Royal College of Physicians | NACAP

Drawing breath report methodology

Version 1.0 January 2023

Methodology of the audit creation and setup

NACAP is a suit of continuous clinical audits, the oldest of which commenced in February 2017. There are four audits covering the following workstreams – COPD, adult asthma, children and young people's asthma and pulmonary rehabilitation.

This report presents data describing the care of 102,481 patients in the following groups with records for 708 services across England and Wales:

- People with asthma and COPD discharged from hospital between April 2021 and March 2022
- People with COPD assessed for pulmonary rehabilitation between March 2021 and February 2022
- People with asthma and COPD extracted from 315 general practices in Wales between April 2020 and July 2021

Information governance and data storage, security and transfer

The COPD and adult asthma audits operate under Section 251 approval from the Confidentiality Advisory Group (CAG) of the Health Research Authority (HRA) (reference number: **CAG-8-06(b)/2013**) A record of the approval can be found here. (April 2013 onwards; non-research).

The children and young people's asthma audit operates under Section 251 approval in England and Wales from the Confidentiality Advisory Group (CAG) of the Health Research Authority (HRA) (reference number: **19/CAG/0001**) A record of this approvals can be found here.

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 here. In addition, a patient leaflet and poster are available to download from the same page.

Recruitment of services

For further details of the recruitment methodology employed, please refer to the data analysis and methodology component of the following reports

- COPD
- Adult asthma
- Children and young people asthma
- Pulmonary rehabilitation

Audit questions and data entry

The data sets for the individual work streams can be accessed using the links below

- COPD
- Adult asthma
- Children and young people asthma
- Pulmonary rehabilitation

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 the web tool (www.nacap.org.uk)

Data entry to the audit is regularly reviewed by the NACAP team. Where a few records are entered or where there is a notable change in participation rates, 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.

Support from NACAP

The audit programme team at the RCP provide a helpdesk 9am–5pm every working day, which is available via both telephone and email, so that participants can 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 was May 2022 for adult asthma, children and young people asthma, COPD and July 2022 for PR. Thereafter, data were extracted by Crown Informatics (excluding drafts), 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) (a geographical area in England and Wales which is large enough to be nonidentifiable to the patient)
- 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 sent via secure file transfer to the statistical team at Imperial College London (National Heart and Lung Institute) where they were analysed.

Data clearing and analysis

The data were analysed at Imperial College London. Data received from the RCP were imported into R version 4.0.3. Each patient was linked to the appropriate IMD quintile for England (2019), Scotland (2016) or Wales (2019) using the patients' LSOA11 code. Patients without an LSOA11 code could not be linked to an IMD quintile.

Asthma severity was classified according to the NICE guideline thresholds for heart rate, respiratory rate, oxygen saturation (where measured) and peak flow (where measured). In addition, patients with a heart rate <30 bpm or a respiratory rate <10 breathes per minute were classified as severe. Patients recorded

as ‘Patient too unwell’ for peak flow measurement whose other physiological measurements were normal were classified as severe. NICE guidelines do not provide any recommendations on grading asthma severity in children <2 so these children did not have an associated asthma severity.

Differences in test values (ISWT, 6MWT, ESWT, CAT, CRQ domains) were calculated by subtracting the initial test result from the discharge test result. MCID variables for ISWT, 6MWT, CAT, and CRQ domains were then created by categorising the test value difference variables into those who achieved the MCID and those who didn’t, with MCID achieved defined as: >=48 for ISWT, >=30 for 6MWT, <= -2 for CAT, >=0.5 for CRQ domains.

Data was cleaned by restricting to the appropriate time period, excluding draft records, test records, duplicate records, and patients marked as overseas, and by removing patients with logical inconsistencies in their data (for example, being discharged before being admitted, receiving non-invasive ventilation after discharge, or being marked as not receiving a peak flow measurement but also being given a time for peak flow measurement).Overall, 63492 COPD records, 15,837 adult asthma records, 13,975 CYP asthma records, and 15,713 pulmonary rehabilitation records were suitable for analysis.

Adjusted odds ratios with confidence intervals were calculated using the ‘glmer’ command from the R package ‘lme4’ with a clustering variable (hospital) and explanatory variable(s) connected to the outcome through a binomial logit link. Kaplan-Meier curves were created using the ‘survfit’ package in R.

Case ascertainment

Case ascertainment calculations are based on the number of records entered to the audits compared to national hospital asthma attack and COPD exacerbation data obtained from 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. Data is request at hospital level per month (with an accumulative total for the period).

Hospitals who submitted at least 1 record during the audit period are included in the calculations. Hospitals who have submitted 0 records are excluded and are presented as non-participants for the report (Registered – No data submitted; Not registered).

HES data has suppression and rounding rules applied for the purposes of patient confidentiality (figures <8 are replaced with an *; all data is rounded to a multiple of 5). For the purposes of NACAPs calculations the following rules are applied to provide as accurate case ascertainment picture as possible:

- For children and young people asthma, where the data point in the total column is represented by an * and the monthly columns have more than one * - then the total = 7 (the maximum figure without applying rounding rule).
- For children and young people asthma, where the data point in the total column is represented by an * and the monthly columns have only one * - then the total = 3.5 (the midpoint between 1 and 7 without applying rounding rule).
- For adult asthma and COPD where the total number of records is *, this has been replaced with a 7 (the maximum it could have been)
- For all audits, where the number of records for a particular month is *, this has been replaced with 3.5 (the middle ‘expected’ value it could have been)

This however means that there may be a discrepancy between English service level case ascertainment rates used to calculate England and National case ascertainment for this report and actual case ascertainment if exact numbers had been available.

References

British Thoracic Society (BTS) / Scottish Intercollegiate Guidelines Network (SIGN*). SIGN 153: British guideline on the management of asthma – A national clinical guideline,* 2019.

British Thoracic Society (BTS). *Quality standards for pulmonary rehabilitation in adults*, 2014.

Getting It Right First Time. *Respiratory Medicine GIFT Programme National Speciality Report*, 2021.

National Institute for Health and Care Excellence. *Asthma: diagnosis, monitoring and chronic asthma management*. London: NICE, 2017 [Updated 2021]

National Institute for Health and Care Excellence. Asthma. *NICE Quality standard 25 (QS25)*. London: NICE, 2013 [Updated 2018]

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National Institute for Health and Care Excellence. Asthma. *NICE Guideline 115 (NG115)*. London: NICE, 2018 [Updated 2019]

National Institute for Health and Care Excellence. Asthma. NICE Quality standard 25 (QS25). London: NICE, 2013 [Updated 2016]

National Institute for Health and Care Excellence. Smoking and tobacco. *NICE Quality standard 43 (QS43)*. London: NICE, 2013 [Updated 2021]

National Institute for Health and Care Excellence. Adult's social care. *NICE Guideline 43 (NG43)*. London: NICE, 2016.

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NHS England and NHS Improvement. *Consultation on 2021/22 National tariff payment system*, 2021.

Royal College of Physicians. *Why asthma still kills: the National Review of Asthma Deaths (NRAD) Confidential Enquiry report*. London: RCP, 2014

The Royal College of Emergency Medicine. *Moderate and acute severe asthma, Clinical audit 2016/17 national report,* 2017.

You will find the specific areas of the guidance referenced throughout the report. Where these have been used to determine the questions asked in the audit, this is clearly marked on the datasets.