%	100	70%	308	65%	337	74%
Worcestershire Royal Hospital (N=418)	Worcestershire Acute Hospitals NHS Trust	4	299	72%	7	18%	132	32%	14	15%	233	56%	131	34%
Worthing Hospital (N=279)	Western Sussex Hospitals NHS Foundation Trust	4	124	73%	<5	-	80	29%	96	91%	175	63%	209	80%
Wythenshawe Hospital (N=273)	Manchester University NHS Foundation Trust	3	197	72%	<5	-	89	33%	45	51%	248	91%	210	90%
Yeovil District Hospital (N=326)	Yeovil District Hospital NHS Foundation Trust	5	320	100%	8	44%	262	80%	65	100%	252	77%	298	96%
York District Hospital (N=545)	York Teaching Hospital NHS Foundation Trust	4	316	63%	<5	-	419	77%	166	91%	382	70%	493	95%
<b>Wales</b>														
Bronglais General Hospital (N=106)	Hywel Dda University Health Board	4	33	49%	6	32%	30	28%	25	74%	84	79%	94	93%
Glan Clwyd Hospital (N=36)	Betsi Cadwaladr University Local Health Board	3	17	63%	<5	-	17	47%	6	67%	15	42%	<5	-
Glangwili General Hospital (N=47)	Hywel Dda University Local Health Board	6	27	84%	<5	-	17	36%	10	91%	19	40%	43	93%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
<b>National medians</b>		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Llandough Hospital (N=333)	Cardiff and Vale University Local Health Board	2	90	68%	9	18%	112	34%	59	42%	167	50%	<5	-
Morrison Hospital (N=276)	Abertawe Bro Morgannwg University Local Health Board	5	188	68%	11	23%	33	12%	51	40%	76	28%	<5	-
Nevill Hall Hospital (N=7)	Aneurin Bevan Local Health Board	3	6	86%	<5	-	<5	-	<5	-	5	71%	<5	-
Prince Charles Hospital (N=477)	Cwm Taf University Local Health Board	4	77	17%	14	23%	146	31%	44	25%	128	27%	<5	-
Prince Philip Hospital (N=128)	Hywel Dda University Local Health Board	3	40	53%	<5	-	16	12%	17	42%	61	48%	10	8%
Princess Of Wales Hospital (N=248)	Abertawe Bro Morgannwg University Local Health Board	4	166	67%	5	9%	26	10%	47	50%	85	34%	<5	-
Royal Glamorgan (N=416)	Cwm Taf University Local Health Board	4	228	66%	11	20%	137	33%	91	54%	209	50%	<5	-
Royal Gwent Hospital (N=<5)	Aneurin Bevan Local Health Board	<5	<5	-	<5	-	<5	-	<5	-	<5	-	<5	-
Singleton Hospital (N=283)	Abertawe Bro Morgannwg University Local Health Board	3	158	56%	<5	-	61	22%	26	22%	147	52%	<5	-
University Hospital of Wales (N=171)	Cardiff and Vale University Local Health Board	5	75	68%	10	23%	39	23%	33	66%	103	60%	<5	-
Withybush General Hospital (N=42)	Hywel Dda University Local Health Board	5	16	70%	<5	-	22	52%	5	71%	16	38%	19	51%

Hospital/unit name (N)	Trust / health board name	Length of stay (days)	Oxygen prescribed to those patients that required it		Patient requiring acute treatment with NIV received it within 2 hours of arrival		Spirometry result available		Current smoker prescribed smoking cessation pharmacotherapy		Patient received respiratory review within 24 hours of admission		Discharge bundle completed for the admission	
			N	%	N	%	N	%	N	%	N	%	N	%
National medians		4	42,736	72%	1,618	19%	30,193	37%	6,194	67%	47,761	62%	50,184	78%
Ysbyty Gwynedd Hospital (N=52)	Betsi Cadwaladr University Local Health Board	4	19	37%	<5	-	27	52%	24	100%	15	29%	52	100%

## 10.2 Non-participating hospitals in England and Wales

The hospitals included in this list are those that either do not participate in the audit or those that have registered, but did not enter any data for the period audited.

Hospital name	Trust name
Derriford Hospital	University Hospitals Plymouth NHS Trust
Huddersfield Royal Infirmary	Calderdale and Huddersfield NHS Foundation Trust
Leeds General Infirmary	The Leeds Teaching Hospitals NHS Trust
Royal Papworth Hospital	Royal Papworth Hospital NHS Foundation Trust
Princess Royal Hospital, Haywards Heath	Brighton and Sussex University Hospitals NHS Trust
Princess Royal Hospital, Telford	The Shrewsbury and Telford Hospital NHS Trust
Royal Shrewsbury Hospital	The Shrewsbury and Telford Hospital NHS Trust
St James's University Hospital	The Leeds Teaching Hospitals NHS Trust
Trafford General Hospital	Manchester University NHS Foundation Trust
West Cumberland Hospital	North Cumbria University Hospitals NHS Trust
West Suffolk Hospital	West Suffolk NHS Foundation Trust
Whipps Cross Hospital	Barts Health NHS Trust
Wrexham Maelor Hospital	Betsi Cadwaladr University Local Health Board
Ysbyty Ystrad Fawr	Aneurin Bevan Local Health Board

## Appendix A: Methodology

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### Methodology of the audit creation and setup

NACAP's COPD continuous clinical audit is built upon the learning from the 2014 snapshot clinical audit.<sup>§§§§§§</sup> The structure of the dataset is similar to that used in 2014, however, it has been considerably streamlined to account for the change in methodology from snapshot (in 2014) to continuous audit which commenced in February 2017. This is the second annual report since the start of continuous data collection and presents the results of the cohort of patients discharged between 14 September 2017 and 30 September 2018. This can be found at: [www.rcplondon.ac.uk/working-together](http://www.rcplondon.ac.uk/working-together).

All hospitals in England and Wales that admit patients with acute exacerbations of COPD (AECOPD) (n=193) were eligible to participate in the audit. A total of 179 hospitals (93%) participated in this period of the audit. A full list of participating hospitals, including those hospitals that did not enter any data for the audit period are listed in [section 10](#).

#### **Information governance and data storage, security and transfer**

This audit operates under Section 251 approval from the Confidentiality Advisory Group (CAG) of the Health Research Authority (HRA). The reference number is CAG-8-06(b)/2013. A record of the approval can be found at: [www.hra.nhs.uk/about-the-hra/our-committees/section-251/cag-advice-and-approval-decisions](http://www.hra.nhs.uk/about-the-hra/our-committees/section-251/cag-advice-and-approval-decisions) (April 2013 onwards; non research).

To find out more about the audit's information governance (IG), legal basis, data storage, security and transfer arrangements please review the COPD fair processing document, IG frequently asked questions (FAQs) and the audit's data flow diagram, all of which can be found on the audit resources page: [www.rcplondon.ac.uk/nacap-copd-resources](http://www.rcplondon.ac.uk/nacap-copd-resources). In addition, a patient leaflet and poster are available to download from the same page

#### **Recruitment**

The recruitment process for the audit started in 2016, prior to the launch of the continuous audit. For further details of the recruitment methodology employed, please refer to Appendix C of the data analysis and methodology component of the 2017 clinical audit report, which can be found here: [www.rcplondon.ac.uk/working-together](http://www.rcplondon.ac.uk/working-together).

#### **Audit question development and pilot**

The audit dataset was based on the snapshot 2014 dataset. It was developed in 2016 iteratively by the audit programme team and clinical lead, in consultation with the workstream group. For further information on the piloting of the audit please refer to Appendix C of the data analysis and methodology of the 2017 clinical audit report found here: [www.rcplondon.ac.uk/working-together](http://www.rcplondon.ac.uk/working-together).

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<sup>§§§§§§</sup> Stone RA, Holzhauser-Barrie J, Lowe D *et al.* COPD: Who cares matters. National Chronic Obstructive Pulmonary Disease (COPD) Audit Programme: Clinical audit of COPD exacerbations admitted to acute units in England and Wales 2014. National clinical audit report. London: RCP, February 2015. [www.rcplondon.ac.uk/projects/outputs/copd-who-cares-matters-clinical-audit-2014](http://www.rcplondon.ac.uk/projects/outputs/copd-who-cares-matters-clinical-audit-2014) [Accessed 16 December 2018]

### ***Data entry***

Hospitals are required to enter data via the audit programme's bespoke web tool, created by Crown Informatics Ltd (available at [www.nacap.org.uk](http://www.nacap.org.uk)).

Guidance documentation to support participation in the audit such as the dataset with help notes, data collection sheets, audit technical guidance and FAQs are available to download from both the web tool ([www.nacap.org.uk](http://www.nacap.org.uk)) and the COPD audit resources webpage on the RCP website ([www.rcplondon.ac.uk/nacap-copd-resources](http://www.rcplondon.ac.uk/nacap-copd-resources)).

Data entry to the audit is regularly reviewed by the NACAP team. Where few records are entered (eg less than 50–100 a year, depending on the size of the hospital) or where there is a notable change in participation rates (eg a hospital that has entered 50% less records in the current 6 months than in the 6 months prior), the NACAP team communicate directly with the hospital to understand the reasons behind the lack of participation and to provide support where possible. Regular email updates and newsletters are also sent to participants with reminders about timelines.

### ***Telephone and email support***

The audit programme team at the RCP provide a helpdesk 9am–5pm every working day, which is available via both telephone and email, so that participants could contact the team directly with any questions.

## **Analysis methodology**

### ***Deadline and data transfer***

The data entry deadline for completion of records pertaining to the audit period (patients discharged between 14 September 2017 and 30 September 2018) was **9 November 2018** at 12pm. Thereafter data were extracted by Crown Informatics, drafts were excluded and the data was anonymised as follows:

- NHS number replaced by an anonymised patient identifier
- Postcode replaced by a Lower Layer Super Output Area (LSOA)\*\*\*\*\*
- Date of birth replaced by calculated age
- Date of death replaced with a life status flag.

The anonymised file containing non-identifiable patient data was then sent via secure file transfer to the statistical team at Imperial College London (National Heart & Lung Institute) where they were analysed.

### ***Data cleaning and analysis***

Data received by Imperial College London were imported in to Stata 15 for cleaning before being analysed in R version 3.5.0. Medians and interquartile ranges were extracted using the 'describe' command from the 'psych' package. Percentages were extracted using the 'table' and 'prop.table' commands, and odds ratios were calculated using the 'glm' command with a single explanatory variable connected through a binomial logit link.

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\*\*\*\*\* A Lower Layer Super Output Area (LSOA) is a geographical area in England and Wales which is large enough to be non-identifiable to the patient.



The dataset was prepared, cleaned, and analysed as follows:

- All string categorical variables were recoded numerically and labelled with the former string value.
- All string date/time variables were converted to numerical date/time variables.
- All indicator variables (to denote presence or absence) were converted from their current format (eg an 'X' character) to a binary 0 or 1 value.
- Overseas patients were removed (n=44).
- Admissions with:
  - An arrival time after admission time were removed (n=0)
  - A discharge date before admission date were removed (n=0)
  - A respiratory specialist review before arrival were removed (n=0)
  - A respiratory specialist review after discharge were removed (n=194)
  - NIV before arrival were removed (n=154)
  - NIV after discharge were removed (n=12)
  - A discharge before arrival were removed (n=0).
- Two-hour time categories (ie 12 in total, starting from 12am) were generated for time of arrival and time of first review by a member of the respiratory team.
- Time from arrival to admission was generated by subtracting arrival time from admission time, and admissions with admission wait times greater than or equal to 24 hours were removed as this was considered unrealistic (n=691).
- Time from admission to specialist review was generated by subtracting admission time from review time and admissions with review wait times less than or equal to -24 hours (24 hours prior) were removed as this was considered unrealistic (n=0 [removed in previous stage]).
- Time from arrival to NIV was calculated by subtracting arrival time from time of NIV administration.
- FEV1/FVC ratio was cleaned such that values under 0.2 or over 1.0 were replaced with missing values (n=468) and a variable to denote airflow obstruction for anyone with a ratio under 0.7 was created.
- For patients which did not have a value for 'oxygen prescribed' but had a target range, 'oxygen prescribed' was changed from missing to 'Yes' (n=12).
- Free text relating to the reason for the discharge bundle not being given was coded, with 307 patients removed if the reason that they did not receive a discharge bundle was that they did not have COPD or that COPD was not officially diagnosed.

### Sub-analysis

- Variables required for analysis and generating odds ratios were created:
  - Specialist review in 24 hours in those who had a specialist review (yes (y) / no (n))
  - Oxygen prescription (y/n)
  - NIV in 2 hours (y/n)
  - Time to NIV administration (<2 hours, 2–24 hours)
  - Smoking cessation pharmacotherapy offered (y/n)
  - Discharge bundle completed (y/n)
  - Length of stay (equal to or below median/above median).

## Appendix B: NICE Quality standard [QS10] – Chronic obstructive pulmonary disease in adults

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Please note, in 2016 this quality standard was updated and statements prioritised in 2011 were either updated [2011, updated 2016] or replaced [new 2016]. To see the full quality standard please use the following link: [www.nice.org.uk/guidance/qs10](http://www.nice.org.uk/guidance/qs10).

No.	Quality statement
1	People aged over 35 years who present with a risk factor and one or more symptoms of chronic obstructive pulmonary disease (COPD) have post-bronchodilator spirometry. [2011, updated 2016]
2	People with COPD who are prescribed an inhaler have their inhaler technique assessed when starting treatment and then regularly during treatment. [2011, updated 2016]
3	People with stable COPD and a persistent resting stable oxygen saturation level of 92% or less have their arterial blood gases measured to assess whether they need long-term oxygen therapy. [2011, updated 2016]
4	People with stable COPD and exercise limitation due to breathlessness are referred to a pulmonary rehabilitation programme. [2011, updated 2016]
5	People admitted to hospital for an acute exacerbation of COPD start a pulmonary rehabilitation programme within 4 weeks of discharge. [2011, updated 2016]
6	People receiving emergency oxygen for an acute exacerbation of COPD have oxygen saturation levels maintained between 88% and 92%. [new 2016]
7	People with an acute exacerbation of COPD and persistent acidotic hypercapnic ventilatory failure that is not improving after 1 hour of optimal medical therapy have non-invasive ventilation. [2011, updated 2016]
8	(Placeholder <sup>+++++</sup> ) Hospital discharge care bundle. [new 2016]

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+++++ A placeholder statement is an area of care that has been prioritised by the Quality Standards Advisory Committee but for which no source guidance is currently available. A placeholder statement indicates the need for evidence-based guidance to be developed in this area.

**Statements from the 2011 quality standard for COPD that may still be useful at a local level, but are no longer considered national priorities for improvement:**

- People with COPD have a current individualised comprehensive management plan, which includes high-quality information and educational material about the condition and its management, relevant to the stage of disease.
- People with COPD have a comprehensive clinical and psychosocial assessment, at least once a year or more frequently if indicated, which includes degree of breathlessness, frequency of exacerbations, validated measures of health status and prognosis, presence of hypoxaemia and comorbidities.
- People with COPD who smoke are regularly encouraged to stop and are offered the full range of evidence-based smoking cessation support.
- People who have had an exacerbation of COPD are provided with individualised written advice on early recognition of future exacerbations, management strategies (including appropriate provision of antibiotics and corticosteroids for self-treatment at home) and a named contact.
- People with COPD receiving long-term oxygen therapy are reviewed in accordance with NICE guidance, at least annually, by a specialist oxygen service as part of the integrated clinical management of their COPD.
- People admitted to hospital with an exacerbation of COPD are cared for by a respiratory team, and have access to a specialist early supported-discharge scheme with appropriate community support.
- People admitted to hospital with an exacerbation of COPD are reviewed within 2 weeks of discharge.
- People with advanced COPD, and their carers, are identified and offered palliative care that addresses physical, social and emotional needs.

## Appendix C: NICE guideline [NG115] – Chronic obstructive pulmonary disease in over 16s: diagnosis and management

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NICE clinical guideline [CG101], June 2010, was updated and replaced by NICE guideline [NG115] in December 2018. Below is a summary of the NICE guideline [NG115] sections that are referred to in this report. To see the full guideline please use the following link:

[www.nice.org.uk/guidance/NG115](http://www.nice.org.uk/guidance/NG115).

Recommendations marked [2004] or [2010] last had an evidence review in 2004 or 2010.

1.1	Diagnosing COPD
<b>Spirometry</b>	
1.1.4	Perform spirometry: <ul style="list-style-type: none"> <li>• At diagnosis</li> <li>• To reconsider the diagnosis, for people who show an exceptionally good response to treatment</li> <li>• To monitor disease progression. [2004, amended 2018]</li> </ul>
1.1.5	Measure post-bronchodilator spirometry to confirm the diagnosis of COPD. [2010]
1.1.6	Think about alternative diagnoses or investigations for older people who have an FEV1/FVC ratio below 0.7 but do not have typical symptoms of COPD. [2010]
1.1.7	Think about a diagnosis of COPD in younger people who have symptoms of COPD, even when their FEV1/FVC ratio is above 0.7. [2010]
1.1.8	All healthcare professionals who care for people with COPD should have access to spirometry and be competent in interpreting the results. [2004]
1.1.9	Spirometry can be performed by any healthcare worker who has had appropriate training and has up-to-date skills. [2004]
1.1.10	Spirometry services should be supported by quality control processes. [2004]
1.1.11	It is recommended that <a href="#">GLI 2012 reference values</a> are used, but it is recognised that these values are not applicable for all ethnic groups. [2004, amended 2018]
<b>Referral for specialist advice</b>	
1.1.30	When clinically indicated, refer people for specialist advice. Referral may be appropriate at all stages of the disease and not solely in the most severely disabled people. [2004]
1.1.31	People who are referred do not always have to be seen by a respiratory physician. In some cases they may be seen by members of the COPD team who have appropriate training and expertise. [2004]

<b>1.2</b>	<b>Managing stable COPD</b>
1.2.1	For guidance on the management of multimorbidity, see the NICE guideline on <a href="#">multimorbidity</a> . [2018]
<b>Smoking cessation</b>	
1.2.2	Document an up-to-date smoking history, including pack years smoked (number of cigarettes smoked per day, divided by 20, multiplied by the number of years smoked) for everyone with COPD. [2004]
1.2.3	At every opportunity, advise and encourage every person with COPD who is still smoking (regardless of their age) to stop, and offer them help to do so. [2004]
1.2.4	Unless contraindicated, offer nicotine replacement therapy, varenicline or bupropion as appropriate to people who want to stop smoking, combined with an appropriate support programme to optimise smoking quit rates for people with COPD. [2010]
1.2.5	For more guidance on helping people to quit smoking, see the NICE guideline on <a href="#">stop smoking interventions and services</a> . [2010]
1.2.6	For more guidance on varenicline, see the NICE technology appraisal guidance on <a href="#">varenicline for smoking cessation</a> . [2010]
<b>Non-invasive ventilation</b>	
1.2.70	Refer people who are adequately treated but have chronic hypercapnic respiratory failure and have needed assisted ventilation (whether invasive or non-invasive) during an exacerbation, or who are hypercapnic or acidotic on long-term oxygen therapy, to a specialist centre for consideration of long-term non-invasive ventilation. [2004]

<b>1.3</b>	<b>Management of exacerbations of COPD</b>
<b>Oxygen therapy during exacerbations of COPD</b>	
1.3.27	Measure oxygen saturation in people with an exacerbation if there are no facilities to measure arterial blood gases. [2004]
1.3.28	If necessary, prescribe oxygen to keep the oxygen saturation of arterial blood (SaO <sub>2</sub> ) within the individualised target range. [2010]
1.3.29	Pulse oximeters should be available to all healthcare professionals involved in the care of people with exacerbations of COPD, and they should be trained in their use. Clinicians should be aware that pulse oximetry gives no information about the PaCO <sub>2</sub> or pH. [2004]
1.3.30	Measure arterial blood gases and note the inspired oxygen concentration in all people who arrive at hospital with an exacerbation of COPD. Repeat arterial blood gas measurements regularly, according to the response to treatment. [2004]
<b>Non-invasive ventilation (NIV) and COPD exacerbations</b>	
1.3.31	Use NIV as the treatment of choice for persistent hypercapnic ventilatory failure during exacerbations despite optimal medical therapy. [2004]
1.3.32	It is recommended that NIV should be delivered in a dedicated setting, with staff who have been trained in its application, who are experienced in its use and who are aware of its limitations. [2004]
1.3.33	When people are started on NIV, there should be a clear plan covering what to do in the event of deterioration, and ceilings of therapy should be agreed. [2004]
<b>Discharge planning</b>	

1.3.42	Measure spirometry in all people before discharge. [2004]
1.3.43	Re-establish people on their optimal maintenance bronchodilator therapy before discharge. [2004]
1.3.44	People who have had an episode of respiratory failure should have satisfactory oximetry or arterial blood gas results before discharge. [2004]
1.3.45	Assess all aspects of the routine care that people receive (including appropriateness and risk of side effects) before discharge. [2004]
1.3.46	Give people (or home carers) appropriate information to enable them to fully understand the correct use of medications, including oxygen, before discharge. [2004]
1.3.47	Make arrangements for follow-up and home care (such as visiting nurse, oxygen delivery or referral for other support) before discharge. [2004]
1.3.48	The person, their family and their physician should be confident that they can manage successfully before they are discharged. A formal activities of daily living assessment may be helpful when there is still doubt. [2004]

## Appendix D: British Thoracic Society (BTS) Quality Standards for acute NIV in adults

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Below is only a summary of the BTS NIV Quality Standards, published April 2018, that are referred to within this report. To see the full standards and rationales please use the following link: [www.brit-thoracic.org.uk/standards-of-care/quality-standards/bts-niv-quality-standards/](http://www.brit-thoracic.org.uk/standards-of-care/quality-standards/bts-niv-quality-standards/).

No.	Quality statement
1	Acute non-invasive ventilation (NIV) should be offered to all patients who meet evidence-based criteria. Hospitals must ensure there is adequate capacity to provide NIV to all eligible patients.
2	All staff who prescribe, initiate or make changes to acute NIV treatment should have evidence of training and maintenance of competencies appropriate for their role.
3	Acute NIV should only be carried out in specified clinical areas designated for the delivery of acute NIV.
4	Patients who meet evidence-based criteria for acute NIV should start NIV within 60 min of the blood gas result associated with the clinical decision to provide NIV and within 120 min of hospital arrival for patients who present acutely.
5	All patients should have a documented escalation plan before starting treatment with acute NIV. Clinical progress should be reviewed by a healthcare professional with appropriate training and competence within 4 hours of starting NIV and by a consultant with training and competence in acute NIV within 14 hours of starting acute NIV.
6	All patients treated with acute NIV should have blood gas analysis performed within 2 hours of starting acute NIV. Failure of these blood gas measurements to improve should trigger specialist healthcare professional review within 30 min.

## **National Asthma and COPD Audit Programme (NACAP)**

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

Tel: +44 (020) 3075 1526

Email: [copd@rcplondon.ac.uk](mailto:copd@rcplondon.ac.uk)

[www.rcplondon.ac.uk/nacap](http://www.rcplondon.ac.uk/nacap)

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