Emergency (non-elective) procedures in children and young people

Study protocol – March 2024

Study Advisory Group Members

Barbara Bahlman	Consultant anaesthetist
Lisa Brown	Parent carer representative
Simon Courtman	Consultant paediatric anaesthetist (Association of Paediatric Anaesthetists)
Sujata De	Consultant paediatric ENT surgeon (British Association for Paediatric Otorhinolaryngology)
Sue Deakin	Consultant orthopaedic surgeon (British Orthopaedic Association)
Jonathan Epstein	Consultant surgeon (Royal College of Surgeons & Association of Surgeons)
Neil Feathersone	Consultant paediatric urologist (British Association of Paediatric Urologists)
Cristina Frezzini	Consultant oral & maxillofacial surgeon (British Association of Oral and Maxillofacial Surgeons)
Laurence Hulatt	Consultant paediatric anaesthetist (Association of Paediatric Anaesthetists)
Richard Hutchinson	Consultant paediatric orthopaedic surgeon (British Society for Children's Orthopaedic Surgery)
Anoo Jain	Consultant neonatologist (British Association of Perinatal Medicine)
Athanasios Kalantzis	Consultant oral & maxillofacial surgeon (British Association of Oral and Maxillofacial Surgeons)
Chris Kelly	Consultant paediatric anaesthetist
Bill Kilvington	Operating department practitioner (College of Operating Department Practitioners)
Dorothy Kufeji	Consultant paediatric surgeon (Royal College of Surgeons)
Zuzana Kusnirikova	Consultant anaesthetist (Association of Paediatric Anaesthetists)
Roger Langford	Consultant anaesthetist (Royal College of Anaesthetists)
Pallavi Latthe	Consultant gynaecologist (Royal College of Obstetrics and Gynaecology)
David MacAfee	Consultant paediatric surgeon (Association of Surgeons)
Alex MacDonald	Consultant paediatric surgeon (British Association of Paediatric Surgeons)
Jane Nicholas	Associate clinical lecturer & Clinical recovery nurse (British Anaesthetic and Recovery Nurses Association)
Andrew Nyman	Consultant paediatric intensivist (Paediatric Critical Care Society)
Adam Oates	Consultant paediatric radiologist (Royal College of Radiology)
Ben Ollivere	Consultant orthopaedic trauma surgeon (British Orthopaedic Association)
Trisha Saha	Lay representative
Ravi Sharma	Consultant paediatric ENT surgeon (British Association for Paediatric Otorhinolaryngology)
Navneet Singh	Consultant neurosurgeons (Society of British Neurological Surgeons & British Paediatric Neurology Association)
Carl Smith	Advanced paramedic in critical care (College of Paramedics)
Rebecca Sutton	Consultant paediatric anaesthetist
Shabnam Undre	Consultant urologist (British Association of Urological Surgeons)
Nick Wilson-Jones	Consultant paediatric plastic surgeon (British Association of Plastic Reconstructive and Aesthetic Surgeons)

Clinical Coordinators

Antony Michalski	Clinical Co-ordinator
Martin Sinclair	Clinical Co-ordinator
Alex Goodwin	Clinical Co-ordinator

Non clinical staff

Heather Freeth	Clinical Researcher
Nicholas Mahoney	Researcher
Marisa Mason	Chief Executive

Introduction

Infant and child mortality rates in England and Wales declined significantly from 1980 to 2020. [1, 2] Improvements in public health including increased immunisation rates, public hygiene awareness, and better nutritional intake have been the main drivers in reducing mortality among infants and children. [3, 4] However, the forty-year decline also reflects significant improvements in paediatric perioperative care. A notable example is in paediatric cardiac surgery where, despite a rise in the national case mix complexity from 2000 to 2010, the 30-day mortality rate for paediatric cardiac surgery halved over this decade. [5] Between 2010 and 2020, emergency paediatric admissions in children under five rose by 18% in the UK. Despite this, advancements in perioperative care along with the availability of dedicated paediatric intensive care facilities led to continued improvements in outcomes for emergency surgical CYP. [6, 7] Indeed, the risk of death and major complications for the general surgical patient population after surgery are low: less than 1% of all patients undergoing surgery die. For emergency surgical CYP, the main challenges lie in the inefficiency of pathways to intervention, increased demand on tertiary centres, appropriate specialty availability and training opportunities, theatre access, a lack of routinely collected and audited data, and equitable access to emergency intervention.

Emergency surgical CYP are a heterogeneous group who can be found on non-elective, elective, adult, and paediatric theatre lists due to a range of medical, neurological and trauma factors. They do, however, share a commonality in the need for prompt assessment, diagnosis and immediate, urgent or expedited access to treatment.[8] The NHS Long Term Plan has pledged that healthcare organisations will provide timely interventions and accurate delivery of emergency interventional care to mitigate lifelong complications. [9] However, reports have indicated that there are still barriers to ensuring all emergency surgical CYP receive access to timely intervention.

In 2019 NHS England highlighted that decades of centralisation of paediatric care had resulted in an increasing drift of non-specialist elective activity clogging up specialist children's centres. While this had not yet happened in non-elective surgery in CYP, the report, along with GIRFT, underscored the importance of ensuring this drift of activity was not reflected in non-elective work. [10, 7] Following the COVID-19 pandemic, anecdotal evidence from specialist centres has suggested this drift is already taking place in non-elective work, with The Royal Manchester Children's Hospital describing their non-elective workload as increasing by 5% to 10% per year in the last four years. The increase in transfers of elective and low-complexity non-elective work from District General Hospitals (DGHs) puts pressure on resources and theatre availability in specialist children's centres. In some cases, the increase in demand can result in elective and low complexity non-elective work, which should be taking place locally, displacing high complexity non-elective procedures in specialist centres.

Additionally, the lowering of thresholds for transferring low complexity non-elective work to specialist centres reduces opportunities for younger non-paediatric clinicians to gain competency in treating non-elective paediatric cases. [10, 11] This is significant due to paediatric cover being thinly spread in DGHs. Despite most paediatric trainees qualifying in general paediatrics, just over half of paediatric consultants work in subspecialty roles. [13] In 2019 it was reported 856 whole time equivalent paediatric consultants were needed to meet the rise in paediatric emergency admissions in the UK.[12] The shortfall in general paediatric specialty uptake coupled with fewer opportunities for non-paediatric specialties to treat emergency surgical CYP, can result in some CYP not being able to access timely emergency intervention due to local staff not having sufficient training or experience in treating CYP.

Interventional radiology enables safe and minimally invasive treatments which can be provided locally for emergency CYP in the form of procedures such as nephrostomies and embolisation for haemorrhage. In all hospitals where emergency surgical CYP are treated, interventional radiology (IR) should be accessible either through direct service provision or through a robust network. However, as with general paediatrics, IR has also recently suffered a shortfall in specialty uptake, with data from the Centre for Workforce Intelligence (England) highlighting the need for an additional 222 consultants in IR. [14, 15] This shortfall in IR uptake can result in more emergency surgical CYP having to be unnecessarily transferred to a specialist children's centres.

In certain circumstances (e.g. in the case of testicular torsion), transfer from one hospital to another has been shown to be a predictable risk factor, as it can cause unnecessary delays to intervention. [16, 17, 18] To mitigate unnecessary delays, transfers should only occur when necessary for high-complexity non-elective cases and in exceptional circumstances for the most common low-complexity cases.[19] When transfer is necessary, agreed thresholds should be arranged within a network of care. [20] However, there is evidence that a growing number of low-complexity non-elective cases, such as testicular torsion, are transferred unnecessary due to general surgery not having sufficient competency in treating CYP.

In 2011 NCEPOD reported on the organisation of paediatric services in the UK. [17] Over a decade later it is important to revisit the pathways of care surgical CYP rely on to draw on the significant developments in knowledge of how to care for this complex and heterogeneous group. This is particularly important given the dearth of data that exists on emergency surgical CYP compared to adults. National projects on adult emergency surgery in the UK have led to improvements in care and the development of detailed and standardised pathways of care and practice. The National Emergency Laparotomy Audit (NELA) resulted in deaths within 30 of surgery falling from 11.8% of emergency laparotomies in the first year of the audit to 8.7% in the latest report. However, NELA does not include patients under the age of 18 and there is data from a single centre audit that there may be a need to look at paediatric emergency laparotomy patients. [21] Comparatively, the care delivered to emergency surgical CYP on a national level is much less understood than those of their adult counterparts.

This NCEPOD study aims to identify remediable factors along the pathway of care provided to CYP undergoing emergency procedures. The final report should be used in conjunction with current guidelines and work programmes to ensure equitable and timely interventional care is provided to all CYP who are categorised as requiring emergency intervention.

Guidelines and standards

- National Confidential Enquiry into Patient Outcome and Death, 2024. Twist and Shout. A review of the pathway and quality of care provided to children and young people aged 2-24 years who presented to hospital with testicular torsion. https://www.ncepod.org.uk/2024testiculartorsion/Twist%20and%20Shout_full%20report.pdf
- Getting It Right First Time, 2024. GIRFT Children and Young People: Testicular Torsion Pathway. https://gettingitrightfirsttime.co.uk/wp-

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- The Royal College of Anaesthetists, 2024. Chapter 10, Guidelines for the Provision of Paediatric Anaesthesia Services. https://www.rcoa.ac.uk/gpas/chapter-10
- Centre for Peri-operative Care, 2023. National Safety Standards for Invasive Procedures 2 (NatSSIPs). https://cpoc.org.uk/guidelines-resources-guidelines/national-safety-standards-invasive-procedures-natssips
- Getting it Right First Time, 2022. Paediatric Trauma and Orthopaedic Surgery. GIRFT Programme National Specialty Report. https://gettingitrightfirsttime.co.uk/surgical_specialties/paediatrictrauma-and-orthopaedic-surgery/
- Getting It Right First Time, 2022. Paediatric Acute Abdominal Pain and Appendectomy. Best Practice Pathway Guidance. https://www.gettingitrightfirsttime.co.uk/wp-content/uploads/2022/06/20220607_Paediatric-general-surgery_Pathway-guide_Acute-abdominal-pain-and-appendicectomy.pdf
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- Royal College of Paediatrics and Child Health, 2018. Facing the Future: Standards for children in emergency care settings. https://www.rcpch.ac.uk/resources/facing-future-standards-children-young-people-emergency-care-settings
- British Society of Interventional Radiology, 2017. Providing access to interventional radiology services, seven days a week. https://www.england.nhs.uk/improvement-hub/wp-content/uploads/sites/44/2017/11/Seven-Day-Access-to-Interventional-Radiology.pdf
- The Royal College of Surgeons, 2015. Standards for non-specialist emergency surgical care of children. https://www.rcpch.ac.uk/resources/facing-future-standards-acute-general-paediatric-services
- Royal College of Paediatrics and Child Health, 2015. Facing the Future: Standards for acute general paediatric services. https://www.rcpch.ac.uk/resources/facing-future-standards-acute-general-paediatric-services
- National Confidential Enquiry into Patient Outcome and Death, 2011. Are We There Yet 2011. https://www.ncepod.org.uk/2011sic.html
- National Adult Cardiac Surgery Audit (NACSA)

Children's Acute Surgical Abdomen Programme

Aim and objectives

Aim

To identify good practice and remediable factors in the delivery of care provided to children and young people (CYP) (0-18th birthday) undergoing emergency (non-elective) procedures under anaesthetic or sedation.

Objectives

Organisational issues

Data to be collected from the organisational questionnaire

To review the organisation of services for CYP undergoing emergency (non-elective) procedures, including:

- What are currently being classed as emergency (non-elective) procedures (including interventions and radiology)
- Protocols and pathways of care (including the definition of paediatric and adult services, shared care arrangements, and escalation policies looking at what else currently exists, e.g. testicular torsion, NELA)
- Networks of care (including the role of tertiary centres in supporting DGHs)
- Transfer arrangements
- The availability of staff (including the seniority of staff, and the availability of ancillary staff)
- The availability of and access to diagnostics/radiology/interventional radiology and the use of remote consulting
- Emergency (non-elective) procedure theatre access, booking systems used and the prioritisation process
- Breaches and consequences
- Access to appropriate critical care
- Support available for staff – (briefing and debriefing procedures)
- The presence of a lead clinician and manager/coordinator for emergency surgery in CYP
- Audit and data collection
- Equitable access for all CYP to emergency (non-elective) surgical services

Clinical issues

Data collected from the clinical questionnaire, the reviewer assessment form and a 'real time' survey designed to pick up themes that may not be recorded in the case notes.

To review:

Whether the patient arrived at hospital in a timely manner? Including;

- Referral to hospital
- Transfers
- The assessment process (including investigations and specialty review)

Whether the patient saw the right people? Including:

- The seniority of staff (including (onsite) staff making the decision to undertake the procedure, anaesthetising the patient, and undertaking the procedure)
- The availability of staff at all stages of the pathway (including radiology and recovery)
- Joint working arrangements

Whether there were there any delays in the patient getting to theatre? Including:

- The time from arrival to procedure

    - Does the consent process for looked after children/access to safeguarding leads cause delay
- The time from the decision to undertake the procedure to procedure
- The availability and location of theatres

Additional:

- Post procedure care (including access to critical care)
- Complications
- Health inequalities (including equity of access to emergency surgical services)

Methods

Inclusion criteria

CYP aged 0 to 18th birthday, undergoing an emergency (non-elective) procedure under anaesthetic or sedation. This will include patients who underwent procedures as part of an emergency surgery, trauma or elective, paediatric or adult theatre list. This will also include patients who underwent a procedure in the emergency department where they can be identified. Patients will be identified for inclusion from hospital patient administration or theatre systems.

Exclusions

- CYP who die prior to arrival in theatre/the procedure area.

Data sampling timeframes

Patients will be identified for inclusion from a sample of patients admitted between the 1st January 2024 – 31st December 2024.

From this group, to allow for seasonal variation, there will be two separate two-week time frames (time frame 1 and time frame 2) from which data will be sampled for inclusion in the clinical peer review process (one during summer and one during winter).

Participating providers of healthcare

All hospital providers where patients might undergo emergency (non-elective) procedures will be asked to participate in the study.

Incidence and prevalence of the exemplar conditions

Early scoping has identified 469 patients from 19 Trusts/Health Boards undergoing an emergency or urgent procedure over a one-week period. This is an average of 25 per Trust/Health Board per week (**range, 0.5 – 116**; median, 14; Mode, 7). Based on data returns from 125 Trusts/Health Boards, this would identify approximately 3,125 patients per week for inclusion in the study.

There will be variation in the number of patients operated on in each organisation, and a large number of patients will be identified for inclusion from tertiary centres. Not including data from these centres as outliers, there were 185 patients identified from 15 Trusts/Health Boards who underwent an emergency or urgent procedure over the one-week period. This is an average of 12 per Trust/Health Board per week (**range, 0.5 – 40**; median, 8; mode, 7)

Study promotion

Prior to data collection, NCEPOD will contact all hospitals providing care to this group of CYP. The study will also be promoted via NCEPOD Local Reporters (sending the study poster on to the relevant departments), the relevant Colleges and Associations, and any relevant patient groups and third sector organisations.

Study method test
The data collection methods and data collection tools will be tested to ensure they are robust before the full study is run.

Methods of data collection

There will be six main methods of collecting data for the study:

1. An organisational questionnaire will be sent for all hospitals where patients might undergo emergency (non-elective) procedures.

2. Clinical data collection – retrospective data collection: For a sample of patients, a questionnaire will be sent to the clinician who undertook the procedure and anaesthetist who was responsible for the care of the patient at the time of the procedure.

3. Clinical data collection – 'real-time' clinician survey: This will be used to collect 'real-time' data on procedures undertaken over the same period as time frame 1.

4. Clinical data collection – data collection quality check: A sample of patients will be identified 'prospectively/on the day' to see if they later present on hospital systems.

5. Case note review: Copies of selected extracts of case notes will be collected for peer review.

6. Clinician views will be collected through an online anonymous survey. We will work with Local Reporters and study contacts to encourage involvement from clinicians.

Further details on the methods of each method of data collection are given below.

1. Organisational questionnaire
Data will be collected at a hospital level and will collect information around protocols and pathways of care, networks of care, transfer arrangements, staffing arrangements, diagnostics and radiology, access to theatre and critical care, audit and data collection, and equitable access to services. The questionnaire will also collect information around the numbers of emergency (non-elective) procedures being undertaken. Questionnaires will be sent to all hospitals participating in the study via the online questionnaire system.

2. Clinical data collection – retrospective data collection
Patient identification
Two patient identification spreadsheets will be used to identify patients for inclusion retrospectively in the study.

a) Spreadsheet 1
This will be used to identify patients from data sampling time frame 1. The local reporter will be asked to complete the patient identification spreadsheet with the details of all patients who underwent an emergency (non-elective) procedure under anaesthetic or sedation within time frame 1**.** The data fields requested will include NHS number, hospital number, date of birth, sex, post code, date of admission, hospital transfer details, date and time of procedure, procedure undertaken (free text and OPCS codes), urgency of the procedure undertaken, type of anaesthetic received (where available), where the procedure was undertaken (type of theatre), which list the patient was on, date of discharge, discharge

destination/outcome, the operators details (code and specialty), the anaesthetists details (code), and the opt out status of the patient.

From testing the data collection methods, it is understood these fields will be available from either patient administration systems or the theatre booking system and will be available from the day after the procedure. To allow for the prompt identification of patients, the spreadsheet will be sent ahead of the data sampling time frame, and the local reporter will be asked to return this as soon as possible following the end of time frame 1.

b) Spreadsheet 2
This will be used to identify patients from data sampling time frame 2. The local reporter will be asked to complete the patient identification spreadsheet with the details of all patients who underwent an emergency (non-elective) procedure under anaesthetic or sedation within time frame 2**.** The data fields requested will include NHS number, hospital number, date of birth, sex, post code, date of admission, hospital transfer details, date and time of procedure, procedure undertaken (free text and OPCS codes), urgency of the procedure undertaken, type of anaesthetic received (where available), where the procedure was undertaken (type of theatre), which list the patient was on, date of discharge, discharge destination/outcome, the operators details (code and specialty), the anaesthetists details (code), and the opt out status of the patient.

Tracking healthcare across multiple organisations
For patients admitted to a different hospital and transferred to the operating hospital, a short clinical questionnaire will be sent to the clinician responsible for the patient prior to transfer. To enable us to identify whether a patient was transferred, details regarding transfers will be requested in the patient identification spreadsheet, and the surgical (operator) and anaesthetic questionnaires. If a patient is identified as being transferred in from another hospital for their procedure, we will contact the local reporter of the transferring organisation to confirm whether the patient is known to their organisation using the NHS number and date of birth prior to uploading the questionnaire.

Clinician questionnaires
Three questionnaires will be used to collect clinical data for this study:

1) Surgical (operator) questionnaire
2) Anaesthetic questionnaire
3) Transfer questionnaire

Surgical (operator) and anaesthetic questionnaires
Questionnaires will be sent to the clinician undertaking the procedure and the anaesthetist responsible for the patient at the time of procedure. Up to 20 patients per hospital will be sampled for inclusion and these will be split across the two data sampling time frames (i.e. 10 from time frame 1 and 10 from time frame 2). Questionnaires will be sent to the NCEPOD Local Reporter for dissemination via the online questionnaire system. A reminder will be sent at six weeks and ten weeks where the data is outstanding.

For the patients identified in data sampling time frame 1, these questionnaires will be sent for completion as soon as possible following receipt of the patient identification spreadsheet.

Transfer questionnaire
Where applicable, the transfer questionnaire will be sent to the clinician responsible for the care of the patient prior to transfer to the hospital where the procedure was undertaken. This questionnaire will be sent to the NCEPOD Local Reporter for dissemination via the

online questionnaire system. A reminder will be sent at six weeks and ten weeks where the data is outstanding.

3. Real-time clinician survey
The survey will be open to gather 'real-time' data over the same period as time frame 1. This survey will collect information from surgeons (operators), anaesthetists and other theatre staff around delays to the procedure. The survey will be available in the NCEPOD online questionnaire system, and the NHS number of the patient will be collected which will allow us to link this to data collected as part of the retrospective clinical data collection.

4. Clinical data collection – prospective data collection
Where organisations are able to provide the information, a patient identification spreadsheet will be used to identify patients 'prospectively/on the day' to see if they later present on hospital systems.

4. Case note review
Photocopied case note extracts will be requested for each patient included in the study sample. The case note review will include patients who underwent an emergency (non-elective) procedure within either data sampling time frame.

Notes requested will include:
From transferring hospitals

- Clinical notes from admission to discharge

From the operating hospital

- 111 Pathways notes (from Adastra or similar) (where available)
- Ambulance patient report form
- Transfer notes
- Medical and nursing notes from ED clerking to discharge
- Imaging reports
- Operation/procedure notes
- Anaesthetic chart
- Consent forms
- Discharge summary
- Follow-up clinic letters

Upon receipt at NCEPOD the case notes will be redacted if not already done so prior to sending.

Reviewer assessment form
A multidisciplinary group of reviewers (detailed below) will be recruited to assess the case notes and questionnaires and provide their opinion on what went well and what did not go well during the process of care via the reviewer assessment form.

5. Anonymous online clinician survey
The survey and interviews will gather data on clinician views of the services available for them to provide to patients undergoing emergency (non-elective) procedures. The data will not be linked to any other aspects of data collection.

Table 2 summarises the data sources for significant points along the pathway.

Area of enquiry	Method of data collection	Confidentiality
Acute care	Case notes, clinician questionnaire, online real time survey, organisational questionnaire	Identifiable
	Online clinician survey	Anonymous

Sample Size

Data source	Target number
Organisational questionnaire	~250
Surgical questionnaires	Up to a maximum of 20 per hospital
Anaesthetic questionnaires	Up to a maximum of 20 per hospital
Case note review	Up to a maximum of 20 per hospital
Clinician online survey (non-identifiable)	300

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 what went well and what did not go well during the admission. The reviewer group will comprise paediatric and adult surgeons (general and specialist), anaesthetists (general and specialist), emergency medicine clinicians, nurses, paediatricians, radiologists, critical care clinicians and operating department practitioners.

An advert will be sent to Local Reporters to disseminate throughout the relevant departments. It will also be placed on the NCEPOD website and social media channels. Successful applicants will be asked to attend a training day where they will each assess the same two cases to ensure consistent assessment. A number of meeting dates will be arranged, and each reviewer will then be asked to attend a minimum of 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. The meetings will either be held in person in the NCEPOD office, or over Microsoft Teams with secure and temporary access to the case notes for review (not downloadable or printable by the case reviewer). 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.

Ethical approval will not be required to undertake this study. Duty of candour is covered by the NCEPOD Cause for Concern policy, which ensure that any cases reviewed as less that satisfactory and as a cause for concern are discussed and action taken where required.

Study outputs

On completion of the study a report will be published and widely disseminated to all stakeholders to encourage local quality improvement (QI) (further details available in the communication plan). In addition to the report, supporting tools will be made available including:

- A summary report and summary sheet
- Infographics
- The recommendation checklist
- An audit tool
- A slide set
- A guide for commissioners
- Quality improvement tools
- Useful links for children and young adults and parent carers

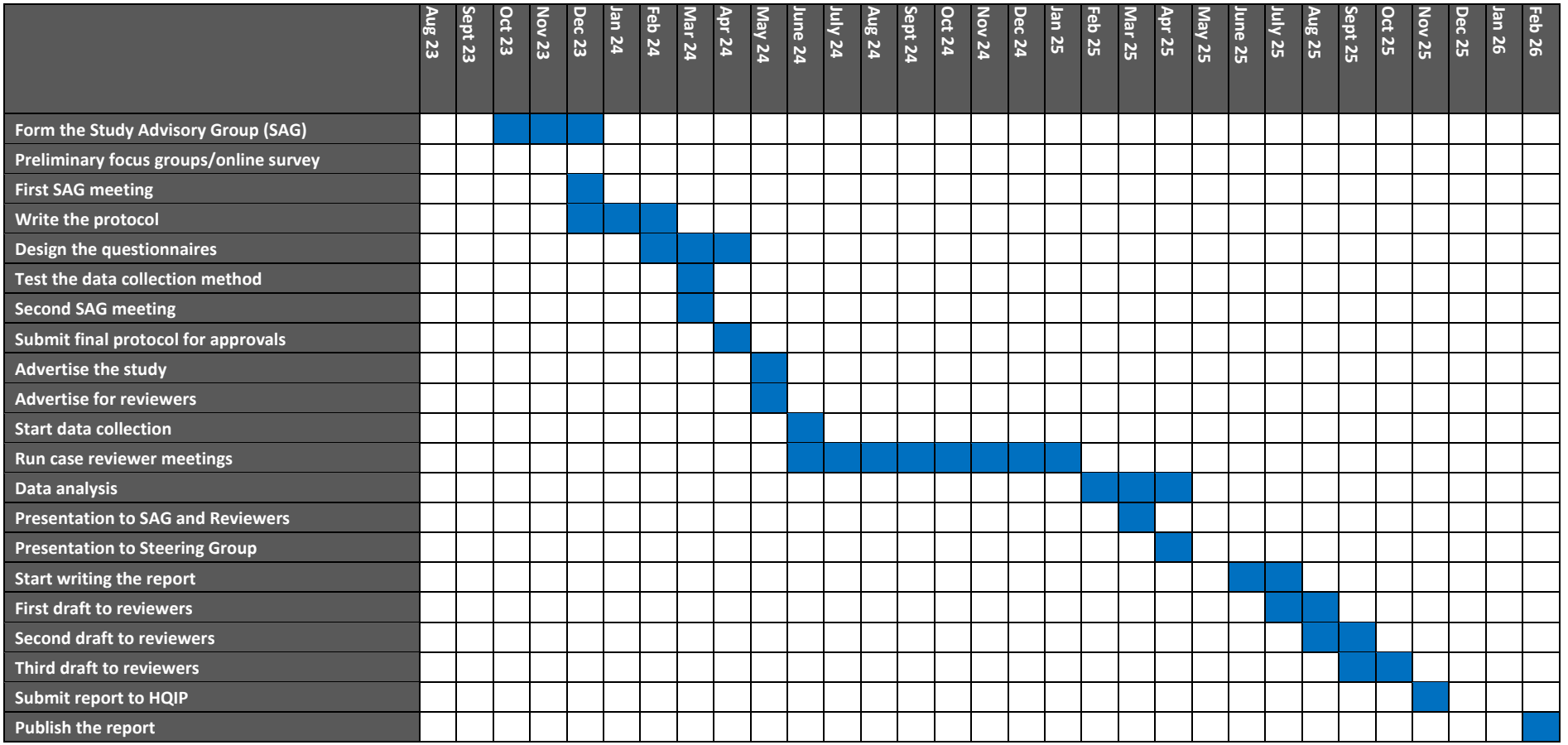
Examples of good practice will be shared, and additional QI tools will be developed where appropriate. Key messages from the report will be shared via social media.

Following publication, the report findings will be shared at national and local conferences, study days and other events; and papers submitted to journal for consideration for publication.

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.

Timescale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Form the Study Advisory Group (SAG)
Preliminary focus groups/online survey
First SAG meeting
Write the protocol
Design the questionnaires
Test the data collection method
Second SAG meeting
Submit final protocol for approvals
Advertise the study
Advertise for reviewers
Start data collection
Run case reviewer meetings
Data analysis
Presentation to SAG and Reviewers
Presentation to Steering Group
Start writing the report
First draft to reviewers
Second draft to reviewers
Third draft to reviewers
Submit report to HQIP
Publish the report

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