METHODS

Study advisory group

A multidisciplinary group of clinicians was convened to steer the study from design to completion, define the objectives of the study and advise on the key questions. The group comprised lay and patient representatives and healthcare professionals in clinical biochemistry, emergency medicine, endocrinology, intensive care medicine, general surgery, neurology, pharmacy, renal medicine and specialist nursing.

Study aims and objectives

The objectives of the study were to identify and explore the avoidable and modifiable factors in the care of adults with abnormal levels of blood sodium levels in hospital, including:

- Guidelines/protocols in use for the management of abnormal sodium levels
- Access to investigations
- Laboratory capabilities and reporting
- Areas for improvement in the investigation and treatment of abnormal blood sodium levels

Hospital participation

Data were included from NHS hospitals in England, Wales, and Northern Ireland.

Study population and case ascertainment

Inclusion criteria

All patients aged 18 or over were admitted to hospital between 1st October 2023 and 31st December 2023 and identified as having hypernatraemia or hyponatraemia during their admission by retrospective ICD10 coding. Patients who presented as an emergency and those who developed abnormal blood sodium levels after surgery were included.

Identification of a sample population

A pre-set spreadsheet was provided to every local reporter to identify all patients meeting the study criteria during the defined time period. From this initial cohort, up to eight patients were selected from each hospital for inclusion in the study.

Data collection

Clinician questionnaire

A clinician questionnaire was sent to the named consultant for each patient in the sample. This collected data on the care provided throughout the admission, focusing on investigation and treatment of the patient's abnormal blood sodium level.

Organisational questionnaires

An organisational questionnaire was sent to each hospital to collect data on the organisational structures, staffing provision and policies around the assessment and management of abnormalities in blood sodium levels.

Case notes

Copies of the case notes were requested for the included admission of each patient for peer review. A list detailing the elements of the case notes that were required was provided to the NCEPOD local reporters that who collated the notes from each participating trust/health Bboard., The importance of emphasis was made on the need for including all biochemistry and fluid charts was highlighted.

Peer review of the case notes and questionnaire data

A multidisciplinary group of case reviewers comprising consultants and trainees from acute medicine, anaesthetics, intensive care medicine, endocrinology, gastroenterology, general medicine, geriatric medicine, renal medicine and clinical biochemistry were recruited to peer review the case notes and associated clinician questionnaires.

Using a semi-structured electronic questionnaire, each set of case notes was reviewed by at least one reviewer within a multidisciplinary meeting. A discussion, chaired by an NCEPOD clinical co-ordinator took place at regular intervals, allowing each reviewer to summarise their cases and ask for opinions from other specialties or raise aspects of the case for further discussion.

Data analysis

Following cleaning of the quantitative data, descriptive data summaries were produced. Qualitative data collected from the case reviewers' opinions and free-text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. As the methodology provides a snapshot of care over a set point in time, with data collected from several sources to build a national picture, denominators will change depending on the data source, but each source is referenced throughout the document. This deep dive uses a qualitative method of peer review, and anonymised case studies have been used throughout this report to illustrate themes. The sampling method of this enquiry, unlike an audit, means that data will not be displayed at a hospital/trust/health board/regional level.

Data analysis rules

- Small numbers have been suppressed if they risk identifying an individual (usually less than 5, but this will be determined by the data)
- Any percentage under 1% has been presented in the report as <1%
- Percentages were not calculated if the denominator was less than 100 so as not to inflate the findings, unless to compare groups within the same analysis
- There is variation in the denominator for different data sources and for each individual question as it is based on the number of answers given.

Information governance

All data received and handled by NCEPOD complied with all relevant national requirements, including the General Data Protection Regulation 2016 (Z5442652), Section 251 of the NHS Act 2006 14 (PIAG 4-08(b)/2003, App No 007), and the Code of Practice on Confidential Information. Each patient was given a unique NCEPOD number.