NCEPOD

The care of patients presenting to hospital with community acquired pneumonia

Study Protocol

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Introduction

In 2012, 345 people for every 100,000 had one or more episodes of pneumonia (1). Of all patients attending their General Practitioner for lower respiratory tract infection symptoms, 5-12% are diagnosed with CAP, with around 42% admitted to hospital (>100,000 admissions per year).

National British Thoracic Society (BTS) CAP audit data 2018/19 found an overall in-hospital mortality of 10.4%, with 5.1% of inpatients admitted to critical care units (3). In 2014, based on data from the UK Office of National Statistics, there were over 25,000 registered deaths from pneumonia making it the sixth leading cause of death in England and Wales (2). The only European countries with higher CAP mortality rates than the UK are Slovakia and Romania. (1)

In the 2018/19 BTS CAP audit, the average length of stay for an episode of CAP was 5 days; 84% of cases were admitted via the emergency department and 14.3% were readmitted within 30 days of discharge. (3,4) The estimated direct healthcare costs are £441 million annually. (5)

The Respiratory Health of the Nation Report (British Lung Foundation) found important variations in the incidence and outcomes of CAP across the UK; highest rate of emergency admission in the North East (age-standardised admission ratio: 125 vs lowest rate of 82 in the South West), highest death rate in the South East (age-standardise mortality ratio 118 vs lowest rate of 89 in East of England. (1)

References:

1. Admission via the emergency department in relation to mortality of adults hospitalised with community-acquired pneumonia: an analysis of the British Thoracic Society national community-acquired pneumonia audit: Emergency Medicine 2015 32: 55-59
2. British Lung Foundation, B. Pneumonia Statistics. 2018; Available from: https://statistics.blf.org.uk/pneumonia
3. BTS Adult Community Acquired Pneumonia Audit report 2018/19. (2018/19 Report in preparation. Previous Reports available from: https://www.brit-thoracic.org.uk/document-library/audit-and-quality-improvement/audit-reports/bts-adult-community-acquired-pneumonia-audit-report-2014-15/
4. Office for National Statistics, O. Death Registration Summary Tables 2016. 2016. Available from: https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathregistrationssummarytablesenglandandwalesreferencetables
5. Welte T, Torres A, Nathwani D. Clinical and economic burden of community-acquired pneumonia among adults in Europe. *Thorax* 2012; **67**(1): 71-9.

Guidelines and standards

- British Thoracic Society guidelines for the management of Community Acquired Pneumonia in Adults, 2009, Thorax 64 Supplement 3. Lim, WS et al.

- British Thoracic Society Guideline of the management of Community Acquired Pneumonia in Adults – annotated 2015 (to cross refer to the 2014 NICE guideline CG91): https://www.brit-thoracic.org.uk/standards-of-care/guidelines/bts-guidelines-for-the-management-of-community-acquired-pneumonia-in-adults-update-2009/annotated-bts-guideline-for-the-management-of-cap-in-adults-2015/

- British Thoracic Society community acquired pneumonia guideline and the NICE pneumonia guideline: how they fit together. 2015 Thorax 70: 698-700. Lim WS, Smith DL, Wise, MP, Welham SA

- British Thoracic Society Care Community Acquired Pneumonia Care Bundle: results of a national implementation project. 2016 Thorax 71: 288-290

- Getting It Right First Time, Royal National Orthopaedic Hospital NHS Trust, NHS England, & NHS Improvement. (2021, March). *Respiratory Medicine - GIRFT Programme National Specialty Report*.

- NHS England and NHS Improvement. (2020, February). Commissioning for Quality and Innovation (CQUIN) Guidance for 2020 - 2021 (No. 001361).

- NICE Guideline: Pneumonia in Adults: diagnosis and management, CG191 2014 (currently stepped down)

- NICE Quality Standard: Pneumonia in Adults QS110 2016 (currently stepped down).

- The National Institute for Health and Care Excellence. (2019a, September). Pneumonia (community-acquired): Antimicrobial prescribing (No. NG138). https://www.nice.org.uk/guidance/ng138/resources/pneumonia-communityacquired-antimicrobial-prescribing-pdf-66141726069445

- The National Institute for Health and Care Excellence. (2019b, September). Pneumonia (hospital-acquired): Antimicrobial prescribing (No. NG139). https://www.nice.org.uk/guidance/ng139/resources/pneumonia-hospitalacquired-antimicrobial-prescribing-pdf-66141727749061

- The National Institute for Health and Care Excellence. (2021, November). COVID-19 rapid guideline: Managing COVID-19 (16.0). https://www.nice.org.uk/guidance/ng191/resources/covid19-rapid-guideline-managing-covid19-pdf-51035553326

Aims and objectives

Overall aim:

To identify and explore avoidable and modifiable factors in the care of adults presenting to hospital with a presumed diagnosis of community acquired pneumonia.

Objectives
Clinical
To identify:

- a cohort of patients with CAP
- characterise the care delivered in the community and on presentation to hospital/admission through to discharge or death
- factors determining an ambulatory care or ward-based approach
- appropriateness of care including risk stratification, antibiotic usage/duration of usage, escalation decisions and discharge location
- communication e.g. admission letter, discharge summary and follow up
- sharing of and treatment escalation plans (e.g. ReSPECT)
- examples of good practice
- remediable factors in the quality of care received and produce recommendations for improvement

Organisational
To review the structures and systems in place to deliver a high-quality service to patients presenting to hospital with CAP:

- available services (acute medicine, same day emergency care, critical care, respiratory, physiotherapy)
- access to investigations
- severity assessment
- respiratory support
- antibiotic formularies; first and second choices for pneumonia severity
- guidelines, audit, and protocols

Opportunities for quality improvement

- To recommend clearer organisation of services, specifically defining accurate diagnosis, determining who should benefit from an ambulatory care or ward-based approach and who requires an escalation of care.
- Publicise best practice guidelines for CAP management and follow up.
- Make recommendations on competencies required to diagnose and deliver effective CAP care.
- Assessment of whether there is a group of patients who fail to receive appropriate escalation of care and monitoring (primary and secondary care).
- Promote preventative measures at hospital discharge.
- De-escalation of care including antibiotics

Methods

Participating hospitals
Data will be collected from all hospitals in England, Wales, and Northern Ireland, which admit patients with community acquired pneumonia.

Population
All patients aged 18 or over who presented to hospital between **1st October 2021 and 31st December 2021** with a primary admission diagnosis of CAP.

Exclusions
Patients presenting to hospital within 10 days of being discharged from hospital where the discharge diagnosis of the previous admission was not CAP (spreadsheet data).

Patients will be identified retrospectively using the following ICD10, SNOMED and Emergency Care Data Set codes.

ICD10 code	Description
J12.0	Adenoviral pneumonia
J12.1	Respiratory syncytial virus pneumonia
J12.2	Parainfluenza virus pneumonia
J12.3	Human metapneumovirus pneumonia
J12.8	Other viral pneumonia
J12.9	Viral pneumonia, unspecified
J13.X	Pneumonia due to Streptococcus pneumoniae
J14.X	Pneumonia due to Haemophilus influenzae
J15.0	Pneumonia due to Klebsiella pneumoniae
J15.1	Pneumonia due to Pseudomonas
J15.2	Pneumonia due to staphylococcus
J15.3	Pneumonia due to streptococcus, group B
J15.4	Pneumonia due to other streptococci
J15.5	Pneumonia due to Escherichia coli
J15.6	Pneumonia due to other Gram-negative bacteria
J15.7	Pneumonia due to Mycoplasma pneumoniae
J15.8	Other bacterial pneumonia
J15.9	Bacterial pneumonia, unspecified
J16.0	Chlamydial pneumonia
J16.8	Pneumonia due to other specified infectious organisms
J17.0	Pneumonia in bacterial diseases classified elsewhere
J17.1	Pneumonia in viral diseases classified elsewhere
J17.2	Pneumonia in mycoses
J17.3	Pneumonia in parasitic diseases
J17.8	Pneumonia in other diseases classified elsewhere
J18.0	Bronchopneumonia, unspecified
J18.1	Lobar pneumonia, unspecified
J18.2	Hypostatic pneumonia, unspecified
J18.8	Other pneumonia, organism unspecified

J18.9	Pneumonia, unspecified
ECDS codes	**Description**
233604007	Pneumonia
278516003	Lobar pneumonia
205237003	Pneumonitis
SNOMED codes	**Description**
125111251000	Bronchopneumonia/Lobar pneumonia
124145811000	Pneumonitis

Sub population

Patients will be included in the initial patient sample if they have a primary diagnosis on admission of CAP. The primary discharge diagnosis will also be collected to enable a sample of patients that were ultimately not confirmed pneumonia patients to be reviewed. This will allow an understanding of what presentations lead to an erroneous diagnosis of pneumonia.

The selection of patients into the study cohort for questionnaire completion and peer review, will be biased towards those more likely to have had a more severe pneumonia and a younger population of patients (50 years old or younger). The marker for severity will be based on whether the patient was admitted to critical care or died in hospital. Up to 10 cases per hospital will be included for questionnaire completion and peer review.

Incidence and prevalence

In the UK, the prevalence of CAP is estimated to be 345 people for every 100,000. Below are the number of admissions (and emergency admissions) for pneumonia reported in the UK in 2018. It should be noted that these figures include hospital acquired pneumonia.

HES DATA:

Primary diagnosis: 3 character code and description		**Finished consultant episodes**	**Admissions**	**Emergency**
J12.0 – J18.9	Pneumonia (see above table for descriptions)	620,541	282,129	274,074

PEDW DATA:

Primary diagnosis: 3 character code and description		**Finished consultant episodes**	**Admissions**	**Emergency**
J12.0 – J18.9	Pneumonia (see above table for descriptions)	30,178	15,970	15,188

Case identification

Within each Trust/Health Board NCEPOD has a Local Reporter (usually employed in clinical audit) who is responsible for providing the details of cases for inclusion to NCEPOD. At the start of the study the Local Reporter will be contacted and sent details of the study criteria.
Patients who are admitted to hospital or ambulatory care with pneumonia will be identified retrospectively using the ICD codes/SNOMED via completion of a spreadsheet with other selected data from central hospital records. This will include patient details (NHS number, hospital number, date of birth), admission/discharge dates, whether the patient was admitted to a critical care ward and discharge location.

Method of data collection

Clinician questionnaire
A questionnaire will be sent to the named consultant responsible for the patients care when they were admitted to hospital. Within this there will be instruction to pass the questionnaire on to most appropriate clinician should it not be the named person.
Data collected will include information on the treatments and investigations the patient received in hospital, specialist reviews, use of protocols and clinical pathways, discharge and follow up.

The questionnaires will be disseminated via the NCEPOD online questionnaire system which is accessed by NCEPOD local reporters. The local reports will then be able email the relevant clinician, granting them access to the online questionnaire. Reminder emails will be sent at six weeks and ten weeks where the data are outstanding. The Local Reporter will be asked to return copied extracts of the patient's case notes to NCEPOD alongside the completed questionnaires.

GP clinical *and community organisational questionnaire*
A questionnaire will be sent to the GP of those patients that were identified as being seen by their GP prior to presentation/admission to hospital. Patients meeting this criteria will be identified from the clinician questionnaire and details of the GP surgery obtained from the case notes. In addition to specific questions regarding the care the individual patient received within the community, questions with respect to the organisation of services for CAP patients in the community will be included. The community care organisational questions will be made available to greater number of community care clinicians via an online survey.

Hospital organisational questionnaire
An organisational questionnaire will be sent to all hospitals that admit patients with CAP.
Data collected will include information around the organisation of services, networks of care, multidisciplinary team working, the use of guidelines/protocols and training.

The questionnaires will be disseminated via the online questionnaire system. Local reporters will be able to invite multiple clinicians to complete the questionnaire,

Case note review
Case note review will be undertaken for a sample of patients who were admitted to hospital with CAP.

Case notes
Photocopies of the case notes of each included patient will be requested at the time of questionnaire dissemination. A list detailing the required case note extracts will be circulated to local reporters. Upon receipt at NCEPOD the case notes will be made anonymous for patient identifiable information.

Reviewer assessment form
A multidisciplinary group of reviewers (details below) will be recruited to assess the case notes and questionnaires and give their opinions on the quality of care via the reviewer assessment form.

Anonymous on-line patient survey
To be developed by NCEPOD. The survey will not be linked to any other aspects of data collection. This survey will gather data on patient views of the services available to them.

Below are the anticipated sample sizes of each type of data collected:

Data source	Target number
Organisational questionnaire	~200
Clinician questionnaires	~500
Case note review	~500
Patient survey	~100

Study method test
The data collection methods and data collection tools will be tested to ensure they are robust.

Analysis and Review of Data

Reviewers
A multidisciplinary group of reviewers will be recruited to assess the case notes and questionnaires and provide their opinion on the care the patients received.

An advert will be sent to Local Reporters to disseminate throughout the relevant departments. It will also be placed on the NCEPOD website. Successful applicants will be asked to attend a training day where they will work through anonymised case notes with the case reviewer form. A number of meeting dates will be arranged, and each reviewer will then be asked to attend a further 4 meetings. NCEPOD staff will ensure there is a mix of specialties at each meeting from across the UK. Each meeting will be chaired by an NCEPOD clinical coordinator who will lead discussion around the cases under review. Meetings will be held virtually if COVID restrictions prevent clinicians from attending. This method has been set up and approved by CAG. Towards the end of the study the reviewers will be invited to attend a meeting where the data will be presented to and discussed with them. The reviewers will also be sent two copies of the draft report for their comment as this is developed.

Confidentiality and data protection
All electronic data are held in password protected files and all paper documents in locked filing cabinets. As soon as possible after receipt of data NCEPOD will encrypt electronic identifiers and anonymise paper documents. Section 251 approval has been obtained to perform this study without the use of patient consent in England and Wales. Public Benefit Privacy Panel approval has been received for Scotland.

Study promotion
Prior to data collection, NCEPOD will contact all hospitals that admit patients with CAP to promote the study. The study will also be promoted to parent/carers and patients via patient groups, NCEPOD Local Reporters (sending the study poster on to the relevant departments), via study contacts recruited as part of the case identification strategy, and via the relevant Colleges and Associations

Dissemination
On completion of the study a report will be published and widely disseminated.

Data sharing
Post publication of the study there is the potential to share anonymised data sets with interested parties working in the same field. This will be undertaken following a strict process and will ensure the data does not become identifiable in their nature due to small numbers.

Timeline

ORIGINAL	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22
CURRENT	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
Form the SAG																									
First SAG																									
Write the protocol																									
Design the questionnaires																									
Second SAG																									
Submit approval requests																									
Advertise the study																									
Advertise for Reviewers																									
Create the database																									
Start data collection																									
Reviewer meetings																									
Data analysis																									
Report production 1st review																									
Report production 2nd review																									
Report production 3rd review																									
To HQIP																									
PUBLISH																									