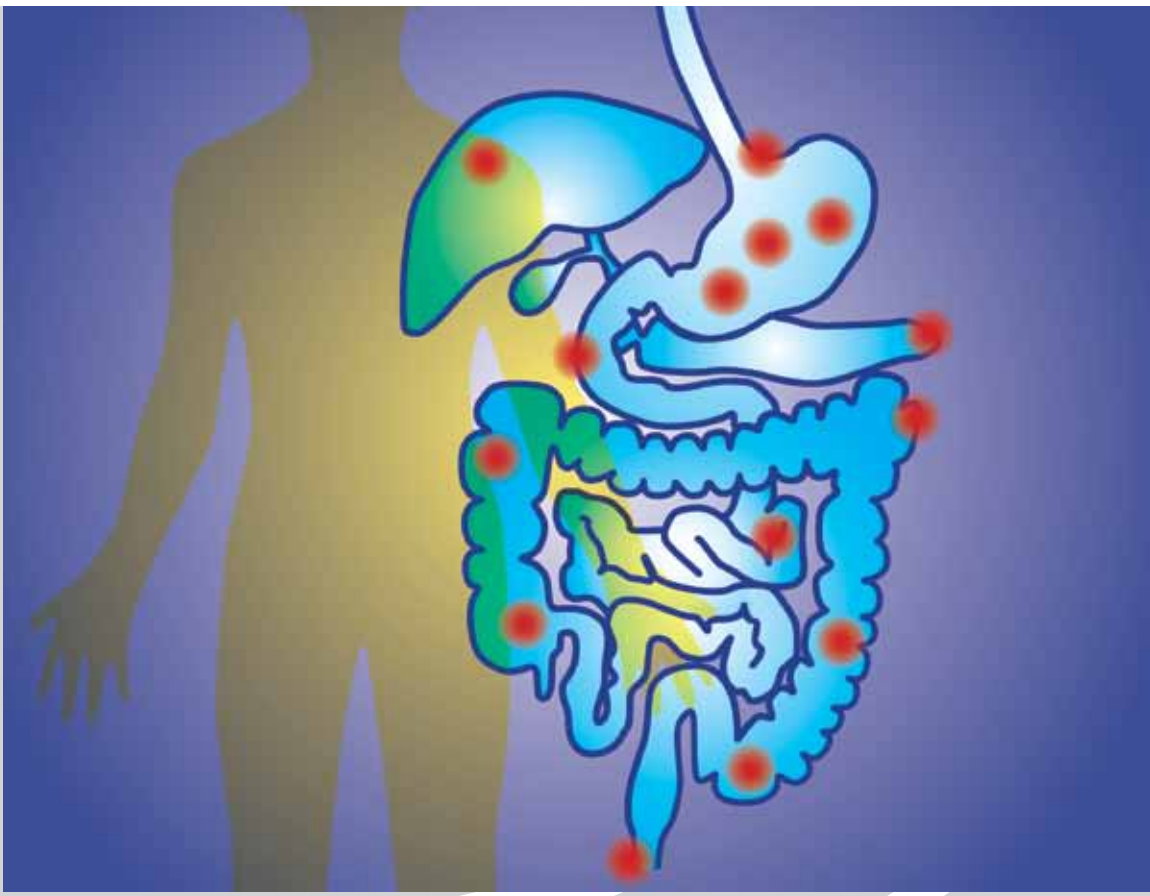
Time to Get Control?

A review of the care received by patients who had a severe gastrointestinal haemorrhage



NCEPOD

Improving the quality of healthcare

Time to Get Control?

A review of the care received by patients who had a severe gastrointestinal haemorrhage

A report by the National Confidential Enquiry into Patient Outcome and Death
(2015)

Compiled by:
S J McPherson BSc MRCP FRCR EBIR – Clinical Co-ordinator
Leeds Teaching Hospitals NHS Trust

M T Sinclair MB ChB FRCS – Clinical Co-ordinator
The Ipswich Hospital NHS Trust

N C E Smith PhD – Clinical Researcher and Deputy Chief Executive

K Kelly BA (Hons) PGC Health Research – Researcher

D Ellis – Administrative Officer

M Mason PhD – Chief Executive

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Dr Rawya Badreldin, Consultant Gastroenterologist
Dr Ian Beales, Consultant Gastroenterologist
Dr Shivkumar Budihal, SPR in Gastroenterology
Dr Basant Chaudhury, Consultant Gastroenterologist
Mr Alex Chung, Consultant Colorectal Surgeon
Dr Ben Colleypriest, Consultant Gastroenterologist
Dr Paul Collins, Consultant Gastroenterologist
Dr Thomas Cozens, Consultant Acute Care Physician
Dr Stephen D'Souza, Consultant Interventional Radiologist
Dr Mark Fullard, Consultant Gastroenterologist
Professor Peter Gaines, Consultant Interventional Radiologist
Dr John Gordon, Consultant Gastroenterologist
Dr Sanjay Gupta, Consultant Gastroenterologist
Dr Chris Hammond, Consultant Interventional Radiologist
Dr Sarah Hearnshaw, Consultant Gastroenterologist
Professor Sauid Ishaq, Consultant Gastroenterologist
Dr Martin James, Consultant Gastroenterologist
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Foreword

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A Bleeding Shame

Forgive the obvious pun if you will, but this vital study should provide a rallying call to the NHS to recognise that things have got to change. The crucial message is that over half of the patients who came to the NHS with an acute emergency that should be dealt with as routine work, received care that our reviewers would not accept from themselves or their teams. This is a problem that must be addressed if it is not to become the next NHS scandal.

However, our study also describes a complex picture and we have to put the presenting problem into context. We have first to acknowledge the revolution that has been achieved before we can understand the process of adjustment that still needs to be made to deliver the service we need.

A few years ago I awoke to the alarming sight of my friend and neighbour being carried into an ambulance. Having self-medicated with a daily aspirin 300 mg for a couple of years as a precaution following a minor embolic stroke, he was paying the price in the form of a massive gastrointestinal bleed. Over the next 48 hours the endoscopists repeatedly attempted to stop the bleeding without success and things were looking difficult. Then a radiologist managed to manoeuvre a catheter into the appropriate artery and to block the haemorrhagic area by producing an embolus, just like the cerebral event my friend had been so anxious to avoid.

This was the first time I had encountered this embolisation technique at first hand and it brought home to me how rapid the evolution had been. My battered 1957 textbook of surgery[i] does not have gastrointestinal haemorrhage in its index: haematemesis and melaena both lead the reader to a recommendation for rest in a bed with raised feet in absolute peace and quiet, followed by a set of open surgical interventions that involved removing significant portions of the patient's innards. 30 years later, Cuschieri and Humphries contributed a chapter[ii] describing a new and much less invasive technique but even then the limitations were thought to be considerable:
"Endoscopic treatment of bleeding is feasible, although by no means always successful. The two main methods are photocoagulation with a laser, or coagulation by an electric current. Direct application of the latter with an electrode is not particularly effective as the coagulum is usually pulled off as the electrode is removed. Perhaps the best way of endoscopic haemostasis is by the heater probe. The exact place for this type of treatment is as yet unclear. It is asking a lot to expect an endoscopist to stop arterial bleeding from a large vessel in the base of a chronic duodenal or gastric ulcer, and indeed the results of such interventions in major upper gastrointestinal haemorrhage are disappointing. On the other hand, slower bleeding from the margins of an ulcer or discrete bleeding from an erosion can often be stopped."

Today the first line of therapy for GI bleed is clearly endoscopy, together with a medical modality to reduce acidity such as a proton pump inhibitor (PPI). If that fails, interventional radiology is now the recognised second line therapy and every hospital handling such acute admissions needs to be able to deal with this common emergency. There must be a Bleeding Rota to provide both therapies at any time of the day or night, either on site or as part of a network.

One challenge for the NHS is that its own workforce struggles to change shape fast enough to keep up with the changes in the art they have to deliver. More places told us that they could deliver open surgery out of hours than interventional radiology, yet surgery is now reserved for a tiny minority of intractable cases.

What is difficult to assess is how far this staggering progress in the state of the art over such a brief period of time has been matched by a similar improvement in the quality of the care. In some ways medicine has never been easier to

deliver. Massive operations removing large parts of the intestines were intrinsically harder to bring off safely than modern endoscopies where the appropriately trained operator can reach the lesion under direct vision without making an incision in the skin.

Have we devoted as much energy and resource to the improvement of the delivery of care as we have to the improvement of the equipment and the state of the art? In some respects things are obviously getting better: the classic story from the early CEPOD report of the SHO struggling alone in the middle of the night to deal with a dissecting aortic aneurysm sounds much more distant than Cuschieri and Humphries's roughly contemporaneous description of the early days of advanced endoscopy. Yet every silver lining comes with its cloud: the more protected junior acquires less clinical ability to recognise and treat disease. Is the gap between what is and what should be the standard of care narrowing or is it getting wider?

In this case there is a null hypothesis, a potentially benign explanation that cannot be dismissed out of hand. GI bleeding is not a disease: it is a sign of an underlying pathology, a manifestation of other disease. Sometimes it is an *end*-stage event in elderly people or it may be caused by complex disease which is beyond the present state of the art.

Indeed, 20 years ago Rockall et al[iii] predicted that mortality from GI bleeding would not fall: they noted that the mortality from this event increased significantly with the age of the patient and that since the population was aging, death from GI bleeding must not be expected to fall despite advances in the art. Both propositions have withstood the test of time and so it is certainly no indictment of our service that we should still find a significant mortality. Since that report by Rockall et al, H2 receptor antagonists have been joined by PPIs and antibiotics following the recognition of the role of helicobacter in the 1990s, so that the incidence of uncomplicated ulcers in younger patients has fallen dramatically leaving a hard core of more challenging problems. This means that studies reporting a modest decline in mortality between 1993 and 2011[iv] provide some cause for celebration. The NHS is responding to a different pattern of disease, with GI bleeds frequently presenting as a complication of other disease in older patients. One of our cases concerned a centenarian who developed a massive bleed as a complication of treatment for a fractured hip. Clearly the proportion of simple peptic ulcers must have fallen and the challenge posed by the average GI bleed is more formidable today than ever before.

This means that as so often with NCEPOD studies, you have to get up close and examine the details to understand what is going on. You have to look at the organisation of care and then read the illustrative vignettes to put flesh on the bones. What we have done is to take about 500 of the most serious cases, chosen because they needed four or more units of blood, and then followed what happened to them in detail. And it is this detailed examination that reveals a situation of which we should be ashamed. Some of the service is wonderful and you can readily appreciate that lives are being saved every day as a result of highly skilled doctors deploying state of the art techniques on people they have never met before in the middle of the night. The trouble is that it is so patchy that it is the places providing a well organised smooth service that indict those who do not.

A quarter of the hospitals that are treating this condition told us that they know they are not accredited by the Joint Advisory Group that was established to set standards for endoscopy over 20 years ago. For me that encapsulates the problem. To quote the *patois* of our politicians, we know what good looks like and these centres know that it does not look like them. You can cut it all sorts of different ways to identify the deficiencies: one hospital has no out of hours endoscopy rota and is not part of a network; another does not have interventional radiology and is not part of an arrangement to provide it, even during working hours: a third has the team in theory, but it is largely manned by locum doctors or bank nurses so the set-up is fragile and unacceptable delays are commonplace.

We do understand that it is difficult within a cash-strapped service to provide this sort of cover. Since 2003 when the NHS deliberately introduced an expensive new contractual arrangement with its consultants, we have insisted on doctors working fixed hours that managers could control. As a corollary we have no longer been able to rely on their professionalism to provide an out of hours cover for which there are no designated funds. The shared recognition that

there were patients who would benefit is not enough to create a service in an era when doctors are paid by the hour. This is the outcome shaped by the modern contract and an event that occurs once every 6 minutes cannot be managed on the basis of one-off volunteers.

Nor has it been helped by moving to a consultant delivered service. Getting up at 3 am to go into a hospital to pass an endoscope is work suited to younger doctors who are more likely to have the physical resilience to be able to handle the out-patient clinic next day. One senior physician pointed out to me that it is also much easier to organise this service in London. A large population will produce a steady flow of work to keep a 24 hour team occupied and enough doctors to be able to absorb the work. In smaller centres, towns served by one DGH of less than 500 beds where there may be only three or four endoscopists and fewer interventional radiologists, it is very hard to provide out of hours cover.

We acknowledge that it is difficult – just as some of these patients present with complex disease that would challenge the most skilled physicians, in some places the logistical challenges would daunt the most determined organisers. And in part it clearly is a question of resources: the results of national parsimony can be seen in this study.

The fact that it is understandable and the challenges are formidable does not mean that it is acceptable or the response is tolerable. We cannot even say GI bleeding is a Cinderella service, something that has languished in the corner unrecognised. No service managing 90,000 life threatening emergencies a year can pass unnoticed for very long. The insiders know that GI bleeding has just not been given the priority that this study shows it needs.

I want to acknowledge the enormous amount of work that has gone into this study. First, from the GI physicians who asked us to study their work. Then HQIP who paid for it. Then the Study Advisory Group who identified the questions we needed to ask and the data we would need for the answers to be useful. Then the Local Reporters with the support of their Ambassadors, who identified the cases and secured the copy notes for us. Then come the clinicians who filled in the questionnaires that enabled us to assess the quality of the care received by their patients. Only then could the Reviewers enter the scene, giving up many days of their time to assess each of the cases in detail and to pick out the data that you see before you. Then we have our authors who have arranged the data and provided the commentary. Finally the Steering Group – mostly the nominees of the Royal Colleges: it is they who chose the Study topic in the first place and who have periodically reviewed the work as it has gone forward, providing criticisms on the basis of their own experience. All of these people have come together and given up their time, almost all unpaid, because they believe they can make the service better for patients.

It will be apparent that this is a diverse problem and that one centre's problems are quite different from another's and we have had to work hard to produce a report that is fair to the diversity as well as the complexity of this problem. However, at the end of the road I am left with one clear conviction: something must be done. The recommendations on page 97 seem to me to be hard-headed and sensible, but they will need an effort of will to push things through. The time has passed when the professionals alone can deliver the sort of organisational change that we need to support the service we need and are entitled to demand. Every hospital ought to have a Lead Clinician for GI bleeds and they should be provided with the resources they need to deliver an appropriate service. Commissioners should insist that the service we deserve is a priority and the CQC should look for evidence that these recommendations are being applied when they inspect. Just remember Dear Reader, it could be you or yours who needs this service.

Bertie Leigh - NCEPOD Chair

i The Essentials of Modern Surgery Handfield-Jones and Porrit 5th Edition 1957
ii Essential Surgical Practice Ed Cuschieri, Giles, Moosa; 2nd Edition 1988
iii Incidence of and mortality from acute upper gastrointestinal haemorrhage in the United Kingdom. Rockall, Logan, Devlin, Northfield BMJ 1995;311: 222-226
iv Cook Cash and West, Endoscopy 2011;141:62-70

Principal recommendations

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Patients with any acute GI bleed should only be admitted to hospitals with 24/7 access to on-site endoscopy, interventional radiology (on-site or covered by a formal network), on-site GI bleed surgery, on-site critical care and anaesthesia. *(Medical Directors, Ambulance Trusts and Commissioners)*

Hospitals that do not admit patients with GI bleeds must have 24/7 access to endoscopy, interventional radiology and GI bleed surgery for patients who develop a GI bleed while as an inpatient for another condition by either an on-site service or a formal network. *(Medical Directors, Chief Executives and Trust Boards)*

The traditional separation of care for upper and lower GI bleeding in hospitals should stop. All acute hospitals should have a Lead Clinician who is responsible for local integrated care pathways for both upper and lower GI bleeding and their clinical governance, including identifying named consultants, ideally gastroenterologists, who would be responsible for the emergency and on-going care of all *major* GI bleeds. *(Medical Directors, Clinical Directors)*

All patients who present with a *major* upper or lower GI bleed, either on admission or as an inpatient, should be discussed with the duty or on-call (out-of-hours) consultant responsible for *major* GI bleeds, within one hour of the diagnosis of a *major* bleed. *(All Doctors)*

The ongoing management of care for patients with a *major* bleed should rest with, and be directed by the named consultant responsible for GI bleeds; to ensure timely investigation and treatment to stop bleeding and reduce unnecessary blood transfusion. *(Lead Clinicians for GI Bleeds, Medical Directors, Clinical Directors)*

All patients with a GI bleed must have a clearly documented re-bleed plan agreed at the time of each diagnostic or therapeutic intervention. *(Gastroenterologists, Radiologists and GI Bleed Surgeons)*

Introduction

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Gastrointestinal (GI) bleeding is one of the commonest medical emergencies. The incidence rate of 1.33/1000 population equates to approximately 85,000 cases/year in the UK or one gastrointestinal bleed every 6 minutes.[1,2] Several surveys have shown that current services are inadequately resourced, particularly in the out-of-hours period.[3-5]

GI bleeding is the second commonest medical reason for transfusion in the UK after haematological malignancy, accounting for 14% of all blood transfusions.[6] Early treatment can reduce the number of units of blood received and complications. Beyond the individual patient benefits, reducing the amount of blood used would reduce NHS transfusion costs.

GI bleeding can occur anywhere from the mouth to the anus and is managed by both medical and surgical teams. It is traditionally split into upper GI and lower GI bleeding. Both are most commonly due to benign diseases. Mortality is largely due to complications associated with a combination of advanced age, multiple co-morbidities and low haemoglobin levels at presentation,[7] rather than bleeding to death.

Upper GI bleeds are subdivided into non-variceal upper GI bleeds (NVUGIB 89%) and variceal upper GI bleeds (VUGIB 11%).[3] NVUGIB is most commonly due to peptic ulcer disease and less commonly abnormal blood vessels, malignancy and other rare causes. VUGIB is commonly due to increased portal pressure from liver disease. Upper GI bleeds have an associated mortality rate of 10%.[3]

Lower GI bleeding is three times less common than upper GI bleeding.[2] Causes include diverticular bleeding, abnormal blood vessels, colitis, bowel cancer and haemorrhoids. The reported mortality rates for lower GI bleeding are also less than for upper GI bleeding, and have not been the focus of much attention. However, a recent study from Portugal showed that despite indicators of severe bleeding being present in a third of patients the mortality rate remained low at 2.2% across the entire study population.[8]

The separation of bleeding into upper and lower GI bleeding has a practical relevance. The distal duodenum represents the limit that can be routinely reached by a standard fibre-optic endoscope via an oral approach. Beyond the reach of oesophago-gastric-duodenoscopy (OGD) alternative diagnostic and therapeutic techniques are required. Upper GI bleeding investigation and treatment includes supportive therapy, pharmacological agents, endoscopic treatment, diagnostic and interventional radiology procedures, and open surgery. Lower GI bleeding investigation and management includes supportive therapy, diagnostic and interventional radiology, colonoscopy/flexible sigmoidoscopy and open surgery.

Around 15% of upper GI bleeds occur in patients already in hospital and are associated with higher mortality rates.[1,3] The physiological stresses of other illnesses, medications including anticoagulants and the greater prevalence of co-morbidities in a hospitalised population have all been implicated. The significance of this is that the burden of caring for patients with a GI bleed, at least in the initial phase of their illness, may fall to any medical team, ward or hospital.

The first UK audit of acute upper gastrointestinal haemorrhage was performed in 1993 across four health care regions.[1] It reported an overall mortality rate of 14% (11% in those admitted as an emergency for their upper GI bleed and 33% in those who developed an upper GI bleed whilst in hospital) and that the elderly were more likely to have a GI bleed.

A follow-up UK wide audit was performed by the British Society of Gastroenterologists and the National Blood

Transfusion Service in 2007 on 6750 patients.[3] This highlighted significant deficiencies and inconsistencies in service provision and the care of patients presenting with upper GI bleeding. Difficulties in obtaining accurate data on blood transfusion times and volumes undermined some of its intended analyses but it reported an improvement in mortality rates since 1993 with an overall mortality rate of 10% (new admissions 7%, existing in-patients 26%). The submitted data about the care of patients when OGD could not control the non-variceal upper GI bleeding suggested surgery and interventional radiology were rarely used (2.3% and 1.5 % respectively), although this was not assessed against service availability.[9] The audit which was based on physician and hospital returns concluded *"The relationships between service provision and outcomes (in particular with reference to interventions and outcomes in emergency endoscopy) need more detailed investigation"*.[3] Conversley the review of services for lower GI bleeding has been lacking.

Evidence based guidance on the management of upper GI bleeds are widely available.[3,10-14] In 2008 the BSG adopted the 2008 SIGN guidelines which included lower GI bleeding.[12] No current guideline addresses all presentation, pathologies or treatment options for lower GI bleeding.[12,14] This may be due to the far fewer publications on lower GI bleeding and consequently a limited evidence base on which to base management recommendations. It may also be due to the available mortality data which suggest it is largely a self limiting condition which rarely results in harm.

Upper GI bleeding has also received more attention than lower GI bleeding in the setting of service standards. In 2007 the BSG published detailed Quality and Safety indicators for therapeutic upper GI endoscopy in GI bleeding. Although colonoscopy and flexible sigmoidoscopy were included and had standards set against them, their role in lower GI bleeding was not recognised.[15]

On the basis of 335 incidents reported to its national reporting and learning system (NRLS) over a 14 month period from 2008-2009 the NPSA highlighted the difficulties that patients with suspected upper GI bleeding faced in accessing endoscopy services outside of normal working hours, with resulting poorer patient outcomes.[16] A multi-collegiate (RCP, AoMRC, AUGIS, BSG, RCN and RCR) response followed in 2010 in the form of the CROMES project.[4] It found that 45% of Trusts to which patients with GI bleeding were admitted did not have a comprehensive out-of-hours service but recognised that smaller units would struggle to provide comprehensive care 24/7/365. Three models of care for an upper GI bleeding service were recommended with either an autonomous 24 hour on-site GI bleeding service, use of networks for all patients, or a combination. To facilitate this it developed a toolkit, stating that "*…all patients should have access to endoscopy, interventional radiology and surgery and to deliver this required planning and co-ordination between individual services, particularly:*

- *the ambulance and A&E emergency services*
- *the admissions unit*
- *the gastroenterology team*
- *specialist staff (gastroenterology and/or surgery) in a dedicated bleed ward area*
- *HDU or ITU where appropriate for resuscitation*
- *organisation of diagnostic and interventional endoscopy and radiology*
- *involvement of emergency care surgery."*[17]

The NCEPOD study presented in this report was undertaken firstly because it was felt that the impact of the recent focus on upper GI bleeding clinical care and services was not yet known. Secondly, the care of lower GI bleeding had not been assessed in the UK.

It has been 11 years since NCEPOD published *'Scoping our Practice'*[14] a review of endoscopy services and this new NCEPOD study focusing on GI bleeding is the first peer review study to look at the entire care pathway for all presentations and categories of gastrointestinal bleeds.

The study was designed to identify areas of good practice as well as deficiencies in care. The care of patients who had a severe GI bleed requiring urgent intervention was reviewed as this group would most test the systems in place, to identify opportunities to improve services, clinical management and the overall quality of care received by all patients with a GI bleed.

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Method and Data Returns

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Study Advisory Group

The Study Advisory Group (SAG) comprised a multidisciplinary group of clinicians in: gastroenterology, critical care, interventional radiology, pharmacy, upper GI surgery and lower GI surgery.

Study aim

To identify the remediable factors in the quality of care provided to patients treated for a GI bleed who received 4 or more units of blood.

Objectives

The Study Advisory Group identified a number of objectives that would address the primary aim of the study, and these will be addressed throughout the following chapters:

- The quality of assessment including the use of risk stratification scores
- Admission/referral pathways, including the transfer of care
- Assess the availability and appropriate use of endoscopy, diagnostic and interventional radiology and surgery, including out-of-hours.
- To assess the effectiveness of local/regional networks where they exist
- Consider the quality of care including
  - the management and appropriate correction of coagulopathy/anticoagulation
  - the use of blood products
  - appropriate timing and documentation of diagnostic investigations
  - selection, timeliness and performance of interventions
- Assess the use of escalated care and anaesthetic support for interventions
- Identify inappropriate interventions
- Outcomes and learning from poor outcomes

Hospital participation

National Health Service hospitals in England, Wales and Northern Ireland were expected to participate as well as relevant hospitals in the independent sector and public hospitals in the Isle of Man, Guernsey and Jersey.

Within each hospital, a named contact, referred to as the NCEPOD Local Reporter, acted as a link between NCEPOD and the hospital staff, facilitating case identification, dissemination of questionnaires and data collation.

Study population and case ascertainment

All patients who were admitted to hospital in the four months between 1st January 2013 and 30th April 2013 who had a diagnosis of GI bleeding at any point during their inpatient stay were identified to NCEPOD.

The included ICD10 codes were:

I85.0 Oesophageal varices with bleeding
K92.0 Haematemesis
K92.1 Melaena
K92.2 Gastrointestinal haemorrhage, unspecified gastrointestinal bleeding
K25.0 Gastric ulcer, acute with haemorrhage
K25.2 Gastric ulcer, acute with both haemorrhage and perforation
K26.0 Duodenal ulcer, acute with haemorrhage
K26.2 Duodenal ulcer, acute with both haemorrhage and perforation
K27.0 Peptic ulcer, site unspecified, acute with haemorrhage
K27.2 Peptic ulcer, site unspecified, acute with both haemorrhage and perforation
K28.0 Gastrojejunal ulcer, acute with haemorrhage
K28.2 Gastrojejunal ulcer, acute with both haemorrhage and perforation
K29.0 Acute haemorrhagic gastritis

Blood transfusion data were then used to identify a sub-population of patients who received 4 or more units of red blood cells during the corresponding inpatient stay. In order to make the blood transfusion data more obtainable, the criterion for inclusion was 4 units or more of red blood cells at any time during the patients hospital stay. Some patients in the current study may have received blood for a condition other than their GI bleed. Data were collected on the timing of blood transfusions in relation to the GI bleed, if it was obvious to NCEPOD, or the clinician completing the questionnaire that the patient only received blood for a condition not related to their GI bleed, the case was excluded and an alternative selected.

A sample of this subpopulation was then randomly selected by NCEPOD for questionnaire completion and peer review. The peer review sample was limited to a maximum of 5 cases per hospital. Therefore this study is a snapshot of the care provided to patients with a severe GI bleed. The proportion of patients with each type of GI bleed (non-variceal upper GI bleed, variceal upper GI bleed and lower GI bleed) represent a sample of all GI bleed patients who required 4 or more units of blood during the study time frame. The proportions randomly selected were as expected (one quarter lower GI bleeds) but it must be acknowledged that patients who required an interhospital transfer for a particular aspect of GI bleed management (e.g. TIPSS) may be under represented as the sampling method biased case selection towards hospitals with a smaller GI bleed workload.

Patients coded for haemorrhoids alone without one of the above codes were intentionally not included in the study population due to the concern that the study population could be skewed by a large number of patients with haemorrhoids who had received 4 units or more of blood for other conditions. Haemorrhage of anus and rectum (K62.5) was omitted from the list in error. The combination of these factors means that patients with ano-rectal causes for bleeding may be under-represented in the study population.

On review, Mallory-Weiss syndrome (gastro-oesophageal laceration-haemorrhage syndrome: K22.6) which predominantly affects younger patients, was unintentionally omitted from the search codes.

Data collection

Two questionnaires were used to collect data for this study; a clinician questionnaire for each patient and an organisational questionnaire for each hospital participating in the study.

Clinician questionnaire

This questionnaire was sent to the consultant responsible for the patient at the time of their discharge. If the consultant was not the most suitable person to complete the questionnaire they were asked to identify one or more appropriate consultants. Information was requested on the patient's presenting features/co-morbid conditions, initial management, investigations/procedures carried out, treatment, complications and escalation in care.

Organisational questionnaire

The data requested in this questionnaire included information on the locations to which patients with GI bleeding were admitted, endoscopy services, interventional radiology services, surgical services, guidelines and standard operating procedures relevant to the management of GI bleed patients. It was recommended that the clinical leads responsible for different components of the GI bleed service were consulted on the relevant sections.

Case notes

Photocopied case note extracts were requested for the final inpatient admission of each case that was to be peer reviewed:

- All inpatient annotations/medical notes
- Nursing notes
- ICU/HDU notes
- Operation/procedure notes
- Anaesthetic charts
- Observation charts
- Haematology/biochemistry results
- Fluid balance charts
- Blood transfusion records
- Drug charts
- Consent forms
- Discharge letter/summary
- Autopsy report if applicable

Peer review

A multidisciplinary group of peer reviewers was recruited to peer review the case notes and associated clinician questionnaires. The group of reviewers comprised consultants and trainees from the following specialties: gastroenterology, acute medicine, interventional radiology and surgery. The reviewers attended a preliminary training day at NCEPOD with test cases for review and discussion.

Questionnaires and case notes were anonymised by the non-clinical staff at NCEPOD. All patient identifiers were removed. Neither the Clinical Co-ordinators at NCEPOD, nor the reviewers, had access to patient identifiable information.

After being anonymised, each case was reviewed by at least one reviewer within a multidisciplinary group. At regular intervals throughout the meeting, the Chair allowed a period of discussion for each reviewer to summarise their cases and ask for opinions from other specialties or raise aspects of the case for discussion.

Case reviewers answered a number of specific questions by direct entry into a data base, and were also encouraged to enter free text commentary at various points.

The grading system below was used by the reviewers to grade the overall care each patient received:

Good practice: A standard that you would accept from yourself, your trainees and your institution.
Room for improvement: Aspects of **clinical** care that could have been better.
Room for improvement: Aspects of **organisational** care that could have been better.
Room for improvement: Aspects of both **clinical and organisational** care that could have been better.
Less than satisfactory: Several aspects of **clinical and/or organisational** care that were well below that you would accept from yourself, your trainees and your institution.
Insufficient data: Insufficient information submitted to NCEPOD to assess the quality of care.

Quality and confidentiality

Each case was given a unique NCEPOD number. The data from all questionnaires received were electronically scanned into a preset database. Prior to any analysis taking place, the data were cleaned to ensure that there were no duplicate records and that erroneous data had not been entered during scanning. Any fields that contained data that could not be validated were removed.

Data analysis

Following cleaning of the quantitative data, descriptive data summaries were produced. The qualitative data collected from the reviewers' opinions and free text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. The data were reviewed by NCEPOD Clinical Co-ordinators, a Researcher, and a Clinical Researcher, to identify the nature and frequency of recurring themes.

Case studies have been used throughout this report to illustrate particular themes.

All data were analysed using Microsoft Access and Excel by the research staff at NCEPOD.

The findings of the report were reviewed by the Study Advisory Group, Case Reviewers and the NCEPOD Steering Group prior to publication.

Data returns

In total 4,780 patients from 227 hospitals were identified as meeting the study inclusion criterion (Figure 1.1). When the sampling criterion of 5 cases per hospital was applied, 1077 cases were selected for inclusion in the main data collection, this reduced to 769 with exclusions. A total of 618 completed clinician questionnaires and 596 sets of case notes were returned to NCEPOD. The reviewers were able to assess 485 cases, the remainder of the returned case note extracts were either too incomplete for assessment or were returned after the final deadline and last reviewer meeting.

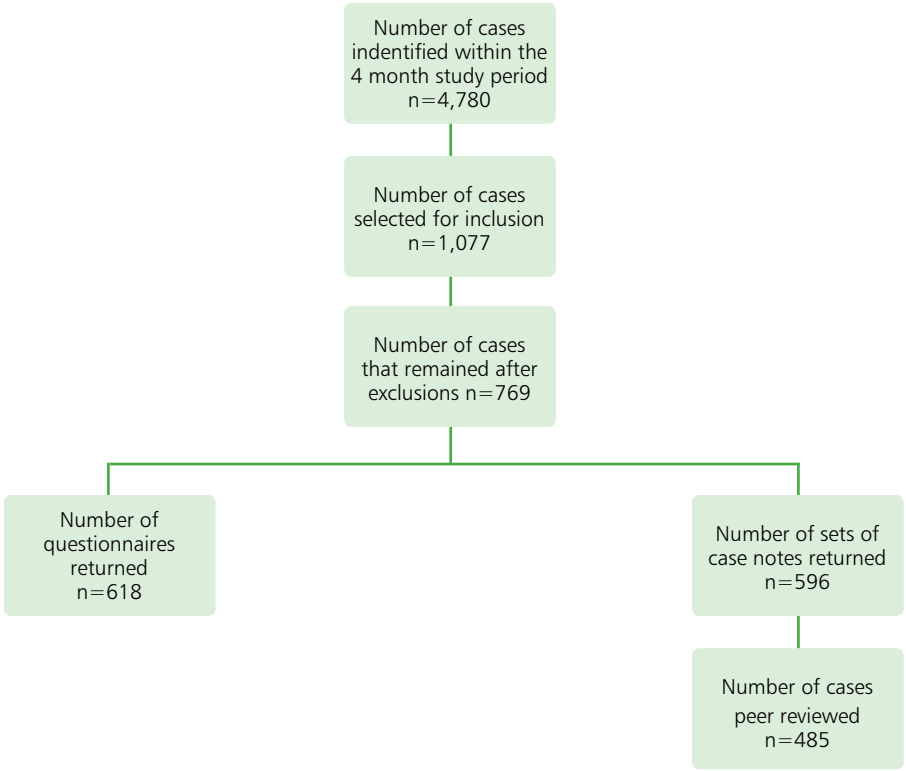

Figure 1.1 Data returns

Study sample denominator by chapter

Within this study the denominator will change for each chapter and occasionally within each chapter. This is because data have been taken from different sources depending on the analysis required. For example, in some cases the data presented will be a total from a question taken from the clinician questionnaire only, whereas some analysis may have required the clinician questionnaire and the reviewers' view taken from the case notes.

2

The organisation of care

Back to contents

An organisational questionnaire was sent to every hospital where patients may be treated for a GI bleed. This section of the report covers the staffing, facilities, policies and procedures in place for hospitals providing care to patients who suffer a GI bleed. Completion of the organisational questionnaire was the responsibility of the Medical Director of the Trust or person(s) nominated by them who would have the knowledge to complete it accurately or be able to seek help to do so. Input from the clinical leads for sub-specialty services, including gastroenterology and interventional radiology, was strongly recommended. Where data were incomplete NCEPOD staff contacted individual hospitals to maximise the percentage of full data sets.

Types of hospital

Table 2.1 shows the types of hospital from which a completed organisational questionnaire was returned.

Table 2.1 Types of hospital where patients with a GI bleed may be treated

Type of hospital	Number of hospitals
University Teaching Hospital	56
District General Hospital > 500 beds	52
District General Hospital ≤ 500 beds	92
Other	5
Total	**205**

Patients in this study either were admitted with a GI bleed or developed a GI bleed as an inpatient for another condition. It was therefore relevant to establish whether patients who presented with GI bleeding would be admitted (Table 2.2). Those hospitals where patients were not admitted (17 hospitals) tended to be hospitals that did not have an emergency department (data not shown).

Table 2.2 Hospitals would admit patients with a GI bleed

Admit patients with a GI bleed	Number of hospitals	%
Yes	186	91.6
No	17	8.4
Subtotal	**203**	
Not answered	2	
Total	**205**	

As the management of patients with an upper or lower GI bleed differs, the pattern of admission location may differ based on the suspected diagnosis.

Tables 2.3 and 2.4 identify the different types of ward where patients with an upper or lower GI bleed are admitted (multiple answers for 186 hospitals). The main difference was the use of surgical wards for patients admitted with a suspected lower GI bleed.

Table 2.3 Wards where upper GI bleed patients are admitted

Type of ward	Number of hospitals
Gastroenterology ward	129
General medical ward	119
Acute medical unit*	36
Critical care*	22
General surgical ward*	17
Hepatology	12
Gastrointestinal bleed unit	5

** Free text answers listed under other. Answers may be multiple*

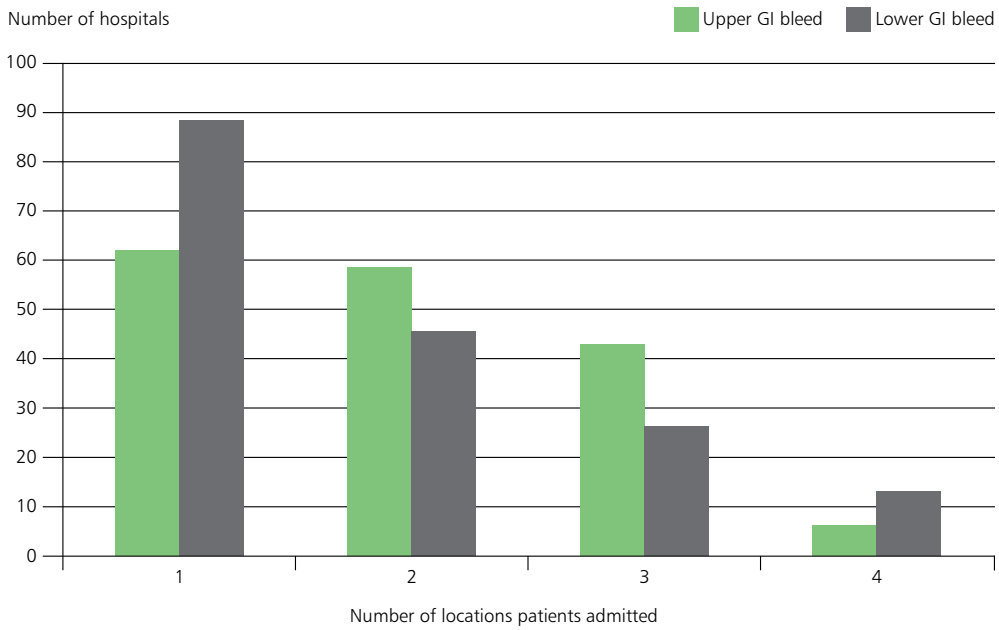

Figure 2.1 Number of locations where upper and lower GI bleed patients are admitted

Table 2.4 Wards where lower GI bleed patients are admitted

Type of ward	Number of hospitals
General surgical ward	156
Gastroenterology ward	65
General medical ward	43
Critical care*	22
Surgical assessment unit*	18
Gastrointestinal bleed unit	2

** Free text answers listed under other*

Figure 2.1 summarises the number of locations where patients with a lower or upper GI bleed might be admitted. Whilst patients with either type of GI bleed are admitted to multiple wards, there did appear to be more filtering of lower GI bleed patients to a single location.

Endoscopy service

The Joint Advisory Group (JAG) for GI endoscopy was established in 1994 and quality assures all aspects of endoscopy units to ensure policies, practices and procedures are safe and compliant with JAG, British Society of Gastroenterology (BSG) and other national guidelines for endoscopy. These aspects include, adequate unit staffing, training, decontamination, a regular rolling audit program is in place and is being undertaken satisfactorily and that patients' privacy and dignity is being adequately maintained at all times.[17]

Table 2.5 shows that 73% (148/202) of hospitals participating in this study were JAG accredited. Whether or not the hospital reported that they admitted patients with a GI bleed had no bearing on JAG accreditation (Table 2.6).

Table 2.5 JAG accreditation (all hospitals)

JAG accredited	Number of hospitals	%
Yes	148	73.3
No	54	26.7
Subtotal	**202**	
Not answered	3	
Total	**205**	

Table 2.6 JAG accreditation (hospitals where patients with a GI bleed are admitted)

JAG accredited	Number of hospitals	%
Yes	138	75.0
No	46	25.0
Subtotal	**184**	
Not answered	2	
Total	**186**	

Oesophago-gastro-duodenoscopy (OGD)

Endoscopy means 'looking inside' and refers to any instrument used to examine the interior of a hollow organ or cavity of the body. It is often used as a synonym of oesophago-gastro-duodenoscopy (OGD).

Table 2.7 and Figure 2.2 show the locations where OGDs were reported as being performed. In the large majority of hospitals OGDs during normal working hours (8am – 6pm Monday to Friday) were undertaken in the endoscopy suite (200/204), critical care (115/204) or theatre (104/204). OGDs in normal working hours were performed exclusively in the endoscopy suite in 72/202 hospitals. OGDs performed outside normal working hours were much less likely to be performed in an endoscopy suite. The endoscopy suite was only available out-of-hours in 72/195 hospitals. The predominant location for out-of-hours OGD was a theatre (172/195). OGDs performed out-of-hours will be on a sicker or more urgent group of patients who are more likely to require anaesthetic support for resuscitation, cardiovascular monitoring and airway management.

Table 2.7 Locations where OGDs were performed

OGD locations	In-hours OGD	Out-of-hours OGD
Endoscopy suite, theatre, critical care	80	44
Endoscopy suite	72	6
Endoscopy suite, critical care	25	5
Endoscopy suite, theatre	14	10
Endoscopy suite, theatre, critical care, other	8	6
Theatre, critical care	3	60
Theatre	1	51
Endoscopy suite, critical care, other	1	1
Other	0	9
Critical care	0	2
Theatre, critical care, other	0	1
Subtotal	**204**	**195**
Not answered	1	10
Total	**205**	**205**

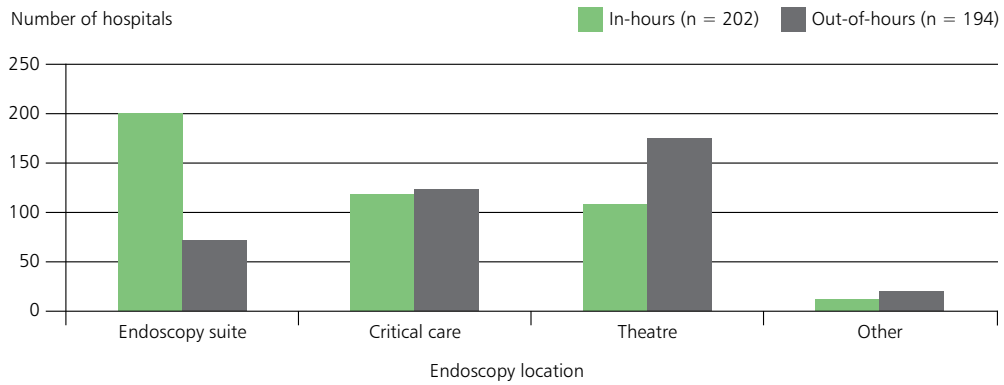

Figure 2.2 Locations where OGDs were performed

Actively bleeding patients are often too unfit for transfer to the endoscopy suite. Out-of-hours OGDs were commonly performed in theatres or critical care (Figure 2.2). Depending on the geographical location it may be possible to move the OGD equipment from the endoscopy suite, but moving equipment repeatedly risks damaging it. Patients should not be disadvantaged by the timing or severity of their GI bleed. Table 2.8 shows that in 27 of the 188 hospitals from which a response was received the out-of-hours OGD equipment was not equivalent to that available in-hours.

Table 2.8 Equivalent equipment available for OGDs out-of-hours as in-hours

Equivalent equipment available	Number of hospitals	%
Yes	161	85.6
No	27	14.4
Subtotal	**188**	
Not answered/Not applicable	17	
Total	**205**	

As OGD is the primary diagnostic and therapeutic modality for upper GI bleeding, it may be required as an urgent procedure. It would therefore seem reasonable to expect the existence of on-call endoscopy rotas or alternative arrangements to manage patients with out-of-hours bleeds.

Table 2.9 demonstrates that 72% (146/204) of hospitals had some form of endoscopy on-call rota. This figure was 75% (138/185) if just the hospitals that reported admitting patients with a GI bleed were considered (Table 2.10).

Table 2.9 Endoscopy on-call rota (all hospitals)

Endoscopy on-call rota	Number of hospitals	%
Yes	146	71.6
No	58	28.4
Subtotal	**204**	
Not answered	1	
Total	**205**	

Table 2.10 Endoscopy on-call rota (hospitals to which patients with a GI bleed are admitted)

Endoscopy on-call rota	Number of hospitals	%
Yes	138	74.6
No	47	25.4
Subtotal	**185**	
Not answered	1	
Total	**186**	

CASE STUDY 1

A middle aged patient with no prior medical history presented with haematemesis. An early OGD performed in theatre under general anaesthetic identified oesophageal varices but the banding equipment malfunctioned. No back-up was available in theatre or obtained from elsewhere. No sclerosant was available in theatre and treatment was delayed whilst this was obtained. Peri-variceal injection of adrenaline was also used.

The reviewers did not agree with the treatment modalities used. They questioned whether the endoscopy service had contingency plans for equipment failure, irrespective of the site where the OGD was performed.

The majority (91%; 132/145 and 125/138) of hospitals with an endoscopy on-call rota reported that it was a 24/7 service (Table 2.11 and 2.12).

Table 2.11 Endoscopy on-call rota 24/7 (all hospitals)

Endoscopy on-call rota 24/7	Number of hospitals	%
Yes	132	91.0
No	13	9.0
Subtotal	**145**	
Not answered	1	
Total	**146**	

Table 2.12 Endoscopy on-call rota 24/7 (hospitals to which patients with a GI bleed are admitted)

Endoscopy on-call rota 24/7	Number of hospitals	%
Yes	125	90.6
No	13	9.4
Total	**138**	

Whilst this may initially appear encouraging, Table 2.13 demonstrates that 32% (60/185) of hospitals to which patients with a GI bleed were admitted did not have a 24/7 endoscopy service.

Table 2.13 Endoscopy service 24/7 (hospitals to which patients with a GI bleed are admitted)

Endoscopy service 24/7	Number of hospitals	%
Yes	125	67.6
No	60	32.4
Subtotal	**185**	
Not answered	1	
Total	**186**	

Table 2.14 Formal network for when OGD is not available (all hospitals)

Formal network	Number of hospitals
Yes	23
No	37
Subtotal	**60**
Not answered	13
Total	**73**

Overall 64% (132/205) of all hospitals had on-site arrangements to manage GI bleeds. Furthermore 37/60 hospitals that did not have a 24/7 endoscopy service reported having no formal network arrangement to cover hours when OGD was not available (Table 2.14). The formal nature of networks was assessed by asking the respondent at each hospital which hospital (or hospitals) they were formally networked with. This was for both those referring on and those receiving. These were cross checked and no major deficiencies were found.

Overall 81% (155/192) of hospitals had access to endoscopy 24/7 for GI bleeds, similar to data from NHS IQ in March 2013 which reported that 77% of Trusts in England could provide this service.[18]

CASE STUDY 2

An elderly patient on prednisolone for COPD was admitted with cellulitis. Five days later on a Friday morning the patient had melaena. Their haemoglobin was 55g/L and 4 units of blood were given. IV omeprazole was started and prophylatic low molecular weight heparin was stopped. There was no weekend OGD service. An OGD on Monday showed a gastric ulcer which was treated with adrenaline alone.

The reviewers considered the OGD should have been performed within 24 hours, use of IV proton pump inhibitors was inappropriately used to justify delaying the OGD and endoscopic monotherapy was inadequate treatment.

CASE STUDY 3

A young patient was admitted over a weekend with haematemesis and hypotension.

The admitting hospital did not have on-site OGD out-of-hours. Within 14 hours of presentation the patient had been transferred to a neighbouring hospital, had an OGD with treatment of a duodenal ulcer with a visible vessel and returned to their original hospital.

The reviewers considered that the patient received high quality care but were concerned that the patient should not have been admitted to a hospital that could not manage the GI bleed and that repatriation was too rapid given the risk of re-bleeding.

Endoscopy on-call rotas

Information was collected on the number of consultants and specialist registrars on the endoscopy on-call rota.

Figure 2.3 shows the total number of clinicians (consultants and specialist registrars /fellows) on each endoscopy on-call rota for those hospitals that reported having a 24/7 on-call service. The number of consultants/specialist registrars / fellows on each 24/7 on-call ranged from 3 - 21 clinicians.

Figure 2.4 shows the data for the number of consultants. 93/130 hospitals had seven or more consultants on their rota. One hospital reported, and confirmed, that they had no consultants on the on-call rota.

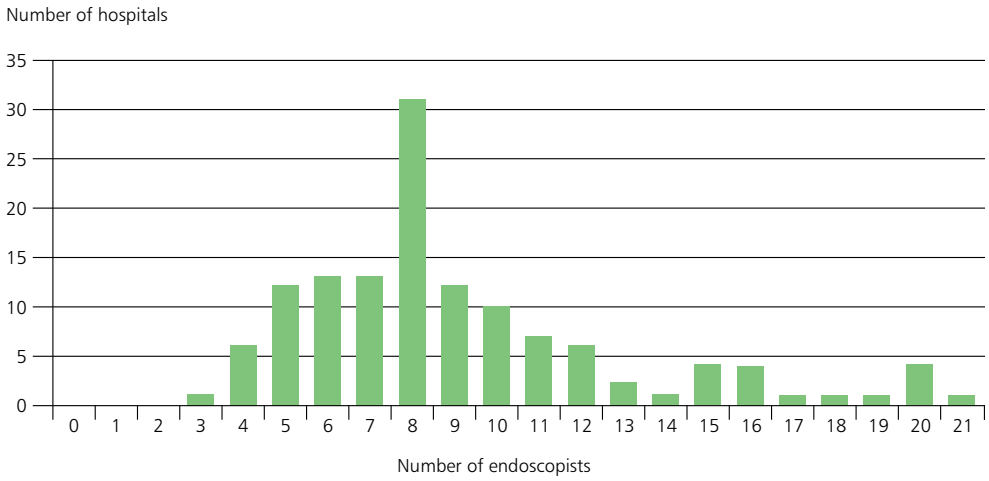

Figure 2.3 Number of endoscopists (consultants + trainees)

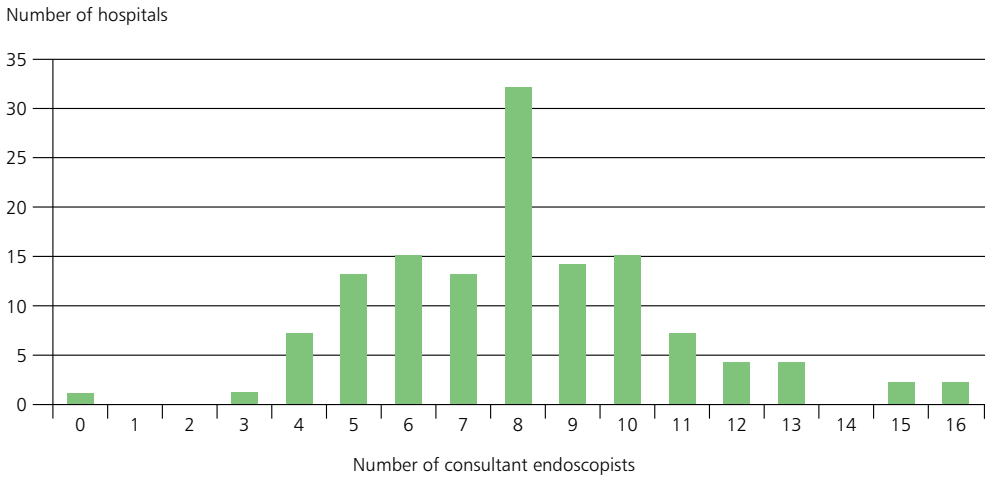

Figure 2.4 Number of consultant endoscopists

Data were collected on the competencies of the consultants on the endoscopy on-call rota. Trainee competencies were not assessed as it was presumed that they would always be supported by a consultant. The major omission in skill set was the ability of the endoscopist to glue gastric varices. Just over half (512/963; 53%) of the 963 consultant endoscopists for which the question was answered, were able to glue gastric varices. Glue injection for gastric varices is included in both the NICE upper GI bleeding clinical guideline[10] and the subsequent Quality Standard.[11] Whilst alternative strategies, such as temporary control with a large tamponading balloon are available for patients with gastric varices these are not without their risks and are not the recommended first line approach.

Two-thirds (61%; 86/141) of hospitals with an endoscopy on-call rota also had an endoscopy nurse on-call rota (Table 2.15). For those hospitals without an endoscopy nurse on-call rota, this service tended to be provided by theatre nurses with varying degrees of training in endoscopy procedures.

Provision of a different level of service at different times of day for a condition that may require urgent treatment is likely to result in unnecessary variation in the treatment provided.

Table 2.15 Endoscopy nurse on-call rota

Endoscopy nurse on-call rota	Number of hospitals	%
Yes	86	61.0
No	55	39.0
Subtotal	**141**	
Not answered	5	
Total	**146**	

Most of the endoscopy on-call services were run solely by gastroenterologists, (61%; 85/140) but 27% (38/140) of hospitals reported that the service was run jointly by gastroenterologists and surgeons (Table 2.16).

Table 2.16 Responsibility for running the on-call endoscopy service

Endoscopy on-call service	Number of hospitals	%
Gastroenterologists	85	60.7
Gastroenterologists/surgeons	38	27.1
Gastroenterologists/other	9	6.4
Gastroenterologists/surgeons/other	4	2.9
Surgeons	4	2.9
Subtotal	**140**	
Not answered	6	
Total	**146**	

CASE STUDY 4

An elderly patient developed melaena whilst an inpatient for investigation of chronic anaemia. There was no on-call OGD service. The on-call ST3 phoned for assistance. The opinion from a unit elsewhere was that the patient was unfit for transfer. A local gastroenterologist was contacted and agreed to perform an OGD if an endoscopy nurse could be found. No nurse was available. The patient suffered a myocardial infarction and then a large hemispheric stroke. End of life care was instituted.

The reviewers agreed that transferring the patient would be hazardous but on balance it was the only option. This case emphasised the need for comprehensive on-call rotas with all required staff readily identifiable and available. Informal local or network approaches are fragile and often lead to delays in treatment. The reviewers recognised that in some formal networks the procedural team travel to the patient.

Proctoscopy and rigid sigmoidoscopy

Proctoscopy and rigid sigmoidoscopy are relatively simple bedside investigations that can confirm or exclude ano-rectal pathology as the likely source of bleeding. A third of hospitals in this study (32%; 62/196) reported that this investigation was not available 24/7 (Table 2.17).

Table 2.17 Proctoscopy and rigid sigmoidoscopy available 24/7

Proctoscopy and rigid sigmoidoscopy 24/7	Number of hospitals	%
Yes	134	68.4
No	62	31.6
Subtotal	**196**	
Not answered	9	
Total	**205**	

Colonoscopy

Colonoscopy could be undertaken during normal working hours at 192/195 (99%) hospitals and out-of-hours in 108/195 (55%) that answered the question (Table 2.18). Colonoscopy was rarely used as a first line or early investigative tool in the current study (see Chapter 6). It is recommended in the current BSG guidance (adopted from SIGN) as the preferred first diagnostic and therapeutic modality in lower GI bleeding.[3] It is unclear if the BSG guidance needs updating or is simply not being followed. Irrespective of this some patients, particularly those with bleeding post-colonoscopic polypectomy are best served by emergency colonoscopy and hospitals should understand how they deliver such treatments to patients when they need them.

Table 2.18 Availability of colonoscopy

	In-hours		Out-of-hours	
Colonoscopy	**Number of hospitals**	**%**	**Number of hospitals**	**%**
Yes	192	98.5	108	55.4
No	3	1.5	87	44.6
Subtotal	**195**		**195**	
Not answered	10		10	
Total	**205**		**205**	

Table 2.19 Availability of intra-operative OGD and intra-operative colonoscopy

	Intra-operative OGD		Intra-operative colonoscopy	
24/7 service	**Number of hospitals**	**%**	**Number of hospitals**	**%**
Yes	147	82.1	120	67.0
No	32	17.9	59	33.0
Subtotal	**179**		**179**	
Not answered	7		7	
Total	**186**		**186**	

In severe GI bleeding intra-operative OGD can localise previously unlocalised bleeding and limit the severity/impact of surgical treatment. On some occasions it may avoid surgery. Intra-operative OGD was not available in 18% (32/179) of hospitals to which patients with a GI bleed are admitted and intra-operative colonoscopy was unavailable at 33% (59/179) (Table 2.19).

Interventional radiology

The NICE Quality Standard on upper GI bleeding recommends interventional radiology treatment when endoscopic treatment does not control non-variceal or variceal upper GI bleeding.[11] The guidance on lower GI bleeding in the SIGN GI bleeding guideline 2008,[12] recommends embolisation for patients with massive haemorrhage if colonoscopy fails to define the site of bleeding and control haemorrhage.

Approximately 70% of all hospitals (141/202) and of those hospitals to which patients with a GI bleed were admitted (131/183) had some form of interventional radiology service operating in normal working hours, but only half (48%; 67/140) of all hospitals with an interventional radiology service had an on-call rota for interventional radiology. It should be noted that these data relate to the hospital having any type of interventional radiology service and not necessarily one that could manage GI bleeds.

Embolisation

Fifty-six of the 67 hospitals that had an interventional radiology on-call rota reported that the consultants on the rota had the competencies to control (embolise) GI bleeds 24/7 (Table 2.20). Furthermore only 27% (51/186) hospitals to which patients with a GI bleed are admitted could offer those patients embolisation on-site irrespective of their day or time of admission.

Table 2.20 Ability to embolise GI bleeds 24/7

GI bleeds embolised 24/7	Number of hospitals
Yes	56
No	11
Total	**67**

Table 2.21 and Figure 2.5 shows the arrangements for the 149 hospitals where GI bleeds could not be embolised 24/7 on-site. A formal network was in place to cover deficiencies in their embolisation capacity for their gastrointestinal bleed patients in 64/143 hospitals. The formal nature of the interventional radiology networks was assessed by asking each hospital which hospital (or hospitals) they were formally networked with. This was for both those referring on and those receiving. These were cross checked and no major deficiencies were found although two receiving hospitals stated they received referrals from "anywhere" which is unlikely to be a formal arrangement. Otherwise formal networks seemed to be understood by all parties.

Table 2.21 Arrangements for where GI bleeds could not be embolised 24/7 on-site

Formal network	Number of hospitals	%
Yes	64	44.8
No	79	55.2
Subtotal	**143**	
Not answered	6	
Total	**149**	

Interventional radiology is rarely a bed-holding specialty. The operating procedures for formal networks must include transfer protocols, a defined admitting ward and team, most commonly gastroenterology or critical care, and when clinically appropriate rapid repatriation which benefits patients and their relatives and maximises the ability of the network to treat other patients.

Those hospitals without any interventional radiology service on-site were more likely to have established a formal network for the embolisation of GI bleeds than those hospitals with partial on-site availability of interventional radiologists who could embolise GI bleeds (Figure 2.5). Reliance on goodwill to cover for rota deficiencies is unsafe.

CASE STUDY 5

An elderly patient on warfarin for atrial fibrillation presented with haematemesis and melaena. Their INR was 2.6 and an OGD 5 hours post admission showed a stomach full of blood obscuring the source of bleeding. Correction of the clotting and a repeat OGD was recommended. An OGD after a further episode of haematemesis and hypotension 5 hours later showed an actively bleeding duodenal ulcer which could not be controlled endoscopically. The patient was haemodynamically unstable. The on-call radiologist happened to be an interventional radiologist and embolised the bleeding gastroduodenal artery 2 hours later. The clinician completing the clinician questionnaire wrote "It was fortunate that an interventional radiologist happened to be on-call that night, otherwise (the patient) probably would have died".

The reviewers considered this good overall care but were concerned that a hospital, which admits patients with acute GI bleeding, had inadequate arrangements for cover of the interventional radiology service.

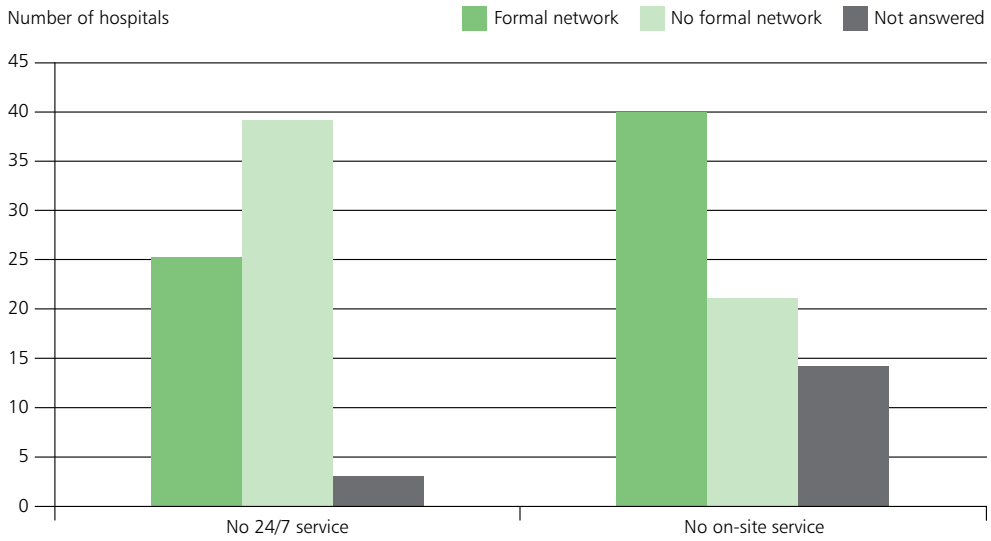

Figure 2.5 Formal network arrangements for the embolisation of GI bleeds

Overall 60% (56+64/199) of all hospitals and 59% (51+56/182) of hospitals who admit GI bleeds could provide embolisation for GI bleeding 24/7. NHS Improving Quality reported that eight hospitals in England that could provide embolisation 24/7 in 2012 could no longer do so in 2013.[18] This suggests a degree of fragility in some services.

Transjugular intrahepatic porto-systemic shunt

A transjugular intrahepatic porto-systemic shunt (TIPSS) is an interventional radiology technique which is used to reduce portal venous pressure and control variceal bleeding when endoscopic techniques cannot control the bleeding. TIPSS was only available 24/7 in 13 hospitals. This was not an unexpected finding as this is a specialised service requiring combined teams of interventional radiologists and hepatologists or gastroenterologists and a case load that can maintain the unit's competency. Hospitals, particularly those to which patients with GI bleeds are admitted, should know where they will send their patients should they require a TIPSS. An ad hoc approach to the management of patients with immediately life threatening bleeding is unlikely to be consistently effective.

Only 51% (94/185) of hospitals without the service to perform TIPSS 24/7 reported having a formal network in place for this service (Table 2.22).

Table 2.22 Arrangements for where TIPSS could not be performed 24/7 on-site

Formal network	Number of hospitals	%
Yes	94	50.8
No	91	49.2
Subtotal	**185**	
Not answered	7	
Total	**192**	

About 90% of hospitals that reported providing a service to embolise GI bleeds 24/7 had vascular radiographer and radiology nurse on-call rotas (Tables 2.23 and 2.24). Information on the arrangements for those that did not have these additional services was not collected.

Informal arrangements are not robust and where intervention requires a combination of skill sets, all contributors should be identified and contactable. The resilience of the 24/7 service must be questioned in the ~10% where these arrangements do not exist.

Table 2.23 Vascular radiographer availability at hospitals where embolisation could occur

Vascular radiographer on-call rota	Number of hospitals	%
Yes	48	87.3
No	7	12.7
Subtotal	**55**	
Not answered	1	
Total	**56**	

Table 2.24 Radiology nurse availability at hospitals where embolisation could occur

Radiology nurse on-call rota	Number of hospitals	%
Yes	50	90.9
No	5	9.1
Subtotal	**55**	
Not answered	1	
Total	**56**	

Surgery

Surgical intervention for GI bleeds may be required when endoscopic and interventional radiology techniques fail or are contraindicated.

The large majority of hospitals (181/200; 91%) reported having a surgical service able to treat GI bleeds during normal working hours (Table 2.25). The figure for hospitals to which patients are admitted with a GI bleed was higher still with 172/184 (93%) hospitals having this service on-site (Table 2.26).

Table 2.25 Surgical service able to treat GI bleeds in-hours (all hospitals)

GI bleed surgical service in-hours	Number of hospitals	%
Yes	181	90.5
No	19	9.5
Subtotal	**200**	
Not answered	5	
Total	**205**	

Table 2.26 Surgical service able to treat GI bleeds in-hours (hospitals to which patients with a GI bleed are admitted)

GI bleed surgical service in-hours	Number of hospitals	%
Yes	172	93.5
No	12	6.5
Subtotal	**184**	
Not answered	2	
Total	**186**	

Data were collected on the out-of-hours surgical management of GI bleeds. Table 2.27 shows that 97% (172/177) of hospitals with a surgical service for GI bleeds were able treat GI bleeds 24/7 and 156 hospitals had a surgical on-call rota (Table 2.28).

Table 2.27 Surgical service for GI bleeds 24/7

GI bleeds treated surgically 24/7	Number of hospitals	%
Yes	172	97.2
No	5	2.8
Subtotal	**177**	
Not answered	4	
Total	**181**	

Table 2.28 Surgical on-call rota for GI bleeds

GI bleed surgical on-call rota	Number of hospitals	%
Yes	156	87.2
No	23	12.8
Subtotal	**179**	
Not answered	2	
Total	**181**	

In the event that emergency surgery for a GI bleed is required, it was noteworthy that 162/174 hospitals had an emergency theatre team on-site (Table 2.29). In addition all 12 hospitals that did not have an emergency theatre team on-site reported having an emergency theatre team on-call rota.

Table 2.29 Availability of an emergency theatre team on-site for GI bleeds

Emergency theatre team on-site	Number of hospitals	%
Yes	162	93.1
No	12	6.9
Subtotal	**174**	
Not answered	7	
Total	**181**	

The presence of a consultant surgeon for all GI bleed operations was reported as being policy for 68% (119/175) of hospitals (Table 2.30). The reality of clinical practice is better than suggested by organisational policies. In the current study, all bar one (34/35) of the surgical procedures undertaken were performed or supervised by a consultant (see Chapter 6).

Table 2.30 Hospital policy for consultant surgeon to be present for GI bleed operations

Hospital policy	Number of hospitals	%
Yes	119	68.0
No	56	32.0
Subtotal	**175**	
Not answered	6	
Total	**181**	

Guidelines /standard operating procedures

Written guidelines for the management of upper GI bleeding were common place amongst all hospitals and included both variceal and non-variceal upper GI bleeding with 177/203 (87%) and 177/201 (88%) hospitals respectively reporting having them in place. This was not the case for lower GI bleeds, with only 49/197 (25%) hospitals reporting that they have written guidance for the management of patients with this condition (Figure 2.6).

Tables 2.31, 2.32 and 2.33 overleaf indicate the different components that each type of guideline contained. Whilst it would appear that there are some noticeable omissions in many hospitals' guidelines, the reviewers and Study Advisory Group were of the opinion that this was not the case and that such decisions around treatment would be made after referral to the specialists.

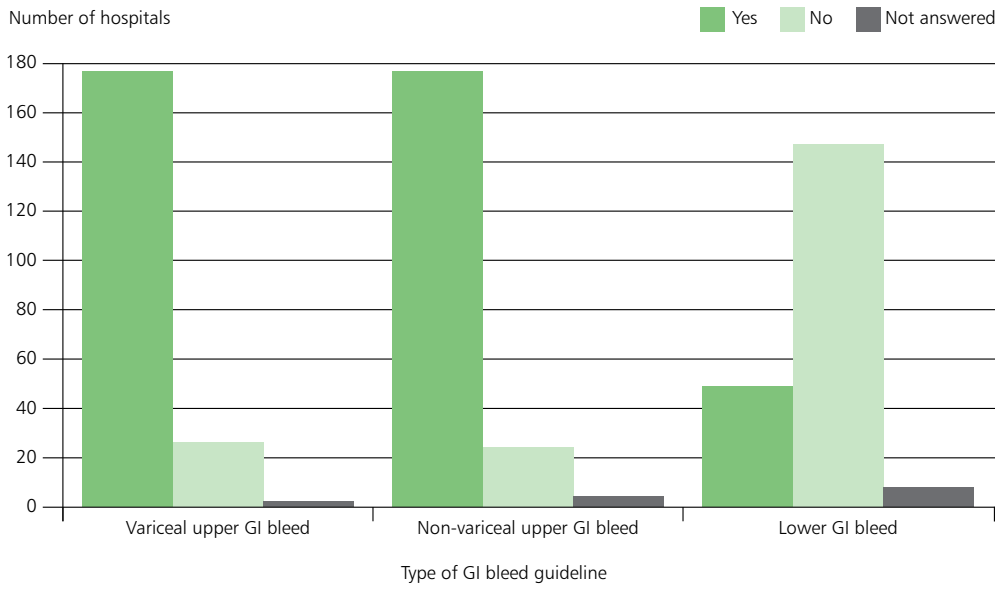

Figure 2.6 Availability of written guidelines for the management of GI bleeding

Table 2.31 Components of a guideline for variceal GI bleeds

Variceal GI bleed guideline includes	Number of hospitals	%
Terlipressin administration	165	100
Antibiotics	163	98.8
Banding of oesophageal varices	153	92.7
N-butyl-2-cyanoacrylate for gastric varices	88	53.3
TIPSS	81	49.1

Table 2.32 Components of a guideline for non-variceal GI bleeds

Non-variceal GI bleed guideline includes	Number of hospitals	%
Stopping aspirin	117	70.5
Stopping clopidogrel (or similar)	115	69.3
Endoscopy	166	100
Action when blood obscures bleeding site at endoscopy	77	46.4
Use of CT angiography	78	47.0
Action when bleeding not controlled endoscopically	128	77.1
Interventional radiology (embolisation)	91	54.8
Surgery	122	73.5

Table 2.33 Components of a guideline for lower GI bleeds

Lower GI bleed guideline includes	Number of hospitals	%
Rigid sigmoidoscopy & proctoscopy to exclude ano-rectal pathology	39	84.8
OGD	43	93.5
Use of CTA	32	69.6
Colonoscopy	43	93.5
Interventional radiology (embolisation)	27	58.7
Surgery	38	82.6

Patients suffering an upper or lower GI bleed would rarely be discussed at a multidisciplinary team meeting ahead of the procedure because of the acuity of presentation, but 104/164 and 94/155 hospitals respectively had morbidity and mortality meetings where cases would be reviewed. Approximately 60% (99/167) of hospitals had an identified clinical lead for upper GI bleed patients indicating that the existence of written guidelines (86% of hospitals) does not come hand in hand with a clinical lead. The corresponding figure for an identified clinical lead for lower GI bleed patients was 38% (57/151), perhaps slightly higher than might be expected when considering the low number of hospitals with any sort of written guidance for lower GI bleed management. Audit of guideline compliance for upper GI bleeds was carried out by 81% (133/164). The figure for lower GI bleeds was considerably lower with just 32% (44/137) of hospitals auditing guideline compliance.

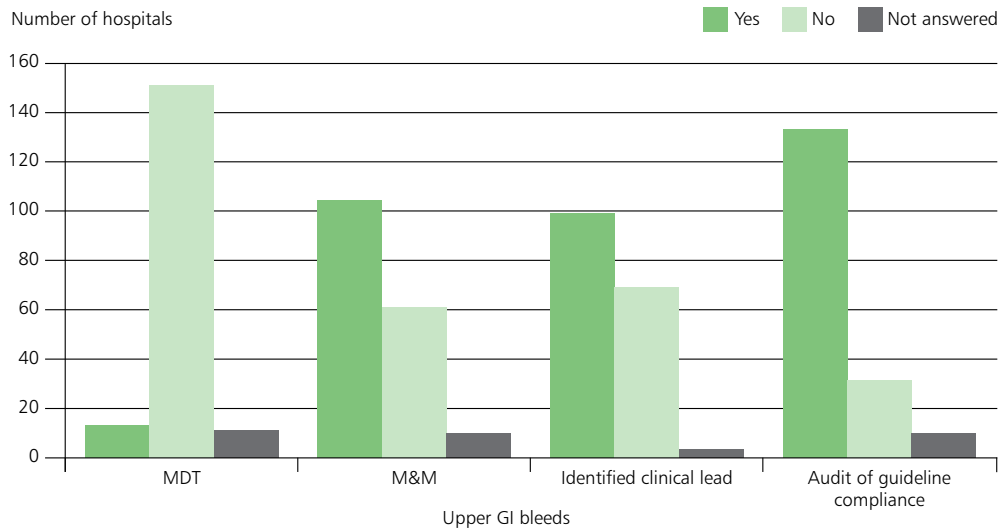

Figure 2.7 Local clinical governance of upper GI bleeds

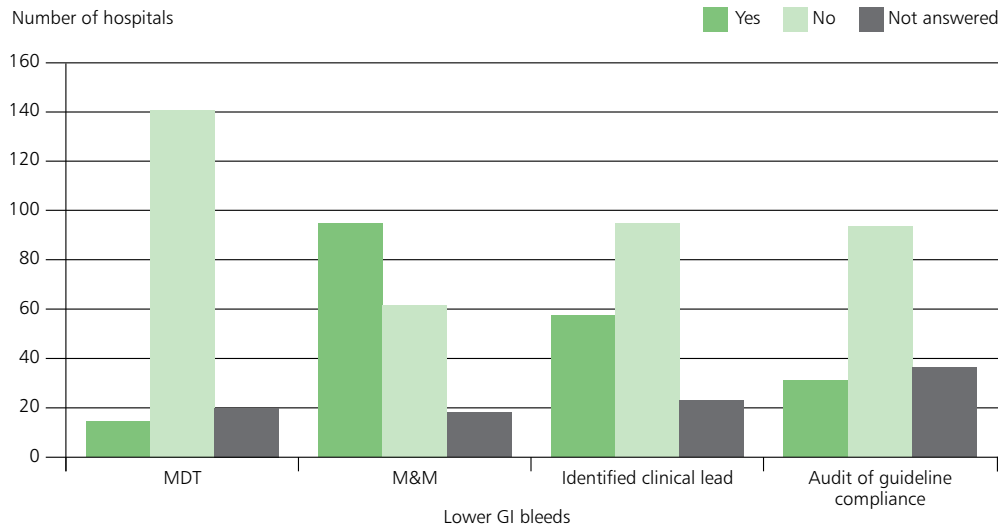

Figure 2.8 Local clinical governance of lower GI bleeds

Massive blood transfusion policy

Major haemorrhage is defined by NHS Blood Transfusion and Tissue Transplantation as loss of more than one blood volume within 24 hours, 50% of total blood volume lost in less than 3 hours or bleeding in excess of 150ml/minute.[19,20]

Table 2.34 Availability of a massive blood transfusion policy

Massive blood transfusion policy	Number of hospitals	%
Yes	200	100
No	0	0
Subtotal	**200**	
Not answered	5	
Total	**205**	

The aim of the protocol is to ensure patients receive adequate blood, clotting factors and other blood products to restore blood volume and maintain the ability of blood to clot. Large transfusions administered without other factors can affect blood clotting and worsen the bleeding episode. A massive blood transfusion policy was reported for 100% of hospitals for which the question was answered (Table 2.34).

Equipment failure and high cost equipment replacement plans

Figure 2.9 illustrates how patients are managed in the event of an equipment failure. The majority of hospitals had a second machine for OGD and colonoscopy, but this was much less common for CT angiography and catheter angiography (Figure 2.9).

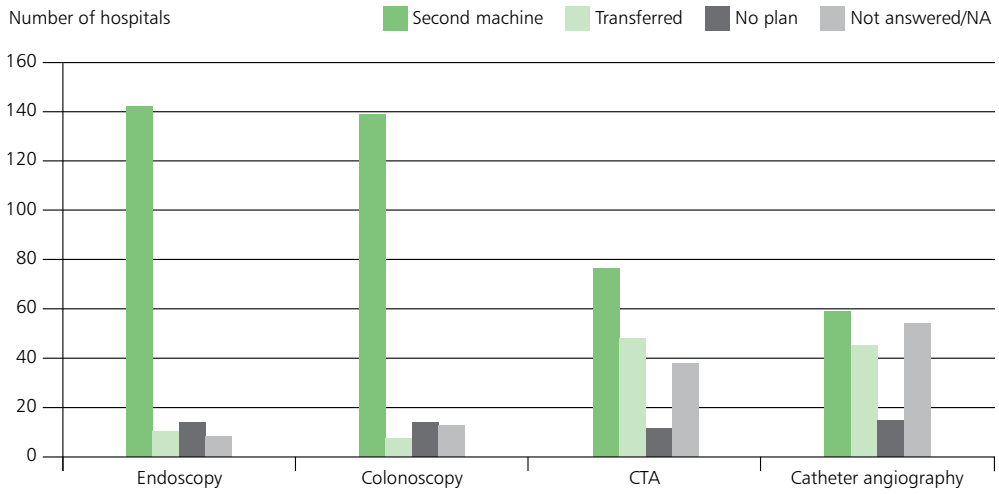

Figure 2.9 Management in the event of equipment failure

The data showed that 101/165 and 78/165 hospitals had a high cost equipment replacement program for endoscopy and imaging respectively (Table 2.35). Radiological and endoscopic equipment has a definite life span, resulting in unavoidable breakdown and decrease or loss of image quality. The European Society of Radiology has

recommended that every healthcare institution should have a plan for medical imaging equipment upgrade or replacement. This plan should look forward a minimum of 5 years, with annual updating. Equipment older than 10 years is no longer state-of-the art equipment and replacement is recommended. Operating costs of older equipment are commonly higher than new equipment, and sometimes maintenance will be impossible if no spare parts are available. Older equipment has a high risk of failure and breakdown, causing delays in diagnosis and treatment of the patient and safety problems both for the patient and the medical staff.[21]

Table 2.35 High cost equipment replacement program

High cost equipment replacement programme	Number of hospitals	%
Imaging and endoscopy	59	35.8
Endoscopy	42	25.5
Imaging	19	11.5
Neither	45	27.2
Subtotal	**165**	
Not answered	21	
Total	**186**	

Key Findings

- Patients with a lower GI bleed more frequently went to a single location than upper GI bleeds
- 25% (46/184) of hospitals to which patients with a GI bleed were admitted were not JAG accredited.
- Out-of-hours endoscopy was performed in operating theatres in 88% (172/195) of hospitals.
- Equipment for out-of-hours endoscopy was not equivalent to in-hours in 14% (27/188) of hospitals.
- 72% (146/204) of all hospitals had an endoscopy on-call rota of which 91% (132/145) were 24/7.
- 32% (60/185) of hospitals admitting GI bleed patients did not have a 24/7 endoscopy service.
- 47% (451/963) of consultants on endoscopy rotas could not use glue for gastric varices.
- 61% (86/141) of hospitals with a 24/7 endoscopy rota had an endoscopy nurse on-call rota.
- 32% (62/196) hospitals did not have proctoscopy and rigid sigmoidoscopy available 24/7.
- Intra-operative OGD was not available in 18% (32/179) of hospitals and intra-operative colonoscopy was not available in 33% (59/179) of hospitals.
- 73% (149/205) of hospitals could not provide 24/7 embolisation of GI bleeding on-site, 45% (64/143) had a formal network to combat this.
- 13 hospitals had 24/7 access to a TIPSS service.
- 51% (94/185) of hospitals had formal network arrangements for TIPSS.
- 87% (177/203) of hospitals had upper GI bleeding guidelines.
- 25% (49/197) of hospitals had lower GI bleeding guidelines.
- 59% (99/167) of hospitals had a clinical lead for upper GI bleeds and 38% (57/151) of hospitals had one for lower GI bleeds.
- 100% (200/200) of hospitals had a massive blood transfusion policy.
- 36% (59/165) of hospitals had a high cost equipment replacement programme for both imaging and endoscopy equipment.

Patient demographics

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During the four month study period in 2013, 31,412 patients were identified to NCEPOD as having a GI bleed. The age and sex of the patient was provided for 30,714 patients (Figure 3.1). Just over half of all patients identified as having a GI bleed were male (16,199/30,714; 52.7%). The median age for males was 74 compared with 68 for females.

Blood transfusion data were used to identify a sample of patients who required 4 or more units of blood during their hospital stay. The number of patients identified as receiving red blood cells at any time during their inpatient stay was 9,604/31,412 (30.6%) with 4,780/31,412 (15.2%) receiving 4 or more units. The age and sex were provided for 4,683 of these patients and is shown in Figure 3.2. The proportion of patients who received 4 or more units of blood that were male was 2,842/4,683 (60.7%), higher than the corresponding figure 10,132/19,822 (51.1%) for the GI bleed population who did not receive blood.

The median ages of both males and females requiring 4 or more units of blood during their inpatient stay was approximately eight years higher than those patients not transfused.

The demographics of the sampled population (618 patients) were similar to the whole study population (4,683 patients) with 63% (392/618) being male and females being slightly older.

The patient age distributions for the three different types of GI bleed is shown in Figure 3.3. Non-variceal upper GI bleeds and lower GI bleeds showed a similar age distribution (median 77 years for both) but variceal upper GI bleed patients were younger (median age 55 years).

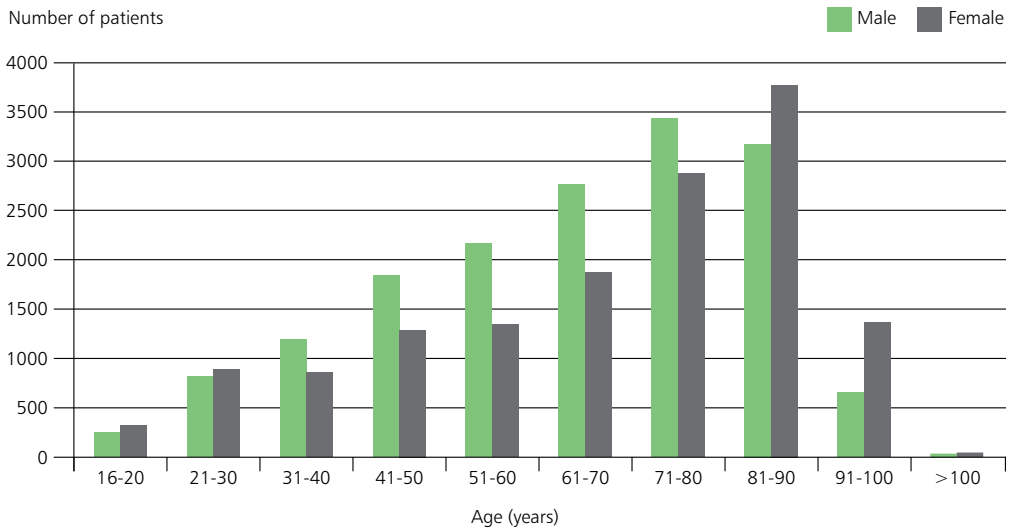

Figure 3.1 Age of all patients identified of having a GI bleed

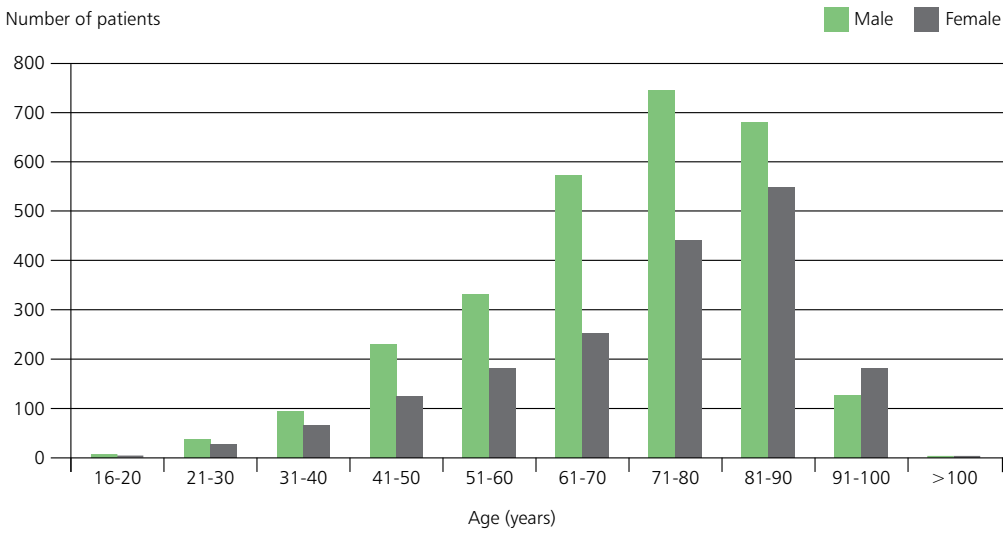

Figure 3.2 Age of all patients who received 4 units of blood or more

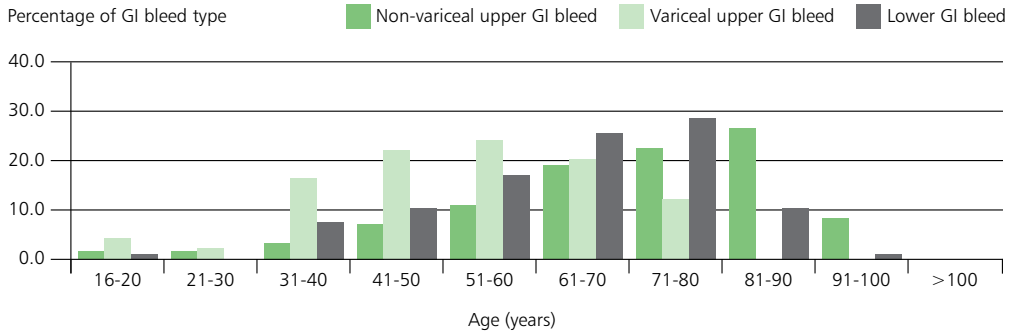

Figure 3.3 Age distribution by type of bleed

Just over half (358/618; 58%) of patients suffered a non-variceal upper GI bleed, 138/618 (22%) a lower GI bleed and 50/618 (8.1%) a variceal upper GI bleed (Table 3.1). For a further 72 patients (11.7%) the category (upper or lower) of GI bleed was not determined.

Table 3.1 Type of GI bleed

Type of GI bleed	Number of patients	%
Non-variceal upper GI bleed	358	57.9
Lower GI Bleed	138	22.3
Variceal upper GI Bleed	50	8.1
Not diagnosed	72	11.7
Total	**618**	

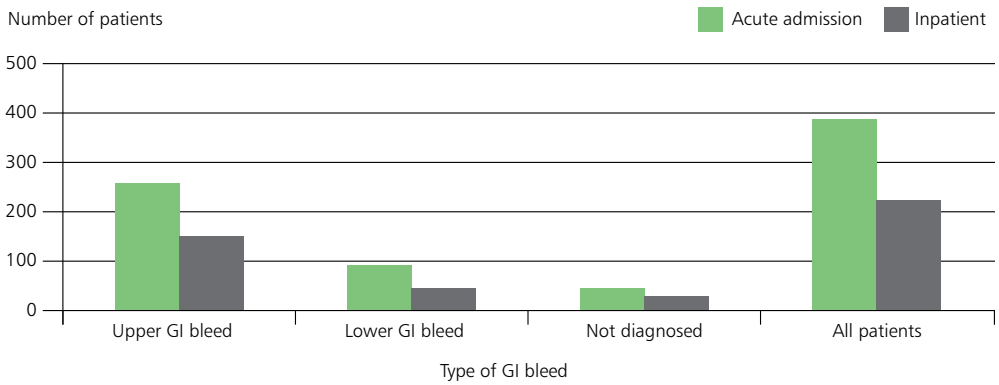

Figure 3.4 Type of bleed by admission type

Two-thirds (370/615; 60%) of the study population presented to hospital with GI bleeding whilst 245/615 (40%) developed GI bleeding whilst already an inpatient for another reason (Figure 3.4). Upper GI bleeding in established inpatients was more common in the present study (148/401; 37%) compared with the 2007 British Society of Gastroenterology (BSG) audit[3] in which only 16% of upper GI bleeds were in established inpatients. This may be due to population and sampling differences. The current study only included patients who received 4 or more units of blood; in addition, the number of cases reviewed was limited to a maximum of 5 per hospital (see study method for details).

There were 109/606 (18%) patients who were reported as having had a previous hospital admission for a GI bleed. The majority of these had experienced a non-variceal upper GI bleed (41/98) with similar numbers of lower GI bleed (24/98) and variceal GI bleed (17/98) (Table 3.2). This study did not seek any further data on the previous admissions.

Table 3.2 Type of GI bleed on previous admission

Type of GI bleed on previous admission	Number of patients
Non-variceal upper GI bleed	41
Variceal upper GI bleed	17
Lower GI Bleed	24
Other	16
Subtotal	**98**
Unknown/not answered	11
Total	**109**

CASE STUDY 6

A young patient was admitted with haematemesis and a drop in blood pressure. Following initial resuscitation the patient underwent early OGD where oesophageal varices were indentified and banded. An ultrasound scan showed portal vein thrombosis but no further assessment or treatment was planned. The patient self-discharged without a mental capacity assessment and no planned surveillance for oesophageal varices was arranged. The patient was readmitted two months later with a further upper GI bleed which on this occasion was due to a bleeding duodenal ulcer. This was treated at OGD and the patient made a good recovery.

Patients who have been admitted with a variceal upper GI bleed previously may have a different cause of GI bleeding on subsequent admissions. The reviewers considered that opportunities to both investigate the underlying cause and prevent further variceal bleeding had been missed on the first admission.

Table 3.3 Co-morbidities present

Co-morbidities	Number of patients	%
Hypertension	221	37.8
Angina/previous myocardial infarction	135	23.1
Chronic kidney disease	121	20.7
Atrial fibrillation	102	17.4
COPD/asthma	96	16.4
Stroke/transient ischaemic attack/ carotid surgery	86	14.7
Alcohol excess	86	14.7
Cirrhosis	42	7.2
Current cancer treatment	40	6.8
Pulmonary embolism/deep vein thrombosis	31	5.3
Mechanical heart valve	16	2.7
Haemodialysis/peritoneal dialysis	11	1.9
Trauma	10	1.7
Pancreatitis	7	1.2

**Answers may be multiple; n=585*

The majority of patients (380/585; 65%) presented with two or more co-morbid conditions. Details of the co-morbidities most relevant to GI bleeds are shown in Table 3.3.

The commonest co-morbidities were cardiovascular 337/585 (57.6%). A large number of patients presented with multiple co-morbidities as shown in Figure 3.5. 9.7% were current smokers. Data from the recently linked English Hospital Episodes Statistics data (secondary care data) and General Practice Research Database (GPRD) has reported that non-GI co-morbidity is an independent risk factor for upper GI bleeding, and contributes to a greater proportion of patients with bleeding than other recognised risk factors such as aspirin or NSAID use.[22]

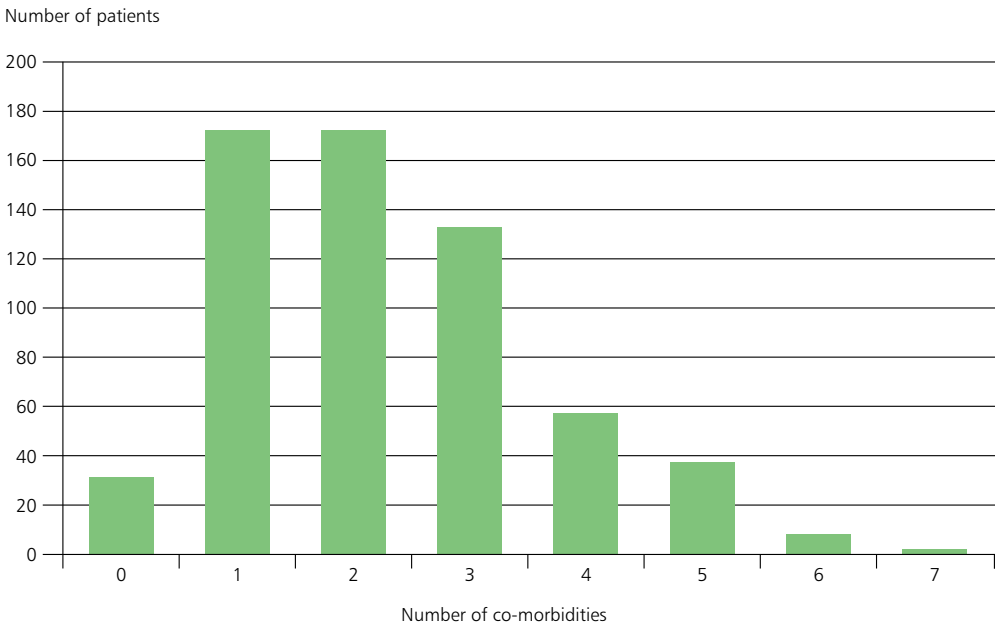

Figure 3.5 Distribution of the number of co-morbidities

Key Findings

- 31,412 patients were identified as having a GI bleed during the 4 month study period.
- 15% (4780/31412) of GI bleed patients received 4 or more units of blood during their inpatient stay.
- Patients receiving 4 or more units of blood were eight years older on average than those patients receiving no blood.
- The mean age was 53 years for variceal upper GI bleeds, 73 years for non-variceal upper GI bleed and 74 years for lower GI bleeds.
- 40% (245/615) of the patients with a GI bleed in the study population were already inpatients being treated for another condition.
- 58% (358/618) of the study population were non-variceal upper GI bleeds.
- 22% (138/618) of the study population were lower GI bleeds.
- 8% (50/618) of the study population were variceal upper GI bleeds.

4

Admission

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Patients with GI bleeds represent a complex challenge to clinical systems. They may present to a variety of different specialities. Traditionally upper GI bleeding has been managed by medical specialities and lower GI bleeding by surgeons. Around a third of the patients in this study suffered a GI bleed whilst an inpatient for another condition.

When bleeding occurs in inpatients admitted for another condition some of the teams initially assessing and managing this group may be unfamiliar with the diagnosis and management of GI bleeding. It is recognised that patients with GI bleeding can deteriorate rapidly, requiring co-ordinated input from a variety of different teams and systems to maximise the chances of a good outcome.[23]

Table 4.1 Type of admission

Type of admission	Number of patients	%
Non-elective	593	96.6
Elective	21	3.4
Subtotal	**614**	
Not answered	4	
Total	**618**	

Determining both the type and mode of presentation of these patients may identify opportunities to improve the co-ordination of care.

Nearly all of the patients (593/614; 97%) in the current study were non-elective admissions, irrespective of whether their admission was for a GI bleed or for another condition (Table 4.1).

Table 4.2 shows the mode of admission by type of GI bleed presentation (admitted with, or inpatient GI bleed). A greater proportion of the patients admitted with GI bleeding were admitted via the emergency department compared with patients who developed an inpatient GI bleed (299/368; 81% vs. 150/242; 62%). The other main difference between the two groups was that 29/242 (12%) of the patients who had a GI bleed as a complication of an admission for another condition were transferred into hospital for the management of another condition. This figure was considerably lower for patients who were admitted with a GI bleed. Just 3% (11/368) of patients admitted with GI bleeding were transferred for treatment of their GI bleed, primarily for interventional radiology and/or surgery.

Table 4.2 Mode of admission

	Admitted with a GI bleed		Inpatient GI bleed		All patients	
Mode of admission	**Number of patients**	**%**	**Number of patients**	**%**	**Number of patients**	**%**
Via the emergency department	299	81.3	150	62.0	449	73.6
Direct from GP	47	12.8	35	14.5	82	13.4
Hospital transfer	11	3.0	29	11.8	40	6.6
Following an outpatients appointment/ telephone consultation	8	2.2	12	4.9	20	3.3
Other	3	0.8	16	6.5	19	3.1
Subtotal	**368**		**242**		**610**	
Unknown	2		3		5	
Total	**370**		**245**		**615**	

CASE STUDY 7

An elderly patient presented with bright red rectal bleeding under the general medical team. There was no evidence of haemodynamic stability. The admission haemoglobin was 90g/L with a platelet count of 70x10/^{9}L. Four units of blood and two units of platelets were administered. The haemoglobin was not re-checked during the transfusions. An OGD the following day was normal. A belated per rectal examination revealed a palpable rectal tumour. No consultant review was recorded.

The reviewers considered the clinical assessment was poor, the OGD was an unnecessary invasive procedure and the blood and platelet transfusions were not indicated. Appropriate consultant review may have improved the quality of the assessment and avoided unnecessary interventions.

The majority of patients in this study were admitted as an emergency under medical specialties. The importance of early consultant review is now well-established; since NCEPOD first called for it eight years ago[24] it has been endorsed by the Royal Colleges of Physicians of London and NHS England.[25,26] And now consultant involvement within one hour is recommended for presentations with a risk of mortality of greater than 10%, or where a patient is unstable and not responding to treatment as expected.[26]

The time of the first consultant review could be identified by reviewers in 358/485 (74%) of cases. The reviewers stated that this review was not sufficiently prompt for the patients' condition in 56/352 cases (16%) (Table 4.3). This is similar to findings of previous NCEPOD reports and is therefore not unique to GI bleed patients. There is a balance required between those patients with a GI bleed who can safely be reviewed by a consultant within 12 hours and the many of the sub-population in this study that could benefit from a much earlier review by the on-call endoscopist (consultant or senior trainee). There is a need to identify the high risk patients, preferably before they have received multiple units of blood.

Table 4.3 First consultant review was sufficiently prompt for patient's condition – reviewers' opinion

Timely consultant review	Number of patients	%
Yes	296	84.1
No	56	15.9
Subtotal	**352**	
Not answered	6	
Total	**358**	

Presenting features

Figures 4.1, 4.2 and 4.3 show the common modes of presentation for patients with a GI bleed. This is in keeping with what would be expected for this group of patients. Answers may be multiple and will be discussed further in the context of investigation choice in Chapter 5.

CASE STUDY 8

An elderly patient on warfarin for a mechanical heart valve who presented with a collapse and dizziness was admitted under cardiology. Their INR was 10, urea 26mmol/L and haemoglobin 79g/L. A rectal examination, which was only performed the following day, showed melaena. No risk score was recorded but the reviewers calculated a high Blatchford score. There was no endoscopy unit at the hospital so the patient was referred to the gastroenterology team at another hospital. An OGD 8 days later showed gastritis and duodenitis.

The reviewers considered that the clinical presentation should have been recognised as a GI bleed much earlier, the gastroenterology service should have taken over the care immediately and the OGD should have been performed within 24 hours.

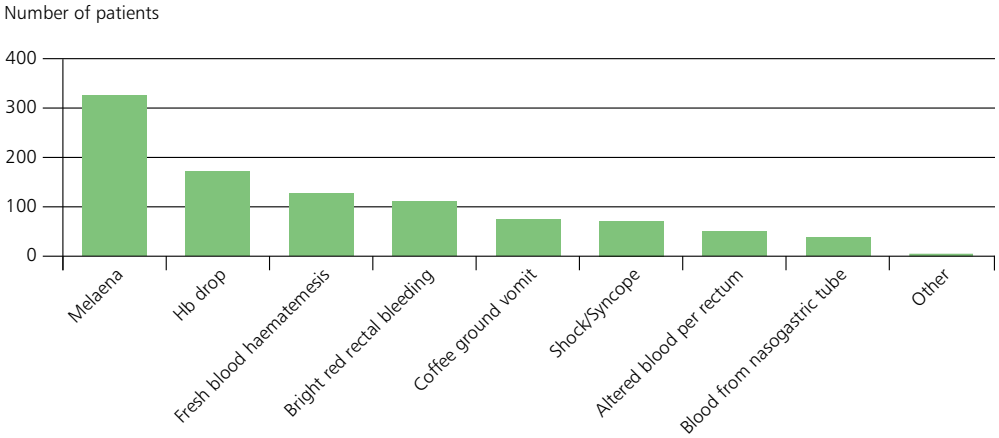

Figure 4.1 Presenting features – all patients

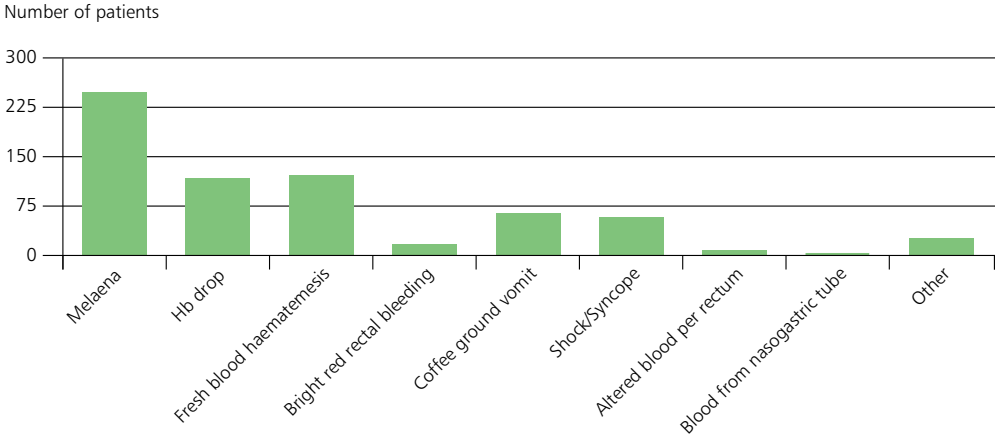

Figure 4.2 Presenting features – upper GI bleed patients

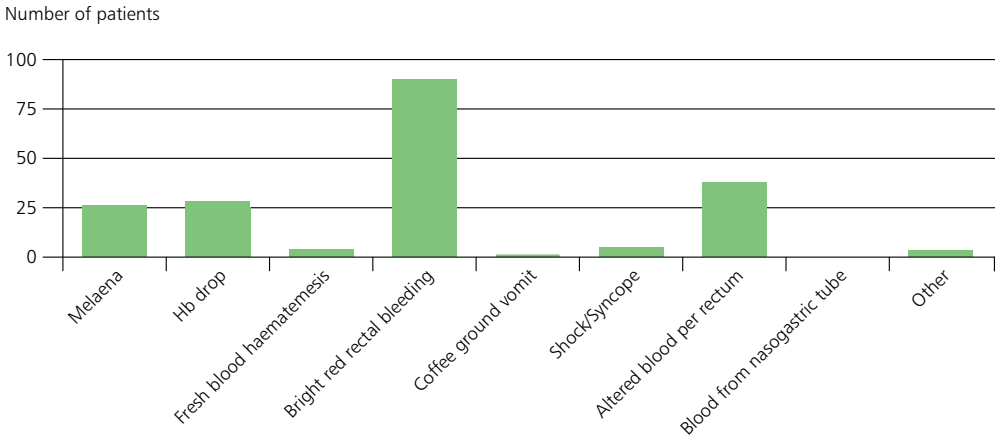

Figure 4.3 Presenting features – lower GI bleed patients

Upper gastrointestinal bleeds

Table 4.4 shows the specialties under which patients with an upper GI bleed were initially managed (reviewer data). Initially managed refers to the admitting team or the specialty they were under when they had their GI bleed as an inpatient. Most patients (140/295) with an upper GI bleed were initially managed by general/acute medicine physicians. Despite the cohort studied having a severe upper GI bleed, only 40/295 (14%) patients were initially managed by a gastroenterology or a dedicated upper GI bleed team.

Table 4.4 Team that managed patient on admission/ when they presented with an upper GI bleed

Team that managed patient	Number of patients	%
General/acute medicine	140	47.5
Gastroenterology/GI bleed team	40	13.6
General surgery	29	9.8
Emergency medicine	22	7.5
Care of the elderly	16	5.4
Critical care medicine	15	5.1
Cardiology	10	3.4
Trauma & orthopaedics	3	1.0
Hepatology	2	0.7
Other	18	6.1
Subtotal	**295**	
Unknown	17	
Total	**312**	

Table 4.5 Care transferred for GI bleed management

Care transferred	Number of patients	%
Yes	80	28.1
No	205	71.9
Subtotal	**285**	
Unknown	27	
Total	**312**	

There were 80/285 (28%) patients who subsequently had their care transferred to another specialty (Table 4.5), usually the gastroenterology team (51 patients) or critical care team (14 patients) for the management of their upper GI bleed.

Lower gastrointestinal bleeds

Table 4.6 shows the equivalent data for patients with a lower GI bleed, where 46/98 patients were managed by surgical specialities on admission or at the time they presented with a lower GI bleed.

Table 4.6 Team that managed patient on admission/ when they presented with a lower GI bleed

Team that managed patient	Number of patients	%
General surgery	40	40.8
General medicine	24	24.5
Surgery (other)	6	6.1
Emergency medicine	6	6.1
Gastroenterology/GI bleeding team	4	4.1
Care of the elderly	4	4.1
Critical care medicine	4	4.1
Other	10	10.2
Subtotal	**98**	
Unknown	8	
Total	**106**	

In 20/100 lower GI bleed patients their care was transferred to another team for GI bleed management. Ten patients were transferred to general surgery and six to gastroenterology.

Table 4.7 Presentation of GI bleed

Presentation	Number of patients	%
Admitted with a GI bleed	296	62.2
Inpatient GI bleed	180	37.8
Subtotal	**476**	
Unknown	9	
Total	**485**	

Initial assessment

Of the 485 patients who had a case note review 180 were inpatients at the time of their GI bleed (Table 4.7).

In the opinion of the reviewers, there was a delay in recognising the GI bleed, despite clear signs of GI bleeding being documented in the patient's notes, for 35/170 (21%) patients who developed a GI bleed whilst in hospital (Table 4.8).

CASE STUDY 9

An elderly patient recovering from hip fracture surgery on an orthopaedic ward developed melaena. The patient was reviewed and managed by the foundation trainee who monitored reducing haemoglobin. A clotting screen and group and save were omitted. No consultant review occurred for 72 hrs during which the haemoglobin dropped to 60g/L. The foundation doctor had difficulty obtaining input from the gastroenterology team who eventually agreed to perform an OGD. This failed to reveal the cause of the bleeding. Despite subsequent transfusion the patient continued to bleed and the gastroenterology team was called again. A repeat OGD revealed a bleeding DU which was successfully treated and the bleeding stopped.

The reviewers felt that care had been suboptimal because of delays in performing endoscopy and accepting responsibility for the GI bleed.

Table 4.8 Delay in recognising the inpatient's GI bleed – reviewers' opinion

Delay	Number of patients	%
No	135	79.4
Yes	35	20.6
Subtotal	**170**	
Unknown	10	
Total	**180**	

Risk assessment scores

Risk assessment scores should identify those patients who require more urgent investigation or treatment. Using a standardised evidence based approach for every patient reduces the variation in decision making. This is particularly applicable to those less experienced in managing a particular condition. Failure to perform these assessments risks delayed or inappropriate treatments with poor outcomes.

In the context of a severe GI bleed, risk assessment scores are used to predict the need for early intervention and the risk of re-bleeding. NICE upper GI bleed Clinical Guideline in 2012 recommended the routine use of pre-endoscopy scoring systems to direct high risk patients to early OGD for haemorrhage control.[10] The currently available risk assessment scores are only validated for those who are subsequently diagnosed with an upper GI bleed. There are no comparable scoring systems which are routinely used in clinical practice for lower GI bleeding. The 34% of the patients in this study who had lower GI bleeding or never had a diagnosis did not have a risk assessment score applicable to them.

There is evidence that the available scoring systems have further limitations. Review of the 526 patients with variceal haemorrhage in the BSG audit found that neither the clinical nor the full Rockall scores were useful predictors of outcome.[27]

For an initial risk assessment score to be clinically useful it should include defined presenting features which reliably predict that diagnosis or apply to all possible final diagnoses for one or more type of presentation. Neither of these conditions applies to GI bleeding. Figures 4.1 to 4.3 show that there was considerable overlap between the presentations of upper and lower GI bleeding.

Table 4.9 Initial risk assessment score used

Risk assessment score used	Number of patients	%
Yes	125	34.1
No	242	65.9
Subtotal	**367**	
Unknown	108	
Not answered	15	
Total	**490**	

Those patients who have an OGD would be suspected of having an upper GI bleed. In 34% (125/367) of patients undergoing an OGD a pre-endoscopy risk assessment score was recorded (Table 4.9). As expected where no advocated risk scoring system exists, only 10/128 patients who did not have an OGD had any sort of risk assessment score recorded.

NICE guidance recommends that all patients with a suspected upper GI bleed should have a pre-endoscopy (Blatchford) and post endoscopy (Rockall) risk assessment calculated (see Appendix 2). This study found that only 36% (109/299) of patients with an upper GI bleed had a pre-endoscopy risk assessment performed. Patients who developed an upper GI bleed whilst in hospital fared worse with only 27% (29/108) of patients scored. Even when scoring systems were used, in only 32/109 cases was the recommended Blatchford score used prior to endoscopy (data not shown). The post-endoscopy Rockall score predicts the risk of mortality and re-bleeding. This was recorded in only 24 patients undergoing an OGD reflecting a loss of opportunities to plan care and inform patients and their relatives.

In addition to often being omitted, risk assessment scores were also poorly applied. The reviewers recorded that they disagreed with the risk score recorded as a common theme in their narrative case summaries.

In the large UK national audit of upper GI bleeding and the use of blood in 6,750 patients only 19% of patients (15% for inpatients, 20% for new admissions) had a Rockall or Blatchford score documented.[3] Numerous other national reports have documented the poor compliance with these validated prognostic scoring systems.[28] The current study shows the adoption remains poor even in patients with severe bleeding (Table 4.10). This may in part be due to the breadth of teams who manage patients at the time of presentation. The numbers where a risk score was recorded are too low to allow a meaningful assessment of their impact on the patient pathway. Notwithstanding their lack of applicability to all presenters with GI bleeding there is a persisting disconnection between existing guidelines and the reality of clinical practice.

Table 4.10 Initial risk assessment undertaken by type of admission

	Admitted with upper GI bleed		Inpatient upper GI bleed		All upper GI patients	
Risk assessment score used	**Number of patients**	**%**	**Number of patients**	**%**	**Number of patients**	**%**
Yes	80	42.3	29	26.9	109	36.5
No	109	57.7	79	73.1	190	63.5
Subtotal	**189**		**108**		**299**	
Unknown/not answered	53		55		109	
Total	**242**		**163**		**408**	

Shock index

The cohort of patients chosen for this study had received 4 or more units of blood and had experienced a GI bleed. As a means of assessing the severity of the presenting bleed the shock index at the time of presentation with the GI bleed was calculated retrospectively by the NCEPOD authors. The shock index is a simple measure of haemodynamic instability calculated by dividing the heart rate by systolic blood pressure. It has been used as a marker of blood loss in trauma and other conditions. There are currently no guidelines which include the use of shock index in the assessment of GI bleeding but a recent publication assessed a simplified scoring system for NVUGIB which included shock index; and it reported a similar accuracy to the Blatchford score.[29] One study reported that a shock index of 1 or greater predicted active bleeding.[30] As shock index was calculated at presentation it is presumed this was before any inotropes were administered. Shock index will be used elsewhere in this report as an assessment of the severity of the bleeding at the time of presentation across the entire population. The low compliance with the recommended dedicated risk scores for upper GI bleeding, despite the longstanding and often repeated guidance regarding their utility, prevents using them further in this study.

In this study 64% (377/587) of patients had a shock index >0.7 and 26% (152/587) >1 at the time of presentation with their GI bleed (Table 4.11). This demonstrates that many of these patients were significantly unstable and may have needed early intervention to stop bleeding.

Table 4.11 Shock index

Shock index	Number of patients	%
≤0.7	210	35.8
>0.7 ≤1	225	38.3
>1 ≤1.3	101	17.2
>1.3	51	8.7
Subtotal	**587**	
Insufficient data	31	
Total	**618**	

Recognition of patients with major bleeding is important to enable timely resuscitation and trigger early senior review. Where there is evidence of continuing blood loss, intervention to stop bleeding should be expedited and care escalated. The care and outcomes of patients stratified by their shock index will be considered in later chapters.

Initial management

The initial management of patients with a GI bleed includes; resuscitation, administration of blood products, drug treatments and appropriate investigations. Previous studies have shown that patients presenting with GI bleeding often have multiple medical conditions for which they take many medications. These include drugs which can cause GI bleeding from peptic ulcer disease as well as drugs which can worsen bleeding such as anti-platelets and anticoagulants.[31]

The quality of the initial assessment and treatment can alter the course of many illnesses and has been related to the rapidity of senior review. It can be difficult to balance because some treatments that increase the risk or severity of a GI bleed are necessary for other major medical conditions. Therefore, the initial treatment of patients with a GI bleed can be complicated, particularly in terms of managing anticoagulants, anti-platelet agents and coagulopathy. The risks and benefits of stopping drugs or reversing anti-coagulation need to be discussed with a doctor of the same specialty and grade as the one who initiated that treatment. This will commonly require a consultant to consultant discussion.

Medication prior to GI bleed

Table 4.12 shows the number of patients who were taking particular medications prior to their GI bleed (answers may be multiple for each patient). There were 209/618 (34%) patients who were taking aspirin immediately prior to their GI bleed and a further 38/618 (6%) patients who were taking non-steroidal anti inflammatory drugs (NSAID), 13% (80/618) of patients were receiving warfarin treatment and a further 4% (24/618) therapeutic low molecular weight heparin (LMWH). Nearly one quarter of patients were being given some form of acid suppression either proton pump inhibitors (PPI) or H2 antagonist.

Although Table 4.13 suggests that whilst most patients had medication that may have contributed to, or potentially worsened the GI bleed stopped or continued following appropriate discussions between specialties, the reviewers identified 8% (31/380) of patients who had one or more medications inappropriately stopped. NICE guidelines[10] recommend that patients receiving aspirin for secondary cardiovascular prophylaxis (e.g. previous myocardial infarction, stroke or recent arterial stent) should continue low-dose aspirin once haemostasis is achieved. The data collected did not allow assessment of compliance with this guidance. There was 9% (35/399) of patients who had medication inappropriately stopped in the view of the reviewers (Table 4.15). The majority of these cases related to the continuation of anti-platelet drugs. Overall there was room for improvement in the management of medication in 44 different patients. This included 12 patients for whom the reviewers felt that aspirin should have been stopped.

Table 4.12 Medication prior to GI bleed

Medication prior to GI bleed	Number of patients	% of all patients
Aspirin	209	33.8
Proton pump inhibitor	128	20.7
Warfarin	80	12.9
Heparin/low molecular weight heparin-prophylactic dose	79	12.8
Clopidogrel	78	12.6
NSAID	39	6.1
Steroids	36	5.8
H2 antagonists	26	4.2
Heparin/low molecular weight heparin-treatment dose	24	3.9
SSRIs	21	3.4
Bisphosphonates (oral)	15	2.4
Novel anticoagulants	6	
Other anti-platelet agents	6	
Other	124	20.1
None of the listed medication	111	18.0

CASE STUDY 10

An elderly patient with an exacerbation of COPD was admitted and treated with antibiotics and steroids. The patient normally took warfarin for atrial fibrillation which was stopped after two weeks when some streaky haemoptysis developed. Aspirin was started without ulcer prophylaxis. After a further two weeks GI bleeding occurred with a drop in blood pressure and haemoglobin. There was no endoscopy service on-site and the patient was deemed too unstable at that stage to transfer for OGD. Several days later the patient was transferred and the OGD was performed. However, the patient subsequently died from respiratory complications.

The reviewers felt that the combination of steroids and aspirin without proton pump inhibitors for ulcer prophylaxis, along with the delay to OGD, may have contributed to the death.

Blood investigations

Table 4.16 lists the blood investigations that were performed at the time the patient presented with their GI bleed (as reported by the clinician caring for the patient).

Table 4.13 Medications that were stopped in hospital post GI bleed

Medication	Prior to GI bleed	Stopped post GI bleed	% stopped
Aspirin	209	180	86.1
Proton pump inhibitor	128	5	3.9
Warfarin	80	68	85.0
Heparin/low molecular weight heparin-prophylactic dose	79	77	97.5
Clopidogrel	78	66	84.6
Non steroidal anti-inflammatory drugs (NSAIDs)	39	39	100.0
Steroids	36	13	36.1
Heparin/low molecular weight heparin-treatment dose	27	27	100.0
H2 antagonists	26	9	34.6
Selective serotonin reuptake inhibitors (SSRIs)	21	2	9.5
Novel anticoagulants	7	6	85.7
Other anti-platelet agents	4	2	50.0
Bisphosphonates (oral)	15	7	46.7

Table 4.14 Medication appropriately stopped – reviewers' opinion

Appropriate medication stopped	Number of patients	%
Yes	349	91.8
No	31	8.2
Subtotal	**380**	
Unknown/Not applicable	105	
Total	**485**	

Table 4.15 Medication inappropriately continued – reviewers' opinion

Inappropriate medication continued	Number of patients	%
Yes	35	8.8
No	364	91.2
Subtotal	**399**	
Unknown	86	
Total	**485**	

Table 4.16 Investigations undertaken at the time of presentation with GI bleed

	Acute admission with a GI bleed		Inpatient with a GI bleed	
Investigations	**Number of patients**	**%**	**Number of patients**	**%**
Full blood count	359	98.1	226	95.8
Urea and electrolytes	354	96.7	218	92.4
Clotting screen	324	88.5	193	81.8
Liver function tests	330	90.2	163	69.1
Cross-match	292	79.8	179	75.8
Group and save	259	70.8	171	72.5
Subtotal	**366**		**236**	
Not answered	4		9	
Total	**370**		**245**	

Table 4.17 Investigations omitted at presentation – reviewers' opinion

	Admitted with a GI bleed		Inpatient GI bleed	
Investigations omitted at presentation	**Number of patients**	**%**	**Number of patients**	**%**
Yes	47	19.7	44	33.1
No	191	80.3	89	66.9
Subtotal	**238**		**133**	
Unknown	58		47	
Total	**296**		**180**	

Whilst the majority of patients underwent appropriate investigations at the time of presentation with their bleed (Table 4.16), it was the opinion of the reviewer that up to a third of patients had one or more of those investigations omitted (Table 4.17).

Neither cross-match nor a group and save was performed in 5% of patients at the time of presentation. A clotting screen was omitted in 14% and liver function tests were omitted in 18% of patients (data not shown). Overall, the reviewers were of the opinion that appropriate investigations for the patient's condition were not performed in 20% (47/191) of patients admitted with GI bleeding. For established inpatients, this figure was 33% (44/133). As all of the patients in the study were subsequently given at least 4 units of blood they were all cross-matched eventually.

Medication commenced after diagnosis

Table 4.18 shows the treatments which were commenced after diagnosis of a GI bleed but before endoscopy.

NICE clinical guideline 141[10] recommends acid suppression therapy (proton pump inhibitors (PPI) or H2 antagonists) should not be started prior to OGD in patients with suspected non-variceal upper GI bleeds. PPIs can downgrade the endoscopic findings but this does not translate in to any impact on mortality, transfusion requirements, re-bleeding or secondary interventions. The guideline recommended that that acid suppression therapy should not be used as a "holding measure" to replace or delay early endoscopic therapy.

Table 4.18 Treatments post GI bleed presentation but prior to endoscopy

Treatments post GI bleed presentation but prior to endoscopy	Number of patients	%
Proton pump inhibitors	330	72.8
Vitamin K	85	18.8
Tranexamic acid	73	16.1
Antibiotics	65	14.3
Terlipressin	49	10.8
H2 antagonisists	11	2.4
Prokinetics (metoclopramide, domperidone)	9	2.0
Octreotide	2	0.4
Factor VIIa	1	0.2
Other	64	14.1

Answers may be multiple; n=453

Contrary to this guidance 150/206 (73%) patients had acid suppression started prior to a definitive diagnosis of a non-variceal upper GI bleed. Why this simple cost saving evidence based guidance has not been adopted into clinical practice is open to conjecture. It may relate to the understandable desire to initiate condition specific treatment when confronted with an acutely haemorrhaging patient, particularly where early endoscopy is not available.

Intravenous high-dose PPI therapy is recommended for 72 hours after successful endoscopic haemostasis as it decreases both re-bleeding and mortality in patients with high-risk stigmata.[32,33] Fifty two patients were appropriately started on PPIs after their endoscopic diagnosis but in five of these patients the reviewers felt that there was a delay in commencing PPI treatment (Table 4.19).

Table 4.19 Acid suppression (PPI or H2 antagonist) started

Acid suppression started	Number of patients	%
Pre-admission	37	18.0
Pre-endoscopy	113	54.9
Post endoscopy	52	25.2
Not started	4	1.9
Subtotal	**206**	
Not answered	3	
Total	**209**	

The reviewers stated that opportunities for treatment were omitted in 37/404 (9%) of patients (Table 4.20). Omissions included tranexamic acid (17 patients), vitamin K (5) and antibiotics (4). Tranexamic acid use is established in acute traumatic haemorrhage and has in the past been reported to reduce mortality in GI bleeding. The judgment that tranexamic acid was omitted will be contentious as the evidence regarding its use in the era of PPIs and modern endoscopic therapies is still being accumulated, including the HALT-IT TRIAL in the UK.[29,47] The recommendation that tranexamic acid should have been used is understandable where patients have haemodynamic instability or delayed access to haemostatic interventions.

Table 4.20 Treatments omitted prior to endoscopy – reviewers' opinions

Treatments omitted prior to endoscopy	Number of patients	%
Yes	37	9.2
No	367	90.8
Subtotal	**404**	
Unknown	81	
Total	**485**	

Abnormal coagulation and its correction

A total of 127 patients included in the study had abnormal coagulation studies with an INR >1.5. Of these, 78 were not taking Warfarin and 26, 33 and eight presented with variceal upper GI bleeding, non-variceal upper GI bleed and lower GI bleeding respectively. Forty-nine patients had an INR >3.5 whilst taking Warfarin (Table 4.21).

Table 4.21 INR at time of GI bleed

	Taking warfarin		
INR	**No**	**Yes**	**Total**
<1.5	372	6	378
1.5 - 3.5	66	22	88
>3.5	12	49	61
Subtotal	**450**	**77**	**527**
Not answered	88	3	91
Total	**538**	**80**	**618**

Tables 4.22 and 4.23 show the measures undertaken to correct an abnormal INR.

Table 4.22 Measures to correct an abnormal INR (not on warfarin)

Measures to correct INR	Number of patients
Vitamin K	18
Vitamin K, fresh frozen plasma	18
None	14
Fresh frozen plasma	6
Vitamin K, fresh frozen plasma, cryoprecipitate	4
Vitamin K, Prothrombin complex	3
Fresh frozen plasma, cryoprecipitate	3
Fresh frozen plasma, other	2
Vitamin K, fresh frozen plasma, other	1
Prothrombin complex, other	1
Other	1
Not answered	7
Total	**78**

Table 4.23 Measures to correct an abnormal INR in patients on warfarin

Measures to correct INR	Number of patients
Vitamin K, prothrombin complex	18
Vitamin K	14
Vitamin K, fresh frozen plasma, prothrombin complex	5
Prothrombin complex	4
None	2
Factor VIIa	1
Combinations of the above not including prothrombin complex	5
Total	**49**

The British Society of Haematology (BSH) produced guidelines in 2011 regarding the correction of clotting when a patient on warfarin has a major haemorrhagic event.[34] The guidelines advise the use of four-factor prothrombin complex concentrate (PCC) combined with a 5mg IV bolus of vitamin K. There are only two four-factor PCCs licensed in the UK. There is additional evidence that reversal of warfarin with PCC is cost effective.[35] The BSH do not recommend recombinant factor VIIa for emergency reversal of anticoagulation. Fresh frozen plasma is only recommended if PCC is unavailable and, as they also advise that all hospitals managing patients on warfarin should stock a licensed four-factor prothrombin complex concentrate this eventuality should not arise in any acute hospital. It would appear that there are a number of cases where this guidance has not been followed. In 17 cases the reviewers judged that the INR was not adequately corrected. Most commonly an elevated INR was not treated or fresh frozen plasma was inappropriately administered.

In this study all patients received at least 4 units of blood. The median haemoglobin for all patients at presentation with a GI bleed was 75g/L. The most frequent presenting haemoglobin was 50-59g/L. This is demonstrated in Figure 4.4. Patients who were already inpatients had higher haemoglobin levels than those admitted with a GI bleed.

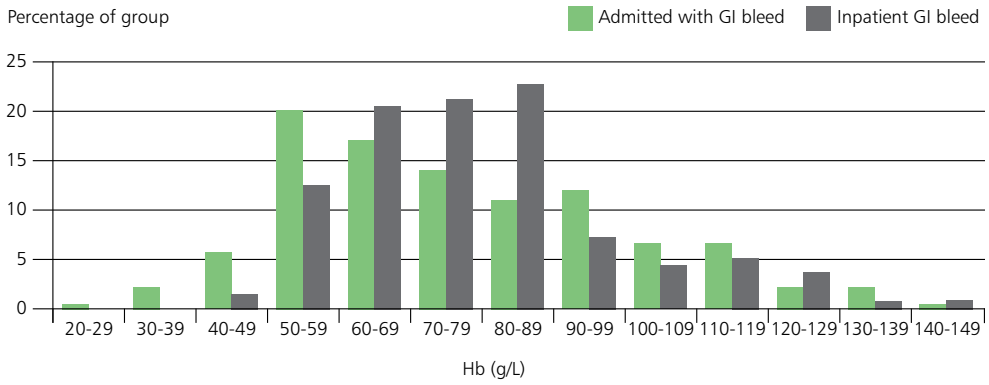

Figure 4.4 Haemoglobin at the time of the GI bleed

Intravenous access

Patients with severe GI bleeding may deteriorate rapidly. Intravenous (IV) access should be of sufficient size and number to allow rapid replacement of intravascular volume, if required. As matter of routine the date of insertion, site and size of all IV cannulas must now be recorded in all medical records.[36] Central venous catheter placement is an invasive intervention with recognised risks of complications. Where the reviewers could make an assessment, IV access was adequate for the patient's condition in 226/257 (88%) cases (Table 4.24). In 228 cases they could not determine from the case notes if IV access was available, suggesting that the recommended mandatory recording of IV cannula and catheter placement was not followed or the documentation was poor.

Table 4.24 IV access adequate – reviewers' opinion

IV access adequate	Number of patients	%
Yes	226	87.9
No	31	12.1
Subtotal	**257**	
Unknown	228	
Total	**485**	

Major blood transfusion protocol

In Chapter 2 the data showed that of 205 hospitals in the study 200 had a massive blood transfusion policy, there were not any that did not and three did not answer.

Large transfusions of stored blood can lead to depletion of platelets and clotting factors. The massive blood transfusion protocol aims to minimise the loss of all of these blood products to maintain blood volume and clotting abilities. At the same time efforts to stop the bleeding are required with endoscopy, interventional radiology or surgery.

A massive transfusion protocol was activated in only 42 patients (8.8%) (Table 4.25). In the remaining 436 patients, there were 13 (3.2%) where clinicians thought that it should have been activated (Table 4.26).

Table 4.25 Major blood transfusion protocol activated – clinicians' opinion

Major blood transfusion protocol activated	Number of patients	%
Yes	42	8.8
No	436	91.2
Subtotal	**478**	
Unknown	116	
Not answered	24	
Total	**618**	

Table 4.26 Major blood transfusion protocol should have been activated – clinicians' opinion

Major blood transfusion protocal should have been activated	Number of patients	%
Yes	13	3.2
No	399	96.8
Subtotal	**412**	
Unknown	11	
Not answered	13	
Total	**436**	

Blood products

GI bleeding is the second commonest medical reason for blood transfusion in the UK accounting for 14% of all blood transfusions.[6] If there were opportunities to reduce the use of blood in GI bleeding this could have a significant cost impact for the NHS.

The opinion of the reviewers was that blood product use was inappropriate in 20% (84/426) of patients (Table 4.27). This was mostly over-transfusion of red blood cells. This is in line with other national audits of blood transfusion going back to 2002.[37] The apparent lack of any improvement in the use of blood products over a prolonged period is disappointing.

Table 4.27 Appropriate blood product use – reviewers' opinion

Appropriate blood product use	Number of patients	%
Yes	342	80.3
No	84	19.7
Subtotal	**426**	
Unknown	59	
Total	**485**	

Table 4.28 Improved management may have reduced the use of blood products – reviewers' opinion

Improved management may have reduced the use of blood products	Number of patients	%
Yes	113	24.7
No	344	75.3
Subtotal	**457**	
Unknown	28	
Total	**485**	

In 25% (113/457) of patients improved management would have reduced the requirement for blood product use (Table 4.28).

The commonest causes cited were delays in performing diagnostic investigations or interventions, performing an inappropriate procedure first and inappropriate transfusion triggers and transfusing beyond haemoglobin targets.

Transfusion targets are important, as restrictive red cell transfusion strategies have been shown to result in no worse outcomes than liberal red cell transfusion in several clinical scenarios, and one single centre trial suggested that that using a transfusion trigger of 70g/L was associated with improved clinical outcomes (mortality and re-bleeding) when compared to 90g/L in upper GI bleeding.[38] The results of the UK TRIGGER trial, which compared a liberal transfusion to maintain the haemoglobin above 100g/L, with a restrictive policy maintaining haemoglobin between 80 and 100g/L in new admission with upper GI bleeding, are awaited. The Study Advisory Group recognised that, whilst there was evidence to support a restrictive transfusion strategy standardised blood transfusion triggers and thresholds had not yet been adopted in national guidance. Therefore, the transfusion triggers or targets were left to the judgement of the reviewers, taking in to account the patient's background condition. Elderly patients and those with multiple co-morbidities may tolerate aggressive restrictive transfusion strategies less well.

Both the clinicians caring for the patient and reviewers at NCEPOD highlighted that the recording of blood transfusions was poor. Identifying when patients had blood products was difficult and time consuming.

For those patients who had an OGD the reviewers were asked if the length of time from GI bleed presentation to OGD was reasonable for that patient's condition. Where they identified a delay excessive blood product usage was more likely. In 38% (39/104) of patients where there was a delay, blood usage could have been improved compared with 14% (31/193) when there was no delay (Table 4.29).

Table 4.29 Time to OGD by appropriate blood usage

	Better management may have improved blood usage				
Time to OGD reasonable	**No**	**Yes**	**Subtotal**	**Not answered**	**Total**
Yes	192	31	223	12	**235**
No	65	39	104	6	**110**
Subtotal	**257**	**70**	**327**	**18**	**345**
Unknown	10	1	11	1	**12**
Total	**267**	**71**	**338**	**19**	**357**

CASE STUDY 11

An elderly patient was admitted as an emergency on a Friday night with haematemesis and melaena. The patient was reviewed by the emergency medical team and commenced on IVI PPI and transfused 6 units of blood over 12 hours. There was no gastroenterology or emergency GI bleeding service available at the weekend and they waited until Monday for an OGD. A further 4 units of blood was given because of ongoing bleeding. At endoscopy the patient was found to have a bleeding duodenal ulcer which was controlled with adrenaline and heater probe.

The reviewers felt that there was an inappropriate delay in performing endoscopy which led to excessive transfusion and put the patient's life at risk.

Key Findings

- 97% (593/614) of patients were non-elective admissions.
- In 16% (56/352) of cases the reviewers felt that the first consultant review was not sufficiently prompt for the patient's condition.
- 14% (40/295) of upper GI bleed patients were managed initially by gastroenterology or a dedicated upper GI bleed team.
- 46/98 lower GI bleed patients were managed by a surgical team.
- 21% (35/170) of patients developing a GI bleed whilst an established inpatient had delayed recognition of their GI bleed.
- 26% (152/587) of patients had a shock index >1 at the time of presentation with their GI bleed.
- 64% (190/299) of patients with an upper GI bleed did not have any risk assessment score calculated.
- Medication was inappropriately continued in 9% (35/399) of patients.
- Important basic investigations were omitted in 20% (47/238) of patients admitted with a GI bleed and 33% (44/133) of inpatients, including 5% who had no cross-match or group and save performed.
- Early basic treatment was omitted in 9% (37/404) of patients.
- Blood product use was inappropriate in 20% (84/426) of cases. In 25% (113/457) improved management would have reduced the need for blood product use.
- Early endoscopy resulted in better management of blood products.

5

Diagnostic pathway

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Diagnosing a GI bleed can be challenging. Factors affecting this include the long length of the GI tract, the wide range of potential pathologies and the often intermittent nature of the bleeding. On some occasions GI bleeding is self limiting but in patients with a severe GI bleed there are no clinical, laboratory or imaging predictors of which patients can be safely managed conservatively.

In GI bleeding there are three levels of diagnostic detail.

- **Category:** Bleeds may be categorised as upper GI bleeds (UGIB) or lower GI bleeds (LGIB) but without a diagnosis of the anatomical site of bleeding. Upper GI bleeds are sub-categorised as non-variceal upper GI bleeds (NVUGIB) or variceal upper GI bleeds (VUGIB).
- **Anatomical site:** The precise anatomical site of haemorrhage is identified. This allows the bleeding lesion to be treated and the patient stabilised but the pathological cause remains unknown.
- **Pathological diagnosis:** A pathological diagnosis is required to reduce the risk of re-bleeding or a missed diagnosis of a malignant or premalignant lesion.

Common diagnostic investigations

Oesophago-gastro-duodenoscopy (OGD)

The primary diagnostic test, and therapeutic modality, for upper GI bleeding is OGD. Thirty-six out of 407 patients were categorised as an upper GI bleed without any investigations. Fourteen were considered too sick or frail for an OGD and eight had known malignancy. At OGD the endoscopist may not be able to see, let alone treat, the culprit lesion if the patient is actively bleeding due to the obscuring blood and blood clot. GI bleeding is commonly intermittent, even in large volume bleeds. The endoscopic signs which predict the risk of re-bleeding are well established. For these reasons endoscopists generally prefer patients to not be actively bleeding at the time of the procedure. Patients are generally resuscitated to the maximum achievable level before proceeding to OGD. This is a difficult balance and many unstable patients require the support of critical care or anaesthetic teams.

CT angiography

In the actively bleeding patient, where blood obscures the underlying cause at OGD or there is no evidence of upper GI bleeding, further investigation is required. CT angiography (CTA) may be used to localise upper or lower GI bleeding and guide interventional radiology or surgical treatment. In active bleeding CT has a reported accuracy of up to 89%.[39] CTA is routinely combined with a pre-contrast study to exclude false positives and a delayed phase study to localise slower bleeding. The detail of the CT technique was not considered in this study. In the current study the reviewers identified 51/420 (12%) patients who underwent a CTA and were of the opinion that a further 20 patients would have benefited from this investigation.

Catheter angiography

Where the CTA is equivocal, unavailable or the patient is immediately threatened by their haemodynamic status the patient may proceed to catheter angiography as a diagnostic study but with the additional intention of embolising any identified bleeding point. Aortic flush catheter angiography is much less sensitive than CTA. Catheter angiography requires first order (selective angiography) or often 2nd, 3rd or greater order arterial branch catheterisation (super-selective angiography) to identify active bleeding. Indirect signs of the site of bleeding (pseudoaneurysms, truncated or irregular vessels, focal hypervascularity and early venous shunting) are useful but have a false positive rate and may lead to an inappropriate treatment or increased risk of complications. Embolisation is lower risk than surgery with an equivalent haemostasis rate.[40]

CTA and catheter angiography are at their most sensitive when the patient is actively bleeding. In catheter angiography a pre-procedural shock index >1 is a good predictor that the angiogram will identify a site of bleeding.[30] The transfer of patients for CTA or catheter angiography should be made as safe as possible but some patients will never stabilise and imaging/intervention needs to take place during resuscitation whilst they are haemodynamically unstable. As with OGD these patients will benefit from anaesthetic or critical care support to resuscitate and improve the chances of diagnostic and/or therapeutic success. A patient who is completely haemodynamically stable with minimal on-going volume replacement is unlikely to be actively bleeding. Such patients may be better observed until or if they re-bleed.

Colonoscopy/ flexible sigmoidoscopy

In this study colonoscopy and /or flexible sigmoidoscopy were rarely (26 data not shown) used as first line investigation or even as part of the early investigation phase. Colonoscopy and flexible sigmoidoscopy are optimally performed after bowel cleansing. The time delay required to achieve this is likely to account for the low numbers of lower GI endoscopies performed as a first investigation.

Clinical presentations

The range of clinical presentations by category of bleeding from the clinician questionnaire is shown in Table 5.1. This data has been presented earlier but is repeated here for ease of reading.

In this study of severe GI bleeds 11.7% (72/618) of patients could not have their bleeding categorised by the consultant completing the clinician questionnaire.

Table 5.1 Symptoms /and/or signs at the time of clinical presentation

	Upper GI bleed		Lower GI bleed		Diagnosis unknown	
How the patient presented	**Number of patients**	**%**	**Number of patients**	**%**	**Number of patients**	**%**
Melaena	251	62.8	25	18.2	50	69.4
Haemoglobin drop	119	29.7	28	20.4	24	33.3
Fresh blood haematemesis	122	30.4	3	2.2	4	5.6
Bright red rectal bleeding	15	3.7	90	65.7	8	11.1
Coffee ground vomit	67	16.7	1	0.7	9	12.5
Shock/syncope	60	15.0	4	2.9	9	12.5
Altered blood per rectum	11	2.7	37	27	5	6.9
Other	29	7.2	3	2.2	8	11.1
Blood from nasogastric tube	4	1.0	0	0	1	1.4
Subtotal	**401**		**137**		**72**	
Not answered	7		1		0	
Total	**408**		**138**		**72**	

Answers may be multiple

No single presentation was specific to upper or lower GI bleeding. Whilst haemoglobin drop was observed commonly in both groups, other presentations were more indicative of the category of bleeding. Melaena, haematemesis, coffee ground vomit and shock/syncope were all more common in upper GI bleeding. Bright red rectal bleeding (BRRB) or altered blood per rectum were commoner in lower GI bleeding. Whilst no presentation was diagnostic, the mode of presentation was nevertheless a reasonable indicator of the location of the bleeding.

Investigations when presenting with bright red rectal bleeding

Patients presenting with BRRB may have ano-rectal pathologies (e.g. haemorrhoids, fissures, rectal ulcers or malignant tumours) which can be diagnosed by direct local examination (proctoscopy +/- sigmoidoscopy) and sometimes treated, avoiding other tests. Proctoscopy was recommended in the 2008 SIGN guideline which was adopted by BSG in the same year. Simple, effective diagnostic tests can be overlooked as medicine becomes increasingly dependent on technology. All teams managing patients with GI bleeding should be able to perform proctoscopy and rigid sigmoidoscopy, and perform local haemostatic treatments 24/7. From the organisational data, 39 of the hospitals responding stated that they had a written lower GI bleed guideline which included proctoscopy +/- rigid sigmoidoscopy to exclude ano-rectal pathology. In this study sixty-seven patients presented with BRRB (alone or with shock/syncope or haemoglobin drop) of which 17 had ano-rectal pathologies, but only three patients had a proctoscopy or rigid sigmoidoscopy. Whilst some of the remainder had external haemorrhoids or palpable rectal lesions and some were diagnosed at colonoscopy or flexible sigmoidoscopy these do not account for all; others must have had proctoscopy or rigid sigmoidoscopy which was not recorded as the method of diagnosis in the notes. All invasive tests and treatments should be included in the medical records.

The first investigation performed in the 67 patients with BRRB is shown in Table 5.2. An OGD was performed first in 23 patients.

There were 17 patients with BRRB who had a shock index >1. Five patients who presented with BRRB were diagnosed with an upper GI bleed on OGD or CTA. All five of these had a shock index >1. This suggests that GI bleed algorithms should consider limiting OGD in patients with BRRB, after proctoscopy has excluded ano-rectal lesions, to those with haemodynamic compromise. The American Society for Gastroenterology's (ASGE) lower GI bleed guideline makes a similar recommendation with emergency OGD in BRRB with haemodynamic instability and colonoscopy first for the remainder.[13]

Table 5.2. First investigation when presenting with bright red rectal bleeding alone

First investigation	All patients	Upper GI bleed	Lower GI bleed	Not diagnosed
OGD	23	4	19	0
Flexible sigmoidoscopy	14	0	14	0
CTA	9	1	8	1
Proctoscopy	3	0	3	0
Colonoscopy	2	0	2	0
Other (CT)	2	0	2	0
No investigation recorded	17	0	16	1
Total	**67**	**5**	**60**	**2**

In 17 patients with BRRB no investigation was recorded as being performed despite all of the patients in this study receiving 4 or more units for their GI bleed. In 16/17 patients the clinical team made a diagnosis of lower GI bleeding despite the lack of any localising investigation. This was presumed to be on the basis of clinical presentation alone. Five patients died in hospital, four patients had further out-patient investigations arranged and the remaining eight were at risk of having malignant/pre-malignant lesions or treatable lesions at risk of re-bleeding missed.

Unlike BRRB, the data did not suggest that altered blood per rectum without haemodynamic compromise made upper GI bleeding unlikely.

Use of diagnostic investigations

Ideally the first investigation performed would diagnose the category, anatomical site and pathological cause of bleeding. By far the commonest first investigation was an OGD in 86.3% (466/540) of patients in this study. Of these patients 76% (355/466) had an upper GI bleed diagnosed by that OGD or other investigations, and 66 (14%) subsequently diagnosed with a lower GI bleed.

Seventy-eight patients had no investigation recorded by the clinician returning the questionnaire (Table 5.3). There were 24/78 patients who did not have their GI bleed categorised (16 died in hospital, 14 of whom were inpatient bleeds).

CASE STUDY 12

A middle-aged patient with 3 stone weight loss and intermittent bright red rectal bleeding was admitted to a general medical ward with increased rectal bleeding and symptomatic anaemia. The patient was already on the waiting list for an out-patient colonosocopy. Two rectal examinations recorded a palpable abnormality. Proctoscopy was not performed, but an OGD was normal. Following a 5 unit blood transfusion, without any haemoglobin check, the patient was discharged. Colonoscopy two months later diagnosed an unresectable recto-sigmoid carcinoma.

The reviewers considered the OGD was unnecessary in a patient with a palpable rectal tumour. The rectal tumour should have been diagnosed during the admission. They considered the patient was over transfused and that care was fragmented with no evidence of leadership or co-ordination of care.

The majority of the 24 without a definitive diagnosis and no investigations had evidence that they were not expected to survive or had Do Not Attempt Cardiopulmonary Resuscitation (DNACPR) orders, 15 had their treatment limited or withdrawn.

Table 5.3 The number of investigations per patient presented by the category of bleeding recorded by the clinician.

Number of investigations	Upper GI bleed	Lower GI bleed	Not diagnosed	Total
1	301	50	22	373
2	51	39	16	106
3	12	17	6	35
4	7	10	4	21
5	1	3	0	4
6	0	0	0	0
7	0	1	0	1
None recorded	36	18	24	78
Total	**408**	**138**	**72**	**618**

In 54/78 patients a category of GI bleed was recorded but they had no diagnostic investigations. The categorisation of GI bleed may have been made on clinical presentation alone or there was poor recording of investigations. Of those 54, 27 patients died in hospital, the majority of were probably unavoidable deaths of the 27, 22 patients had their treatment limited and 23 had DNACPR orders (data not shown).

Table 5.3 shows that 373 patients had a single investigation which at least categorised the bleeding in 94% (351/373). The remaining 22 patients had no further investigation despite a non-diagnostic first test. One third of patients 31% (167/540) had two diagnostic investigations. Forty-eight out of 533 patients who had between one and four investigations to localise the bleeding never had their category of haemorrhage identified. The reviewers were concerned that the diagnostic process appeared to have been curtailed in so many patients without clear justification, particularly as this is a group who had a severe GI bleed and a high risk of re-bleeding. They did recognise that in some patients further intervention was inappropriate and focus was moved to end of life care.

CASE STUDY 13

A middle-aged patient was admitted with melaena. Admission haemoglobin was 140g/L dropping to 70g/L the next day. The following day the patient was transfused 2 units and had a normal OGD. No re-bleed or further assessment plan was recorded. A further 2 unit blood transfusion was received and they were discharged on day 2 with no follow-up documented.

The reviewers considered that the patient was discharged too early given the severity of the initial GI bleed and should have had a colonoscopy, and if that was negative, a CT scan.

Category of bleeding

The total number of patients receiving each type of investigation by their category of GI bleed is shown in Table 5.4. Patients where the category of bleeding can be determined will often also have the anatomical site of bleeding identified (with or without a pathological diagnosis).

Table 5.4 Procedure type by type of bleed

All procedures	All	Upper GI Bleed	Lower GI Bleed	Diagnosis unknown
OGD	490	365	80	45
CT angiography	68	22	39	7
Catheter angiography	17	8	8	1
Colonoscopy	58	11	30	17
Flexible sigmoidoscopy	53	5	44	3
Scintigraphy	5	2	3	0
Capsule endoscopy	12	3	5	4
Proctoscopy/rigid sigmoidoscoy	3	0	3	0
At surgery by intra-op endoscopy of small or large bowel, or OGD	5	2	3	0
Repeat OGD	33	28	1	4
CT	22	9	9	4
Other	24	11	12	1
Number of patients	**618**	**408**	**138**	**72**

In patients with a combination of presenting features for both upper and lower GI bleeds it can be difficult to decide on the best order and timing of investigations. One or more OGDs were performed in 490 patients. Eighty of those patients were subsequently found to have a lower GI bleed. CTA, colonoscopy and flexible sigmoidoscoy were next most commonly used. Large bowel endoscopy (colonoscopy or flexible sigmoidoscopy) was used in 111 patients, following which 16 patients were diagnosed with an upper GI bleed. CTA was used as the first investigation in 24/68 cases; five patients had haemodynamic shock. Forty patients had an OGD before their CTA; 10 of whom were shocked. It was unclear if this reflected individualised decision making, availability of services or confusion over care-pathways. CTA was more likely to have been used in those who were categorised as lower GI bleeding (39/68).

Anatomical site of bleeding

The diagnostic and therapeutic challenges in acute GI bleeding have been commented on previously. Definitive local treatment requires identification of the precise anatomical site of haemorrhage. The site of bleeding was identified in 62% (363/590) of patients (Table 5.5). The corollary of the failure to diagnose the anatomical site of bleeding is that 38% (255/590) of patients with severe GI bleeding could not have treatment of the bleeding lesion and were restricted to supportive treatment only. Amongst the 363/590 with an anatomical site of bleeding identified 75% (274/363) were upper GI bleeds.

Table 5.5 Anatomical site identified

Anatomical site identified	Number of patients	%
Yes	363	61.5
No	227	38.5
Subtotal	**590**	
Not answered	28	
Total	**618**	

The sites of bleeding are shown in Table 5.6. A site of bleeding was identified in 75% (295/392) of the patients with an upper GI bleed but in only 47% (62/133) of lower GI bleeds. It is unclear if this is because upper GI bleeding is intrinsically easier to diagnose. Other factors such as access to other tests, patient preparation or clinical interest in diagnosing lower GI bleeds may have an influence on the bleeding site points for lower GI bleeds.

Table 5.6 Sites of bleeding

Anatomical site of bleeding*	Number of patients
Oesophagus	76
Oesophagus/gastric	3
Gastric	77
Gastric/duodenum	8
Duodenum	124
Ileum/ jejunum	7
Ascending/transverse colon	15
Descending colon	6
Sigmoid colon	16
Ano-rectal	18
Unclear data	12

**Some patients had more than one pathology or more than one anatomical site*

Table 5.7 shows which investigation identified the anatomical site of the bleeding (the data includes patients with a single or more than one investigation). OGD diagnosed an upper GI site in 63.2% (256/405) of patients. As would be expected, colonoscopy was more likely to diagnose the site of bleeding than flexible sigmoidoscopy (75% vs. 25%) and CTA identified the site of bleeding in 45% (24/53) of patients.

Table 5.7 Investigations which identified the anatomical site of bleeding.

	Anatomical bleeding site identified				
Type of investigation	**Yes**	**No**	**Subtotal**	**Not answered**	**Total**
OGD	256	149	**405**	82	**487**
CTA	24	29	**53**	14	**67**
Catheter angiography	6	7	**13**	3	**16**
Colonoscopy	30	10	**40**	14	**54**
Flexible sigmoidoscopy	9	26	**35**	16	**51**
Proctoscopy/rigid sigmoidoscopy	3	0	**3**	0	**3**
Scintigraphy	0	2	**2**	3	**5**
Capsule endoscopy	0	4	**4**	6	**10**
Intra-operative endoscopy	2	1	**3**	3	**6**
Repeat OGD	19	8	**27**	6	**33**
CT	5	14	**19**	3	**22**
Other	7	6	**13**	13	**26**

Pathological cause of bleeding

Both endoscopic and imaging techniques may identify the anatomical site of bleeding but without identifying the underlying pathology, although the latter is probably more likely with radiological imaging. The pathological cause for the GI bleed was identified in 370/570 (65%) (Table 5.8) and the causes are listed in Table 5.9 There were a small number of cases where the clinician could identify a pathological cause of bleeding but not the anatomical site. The pathological causes for such cases were anticoagulation, diverticular disease and multiple ulcers.

Eight patients had benign ano-rectal causes for their severe GI bleed. As noted in the method, the search terms used may have led to an under-representation of these conditions as causes of GI bleeding requiring 4 or more units of blood.

Table 5.8 Pathological cause of bleeding identified

Pathological cause of bleeding identified	**Number of patients**	**%**
Yes	370	64.9
No	200	35.1
Subtotal	**570**	
Not answered	48	
Total	**618**	

Table 5.9 Pathological cause of bleeding

Pathological cause of bleeding	**Number of patients**
Peptic ulceration or erosion	166
Tumours	38
Varices	37
Oesophagitis/gastritis/duodenitis	32
Diverticular disease	18
Angiodysplasia	14
Dieulafoy lesions	8
Haemorrhoids	5
Rectal ulcers	3
Other	10
Not recorded or not legible	49

Key Findings

- No single presentation was specific to upper or lower GI bleeding.
- 16% (80/490) of patients who had an OGD were subsequently found to have a lower GI bleed.
- 14% (16/111) of patients who had lower GI endoscopy subsequently found to have upper GI bleed.
- 36% (156/429) of patients first investigation did not identify site of bleeding.
- 31% (167/540) patients had two or more diagnostic investigations.
- 3/67 patients with bright red rectal bleeding had a proctoscopy or rigid sigmoidoscopy recorded.
- All 5 patients where bright red rectal bleeding was associated with upper GI bleeds had a shock index >1.
- 78 patients had no investigations recorded.
- The anatomical site of bleeding was identified in 75% (295/392) of patients with upper GI bleeds and 47% (62/133) with lower GI bleeds.
- A pathological cause of bleeding found in 65% (370/570) of cases.

Control of bleeding

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Control of upper gastrointestinal bleeding

Oesophago-gastro-duodenoscopy

Oesophago-gastro-duodenoscopy (OGD) is the primary diagnostic and therapeutic modality for upper GI bleeding. As there is considerable overlap in the presenting symptoms between upper and lower GI bleeding it may also be the appropriate first line investigation in patients who subsequently are diagnosed with lower GI bleeding.

Decision to perform OGD

Of the cases reviewed 79% (381/480) of patients underwent an OGD (Table 6.1). Of these patients 57/348 were subsequently diagnosed with a lower GI bleed. For a further 29/348 cases, no diagnosis was made.

Table 6.1 Patient underwent an OGD

Patient underwent OGD	Number of patients	%
Yes	381	79.4
No	99	20.6
Subtotal	**480**	
Unknown	5	
Total	**485**	

Where patients did not undergo an OGD (99/480; 21%), the reviewers were asked whether that decision was appropriate. Where an assessment could be made they stated that 26 patients were inappropriately denied an OGD (Table 6.2).

Table 6.2 Decision not to perform OGD was appropriate – reviewers' opinion

Appropriate decision	Number of patients	%
Yes	64	71.1
No	26	28.9
Subtotal	**90**	
Unknown	9	
Total	**99**	

The reasons for omitting an OGD were equally split between difficulties in accessing OGDs and clinical decision making. In 11/26 the reasons were due to organisational issues with difficulties accessing OGD services; in eight a delay in performing an on-site OGD and three no on-site OGD. In 12/26 the reasons were clinical decision making; eight had a delayed referral by the ward team and four were considered too unwell for transfer, a judgement that the reviewers disagreed with. Consultant involvement should be within one hour for patients considered "high risk" (defined as unstable patients not responding to treatment as expected and or where the risk of mortality is over 10%).[26] Earlier input by consultants with the skills to manage GI bleeds is shown later in this chapter to improve access to OGD.

NICE upper GI bleed Quality Standard 38, 2013 recommends OGD is performed within two hours of optimal resuscitation in those patients with haemodynamic instability.[11] The NICE upper GI bleed clinical guideline and the Quality Standard further recommended that all patients with upper GI bleeds should have an OGD within 24 hours of presentation with a GI bleed. In the current study only 205/316 (65%) patients had an OGD within 24 hours of presentation. The time to OGD calculated from time of admission or time of diagnosis for inpatient bleeds is demonstrated in Figure 6.1. The NICE Quality Standard of OGD within 24 hours of a suspected upper GI bleed was not achieved in 35% (115/327) of patients.

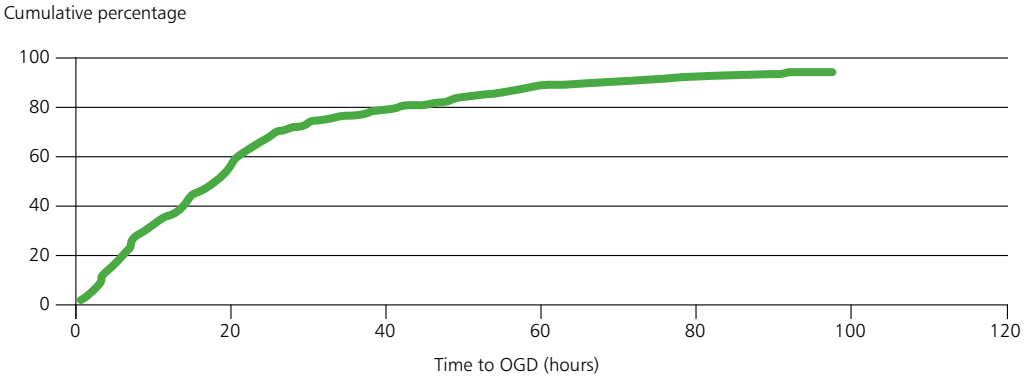

Figure 6.1 Time to OGD

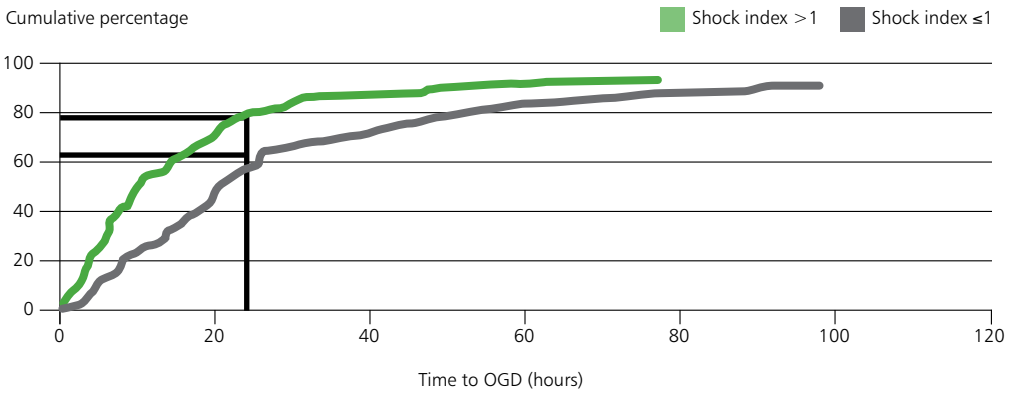

Figure 6.2 Time to OGD compared with a shock index great or lower than 1

In Figure 6.2 the same data are split for a shock index greater than or less than 1.

From the clinician questionnaire 12% (73/610) of patients were identified as having shock/ syncope at the time they presented with a GI bleed. Examination of their haemodynamic recordings at the same time showed that 26% (152/587) of patients had a shock index >1 and 64% (377/587) had a shock index >0.7. Thus only half of the patients with a shock index >1 were recognised as being shocked in the clinician questionnaire.

It would be reasonable to expect that patients presenting with GI bleeding who do not rapidly stabilise or who require continuous volume replacement resuscitation to maintain their blood pressure receive an early OGD. Two hours to deliver initial resuscitation does not seem to be an ambitious target for this group. It is also an achievable time frame to have a full OGD team in place. In the setting of haemodynamic shock it would be reasonable to expect that the endoscopist reviews the patient and, with the anaesthetic or critical care team, decides where the safest place to perform an OGD is. Delegating this to a trainee with no training in GI bleed management is unsafe. Some patients will not normalise despite resuscitation and require on-going resuscitation during their OGD. These patients have a greater risk of loss of airway and aspiration requiring urgent anaesthetic support and commonly critical care post OGD.

Table 6.3 Time to endoscopy vs. shock index

Time to endoscopy	Shock index at presentation ≤1	%	Shock index at presentation >1	%
<2 hours	4	1.8	8	8.5
2-4 hours	16	7.1	13	13.8
4 to 24 hours	119	52.9	53	56.4
>24 hours	86	38.2	20	21.3
Total	**225**		**94**	

Table 6.3 shows the time to OGD related to shock index. Irrespective of the shock index very few patients in this study had an OGD within two hours of presentation. In measuring two hours from presentation there may not be time for resuscitation and an emergency OGD for some patients and some will stabilise after initially being shocked. A four hour time window would provide sufficient time for resuscitation and for prokinetics to clear the stomach of blood in patients who do not have evidence of ongoing bleeding. Only 22% (21/94) of patients with a shock index of >1 had an OGD within four hours.

Patients with a shock index of >1 were more likely to get an OGD within 24 hours; 79% (74/94) vs. 62% (139/225) for a shock index <1 (Table 6.3). Despite the low number of patients who were recognised as having haemodynamic compromise the teams caring for the patients do seem to stratify patients based on some form of haemodynamic assessment.

Reviewers and clinicians caring for the patient were asked to comment on the timeliness of the OGD where it occurred.

The Study Advisory Group had recognised the challenge of defining haemodynamic instability remote from the patient's bedside when designing the study. Patients receiving rapid volume fluid or blood replacement may have normal haemodynamic parameters. Those on beta blockers will not mount a normal tachycardic response. A normal range blood pressure can result in vital organ malperfusion in poorly controlled hypertension. However, both reviewers and clinicians felt able to comment on the timeliness of endoscopy in 97% (369/381) and 88% (433/490) respectively. The reviewers considered the time to OGD was too slow in 31% (114/369) of patients; a judgement based on the patient's clinical condition rather than compliance with existing guidelines. The clinicians recognised a delay in the time to OGD in a lower percentage of cases; 15% (67/433) (Table 6.4)

This variance may be due to the reviewers being more rigorous in their expectations of an appropriate service. Alternatively the clinicians may have been better placed to judge the urgency or had become accustomed to a suboptimal access to OGD within their Trust.

Table 6.4 Timely OGD for patient's condition

Timely OGD for patient's condition (reviewers' opinion)	Number of patients	%	Timely OGD for patient's condition (clinicians' opinion)	Number of patients	%
Yes	255	69.1	Yes	366	84.5
No	114	30.9	No	67	15.5
Subtotal	**369**		**Subtotal**	**433**	
Unknown	12		Unknown	24	
			Not answered	33	
Total	**381**		**Total**	**490**	

Table 6.5 Specialty of the first consultant vs. timely OGD

	Acceptable time frame for endoscopy - clinicians opinion					
Specialty of consultant	**Yes**	**%**	**No**	**Subtotal**	**Unknown**	**Total**
General medicine	86	78.9	23	**109**	9	**118**
Gastroenterology	91	91.9	8	**99**	12	**111**
General surgery	37	90.2	4	**41**	10	**51**
Geriatric medicine	30	88.2	4	**34**	6	**40**
Respiratory medicine	14	82.4	3	**17**	6	**23**
Cardiology	13	68.4	6	**19**	1	**20**
Critical/intensive care medicine	10	76.9	3	**13**	2	**15**
Colorectal surgery	11	91.7	1	**12**	3	**15**
Endocrinology	6	66.7	3	**9**	2	**11**
Nephrology	7	77.8	2	**9**	1	**10**

Table 6.5 shows that for patients who had an OGD, the specialty of the first consultant who saw the patient at the time of their GI bleed related to whether the clinician caring for the patient considered that the endoscopy was performed quickly enough for that patient's condition. Patients who were seen by specialist with a responsibility for GI bleeds were less likely to have an inappropriately delayed OGD;

CASE STUDY 14

A middle-aged patient with cardiovascular disease was admitted on a Monday at 5am with haematemesis, melaena, sweating, dizziness and raised urea. Admission haemoglobin was normal. An OGD was planned for the afternoon endoscopy list but was not performed. The patient collapsed with haematemesis that night and had an emergency OGD in theatre with successful treatment of a bleeding duodenal ulcer.

The reviewers considered that the patient should have received an endoscopy within 6-12 hours during working hours when there were facilities and a suitably skilled endoscopist were available that afternoon. Cancelling the planned procedure put the patient's life at risk and resulted in an avoidable emergency procedure and extra blood transfusion.

gastroenterologists 8% (8/99), colorectal and general surgery 9% (5/53), other medical specialities 26.5% (44/166). The data provided by the reviewers mirrored these opinions.

The OGD procedure

In 74% (342/461) of OGDs a consultant performed the procedure and in 13% (62/461) a trainee performed the procedure alone or under indirect supervision (Table 6.6). In 20% (93/461) there was documentation that both a trainee and consultant were present, either a senior trainee directly supervised or assisting a consultant endoscopist (Tables 6.6 and 6.7). There was no difference in the grade of endoscopist when the data were split by in-hours and out-of-hours procedures.

Table 6.6 Grade of endoscopist

Grade of endoscopist	**Number of patients**	**%**
Consultant	342	74.2
Senior trainee directly supervised	57	12.4
Senior trainee performed alone	39	8.5
Senior trainee indirectly supervised	23	5.0
Subtotal	**461**	
Not answered	29	
Total	**490**	

CASE STUDY 15

A young patient with a history of alcohol misuse was admitted to a gastroenterology ward with large volume ascites. The abnormal liver function tests improved during the admission. 10 days into the admission, at 6pm on a weekday, the patient developed per rectal bleeding and abdominal pain followed by massive haematemesis. They were transferred to the ITU and intubated. A Sengstaken tube was inserted for presumed variceal bleeding but did not control the continuous mouth and nose bleeding. An OGD was not performed as there was no out-of-hours endoscopy service. A total of 15 units of red blood cells, 4 units of FFP and 2 of platelets were transfused. The patient was considered too unstable for transfer to another hospital. A decision was made on ITU for supportive /palliative treatment only. The patient died a few hours later.

Whilst the reviewers recognised that this was a challenging case, the patient should have had an emergency OGD within two hours of presentation. Endoscopy services were available on-site in-hours and there should have been arrangements for out-of-hours emergency care. The reviewers further considered that the presumptive diagnosis of variceal bleeding may have been wrong as the Sengstaken tube did not have any impact and pain is not a recognised presentation of variceal bleeding.

Table 6.7 Presence of a trainee assisting the endoscopist

Trainee assisting	Number of patients	%
No	215	85.7
Yes	36	14.3
Subtotal	**251**	
Unknown	71	
Not answered	20	
Total	**342**	

In 26% (120/461) the designation of the primary operator or presence of a trainee assistant was unanswered or unknown. Endoscopic documentation should allow ready determination of who cared for the patient. The 2007 BSG Endoscopy Quality and Safety standard did not define what data should be recorded in procedural documentation.[3]

Haemostasis was achieved by OGD in 140/190 patients with non-variceal upper GI bleeds; with similar rates of haemostasis between consultants (117/160) and trainees (16/21). In variceal upper GI bleeds OGDs controlled the bleeding in 25/37 patients. Whilst this study did not ask directly about education of trainees, the findings suggest that opportunities for training exist in the management of this common medical emergency.

The location where the OGD was performed was well recorded (Table 6.8). This question could not be answered in only 2.5% (12/490) procedures.

Table 6.8 Location of OGD being performed

Location of OGD	Number of patients	%
Endoscopy unit	368	77.0
Theatre	67	14.0
ICU	21	4.4
HDU	20	4.2
Ward	2	0.4
Subtotal	**478**	
Not answered	12	
Total	**490**	

In this population containing many acutely unwell patients around one quarter (23%; 110/478) of the endoscopies were performed in a location outside of the endoscopy unit. The commonest location was surgical theatres, which accounted for 61% (67/110) of the non-endoscopy unit procedures. The remainder occurred on critical care or on the patient's own ward.

Data from the organisational questionnaire showed that 14% of all hospitals recognised that the out-of-hours equipment was not comparable to equipment available in-hours. As the equipment in the endoscopy unit will be the same in and out-of-hours, the inference is that in some instances endoscopists are performing OGDs on the sickest patients with unfamiliar or sub-optimal equipment in an unfamiliar location. It is likely that this approach could increase the risk of treatment or equipment failure in some patients. Where the equipment is not equivalent endoscopy and anaesthetic teams face the dilemma of deciding between moving patients to a less safe environment in terms of monitoring, resuscitation and support but with good quality endoscopic equipment versus a safer environment in theatres or critical care but with endoscopic compromises. Endoscopy trained nurses are integral to the safety and efficacy of therapeutic OGDs and should be available for all OGDs irrespective of where or when they are performed. Standard operating procedures should minimise risks where OGD are performed in more than one location.

Entries in medical records should include a date and time. It would be a reasonable standard that 100% of OGDs should be dated and timed. In this study the clinicians could not identify either the date or time in 23.8% (117/490) of the OGDs. Procedures performed in theatre would be expected to have a detailed anaesthetic record. It might be expected that failings in documentation would be more likely when the procedure was performed in unfamiliar surroundings such as ICU or HDU. The reality was that the missing data were more likely in endoscopy unit OGDs, accounting for 88/117 (75%) of the missing data on endoscopies.

When out-of-hours procedures were examined, half of the OGDs performed on weekdays out-of-hours or at the weekend were performed outside the endoscopy unit (49.5%; 55/111) whereas during weekdays in-hours 13% were performed outside of the endoscopy suite (Table 6.9). The non-endoscopy suite locations for out-of-hours OGD were largely theatres and critical care.

Table 6.9 Timing of the OGD

Time of OGD	Endoscopy suite	Theatre	Critical care	Ward	Not answered	Total
Weekday in-hours	224	14	7	14	1	260
Weekday out-of-hours	17	25	2	1	0	45
Weekend	39	19	8		2	68
Subtotal	**280**	**58**	**17**	**15**	**3**	**373**
Day unknown	27	5	2	1	9	44
Weekday time unknown	61	4	4	4		73
Total	**368**	**67**	**23**	**20**	**12**	**490**

Sedation and monitoring

Table 6.10 shows that 61% (288/473) of patients in the study had their OGD performed under conscious sedation but around 1 in 4 (27%) had no sedation and 12% (57/473) had the procedure performed under general anaesthesia or unconscious sedation. Sedation was performed by an anaesthetist in 26 patients; 17 conscious sedation and 9 unconscious sedation. The majority (271/288) of patients who were sedated by the endoscopist received conscious sedation but four patients had unconscious sedation.

Table 6.10 Sedation used

Sedation used	Number of patients	%
Conscious sedation	288	60.9
No sedation	128	27.1
General anaesthesia	44	9.3
Unconscious sedation	13	2.8
Subtotal	**473**	
Not answered	17	
Total	**490**	

Emergency endoscopies in unstable patients need an anaesthetist, with or without intubation to protect the airway. Of the OGDs performed under general anaesthetic 37/42 were in theatre or ITU. Only five were performed in endoscopy suites, suggesting they may not be appropriately equipped, staffed or located to provide general anaesthesia. It is understandable that anaesthetic teams would be rightly cautious about performing the endoscopy suite in those circumstances. Performing the OGD in a theatre setting allows an anaesthetist to be quickly available providing they have been pre-alerted. It also allows them to manage other unstable patients, such as in recovery, and supervise junior colleagues.

The reviewers considered that in 14/199 (7%) cases (data not shown) where they could make an assessment, patients had a higher dose of sedation than was necessary, with four patients requiring naloxone or flumazenil. This is an improvement on the data shown in NCEPOD's *'Scoping Our Practice'* report in 2004,[14] where 14% of patients were judged by the reviewers to have received an overdose of sedation. These data are further supported by a national audit of 20,000 colonoscopies undertaken in 2011 over a two-week period which reported significant improvements in sedation practice within the field of endoscopy with BSG guideline doses for sedation exceeded in <10% of procedures.

It is recognised that clinicians performing interventions cannot safely monitor sedated patients. In 2013 The Royal College of Anaesthetists produced standards and guidance for Safe Sedation Practice for Healthcare Procedures.[41] The guidance applies equally to sedation in the emergency setting. In four patients the endoscopist was recorded as the person monitoring the patient. In a much larger number (75/271) the person monitoring the patient was not recorded (data not shown).

CASE STUDY 16

A young patient with Child's C hepatic cirrhosis was admitted with dark red rectal bleeding. The initial care was appropriate save that antibiotics were not commenced. An OGD was performed 4 hours post admission with topical pharyngeal anaesthesia alone showed varices and oesophagitis. The endoscopist did not band the varices and recorded that the procedure was poorly tolerated. The reviewers could not agree whether the varices should have been treated. A flexible sigmoidoscopy revealed altered blood only. The patient continued to bleed with ongoing melaena and fall in haemoglobin. A second OGD was performed days later, again with throat spray alone, and no recognition of the difficulties at the first OGD. Variceal banding was performed but required multiple attempts. As with the first OGD, the patient tolerated the procedure poorly and was recorded as being distressed.

The reviewers considered that the second OGD was inappropriately delayed and whilst both OGDs should have been under sedation / GA / airway protection when variceal bleeding was suspected, it was unacceptable that a second OGD was performed without reference to the difficulties recorded on the first. They questioned whether there was sufficient anaesthetic support for GI bleeding. No procedure should have to be abandoned due to a lack of ongoing resuscitation/sedation to the point that the patient finds the procedure too uncomfortable or too distressing.

In the commentary on other similar cases the reviewers suggested that the patient would have benefitted from anaesthetic or critical care support. They could not determine if this was an issue with the availability of teams, the location of the OGD procedure or the need for escalation not being identified.

As a minimum, a nurse or other practitioner with no other responsibilities during the procedure should be available to monitor every patient. This has been described as the three person model comprising an operator/sedationist, trained assistant to monitor the patient and an assistant for the procedure.[41] The Study Advisory Group recognised that for both endoscopy and interventional radiology the on-call team is restricted to procedure teams; that is endoscopist plus endoscopy nurse and interventional radiologist plus radiology scrub nurse plus vascular radiographer respectively. These teams are by definition not compliant with these recommendations for out-of-hours procedures. Having two nurses on-call was recognised as being impracticable in most hospitals. Delegating to untrained nurses or junior doctors is inappropriate. Whilst anaesthetic or critical care support will be required for some patients it will be inappropriate for many others. This is an issue which must be addressed by all hospitals which provide these services.

The clinicians responsible for the patient considered that the documentation of monitoring during upper endoscopy was inadequate in 19% (78/415) of cases. Eleven years ago in *'Scoping Our Practice'* 42% of cases had no contemporaneous monitoring record available in the notes. The halving of this is clearly a step in the right direction but it is notable that the cases with deficiencies in the documentation of the OGD monitoring were identified by the internal reviewers of the case notes. This suggests current clinical governance strategies can be improved and should have a further impact. In 2007 the BSG recommended that both appropriate equipment for oxygen monitoring, BP and ECG monitoring and a unit sedation policy should be agreed.[15] It would be reasonable to believe that it is inherent in these recommendations that monitoring data should be routinely recorded, stored and be available for review. Shocked patients are at risk of dysrythmias. The pulse rate may be unreliable through oximetry in the setting of shock. Continuous ECG monitoring is the only reliable way of recording heart rate as well as recognising dysrythmias or myocardial ischaemic changes. Visual signal pulse oximetry can be a useful alert when low oxygen saturations readings are due to hypoperfusion.

CASE STUDY 17

An elderly patient on dual anti-platelet agents for a recent myocardial infarction was admitted following a fall. Two days later on the day of planned discharge the patient had a GI bleed. At OGD dual therapy was applied to a duodenal ulcer. Sedation was with 3.5mg of midazolam. Oxygen saturations fell from 96% pre OGD to 86% post OGD. There was no action taken and there was no record of handover of the fall in oxygen saturation. Oxygen saturations were not recorded on the ward, although other observations were performed. IV PPI was written up at the first OGD but never given. A re-bleed occurred 2 days later. OGD and treatment were repeated. A further GI bleed on day 5 was fatal.

The reviewers considered that the patient should not have been returned to the ward with low oxygen saturations and administration of the prescribed PPI could have prevented the re-bleeds and death.

The questionnaires did not seek information about the use of capnography which has been recommended for all patients undergoing moderate or deep sedation as well as those whose trachea is intubated or who are anaesthetised.[42] Around 90% of the patients in this study who underwent an OGD were not intubated. Recording a reliable capnography waveform and interpreting it in patients receiving supplemental oxygen via a facemask or nasal cannulas can be difficult and usually requires the skills of an anaesthetist.

The clinician questionnaires raised greater concerns about the types of monitoring used with 4% of patients having no pulse oximetry 29% no pulse rate recording and 24% no blood pressure recording (Table 6.11). Whilst BSG recommend the availability of ECG monitoring this was only used in 16% of patients. These non-invasive monitors are easy-to-use with no adverse effects.

Table 6.11 Type of monitoring

Type of monitoring	Number of patients	%
Pulse oximetry	265	96.0
Blood pressure	211	76.4
ECG	45	16.3
Pulse	197	71.4
Other	24	8.7
Total	**276**	

When the combinations of monitoring were reviewed 210/276 (76%) patients had pulse rate, blood pressure and pulse oximetry used during their endoscopy (Table 6.12).

Table 6.12 Combinations of monitoring used

Monitoring	Number of patients	%
Pulse oximetry + blood pressure + ECG	42	15.2
Pulse oximetry + blood pressure	168	60.9
Pulse oximetry and/or blood pressure **omitted**	66	23.9
Total	**276**	

Pulse oximetry monitoring should be used in all sedated patients.[15] The use of pulse oximetry would seem to be well established in clinical practice. Patients are at risk of deterioration during OGD for acute GI bleeding including cardiac complications, adverse drug reactions, sedation levels, aspiration and aggravated GI bleed. Comprehensive monitoring facilitates the earlier identification of such problems. *'Scoping Our Practice'* recommended there should be national guidelines on the frequency and method of the recording of vital signs during the endoscopy.[14] Eleven years on these are not available.

Table 6.13 Adequacy of monitoring documentation

Adequate documentation of monitoring	Number of patients	%
Yes	337	81.2
No	78	18.8
Subtotal	**415**	
Not answered	75	
Total	**490**	

The Academy of Medical Royal Colleges recommends every hospital should have a Sedation Committee and that where verbal communication is lost with a patient the level of monitoring should be the same as the existing recommendations for anaesthesia; that is pulse oximetry, ECG and automated non-invasive blood pressure monitoring.[43,44] Verbal communication is routinely lost during OGDs irrespective of the level of sedation.

Findings at OGD

Table 6.14 shows the findings at OGD. Amongst the large group who underwent an OGD, 60% (276/462) had an upper GI bleed diagnosed, 77% (213/276) were non-variceal and 14% (38/276) were variceal bleeds. In 9% (25/276) of patients with an upper GI bleed the site of bleeding was obscured by blood or clot. At the time of OGD, no upper GI bleeding was found in 40% (186/462) of patients.

Table 6.14 Findings at OGD

Findings at OGD	Number of patients	%
Non-variceal bleeding	213	46.1
Variceal bleeding	38	8.2
Upper GI bleeding but cause obscured by blood	25	5.4
No upper GI bleed found	186	40.3
Subtotal	**462**	
Not answered	28	
Total	**490**	

Non-variceal upper gastrointestinal bleeding

In this study 213 patients had a non-variceal upper GI bleed diagnosed on their OGD. In 74/178, where it could be assessed, the patients had no therapeutic treatment. The commonest reason was the absence of endoscopic high risk stigmata for re-bleeding. The documentation of the decision making was available in 54/74. In 20 patients no reason for the decision not to treat was available.

Non-variceal upper gastrointestinal bleed treatment

One of the recommendations which is consistent across all contemporary guidelines, including NICE[10] is that adrenaline injection alone should be avoided as it is inferior to dual modality treatment or mechanical clipping. NICE did not recommend a concentration or volume of adrenaline to be used but the 2008 SIGN[12] guideline recommended at least 13mls of 1:10,000 adrenaline coupled with thermal or mechanical treatment. Twenty-three of the 104 patients who had therapy applied had adrenaline injection only (Table 6.15).

The reviewers considered that in 10/23 patients the decision to use adrenaline monotherapy was supportable from the documentation but in 11/23 patients the endoscopic treatment was inappropriate. In two cases there was insufficient information recorded in the notes to make a judgement. When deviating from guidelines it is important to record the clinical justification.

Table 6.15 Treatment (data from assessment form)

Treatment	Number of patients
Adrenaline + coagulation therapy	30
Adrenaline + clips	26
Adrenaline	23
Adrenaline + clips + coagulation therapy	10
Clips	6
Coagulation therapy	6
Adrenaline + haemospray	1
Clips + coagulation therapy	1
Other	1
None	74
Total	**178**

Whilst the reviewers agreed with the endoscopic management in 89% (154/174) of patients they considered it was inappropriate in 20 (11%) of the 174 patients treated (Table 6.16). Eleven of these were patients who had adrenaline monotherapy. The remaining 10 had a mixture of therapeutic modalities, two patients had no therapy, two had just clips when the reviewers felt dual therapy should have been applied and two should have had higher concentration of adrenaline.

Table 6.16 Appropriateness of the endoscopic treatment – reviewers' opinion

Appropriate treatment	Number of patients	%
Yes	154	88.5
No	20	11.5
Subtotal	**174**	
Unknown	4	
Total	**178**	

Re-bleed plans in non-variceal upper gastrointestinal bleed

Those caring for patients with a GI bleed should recognise that the bleeding is often intermittent. This is regardless of the severity of the presenting event. Temporary haemostasis results from decreased perfusion pressure secondary

to hypotension and /or feeding vessel spasm. Local haemostatic interventions and correction of coagulopathy may not be durable. Re-bleeding can occur hours, days or weeks after the initial event.

The reported range of re-bleeding rates after endoscopic treatment is 5-20%. Hypotension and a peptic ulcer size greater than 2cm are predictive of a need for endoscopic retreatment.[45] One of 13 quality standards produced by the BSG JAG on endoscopy in 2007 was that there should be a contemporaneous written report in notes of all inpatients including recommendations on further management following OGD for a GI bleed.[15] As this is not a new issue it is both surprising and concerning that 82/197 (42%) patients with the commonest diagnosis of a non-variceal upper GI bleed, had no documented treatment plan should a further bleed occur (Table 6.17).

Table 6.17 Documented treatment plan if re-bleed occurs

Documented re-bleed plan	Number of patients	%
Yes	115	58.4
No	82	41.6
Subtotal	**197**	
Not answered	16	
Total	**213**	

The best placed person to decide what should happen in the case of further bleeding is the endoscopist who has just tried to stop active bleeding or treated a high risk lesion. Current evidence supports two attempts at endoscopic control of active bleeding in most cases. Repeat endoscopic treatment for re-bleeding has equivalent 30 day mortality and transfusion requirements with a lower rate of complications compared with surgery.[46] Where a re-bleed plan was recorded a second OGD was the commonest first recommended action in 64 patients. A recorded plan can also facilitate a successful OGD by suggesting an alternative sedative or anaesthetic techniques. In six patients CTA was recommended in the event of re-bleeding. CTA assesses the whole bowel in a single examination and can identify a lower GI bleed cause when OGD is normal or when the diagnosis of an upper GI bleed is in doubt.

When maximal endoscopic therapy has been applied, or bleeding cannot be primarily controlled, NICE recommends the next therapeutic intervention should be interventional radiology (embolisation).[11] The placement of multiple endoscopic clips in the region of the culprit lesion is a useful guide to the interventional radiologist, increasing the chance of successful treatment, even if the bleeding has temporarily stopped.[46] Multiple clips are required which allows one to dislodge and still leave an identifiable marker. Surgery is most commonly reserved for failed embolisation but is also appropriate in suspected malignancy or lesions thought to be at high risk of perforation. Interventional radiology was the suggested next procedure in only seven patients but was included as part of the re-bleed plan in an additional six (Table 6.18). Six patients in this study had endoscopic clips placed to target subsequent interventional radiology. Five of whom proceeded to interventional radiology and had a successful embolisation.

Surgery was the recommended next action in 16 patients and was included without consideration of interventional radiology as an option in a further 11 patients (Table 6.18). This may be due to a lack of access to interventional radiology services within a Trust or through networking or a failure to recognise the evolution in the care of non-variceal upper GI bleeds. A documented re-bleed plan can prevent repeating endoscopy where this has little or no chance of controlling the bleeding.

Table 6.18 Recommended next steps and/or treatment plan if re-bleed occurs

	Number of patients
Redo OGD	64
Surgery	29
Interventional radiology	13
CTA	10
End of life care	9
Other	9

Answers may be multiple; n=113

Variceal upper gastrointestinal bleeding

A 2013 NCEPOD report showed that in patients with alcohol-related liver disease (and therefore at increased risk of having varices) an upper GI bleed is equally likely to be a non-variceal as a variceal bleed.[47] In this study 42 patients had known hepatic cirrhosis. Variceal bleeding was the least common of the three major groups of GI bleeding in this study accounting for 8% of patients. Bleeding from oesophageal varices was more common than gastric or other varices. There were 32 patients who had bleeding from oesophageal varices and five were thought to have combined gastric and oesophageal variceal bleeding. Presentations with severe acute variceal bleeding are both amongst the most challenging cases to manage endoscopically and those that require the most urgent definitive or temporary treatment. The combination of relative rarity and technical challenges makes achieving endoscopy rotas with 24/7 capacity to treat variceal upper GI bleeds problematic.

Table 6.19 Types of variceal bleeding at OGD

Variceal bleed	Number of patients
Oesophageal varices	32
Oesophageal varices & gastric varices	5
Subtotal	**37**
Not answered	1
Total	**38**

The outcome for patients with variceal upper GI bleeding is influenced by the severity of their liver disease as well as the severity of their bleeding. A patient with Childs-Pugh grade C cirrhosis has a 1 in 3 chance of dying in hospital. Only 1/42 had the severity of their cirrhosis assessed by Childs-Pugh score. No patient had a MELD score recorded.

Banding of oesophageal varices was used in isolation or as part of a combined approach in 31 patients. Four patients required a Sengstaken or similar tube for endoscopically uncontrollable bleeding (Table 6.20).

Table 6.20 Endoscopic therapy of oesophageal varices

Endoscopic therapy	Number of patients
Band ligation	27
Sclerotherapy	2
Band & Sengstaken	3
Band, sclerotherapy & Sengstaken	1
Danis stent	1
Clips	1
None	3
Total	**38**

None of the patients with bleeding from gastric varices received the NICE recommended primary treatment of endoscopic glue injection. Glue injection was the only commonly missing competency on the organisational questionnaire with only around half of endoscopists able to perform this treatment (Chapter 2). There are alternatives; Linton, Sengstaken, and similar tubes are able to provide immediate control of gastric variceal bleeding pending definitive treatment. The reviewers judged that the endoscopic therapy was appropriate in all but four patients. Three patients had an OGD which diagnosed varices but received no endoscopic treatment. In two there were no stigmata of recent bleeding and one patient did not tolerate the procedure under conscious sedation. Four patients underwent treatments which are not included in the recent NICE variceal upper GI bleed guidance.

Terlipressin is a long acting analogue of vasopressin. It reduces the severity of variceal upper GI bleeding by lowering the portal venous pressure. It is recommended that patients with suspected variceal bleeding should be started on terlipressin when they present.[10] In this dataset 34/38 patients were prescribed terlipressin but four did not receive it before or after their variceal upper GI bleed was confirmed and 30 patients with variceal bleeding had a history of alcohol excess, cirrhosis or a previous variceal upper GI bleeding.

One patient who did not receive terlipressin before their OGD had a history of variceal bleeding and cirrhosis and two patients had a history of alcohol excess. Terlipressin should be stopped after five days or earlier if definitive haemostasis has been achieved. The duration of terlipressin therapy was 1 – 5 days for 21 patients, 8 days for one and not answered for 12.

It is also recommended that patients with suspected variceal upper GI bleeding receive prophylactic antibiotics. Portal hypertension is most commonly due to liver disease. Patients with advanced cirrhosis have liver dysfunction which causes a diminished immune response and the translocation of gut bacteria into the peritoneum resulting in spontaneous bacterial peritonitis (SBP). Antibiotics reduce all infections including bacteraemia, pneumonia and SBP but also decrease early re-bleeding and blood transfusions. Those who are unexpectedly found to have variceal bleeding at OGD should be started on prophylactic antibiotics at the time of diagnosis The implementation of guidance on prophylactic antibiotics was even poorer with 37% (14/38) not receiving this simple treatment which reduces infective complications and re-bleeding.

Four patients were started on tranexamic acid at the time of their diagnosis (Table 6.21). Whilst tranexamic acid has been proved to be of benefit in other bleeding conditions as already discussed its utilty in GI bleeding is as yet unproven and is the subject of current research.[48]

Table 6.21 Drugs started/continued at the time of diagnosis of variceal bleed

Drugs started/continued	Number of patients
Terlipressin	33
Antibiotics	24
Tranexamic acid	4
Other	3

Answers may be multiple; n=38

In keeping with the known challenge of controlling variceal bleeding 12/37 patients did not have their bleeding controlled at their initial endoscopy (Table 6.22). Four of these patients had a Sengstaken or similar type of tube placed for temporary control of the bleeding.

Table 6.22 Variceal bleeding controlled at initial endoscopy

Haemostasis achieved	Number of patients
Yes	25
No	12
Subtotal	**37**
Not answered	1
Total	**38**

Re-bleed plans in VUGIB

The need to have a written plan should the patient have the common occurrence of a re-bleed has been discussed previously when considering non-variceal upper GI bleeds and applies to all types of GI bleeds. Patients with variceal bleeding had a documented re-bleed plan in 68% (25/37) (Table 6.23). Unsurprisingly as these plans would both be produced by endoscopists this is a similar frequency to re-bleed plans in non-variceal upper GI bleeds (59.5%).
The commonest re-bleed plan was a further OGD procedure. Three patients had end of life palliative care initiated. In two TIPSS was recommended in the event of a re-bleed. In two patients a surgical shunt to decompress the portal system was recommended (Table 6.24). This is a procedure which is rarely performed since the introduction of TIPSS, and may reflect either a failure to recognise advances in care or poor access to TIPSS.

Table 6.23 Documented treatment plan for variceal re-bleed

Documented re-bleed plan	Number of patients
Yes	25
No	12
Subtotal	**37**
Not answered	1
Total	**38**

Table 6.24 Treatment included in re-bleed plan for variceal bleeds

Included in treatment plan for re-bleed	Number of patients
Redo OGD	19
End of life care/palliative care	3
Surgery	2
TIPSS	2

Answers may be multiple; n=24

OGD management

Despite the delay in performing some OGDs and the deficiencies in documentation of patient monitoring, the reported complication rate in the endoscopy group was very low at 2.2% (Table 6.25). Details of the complications were given in four cases, two patients suffered aspiration pneumonia and two had exacerbation of bleeding.

Table 6.25 Complications of OGD – reviewers' opinion

Complications of OGD	Number of patients	%
No	357	97.8
Yes	8	2.2
Subtotal	**365**	
Unknown	16	
Total	**381**	

Table 6.26 Quality of endoscopic management - reviewers' opinion

Quality of endoscopic management	Number of patients	%
Good	194	52.4
Adequate	133	35.9
Poor	42	11.4
Unacceptable	1	<1
Subtotal	**370**	
Unknown	11	
Total	**381**	

CASE STUDY 18

A young patient with known alcohol dependency was admitted with a significant upper GI bleed. Antibiotics and terlipressin were started and the patient was referred early to the liver team who immediately took over the patient and arranged urgent endoscopy under general anaesthesia with banding of oesophageal varices within four hours of admission. Post discharge varices surveillance was organised.

The reviewers recognised that early referral and transfer of the patient had led to early control of bleeding and excellent co-ordinated management of liver disease.

Overall the reviewers rated the endoscopic management as good in 52% (194/370) of the patients (Table 6.26). Of the remainder 36% (133/370) was adequate management and 12% (43/370) was poor or unacceptable. Where the management was less than good the common concerns were delays to OGD and choice of treatment.

Control of lower gastrointestinal bleeding

Lower GI bleeding occurs more commonly in the elderly. In this study of severe GI bleeding it was as common in inpatients as those admitted with a GI bleed. The majority of lower GI bleeding (80-85%) stops spontaneously without any specific treatment.[49] It is unknown if this figure applies equally to those with more severe bleeding. Guidance on the endoscopic management of lower GI bleeding published by the American Society for Gastrointestinal Endoscopy (ASGE) in 2014 states that compared with acute upper GI bleeding, patients with lower GI bleeding tended to present with a higher haemoglobin level and were less likely to develop hypotensive shock or require blood transfusions.[13] The frequency of lower GI bleeds in this study of patients requiring transfusion of 4 or more units of blood brings doubt to this belief. The incidence of lower GI bleeds in these patients was the same as in a non-selected GI bleed population.

The belief that lower GI bleeding is a less severe condition may account for the failure to plan for the care of these patients, evidenced by guidelines for lower GI bleeding only being available in only 25% of all hospitals. This is contrasted by variceal bleeding, which although only half as common, has guidelines for its care in 86% of all hospitals. The Study Advisory Group recognised that an evidence base for the management of lower GI bleeding was lacking. Despite this they considered that this did not support a failure to establish a locally agreed plan for the management of these patients, particularly as there is national guidance from BSG following their adoption of the 2008 SIGN clinical guideline.[12]

Diagnostic and therapeutic procedures

Over half (58%; 80/137) the patients with a lower GI bleed diagnosis had an OGD (Table 6.27). A colonoscopy and /or a flexible sigmoidoscopy were performed in 54% (74/137) of cases peer reviewed by the reviewers (Table 6.28). 50/69 (5 not answered) presented with bright red rectal bleeding or altered blood per rectum (as already reported in Chapter 5). In a further 23 patients the reviewers considered they should have had flexible sigmoidoscopy and/or colonoscopy performed (Table 6.29).

Table 6.27 Procedures undertaken in lower GI bleed patients

Procedures undertaken in lower GI bleed patients	Number of patients
OGD	80
CT angiography	39
Catheter angiography	8
Colonoscopy	30
Flexible sigmoidoscopy	44
Scintigraphy	3
Capsule endoscopy	5
Rigid sigmoidoscopy/proctoscopy	3
At surgery by intra-op endoscopy of small or large bowel, or OGD	3
Other	23

**Answers may be multiple; n=137*

Table 6.28 Colonoscopy or flexible sigmoidoscopy performed

Colonoscopy or flexible sigmoidoscopy performed	Number of patients	%
Yes	79	17.2
No	381	82.8
Subtotal	**460**	
Unknown	25	
Total	**485**	

Table 6.29 Appropriateness of the decision not to perform colonoscopy or flexible sigmoidoscopy - reviewers' opinion

Appropriate decision	Number of patients	%
Yes	297	92.8
No	23	7.2
Subtotal	**320**	
Unknown	61	
Total	**381**	

Colonoscopy/flexible sigmoidoscopy

Endoscopic colonic examinations are best performed after bowel preparation. Wide diagnostic rates 45-100% have been reported in acute lower GI bleeding.[13] In haemodynamically stable patients with suspected lower GI bleeding colonoscopy or flexible sigmoidoscopy should be the first test. In haemodynamically unstable patients an OGD is generally advocated as the first investigation (after direct local examination has excluded haemorrhoids, rectal ulcers or other lesions treatable by local surgical management in those with BRRB) because of its combined diagnostic and therapeutic utility. CTA may be chosen first as a diagnostic test in some haemodynamically unstable patients, particularly where signs, symptoms or history suggest a lower GI bleed is likely, as a prelude to embolisation.

In common with OGD, the advantage of colonoscopy in stable patients is the ability to both diagnose and treat. In some European healthcare systems colonoscopy is used as the first line intervention to control lower GI bleeding.[8] Its use has also been recommended in North American guidelines (ASGE). The colonoscopic therapeutic armamentarium mirrors those used at OGD including thermal contact modalities, adrenaline, clips and rarely bands. The risk of perforation from treatment is highest in the right colon due to its thin wall with rates of up to 2.5% reported. The SIGN guidance recognised that colonoscopic haemostasis is an effective means of controlling massive lower GI bleeding from active diverticular or post-polypectomy bleeding but that it required appropriately skilled experienced colonoscopists. Only three colonoscopies or flexible sigmoidoscopies in this study of the care of patients with severe GI bleeding were performed within 24 hours of presentation with GI bleed.

Data from the clinician questionnaire indicated that of the 79 patients who underwent a colonoscopy 49 had a lower GI bleed. In the other 30, 13 had an upper GI bleed and in 17 the GI bleed was not localised. Table 6.30 shows that the lower GI bleeding site was identified at the time of colonoscopy in 22 patients.

Table 6.30 Site of bleeding identified

Bleeding site identified	Number of patients
Yes	22
No	53
Subtotal	**75**
Not answered	4
Total	**79**

Six out of 22 patients received treatment at the time of their colonoscopy. Four had argon plasma coagulation, one adrenaline soaked gauze and the other a combination of argon, adrenaline and clips. Haemostasis was achieved in 5/6 patients. In all 16/22 who received no treatment the reviewers considered this was appropriate.

CASE STUDY 19

An elderly patient on warfarin for a recent deep vein thrombosis was admitted with altered blood per rectum without haemodynamic compromise. INR was 2.3 and an OGD 36 hours post presentation was normal. Five days later a colonoscopy was performed. At discharge the bleeding was attributed to a warfarin induced diverticular bleed.

The reviewers commented that there was unusually refreshing clarity in the clinical notes with entries timed and designation clearly recorded. The delayed colonoscopy was considered to have extended the hospital stay by 2 to 3 days.

In 30% (21/71) of patients who underwent colonoscopy and/or flexible sigmoidoscopy the reviewers considered that there was a delay in performing the procedure (Table 6.31). Early colonoscopy (within 8-24 hours of admission) increases the diagnostic yield and the opportunity for therapeutic intervention. Time to colonoscopy has been reported to be an independent predictor of length of hospital stay in acute lower GI bleeding but this related to improved diagnostic yield rather than therapeutic interventions.[50] In a randomised controlled trial early colonoscopy failed to show any impact on re-bleeding or the need for surgery.[51]

Table 6.31 Time to colonoscopy/flexible sigmoidoscopy appropriate for the patient's condition – reviewers'opinion

Reasonable time frame	Number of patients	%
Yes	50	70.4
No	21	29.6
Subtotal	**71**	
Unknown	3	
Total	**74**	

The overall grading for colonoscopy and/or a flexible sigmoidoscopy management was less than good in 39/66 (Table 6.32). The common reasons for this identified by the reviewers were poor bowel preparation and long delays to carrying out the procedure.

Table 6.32 Overall grading for colonoscopy and/or a flexible sigmoidoscopy management

Quality of management	Number of patients
Good	27
Adequate	28
Poor	10
Unacceptable	1
Unknown	8
Total	**74**

Interventional radiology for upper and lower GI bleeds

The interventional radiology procedure of embolisation is used to treat non-variceal upper GI bleeding and lower GI bleeding by blocking the bleeding vessel or vessels from the inside. Via a femoral artery puncture a catheter is steered as close as possible to the bleeding site. The longer the section of bowel that has its blood supply completely occluded the more likely the bleeding will be controlled but the greater the chance of a complication from local bowel ischaemia causing acute perforation or late stricture. The radiologist has to decide how much blood supply to block. The consequence of this risk:benefit decision making is that some patients may re-bleed due to reperfusion as blood pressure is restored or arterial spasm reverses. If the patient re-bleeds the options are a more extensive embolisation or surgery.

Embolisation is usually performed under local anaesthesia unless the patient's condition or ability to co-operate dictates a general anaesthetic. The lesser physiological impact of endovascular treatments makes it suitable for surgically high risk patients who are often elderly. An anaesthetic team in addition to the interventional radiology procedural team can improve patient comfort and monitoring and respond more quickly to deterioration in the patient's condition.

Embolisation is the preferred second line treatment for most upper GI bleeds when OGD treatment cannot control the bleeding, when the patient re-bleeds following the use of maximal endoscopic therapy or where the bleeding site cannot be determined at OGD due to obscuring blood.[10] In May 2014 NHS Improving Quality (NHSIQ) published a document which stated that *"No patient should undergo surgery for non-variceal upper GI bleeding without first undergoing endoscopic treatment, and if this fails or is inappropriate, interventional radiology"*.[52]

Embolisation is the intervention of choice in lower GI bleeding when bleeding is severe and the patient cannot be stabilised or have bowel preparation for a colonoscopy and for those who have failed colonoscopic management. Surgery is usually chosen only when a diagnosis of malignancy or bowel perforation is suspected. Interventional radiology may still be used be used in severe bleeding from lower GI malignancy as a temporising measure to stop bleeding, to allow improvement in the physiological state before definitive surgery under more controlled conditions. The NHSIQ guidance stated that *"No patient should undergo laparotomy for lower gastro intestinal bleeding from any cause where embolisation may be appropriate without a referral to interventional radiology"*.[52]

When endoscopic therapy is unable to control variceal upper GI bleeding the recommended treatment is a transjugular intra-hepatic porto-systemic shunt (TIPSS).[10] This is a painful procedure and is usually performed under general anaesthesia. Under x-ray guidance a needle track is created between a hepatic vein or the inferior vena cava and the portal vein. The connection is made permanent by placing a covered stent across the track. This allows some of the portal blood flow to bypass the liver, reducing the portal venous pressure and controlling the bleeding. The NHSIQ guidance stated that *"No patient should have open surgical repair of a GI variceal haemorrhage which is refractory to all other treatments without a referral to interventional radiology for transjugular intrahepatic porto-systemic shunting (TIPSS)"*.[52]

Data from the organisational questionnaire identified only 13 hospitals with the capability to perform a TIPSS 24/7. On-site access to TIPSS for patients with variceal GI bleeding is not required as they can be temporised with a Sengstaken or similar tube to facilitate transfer to a specialist unit. The sampling method used in this study of including no more than five cases from a single Trust, may have resulted in the lower incidence of variceal relative to non-variceal upper GI bleeding and lower GI bleeding and the success of endoscopic treatment meant that the number of cases where the patient had a TIPSS was always going to be small.

It can be difficult to obtain complete medical records when a patient is transferred between Trusts. A number of patients who were referred for TIPSS had to be excluded from this study because of absent or very brief medical records from one of the sites. Detailed medical records underpin communication and good quality healthcare, particularly in complex or intractable disease. When patients are transferred between hospitals, a detailed transfer letter or a copy of the medical records should accompany them that allows the receiving team to treat the patient no differently than if they had been transferred from another ward in the same hospital.

Not all interventional radiology procedures in patients with non-variceal upper GI bleeding and lower GI bleeding result in treatment (embolisation). Catheter arteriography may be performed to try to localise the bleeding site. For example when other tests are negative, but there is evidence of continuing or intermittent bleeding. In addition a procedure performed with the intent of embolising a bleeding point seen on OGD, lower endoscopy or CTA may not proceed to treatment. This may result when the bleeding has spontaneously stopped, the secondary signs of a bleeding site are unconvincing or the bleeding point cannot be reached. In these patients with severe GI bleeding, where only around half of hospitals returning cases had on-site or networked 24/7 access to interventional radiology for GI bleeds 36/459 (8%) had an interventional radiology procedure (Table 6.33). In a further 21 (6%) cases reviewers judged they should have been offered interventional radiology (Table 6.34).

Table 6.33 Patient underwent interventional radiology

Interventional radiology	Number of patients	%
Yes	36	7.8
No	423	92.2
Subtotal	**459**	
Unknown	26	
Total	**485**	

Table 6.34 Appropriateness of the decision to perform interventional radiology – reviewers' opinion

Appropriate decision not to perform interventional radiology	Number of patients	%
Yes	313	93.7
No	21	6.3
Subtotal	**334**	
Unknown	89	
Total	**423**	

The reasons for the performed interventional radiology procedures are shown in Table 6.35. There were 25/36 patients who had a CTA, in 18 that CTA had identified the bleeding site. In 32/36 cases where interventional radiology was performed it was judged to have been performed at an appropriate time for the patient's condition.

Table 6.35 The reasons interventional radiology procedures were performed

Reason for interventional radiology	Number of patients
Haemostasis not achieved endoscopically	16
Diagnosis on CTA	18
Haemodynamically unstable, no bleeding on CTA	7
Haemodynamically unstable, CTA not performed	4
TIPSS	2

**Answers may be multiple*

The 2007 BSG audit data reported that 1.5% of patients required interventional radiology for upper GI bleeding.[9] This study found that at least 14% did or should have had interventional radiology. Our qualitative focus on severe GI bleeds, the inclusion of lower GI bleeding and some improvements in awareness of and access to interventional radiology since 2007 will account for this large difference.

In those cases where it could be determined, the interventional radiology operator was a consultant in 30/33 cases (Table 6.36). Whilst this might be taken to reflect a high quality service, it may also be considered to reflect a failure to utilise educational opportunities. In this study three cases were performed by a trainee under direct consultant supervision and in six a trainee was assisting during the procedure (Table 6.37). In 10 there was no trainee present but in a further 22 the clinician completing the questionnaire was unable to determine if a trainee was present. All personnel directly contributing to the care of a patient during an intervention should be documented.

Interventional radiology is currently considered to be a shortage specialty. According to a 2013 survey on the interventional radiology workforce by the British Society of Interventional Radiology, of the 449 interventional radiologists who were employed in the UK 343 were able to perform embolisation for haemorrhage control.[53] This represented an under-provision of around 200 consultants. The Centre for Workforce Intelligence calculated a similar shortfall of 222 consultants to deliver a British Society of Interventional Radiology rota target of 1 in 5 on-call in all acute Trusts.[54] It must be acknowledged that this figure could be reduced by formal networking between Trusts. Both networking and training /recruitment of interventional radiologists requires attention.

The collected data do not reveal how many procedures were performed for diagnostic purposes and how many with straight to embolisation intent. We do know that 18 patients had interventional radiology therapy with two TIPSS and 16 embolisation. Where treatment cannot be performed it is important to document the reason. This will influence the re-bleed plan in terms of modifying the interventional radiology technique or using an alternative treatment, most commonly surgery. This principle seems to be well-established in interventional radiology practice with a reason for not performing therapy in 14/15 documented.

Table 6.36 Grade of interventional radiologist

Grade of interventional radiologist	Number of patients
Consultant	30
Senior trainee supervised by consultant	3
Unknown	2
Not answered	3
Total	**38**

Table 6.37 Presence of a trainee assisting the interventional radiologist

Trainee assisting	Number of patients
Yes	6
No	10
Unknown	22
Total	**38**

Re-bleed plans post interventional radiology

GI bleeding is commonly intermittent. It may stop spontaneously resulting in catheter arteriography failing to localise the bleeding point or recur following apparently successful treatment as a result of volume expansion or reversal of arterial spasm and reperfusion or the opening up of collateral vessels to the site of haemorrhage. It is essential to plan what the next action should be if the patient re-bleeds. Following an interventional radiology procedure a re-bleed plan was documented in 21/32 cases (Table 6.38). Decision making could be made easier if all patients had a re-bleed plan.

Table 6.38 Documented treatment plan should re-bleed occur following interventional radiology

Documented re-bleed plan	Number of patients
Yes	21
No	11
Subtotal	**32**
Not answered	6
Total	**38**

Surgery

Surgery for GI bleeding is usually now considered a last resort when all other available treatment methods have failed. The 2007 BSG audit data reported that 2.3% of patients underwent surgery for uncontrolled bleeding.[9] The use of non-endoscopic interventions in this unselected population was low at less than 4%.

NICE guidance recommends initial endoscopic management to stop upper GI bleeding and repeat endoscopy as necessary. The National Emergency Laparotomy Audit (NELA) recommends that all hospitals performing emergency general surgery should have access to 24/7 interventional radiology to control bleeding.[55] This can be used to stop all forms of GI bleeding with the exception of ano-rectal bleeding which can generally be controlled by non-incisional local surgery. The effect of improvements in endoscopic and interventional radiology management of GI bleeding has meant that the need for surgery has diminished by 50% over the last 10 years, even if the 30 day mortality of 15%, which rises to 25% in those over 80 years, remains unchanged.[56]

Reduced caseload, developing sub-specialisation of postgraduate surgical training and centralisation of services for cancer surgery has resulted in reduced exposure (of both trainees and established consultants) to surgical treatments for GI bleeding. Surgical management of GI bleeding is a core emergency skill that every emergency General Surgeon must have, the following is adopted directly from The Intercollegiate Surgical Curriculum, October 2013. *'All surgical trainees must attain ST8 competence in emergency general surgery: 12.2.3 Manage acute GI haemorrhage:*

- *Be able to diagnose and manage the common causes of acute gastrointestinal haemorrhage and supervise effective resuscitation*
- *Recognise the indications for appropriate endoscopic and radiological investigation and intervention and refer appropriately*
- *Be familiar with the indications and be competent to perform surgical intervention if necessary.'*[57]

At the same time, the cases now referred for surgery are usually those who have failed either endoscopic or interventional radiology management, or both, and are likely to be more complex and challenging. Despite this, the organisational data demonstrated that 97% of hospitals from which a response was received stated that they could offer surgical treatments for GI bleeding 24/7. Therefore, the surgical treatment of GI bleeding is complex, risky, and increasingly rare and is only performed when all else has failed or because endoscopy or interventional radiology is not available, or has not been considered.

Surgical procedures

In this study 36 patients (6%) underwent surgical intervention for control of their GI bleed (Table 6.39). Of these, 20 patients had an upper GI bleed and 15 had a lower GI bleed.

Table 6.39 Surgery undertaken

Surgery undertaken	Number of patients	%
Yes	36	6.1
No	550	93.9
Subtotal	**586**	
Not answered	32	
Total	**618**	

The reasons for surgical intervention are shown in Table 6.40. Fourteen patients underwent surgery for peptic ulcer bleeding, seven for small bowel bleeding and eight for colonic bleeding.

Table 6.40 Type of surgery undertaken

Type of surgery	Number of patients
Under-running /oversewing bleeding duodenal /gastric ulcer	14
Colectomy	8
Small bowel resection	7
Local rectal procedure	2
Gastrectomy	2
Other	3
Total	**36**

It was considered that patients were transferred to theatre in an acceptable timeframe in 31/32 cases where this could be assessed (Table 6.41). Around 31% of OGDs and 9% of interventional radiology procedures were not timely. Further evidence that access to surgery is easier and opportunities for alternative less invasive treatments are possibly being missed.

Table 6.41 Timely transfer to theatre

Acceptable timeframe	Number of patients
Yes	31
No	1
Subtotal	**32**
Unknown	1
Not answered	3
Total	**36**

Decision making

At least 21/36 operations were undertaken because bleeding was not controlled using endoscopy or interventional radiology; however nine patients underwent surgery because of lack of interventional radiology cover (Table 6.42). On review most of the patients who underwent surgery for failure of endoscopic control were considered suitable for interventional radiology treatment.

Table 6.42 Reason for surgery

Reason	Number of patients
Bleeding despite maximal endoscopic therapy	15
Bleeding despite interventional radiology therapy	6
Interventional radiology not available in this hospital in-hours	5
Interventional radiology not available in this hospital out-of-hours	4
Suspected peritonitis or perforation	3
Unfit for transfer for interventional radiology	2
Suspected malignancy	1
Other	11

**Answers may be multiple; n=36*

In consenting patients for any intervention the alternative treatments options should be discussed.[58] In 20 out of 35 patients who underwent surgery (where the answer was available) there was no discussion with an interventional radiologist before proceeding to surgery (Table 6.43). It is unclear if this was due to availability, preference for surgery or failure to consider it as an option. Most of these cases were potentially suitable for interventional radiology treatment.

Table 6.43 Case discussed with an interventional radiologist

Case discussed	Number of patients
Yes	15
No	20
Subtotal	**35**
Not answered	1
Total	**36**

The lack of availability of interventional radiology and endoscopy out-of-hours and guidelines for managing lower GI bleeding, as shown earlier in the organisational data may contribute to this finding. It is possible that ease of surgical access leads to more patients treated with surgery (94% of hospitals had surgery on-site).

Pre-operative risk assessment

Pre-operative assessment of surgical risk can be performed using scoring systems (P-POSSUM, ASA, APACHE II, ACS NSQIP risk predictor, SORT) in addition to clinical assessment by a consultant as high, medium or low risk. This is important because this may influence decisions regarding treatment and postoperative care.

A pre-operative risk assessment was not performed in nearly half of patients undergoing surgery (Table 6.44). However, only five patients underwent formal assessment using P-POSSUM or ASA score.

Table 6.44 Pre-operative risk assessment performed

Pre-operative risk assessment performed	Number of patients
Yes	17
No	16
Subtotal	**33**
Not answered	3
Total	**36**

The operation

Most of the cases were performed by a consultant surgeon (30/36) and anaesthetised by a consultant anaesthetist (30/36). Trainees were recorded as assisting in 26 cases (Table 6.45).

Emergency surgery being performed by consultants undoubtedly represents a high quality service but at the same time educational opportunities must be maximized. The Intercollegiate Surgical Curriculum requirement for all ST8 surgical trainees to be competent in the management

Table 6.45 Grade of primary operating surgeon and anaesthetist

Grade of clinician	Surgeon	Anaesthetist
Consultant	30	30
Senior trainee supervised by consultant	4	1
Senior trainee performed alone	1	3
Subtotal	**35**	**34**
Not answered	1	2
Total	**36**	**36**

Table 6.46 Presence of a trainee assisting with the surgery

Trainee assisting	Number of patients
Yes	26
No	6
Subtotal	**32**
Unknown	1
Not answered	3
Total	**36**

of acute GI bleeding, including surgical intervention, has been discussed earlier in this section. Senior trainees need opportunities to perform emergency surgery under consultant supervision: this occurred in 26 cases (Table 6.46).

Assisting may be a valuable educational experience but the value depends on the experience and seniority of the trainee. Delivering training and attaining competency in emergency surgery is a challenge for training programmes and surgical trainees, particularly when less invasive treatments are replacing conventional open surgery in so many conditions. Whilst many surgical skills and competencies are transferrable from elective to emergency surgery there is no substitute for hands-on experience.

Post-operative care

Transfer to ICU or HDU postoperatively was appropriate (Table 6.47) and surgery stopped the bleeding in 33/36 patients where this could be assessed.

Table 6.47 Location immediately post recovery

Location	Number of patients
Intensive care unit	24
High dependency unit	6
General surgical ward	4
Subtotal	**34**
Not answered	2
Total	**36**

There were 13/36 patients who developed a surgical complication as shown in the Table 6.48, including five re-bleeds. Three patients returned to theatre and six (Table 6.49) had further procedures for treatment of their GI bleed.

Table 6.48 Complications following surgery (multiple answers)

Complications	Number of patients
Re-bleed	5
Wound infection/dehiscence	4
Enteric leak/fistula	4
Return to theatre	3
Sepsis	2
Intra-abdominal abscess	0
Other	2

**Answers may be multiple; n=13*

Table 6.49 Further procedures for GI bleeding undertaken

Further procedures	Number of patients
No	27
Yes	6
Subtotal	**33**
Not answered	3
Total	**36**

Re-bleed after surgery

In 21/34 patients there was no documented treatment plan in the event of a re-bleed (Table 6.50). This is despite nine patients returning to theatre for uncontrolled bleeding or re-bleeding later in their admission. Patients can re-bleed at any stage in their pathway. There is no definitive treatment for GI bleeding. Re-bleed plans must be embedded at all stages in the pathway.

Table 6.50 Documented treatment plan for a re-bleed after surgery

Documented re-bleed plan	Number of patients
No	21
Yes	13
Subtotal	**34**
Not answered	2
Total	**36**

Key Findings

Upper GI bleeding

- 26/90 patients who didn't have an OGD reviewers felt should have.
- 35% (115/327) of patients waited longer than 24 hours for an OGD.
- Reviewers found that in 31% (114/369) of patients the time to OGD was too slow.
- 73/94 of patients with a shock index >1 did not have an OGD within 4 hours.
- There was less delay to OGD if the first consultant review was by a GI bleed specialist.
- 74% (342/461) of OGDs were performed by a consultant.
- 23% (110/478) of endoscopies were performed outside an endoscopy unit.
- 24% (117/490) of OGDs had no date and/or time recorded in the case notes.
- 7% (14/199) of patients had too much sedation during endoscopy according to reviewers.
- 19% (78/415) of patients had inadequate documentation of monitoring during their endoscopy.
- 84% (231/276) of patients did not have ECG monitoring during endoscopy.
- 76% (210/276) of patients had pulse, blood pressure and pulse oximetry monitored during endoscopy.
- 42% (82/197) of patients who had an endoscopy for non-variceal upper GI bleed had no re-bleed plan documented.
- 32% (12/37) of patients with a variceal upper GI bleed had no re-bleed plan.
- 39% (14/38)of patients with a variceal upper GI bleed did not receive prophylactic antibiotics.
- In the opinion of the reviewers, the endoscopic management of 12% (43/370) of patients was poor or unacceptable.

Lower GI bleeding

- 54% (74/137) of patients with a lower GI bleed had a colonoscopy or flexible sigmoidoscopy.
- 30% (21/71) of patients had an unnecessary delay to lower GI colonoscopy/flexible sigmoidoscopy

Interventional radiology

- 8% (36/459) of patients underwent an interventional radiology procedure.
- Reviewers found that 6% (21/334) of patients should have had an interventional radiology procedure but did not.

Surgery

- Surgical control of bleeding was needed in 6% (36/618) of patients.
- 9 patients had surgery because there was no interventional radiology available.
- 20 patients who underwent surgery did not have this discussed with interventional radiology despite most being suitable for interventional radiology.
- Only 5 patients had a formal surgical risk assessment score performed.
- Time to theatre was good in 31/32 cases where this could be assessed.
- Trainees performed the surgery in 5/36 cases, all other operations performed by consultants with trainees assisting.
- Patients transferred to appropriate postoperative location in all cases where this could be assessed.

Outcomes

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Re-bleeds

In an unselected upper GI bleed population 10-15% of patients will have a re-bleed.[28] However, a re-bleed rate in lower GI bleeding is not widely recognised. In the BSG 2007 audit re-bleeding was associated with high mortality rates when active intervention was performed irrespective of the type of treatment used for re-bleeding (OGD 32%, embolisation 10%, surgery 29%).[9] Patients with inpatient GI bleeds have more severe bleeding, more co-morbidities and a higher tendency to re-bleed.[59]

In this study of severe GI bleeding 23.2% (138/595) of patients had one or more re-bleed (Table 7.1), occurring in a similar proportion of upper and lower GI bleed patients (92/408; 22.5% and 35/138; 25.4% respectively). Similar to previous studies, inpatients with a GI bleed were more likely to re-bleed than patients admitted with a GI bleed (67/245; 27.3% and 71/370; 19.2% respectively) (data not shown).

CASE STUDY 20

A fit young patient presented feeling suddenly unwell. Although not recognised as being shocked they had a shock index of 1.2. Haemoglobin was 60g/L and the patient later passed melaena. Consultant review and a normal OGD were timely. The patient deteriorated 12 hours later and had a CTA which was normal. They then re-bled again 24 hours later. A CTA at 2am showed active bleeding in the distal ileum. A superior mesenteric artery catheter angiogram at 3am did not identify any abnormality. 12 hours later a small bowel lesion was resected at laparotomy. In total the patient received 15 units of blood.

The patient had a good outcome with well planned and co-ordinated care, in particular re-bleed plans were recorded.

Table 7.1 Re-bleed occurred

Re-bleed	Number of patients	%
Yes	138	23.2
No	457	76.8
Subtotal	**595**	
Unknown	23	
Total	**618**	

Table 7.2 Intervention following a re-bleed

Therapeutic endoscopy	30
Conservative management	41
Interventional radiology	6
End of life care/palliative care	24
Surgery	4
Other	12

Re-bleeding was not defined and was left to the discretion of the clinicians and reviewers. Active intervention occurred in 40 patients, with 30 having endoscopy, six had interventional radiology and four patients had surgery (Table 7.2). A larger group of 65 patients had no active intervention. In 41 the re-bleed was managed conservatively but in 24 patients palliation was initiated.

Escalation of care

Patients with GI bleeding are at risk of failure of one or more organ systems. This is more likely with increasing volumes of blood transfusions.[40] If they are unfortunate enough to be in the quarter of patients in this study who had a re-bleed they are at further risk of deterioration. In this study 18% (68/380) of patients had escalation of their care to a HDU/ ICU facility (Table 7.3). Surgical patients with much lower mortality rates are routinely managed in HDU or ITU. The underuse of critical care for these patients may relate to a failure to recognise the severity of the illness or a reluctance to accept patients who are commonly elderly, with multiple co-morbidities and high expected mortality.

When reviewers looked at the clinical records they judged that a further 7% (23/312) of patients should have had their care escalated to improve their chances of recovery.

Table 7.3 Escalation of care

Escalation in care post GI bleed	Number of patients	%
Yes	68	17.9
No	312	82.1
Subtotal	**380**	
Not answered	105	
Total	**485**	

Complications

The outcome of patients with a GI bleed is related to their pre-morbid state, age, degree of shock, number of units of blood received and the degree of any coagulopathy.[39] Infection, malperfusion and immobilisation complications are reported to be more likely to lead to a poor outcome than exsanguination. Complications were common with 22.2% (108/486)of patients having one or more complication. These are shown in Table 7.4. The commonest complications were pneumonia 33, renal failure 28 and cardiovascular events 17 (Table 7.5). Many of these were unavoidable but the reviewers identified 19 patients where the complication would have been avoidable with improved care.

Table 7.4 Post GI bleed complications

Post GI bleed complications	Number of patients	%
No	378	77.8
Yes	108	22.2
Subtotal	**486**	
Not answered	132	
Total	**618**	

Table 7.5 Complication that occurred

Complication	Number of patients
Pneumonia	33
Renal failure	28
Significant cardiac event	17
Hospital acquired infection	11
Hepatic failure	11
Stroke/transient ischaemic attack	4
Thromboembolic disease	2
Other	12

Length of stay

Severe GI bleeding is a significant physiological insult which takes some time to recover from. Bed occupancy days may also be affected by the need for surety that the patient is not going to re-bleed. No data exists on how long that should be. The length of stay in those patients where the reason for admission was a GI bleed is shown in Figure 7.1. Over half the patients stayed 8 days or more. 20% of patients remained in hospital for more than 18 days and 10% were still in hospital a month after their admission.

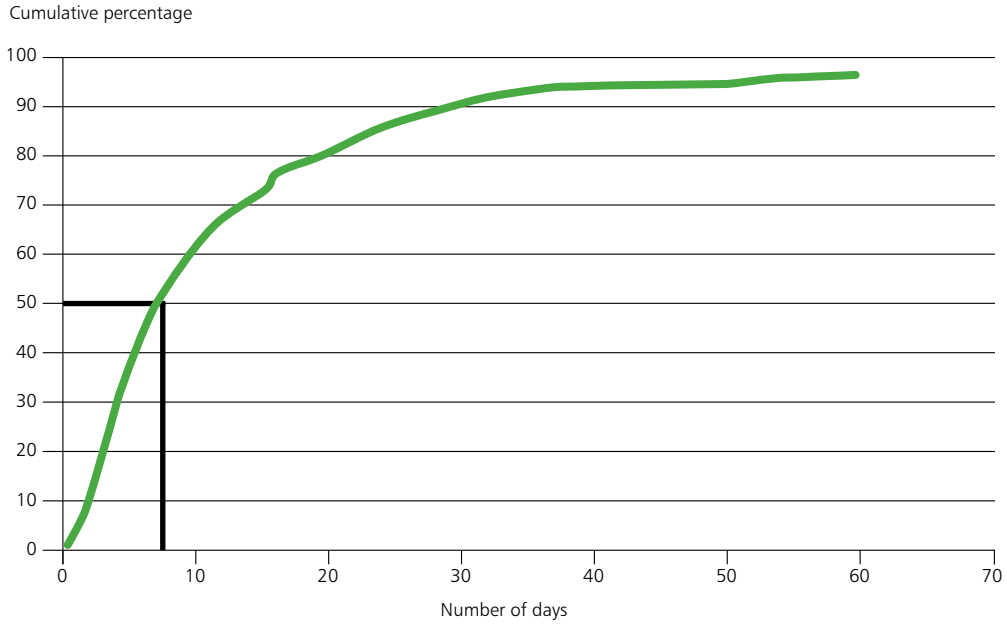

Figure 7.1 Length of stay - acute admission with GI bleeding

Outcome of the hospital episode

Table 7.6 demonstrates the outcome of the hospital episode for patients included in this study.

This NCEPOD study was designed to assess quality of care. Mortality figures must be treated with caution due to the case selection method biasing representation so that all hospitals are equally represented. Higher volume units are associated with better outcomes for most medical emergencies. The sampling method will likely skew the raw mortality rates by over representing lower volume units. The overall the mortality rate in these patients with a GI bleed and a 4 unit or more blood transfusion was 24% (142/599). In unselected patients with a GI bleed the mortality rate is around 10%.[3] The incidence of GI bleeding categories in the severe patients is identical to the diagnostic categories in non-selected patients with a GI bleed.

Table 7.6 Outcome of hospital episode

	All		Admitted with GI Bleed		Inpatient GI bleed	
Outcome of hospital episode	**Number of patients**	**%**	**Number of patients**	**%**	**Number of patients**	**%**
Discharged to previous place of residence	386	64.4	276	76.7	109	46.2
Patient died during the admission	142	23.7	52	14.4	89	37.7
Discharged to other hospital	36	6.0	18	5.0	18	7.6
Other	35	5.8	14	3.9	20	8.5
Subtotal	**599**		**360**		**236**	
Not answered	19		10		9	
Total	**618**		**370**		**245**	

There was a similarity in mortality rates between non-variceal upper GI bleeds at 21.5% (77/358) and lower GI bleeds at 20% (28/138). Numbers of cases of variceal upper GI bleeds was lower but mortality rates were similar to those without a diagnosis at 32% (16/50) and 29% (21/72) respectively.

The mortality rate of all patients in this study requiring 4 units or more of blood was 23.7% (Table 7.6). 79% (107/142) of these patients were on a palliative care pathway at the time of their death. Where the data were available, 71% (90/127) of patients died outside of critical care. As many of these patients had their care limited it might be suspected that their deaths were expected from the outset. However, 69% (98/142) of the patients who died had at least one investigation for their GI bleeding implying that at the time of presentation they were not expected to die and their deaths were potentially avoidable or that the initial assessment was sub-optimal and they should not have had any invasive investigations.

The cause of death was available for 124/142 patients who died. The commonest single cause of death was GI bleeding which accounted for 36% (45/124) of deaths. This rate of death which was directly attributed to bleeding is higher than other reports in unselected patients. Complications remained the commonest cause of death (49%; 61/124). Respiratory (30), cardiac (13) and multi-organ failure (8) were the commonest. Eighteen patients died of malignancy or age related causes.

For all of the patients coded for GI bleeding in the first four months of 2013 the overall mortality was 10.4% (Table 7.7). Mortality was double in those who received 4 or more units of blood but as these were unselected and unreviewed cases the contribution of other conditions to the mortality rates or need for blood transfusion cannot be determined.

Although the mortality rate was high throughout the study cohort who received a blood transfusion of 4 or more units, an increasing mortality rate with increasing shock index was observed (Table 7.8).

Table 7.7 Mortality

	Died	Total number of patients	Mortality %
All patients	3,093	29,796	10.4
≥4 units	921	4,563	20.2
No blood	1,496	20,631	7.3

Table 7.8 Mortality by degree of sickness using shock index as a marker

Shock index	Alive	Deceased	Mortality %	Total
≤0.7	172	38	18.1	210
>0.7 ≤1	170	55	24.4	225
>1.0 ≤1.3	73	28	27.7	101
>1.3	36	15	29.4	51
Insufficient data	25	6	19.4	31
Total	**476**	**142**		**618**

Morbidity and mortality meetings

Whilst learning opportunities lie in the review of the care of all patients it is recognised that those opportunities are greater in those with poorer outcomes, this is the principle underlying morbidity and mortality (M&M) meetings. In this study 142 patients died, it would be reasonable to suspect that in some there were opportunities to improve the care of future patients by reviewing their case notes. The clinician caring for the patient reported that the death was discussed at an M&M in 45 out of the 91 times the question was answered (Table 7.9). Only one of the deaths was in a patient who underwent surgery. Some of the hospitals may have had more than one death reviewed. This suggests that M&Ms are a reasonably well embedded part of the clinical governance process in non-surgical specialities in only half of hospitals at best.

The failure to review half of the deaths in this study at an M&M is even more disappointing when it is considered in the context of previous NCEPOD recommendations. One of the key recommendations in *'Scoping Our Practice'* was *"All endoscopy units should perform regular audit and all deaths during, or within 30 days of, therapeutic endoscopy should be reviewed"*.[14]

Table 7.9 Death discussed at a morbidity and mortality meeting

Death discussed at M&M meeting	Number of patients
Yes	45
No	46
Subtotal	**91**
Unknown	41
Not answered	10
Total	**142**

Fewer than one in ten of the M&Ms identified a remediable factor in the patients care (Table 7.10).

Table 7.10 Remediable factors in care identified locally

Remediable factors in care identified	Number of patients
No	38
Yes	3
Subtotal	**41**
Unknown	1
Not answered	3
Total	**45**

Peer review underpins all NCEPOD reports. Morbidity and mortality review or local quality improvement meetings being conducted according to standardised and structured formats are designed to identify opportunities for improvement. The reviewers judged that the care of the patients who died showed room for improvement in clinical and/or organisational aspects of the care in 48/108, and in 8/108 the grading was less than satisfactory. The method of peer review undertaken in this study highlighted a number of remediable factors, more than those identified by the local M&M process(es) in hospitals. This may be attributed to the fact that the M&Ms at hospitals are commonly specialty specific and restricted to the team under whose care the patient died. Peer review which involves representatives from all teams involved in a patients care would be more time consuming but offers greater opportunities to improve communication and share learning.

Key Findings

- 23% (138/595) of patients suffered a re-bleed.
- 58% (65/138) of patients had no active treatment for a re-bleed with 41 given conservative management and 24 palliative care.
- 18% (68/380) of patients had their care escalated to critical care, of whom 30 had undergone surgery.
- 8% (24/312) of patients reviewers felt should have had escalation to critical care.
- 18% (19/108) of patients who had complications, the complications could have been avoided with improved care.
- Median length of stay for severe GI bleeds was 8 days.
- 24% (142/599) of patients died overall whilst 38% (89/236) of patients died who developed a GI bleed whilst already in hospital.
- 49% (45/91) of deaths in patients with a severe GI bleed were discussed at a morbidity and mortality meeting, although remediable factors were rarely found.
- GI bleeding was the cause of death in 36% (45/124) of patients and death was due to complications in 49% (61/124) where this was recorded.
- Increasing shock index at presentaion was associated with increasing mortality.
- The mortality rate of lower GI bleeds in this study was comparable to that of the patients who died with a non-variceal upper GI bleed 20.2% (28/138) and 21.5% (77/358) respectively.

8

Overall quality of care

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It should be remembered that some deaths are unavoidable and that many patients with poor outcomes will still have received high quality care. Only 44.1% (210/476) of patients included in this study received a standard of care that the reviewers would have accepted from their team, colleagues or Trust (Table 8.1). The most common deficiencies were in clinical care with nearly half (45%) of the patients identified as having room for improvement. Organisational factors were cited as requiring improvement in around a fifth (18.5%) of cases reviewed. Twenty one patients had less than satisfactory care. This assessment should lead to a drive to improve the care of all patients with a GI bleed.

Table 8.1 Overall assessment of care

Overall assessment of care	Number of patients	%
Good practice	210	44.1
Room for improvement clinical	157	33.0
Room for improvement organisational	31	6.5
Room for improvement clinical and organisational	57	12.0
Less than satisfactory	21	4.4
Subtotal	**476**	
Insufficient data	9	
Total	**485**	

In this group who received 4 or more units of blood there was no difference in the quality of care across non-variceal upper GI bleeds, variceal upper GI bleeds, lower GI bleeds and those patients without a diagnosis.

In addition there was only a small difference in the overall assessment of care when the day of presentation was divided into weekdays and weekends (44% good vs 38% good respectively). This applied equally to admissions for GI bleeding and bleeds in established inpatients.

When out-of-hours and in-hours admissions with GI bleeding were considered there was no change in the quality of care ratings so out-of-hours weekday admissions were not masking a weekend effect.

In patients admitted with a GI bleed there was no difference in the quality of care for those with no or less severe haemodynamic changes (shock index <1) between in-hours and out-of-hours presentations. In those with a shock index >1 they were more likely to be graded as good care if they presented between 8am and 6pm Monday to Friday. The major difference between hospitals in-hours and out-of-hours is largely the number of staffing and their seniority. The relatively low numbers in the two groups where data were available of 59.3% (16/27) vs 36.1% (13/36) is recognised.

Key Findings

- 44% (210/476) of patients received good care overall.
- 18% (88/476) of cases had organisational factors identified as leading to less than good care.
- 45% (214/476) of cases had clinical factors identified as leading to less than good care.
- There was no difference in the quality of care provided across all types of GI bleed.

Recommendations

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1 Patients with any acute GI bleed should only be admitted to hospitals with 24/7 access to on-site endoscopy, interventional radiology (on-site or covered by a formal network), on-site GI bleed surgery, on-site critical care and anaesthesia. *(Medical Directors, Ambulance Trusts and Commissioners)*

2 Hospitals that do not admit patients with GI bleeds must have 24/7 access to endoscopy, interventional radiology and GI bleed surgery for patients who develop a GI bleed while as an inpatient for another condition by either an on-site service or a formal network. *(Medical Directors, Chief Executives and Trust Boards)*

3 Network arrangements for GI bleeds must include repatriation as well as referral, transfer and admission in their protocols and should take into account any existing networks for other conditions which require these services and integrate with them. *(Medical Directors and Commissioners)*

4 The traditional separation of care for upper and lower GI bleeding in hospitals should stop. All acute hospitals should have a Lead Clinician who is responsible for local integrated care pathways for both upper and lower GI bleeding and their clinical governance, including identifying named consultants, ideally gastroenterologists, who would be responsible for the emergency and on-going care of all *major* GI bleeds. *(Medical Directors, Clinical Directors)*

5 Care pathways for all GI bleeds should include, as a minimum, risk assessment, escalation of care, transfusion documentation, core procedural documentation, network arrangements and re-bleed plans. The pathway needs to be clearly documented. *(Lead Clinicians for GI Bleeds and Medical Directors)*

6 All patients who present with a *major* upper or lower GI bleed, either on admission or as an inpatient, should be discussed with the duty or on-call (out-of-hours) consultant responsible for *major* GI bleeds*, within one hour of the diagnosis of a *major* bleed. *(All Doctors)* **see recommendation #4*

7 The ongoing management of care for patients with a *major* bleed should rest with, and be directed by the named consultant responsible for GI bleeds*; to ensure timely investigation and treatment to stop bleeding and reduce unnecessary blood transfusion. *(Lead Clinicians for GI Bleeds, Medical Directors, Clinical Directors)* **see recommendation #4*

8 As previously stated by NICE (QS38), all patients with a GI bleed and haemodynamic instability should have 24/7access to an OGD within two hours of optimal resuscitation. *(Lead Clinicians for GI Bleeds, Medical Directors and Commissioners)*

9 Endoscopy lists should be organised to ensure that GI bleed emergencies can be prioritised and all acute patients with GI bleeding have their endoscopy within 24 hours. *(Clinical Directors)*

10 Hospitals should improve access to colonoscopies for patients with a *major* GI bleed to avoid the unnecessary delays seen in this report. *(Clinical Directors)*

11 GI bleed specialists need to develop risk stratification methods relevant to all GI bleeding. *(Professional Societies)*

12 All patients with a GI bleed must have a clearly documented re-bleed plan agreed at the time of each diagnostic or therapeutic intervention. *(Gastroenterologists, Radiologists and GI Bleed Surgeons)*

Local guidelines/protocols will need to define a major bleed pending any National Guideline/consensus

13 Resuscitation and airway support during endoscopy and interventional radiology procedures should be equivalent to facilities during emergency surgery. Unstable patients should have anaesthetic and/or critical care support. *(Clinical Directors and Consultants in Anaesthesia and Critical Care Medicine and Medical Directors)*

14 Minimal monitoring during procedures for *major* GI bleeds should be blood pressure, pulse oximetry and ECG. Monitoring should be provided by suitably skilled individuals who are separate from the procedural team and available 24/7. *(Lead Clinicians for GI Bleeds, Clinical Directors and Medical Directors)*

15 Endoscopy equipment and nursing support should be comparable in all locations where endoscopy is performed. *(Clinical Directors and Directors of Nursing)*

16 Core procedural data to be recorded at every OGD should be defined and audited. *(Lead Clinicians for GI Bleeds, Professional Societies)*

17 All patients with a possible lower GI bleed should have 24/7 access to proctoscopy/rigid sigmoidoscopy. *(Medical Directors, Clinical Directors and Commissioners)*

18 All hospitals must have an integrated replacement plan for all high cost equipment which plans 5 years ahead and is reviewed annually. *(Medical Directors, Finance Directors, Chief Executives and Trust Boards)*

19 Hospitals should have contingency plans for failure of endoscopy, interventional radiology or surgical equipment. *(Clinical Directors)*

20 All deaths from *major* GI bleeds within 30 days of admission should undergo combined multidisciplinary peer review to identify remediable factors in patient care. *(All Clinicians and Allied Healthcare Professionals)*

21 The NICE Clinical Guideline (CG141) and Quality Standard (QS38) for Acute Upper GI Bleeding should be adhered to. *(All Doctors)*

22 Guidelines need to be developed for the optimal management of lower GI bleeds. *(British Society for Gastroenterologists, Medical and Surgical Royal Colleges and Specialist Associations and NICE)*

23 Consideration needs to be given to developing a combined guideline for all GI bleeding (to include NICE CG 141, QS 38, SIGN guidelines and the recommendations from this NCEPOD report). *(Led by the BSG and NICE and to include, but not limited to, SIGN, RCR, BSIR, ASGBI, AAGBI, RCoA, ICS, FICM)*

24 All hospitals to which patients with a GI bleed are admitted should have their endoscopy units accredited by the *Joint Advisory Group (JAG) on GI Endoscopy*. *(Medical Directors and Chief Executives)*

25 The Joint Advisory Group (JAG) on GI Endoscopy should consider including access to and delivery of 24/7 endoscopy for GI bleeding in their Global Rating Scale. *(Joint Advisory Group (JAG) on GI Endoscopy)*

26 A consensus exercise should be undertaken by specialties with an interest in GI bleeds to define 'major/severe' GI bleeding. *(Relevant Royal Colleges, Specialist Associations and Professional Societies)*

Local guidelines/protocols will need to define a major bleed pending any National Guideline/consensus

Summary

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The clinical community looking after patients with gastrointestinal (GI) bleeding have long realised that the care of these patients is less than satisfactory. A number of organisations including NICE, the BSG and SIGN have identified this care as wanting and suggested improvements. There is a belief amongst clinicians that progress remains slow and there is still significant variation in care despite recommendations and advances.

It is with this background that NCEPOD was asked to assess the quality of care given to patients with gastrointestinal bleeding. To do this we used our standard method of assessment of all hospitals in our study. This included assessment of care at an organisational level, clinical level within hospitals and external peer review of selected cases. We identified 31,412 patients who had experienced a gastrointestinal bleed during a 4 month period from 1st January 2013. We decided to look at a group of patients with more severe bleeding and found that 15% of patients received 4 or more units of blood. From these we selected a random sample of 618 patients for hospital clinician review and 485 patients for external peer review.

We found that there are still significant opportunities to improve the care of patients with gastrointestinal bleeding. The most striking findings of this study were that the organisation of GI bleeding services remain patchy and lacks co-ordination. Many hospitals do not have the facilities and / or staffing to deliver comprehensive care both during and out-of-hours. As a result many patients received inappropriate treatment whilst waiting for definitive control of bleeding. For example 9% of patients were given medical treatment that our reviewers felt was unnecessary and 25% were given blood products that could have been avoided.

We recommend that the artificial separation of upper and lower gastrointestinal bleeding should be stopped. To do this each hospital should appoint a Lead Clinician for GI bleeds to take responsibility for the management of patients with upper and lower GI bleeding. This clinician should develop pathways for patients with GI bleeds that identify patients early who require specialist input from GI bleed specialists ensuring timely early investigation and treatment of bleeding. This service should include 24/7 access to a specialist, GI bleed service, endoscopy, IR and surgery. Where deficiencies exist hospitals should develop joint networks with neighbouring hospitals.

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Appendices

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Appendix 1 – Glossary

Anticoagulation	Anticoagulant medicines reduce the ability of the blood to clot.
Banding	Banding is a medical procedure which uses elastic bands for constriction.
Catheter angiography CT angiography (CTA)	Angiography is a minimally invasive medical test that helps physicians diagnose and treat medical conditions. Angiography uses one of three imaging technologies and, in most cases, a contrast material injection is needed to produce pictures of blood vessels in the body. Angiography is performed using: • x-rays with catheters • computed tomography (CT) • magnetic resonance imaging (MRI) In catheter angiography, a thin plastic tube, called a catheter, is inserted into an artery through a small incision in the skin. Once the catheter is guided to the area being examined, a contrast material is injected through the tube and images are captured using a small dose of ionizing radiation (x-rays).
Coagulopathy	Also called clotting disorder and bleeding disorder is a condition in which the blood's ability to clot (coagulate) is impaired.
Coffee ground vomit	Vomit that looks like coffee grounds due to coagulated blood in it.
Colectomy	A surgical procedure to remove all or part of the colon: (the large intestine or large bowel).
Colonoscopy	Colonoscopy is a procedure that enables an examiner (usually a gastroenterologist or GI surgeon) to evaluate the inside of the colon. The colonoscope is a four foot long, flexible tube about the thickness of a finger with a camera and a source of light at its tip.
Danis stent	The Danis system is a self-expanding stent used for the management of acute oesophageal variceal bleeding. It applies direct compression of the bleeding varices.
Duodenectomy	Removal of the duodenum which is the first and shortest segment of the small intestine. It receives partially digested food from the stomach.
Embolisation	Blockage of abnormal blood vessels using a range of devices including tiny metal coils, tiny plastic beads and medical glue.

Endoscopy	This means 'looking inside' and typically refers to looking inside the body using an endoscope, an instrument used to examine the interior of a hollow organ or cavity of the body. Unlike most other medical imaging devices, endoscopes are inserted directly into the organ.
Enteric leak	A leak through part of the intestine.
Exsanguination	The process of blood loss, to a degree sufficient to cause death.
Fresh Frozen Plasma (FFP)	This is the liquid portion of human blood that has been frozen and preserved after a blood donation to be used for blood transfusion.
Fistula	A gastrointestinal fistula is an abnormal connection between the stomach or intestines and other hollow structures.
Gastrectomy	A medical procedure where all or part of the stomach is surgically removed.
Group and save	A group and save involves determining the patient's blood group and screening serum for the presence of antibodies to common red cell antigens that can cause transfusion reactions. A group and save is ordered if the patient is unlikely to need a blood transfusion but it will reduce the time required for cross-matched blood, should the patient subsequently need it.
Haematemesis	Haematemesis is the medical word for vomiting of blood.
Haemoglobin (Hb)	Haemoglobin is the protein molecule in red blood cells that carries oxygen from the lungs to the body's tissues and returns carbon dioxide from the tissues back to the lungs.
Haemostasis	This is a process which causes bleeding to stop, meaning to keep blood within a damaged blood vessel (the opposite of haemostasis is haemorrhage).
HDU	High dependency unit.
ICU	Intensive care unit.
Ileum	The final and longest segment of the small intestine.
International normalised ratio (INR)	This is a laboratory measurement of how long it takes blood to form a clot. It is used to determine the effects of oral anticoagulants on the clotting system.
In-hours	08:00 hours to 17:59 hours on weekdays.
Interventional Radiology	This refers to a range of techniques which rely on the use radiological image guidance (X-ray fluoroscopy, ultrasound, computed tomography (CT) or magnetic resonance imaging (MRI) to precisely target therapy.

Melaena	Black 'tarry' faeces that are associated with partially digested blood in the gastrointestinal tract.
NELA	National Emergency Laparotomy Audit.
NICE	National Institute for Health and Care Excellence
Oesophagitis	Inflammation of the lining of the oesophagus.
Oesophago-gastro-duodenoscopy, OGD	An OGD test is performed for both diagnostic and therapeutic reasons. The procedure is sometimes known more simply as a gastroscopy or endoscopy. This is an examination of the oesophagus (gullet), stomach and the first part of the small bowel (duodenum). An endoscope, which is a flexible tube with a diameter less than that of a little finger. It has three channels, from one light is directed onto the lining of the upper digestive tract, one which relays pictures back to the endoscopist onto a television screen and one to allow treatment.
Out-of-hours	18:00 hours to 07:59 hours on weekdays and all day on the weekends.
Proton pump inhibitors (PPI)	A group of medicines that work on the cells that line the stomach, reducing the production of acid.
Proctoscopy	An examination of the rectum using a special metal or plastic scope called a proctoscope. The rectum is the muscular tube that connects the colon to the anus.
Pulse oximetry	An external probe which sits on the patient's skin and measures the oxygen level in the blood.
Pulmonary aspiration	Aspiration can mean breathing in a foreign object (such as sucking food into the airway) or the term can also refer to a medical procedure that removes something from an area of the body. These substances can be air, body fluids, or bone fragments. An example is removing ascites fluid from the belly area.
Scintigraphy	A diagnostic technique in which a two-dimensional picture of internal body tissue is produced through the detection of radiation emitted by a radioactive substance administered into the body.
Sclerotherapy	A procedure used to treat blood vessels by injecting a medicine into the vessels, which makes them shrink and scar.
Sengstaken tube	A Sengstaken–Blakemore tube is a medical device inserted through the mouth which has an inflatable balloon which compresses oesophageal or gastric varices.
Shock	Circulatory shock, commonly known as shock, is a life threatening medical condition of low blood perfusion to tissues resulting in cellular injury and inadequate tissue function. The typical signs of shock are low blood pressure, rapid heart rate, and signs of poor end-organ perfusion (i.e. low urine output, confusion, or loss of consciousness).

Shock index (SI)	This is defined by the ratio of heart rate (HR) to systolic blood pressure (SBP). The SI has previously been used as a capable measure for hemodynamic instability and to risk stratify patients for transfusion requirements and outcomes.
Sigmoidoscopy	A minimally invasive medical examination of the large intestine from the rectum through the last part of the colon.
Syncope	Fainting or passing out.
Transjugular intrahepatic portosystemic shunt (TIPSS)	This creates an artificial channel within the liver that establishes communication between the inflow portal vein and the outflow hepatic vein. It is used to treat portal hypertension (which is often due to liver cirrhosis) which frequently leads to intestinal bleeding, life-threatening oesophageal or gastric bleeding (varices) and the buildup of fluid within the abdomen (ascites).
Tranexamic acid	A medicine which is used in treating and preventing bleeding problems.
Varices	Dilated veins.
Wound dehiscence	A surgical complication in which a wound ruptures along surgical suture.

Appendix 2 – Rockall and Blatchford Scores

The Rockall Score

Scores are additive which means that possible values for the first three rows (lighter shaded and referring to the Clinical Rockall) range from 0 to 7. Scores from the darker shaded cells (last two rows) are added post endoscopy to create the Full Rockall. A total score less than 3 carries good prognosis but total score more than 8 carries high risk of mortality.

Rockall TA, Logan RF, Devlin HB, et al; Risk assessment after acute upper gastrointestinal haemorrhage. Gut. 1996 Mar;38(3):316-21.

	Score			
Variable	**0**	**1**	**2**	**3**
Age	<60	60-79	≥80	
Shock	'No shock', systolic BP ≥100 pulse <100	'Tachycardia', systolic BP ≥100 pulse ≥100	'Hypotension', systolic BP <100	
Co-morbidity	No major co-morbidity		Cardiac failure, ischemic heart disease, any major co-morbidity	Renal failure, liver failure, disseminated malignancy
Diagnosis	Mallory-Weiss tear, no lesion identified and no SRH	All other diagnoses	Malignancy of upper GI tract	
Major SRH	None or dark spot only		Blood in upper GI tract, adherent clot, visible or spurting vessel	

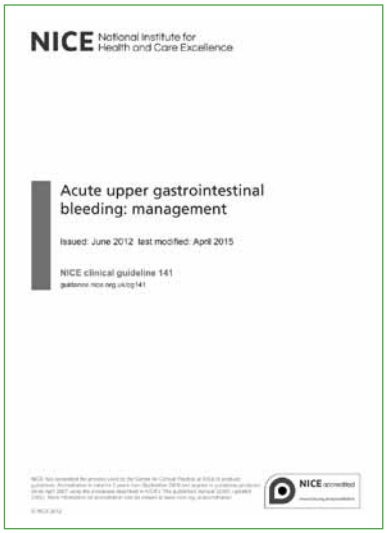
Blatchford score

Blatchford risk assessments are designed to be used pre-endoscopy. Scores in the right column are added up for each component. A score of 0 is the cut-off with any patient scoring >0 at risk of requiring an intervention.

Blatchford O, Murray WR, Blatchford M. A risk score to predict need for treatment for upper-gastrointestinal haemorrhage. Lancet. 2000 Oct 14; 356(9238):1318-21.

Admission risk marker	Score component value
Blood urea (mmol/L)	
≥6.5 <8.0	2
≥8.0 <10.0	3
≥10.0 <25	4
≥25	6
Haemoglobin (g/L) for men	
≥120 <130	1
≥100<120	3
<100	6
Haemoglobin (g/L) for woman	
≥100<120	1
<100	6
Systolic blood pressure (mm Hg)	
100-109	1
90-99	2
<90	3
Other markers	
Pulse ≥100 (per min)	1
Presentation with malaena	1
Presentation with syncope	2
Hepatic disease	2
Cardiac failure	2

Appendix 3 – Related guidelines



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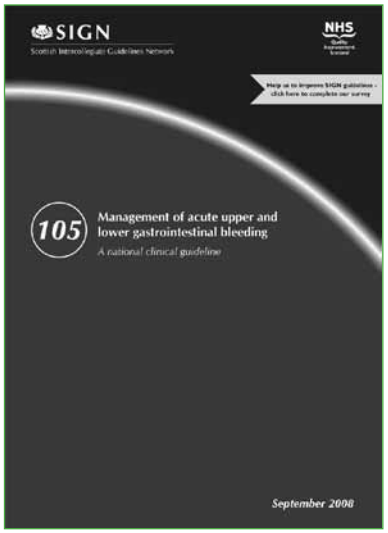

Scottish Intercollegiate Guidelines Network [SIGN] Guideline No. 105 Published date: 2008
http://www.sign.ac.uk/guidelines/fulltext/105/

NICE quality standard [QS38] Published date: 2013
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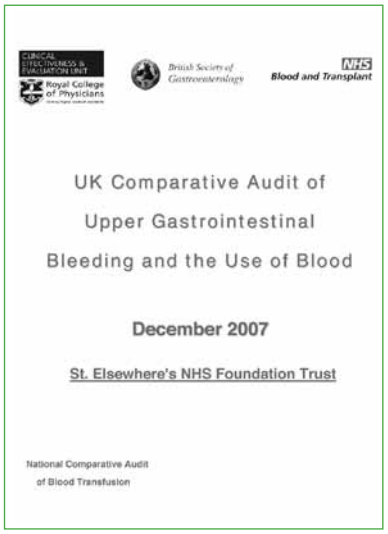

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Appendix 4 - The role and structure of NCEPOD

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) is an independent body to which a corporate commitment has been made by the Medical and Surgical Colleges, Associations and Faculties related to its area of activity. Each of these bodies nominates members on to NCEPOD's Steering Group.

Steering Group as at 3rd July 2015

Dr A Hartle	Association of Anaesthetists of Great Britain and Ireland
Mr F Smith	Association of Surgeons of Great Britain and Ireland
Dr C Mann	College of Emergency Medicine
Vacancy	Faculty of Public Health Medicine
Ms S Payne	Lay Representative
Mr S Barasi	Lay Representative
Dr J Fazackerley	Royal College of Anaesthetists
Dr A Batchelor	Royal College of Anaesthetists
Dr D Cox	Royal College of General Practitioners
Mrs J Greaves	Royal College of Nursing
Dr E Morris	Royal College of Obstetricians and Gynaecologists
Mr W Karwatowski	Royal College of Ophthalmologists
Dr I Doughty	Royal College of Paediatrics and Child Health
Dr M Osborn	Royal College of Pathologists
Dr A McCune	Royal College of Physicians
Dr M Ostermann	Royal College of Physicians
Dr M Cusack	Royal College of Physicians
Dr T Sabharwal	Royal College of Radiologists
Mr J Abercrombie	Royal College of Surgeons of England
Mr M Bircher	Royal College of Surgeons of England
Mr K Altman	Faculty of Dental Surgery, Royal College of Surgeons of England

Observers

Dr R Hunter	Coroners' Society of England and Wales
Mrs J Mooney	Healthcare Quality in Partnership (HQIP)
Dr M Jones	Royal College of Physicians of Edinburgh
Mr W Tennant	Royal College of Surgeons of Edinburgh

Trustees

Mr B Leigh - Chair
Dr D Mason - Honorary Treasurer
Professor L Regan
Professor R Endacott
Mr I Martin
Professor T Hendra

Company Secretary - Dr M Mason

NCEPOD is a company, limited by guarantee (Company number: 3019382) and a registered charity (Charity number: 1075588)

Clinical Co-ordinators

The Steering Group appoint a Lead Clinical Co-ordinator for a defined tenure. In addition there are six Clinical Co-ordinators who work on each study. All Co-ordinators are engaged in active academic/clinical practice (in the NHS) during their term of office.

Lead Clinical Co-ordinator	Dr M Juniper (Medicine)
Clinical Co-ordinators	Dr K Wilkinson (Anaesthesia)
	Dr A P L Goodwin (Anaesthesia)
	Mr M Sinclair (Surgery)
	Dr S McPherson (Radiology)
	Dr V Srivastava (Medicine)

Supporting organisations

This project was undertaken as part of the Clinical Outcome Review Programme into Medical and Surgical Care.

The Clinical Outcome Review Programme into Medical and Surgical Care is commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England, NHS Wales, the Northern Ireland Department of Health, Social Services and Public Safety (DHSSPS), the States of Jersey, Guernsey, and the Isle of Man.

Members of the Clinical Outcome Review Programme into Medical and Surgical Care Independent Advisory Group:

Dr Kevin Stewart - Chair
Rachel Binks
Professor Mike Dent
Gemma Ellis
Dr Karen Gully
Margaret Hughes
Mr Peter Lamont
Professor Donal O'Donoghue
Joan Russell
Professor Roger Taylor
Dr William Taylor
Phil Willan
Professor Keith Willett
Dr Ian Woods
Dr Paddy Woods

The organisations that provided additional funding to cover the cost of this study:

Aspen Healthcare
Beneden Hospital
BMI Healthcare
BUPA Cromwell
East Kent Medical Services Ltd
Fairfield Independent Hospital
HCA International
Hospital of St John and St Elizabeth
King Edward VII's Hospital Sister Agnes
New Victoria Hospital
Nuffield Health
Ramsay Health Care UK
Spire Health Care
St Anthony's Hospital
St Joseph's Hospital
The Horder Centre
The London Clinic
Ulster Independent Clinic

Appendix 5 - Participation

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Abertawe Bro Morgannwg University Health Board	3	0	0	0	0	3
Aintree Hospitals NHS Foundation Trust	1	3	3	3	3	1
Airedale NHS Foundation Trust	1	4	4	4	4	1
Ashford & St Peter's Hospital NHS Trust	2	3	3	3	3	2
Barking, Havering & Redbridge University Hospitals NHS Trust	2	7	7	7	7	1
Barnsley Hospital NHS Foundation Trust	1	4	4	3	3	1
Barts Health NHS Trust	5	17	17	7	7	4
Basildon & Thurrock University Hospitals NHS Foundation Trust	1	3	3	0	0	1
Bedford Hospital NHS Trust	1	0	0	0	0	0
Belfast Health and Social Care Trust	3	8	8	7	6	3
Betsi Cadwaladr University Local Health Board	3	13	13	6	3	3
Blackpool Teaching Hospitals NHS Foundation Trust	1	5	5	5	5	1
Bradford Teaching Hospitals NHS Foundation Trust	1	4	4	4	4	1
Brighton and Sussex University Hospitals NHS Trust	3	3	3	3	3	3
Buckinghamshire Healthcare NHS Trust	2	7	7	6	6	2
Burton Hospitals NHS Foundation Trust	1	3	3	3	3	1
Calderdale & Huddersfield NHS Foundation Trust	2	8	8	7	8	2
Cambridge University Hospitals NHS Foundation Trust	1	5	5	5	5	1

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Cardiff and Vale University Health Board	2	6	6	5	6	2
Central Manchester University Hospitals NHS Foundation Trust	4	6	6	2	0	4
Chelsea & Westminster Healthcare NHS Trust	1	5	5	1	1	0
Chesterfield Royal Hospital NHS Foundation Trust	1	4	4	4	4	1
City Hospitals Sunderland NHS Foundation Trust	1	4	4	4	4	1
Colchester Hospital University NHS Foundation Trust	2	5	5	4	2	0
Countess of Chester Hospital NHS Foundation Trust	1	4	4	4	4	1
County Durham and Darlington NHS Foundation Trust	2	9	9	9	9	2
Croydon Health Services NHS Trust	1	5	5	5	5	1
Cwm Taf Local Health Board	2	8	8	8	8	2
Dartford & Gravesham NHS Trust	1	0	0	0	0	1
Derby Hospitals NHS Foundation Trust	1	4	4	4	4	1
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	2	7	7	5	4	1
Dorset County Hospital NHS Foundation Trust	1	4	4	4	4	1
East & North Hertfordshire NHS Trust	2	6	6	6	6	2
East Cheshire NHS Trust	1	5	5	5	5	1
East Kent Hospitals University NHS Foundation Trust	1	0	0	0	0	0
East Lancashire Hospitals NHS Trust	1	4	4	2	1	1
East Sussex Healthcare NHS Trust	4	9	9	9	9	4

Appendix 5 - Participation (continued)

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Epsom and St Helier University Hospitals NHS Trust	3	9	9	5	3	3
Frimley Health NHS Foundation Trust	2	6	6	5	4	2
Gateshead Health NHS Foundation Trust	1	4	4	4	4	1
George Eliot Hospital NHS Trust	1	4	4	4	4	1
Gloucestershire Hospitals NHS Foundation Trust	2	5	5	4	4	2
Great Western Hospitals NHS Foundation Trust	3	4	4	3	3	3
Guy's & St Thomas' NHS Foundation Trust	2	6	6	6	6	2
Hampshire Hospitals NHS Foundation Trust	2	8	8	7	3	2
Harrogate and District NHS Foundation Trust	1	2	2	2	2	1
Health and Social Services Department, States of Guernsey	1	4	4	3	3	1
Heart of England NHS Foundation Trust	3	9	9	9	9	3
Hillingdon Hospitals NHS Foundation Trust (The)	2	5	5	4	3	1
Hinchingbrooke Health Care NHS Trust	1	4	4	2	0	1
Homerton University Hospital NHS Foundation Trust	1	5	5	5	4	1
Hull and East Yorkshire Hospitals NHS Trust	2	10	10	8	8	2
Hywel Dda Local Health Board	4	2	2	2	1	4
Imperial College Healthcare NHS Trust	3	9	9	8	8	3
Ipswich Hospital NHS Trust	1	3	3	3	3	1
Isle of Wight NHS Trust	1	4	4	2	2	1
James Paget Healthcare NHS Trust	1	4	4	3	3	1

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Kettering General Hospital NHS Foundation Trust	1	4	4	4	4	1
King's College Hospital NHS Foundation Trust	2	7	7	7	6	2
Kingston Hospital NHS Trust	1	5	5	4	5	1
Lancashire Teaching Hospitals NHS Foundation Trust	2	8	8	3	1	2
Lewisham and Greenwich NHS Trust	2	7	7	6	7	2
Liverpool Heart and Chest Hospital NHS Trust	1	2	2	2	2	1
London North West Healthcare NHS Trust	3	13	13	9	13	3
Luton and Dunstable Hospital NHS Foundation Trust	1	4	4	2	2	1
Maidstone and Tunbridge Wells NHS Trust	2	8	8	8	7	2
Medway NHS Foundation Trust	1	5	5	5	5	1
Mid Essex Hospitals NHS Trust	1	5	5	0	0	1
Milton Keynes Hospital NHS Foundation Trust	1	2	2	2	2	1
Newcastle upon Tyne Hospitals NHS Foundation Trust	2	5	5	5	5	2
Norfolk & Norwich University Hospital NHS Trust	1	4	4	3	4	1
North Bristol NHS Trust	2	6	6	4	6	2
North Cumbria University Hospitals NHS Trust	2	7	7	7	6	2
North Middlesex University Hospital NHS Trust	1	4	4	4	4	1
North Tees and Hartlepool NHS Foundation Trust	2	4	4	1	1	2

Appendix 5 - Participation (continued)

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Northampton General Hospital NHS Trust	1	4	4	4	4	1
Northern Devon Healthcare NHS Trust	1	4	4	4	4	1
Northern Health & Social Care Trust	2	6	6	3	3	2
Northern Lincolnshire & Goole NHS Foundation Trust	2	4	4	1	4	2
Northumbria Healthcare NHS Foundation Trust	7	11	11	10	8	6
Nottingham University Hospitals NHS Trust	2	9	9	9	9	2
Oxford University Hospitals NHS Trust	2	5	5	5	4	2
Papworth Hospital NHS Foundation Trust	1	1	1	1	1	1
Pennine Acute Hospitals NHS Trust (The)	4	13	13	10	10	4
Peterborough & Stamford Hospitals NHS Foundation Trust	1	2	2	2	2	1
Plymouth Hospitals NHS Trust	1	4	4	4	4	1
Poole Hospital NHS Foundation Trust	1	2	2	2	0	1
Portsmouth Hospitals NHS Trust	1	2	2	1	1	1
Queen Victoria Hospital NHS Foundation Trust	1	0	0	0	0	1
Royal Berkshire NHS Foundation Trust	1	3	3	3	3	1
Royal Bolton Hospital NHS Foundation Trust	1	2	2	2	2	1
Royal Bournemouth and Christchurch Hospitals NHS Trust	1	5	5	5	5	1
Royal Brompton and Harefield NHS Foundation Trust	2	5	5	5	5	2
Royal Cornwall Hospitals NHS Trust	3	6	6	6	6	3
Royal Devon and Exeter NHS Foundation Trust	1	4	4	4	4	1

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Royal Free London NHS Foundation Trust	3	7	7	6	6	3
Royal Liverpool & Broadgreen University Hospitals NHS Trust	1	4	4	4	4	1
Royal Marsden NHS Foundation Trust (The)	2	2	2	0	0	1
Royal National Orthopaedic Hospital NHS Trust	1	0	0	0	0	1
Royal Surrey County Hospital NHS Trust	1	3	3	3	3	1
Royal United Hospital Bath NHS Trust	1	5	5	5	5	1
Salford Royal Hospitals NHS Foundation Trust	1	4	4	3	4	1
Salisbury NHS Foundation Trust	1	5	5	5	5	1
Sandwell and West Birmingham Hospitals NHS Trust	2	8	8	8	8	2
Sheffield Teaching Hospitals NHS Foundation Trust	2	7	7	7	7	2
Sherwood Forest Hospitals NHS Foundation Trust	2	4	4	4	4	2
Shrewsbury and Telford Hospitals NHS Trust	2	7	7	6	6	0
South Devon Healthcare NHS Foundation Trust	1	5	5	2	2	1
South Eastern Health & Social Care Trust	4	4	4	4	4	4
South Tees Hospitals NHS Foundation Trust	2	3	3	2	2	2
South Tyneside NHS Foundation Trust	1	4	4	3	3	1
South Warwickshire NHS Foundation Trust	1	4	4	4	4	1
Southampton University Hospitals NHS Trust	1	4	4	3	3	1
Southend University Hospital NHS Foundation Trust	1	5	5	1	0	1

Appendix 5 - Participation (continued)

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Southern Health & Social Care Trust	2	9	9	9	8	2
Southern Health NHS Foundation Trust	1	0	0	0	0	1
Southport and Ormskirk Hospitals NHS Trust	2	3	3	3	3	2
St George's University Hospitals NHS Foundation Trust	1	3	3	3	3	1
St Helens and Knowsley Teaching Hospitals NHS Trust	1	4	4	4	4	1
States of Jersey Health & Social Services	1	5	5	5	5	1
Stockport NHS Foundation Trust	1	4	4	2	0	1
Surrey & Sussex Healthcare NHS Trust	1	4	4	2	2	1
Tameside Hospital NHS Foundation Trust	1	4	4	4	4	1
Taunton & Somerset NHS Foundation Trust	1	5	5	5	5	1
The Christie NHS Foundation Trust	1	1	1	0	0	0
The Clatterbridge Cancer Centre NHS Foundation Trust	1	0	0	0	0	1
The Dudley Group NHS Foundation Trust	1	4	4	4	4	1
The Leeds Teaching Hospitals NHS Trust	3	6	6	6	6	3
The London Clinic	1	3	3	1	1	0
The Princess Alexandra Hospital NHS Trust	1	5	5	5	5	1
The Queen Elizabeth Hospital King's Lynn NHS Foundation Trust	1	5	5	4	5	1
The Rotherham NHS Foundation Trust	1	3	3	3	3	1
The Royal Wolverhampton Hospitals NHS Trust	1	0	0	0	0	1

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
The University Hospitals of North Midlands NHS Trust	2	8	8	3	8	2
The Walton Centre NHS Foundation Trust	1	0	0	0	0	1
United Lincolnshire Hospitals NHS Trust	3	11	11	9	9	3
Univ. Hospital of South Manchester NHS Foundation Trust	1	2	2	2	2	1
University College London Hospitals NHS Foundation Trust	3	9	9	4	1	3
University Hospitals Birmingham NHS Foundation Trust	1	5	5	5	5	1
University Hospitals Coventry and Warwickshire NHS Trust	1	4	4	4	4	1
University Hospitals of Bristol NHS Foundation Trust	1	5	5	1	0	1
University Hospitals of Leicester NHS Trust	3	11	11	6	10	3
University Hospitals of Morecambe Bay NHS Trust	2	5	5	5	5	2
Walsall Healthcare NHS Trust	1	3	3	3	3	1
Warrington & Halton Hospitals NHS Foundation Trust	1	0	0	0	0	1
West Hertfordshire Hospitals NHS Trust	3	5	5	5	5	3
West Middlesex University Hospital NHS Trust	1	4	4	2	1	1
West Suffolk NHS Foundation Trust	1	4	4	4	4	1
Western Health & Social Care Trust	1	6	6	5	4	1
Western Sussex Hospitals NHS Foundation Trust	2	5	5	5	5	2

Appendix 5 - Participation (continued)

Trust Name	Number of hospitals	Number of cases included	Number of clinician questionnaires sent	Number of clinician questionnaires received	Number of sets of case notes returned	Number of organisational questionnaires returned
Weston Area Health Trust	1	4	4	2	1	1
Whittington Health	1	3	3	3	3	1
Wirral University Teaching Hospital NHS Foundation Trust	2	5	5	5	5	2
Worcestershire Acute Hospitals NHS Trust	3	9	9	5	8	2
Wrightington, Wigan & Leigh NHS Foundation Trust	1	6	6	3	3	1
Wye Valley NHS Trust	1	4	4	2	2	1
Yeovil District Hospital NHS Foundation Trust	1	4	4	4	3	1
York Teaching Hospitals NHS Foundation Trust	2	8	8	7	5	2

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Ground Floor
Abbey House
74-76 St John Street
London EC1M 4DZ

T 0207 251 9060
F 0207 250 0020
E info@ncepod.org.uk
w www.ncepod.org.uk

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