Royal College of Physicians | NACAP

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

## COPD clinical audit 2019/20

(people with COPD exacerbations discharged from acute hospitals in England, Scotland and Wales between October 2019 and February 2020)

## Data analysis and methodology report

Published June 2021

In association with:

ARNS Association of Respiratory Nurse Specialists

asthma UK | British Lung Foundation

THE ASTHMA UK AND BRITISH LUNG FOUNDATION PARTNERSHIP

British Thoracic Society

Imperial College London

PCRS

RCGP Royal College of General Practitioners

RCPCH Royal College of Paediatrics and Child Health

Commissioned by:

HQIP Healthcare Quality Improvement Partnership

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

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

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

**COPD: 2019/20 clinical audit data and methodology report**

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

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# Contents



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# Report at a glance

## Spirometry

A spirometry result was recorded for

**48.1%**

of patients admitted.

**QI priority**

Ensure spirometry results are available for all patients admitted to hospital with an acute exacerbation of COPD.

## Non-invasive ventilation (NIV)

Only

**24.8%**

of patients who received NIV did so within 120 minutes of arrival at hospital.

**QI priority**

Ensure all patients requiring NIV receive it within 120 minutes of arrival at hospital.

## Respiratory review

**87.5%**

of patients admitted were reviewed by a member of the respiratory team.

**66.7%**

of admitted patients were reviewed within 24 hours of admission.

## Smoking cessation

**35.5%**

of patients with smoking status recorded on admission were current smokers.

**53.1%**

of current smokers were referred for behavioural change intervention and/or prescribed a stop smoking drug.

**QI priority**

Ensure that all current smokers are identified and, if they accept, referred for behavioural change intervention and/or prescribed a stop smoking drug.

## Discharge bundles

**75.5%**

of patients admitted received a discharge bundle.

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# How to use this report

## 1. Scope and data collection

This report presents the results from an analysis of data derived from the chronic obstructive pulmonary disease (COPD) clinical audit component of the National Asthma and COPD Audit Programme (NACAP). The COPD audit is continuous and captures the process and clinical outcomes of treatment in patients admitted to hospital in England, Scotland and Wales with COPD exacerbations. The audit was launched in England and Wales on 1 February 2017 and in Scotland on 1 November 2018.

From 1 March 2021, the Scottish government has ceased commissioning NACAP. As a result, data collection from Scottish hospitals has now ceased and this will therefore be the last COPD clinical audit report to include Scotland.

This report, which is the fourth report post-launch of continuous data collection, presents data describing the cohort of patients discharged between 1 October 2019 and 29 February 2020 – the period just prior to the COVID-19 pandemic. HQIP and NACAP decided not to report on any data impacted by COVID-19, so this report does not include any data recorded after 29 February 2020. Contributing to the overarching national quality improvement (QI) objectives of the NACAP, it serves to empower stakeholders to use audit data to facilitate improvements in the quality of care. More on the NACAP QI objectives can be found via our website: **www.rcp.ac.uk/nacap-quality-improvement**.

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

### Reporting of COVID-19 impacted data and quality improvement

In spring 2020, NHS services were instructed to prioritise activity relating to the COVID-19 pandemic and to enter audit data only if resources allowed. This meant that participation in the audit naturally decreased with services becoming more focused on patient-facing clinical care. However, the NACAP webtool remained open and is continuously monitored, as there were concerns from patients and clinicians that care for those with long term conditions might particularly suffer while the focus moved to COVID-19 care. Following this, NACAP and HQIP made the decision not to report on COVID-19 impacted data. We agreed that publication of benchmarked data and recommendations in a national report format would be paused until data submission returned to approximately 50% of pre-COVID participation rates. This ensures data quality is adequate to support these types of national analysis and conclusions. **Therefore, this report presents data for a smaller cohort of patients discharged between 1 October 2019 and 29 February 2020.** Submission levels for the remaining period of the planned reporting cohort (March – Sept 2020) did not meet the above threshold and so this report will not present any comparative data (from 2018/19), performance against QI priorities or benchmarked key indicators, because this smaller cohort is not deemed comparable with previous annual cohorts. No additional reporting outputs will be produced. If you would like to obtain information on hospital performance against key performance indicators for this period, please see the October 2019 – March 2020 regional report found on the NACAP webtool: **www.nacap.org.uk**.

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Quality improvement priorities for the COPD audit remain the same as in previous years. These, as well as guidance and tips on achieving them can be found below on page 9 and in previous COPD clinical audit reports via our website: **www.rcp.ac.uk/nacap-copd-clinical-audit-201819**.

## 2. Report structure

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

## 3. Report coverage

The data presented in this report are based on patients discharged between 1 October 2019 and 29 February 2020 from hospitals in England, Scotland and Wales which participate in the continuous audit and enter data onto the NACAP web tool. Note that Scotland results are based on records submitted by only two Scottish hospitals and therefore should be interpreted with caution.

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

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

## 4. Audience and links to relevant guidelines and standards

The report is intended to be read by healthcare professionals; NHS managers, chief executives and board members; as well as service commissioners, policymakers and voluntary organisations. A separate report has been produced for patients and the public and is available at **www.rcp.ac.uk/nacap-copd-clinical-audit-201819**.

References to the appropriate National Institute for Health and Care Excellence (NICE) quality statements,[1,2] (**Appendix B**), clinical guidelines[3] (**Appendix C**) and British Thoracic Society (BTS) non-invasive ventilation (NIV) quality standards[4] (**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.rcp.ac.uk/nacap-copd-resources**.

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# Foreword by John Hurst, COPD clinical lead

Welcome to this NACAP data analysis and methodology report, providing further insights from the 2019–20 COPD clinical audit dataset and therefore a more detailed picture of the state of hospitalised COPD exacerbation care in the UK. The report is intended to enable you to reflect on your own data in comparison to the national picture, and for local services to improve care and make the case for change in services.

The report reiterates our current recommendations and quality improvement priorities, and the headline figures will be familiar to you: COPD exacerbation admissions are associated with socio-economic deprivation, the median length of stay remains around 4 days and the inpatient mortality is around 4% (with variation across the devolved nations). There remains unexplained variation in care, including fundamental items such as access to confirmatory spirometry results and smoking cessation support, and time-sensitive processes such as the application of non-invasive ventilation.

You may be less familiar with analyses looking at the time and day of presentation to hospital. The busiest times are later in the afternoon and in the early evening, especially on Mondays. This should force us to rethink the resources we deploy to assess people with COPD as they first present to hospital. We also include data supporting the concept that specialist review is indeed associated with better process outcomes: respiratory team review within 24 hours was associated with improvements in smoking cessation support, prescription of oxygen and use of the discharge bundle. Our patients deserve specialist review, whenever and wherever they are admitted. There is notable variation in which components of the discharge bundle are routine across units.

Ultimately these new analyses and NACAP itself are a resource to support local quality improvement initiatives for hospitalised patients with exacerbations of COPD. It is imperative for us all to optimise our care in relation to quality standards and national benchmarking, and to learn from each other how best to improve care for people living with COPD. Our patients deserve nothing less.

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# Recommendations

## National (NACAP and national data collection organisations)

1. The National Asthma and COPD Audit Programme (NACAP) should work with NHS Digital in England and the Digital Health and Care Wales (DHCW) to maximise opportunities to support hospitals to identify patients admitted with COPD and prospectively collect audit data. This can be done by implementing information systems to identify patients early in admission, alerting teams and facilitating audit collection.

## For providers of hospital-based COPD care

We defined three key QI priorities for 2018 and these are retained to allow a continued focus on these important areas. They were chosen with a strong evidence base for their effectiveness in improving outcomes. These priorities still stand as there is further improvement required:

2. **National QI priority 1:** Ensure that all patients requiring NIV on presentation receive it within 120 minutes of arrival for those patients who present acutely. *(BTS NIV QS4)*[4]
3. **National QI priority 2:** Ensure that a spirometry result is available for all patients currently admitted to hospital with an acute exacerbation of COPD. *(NICE [NG115] 1.1.4, NICE [QS10] statement 1)*[3,1]
4. **National QI priority 3:** Ensure that all current smokers are identified, offered, and if they accept, referred to behavioural change intervention and/or prescribed a stop smoking drug. *(NICE [NG115] 1.2.3, 1.2.4)* [3]

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

5. Ensure all acute trusts/units are taking part in the audit and using audit data to support QI. There should be sight of this at board level.
6. Support working across traditional primary, community and secondary care boundaries to facilitate information sharing of spirometry results therefore enabling seamless care.
7. Invest in high-value interventions with robust evidence of benefit in COPD, notably smoking cessation services and pulmonary rehabilitation.[5*]

## For primary care providers

8. Support data sharing across primary, community and secondary care teams, notably in the provision of diagnostic spirometry.
9. Commit as a practice to ensure that all staff who have contact with patients undertake online Very Brief Advice (VBA) training in relation to smoking cessation (www.ncsct.co.uk/publication_very-brief-advice.php).

## For people living with COPD and their families and carers

10. For these recommendations please view the patient-specific report that can be downloaded here: **www.rcp.ac.uk/copd-2017-18**

* The NACAP ran a snapshot pulmonary rehabilitation clinical and organisational audit in England, Scotland and Wales in 2019. The report published in December 2020 supports the considerable health benefits in those patients completing pulmonary rehabilitation for their COPD. Access the report at: **www.rcp.ac.uk/nacap-pulmonary-rehabilitation**.

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# National COPD QI priorities

**1** **National QI priority:** Ensure that all patients requiring NIV on presentation receive it within 120 minutes of arrival for those patients who present acutely. (*BTS NIV QS4*)

**Rationale:**
Timely NIV is associated with reduced length of stay. Patients admitted with respiratory acidosis are the sickest with high mortality.[4] There remains significant variability in the speed at which hospitals administer NIV which is unexplained, suggesting that it relates to process of care.

**Tips to achieve this priority:**
- Ensure close working relationships with A&E and acute medicine teams.
- Have a dedicated respiratory contact to call for patients requiring assessment for NIV.
- Use the data from the audit to develop local QI projects to understand local challenges and test methods for mitigating against these.

**2** **National QI priority:** Ensure that a spirometry result is available for all patients admitted to hospital with an acute exacerbation of COPD. (*NICE [NG115] 1.1.4, NICE [QS10] statement 1*)

**Rationale:**
The diagnosis of COPD can **only** be made using quality-assured post-bronchodilator spirometry. (*NICE [QS10] statement 1*) In someone admitted to hospital with symptoms suggestive of a COPD exacerbation, access to diagnostic spirometry provides assurance that COPD is the correct underlying diagnosis, or excludes COPD prompting consideration of other diagnoses.

**Tips to achieve this priority:**
- Ensure close working links between hospital, community and primary care teams to facilitate sharing and access to spirometry results.
- Conduct pre-discharge spirometry thus providing the opportunity to confirm or exclude airflow obstruction in people with no available spirometry.
- Spirometry results should be accessible from routine clinical stations and computers.
- Keep a record of previous spirometry results such that the information on patients being readmitted is easy to locate.

**3** **National QI priority:** Ensure that all current smokers are identified, offered, and if they accept, are referred to behavioural change intervention and/or prescribed a stop smoking drug. (*NICE [NG115] 1.2.3, 1.2.4*)

**Rationale:**
Although the recording of smoking status has improved, the referral to behavioural change intervention and/or prescription of a stop smoking drug is poor. It is higher when the patient is seen by a respiratory specialist. Smoking cessation is the only intervention applicable to everyone with COPD that has a proven mortality benefit.

**Tips to achieve this priority:**
- Take the opportunity at the time of hospital admission, a significant event, to emphasise the importance of smoking interventions.
- Ensure stop smoking drugs are on the hospital formulary.
- Provide early follow up for smokers who have successfully started a quit attempt during the admission.

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# Section 1:
# General information

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## Navigation

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



## Key findings

### Admission and demographics

> A higher proportion of COPD admissions were female (54.6%).
> The mean age at admission was 71 years.
> The highest proportion of COPD admissions were from the most deprived quintile (quintile 1) in England (35.6%), Scotland (37.5%) and Wales (40.8%).
> 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 was 4 days.

### Inpatient mortality

> Inpatient mortality was 3.9%, however crude inpatient mortality appears higher in Wales (5.3%) and Scotland (4.7%) compared with England (3.8%).

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## Case ascertainment[†]

| | 2019/20 | | | |
|---|---|---|---|---|
| **Case ascertainment** | **England (n=165*)** | **Scotland (n=2*)** | **Wales (n=15*)** | **All (n=182)** |
| **Median (IQR)** | 56% (39–72%) | 92% (74–109%)** | 60% (24–84%) | 56% (38–73%) |

*165 out of 178 eligible hospitals in England.

2 out of 24 eligible hospitals in Scotland.

15 out of 17 eligible hospitals in Wales.

**Case ascertainment for Scotland is high due to it being calculated based on two hospitals with good participation rates.

## 1.1 Age

| | 2019/20 | | | |
|---|---|---|---|---|
| **Age at admission** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Mean (SD*) (years)** | 71.8 (10.6) | 71.5 (10.4) | 70.9 (10.7) | 71.8 (10.6) |

*SD = standard deviation

## 1.2 Gender

| | 2019/20 | | | |
|---|---|---|---|---|
| **Gender** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Male** | 16,518 (45.5%) | 123 (44.6%) | 608 (40.7%) | 17,249 (45.3%) |
| **Female** | 19,764 (54.4%) | 153 (55.4%) | 882 (59.1%) | 20,799 (54.6%) |
| **Transgender** | 5 (0.0%) | 0 (0.0%) | 2 (0.1%) | 7 (0.0%) |
| **Other** | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) | 0 (0.0%) |
| **Not recorded / preferred not to say** | 29 (0.1%) | 0 (0.0%) | 0 (0.0%) | 29 (0.1%) |

## 1.3 Socio-economic status

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

| | | Percentage of audit sample living in each quintile of the English, Scottish or Welsh Index of Multiple Deprivation (IMD) | | | | |
|---|---|---|---|---|---|---|
| **Index of Multiple Deprivation** | | **Q1 (most deprived)** | **Q2** | **Q3** | **Q4** | **Q5 (least deprived)** |
| **2019/20** | **England (2019 IMD)** | 12,771 (35.6%) | 8,205 (22.8%) | 6,416 (17.9%) | 5,030 (14.0%) | 3,505 (9.8%) |
| | **Scotland (2020 v2 SIMD)** | 103 (37.5%) | 68 (24.7%) | 72 (26.2%) | 26 (9.5%) | 6 (2.2%) |
| | **Wales (2019 WIMD)** | 602 (40.8%) | 347 (23.5%) | 235 (15.9%) | 167 (11.3%) | 125 (8.5%) |

[†] This percentage was calculated using admission figures as recorded by Hospital Episode Statistics (HES) for England, the Patient Episode Database for Wales (PEDW) and the electronic Data Research and Innovation Service (eDRIS) for Scotland. (There were a small number of participating hospitals that did not submit their COPD admissions data to HES and therefore could not be allocated).

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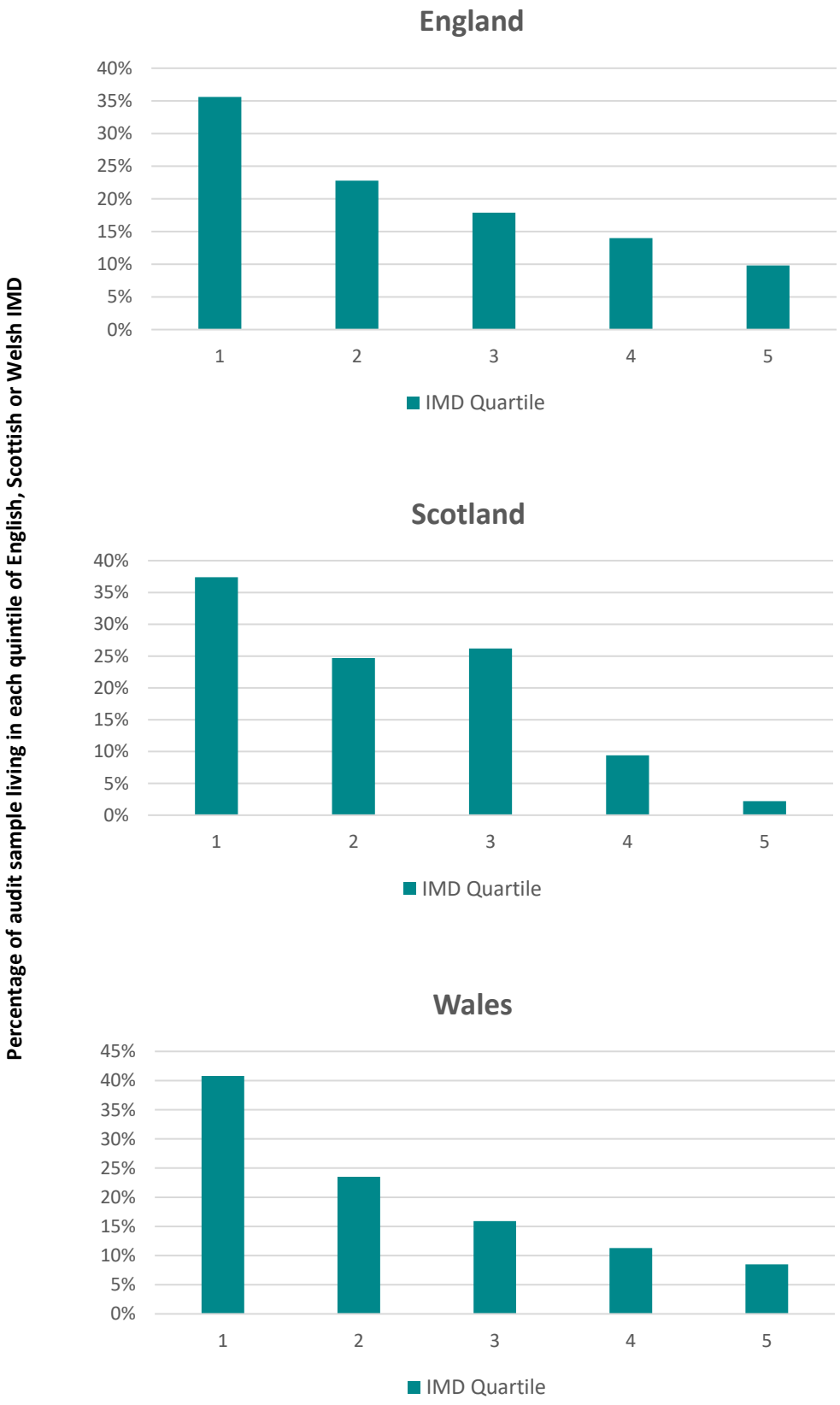
**Figure 1: Percentage of hospital inpatients with COPD exacerbations in each IMD quintile**

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# 1.4 Admission

## 1.4.1 Average number of audited admissions per hospital

| | 2019/20 | | | |
|---|---|---|---|---|
| **Number of admissions** | **England (n=165)** | **Scotland (n=2)** | **Wales (n=15)** | **All (n=182)** |
| **Median (IQR*)** | 177 (114–290) | 138 (128–148) | 100 (28–171) | 168 (105–284) |

*IQR = interquartile range

## 1.4.2 Age at admission by gender

| | 2019/20 | | | |
|---|---|---|---|---|
| **Age at admission by gender** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Mean (SD) (years)** | | | | |
| **Male** | (n=16,518) 71.8 (10.5) | (n=123) 72.7 (9.6) | (n=608) 71.1 (11.3) | (n=17,249) 71.8 (10.5) |
| **Female** | (n=19,764) 71.8 (10.7) | (n=153) 70.6 (10.9) | (n=882) 70.8 (10.3) | (n=20,799) 71.8 (10.7) |
| **Transgender** | (n=5) 58.8 (11.3) | (n=0) - | (n=2) 67.0 (1.4) | (n=7) 61.1 (10.1) |
| **Not recorded/preferred not to say** | (n=29) 71.6 (10.5) | (n=0) - | (n=0) - | (n=29) 71.6 (10.5) |

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Time from arrival to admission, in hours** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Median (IQR)** | 5.0 (2.5–8.7) | 1.8 (0.5–3.8) | 0.6 (0.1–3.2) | 4.8 (2.2–8.6) |

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## 1.4.4 Day and time of admission to hospital

| | Day patient admitted (n=38,084) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Time admitted** | **Sunday (n=4,770)** | **Monday (n=6,063)** | **Tuesday (n=5,833)** | **Wednesday (n=5,531)** | **Thursday (n=5,739)** | **Friday (n=5,571)** | **Saturday (n=4,577)** |
| **00.00–01.59** | 374 (7.8%) | 385 (6.4%) | 486 (8.3%) | 458 (8.3%) | 439 (7.7%) | 457 (8.2%) | 416 (9.1%) |
| **02.00–03.59** | 316 (6.6%) | 317 (5.2%) | 389 (6.7%) | 345 (6.2%) | 364 (6.3%) | 335 (6.0%) | 362 (7.9%) |
| **04.00–05.59** | 266 (5.6%) | 262 (4.3%) | 313 (5.4%) | 270 (4.9%) | 301 (5.2%) | 288 (5.2%) | 280 (6.1%) |
| **06.00–07.59** | 184 (3.9%) | 218 (3.6%) | 240 (4.1%) | 219 (4.0%) | 221 (3.9%) | 210 (3.8%) | 226 (4.9%) |
| **08.00–09.59** | 219 (4.6%) | 325 (5.4%) | 354 (6.1%) | 320 (5.8%) | 255 (4.4%) | 298 (5.4%) | 288 (5.0%) |
| **10.00–11.59** | 401 (8.4%) | 480 (7.9%) | 478 (8.2%) | 417 (7.5%) | 464 (8.1%) | 472 (8.5%) | 355 (7.8%) |
| **12.00–13.59** | 435 (9.1%) | 598 (9.9%) | 540 (9.3%) | 535 (9.7%) | 548 (9.6%) | 483 (8.7%) | 368 (8.0%) |
| **14.00–15.59** | 493 (10.3%) | 744 (12.3%) | 641 (11.0%) | 665 (12.0%) | 641 (11.2%) | 605 (10.9%) | 466 (10.2%) |
| **16.00–17.59** | 565 (11.8%) | 796 (13.1%) | 657 (11.3%) | 664 (12.0%) | 707 (12.3%) | 709 (12.7%) | 520 (11.4%) |
| **18.00–19.59** | 530 (11.1%) | 722 (11.9%) | 630 (10.8%) | 610 (11.0%) | 714 (12.4%) | 632 (11.3%) | 476 (10.4%) |
| **20.00–21.59** | 470 (9.9%) | 625 (10.3%) | 536 (9.2%) | 492 (8.9%) | 541 (9.4%) | 522 (9.4%) | 431 (9.4%) |
| **22.00–23.59** | 517 (10.8%) | 591 (9.8%) | 569 (9.8%) | 536 (9.7%) | 544 (9.5%) | 560 (10.0%) | 449 (9.8%) |

**Key**


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## 1.5 Length of stay

| | 2019/20 | | | |
|---|---|---|---|---|
| **Length of stay, days** | **England (n=34,919)** | **Scotland (n=263)** | **Wales (n=1,412)** | **All (n=36,595)** |
| **Median (IQR)** | 4 (2–7) | 4 (2–7) | 4 (2–8) | 4 (2–7) |

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Inpatient mortality** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 1,397 (3.9%) | 13 (4.7%) | 79 (5.3%) | 1,489 (3.9%) |

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# Section 2:
# Respiratory review

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## Navigation

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



## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2011), statement 10**: 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.[2]

## Key findings

> **87.5%** of admissions were **reviewed** by a member of the **respiratory team. 66.7%** of admissions were **reviewed within 24 hours.**

> The median time from **admission to respiratory team review** was **14.9 hours**.

## 2.1 Respiratory team review

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Respiratory team review during admission** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 32,005 (88.1%) | 219 (79.4%) | 1,107 (74.2%) | 33,331 (87.5%) |

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Respiratory team review within 24 hours of admission** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 24,687 (68.0%) | 128 (46.4%) | 583 (39.1%) | 25,398 (66.7%) |

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Time, in hours, from admission to respiratory team review** | **England (n=32,005)** | **Scotland (n=219)** | **Wales (n=1,107)** | **All (n=33,331)** |
| **Median (IQR)** | 14.7 (5.8–23.0) | 21.2 (15.2–44.5) | 22.5 (10.9–55.9) | 14.9 (6.0–23.5) |

**Of those patients who received a respiratory review*

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# Section 3:
# Oxygen

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## Navigation

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



## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2016), statement 6**: People receiving emergency oxygen for an acute exacerbation of COPD have their oxygen saturation levels maintained between 88% and 92%.[1]

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2016), statement 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.[1]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 1.3.27:** If necessary, prescribe oxygen to keep the oxygen saturation of arterial blood ($SaO_2$) within the individualised target range.[3]

## Key findings

- **63.7%** of patients admitted were **prescribed oxygen**.
- **2.6%** of patients admitted who were prescribed oxygen **did not have a target range stipulated**.

## 3.1 Was oxygen prescribed for this patient?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Oxygen prescribed** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 23,098 (63.6%) | 155 (56.2%) | 995 (66.7%) | 24,248 (63.7%) |

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### 3.1.1 If oxygen was prescribed, was it to a stipulated target range and what was the range?

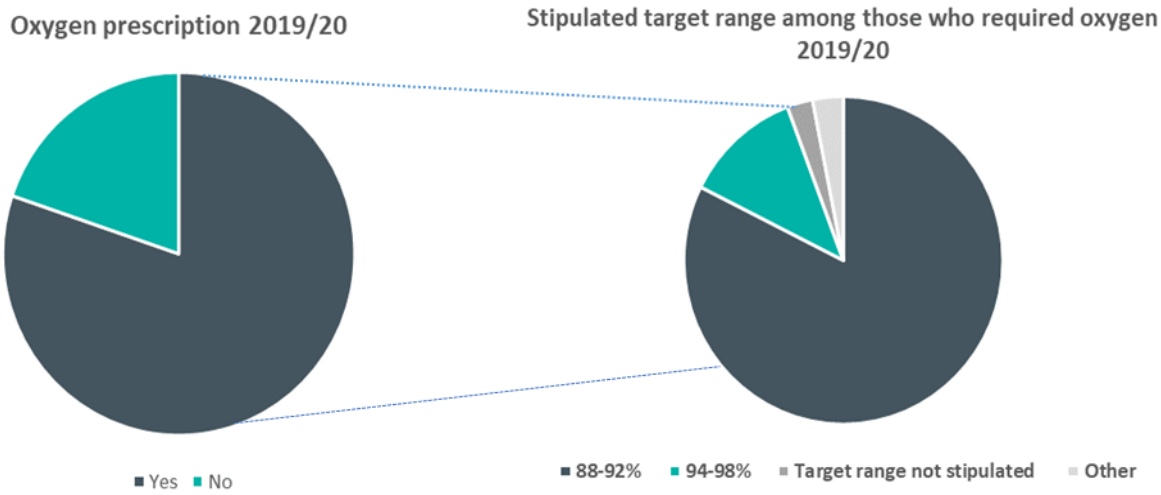
| | 2019/20 | | | |
|---|---|---|---|---|
| **Target range for oxygen prescription, among those prescribed‡** | **England (n=23,098)** | **Scotland (n=155)** | **Wales (n=995)** | **All (n=24,248)** |
| **88–92%** | 18,967 (82.1%) | 118 (76.1%) | 880 (88.4%) | 19,965 (82.3%) |
| **94–98%** | 2,784 (12.0%) | 25 (16.1%) | 71 (7.1%) | 2,880 (11.9%) |
| **Target range not stipulated** | 635 (2.8%) | 1 (0.7%) | 5 (0.5%) | 641 (2.6%) |
| **Other** | 712 (3.1%) | 11 (7.1%) | 39 (3.9%) | 762 (3.1%) |

### 3.1.2 Was oxygen administered to the patient at any point during this admission?*

| | 2019/20 | | | |
|---|---|---|---|---|
| **Oxygen administered** | **England (n=23,098)** | **Scotland (n=155)** | **Wales (n=995)** | **All (n=24,248)** |
| **No** | 4,510 (19.5%) | 24 (15.5%) | 182 (18.3%) | 4,716 (19.5%) |
| **Yes** | 18,588 (80.5%) | 131 (84.5%) | 813 (81.7%) | 19,532 (80.6%) |

**Out of patients prescribed oxygen*

**Figure 2: Oxygen prescription**




‡ Target ranges based on BTS oxygen use in adult guideline.

# Section 4:
# Non-invasive ventilation

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## Navigation

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



## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2016), statement 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.[1]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 1.3.30:** Use NIV as the treatment of choice for persistent hypercapnic ventilatory failure during exacerbations despite optimal medical therapy.[3]

**British Thoracic Society (BTS) quality standards for acute NIV in adults, 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.[4]

## Key findings

> **9.9%** of admissions **received acute treatment with non-invasive ventilation (NIV).** The proportion in Wales appears higher at 14.5%. The proportion in Scotland was 11.2%.

> Of those who received NIV, **24.8% received it within 2 hours of arrival** at hospital.

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Acute treatment with NIV** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 3,532 (9.7%) | 31 (11.2%) | 217 (14.5%) | 3,780 (9.9%) |

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### 4.1.1 If the patient received acute treatment with NIV, was it received within 2 hours of arrival?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Acute treatment with NIV received within 2 hours of arrival** | **England (n=3,532)** | **Scotland (n=31)** | **Wales (n=217)** | **All (n=3,780)** |
| **No** | 2,163 (61.2%) | 25 (80.7%) | 129 (59.4%) | 2,317 (61.3%) |
| **Yes** | 859 (24.3%) | 5 (16.1%) | 72 (33.2%) | 936 (24.8%) |
| **No time/date recorded** | 510 (14.4%) | 1 (3.2%) | 16 (7.4%) | 527 (13.9%) |

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Time, in hours, from arrival at hospital to acute treatment with NIV** | **England (n=3,022)** | **Scotland (n=30)** | **Wales (n=201)** | **All (n=3,253)** |
| **≤2 hours** | 859 (28.4%) | 5 (16.7%) | 72 (35.8%) | 936 (28.8%) |
| **>2–24 hours** | 1,725 (57.1%) | 17 (56.7%) | 79 (39.3%) | 1,821 (56.0%) |
| **>24 hours** | 438 (14.5%) | 8 (26.7%) | 50 (24.9%) | 496 (15.3%) |

**Of those patients with a date/time for NIV recorded*

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# Section 5: Spirometry

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## Navigation

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



## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2016), 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.[1]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 1.1.4:** Perform spirometry:

- at diagnosis
- to reconsider the diagnosis, for people who show an exceptionally good response to treatment
- to monitor disease progression.[3]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 1.1.5:** Measure post-bronchodilator spirometry to confirm the diagnosis of COPD[3]

## Key findings

- A **spirometry** result was **available for 48.1%** of patients admitted. **Availability appears greater in England (48.5%)** than in Wales (44.0%) and Scotland (18.8%).
- **13.2%** of admissions with a spirometry result recorded had **no evidence of airflow obstruction despite being managed for COPD exacerbation**.

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## 5.1 Is a spirometry result available?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Spirometry result available** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 17,619 (48.5%) | 52 (18.8%) | 656 (44.0%) | 18,327 (48.1%) |

## 5.2 If a spirometry result is available, what is the patient's most recent FEV1 % predicted?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Patient's most recent FEV1 % predicted** | **England (n=17,126)** | **Scotland (n=52)** | **Wales (n=649)** | **All (n=17,827)** |
| **Median (IQR)** | 44 (32–60) | 56 (42–76) | 44 (32–59) | 44 (32–60) |

## 5.3 The presence of airflow obstruction[§]

| | 2019/20 | | | |
|---|---|---|---|---|
| **Airflow obstruction (FEV1/FVC ratio)** | **England (n=16,567)** | **Scotland (n=51)** | **Wales (n=612)** | **All (n=17,230)** |
| **No obstruction (≥0.7)** | 2,189 (13.2%) | 12 (23.5%) | 77 (12.6%) | 2,278 (13.2%) |
| **Obstruction (<0.7)** | 14,378 (86.8%) | 39 (76.5%) | 535 (87.4%) | 14,952 (86.8%) |

[§] Participants were asked in the dataset to record the value of the spirometry 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).

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# Section 6: Smoking

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## Navigation

*This section contains the following tables and graphs. If you are viewing this report on an electronic device, 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 referred to behavioural change intervention and/or prescribed a stop smoking drug during the current admission?

## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2011), statement 5:** People with COPD who smoke are regularly encouraged to stop and are offered the full range of evidence-based smoking cessation support.[2]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 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.[3]

**NICE guideline [NG115]: Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 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.[3]

**NICE guideline [NG115], Chronic obstructive pulmonary disease in over 16s: diagnosis and management, 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.[3]

**NICE quality standard [QS43]: Smoking: supporting people to stop (2013), standard 1:** People are asked if they smoke by their healthcare practitioner, and those who smoke are offered advice on how to stop.[5]

## Key findings

> **35.5%** of admissions were **current smokers.** Few patients were vaping (1.1%).

> **53.1%** of current smokers were **referred for behavioural change intervention and/or prescribed a stop smoking drug** during the admission.

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

| | 2019/20 | | | |
|---|---|---|---|---|
| **Smoking status** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Never smoked** | 1,127 (3.1%) | 7 (2.5%) | 51 (3.4%) | 1,185 (3.1%) |
| **Ex-smoker** | 20,084 (55.3%) | 151 (54.7%) | 811 (54.4%) | 21,046 (55.3%) |
| **Current smoker** | 12,841 (35.4%) | 105 (38.0%) | 578 (38.7%) | 13,524 (35.5%) |
| **Ex-smoker and current vaper** | 388 (1.1%) | 2 (0.7%) | 16 (1.1%) | 406 (1.1%) |
| **Never smoked and current vaper** | 15 (0.0%) | 0 (0.0%) | 0 (0.0%) | 15 (0.0%) |
| **Not known / not recorded** | 1,861 (5.1%) | 11 (4.0%) | 36 (2.4%) | 1,908 (5.0%) |

### 6.1.1 If a current smoker, was the patient referred to behavioural change intervention and/or prescribed a stop smoking drug during this admission?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Referral to behavioural change and/or prescribed a stop smoking drug during the admission** | **England (n=12,841)** | **Scotland (n=105)** | **Wales (n=578)** | **All (n=13,524)** |
| **No** | 5,642 (43.9%) | 50 (47.6%) | 267 (46.2%) | 5,959 (44.1%) |
| **Yes** | 6,838 (53.3%) | 54 (51.4%) | 289 (50.0%) | 7,181 (53.1%) |
| **Not recorded** | 361 (2.8%) | 1 (0.1%) | 22 (3.8%) | 384 (2.8%) |

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# Section 7:
# Acute observation

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## Navigation

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



## Key findings

> 84.2% of patients had a National Early Warning Score 2 (NEWS2) score recorded.

> Recording of NEWS2 was lower in England (83.8%) than Scotland (94.2%) and Wales (93.4%).

> 48.7% of admissions were in the lowest risk category.

## 7.1 Was a NEWS2 score recorded for this patient?

| | 2019/20 | | | |
|---|---|---|---|---|
| **NEWS2 score recorded** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **Yes** | 30,418 (83.8%) | 260 (94.2%) | 3,186 (93.4%) | 32,071 (84.2%) |

### 7.1.1 If yes, what was the recorded NEWS2 score?

| | 2019/20 | | | |
|---|---|---|---|---|
| **NEWS2 score, among those with a score recorded** | **England (n=33,539)** | **Scotland (n=276)** | **Wales (n=1,489)** | **All (n=35,304)** |
| **0–4 (Low risk)** | 16,511 (49.2%) | 73 (26.5%) | 615 (41.3%) | 17,199 (48.7%) |
| **5–6 (Medium risk)** | 8,517 (25.4%) | 89 (32.2%) | 420 (28.2%) | 9,026 (25.6%) |
| **7+ (High risk)** | 8,511(25.4%) | 114 (41.3%) | 454 (30.5%) | 9,079 (25.7%) |

** NACAP is exploring NEWS2 as a way to adjust for case-mix in the acuity of admissions. These data are presented for information only.

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# Section 8: Comorbidities

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## Navigation

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## Key findings

> 40.0% of patients had a history of cardiovascular disease, and 16.6% had a history of mental illness.

> New interventions were made in 20.9% of those with cardiovascular disease and 13.6% of those with mental illness.

## 8.1 Was a history of cardiovascular disease recorded for this patient?

| | 2019/20 | | | |
|---|---|---|---|---|
| History of cardiovascular disease recorded | England (n=36,316) | Scotland (n=276) | Wales (n=1,492) | All (n=38,084) |
| No | 21,883 (60.3%) | 167 (60.5%) | 792 (53.1%) | 22,842 (60.0%) |
| Yes | 14,433 (39.7%) | 109 (39.5%) | 700 (46.9%) | 15,242 (40.0%) |

### 8.1.1 If yes, were any new interventions made for this comorbidity?

| | 2019/20 | | | |
|---|---|---|---|---|
| Interventions for cardiovascular disease | England (n=14,433) | Scotland (n=109) | Wales (n=700) | All (n=15,242) |
| No | 11,479 (79.5%) | 95 (87.2%) | 487 (69.6%) | 12,061 (79.1%) |
| Yes | 2,954 (20.5%) | 14 (12.8%) | 213 (30.4%) | 3,181 (20.9%) |

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## 8.2 Was a history of mental illness recorded for this patient?

| | 2019/20 | | | |
|---|---|---|---|---|
| **History of mental illness recorded** | **England (n=36,316)** | **Scotland (n=276)** | **Wales (n=1,492)** | **All (n=38,084)** |
| **No** | 30,375 (83.6%) | 217 (78.6%) | 1,166 (78.1%) | 31,758 (83.4%) |
| **Yes** | 5,941 (16.4%) | 59 (21.4%) | 326 (21.9%) | 6,326 (16.6%) |

### 8.2.1 If yes, were any new interventions made for this comorbidity?

| | 2019/20 | | | |
|---|---|---|---|---|
| **Interventions for mental health recorded** | **England (n=5,941)** | **Scotland (n=59)** | **Wales (n=326)** | **All (n=6,326)** |
| **No** | 5,140 (86.5%) | 45 (76.3%) | 280 (85.9%) | 5,465 (86.4%) |
| **Yes** | 801 (13.5%) | 14 (23.7%) | 46 (14.1%) | 861 (13.6%) |

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# Section 9:
# Discharge processes††

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## Navigation

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



## Key standards

**NICE quality standard [QS10]: Chronic obstructive pulmonary disease in adults (2016), statement 8**: Hospital discharge care bundle.[1]

## Key findings

### Discharge

- The lowest number of discharges took place on a weekend (**7.9% on Saturdays and 6.2% on Sundays**).

### Discharge bundle

- **75.5%** of admissions received a **discharge bundle.** However, patients were **far less likely** to receive a discharge bundle in **Scotland (24.0%)** and **Wales (25.8%)** than patients in England (77.9%).
- However, use of individual measures considered part of a bundle on discharge varied greatly. **71.2%** of patients had their **inhaler technique checked,** but only **61.8%** were **assessed for suitability for pulmonary rehabilitation** despite these being standard components of a discharge bundle.
- **10.2%** of patients had care **discussed at an MDT meeting** with a local community team**.**

†† Patients who died as inpatients have been removed from the analysis for this section.

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## 9.1 Day of discharge

| | 2019/20 | | | |
|---|---|---|---|---|
| Day of discharge | England (n=34,919) | Scotland (n=263) | Wales (n=1,413) | All (n=36,595) |
| Sunday | 2,238 (6.4%) | 7 (2.7%) | 35 (2.5%) | 2,280 (6.2%) |
| Monday | 5,868 (16.8%) | 56 (21.3%) | 282 (20.0%) | 6,206 (17.0%) |
| Tuesday | 6,462 (18.5%) | 46 (17.5%) | 290 (20.5%) | 6,798 (18.6%) |
| Wednesday | 5,751 (16.5%) | 44 (16.7%) | 213 (15.1%) | 6,008 (16.4%) |
| Thursday | 5,525 (15.8%) | 53 (20.2%) | 222 (15.7%) | 5,800 (15.9%) |
| Friday | 6,293 (18.0%) | 41 (15.6%) | 292 (20.7%) | 6,626 (18.1%) |
| Saturday | 2,782 (8.0%) | 16 (6.1%) | 79 (5.6%) | 2,877 (7.9%) |

## 9.2 Was a discharge bundle completed for this admission?

| | 2019/20 | | | |
|---|---|---|---|---|
| Discharge bundle completed for this admission | England (n=34,919) | Scotland (n=263) | Wales (n=1,413) | All (n=36,595) |
| No | 7,532 (21.6%) | 199 (75.7%) | 1,036 (73.3%) | 8,767 (24.0%) |
| Yes | 27,194 (77.9%) | 63 (24.0%) | 365 (25.8%) | 27,622 (75.5%) |
| Patient self-discharged | 193 (0.6%) | 1 (0.4%) | 12 (0.1%) | 206 (0.6%) |

## 9.3 Which of the following specific elements of good practice were undertaken as part of the patient's discharge process (irrespective of whether a formal discharge 'bundle' was completed)?‡‡

| | 2019/20 | | | |
|---|---|---|---|---|
| Elements of good practice care | England (n=34,919) | Scotland (n=263) | Wales (n=1,413) | All (n=36,595) |
| Inhaler technique checked | 25,244 (72.3%) | 174 (66.2%) | 632 (44.7%) | 26,050 (71.2%) |
| Assessment of medication | 27,982 (80.1%) | 185 (70.3%) | 1,199 (84.9%) | 29,366 (80.3%) |
| Self-management plan provided | 21,180 (60.7%) | 33 (12.6%) | 471 (33.3%) | 21,684 (59.3%) |
| Emergency drug pack provided or referred to community | 9,404 (26.9%) | 5 (1.9%) | 346 (24.5%) | 9,755 (26.7%) |
| Oxygen alert card provided | 4,303 (12.3%) | 35 (13.3%) | 130 (9.2%) | 4,468 (12.2%) |
| Pulmonary rehabilitation suitability assessment | 22,093 (63.3%) | 145 (55.1%) | 372 (26.3%) | 22,610 (61.8%) |
| Follow up arranged | 13,189 (37.8%) | 41 (15.6%) | 378 (26.8%) | 13,608 (37.2%) |
| MDT meeting about patient | 3,398 (9.7%) | 2 (0.8%) | 317 (22.4%) | 3,717 (10.2%) |
| BLF patient passport provided | 3,887 (11.1%) | 0 (0.0%) | 224 (15.9%) | 4,111 (11.2%) |
| None | 3,192 (9.1%) | 67 (25.5%) | 174 (12.3%) | 3,433 (9.4%) |

BLF = British Lung Foundation; MDT = multidisciplinary team

‡‡ A British Thoracic Society standard discharge bundle consists of (1) reviewing inhaled medication, (2) providing a written self-management plan, (3) assessing and referring for smoking cessation support, (4) assessing and referring for pulmonary rehabilitation and (5) arranging appropriate follow-up.

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# Section 10: Sub-analyses

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This section presents associations between various metrics:

- 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 an electronic device, you can select the table that you wish to see from the list below.*



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# Key findings

## NIV

There was not a clear association between timing of NIV delivery and length of stay.

## Respiratory review

**Respiratory team review within 24 hours** was associated with:

- **better smoking cessation support:** 59.3% of smokers who **received a specialist review** within 24 hours were more likely to be referred to a behavioural change intervention and/or prescribed a stop smoking drug compared with 44.0% for smokers who did not receive a review (p<0.001).
- **discharge bundles:** 87.3% of patients who **received a specialist review** within 24 hours received a discharge bundle compared with 52.9% for those who did not receive a review within 24 hours (p<0.001).
- **oxygen prescription:** 66.7% of patients who **received a specialist review** within 24 hours and required oxygen received it compared with 57.6% of those who received a review after 24 hours and required oxygen (p<0.001).

# 10.1 NIV

## 10.1.1 Time to acute treatment with NIV and association with length of stay[§§]

| | 2019/20 | |
|---|---|---|
| **Time to acute treatment with NIV and length of stay** | **Time from arrival to acute treatment with NIV ≤2 hours (n=831)** | **Time from arrival to acute treatment with NIV >2–24 hours (n=1,591)** |
| **Length of stay ≤4 days** | 221 (26.6%) | 384 (24.1%) |
| **Length of stay >4 days** | 610 (73.4%) | 1,207 (75.9%) |

## 10.1.2 Time to acute treatment with NIV and association with inpatient mortality[***]

| | 2019/20 | |
|---|---|---|
| **Time to acute treatment with NIV and inpatient mortality** | **Time from arrival to acute treatment with NIV ≤2 hours (n=936)** | **Time from arrival to acute treatment with NIV >2–24 hours (n=1,821)** |
| **Died as inpatient** | 105 (11.2%) | 230 (12.6%) |

[§§] Patients receiving acute treatment with NIV >24 hours after arrival have been excluded from this analysis.
[***] Patients receiving acute treatment with NIV >24 hours after arrival have been excluded from this analysis.

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## 10.2 Respiratory specialist review[†††]

### 10.2.1 Time to respiratory specialist review and association with length of stay

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and length of stay** | **Received specialist review within 24 hours (n=24,453)** | **Did not receive specialist review within 24 hours (n=12,142)** |
| **Length of stay ≤4 days** | 13,846 (56.6%) | 6,644 (57.7%) |
| **Length of stay >4 days** | 10,607 (43.4%) | 5,498 (45.3%) |

### 10.2.2 Time to respiratory specialist review and association with inpatient mortality

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and inpatient mortality** | **Received specialist review within 24 hours (n=25,398)** | **Did not receive specialist review within 24 hours (n=12,686)** |
| **Died as an inpatient** | 945 (3.7%) | 544 (4.3%) |

### 10.2.3 Time to respiratory specialist review and association with prescription of oxygen

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and prescription of oxygen** | **Received specialist review within 24 hours and required oxygen (n=25,398)** | **Did not receive specialist review within 24 hours and required oxygen (n=12,686)** |
| **Oxygen prescribed** | 16,938 (66.7%) | 7,310 (57.6%) |

### 10.2.4 Time to respiratory specialist review and association with receiving NIV within 2 hours of arrival

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and receiving NIV within 2 hours of arrival** | **Received specialist review within 24 hours and received NIV (n=2,210)** | **Did not receive specialist review within 24 hours and received NIV (n=547)** |
| **Received NIV within 2 hours of arrival** | 732 (33.1%) | 204 (37.3%) |

[†††] 'Did not receive specialist review within 24 hours' includes both patients who did not receive any specialist review and those who received one more than 24 hours after they were admitted.

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### 10.2.5 Time to respiratory specialist review and association with referral to a behavioural change intervention and/or prescription of a stop smoking drug in smokers.

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and smoking cessation** | **Received specialist review within 24 hours and a current smoker (n=9,125)** | **Did not receive specialist review within 24 hours and a current smoker (n=4,015)** |
| **Referred to behavioural change intervention and/or prescribed a stop smoking drug** | 5,413 (59.3%) | 1,768 (44.0%) |

### 10.2.6 Time to respiratory specialist review and association with receipt of a discharge bundle

| | 2019/20 | |
|---|---|---|
| **Time to respiratory specialist review and receipt of a discharge bundle** | **Received specialist review within 24 hours and received a discharge bundle (n=24,357)** | **Did not receive specialist review within 24 hours and received a discharge bundle (n=12,032)** |
| **Received a discharge bundle**[ǂǂǂ] | 21,262 (87.3%) | 6,360 (52.9%) |

[ǂǂǂ] Excluding those patients who died or self-discharged.

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# Section 11:
# Participating and non-participating hospitals

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## 11.1 Participating hospitals in England, Scotland and Wales

The hospitals included in this list are those that participated in the audit for the period audited.

| Hospital name | Trust / health board name |
|---|---|
| **England** | |
| Addenbrooke's Hospital | Cambridge University Hospitals NHS Foundation Trust |
| Airedale General Hospital | Airedale NHS Foundation Trust |
| Arrowe Park Hospital | Wirral University Teaching Hospital NHS Foundation Trust |
| Barnet General Hospital | Royal Free London NHS Foundation Trust |
| Barnsley District General Hospital | Barnsley Hospital NHS Foundation Trust |
| Basingstoke and North Hampshire Hospital | Hampshire Hospitals NHS Foundation Trust |
| Bassetlaw District General Hospital | Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust |
| Bedford Hospital | Bedford Hospital NHS Trust |
| Birmingham City Hospital | Sandwell and West Birmingham Hospitals NHS Trust |
| Birmingham Heartlands Hospital | University Hospitals Birmingham NHS Foundation Trust |
| Bradford Royal Infirmary | Bradford Teaching Hospitals NHS Foundation Trust |
| Bristol Royal Infirmary | University Hospitals Bristol NHS Foundation Trust |
| Calderdale Royal Hospital | Calderdale and Huddersfield NHS Foundation Trust |
| Charing Cross Hospital | Imperial College Healthcare NHS Trust |
| Chelsea and Westminster Hospital | Chelsea and Westminster Hospital NHS Foundation Trust |
| Cheltenham General Hospital | Gloucestershire Hospitals NHS Foundation Trust |
| Chesterfield Royal Hospital | Chesterfield Royal Hospital NHS Foundation Trust |
| Chorley Hospital | Lancashire Teaching Hospitals NHS Foundation Trust |
| Colchester General Hospital | East Suffolk and North Essex NHS Foundation Trust |
| Conquest Hospital | East Sussex Healthcare NHS Trust |
| Countess of Chester Hospital | Countess of Chester Hospital NHS Foundation Trust |
| County Hospital (Stafford) | University Hospitals of North Midlands NHS Trust |
| County Hospital Hereford | Wye Valley NHS Trust |
| Croydon University Hospital | Croydon Health Services NHS Trust |
| Cumberland Infirmary | North Cumbria Integrated Care NHS Foundation Trust |
| Darent Valley Hospital | Dartford and Gravesham NHS Trust |
| Darlington Memorial Hospital | County Durham and Darlington NHS Foundation Trust |
| Derriford Hospital | University Hospitals Plymouth NHS Trust |

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| Hospital name | Trust / health board name |
|---|---|
| Diana, Princess of Wales Hospital | Northern Lincolnshire and Goole NHS Foundation Trust |
| Doncaster Royal Infirmary | Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust |
| Dorset County Hospital | Dorset County Hospital NHS Foundation Trust |
| Ealing Hospital | London North West University Healthcare NHS Trust |
| East Surrey Hospital | Surrey and Sussex Healthcare NHS Trust |
| Eastbourne DGH | East Sussex Healthcare NHS Trust |
| Epsom Hospital | Epsom and St Helier University Hospitals NHS Trust |
| Fairfield General Hospital | Pennine Acute Hospitals NHS Trust |
| Friarage Hospital | South Tees Hospitals NHS Foundation Trust |
| Frimley Park Hospital | Frimley Health NHS Foundation Trust |
| Furness General | University Hospitals of Morecambe Bay NHS Foundation Trust |
| George Eliot Hospital | George Eliot Hospital NHS Trust |
| Glenfield Hospital | University Hospitals of Leicester NHS Trust |
| Gloucestershire Royal Hospital | Gloucestershire Hospitals NHS Foundation Trust |
| Good Hope General Hospital | University Hospitals Birmingham NHS Foundation Trust |
| Grantham And District General Hospital | United Lincolnshire Hospitals NHS Trust |
| Harrogate District Hospital | Harrogate and District NHS Foundation Trust |
| Hillingdon Hospital | The Hillingdon Hospitals NHS Foundation Trust |
| Hinchingbrooke Hospital | North West Anglia NHS Foundation Trust |
| Homerton Hospital | Homerton University Hospital NHS Foundation Trust |
| Horton General Hospital | Oxford University Hospitals NHS Foundation Trust |
| Hull Royal Infirmary | Hull University Teaching Hospitals NHS Trust |
| James Cook University Hospital | South Tees Hospitals NHS Foundation Trust |
| James Paget Hospital | James Paget University Hospitals NHS Foundation Trust |
| John Radcliffe Hospital | Oxford University Hospitals NHS Foundation Trust |
| Kettering General Hospital | Kettering General Hospital NHS Foundation Trust |
| King George Hospital | Barking, Havering and Redbridge University Hospitals NHS Trust |
| King’s College Hospital | King's College Hospital NHS Foundation Trust |
| King’s Mill Hospital | Sherwood Forest Hospitals NHS Foundation Trust |
| Kingston Hospital | Kingston Hospital NHS Foundation Trust |
| Leicester Royal Infirmary | University Hospitals of Leicester NHS Trust |
| Leighton Hospital | Mid Cheshire Hospitals NHS Foundation Trust |
| Lincoln County Hospital | United Lincolnshire Hospitals NHS Trust |
| Lister Hospital | East and North Hertfordshire NHS Trust |
| Luton and Dunstable Hospital | Luton and Dunstable University Hospital NHS Foundation Trust |
| Lymington New Forest Hospital | Southern Health NHS Foundation Trust |
| Macclesfield District General Hospital | East Cheshire NHS Trust |

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| Hospital name | Trust / health board name |
|---|---|
| Maidstone General Hospital | Maidstone and Tunbridge Wells NHS Trust |
| Manchester Royal Infirmary | Manchester University NHS Foundation Trust |
| Manor Hospital | Walsall Healthcare NHS Trust |
| Medway Maritime Hospital | Medway NHS Foundation Trust |
| Milton Keynes General Hospital | Milton Keynes University Hospital NHS Foundation Trust |
| Musgrove Park Hospital | Taunton and Somerset NHS Foundation Trust |
| New Cross Hospital | The Royal Wolverhampton NHS Trust |
| Norfolk and Norwich Hospital | Norfolk and Norwich University Hospitals NHS Foundation Trust |
| North Devon District Hospital | Northern Devon Healthcare NHS Trust |
| North Manchester General Hospital | Pennine Acute Hospitals NHS Trust |
| North Middlesex Hospital | North Middlesex University Hospital NHS Trust |
| Northampton General Hospital | Northampton General Hospital NHS Trust |
| Northern General Hospital | Sheffield Teaching Hospitals NHS Foundation Trust |
| Northumbria Specialist Emergency Care Hospital | Northumbria Healthcare NHS Foundation Trust |
| Northwick Park Hospital | London North West University Healthcare NHS Trust |
| Nottingham City Hospital | Nottingham University Hospitals NHS Trust |
| Peterborough City Hospital | North West Anglia NHS Foundation Trust |
| Pilgrim Hospital | United Lincolnshire Hospitals NHS Trust |
| Pinderfields General Hospital | Mid Yorkshire Hospitals NHS Trust |
| Poole General Hospital | Poole Hospital NHS Foundation Trust |
| Princess Alexandra Hospital | The Princess Alexandra Hospital NHS Trust |
| Princess Royal Hospital, Telford | Shrewsbury and Telford Hospital NHS Trust |
| Princess Royal University Hospital (Bromley) | King's College Hospital NHS Foundation Trust |
| Queen Alexandra Hospital | Portsmouth Hospitals NHS Trust |
| Queen Elizabeth Hospital, Edgbaston | University Hospitals Birmingham NHS Foundation Trust |
| Queen Elizabeth Hospital, Gateshead | Gateshead Health NHS Foundation Trust |
| Queen Elizabeth Hospital, King's Lynn | The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust |
| Queen Elizabeth Hospital, Woolwich | Lewisham and Greenwich NHS Trust |
| Queen Elizabeth the Queen Mother Hospital | East Kent Hospitals University NHS Foundation Trust |
| Queen's Hospital | University Hospitals of Derby and Burton NHS Foundation Trust |
| Queen's Hospital Romford | Barking, Havering and Redbridge University Hospitals NHS Trust |
| Rotherham General Hospital | The Rotherham NHS Foundation Trust |
| Royal Albert Edward Infirmary | Wrightington, Wigan and Leigh NHS Foundation Trust |
| Royal Berkshire Hospital | Royal Berkshire NHS Foundation Trust |
| Royal Blackburn Hospital | East Lancashire Hospitals NHS Trust |

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| Hospital name | Trust / health board name |
|---|---|
| Royal Bournemouth General Hospital | The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust |
| Royal Cornwall Hospital | Royal Cornwall Hospitals NHS Trust |
| Royal Derby Hospital | University Hospitals of Derby and Burton NHS Foundation Trust |
| Royal Devon and Exeter Hospital | Royal Devon and Exeter NHS Foundation Trust |
| Royal Free Hospital | Royal Free London NHS Foundation Trust |
| Royal Hampshire County Hospital | Hampshire Hospitals NHS Foundation Trust |
| Royal Lancaster Infirmary | University Hospitals of Morecambe Bay NHS Foundation Trust |
| Royal Liverpool University Hospital | Liverpool University Hospitals NHS Foundation Trust |
| Royal London Hospital | Barts Health NHS Trust |
| Royal Oldham Hospital | Pennine Acute Hospitals NHS Trust |
| Royal Preston Hospital | Lancashire Teaching Hospitals NHS Foundation Trust |
| Royal Stoke University Hospital | University Hospitals of North Midlands NHS Trust |
| Royal Surrey County Hospital | Royal Surrey County Hospital NHS Foundation Trust |
| Royal Sussex County Hospital | Brighton and Sussex University Hospitals NHS Trust |
| Royal United Hospital Bath | Royal United Hospitals Bath NHS Foundation Trust |
| Royal Victoria Infirmary | The Newcastle Upon Tyne Hospitals NHS Foundation Trust |
| Russells Hall Hospital | The Dudley Group NHS Foundation Trust |
| Salford Royal Hospital | Salford Royal NHS Foundation Trust |
| Salisbury District Hospital | Salisbury NHS Foundation Trust |
| Sandwell District Hospital | Sandwell and West Birmingham Hospitals NHS Trust |
| Scarborough General Hospital | York Teaching Hospital NHS Foundation Trust |
| Scunthorpe General Hospital | Northern Lincolnshire and Goole NHS Foundation Trust |
| Solihull General Hospital | University Hospitals Birmingham NHS Foundation Trust |
| South Tyneside District Hospital | South Tyneside and Sunderland NHS Foundation Trust |
| Southampton General Hospital | University Hospital Southampton NHS Foundation Trust |
| Southend Hospital | Southend University Hospital NHS Foundation Trust |
| Southmead Hospital | North Bristol NHS Trust |
| Southport and Formby District General | Southport and Ormskirk Hospital NHS Trust |
| St George's Hospital | St George's University Hospitals NHS Foundation Trust |
| St Helier Hospital | Epsom and St Helier University Hospitals NHS Trust |
| St James's University Hospital | Leeds Teaching Hospitals NHS Trust |
| St Mary's Hospital, Newport | Isle of Wight NHS Trust |
| St Mary's Hospital, Paddington | Imperial College Healthcare NHS Trust |
| St Peter's Hospital | Ashford and St Peter's Hospitals NHS Foundation Trust |
| St Richard's Hospital | Western Sussex Hospitals NHS Foundation Trust |
| St Thomas' Hospital | Guy's and St Thomas' NHS Foundation Trust |
| Stepping Hill Hospital | Stockport NHS Foundation Trust |

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| Hospital name | Trust / health board name |
|---|---|
| Sunderland Royal Hospital | South Tyneside and Sunderland NHS Foundation Trust |
| Tameside General Hospital | Tameside And Glossop Integrated Care NHS Foundation Trust |
| The Great Western Hospital | Great Western Hospitals NHS Foundation Trust |
| The Ipswich Hospital | East Suffolk and North Essex NHS Foundation Trust |
| Torbay Hospital | Torbay and South Devon NHS Foundation Trust |
| Tunbridge Wells Hospital | Maidstone and Tunbridge Wells NHS Trust |
| University College Hospital | University College London Hospitals NHS Foundation Trust |
| University Hospital Aintree | Liverpool University Hospitals NHS Foundation Trust |
| University Hospital Coventry | University Hospitals Coventry and Warwickshire NHS Trust |
| University Hospital Lewisham | Lewisham and Greenwich NHS Trust |
| University Hospital of North Durham | County Durham and Darlington NHS Foundation Trust |
| University Hospital of North Tees | North Tees and Hartlepool NHS Foundation Trust |
| Warrington District General Hospital | Warrington and Halton Hospitals NHS Foundation Trust |
| Watford General Hospital | West Hertfordshire Hospitals NHS Trust |
| West Cumberland Infirmary | North Cumbria Integrated Care NHS Foundation Trust |
| West Middlesex University Hospital | Chelsea and Westminster Hospital NHS Foundation Trust |
| West Suffolk Hospital | West Suffolk NHS Foundation Trust |
| Weston General Hospital | Weston Area Health NHS Trust |
| Wexham Park Hospital | Frimley Health NHS Foundation Trust |
| Whipps Cross Hospital | Barts Health NHS Trust |
| Whiston Hospital | St Helens And Knowsley Teaching Hospitals NHS Trust |
| Whittington Hospital | Whittington Health NHS Trust |
| William Harvey Hospital | East Kent Hospitals University NHS Foundation Trust |
| Worcestershire Royal Hospital | Worcestershire Acute Hospitals NHS Trust |
| Worthing Hospital | Western Sussex Hospitals NHS Foundation Trust |
| Wythenshawe Hospital | Manchester University NHS Foundation Trust |
| Yeovil District Hospital | Yeovil District Hospital NHS Foundation Trust |
| York District Hospital | York Teaching Hospital NHS Foundation Trust |
| **Scotland** | |
| Dumfries and Galloway Royal Infirmary | NHS Dumfries and Galloway |
| Inverclyde Royal Hospital | NHS Greater Glasgow and Clyde |
| **Wales** | |
| Bronglais General Hospital | Hywel Dda University Health Board |
| Glan Clwyd Hospital | Betsi Cadwaladr University Health Board |
| Glangwili General Hospital | Hywel Dda University Health Board |
| University Hospital Llandough | Cardiff and Vale University Local Health Board |
| Morriston Hospital | Swansea Bay Local Health Board |

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| Hospital name | Trust / health board name |
|---|---|
| Nevill Hall Hospital | Aneurin Bevan University Health Board |
| Prince Charles Hospital | Cwm Taf Morgannwg University Local Health Board |
| Prince Philip Hospital | Hywel Dda University LHB |
| Princess of Wales Hospital | Swansea Bay Local Health Board |
| Royal Glamorgan | Cwm Taf Morgannwg University Local Health Board |
| Royal Gwent Hospital | Aneurin Bevan University Health Board |
| Singleton Hospital | Swansea Bay Local Health Board |
| University Hospital of Wales | Cardiff and Vale University Local Health Board |
| Withybush General Hospital | Hywel Dda University Health Board |
| Ysbyty Ystrad Fawr | Aneurin Bevan University Local Health Board |

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## 11.2 Non-participating hospitals in England, Scotland 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 / health board name |
|---|---|
| **England** | |
| Basildon Hospital | Basildon and Thurrock University Hospitals NHS Foundation Trust |
| Broomfield Chelmsford | Mid Essex Hospital Services NHS Trust |
| Huddersfield Royal Infirmary | Calderdale and Huddersfield NHS Foundation Trust |
| Leeds General Infirmary | Leeds Teaching Hospitals NHS Trust |
| Newham General Hospital | Barts Health NHS Trust |
| Princess Royal Hospital (Haywards Heath) | Brighton and Sussex University Hospitals NHS Trust |
| Royal Bolton Hospital | Bolton NHS Foundation Trust |
| Royal Shrewsbury Hospital | Shrewsbury and Telford Hospital NHS Trust |
| Stobhill General Hospital | NHS Greater Glasgow and Clyde |
| Stoke Mandeville Hospital | Buckinghamshire Healthcare NHS Trust |
| Trafford General Hospital | Manchester University NHS Foundation Trust |
| Victoria Hospital | Blackpool Teaching Hospitals NHS Foundation Trust |
| Warwick Hospital | South Warwickshire NHS Foundation Trust |
| **Scotland** | |
| Aberdeen Royal Infirmary | NHS Grampian |
| Balfour Hospital | NHS Orkney |
| Belford Hospital | NHS Highland |
| Borders General Hospital | NHS Borders |
| Forth Valley Royal Hospital | NHS Forth Valley |
| Gartnavel General | NHS Greater Glasgow and Clyde |
| Gilbert Bain Hospital | NHS Shetland |
| Glasgow Royal Infirmary | NHS Greater Glasgow and Clyde |
| New Victoria Hospital | NHS Greater Glasgow and Clyde |
| Ninewells Hospital | NHS Tayside |
| Perth Royal Infirmary | NHS Tayside |
| Royal Alexandra Hospital | NHS Greater Glasgow and Clyde |
| Royal Infirmary of Edinburgh | NHS Lothian |
| St John's Hospital at Howden | NHS Lothian |
| University Hospital Ayr | NHS Ayrshire and Arran |
| University Hospital Crosshouse | NHS Ayrshire and Arran |
| University Hospital Hairmyres | NHS Lanarkshire |
| University Hospital Monklands | NHS Lanarkshire |
| Victoria Hospital (Kirkcaldy) | NHS Fife |

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| | |
|---|---|
| Western General Hospital | NHS Lothian |
| Western Isles Hospital | NHS Western Isles |
| Wishaw General Hospital | NHS Lanarkshire |
| **Wales** | |
| Wrexham Maelor Hospital | Betsi Cadwaladr University Health Board |
| Ysbyty Gwynedd | Betsi Cadwaladr University Health Board |

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# 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.[6] 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 fourth report since the start of continuous data collection and presents the results of the cohort of patients discharged between 1 October 2019 and 29 February 2020.

All hospitals in England, Scotland and Wales that admit patients with acute exacerbations of COPD (AECOPD) (n=219) were eligible to participate in the audit. A total of 182 hospitals (83%) 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 11**.

### 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) and Public Benefit and Privacy Panel for Health and Social Care Scotland. The reference numbers for these are CAG-8-06(b)/2013 and 1718-0135 respectively. A record of the approval can be found at **www.hra.nhs.uk/planning-and-improving-research/application-summaries/confidentiality-advisory-group-registers** (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.rcp.ac.uk/nacap-copd-resources**. In addition, a patient leaflet and poster are available to download from the same page.

### Recruitment

The England and Wales 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.rcp.ac.uk/working-together**. Recruitment for Scotland started in early 2018 and audit launched there on 1 November 2018, with a very similar recruitment process being followed.

### Audit question development and pilot

The audit dataset was based on the snapshot 2014 dataset. It was developed in 2016 iteratively and then refreshed in 2018 by the audit programme team and clinical lead, in consultation with all necessary governance groups. For further information on the original piloting of the audit please

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refer to **Appendix C** of the data analysis and methodology of the 2017 clinical audit report which can be found here: **www.rcp.ac.uk/working-together**.

## 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**).

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**) and the COPD audit resources webpage on the RCP website (**www.rcp.ac.uk/nacap-copd-resources**).

Data entry to the audit is regularly reviewed by the NACAP team. Where few records are entered (eg fewer 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 provided a helpdesk 9am–5pm every working day, which was 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 1 October 2019 and 29 February 2020) was **6 November 2020** 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 and Lung Institute) where they were analysed.

[§§§] 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.

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## Data cleaning and analysis

Data received by Imperial College London were imported into and analysed using Stata 15.
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=29).
- Patients with an invalid NHS number were removed (n=1).
- Duplicate admissions were removed (n=33).
- 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=0)
  - NIV before arrival were removed (n=0)
  - NIV after discharge were removed (n=0)
  - a discharge before arrival were removed (n=0).
- 2-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.
- 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).
- Time from arrival to NIV was calculated by subtracting arrival time from time of NIV administration.
- Patients who died as an inpatient had their date of discharge removed as this was not included in the previous (2019) audit.

# Sub-analysis

Variables required for analysis and generating odds ratios were created:

- length of stay (equal to or below median/above median)
- NIV in 2 hours (y/n).

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# 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 or replaced. To see the full quality standard please use the following link: **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 | Hospital discharge care bundle. [new 2016] |

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| **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. |

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# 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**.

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

| 1.1 | Diagnosing COPD |
|---|---|
| **Spirometry** | |
| 1.1.4 | Perform spirometry:<br>> at diagnosis<br>> to reconsider the diagnosis, for people who show an exceptionally good response to treatment<br>> to monitor disease progression. [2004, amended 2018] |
| 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 GLI 2012 reference values are used, but it is recognised that these values are not applicable for all ethnic groups. [2004, amended 2018] |
| **Referral for specialist advice** | |
| 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] |

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| 1.2 | Managing stable COPD |
|---|---|
| 1.2.1 | For guidance on the management of multimorbidity, see the NICE guideline on multimorbidity. [2018] |
| **Smoking cessation** | |
| 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 stop smoking interventions and services. [2010] |
| 1.2.6 | For more guidance on varenicline, see the NICE technology appraisal guidance on varenicline for smoking cessation. [2010] |
| **Non-invasive ventilation** | |
| 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] |

| 1.3 | Management of exacerbations of COPD |
|---|---|
| **Oxygen therapy during exacerbations of COPD** | |
| 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 ($SaO_2$) 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 $PaCO_2$ 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] |
| **Non-invasive ventilation (NIV) and COPD exacerbations** | |
| 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] |

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| Discharge planning | |
|---|---|
| 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] |

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# Appendix D:
# British Thoracic Society (BTS) quality standards for acute NIV in adults

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Below is a summary of the BTS NIV quality standards, published in 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/**.

| 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. |

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# References

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