



Royal College
of Physicians

NACAP

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

Clinical outcomes

October 2018 – March 2020

Summary report

Published March 2023



In association with:



British
Thoracic
Society

Imperial College
London



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General Practitioners



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HQIP
Healthcare Quality
Improvement Partnership

Commissioned by:

Clinical outcomes for:

adults included in the adult asthma and COPD 2018/19 and 2019/20 clinical audit reports

- > adults with asthma attacks discharged from acute hospitals in England, Scotland and Wales between 1 November 2018 and 31 March 2020
- > adults with COPD exacerbations discharged from acute hospitals in England, Scotland and Wales between 1 October 2018 and 29 February 2020

and

children and young people included in the 2019/20 clinical audit report

- > children and young people with asthma attacks discharged from acute hospitals in England, Scotland and Wales between 1 June 2019 and 31 January 2020
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Introduction

Lung diseases affect one in five people in the UK and their prevalence is growing.^{1,2} Asthma and chronic obstructive pulmonary disease (COPD) are the two most common respiratory diseases in the UK.

The outcome of a patient following admission to hospital is an important proxy for the quality of care across the healthcare system and provides additional understanding on where care can be improved. This report presents information on the 30- and 90-day outcomes of 107,761 adults and 6,716 children and young people who were admitted to hospitals in England, Scotland and Wales for asthma or COPD and whose data were submitted to the NACAP adult asthma; children and young people asthma; or COPD secondary care audits between 2018 and 2020.

Results are reported at national (All), England and Wales level. Due to small numbers (with NACAP recruitment rates for Scottish hospitals being low), Scotland data are included under 'All' figures only. This is to avoid any misinterpretation associated with smaller cohorts. The report should be read as an addendum to the following clinical audit reports:

- > Adult asthma – 2018/19 and 2019/20 (published December 2019 and January 2021)
www.nacap.org.uk/nacap/welcome.nsf/reportsAA.html
- > Children and young people asthma – 2019/20 (published May 2021)
www.nacap.org.uk/nacap/welcome.nsf/reportsPA.html
- > COPD – 2018/19 and 2019/20 (published July 2020 and June 2021)
www.nacap.org.uk/nacap/welcome.nsf/reportsSC.html

and can be used by service providers, commissioners and clinical teams when reviewing and recognising areas of success or areas requiring improvement to help influence change.

Reading and understanding this report

Data in this report cover:

- > adults with asthma attacks or COPD exacerbations discharged from acute hospital between 1 November 2018 – 31 March 2020 and 1 October 2018 – 29 February 2020 respectively
- > children and young people with asthma attacks discharged from acute hospital between 1 June 2019 and 31 January 2020.

Comparisons with previous COPD outcomes have not been made in this report due to the different audit periods and patient cohorts covered. The 2017/18 COPD outcomes report was published in summer 2020. www.nacap.org.uk/nacap/welcome.nsf/reportsSC.html

High-level results (percentages) are presented for each category in the report and the reader is advised to interpret these carefully as case ascertainment (see page 11) varies significantly across organisations and regions (see Appendix A: Methodology).
www.rcp.ac.uk/projects/outputs/outcomes18_20.

Despite this, NACAP believes that data presented are useful in providing a pre-COVID state of healthcare and a baseline on which services can be re-built. There is a joint responsibility for policy makers, commissioners and NHS services to ensure development of excellent care post-COVID and we hope these results will support that.

More timely data are being sought, with data presented taking approximately 2 years to obtain. It is important for outcomes data to be available in a contemporaneous and accurate format for national and service level access and quality improvement and we hope national data providers will support us with obtaining these more efficiently in the future.

Lessons learnt from obtaining these data have been used to inform inclusion criteria, outcomes, and case ascertainment methodology changes to strengthen NACAP's future outcomes reporting.

Please see NACAP's latest clinical audit report *Drawing breath* for key findings and national recommendations relating to asthma and COPD care. www.rcp.ac.uk/projects/outputs/drawing-breath-clinical-audit-report-202122.

Supporting statement

by Asthma and Lung UK



This report shows what happened after people were admitted to hospital with an asthma attack or COPD exacerbation between 2018 and 2020, the last years before the COVID-19 pandemic.

We know that being discharged from hospital is a critical time for respiratory care. If people who have had an asthma attack or COPD exacerbation get the right support in hospital, it can stop this happening again. An admission to hospital is also an opportunity to make sure people have the right treatment and management plan to stay as well as possible before they go home.

The data show that many people are being readmitted to hospital within 3 months of going home and that some, particularly with COPD, are dying within 3 months of their exacerbation (see key findings). This suggests that the healthcare community must look critically to see if there is more that can be done to make sure that anyone admitted to hospital for their asthma or COPD gets the best possible support afterwards to avoid future flare ups.

We know that respiratory services will be working differently since the pandemic, and the next set of data to be published will show how outcomes for people with asthma and COPD were affected coming out of COVID-19 (April 2021 onwards). This report highlights the need for all parts of the health service to prioritise respiratory care as they recover from the pandemic, so that everyone with asthma and COPD gets the care they need.

Key findings

Mortality

- > Adult asthma: 0.4% died within 30 days of admission to hospital, 0.8% within 90 days.
- > COPD: 6.1% died within 30 days of admission, 11.9% within 90 days.

Readmission

- > Adult asthma: 13.7% were readmitted within 30 days of discharge from hospital, 26.4% within 90 days.
- > Children and young people asthma: 9.5% were readmitted within 30 days of discharge from hospital, 19.2% within 90 days.
- > COPD: 24.4% were readmitted within 30 days of discharge from hospital, 43.1% within 90 days.

Section 1: Mortality after index admission

1.1 Mortality within 30 and 90 days of index admission

Of adults admitted to acute hospital with an asthma attack and exacerbation of COPD:

	All	England	Wales
Mortality			
Adult asthma	n=23,767	n=22,477	n=1,053
Within 30 days of index admission	95 (0.4%)	86 (0.4%)	6 (0.6%)
Within 90 days of index admission	185 (0.8%)	173 (0.8%)	8 (0.8%)
COPD	n=83,994	n=79,589	n=3,715
Within 30 days of index admission	5,133 (6.1%)	4,829 (6.1%)	246 (6.6%)
Within 90 days of index admission	9,999 (11.9%)	9,492 (11.9%)	411 (11.1%)

1.1.1 Mortality within 30 days of index admission: by top three reasons

	All
Adult asthma	n=95
Asthma	26 (27.4%)
Other COPD	14 (14.7%)
Pneumonia; unspecified organism	7 (7.4%)
COPD	n=5,133
Other COPD	3,434 (66.9%)
Malignant neoplasm of bronchus and lung	280 (5.5%)
Chronic ischaemic heart disease	149 (2.9%)

1.1.2 Mortality within 90 days of index admission: by top three reasons

	All
Adult asthma	n=185
Asthma	33 (17.8%)
Other COPD	25 (13.5%)
Acute myocardial infarction	9 (4.9%)
COPD	n=9,999
Other COPD	6,092 (60.9%)
Malignant neoplasm of bronchus and lung	661 (6.6%)
Chronic ischaemic heart disease	363 (3.6%)

A full data file presenting national, country and service level results is also available at: www.rcp.ac.uk/projects/outputs/outcomes18_20 or www.data.gov.uk.

1.2 Mortality within 30 and 90 days: by variable

This table presents odds ratio data on whether certain groups of people (for example those who have multiple health conditions) are more likely to die following their admission to hospital. See the report methodology for further detail.

Variable (see Appendix A: Methodology for definition of adjusted odds ratio)	COPD estimates: died in 30 days (adjusted odds ratio with 95% CI)	COPD estimates: died in 90 days (adjusted odds ratio with 95% CI)	Adult asthma estimates: died in 30 days (adjusted odds ratio with 95% CI)	Adult asthma estimates: died in 90 days (adjusted odds ratio with 95% CI)
Sex (Men = 1 (Reference))				
Women	0.88 (0.83 to 0.94)	0.87 (0.83 to 0.91)	0.58 (0.32 to 1.06)	0.66 (0.43 to 1.00)
Age				
35–44	0.26 (0.14 to 0.48)	0.31 (0.21 to 0.47)	-	-
45–54	0.38 (0.31 to 0.47)	0.43 (0.37 to 0.50)	-	-
55–64	0.64 (0.58 to 0.72)	0.64 (0.59 to 0.69)	-	-
65–74	1	1	-	-
75–84	1.47 (1.37 to 1.58)	1.49 (1.41 to 1.57)	-	-
85+	2.32 (2.13 to 2.53)	2.35 (2.20 to 2.51)	-	-
+1 year*	-	-	1.05 (1.02 to 1.08)	1.06 (1.03 to 1.08)
+1 year (quadratic)*	-	-	1.00 (1.00 to 1.00)	1.00 (1.00 to 1.00)
IMD quintile (combined English and Welsh and individual Scottish index of multiple deprivation (IMD/SIMD))^{3, 4}				
1 (most deprived)	1	1	1	1
2	1.06 (0.98 to 1.15)	1.01 (0.95 to 1.08)	0.66 (0.27 to 1.62)	1.01 (0.53 to 1.96)
3	1.09 (1.00 to 1.19)	1.03 (0.96 to 1.10)	0.87 (0.38 to 2.02)	1.56 (0.84 to 2.89)
4	1.10 (1.00 to 1.21)	1.07 (1.00 to 1.15)	1.14 (0.50 to 2.62)	1.68 (0.89 to 3.17)
5 (least deprived)	1.11 (0.99 to 1.24)	1.04 (0.96 to 1.13)	0.65 (0.22 to 1.92)	1.24 (0.59 to 2.61)
Missing / unavailable	1.06 (0.98 to 1.15)	1.01 (0.95 to 1.08)	1.48 (0.29 to 7.56)	1.66 (0.44 to 6.21)
Charlson comorbidity index (adults only)				
0–1	1	1	-	-
2	1.14 (1.03 to 1.27)	1.21 (1.12 to 1.31)	-	-
3	1.57 (1.46 to 1.69)	1.71 (1.62 to 1.80)	-	-
4	1.88 (1.68 to 2.09)	1.97 (1.81 to 2.14)	-	-
5	2.07 (1.78 to 2.40)	2.40 (2.15 to 2.68)	-	-
6	2.81 (2.26 to 3.49)	2.55 (2.13 to 3.05)	-	-
7+	5.29 (4.56 to 6.14)	6.38 (5.65 to 7.21)	-	-
CCI +1 comorbidity	-	-	1.26 (1.04 to 1.53)	1.52 (1.34 to 1.72)
Non-invasive ventilation (COPD only) [†]	4.24 (3.95 to 4.56)	3.03 (2.85 to 3.22)	-	-
Severe and life- threatening asthma [‡]	-	-	2.29 (1.23 to 4.28)	1.78 (1.16 to 2.72)

* Age was included as a quadratic variable for the model for adult asthma mortality (due to low numbers of deaths) and for CYP asthma readmission (due to the narrow range of ages). Odds ratios represent increased odds of the outcome for each +1 year of age, plus an additional effect to represent a non-linear relationship. A quadratic term >1 indicates that the relationship between age and the log odds of the outcome is in the form of a 'U', whilst a value <1 indicates a relationship in the form of 'n'.

[†] NIV in hospital

[‡] Determined based on hospital admission data (respiratory rate, heart rate etc)

Section 2: Readmissions after index discharge

2.1 Readmission within 30 and 90 days of index discharge date⁵

Of adults discharged from acute hospital with an asthma attack or an exacerbation of COPD or children and young people admitted with an asthma attack:

	All	England	Wales
Readmission			
Adult asthma	n=23,707	n=22,426	n=1,047
Within 30 days of index discharge	3,257 (13.7%)	3,121 (13.9%)	110 (10.5%)
Within 90 days of index discharge	6,266 (26.4%)	6,003 (26.8%)	203 (19.4%)
Children and young people asthma	n=6,716	n=6,339	n=280
Within 30 days of index discharge	640 (9.5%)	607 (9.6%)	25 (8.9%)
Within 90 days of index discharge	1,290 (19.2%)	1,230 (19.4%)	43 (15.4%)
COPD	n=81,025	n=76,829	n=3,545
Within 30 days of index discharge	19,806 (24.4%)	18,993 (24.7%)	663 (18.7%)
Within 90 days of index discharge	34,960 (43.1%)	33,450 (43.5%)	1,229 (34.7%)

2.1.1 Readmission within 30 days of index discharge: by top three reasons

	All
Adult asthma	n=4,091
Asthma	1,428 (34.9%)
Pneumonia; unspecified organism	208 (5.1%)
Other COPD	132 (3.2%)
Children and young people asthma	n=746
Asthma	371 (49.7%)
Viral infection of unspecified site	112 (15.0%)
Acute (lower) respiratory (tract) infection	34 (4.6%)
COPD	n=25,095
Other COPD	10,084 (40.2%)
Pneumonia; unspecified organism	3,451 (13.8%)
Heart failure	459 (1.8%)

⁵ Only including patients who were alive at discharge. Same day readmissions have been excluded from the analysis.

2.1.2 Readmission within 90 days of index discharge: by top three reasons

	All
Adult asthma	n=10,719
Asthma	3,381 (31.5%)
Pneumonia; unspecified organism	407 (3.8%)
Other COPD	352 (3.3%)
Children and young people asthma	n=1,863
Asthma	959 (51.5%)
Viral infection of unspecified site	268 (14.4%)
Acute (lower) respiratory (tract) infection	77 (4.1%)
COPD	n=62,161
Other COPD	23,727 (38.2%)
Pneumonia; unspecified organism	7,613 (12.2%)
Chronic kidney disease	1,350 (2.2%)

A full data file presenting national, country and service level results is also available at: www.rcp.ac.uk/projects/outputs/outcomes18_20 or www.data.gov.uk.

2.2 Readmission within 30 and 90 days: by variable

Variable (see Appendix A: Methodology for definition of adjusted odds ratio)	COPD estimates: readmitted in 30 days	COPD estimates: readmitted in 90 days	Adult asthma estimates: readmitted in 30 days	Adult asthma estimates: readmitted in 90 days	CYP asthma estimates: readmitted in 30 days	CYP asthma estimates: readmitted in 90 days
Sex (Men = 1 (Reference))						
Women	0.91 (0.89 to 0.94)	0.92 (0.90 to 0.95)	1.19 (1.07 to 1.33)	1.33 (1.22 to 1.45)	1.15 (0.97 to 1.37)	1.08 (0.95 to 1.23)
Age						
16–24	-	-	0.80 (0.66 to 0.98)	0.77 (0.66 to 0.90)	-	-
25–34	-	-	1	1	-	-
35–44	0.78 (0.65 to 0.94)	0.83 (0.71 to 0.96)	1.00 (0.84 to 1.19)	0.95 (0.83 to 1.09)	-	-
45–54	0.86 (0.80 to 0.93)	0.83 (0.78 to 0.89)	0.91 (0.76 to 1.08)	0.92 (0.80 to 1.05)	-	-
55–64	0.95 (0.90 to 1.00)	0.92 (0.88 to 0.96)	0.92 (0.77 to 1.10)	0.95 (0.83 to 1.09)	-	-
65–74	1	1	1.06 (0.88 to 1.28)	1.08 (0.93 to 1.25)	-	-
75–84	1.06 (1.02 to 1.10)	1.11 (1.07 to 1.15)	1.02 (0.84 to 1.25)	0.99 (0.84 to 1.16)	-	-
85+	1.02 (0.97 to 1.08)	1.05 (1.00 to 1.10)	1.16 (0.90 to 1.48)	1.12 (0.92 to 1.37)	-	-
+1 year**	-	-	-	-	0.96 (0.93 to 0.98)	0.93 (0.92 to 0.95)
+1 year (quadratic)**	-	-	-	-	1.01 (1.01 to 1.02)	1.01 (1.01 to 1.02)
IMD quintile (combined English and Welsh and individual Scottish index of multiple deprivation (IMD/SIMD))^{3,4}						
1 (most deprived)	1	1	1	1	1	1
2	1.01 (0.96 to 1.05)	0.99 (0.95 to 1.02)	0.97 (0.85 to 1.10)	0.95 (0.86 to 1.05)	1.22 (0.97 to 1.53)	0.95 (0.80 to 1.12)
3	1.00 (0.95 to 1.05)	0.94 (0.90 to 0.98)	1.02 (0.89 to 1.18)	1.01 (0.91 to 1.13)	1.16 (0.91 to 1.49)	1.04 (0.86 to 1.25)
4	0.98 (0.93 to 1.03)	0.92 (0.87 to 0.96)	0.95 (0.81 to 1.11)	0.86 (0.76 to 0.97)	1.20 (0.92 to 1.57)	0.94 (0.77 to 1.15)
5 (least deprived)	0.95 (0.89 to 1.01)	0.89 (0.85 to 0.95)	0.81 (0.67 to 0.96)	0.80 (0.70 to 0.92)	0.81 (0.59 to 1.12)	0.90 (0.72 to 1.13)
Missing / unavailable	1.05 (0.92 to 1.20)	1.03 (0.91 to 1.16)	0.99 (0.73 to 1.36)	1.17 (0.92 to 1.48)	1.08 (0.68 to 1.72)	0.99 (0.70 to 1.39)

** Age was included as a quadratic variable for the model for adult asthma mortality (due to low numbers of deaths) and for CYP asthma readmission (due to the narrow range of ages). Odds ratios represent increased odds of the outcome for each +1 year of age, plus an additional effect to represent a non-linear relationship. A quadratic term >1 indicates that the relationship between age and the log odds of the outcome is in the form of a 'U', while a value <1 indicates a relationship in the form of 'n'.

Variable (see Appendix A: Methodology for definition of adjusted odds ratio)	COPD estimates: readmitted in 30 days	COPD estimates: readmitted in 90 days	Adult asthma estimates: readmitted in 30 days	Adult asthma estimates: readmitted in 90 days	CYP asthma estimates: readmitted in 30 days	CYP asthma estimates: readmitted in 90 days
Charlson comorbidity index (CCI) (adults only)						
0-1	1	1	1	1	-	-
2	1.24 (1.17 to 1.31)	1.23 (1.16 to 1.29)	1.49 (1.23 to 1.81)	1.54 (1.32 to 1.80)	-	-
3	1.36 (1.30 to 1.42)	1.43 (1.38 to 1.49)	1.86 (1.56 to 2.23)	1.70 (1.46 to 1.98)	-	-
4	1.60 (1.49 to 1.72)	1.67 (1.56 to 1.78)	2.13 (1.56 to 2.91)	1.98 (1.51 to 2.61)	-	-
5	1.46 (1.32 to 1.62)	1.62 (1.48 to 1.78)	3.44 (2.13 to 5.57)	2.54 (1.60 to 4.02)	-	-
6	1.53 (1.30 to 1.82)	1.84 (1.57 to 2.15)	2.37 (1.11 to 5.07)	4.76 (2.32 to 9.77)	-	-
7+	2.40 (2.13 to 2.71)	2.28 (2.02 to 2.57)	3.91 (2.12 to 7.18)	6.58 (3.54 to 12.25)	-	-

Variable (see Appendix A: Methodology for definition of adjusted odds ratio)	COPD estimates: readmitted in 30 days	COPD estimates: readmitted in 90 days	Adult asthma estimates: readmitted in 30 days	Adult asthma estimates: readmitted in 90 days	CYP asthma estimates: readmitted in 30 days	CYP asthma estimates: readmitted in 90 days
Length of stay	1.01 (1.01 to 1.01)	1.01 (1.01 to 1.01)	1.03 (1.02 to 1.04)	1.04 (1.03 to 1.05)	1.06 (1.01 to 1.11)	1.08 (1.03 to 1.12)
Non-invasive ventilation (COPD only)	1.00 (0.94 to 1.06)	1.06 (1.01 to 1.12)	-	-	-	-
Severe and life- threatening asthma	-	-	1.06 (0.96 to 1.17)	1.00 (0.93 to 1.08)	0.59 (0.49 to 0.71)	0.73 (0.64 to 0.84)
Unclassified asthma severity (<2 years old)	-	-	-	-	0.85 (0.56 to 1.29)	0.96 (0.70 to 1.32)
Any IV drug administered (asthmatic children only)	-	-	-	-	1.31 (1.06 to 1.62)	1.23 (1.04 to 1.45)

Section 3: Case ascertainment

Case ascertainment rates were calculated based on the number of records entered to the audit (at least one) compared with national data on hospital admissions for asthma attack and acute exacerbation of COPD (AECOPD) in England and Wales^{††}. More information on case ascertainment is available in Appendix A: Methodology and at:

- > Adult asthma reports: www.nacap.org.uk/nacap/welcome.nsf/reportsAA.html
- > Children and young people asthma reports: www.nacap.org.uk/nacap/welcome.nsf/reportsPA.html
- > COPD reports: www.nacap.org.uk/nacap/welcome.nsf/reportsSC.html

Adult asthma*

Case ascertainment: 1 November 2018 – 31 March 2020	Number of patients discharged from hospitals in England, Scotland and Wales	Number of patients' records submitted to the audit	Case ascertainment %
National	65,181	29,602	45.4%
England	61,781	27,990	45.3%
Scotland	1,362	262	19.2%
Wales	2,038	1,350	66.2%

Children and young people asthma*

Case ascertainment: 1 June 2019 – 31 January 2020	Number of patients discharged from hospitals in England, Scotland and Wales	Number of patients' records submitted to the audit	Case ascertainment %
National	9,486	8,506	89.7%
England	6,041	8,090	133.9% [‡]
Scotland	2,688	105	3.9%
Wales	757	311	41.1%

COPD*

Case ascertainment: 1 October 2018 – 29 February 2020	Number of patients discharged from hospitals in England, Scotland and Wales	Number of patients' records submitted to the audit	Case ascertainment %
National	217,497	118,639	54.6%
England	205,465	113,545	55.3%
Scotland (1 April 2019 – 29 February 2020)	2,088	566	27.1%
Wales	9,944	4,528	45.5%

* The methodology used by NACAP to calculate case ascertainment changed in 2022. Rates reported above therefore may differ from the rates reported in the respective clinical audit reports. Low NACAP recruitment rates for Scottish hospitals have also impacted numbers.

^{††} As recorded by Hospital Episode Statistics (HES) Admitted Patient Care (APC) (England), Information Services Division (ISD) Admitted Patient Care (APC) (Scotland) and Digital Health Care Wales (DHCW) Patient Episode Database (PEDW) (Wales) datasets.

[‡] See the 2019/20 children and young people asthma report for information on audit inclusion criteria, hospital coding of asthma/wheeze in children and the impact on case ascertainment for this period. Link: www.nacap.org.uk/nacap/welcome.nsf/reportsPA.html

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The Royal College of Physicians (RCP)

RCP plays a leading role in the delivery of high-quality patient care by setting standards of medical practice and promoting clinical excellence. The RCP provides physicians in over 30 medical specialties with education, training and support throughout their careers. As an independent charity representing over 40,000 fellows and members worldwide, the RCP advises and works with government, patients, allied healthcare professionals and the public to improve health and healthcare.

Healthcare Quality Improvement Partnership (HQIP)

The National Asthma and Chronic Obstructive Pulmonary Disease (COPD) Audit Programme (NACAP) is commissioned by 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)

More than 9 million people live with a diagnosis of asthma or COPD in the UK. NACAP aims to improve the quality of their care, services and clinical outcomes. We do this by supporting and training clinicians, empowering patients and carers, and informing policy. We have a track record of delivery and are critical to assessing progress against the NHS Long Term Plan. For more information visit: www.rcp.ac.uk/nacap.

Data from secondary care centres were collected for this report via a bespoke, secure data-entry web tool developed for NACAP by Crown Informatics. More information on the webtool can be found here: www.nacap.org.uk.

Outcomes of adults included in the 2018/19 and 2019/20 adult asthma and COPD and children and young people included in the 2019/20 clinical audit reports

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

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NACAP Board and Advisory Groups

NACAP patient panels

Citation for this document: Royal College of Physicians. *National Asthma and Chronic Obstructive Pulmonary Disease Audit Programme (NACAP). Outcomes of patients included in the asthma and COPD clinical audit 2018/19 and/or 2019/20 clinical audit reports*. Audit report. London: RCP, 2023.

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Registered charity no 210508

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