

# Delay in Transit

A review of the quality of care provided to patients aged over 16 years with a diagnosis of acute bowel obstruction



# Delay in Transit

A review of the quality of care provided to patients aged over 16 years with a diagnosis of acute bowel obstruction

A report published by the National Confidential Enquiry into Patient Outcome and Death (2020)

---

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 Royal Colleges, Associations and Faculties related to its area of activity. <https://www.ncepod.org.uk/about.html> NCEPOD is a company, limited by guarantee (3019382) and a registered charity (1075588).

The report has been compiled by:  
AJ Michalski MRCP PhD FRCPCH – Clinical Co-ordinator  
Great Ormond Street Hospital for Children NHS Trust  
MT Sinclair MB ChB FRCS – Clinical Co-ordinator  
Ipswich hospital NHS Foundation Trust  
H Shotton PhD – Clinical Researcher

K Kelly BA (Hons) PGC Health Research - Researcher  
H Freeth BSc (Hons) MSc RGN MSc - Clinical Researcher  
M Mason PhD – Chief Executive

The authors and Trustees of NCEPOD would like to thank the NCEPOD staff for their work in collecting and analysing the data for this study: Peyman Aleboyeh, Aysha Butt, Donna Ellis, Dolores Jarman, Dee Koomson, Nicholas Mahoney, Eva Nwosu, Neil Smith, Karen Protopapa, and Anisa Warsame.

This report should be cited as: The National Confidential Enquiry into Patient Outcome and Death. *Delay in Transit*. 2020. London

---

The Medical and Surgical Clinical Outcome Review Programme is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing, and National Voices. Its aim is to promote quality improvement in patient outcomes. The Clinical Outcome Review Programmes, which encompass confidential enquiries, are designed to help assess the quality of healthcare, and stimulate improvement in safety and effectiveness by systematically enabling clinicians, managers, and policy makers to learn from adverse events and other relevant data. HQIP holds

the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies [www.hqip.org.uk/national-programmes](http://www.hqip.org.uk/national-programmes).

© 2020 Healthcare Quality Improvement Partnership (HQIP)

Designed and published by Dave Terrey  
[dave.terrey@greysquirrel.co.uk](mailto:dave.terrey@greysquirrel.co.uk)



# Acknowledgements

---

This report could not have been achieved without the involvement of a wide range of individuals who have contributed to this study.

## **Our particular thanks go to:**

### ***The Study Advisory Group who advised NCEPOD on the design of the study***

John Abercrombie, Consultant General Surgeon  
Bushra Alam, Consultant in Acute Medicine  
Conrad Beckett, Consultant Gastroenterologist  
John Butler, Consultant in Emergency and Intensive Care Medicine  
Graham Copeland, Consultant General Surgeon  
Alison Culkin, Lead Intestinal Failure and Rehabilitation Dietitian  
Martyn Evans, Consultant Colorectal Surgeon  
Nicola Fearnhead, Consultant Colorectal Surgeon  
Jane Greaves, Senior Lecturer in Nursing  
Thusitha Sampath Hettiarachchi, Specialty Registrar in General Surgery  
Sunjay Kanwar, Consultant General and Upper Gastrointestinal Surgeon  
Hans-Ulrich Laasch, Consultant Interventional Radiologist  
Matthew Lee, Trainee General Colorectal Surgeon and representative for the National Audit of Small Bowel Obstruction  
Susan Moug, Consultant Colorectal Surgeon  
Dave Murray, Consultant Anaesthetist and Chair of the National Emergency Laparotomy Audit  
Ronald Newall, NCEPOD Lay Representative  
Marlies Osterman, Consultant in Critical Care and Nephrology  
Julie Patton, Registered General Nurse  
Krishna Ramachandran, Consultant Anaesthetist  
Constantinos Regas, NCEPOD Lay Representative  
John Wilson, Consultant Gastroenterologist

### ***The case reviewers who undertook the peer review***

Najwan Abu Al-Saad, Consultant in Critical care and Anaesthesia  
Kiren Ali, Clinical Fellow General Surgery  
Michael Argent, Specialist Registrar in Intensive Care Medicine and Anaesthesia  
Tan Arulampalam, Consultant General Surgeon  
Eileen Baker, Senior Specialist Dietitian  
Nick Bergin, Specialist Nutrition Support Dietitian and Acute Team Leader  
Elaine Boland, Consultant and Honorary Senior Lecturer in Palliative Medicine  
Shirley Chan, Consultant Colorectal and Paediatric Surgeon  
Dimitrios Damaskos, Consultant General Surgeon  
Alexander Davey, Consultant Anaesthetist  
Matthew Davies, Consultant in Anaesthesia and Intensive Care  
Robert Docking, Consultant in Anaesthesia and Intensive Care Medicine  
Andrew Douds, Consultant Gastroenterologist  
Deepak Dwarakanath, Consultant Gastroenterologist  
Karin Gerber, Advanced Nurse Practitioner, Critical Care Outreach  
Claire Hall, Consultant Colorectal Surgeon  
Emma Helbren, Consultant Gastrointestinal Radiologist  
Victoria Hemmings, Clinical Nurse Specialist in Emergency Surgery  
Antony Higginson, Consultant Gastrointestinal Radiologist  
Stephen Holtham, Consultant Colorectal Surgeon  
Nicola Jardine, Senior Nurse Practitioner  
Mong-Yang Loh, Consultant Radiologist  
Peta-Marie Longstaff, Consultant Emergency Medicine  
David Maudgil, Consultant Interventional Radiologist  
Grace McClune, Consultant Anaesthetist  
Stephen McNally, Consultant Hepatobiliary, Upper Gastrointestinal and General Surgeon  
Matthew Outram, Consultant in Anaesthetics and Intensive Care

## ACKNOWLEDGEMENTS

---

Tim Pencavel, Consultant Hepatobiliary and General Surgeon  
Jeremy Reid, Consultant in Anaesthesia and Intensive  
Care Medicine  
Sarah Rose, Consultant Acute Physician  
Fiona Rust, Emergency Surgical Specialist Nurse  
David Scullion, Consultant Radiologist  
Guy Shingler, Consultant General and Hepatobiliary Surgeon  
David Sparkes, Consultant in Intensive Care and Anaesthesia  
James Stephenson, Consultant Gastrointestinal and  
Abdominal Radiologist  
Jamie Swales, Advanced Clinical Practitioner  
Alfredo Tonsi, General and Colorectal Surgeon  
Stella Vig, Consultant General Surgeon  
YKS Viswanath Consultant Surgeon Upper Gastrointestinal  
and Laparoscopic Surgeon  
David Watmough, Consultant Gastroenterologist

Thanks also go to all the NCEPOD Local Reporters for  
facilitating the study at their hospital(s), the NCEPOD  
Ambassadors for championing the study and the clinicians  
who took the time to complete questionnaires. Without  
your help this report would not have been possible.

## Foreword

---

Acute bowel obstruction is a relatively common emergency condition which, nonetheless, still presents a significant challenge for clinicians. The challenge is identifying those patients who need the prompt diagnosis and therapy essential to avoid significant morbidity and mortality, particularly as the presenting symptoms of abdominal pain, nausea and vomiting are relatively non-specific.

Although this study did not set out to assess the presentation of patients with non-specific gastrointestinal symptoms, it did assess key elements of the acute bowel obstruction pathway, to 'stress-test' the system in patients who developed more severe disease or complications related to deficiencies in the pathway. Care should be taken not to extrapolate the data too widely, due to the sampling used but the recommendations to improve the care pathway will be relevant to the 780,000 patients presenting to emergency departments per year with gastrointestinal symptoms<sup>i</sup> and 600,000 patients admitted to surgical departments with abdominal pain.<sup>ii</sup>

The study showed that despite guidelines existing for the management of small and large bowel obstruction, and improvements in laparotomy care stimulated by previous NCEPOD reports and the National Emergency Laparotomy Audit (NELA), there is still more that can be done to improve the care provided.

Problems with timely access to CT scanning for diagnosis, and access to the operating theatre for treatment, were commonly identified themes. The recommendation to carry out a prompt CT scan with IV contrast to identify patients with or at risk of serious complications such as perforation should be taken seriously to ensure speedy diagnosis and urgent surgery. Furthermore, it was somewhat ironic that delays in access to the operating theatre occurred in this study as NCEPOD has championed the issue of emergency theatre access since its inception over 30 years ago. The recommendation that all hospitals should have a process in

place to ensure timely access to theatre for these critically ill patients is crucial and where these standards are not being met there is a requirement to consider how to utilise resources more effectively.

We often hear that patients are getting older and frailer and this can be a challenge when deciding on the best course of action for each patient. This study has shown that frailty was a common risk factor for surgery in patients with acute bowel obstruction. The recommendation to assess frailty to facilitate multidisciplinary assessment and shared decision-making will assist clinicians, patients and their relatives in these complex scenarios.

Delays in recognition, senior assessment, appropriate imaging, decision-making, recognition of acute kidney injury and resuscitation and surgery, all feature heavily in the report. Even the most basic assessments of pain, hydration and nutrition were frequently inadequate. These delays, which are widely known to contribute to poorer outcomes, may be avoidable. I hope therefore that each and every consultant, clinical and medical director heeds the recommendations of this report, and takes steps to ensure that robust, auditable pathways are introduced and consistently followed, in order to maximise the likelihood of good outcomes for patients.

As ever I must thank all those involved in undertaking this study, which represent an enormous combined effort. It is particularly gratifying to see contributions to the review process from such a wide ranging multidisciplinary group of professionals. Our local reporters are pivotal in identifying the sample population and supporting the return of case notes and questionnaires and without them our studies would simply not happen. We are particularly grateful as this was the first study in which we had used electronic clinical questionnaires, which we know provided new challenges to the local reporters and to the treating clinicians who gave up their time to complete the

## FOREWORD

---

questionnaire. This process provided the treating clinician with the opportunity to state their retrospective view on the care they provided. This self-reflection is of vital importance in contributing to the dataset, to ascertain whether there were things which could have been done better. Given that the GMC<sup>iii</sup> expect clinicians to co-operate fully in the work of the confidential enquiries, we would encourage medical directors to ensure that clinicians are supported with the ongoing resources to participate in such studies. Furthermore our Steering Group and Trustees all play a valuable role in reviewing the study data and providing guidance to the NCEPOD Clinical Co-ordinators and staff who ultimately compile the report. To all of them I am enormously grateful.



Ian C Martin,  
Chair

- i. *Accident and Emergency Statistics - Parliament UK - Number 6964, 21 February 2017 – Page 12*  
<https://researchbriefings.files.parliament.uk/documents/SN06964/SN06964.pdf>
- ii. *Association of Surgeons of Great Britain and Ireland and the Royal College of Surgeons of England. Commissioning Guide: Emergency General Surgery (acute abdominal pain) 2014* <https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-general-guide/>
- iii. *GMC Good Medical Practice “23 To help keep patients safe you must: a) contribute to confidential inquiries”*  
<https://www.gmc-uk.org/ethical-guidance/ethical-guidance-for-doctors/good-medical-practice/domain-2----safety-and-quality>

# Introduction

---

Acute bowel obstruction occurs when there is an interruption to the forward flow of intestinal contents, and accounts for 10% of emergency surgical admissions.<sup>1</sup> Intestinal obstruction is associated with life threatening complications such as aspiration pneumonia as well as bowel ischaemia and perforation. Planning optimal therapy can be challenging; surgeons have to make critical decisions with regard to non-operative management versus surgery. Prompt radiological investigations and diagnosis is essential to prevent a delay in surgical intervention, which can significantly affect patient outcome.

Early recognition of impending perforation is essential using clinical and radiological investigations to ensure expedient surgery or other therapeutic intervention. Early abdominal CT with intravenous contrast is recommended to identify closed-loop obstruction, bowel ischaemia and bowel perforation.<sup>2-4</sup> Adhesions from previous surgery are currently the leading cause of small bowel obstruction in industrialised countries (70%), followed by malignancy, inflammatory bowel disease, and hernias. Malignancy and volvulus are the commonest causes of large bowel obstruction.<sup>5</sup>

When surgery is required, mortality can exceed 10%, far higher than seen in elective gastrointestinal surgery. The majority of patients requiring surgery can be categorised as

'high-risk' and require consultant delivered care as well as admission to critical care after surgery. Prompt recognition of patient deterioration, sepsis, and perforation is needed. Surgery may be required within a matter of hours for the surgical source control of sepsis, or to prevent impending perforation.<sup>6,9</sup>

Currently there is no national guideline nor framework for the management of acute bowel obstruction and there is considerable variation in care, with variation in outcomes.<sup>2,5,7-9</sup>

This NCEPOD study was developed with wide multidisciplinary input and a number of areas for review were identified as those affecting the care and outcome of patients with bowel obstruction. Particular focus was on the early clinical recognition of bowel obstruction and early definitive diagnosis by abdominal CT with intravenous contrast. Data were collected on potential delays in the pathway including the availability of CT imaging, decision-making regarding the timing of surgery and subsequent access to theatres.

This review includes an assessment of service structure at an organisational level and patient care at a clinical level. Recommendations are formed from data provided by clinicians and from the external peer review of a sample of patients.



# Executive summary

---

## Aim

The aim of this study was to highlight areas where care could be improved in patients who were admitted to hospital and had a diagnosis of acute bowel obstruction.

## Method

A retrospective questionnaire review was undertaken in 690 patients and a case note review in 294 patients aged 16 and over who had an acute bowel obstruction either presenting to hospital or during their hospital admission.

## Key messages

This study has highlighted significant opportunities to improve the care of patients with acute bowel obstruction. The overarching finding was that there were significant delays in the pathway of care for this group of patients, from requesting imaging, diagnosis, decision-making and availability of an operating theatre.

There were delays in imaging in 57/276 (20.7%) of the cases reviewed and the delays increased if an abdominal X-ray was performed as well as an abdominal CT. Furthermore a delay in imaging led to a delay in diagnosis in 35/57 (61.4%) patients whereas only 14/219 (6.4%) patients had a delay in diagnosis if there was no delay in imaging.

Delays in consultant assessment led to a delay in diagnosis in 13/32 (40.6%) patients. Only 23/147 (15.6%) patients who were seen in a timely manner by a consultant experienced a delay in diagnosis. Following diagnosis 72/368 (19.6%) patients experienced a delay in access to surgery and in 38/72 (52.8%) patients the delay was due to non-availability of theatre and in 34/72 (47.2%) it was due non-availability of an anaesthetist.

In addition to the delays, there was found to be room for improvement in the clinical care of this group of patients. Risk and frailty assessments were variable. Risk assessment is important as patients who had a risk assessment had better escalation of care, however this was inadequate in 98/219 (44.7%) patients. Similarly, only 34/124 (27.4%) patients over 65 years of age had their frailty score assessed on admission to the ward and if patients did have a Rockwood frailty score of 5 or higher this was more likely to result in discussions around mortality, resuscitation status and treatment options.

To prevent malnutrition and acute kidney injury, nutrition and hydration status are fundamental to care in patients with an acute bowel obstruction, these were often not well assessed. Only 163/686 (23.8%) patients had their hydration status recorded, 105/254 (41.3%) patients either had no nutritional status assessment or the assessment was inadequate and only 88/233 (37.8%) patients had a nutrition assessment on discharge.

The areas for improvements in care highlighted in the report, and the recommendations made, have the potential to improve the care of a large proportion of surgical patients. This should lead to measurable improvements in outcomes and enhanced patient care.

# Recommendations

These recommendations have been formed by a consensus exercise including all those listed in the acknowledgements. They highlight a number of areas that are suitable for local audit and quality improvement initiatives to address any areas of care that are below the expected standard. The

result of the audits or quality improvement initiatives should be presented at a quality or governance meeting and action plans shared with the Executive Board.

RECOMMENDATIONS		
Suggested groups to undertake the recommendation are shown in brackets after each one, as a guide only. NB. The term clinicians includes nurses	# is the number of the supporting key data in the report	Associated guidelines and other related evidence
<p>1 Undertake a CT scan with intravenous contrast promptly, as the definitive method of imaging* for patients presenting with suspected acute bowel obstruction. Prompt radiological diagnosis will help ensure admission to the correct specialty, so the time to CT reporting should be audited locally.</p> <p><i>*unless the use of IV contrast is deemed inappropriate by a senior clinician, in which case CT without contrast should be performed – in line with NICE CG169</i></p> <p><i>(Emergency Medicine, Admitting Clinicians, Radiologists, Quality Improvement Leads)</i></p>	<p><b>CHAPTER 5 – PAGE 33</b> #23 There were delays in imaging in 57/276 (20.7%) of the cases reviewed</p> <p><b>CHAPTER 5 – PAGE 28</b> #24 Radiological imaging was most often reported by a consultant: X-ray for 216/293 (73.7%) patients; CT with IV contrast for 403/436 (92.4%) patients and CT without contrast for 33/38 (86.8%) patients</p> <p><b>CHAPTER 5 – PAGE 29</b> #25 CT with IV contrast was sufficient to diagnose acute bowel obstruction in 427/479 (89.1%) patients whereas abdominal X-ray was sufficient to diagnose acute bowel obstruction in 132/411 (32.1%)</p> <p>#26 CT with IV contrast affected subsequent decision-making in the management of acute bowel obstruction in 456/484 (94.2%) patients and abdominal X-ray in 266/411 (64.7%) patients</p> <p><b>CHAPTER 5 – PAGE 31</b> #27 35/57 (61.4%) patients with delayed imaging also experienced a delay in diagnosis whereas only 14/219 (6.4%) patients had a delay in diagnosis if there was no delay in imaging</p> <p><b>CHAPTER 5 – PAGE 33</b> #21 34/434 (7.8%) patients who had an abdominal X-ray and 9/491 (1.8%) patients who had a CT with IV contrast had a delay in the reporting on the image</p> <p>#22 43/491 (8.8%) patients who underwent a CT with IV contrast and 6/421 (1.4%) patients who underwent an abdominal X-ray experienced a delay due to access to radiology</p> <p>#28 In 23/29 (79.3%) cases reviewed where the patient was considered to have had unnecessary imaging and 28/57 (49.1%) where there was an unnecessary delay, the patient had undergone both an abdominal X-ray and a CT scan</p> <p><b>CHAPTER 11 – PAGE 58</b> #69 In 31/168 (18.5%) hospitals there was a CT scanner in the emergency department</p> <p><b>CHAPTER 11 – PAGE 60</b> #71 There was a maximum time reporting of CT of less than 1 hour in 43/74 (58.1%) hospitals (in hours) and 48/94 (51.1%) hospitals out-of-hours</p>	<p>NELA <a href="https://www.nela.org.uk/reports">https://www.nela.org.uk/reports</a></p> <p>ACPGBI - NASBO <a href="https://www.acpgbi.org.uk/content/uploads/2017/12/NASBO-REPORT-2017.pdf">https://www.acpgbi.org.uk/content/uploads/2017/12/NASBO-REPORT-2017.pdf</a></p> <p>ACPGBI – LBO pathway <a href="https://www.acpgbi.org.uk/content/uploads/2016/12/Large-Bowel-Obstruction-pathway-2017.pdf">https://www.acpgbi.org.uk/content/uploads/2016/12/Large-Bowel-Obstruction-pathway-2017.pdf</a></p> <p>RCSEng &amp; AAGBI <a href="https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-general-guide/">https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-general-guide/</a></p> <p>NICE CG169 <a href="https://www.nice.org.uk/guidance/cg169/chapter/1-Recommendations#assessing-risk-of-acute-kidney-injury">https://www.nice.org.uk/guidance/cg169/chapter/1-Recommendations#assessing-risk-of-acute-kidney-injury</a></p> <p>NICE CG131 <a href="https://www.nice.org.uk/guidance/cg131/ipf/chapter/acute-large-bowel-obstruction">https://www.nice.org.uk/guidance/cg131/ipf/chapter/acute-large-bowel-obstruction</a></p>

## RECOMMENDATIONS

<p>2</p>	<p>Undertake a consultant review in all patients diagnosed with acute bowel obstruction as soon as clinically indicated and at the latest within 14 hours of admission to hospital. Discussion with a consultant should occur within an hour for high-risk patients*</p> <p><i>*As recommended by the RCP London and NHS England ('High risk' is defined as where the risk of mortality is greater than 10%, or where a patient is unstable and not responding to treatment as expected)</i> (Consultant Surgeons)</p>	<p><b>CHAPTER 4 – PAGE 22</b> #12 41/258 (15.9%) patients experienced a delay in consultant review</p> <p><b>CHAPTER 5 – PAGE 33</b> #29 13/32 (40.6%) patients who had a delay in consultant assessment had a delay in diagnosis. In patients who were seen in a timely manner by a consultant only 23/147 (15.6%) experienced a delay in diagnosis</p>	<p>RCP Acute care toolkit 12 <a href="https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-12-acute-kidney-injury-and-intravenous-fluid-therapy">https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-12-acute-kidney-injury-and-intravenous-fluid-therapy</a></p> <p>RCP Acute care toolkit 4 <a href="https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-4-delivering-12-hour-7-day-consultant-presence-acute-medical-unit">https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-4-delivering-12-hour-7-day-consultant-presence-acute-medical-unit</a></p> <p>NHS England NHS Services, Seven Days a Week Forum. Standard 2 <a href="https://www.england.nhs.uk/wp-content/uploads/2013/12/forum-summary-report.pdf">https://www.england.nhs.uk/wp-content/uploads/2013/12/forum-summary-report.pdf</a></p>
<p>3</p>	<p>Admit patients with symptoms of acute bowel obstruction as necessary, but patients who have a definitive diagnosis of acute bowel obstruction should be admitted under the care of a surgical team. (Clinicians, Clinical Directors)</p>	<p><b>CHAPTER 4 – PAGE 22</b> #11 Admission to an inappropriate ward was most commonly due to admission to a medical rather than surgical ward (22/24; 91.7%), which was also the reason for a delay to the patient being assessed by the surgical team in 31/52 (59.6%) patients</p> <p><b>CHAPTER 4 – PAGE 24</b> #31 14/26 (53.8%) patients who experienced a delay in surgical assessment also had a delay in diagnosis compared with 24/170 (14.1%) when surgical assessment was not delayed</p> <p><b>CHAPTER 4 – PAGE 35</b> #30 Delays in obtaining a CT scan with IV contrast were more likely if patients were admitted under the medical team (18/74; 24.3%) compared with admission under surgery (33/351; 9.4%)</p> <p>#33 Clinicians reported a delay in diagnosis that was outside of their control in 22/118 (18.6%) patients where the patient was admitted under medical teams compared with 20/454 (4.4%) of those under surgical teams</p> <p>#34 A delay in making the decision about the best treatment for the patient occurred in 11/125 (8.8%) admissions under medical teams and 14/483 (2.9%) under surgical teams</p>	



## RECOMMENDATIONS

7	<p>Ensure patients with a high frailty score (eg. Rockwood 5 or more) receive:</p> <ol style="list-style-type: none"> <li>A multidisciplinary team discussion for shared decision-making, including care of the elderly</li> <li>A risk assessment, with input from critical care relevant to the patient's needs</li> <li>A treatment escalation plan</li> <li>Their resuscitation status recorded <i>(Clinicians including Care of the Elderly)</i></li> </ol>	<p><b>CHAPTER 2 – PAGE 17</b> #3 195/549 (35.5%) patients had a frailty score of 5 or more, of whom 187/195 (95.9%) patients were aged 60 years or older</p> <p><b>CHAPTER 4 – PAGE 26</b> #14 Only 34/124 (27.4%) patients over 65 years of age had their frailty score assessed on admission to the ward</p> <p><b>CHAPTER 6 – PAGE 38</b> #38 Care of the elderly input was sought in 61/498 (12.2%) patients in the view of the clinicians completing questionnaires. Of the patients who had no care of the elderly input, 343/437 (78.5%) were over the age of 65 #40 21/204 (10.3%) patients who did not have a critical care opinion should have; 4/21 (19.0%) of these patients died and 18/21 (85.7%) patients had an operation.</p> <p><b>CHAPTER 6 – PAGE 39</b> #42 Critical care input influenced care in 36/61 (59.0%) patients. Of those patients who had surgery 99/390 (25.4%) required critical care post operatively #43 579/603 (96.0%) patients had their treatment plan discussed with them and in 394/497 (79.3%) it was discussed with the their family #44 If the patient had a Rockwood frailty score of 5 or more, their treatment plan was discussed with them 169/186 (90.9%) cases reviewed and with their family in 168/190 (88.4%) #45 101/279 (36.2%) patients had their resuscitation status documented</p> <p><b>CHAPTER 7 – PAGE 42</b> #48 30/109 (27.5%) patients did not have all possible alternative treatment options discussed with them</p> <p><b>CHAPTER 10 – PAGE 54</b> #61 84/223 (37.7%) patients noted to be frail (Rockwood score 5-9) on admission, died during the admission compared to 10/333 (3.0%) who had a Rockwood score of 1-4 when they were admitted to hospital</p>	<p>The Rockwood Frailty Score: Rockwood K Song X, MacKnight C et al. 2005. A global clinical measure of fitness and frailty in elderly people. CMAJ. 173:489-495 <a href="https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html">https://www.dal.ca/sites/gmr/our-tools/clinical-frailty-scale.html</a></p>
8	<p>Ensure local policies are in place for the escalation of patients requiring surgery for acute bowel obstruction to enable rapid access to the operating theatre.* This should be regularly audited to ensure adequate emergency capacity planning. <i>*e.g. The NCEPOD Classification of Intervention can be used to ensure that patients are treated within a clinically acceptable timeframe (Medical Directors, Clinical Directors, Quality Improvement Leads)</i></p>	<p><b>CHAPTER 7 – PAGE 45</b> #49 183/273 (67.0%) patients had their operation within 6 hours of the decision to operate. Of the 29 patients where case reviewers found that the timing of surgery was inappropriate, they were of the opinion that the inappropriate delay affected the outcome of eight patients</p> <p><b>CHAPTER 7 – PAGE 44</b> #50 72/368 (19.6%) patients experienced a delay in access to surgery and in 38/72 (52.8%) patients the delay was due to non-availability of theatre, in 34/72 (47.2%) it was due non-availability of an anaesthetist and in 15/72 (20.8%) the patient required further treatment</p> <p><b>CHAPTER 11 – PAGE 63</b> #73 136/170 (80.0%) hospitals had at least one dedicated emergency (CEPOD) theatre #74 120/166 (72.3%) hospitals reported that there was priority grading for emergency surgery and in 79/164 (48.2%) hospitals there was a theatre co-ordinator to facilitate this</p>	<p>NCEPOD Classification of Intervention <a href="http://www.ncepod.org.uk/classification">www.ncepod.org.uk/classification</a></p>









**Information governance**

All data received and handled by NCEPOD comply with all relevant national requirements, including the General Data Protection Regulation 2016 (Z5442652), Section 251 of the NHS Act 2006 (PIAG 4-08(b)/2003, App No 007), PBPP (1718-0328) and the Code of Practice on Confidential Information.

Each patient was given a unique NCEPOD number. The data from all paper questionnaires received were electronically scanned into a pre-set database. All electronic questionnaires were submitted through a dedicated online application. 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**

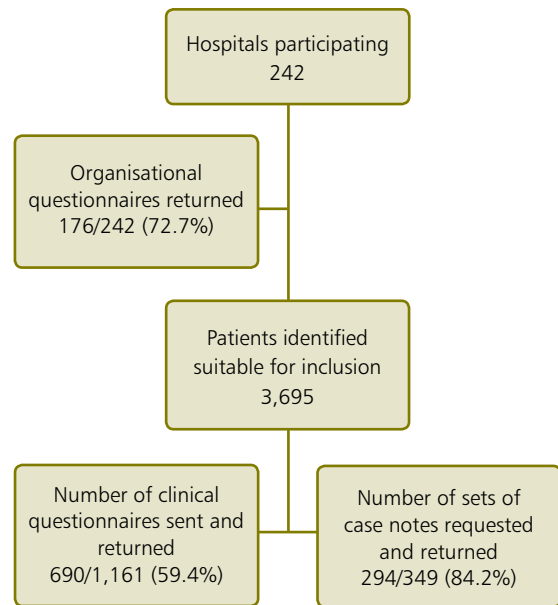
Following cleaning of the quantitative data, descriptive data summaries were produced. Qualitative data collected from the case reviewers’ opinions and free text answers in the clinician questionnaires were coded, where applicable, according to content to allow quantitative analysis. The data were reviewed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

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

The findings of the report were reviewed by the Study Advisory Group, Case Reviewers, NCEPOD Steering Group including Clinical Co-ordinators, Trustees and Lay Representatives prior to publication.

**Data returns**

A total of 177/242 (73.1%) organisational questionnaires were received. There were 3,695 patients identified who fulfilled the study criteria of which 1,161 were sampled for clinical questionnaire completion (maximum of ten per hospital) and 349 were sampled for case note review (two per hospital). A return of 690 clinical questionnaires (59.4%) was made and 294 sets of case notes (84.2%) (Figure 1.1).



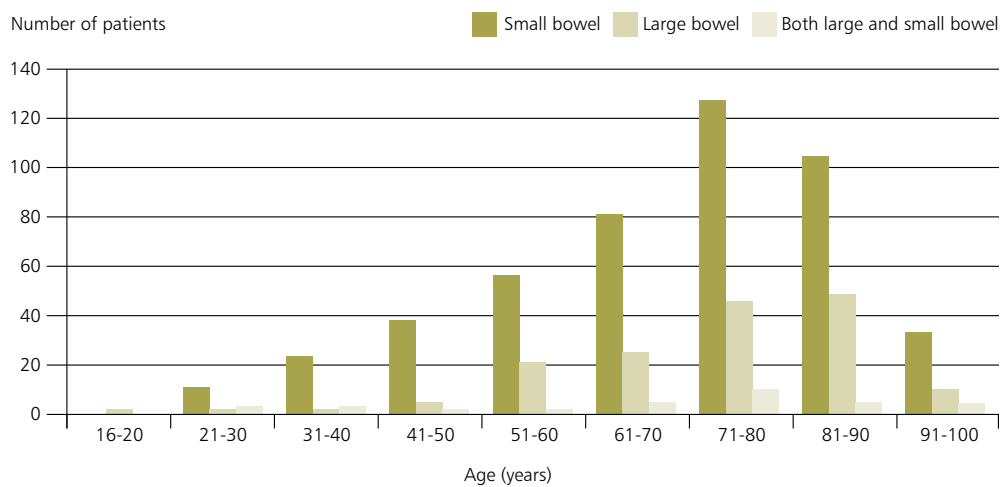
**Figure 1.1 Data returns**

## Demographics

Of the included study population with an acute bowel obstruction, 476/668 (71.3%) presented with small bowel obstruction and 158/668 (23.7%) with large bowel obstruction. A further 34/668 (5.1%) patients presented with both small and large bowel obstruction. The site of the obstruction was not identified for 22 patients.

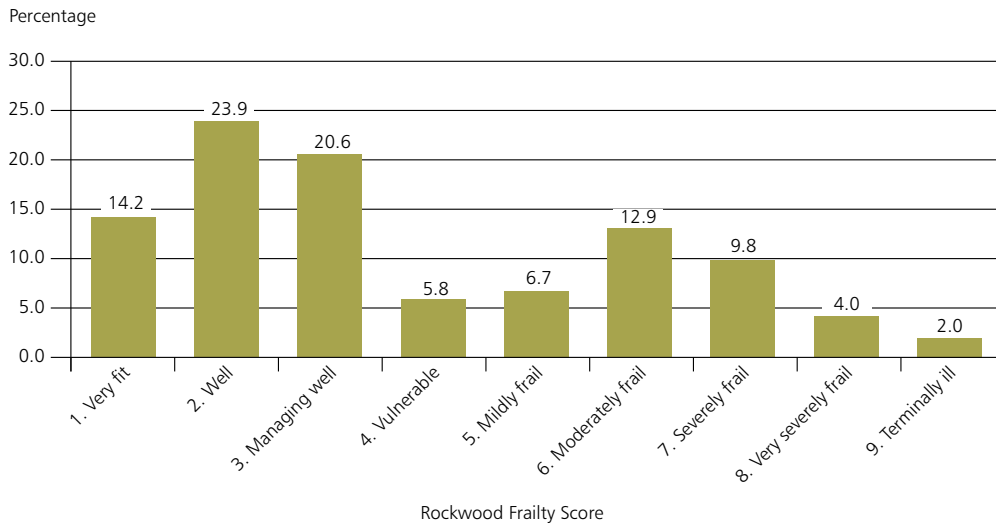
The sampled study population was skewed towards the older age group with a median of 59.4 years (range 19-99 years) and Figure 2.1 shows the age and the site of the obstruction in the study population.

As 519/690 (75.2%) of the study population were over 60 years of age, their frailty before the onset of the bowel obstruction was estimated from the data available. Figure 2.2, overleaf, shows that in the Rockwood scores<sup>10</sup> of the study population as a whole there were 195/549 (35.5%) patients who had a frailty score of 5 or more, of whom 187/195 (95.9%) patients were aged 60 years or older.



**Figure 2.1 Patient age and site of bowel obstruction (n=668)**

*Clinical questionnaire data*



**Figure 2.2 Functional status on admission (n=549)**

*Clinical questionnaire data*

It was not possible from the available datasets to ascertain how many of the patients with large bowel obstruction had been screened for colonic cancer. However, it was reported in a third of the cases reviewed (70/210; 33.3%) that the patient had seen their GP for symptoms of large bowel obstruction prior to admission.

**Key Findings**

1. 476/668 (71.3%) patients in the study presented with small bowel obstruction and 158/668 (23.7%) with large bowel obstruction. A further 34/668 (5.1%) patients presented with both small and large bowel obstruction
2. 519/690 (75.2%) of the study population were over 60 years of age
3. 195/549 (35.5%) patients had a frailty score of 5 or more, of whom 187/195 (95.9%) patients were aged 60 years or older

## Presentation to hospital and initial assessment

### Presentation

The majority of patients presented via the emergency department (556/677; 82.1%). Of these patients 329/556 (59.2%) presented outside normal working hours. The most common presenting symptom was abdominal pain (438/690; 63.5%), but in 61/690 (8.8%) the presentation was with non-gastrointestinal related symptoms (Table 3.1).

**Table 3.1 Presenting symptoms**

	Number of patients	%
Abdominal pain	438	63.5
Nausea/vomiting	302	43.8
Abdominal distension	94	13.6
Constipation	47	6.8
Diarrhoea	25	3.6
Hernia	13	1.9
Other non-gastrointestinal related symptoms	61	8.8

Answers may be multiple; n=690 Clinical questionnaire data

### Initial assessment

The majority of patients had their initial assessment performed in emergency department (514/657; 78.2%). The grade of the staff member performing the initial assessment is shown in Table 3.2, where it can be seen that 245/572 (42.8%) patients were initially assessed by more senior doctors (ST3 or above), 276/572 (48.3%) were seen by junior doctors and 51/572 (8.9%) by nursing staff. Overall 292/572 (51.0%) of the initial assessments were performed by junior team members.

**Table 3.2 Grade of clinician carrying out the initial assessment**

	Number of patients	%
Foundation grade (HO/FY1 or SHO/FY2 or equivalent)	143	25.0
Junior specialist trainee (ST1 and ST2 or CT equivalent)	133	23.3
Senior specialist trainee (ST3+ or equivalent)	110	19.2
Staff grade/Associate specialist	66	11.5
Consultant	59	10.3
Specialist nurse (nurse consultant/ nurse practitioner etc.)	19	3.3
Senior staff nurse	16	2.8
Staff nurse	16	2.8
Trainee with core clinical training (CCT)	10	1.7
<b>Subtotal</b>	<b>572</b>	
Unknown	118	
<b>Total</b>	<b>690</b>	

Clinical questionnaire data

### Clinical questionnaire data

Table 3.3 shows that a pain score was performed in 290/690 (42.0%) patients despite pain being the commonest presenting symptom. In those patients where pain was noted as a presenting symptom, a pain score was performed in 252/438 (57.5%). In the context of bowel dysfunction, hydration and nutrition are important considerations but hydration status was only assessed in 163/690 (23.6%) patients and weight recorded in 157/690 (22.8%) patients resulting in Body Mass Index (BMI) only recorded in 80/690 (11.6%) patients.

**Table 3.3 Observations recorded at initial assessment**

	Number of patients	%
Pulse	644	93.3
Blood pressure	652	94.5
Respiratory rate	636	92.2
Temperature	639	92.6
Oxygen saturation	629	91.2
Glasgow Coma Score	362	52.5
Pain score	290	42.0
Hydration status	163	23.6
Weight	157	22.8
Body Mass Index	80	11.6
Other	51	7.4

Answers maybe multiple; n=690 Clinical questionnaire data

The non-imaging investigations performed at initial assessment are shown in Table 3.4.

**Table 3.4 Non-imaging investigations undertaken at the initial assessment**

	Number of patients	%
Arterial blood gas	156	24.6
Lactate	321	50.7
C-reactive protein	411	64.9
Full blood count	475	75.0
Urea and electrolytes	466	73.6
Other	92	14.5

Answers maybe multiple; n=633 Clinical questionnaire data

In the opinion of the case reviewers, 253/282 (89.7%) patients had a satisfactory initial assessment undertaken in terms of the investigations performed, but in 44/283 (15.5%) cases reviewed there was a delay in concluding that bowel obstruction was present.

Following the initial assessment, 116/618 (18.8%) patients had an escalation of care. In 76/116 (65.5%) patients this was determined by using an early warning score, in 40/116 (34.5%) no early warning score was noted. The location to which the patients' care was escalated is shown in Table 3.5.

**Table 3.5 Location to which patients' care was escalated during initial assessment**

	Number of patients	%
Surgical ward	39	35.8
Surgical assessment unit	37	33.9
Medical assessment unit	16	14.7
Level 3 care	7	6.4
Medical ward	7	6.4
Level 2 care	3	2.8
<b>Subtotal</b>	<b>109</b>	
Unknown	7	
<b>Total</b>	<b>116</b>	

Clinical questionnaire data

Care was escalated to a surgical ward in 76/109 (69.7%) patients, underscoring the need for surgical ward staff to be fully trained in identifying a deteriorating patient.

The fluid shifts associated with bowel obstruction coupled with impaired intake mean that hypovolaemia is a significant risk. In the view of the case reviewers, 69/264 (26.1%) patients were found to have acute kidney injury (AKI) after initial assessment (Table 3.6). Although the selection criteria for patients in this study enriched this group. A further 16 patients developed AKI following admission; in four of these patients the AKI was thought to have been avoidable if adequate resuscitation had taken place. In the view of the clinicians completing questionnaires, 180/666 (27.0%) patients had AKI on admission and were of the opinion that resuscitation was inadequate in 10/178 (5.6%) patients.

**Table 3.6 Acute Kidney Injury (AKI) present at the initial assessment**

	Number of patients	%
Yes	69	26.1
No	195	73.9
<b>Subtotal</b>	<b>264</b>	
Unknown	30	
<b>Total</b>	<b>294</b>	

*Case reviewer data*

As a result of the initial assessment only 83/645 (12.9%) patients were started on a pathway of care specifically for acute bowel obstruction. For 263/645 (40.8%) patients they were admitted to a hospital in which there was a pathway but it was not used, and in 299/645 (46.4%) patients they were admitted to a hospital in which there was no pathway.

### Key Findings

- 438/690 (63.5%) patients had a presenting symptom of pain. However, a pain score was performed in 252/438 (57.5%)
- 163/690 (23.6%) patients had their hydration status recorded and 157/690 (22.8%) patients had their weight recorded resulting in Body Mass Index (BMI) only recorded in 80/690 (11.6%) patients
- 253/282 (89.7%) patients and a satisfactory initial assessment undertaken in terms of the investigations performed in the view of the case reviewers
- 44/283 (15.5%) cases reviewed highlighted a delay in identifying acute bowel obstruction at the initial assessment
- 69/264 (26.1%) patients had acute kidney injury (AKI) on admission and 16 patients developed it following admission. In the view of the case reviewers this was avoidable in four patients and clinicians completing questionnaires thought that AKI resuscitation was inadequate in 10/178 (5.6%) patients
- 83/645 (12.9%) patients were cared for on a specific pathway for acute bowel obstruction
- 299/645 (46.4%) patients were admitted to a hospital in which there was no pathway for acute bowel obstruction







Only 37/639 (5.8%) patients were seen by an acute pain team before their surgery (although it is important that assessment by the acute pain team does not result in delay to urgent surgery) (Table 4.6). Even if it were presumed that patients with sigmoid volvulus were sent directly for colonoscopy as therapy for the underlying condition and the quickest way of relieving pain due to obstruction, these were the minority (30/438; 6.8%).

**Table 4.6 Patient was seen by the acute pain**

	Number of patients	%
Yes	37	5.8
No	602	94.2
<b>Subtotal</b>	<b>639</b>	
Unknown	51	
<b>Total</b>	<b>690</b>	

*Clinical questionnaire data*

**Table 4.7 Adequacy of the nutritional assessment**

	Nutritional assessment carried out		Adequate nutritional assessment	
	Number of patients	%	Number of patients	%
Yes	167	65.7	146	89.0
No	87	34.3	18	11.0
<b>Subtotal</b>	<b>254</b>		<b>164</b>	
Unknown	40		3	
<b>Total</b>	<b>294</b>		<b>167</b>	

*Case reviewer data*

Bowel obstruction is a major risk factor for malnutrition yet in 105 patients (87 + 18 = 105/254; 41.3%) nutritional status was either not assessed at all or the assessment was inadequate (Table 4.7) despite poor nutrition being a risk factor for delayed recovery.

The Malnutrition Universal Screening Tool (MUST) score is the expected assessment of nutritional status.<sup>13</sup> Table 4.8 shows that only 271/516 (52.5%) patients had evidence of this being done in the view of the clinicians completing questionnaires.

The indications for a nasogastric (NG) tube insertion in patients with bowel obstruction are to relieve vomiting or to allow some enteral feeding in patients who are recovering.

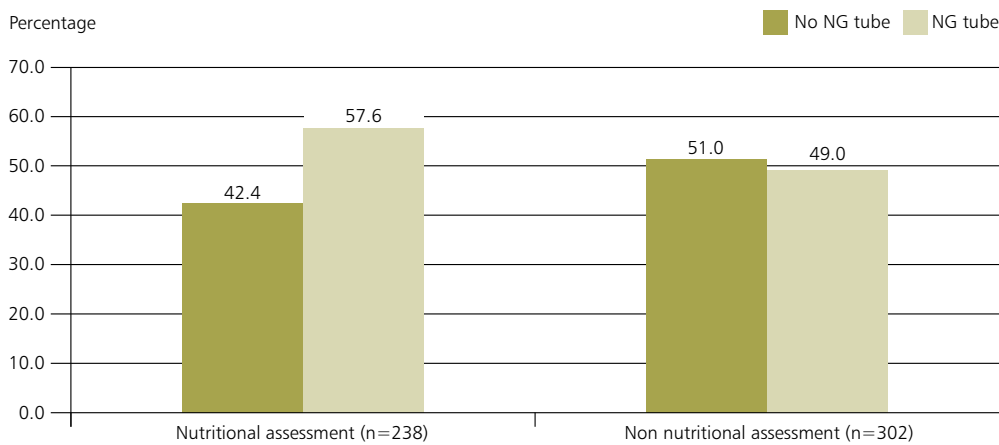
**Table 4.8 A MUST score was recorded**

	Number of patients	%
Yes	271	52.5
No	245	47.5
<b>Subtotal</b>	<b>516</b>	
Unknown	174	
<b>Total</b>	<b>690</b>	

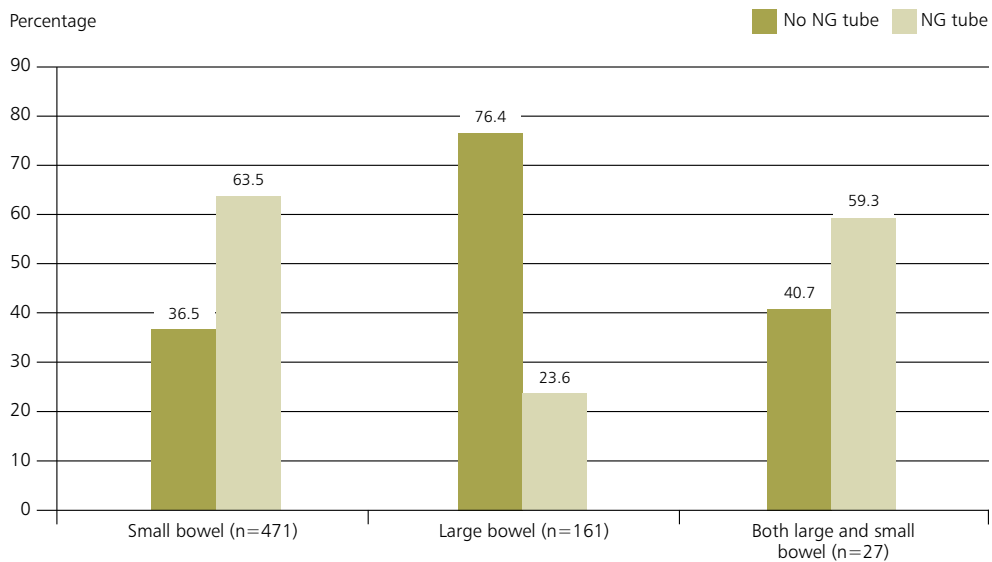
*Clinical questionnaire data*

Patients who had a nutritional review were more likely to have an NG tube inserted (137/238 (57.6%) vs 148/302 (49.0%), Figure 4.1).

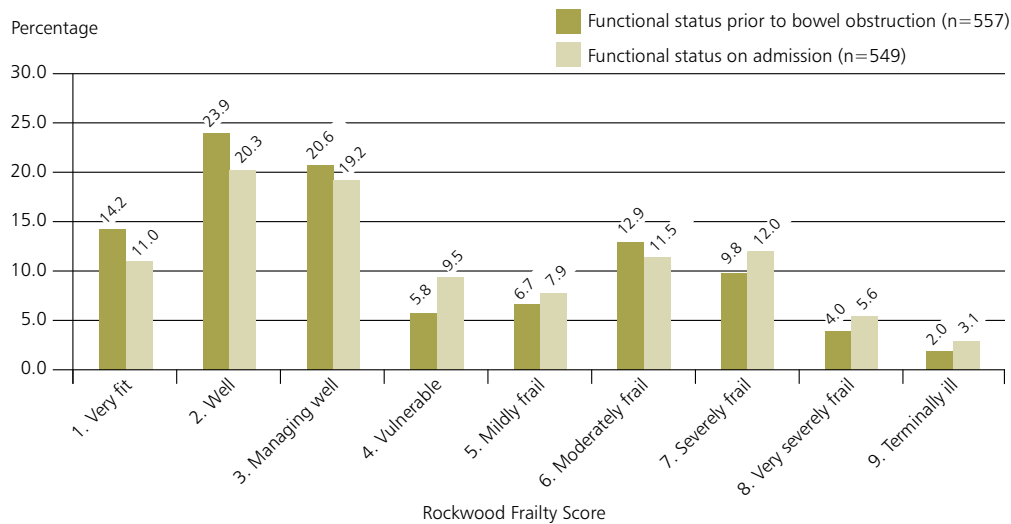
NG tubes were also inserted more frequently in patients with small bowel obstruction (299/471; 63.5% vs 38/161; 23.6%; Figure 4.2).



**Figure 4.1 Frequency of nasogastric (NG) tube insertion and nutritional assessment**  
Clinical questionnaire data



**Figure 4.2 Frequency of nasogastric (NG) tube insertion and location of the bowel obstruction**  
Clinical questionnaire data



**Figure 4.3 Functional status prior to bowel obstruction and on admission to hospital**

*Clinical questionnaire data*

As shown in Chapter 2, the study population was skewed to those patients who were over 60 years of age and comparison between the patient's condition on admission and their pre-morbid state showed an increase in frailty, testament to the debilitating effect of the illness (Figure 4.3). However, only 34/124 (27.4%) patients over 65 years of age had their frailty score assessed on admission to the ward. Assessing frailty allows therapy decisions to be tailored to the holistic needs of the patient as suggested in the ReSPECT guidelines.<sup>14,15</sup>

### Key Findings

11. Admission to an inappropriate ward was most commonly due to admission to a medical rather than surgical ward (22/24; 91.7%), which was also the reason for a delay to the patient being assessed by the surgical team in 31/52 (59.6%) patients
12. 41/258 (15.9%) patients experienced a delay in consultant review
13. 106/622 (17.0%) patients were not seen within 4 hours of admission
14. 34/124 (27.4%) patients over 65 years of age had their frailty score assessed on admission to the ward
15. 163/544 (30.0%) patients did not have their pain score assessed on admission to a ward of which 102/163 (62.6%) patients had presented with abdominal pain
16. When analgesia was given, it was considered by case reviewers to be timely in 164/187 (87.7%) patients and adequate in 166/184 (90.2%)
17. 37/639 (5.8%) patients were seen by the acute pain team prior to surgery
18. 105/254 (41.3%) patients either had no nutritional status assessment or the assessment was inadequate
19. 271/516 (52.5%) patients had a MUST score recorded on the ward

## Diagnosis of acute bowel obstruction

The initial diagnosis of acute bowel obstruction is important because any delay can result in serious complications including bowel perforation, ischaemia and sepsis. It is therefore essential that an accurate diagnosis is made at presentation to determine which patients need urgent surgery and those whose early management can be conservative.<sup>2,4</sup>

### Diagnostic imaging

Abdominal imaging including plain abdominal X-ray and CT scanning can contribute to accurate and timely diagnosis of acute bowel obstruction.<sup>2,4,5</sup> Abdominal X-rays are readily obtainable and have traditionally been used in the assessment of abdominal pathology but a CT scan with intravenous contrast is seen as the gold standard investigation in the assessment of acute abdominal pathology.<sup>2,4,5,16</sup>

Table 5.1 shows the radiological investigations patients had, as identified from the case note review and from the clinician questionnaire.

**Table 5.1 Imaging undertaken**

Imaging	Case reviews		Clinician questionnaire	
	Number of patients (n = 247)	%	Number of patients (n = 657)	%
Abdominal X-ray	150	60.7	434	66.1
CT scan with IV contrast	180	72.9	491	74.7
CT scan without contrast	11	4.5	40	6.1
Gastrografin follow-through	16	6.5	34	5.2
MRI	3	1.2	32	4.9
None	5	2.0	3	0.5
Other	150	60.7	13	1.2

*Answers maybe multiple*

**Table 5.2 Gastrografin was performed in this patient**

	Number of patients	%
Yes	79	17.8
No	364	82.2
<b>Subtotal</b>	<b>443</b>	
Not applicable	23	
Unknown	44	
<b>Total</b>	<b>510</b>	

*Clinical questionnaire data*

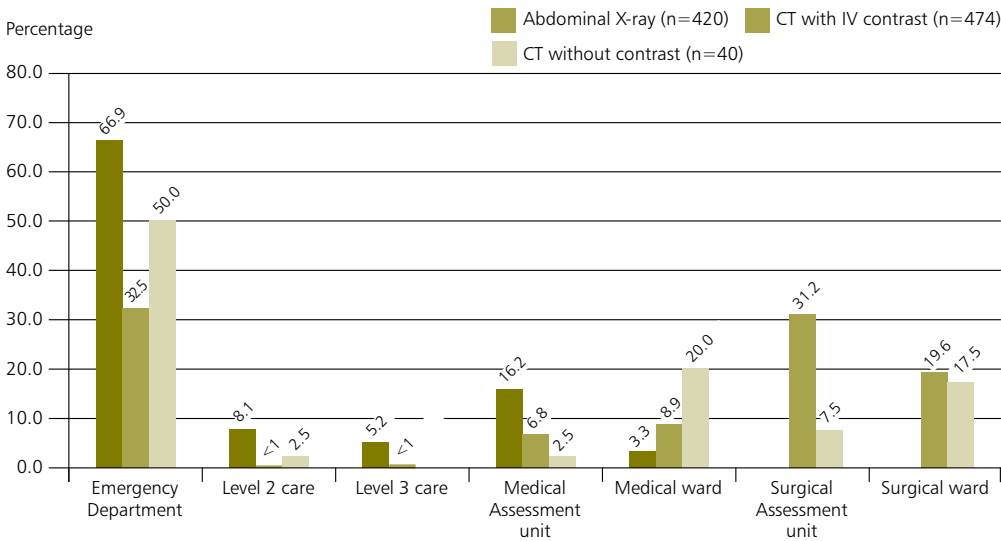
Patients with adhesional small bowel obstruction sometimes undergo a gastrografin follow-through, if they do not need immediate surgery, to help predict the likelihood of spontaneous resolution of the bowel obstruction and successful conservative management. In this study 79/443 (17.8%) patients with small bowel obstruction underwent a gastrografin X-ray (Table 5.2).

In both data sources there were a substantial number of patients who underwent both abdominal X-rays and CT scans (case reviews: 116/247 (47.0%); clinician questionnaire: 321/657 (48.9%).

**Location and reporting**

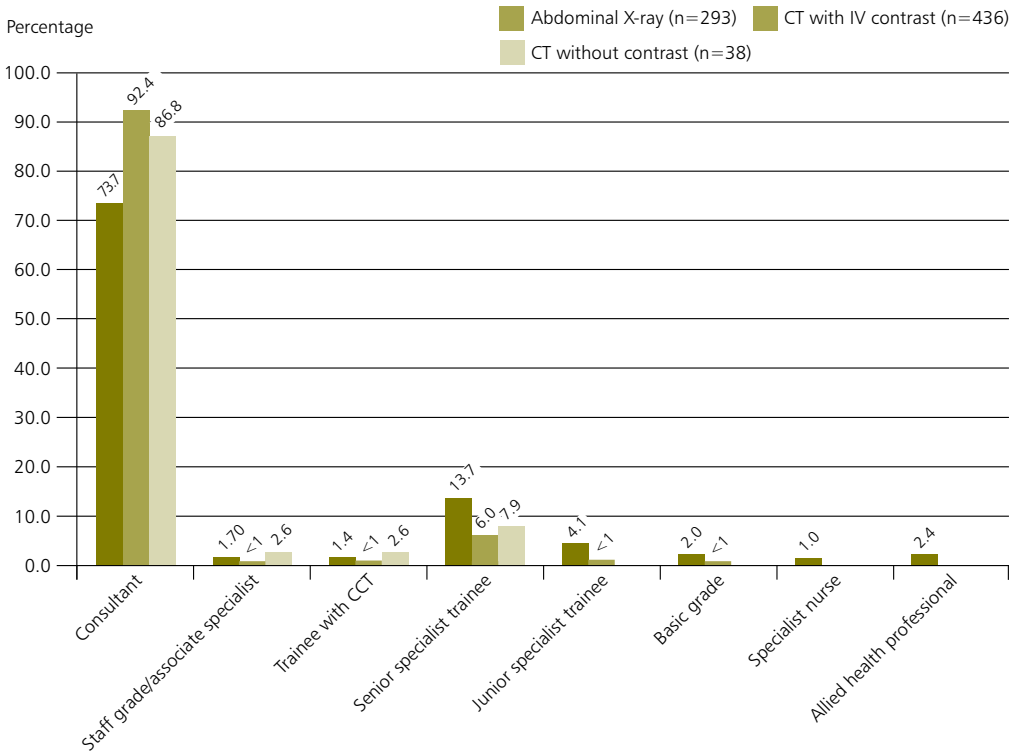
The investigations were most often performed in the emergency department and included abdominal X-ray (282/420; 67.1%), CT with IV contrast (154/474; 32.5%)

and CT non-contrast (20/40; 50.0%) (Figure 5.1). The radiology was most commonly reported by a consultant for abdominal X-ray (216/293; 73.7%), CT with IV contrast (403/436 92.4%) and CT non-contrast (33/38; 86.8%) (Figure 5.2).



**Figure 5.1 Location at which different radiological imaging modalities were performed**

*Clinical questionnaire data*



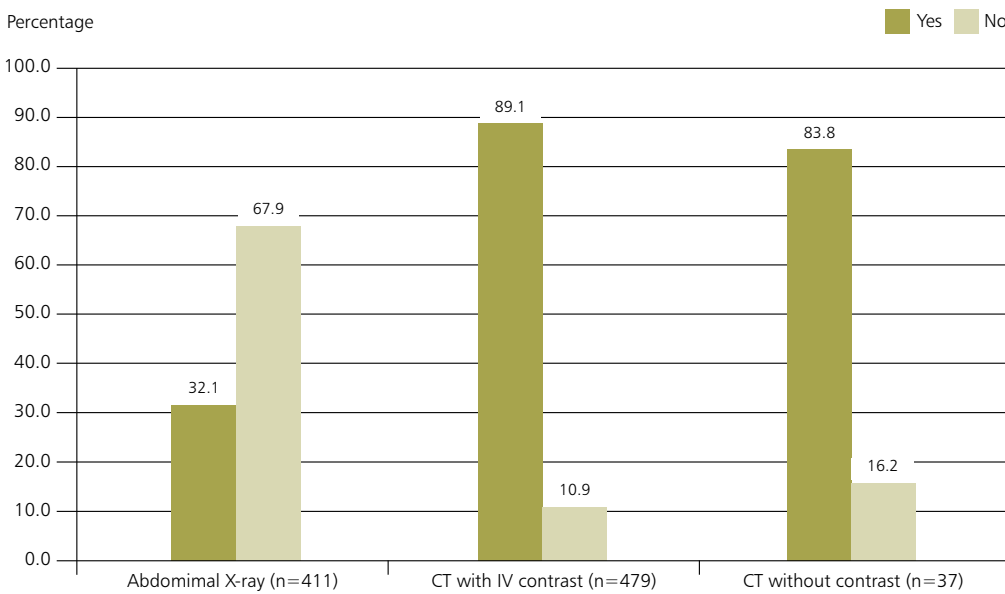
**Figure 5.2 Grade of clinician who reported the different imaging modalities**

*Clinical questionnaire data*

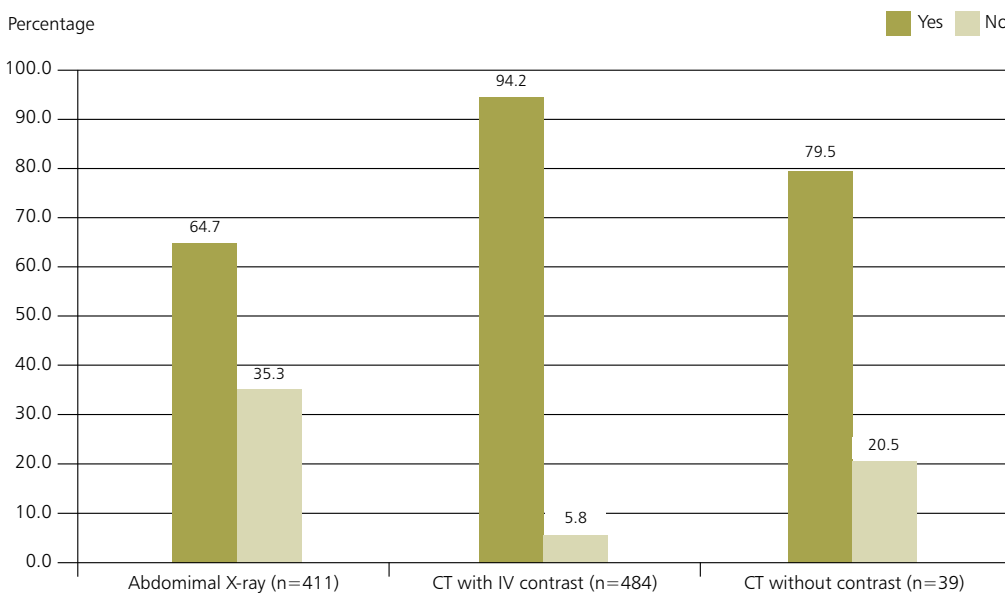
**Usefulness of the different imaging modalities**

In the view of the clinicians completing the questionnaires, abdominal X-rays were much less good at aiding diagnosis of the intra-abdominal pathology than CT scans with intravenous contrast (abdominal X-ray 132/411 (32.1%); CT with IV contrast 427/479 (89.1%) Figure 5.3)

CT scans also had a much greater effect on aiding decision-making as can be seen in Figure 5.4 (CT with IV contrast 456/484 (94.2%); CT without contrast 31/39 (79.5%); abdominal X-ray 266/411 (64.7%).



**Figure 5.3 Adequacy of the imaging to aid diagnosis of acute bowel obstruction**  
*Clinical questionnaire data*



**Figure 5.4 Influence of the radiological imaging on decision-making**  
*Clinical questionnaire data*

As abdominal X-rays do not provide an accurate aid to the diagnosis of acute bowel obstruction, or influence decision-making, serious consideration should be given instead to using CT scans with IV contrast as the primary imaging modality for all patients who are suspected of having acute bowel obstruction. There has long been debate about the use of IV contrast for imaging in patients with acute renal impairment because of the perceived potential nephrotoxic effect of the contrast. Conversely, the risk of missed or under-diagnosis of a surgical pathology such as acute bowel obstruction is likely to be of more risk to the patient as this can result in delay in the diagnosis and treatment of ischaemic or perforated bowel. Nearly all reviewers and Study Advisory Group members on this study were of the opinion that in patients with suspected acute bowel obstruction, CT with IV contrast should not be delayed/omitted because of poor renal function.

**CASE STUDY 3 - delay to imaging**

An elderly patient was admitted to hospital following a fall resulting in a fractured neck of femur. Three days after surgery the patient deteriorated and became constipated. The constipation was initially treated with laxatives but they did not resolve the issue. One day later a CT was requested for a suspected volvulus. The CT was not undertaken until the following afternoon. The patient was diagnosed with a tumour in the large bowel, although this was initially reported as ‘pseudo-obstruction’.

*The case reviewers were of the opinion that the delay in CT of more than 24 hours led to delay in diagnosis and surgery. They also noted that there was no formalised frailty scoring undertaken or pain assessment.*

**CASE STUDY 4 - prompt CT**

A middle-aged patient arrived in the emergency department with symptoms of large bowel obstruction. CT was undertaken whilst in the emergency department allowing early identification of an obstruction. The patient underwent surgery that day and an appropriate postoperative admission to critical care. Although the patient developed a postoperative infection, this was treated appropriately and the patient was discharged home.

*In the view of the case reviewers the rapid access to CT, and timely and accurate report ensured prompt surgery at which resolution of the obstruction resulted in successful re-perfusion of the bowel.*

**Clinical diagnosis**

In 291/649 (44.8%) patients a consultant made the diagnosis of bowel obstruction and in 56/649 (8.6%), it was a staff grade/ associate specialist (Table 5.3). Trainees made the diagnosis in 299/649 (46.1%) of cases with 198/649 (30.5%) senior trainees (including those with CCT) and 64/649 (9.9%) junior specialist trainees. Specialist nurses or basic grades doctors made the diagnosis in 40/649 (6.2%).

**Table 5.3 Grade of clinician who made the diagnosis of acute bowel obstruction**

	Number of patients	%
Consultant	291	44.8
Senior specialist trainee (ST3+ or equivalent)	182	28.0
Junior specialist trainee (ST1 and ST2 or CT equivalent)	64	9.9
Staff grade/associate specialist	56	8.6
Basic grade (HO/FY1 or SHO/FY2 or equivalent)	37	5.7
Trainee with CCT	16	2.5
Specialist nurse (nurse consultant, nurse practitioner etc.)	3	<1
<b>Subtotal</b>	<b>649</b>	
Unknown	41	
<b>Total</b>	<b>690</b>	

*Clinical questionnaire data*

**Delays in diagnosis**

Case reviewers were of the opinion that there was a delay in diagnosis in 51/285 (17.9%) patients (Table 5.4). They stated that this was avoidable in 15 patients and that the outcome was affected in 12/51 (23.5%) patients in whom there was a delay.

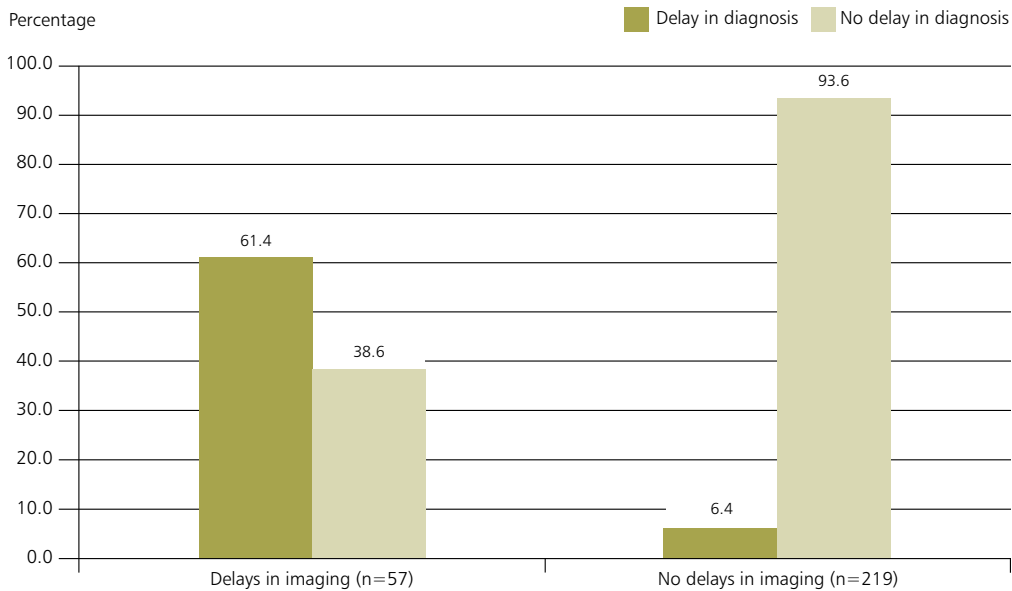
**Table 5.4 Delay in diagnosis**

	Number of patients	%
Yes	51	17.9
No	234	82.1
<b>Subtotal</b>	<b>285</b>	
Unknown	9	
<b>Total</b>	<b>294</b>	

Case reviewer data

**Delays in imaging**

Delays were identifiable at all stages of the pathway and delays in imaging were common. Figure 5.5 shows that when patients experienced a delay in imaging, 35/57 (61.4%) patients also experienced a delay in diagnosis. Conversely, only 14/219 (6.4%) patients had a delay in diagnosis if there was no delay in imaging. This suggests that early imaging with CT scanning is an important factor in establishing an accurate diagnosis and should be included in pathways for the management of bowel obstruction.

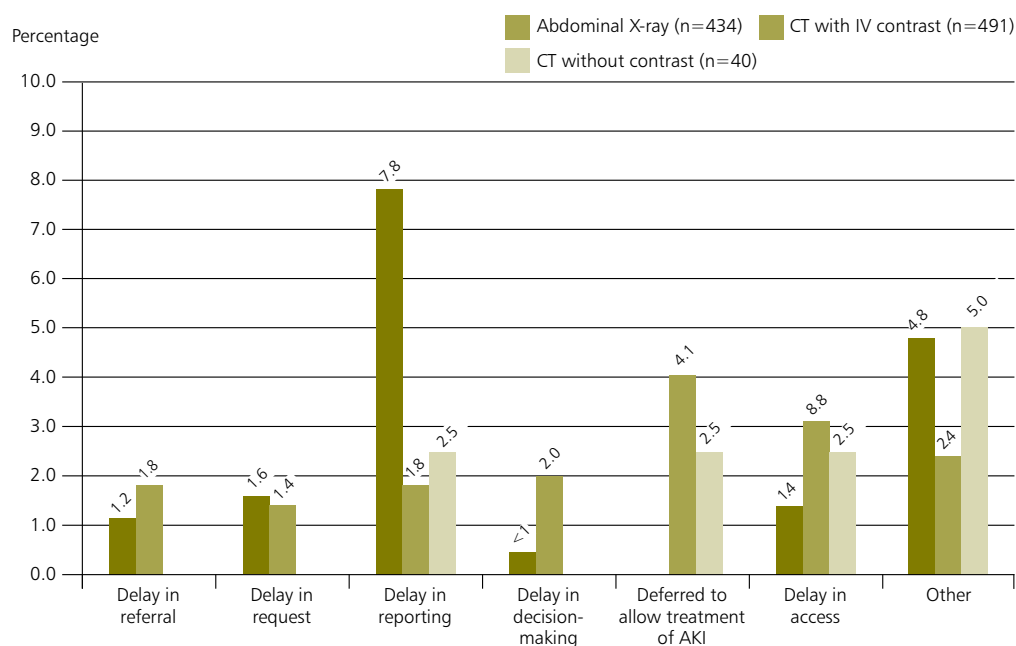


**Figure 5.5 Delay in imaging and diagnosis**

Case reviewer data



Delays in the pathway for different modalities of radiological imaging with regard to the timeliness of the imaging and the reports are shown in Figure 5.6.



**Figure 5.6 Delays in the pathway for different modalities of radiological imaging**

*Answers may be multiple  
Clinical questionnaire data*

It appeared that although it was easy to request an abdominal X-ray the reports were more likely to be delayed (34/434; 7.8%) than those of a CT scan with IV contrast (9/491; 1.8%). However, there was a much higher incidence of delay in CT scans due to problems with access (CT with IV contrast: 43/491; 8.8% vs abdominal X-ray: 6/421; 1.4%) (See Chapter 8).

The time to performing radiological investigations was longer if patients were not on an acute bowel obstruction pathway (Table 5.5) which underscores the need for pathways to be developed and be easily accessible in the emergency department.

**Table 5.5 Delays to imaging and presence of pathway for acute bowel obstruction**

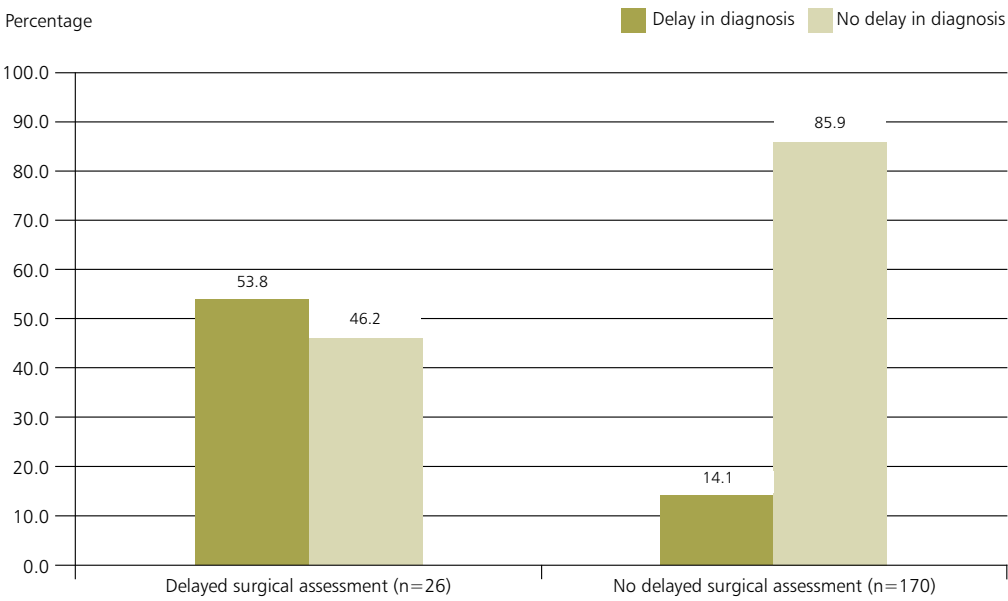
Acute Bowel Obstruction Pathway	Abdominal X-Ray					CT scan				
	Delay	%	Subtotal	Unknown	Total	Delay	%	Subtotal	Unknown	Total
Yes	3	6.3	48	3	51	3	4.6	65	2	67
No	49	14.8	331	26	357	64	16.7	383	11	394
<b>Subtotal</b>	<b>52</b>		<b>379</b>	<b>29</b>	<b>408</b>	<b>67</b>		<b>448</b>	<b>13</b>	<b>461</b>
Unknown	3		22	4	26	3		24	6	30
<b>Total</b>	<b>55</b>		<b>401</b>	<b>33</b>	<b>434</b>	<b>70</b>		<b>472</b>	<b>19</b>	<b>491</b>

*Clinical questionnaire data*

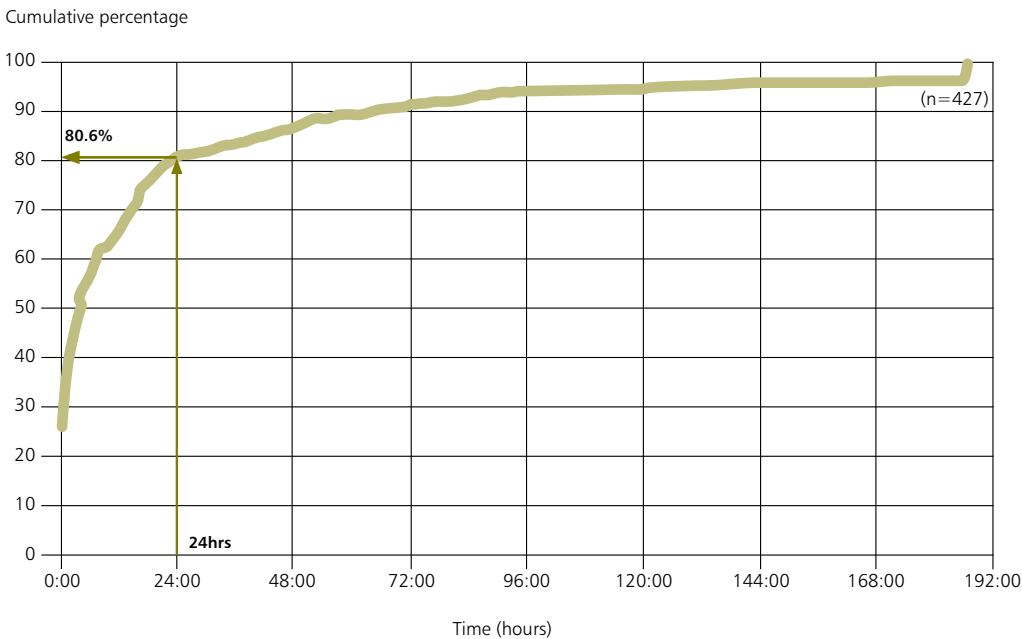


It was also found by the case reviewers that there was a delay in diagnosis in 14/26 (53.8%) patients who experienced a delay in surgical assessment compared with only 24/170 (14.1%) when surgical assessment was not delayed (Figure 5.8).

A diagnosis was made within 24 hours of admission for 344/427 (80.6%) patients, of which 284/344 (82.6%) patients had a diagnosis within 12 hours. The remaining 83/427 (19.4%) patients were diagnosed more than 24 hours after admission with a range of 24-144 hours. (Figure 5.9).



**Figure 5.8 Delay in surgical assessment and delay in diagnosis**  
Case reviewer data



**Figure 5.9 Time from admission to diagnosis of acute bowel obstruction**  
Clinical questionnaire data



## Decision-making and treatment planning

The study proposers and Study Advisory Group suggested that due to the complexity of care of patients with acute bowel obstruction, multiple handovers of care may lead to delays in treatment. Table 6.1 shows the number of consultants who reviewed each patient prior to treatment. There were 123/617 (19.9%) patients who were not reviewed by a consultant surgeon before treatment. Furthermore, case reviewers found that delays in treatment due to multiple handovers occurred in only 6/199 (3.0%) patients.

Case reviewers were of the opinion that there was a further delay relating to decision-making in 42/281 (14.9%) patients once a diagnosis had been made (Table 6.2) and this adversely affected the outcome in 15 of these patients.

In 14/41 (34.1%) patients for whom a delayed decision occurred, they were admitted under the incorrect specialty compared to 10/237 (4.2%) for whom a delayed decision did not occur (Figure 6.1). Most patients considered to be admitted under the incorrect specialty were under a medical team (23/25; 92.0%).

There was also an inappropriate delay in treatment in 39/281 (13.9%) patients in the view of the case reviewers (Table 6.3). This was seen more frequently in patients who had a delayed diagnosis (23/50; 46.0% v 16/229; 7.0%) and delay in decision-making (22/41; 53.7% v 15/236; 6.4%) than those who did not.

**Table 6.1 Number of consultant surgeons who reviewed each patient prior to treatment**

	Number of patients	%
0	123	19.9
1	357	57.9
2	118	19.1
3	16	2.6
4	1	0.2
5	2	0.3
<b>Subtotal</b>	<b>617</b>	
Unknown	73	
<b>Total</b>	<b>690</b>	

**Table 6.2 Delays in decision-making**

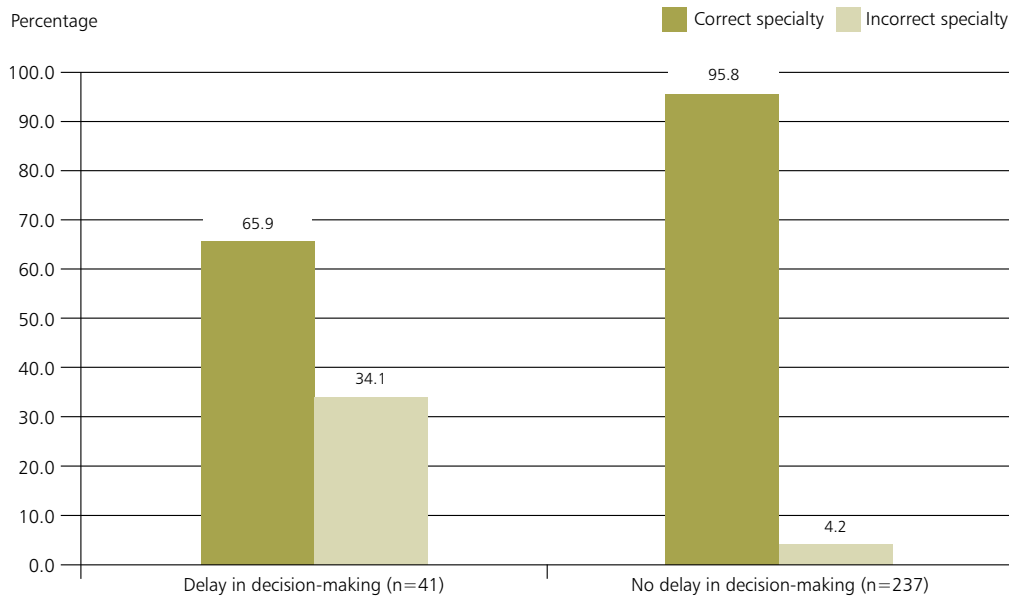
	Number of patients	%
Yes	42	14.9
No	239	85.1
<b>Subtotal</b>	<b>281</b>	
Unknown	13	
<b>Total</b>	<b>294</b>	

*Case reviewer data*

**Table 6.3 Inappropriate delay in treatment**

	Number of patients	%
Yes	39	13.9
No	242	86.1
<b>Subtotal</b>	<b>281</b>	
Unknown	13	
<b>Total</b>	<b>294</b>	

*Case reviewer data*



**Figure 6.1 Delay in decision-making by admission to correct specialty**

*Case reviewer data*

**Risk assessment and multidisciplinary team input**

All patients requiring emergency surgery should have an assessment of their risk documented in their case notes and/or on the consent form. Mortality risk scoring is an important aspect of patient assessment prior to any surgical procedure. Risk scoring can be used to inform decision-making regarding treatment options as well as escalation of care to critical care or the wider multidisciplinary team, during the perioperative period.<sup>9,17,18</sup> This is especially important in patients potentially undergoing emergency laparotomy for bowel obstruction as the mortality risk is, on average, 10% nationally for these operations.<sup>9,19-21</sup>

In 98/219 (44.7%) patients, case reviewers stated that mortality and morbidity risk assessment was not adequate (Table 6.4) and 11/98 (11.2%) patients with an inadequate risk assessment died prior to discharge. Furthermore 68/98 (69.4%) patients were reported to have had an inadequate risk assessment before undergoing surgery.

A risk assessment tool was used in 315/582 (54.1%) patients and these are shown in Table 6.5 and case reviewers reported that this influenced the clinical management plan in 146/315 (46.3%) patients.

**Table 6.4 Adequate mortality and morbidity risk assessment**

	Number of patients	%
Yes	121	55.3
No	98	44.7
<b>Subtotal</b>	<b>219</b>	
Unknown	75	
<b>Total</b>	<b>294</b>	

*Case reviewer data*

**Table 6.5 The mortality and morbidity risk assessment tool used**

	Number of patients	%
P-POSSUM	209	67.6
Clinical judgement	117	37.9
National emergency laparotomy audit (NELA)	90	29.1
American Society of Anesthesiologists (ASA)	88	28.5
Surgical outcome risk tool (SORT)	6	1.9
American College of Surgeons (ACS)	3	1.0

*Answers may be multiple; n=309 Clinical questionnaire data*

In more complex, frail or higher-risk patients a multidisciplinary approach to care, including input from care of the elderly, anaesthetic and critical care clinicians would be expected.<sup>9,19</sup> Care of the elderly input was sought in 61/498 (12.2%) patients in the view of the clinicians completing questionnaires (Table 6.6). Of the patients who had no care of the elderly input, 343/437 (78.5%) were over the age of 65 and 58/61 (95.1%) patients with care of the elderly input were over 65.

**Table 6.6 Input from care of the elderly was sought in the care planning for this patient**

	Number of patients	%
Yes	61	12.2
No	437	87.8
<b>Subtotal</b>	<b>498</b>	
Not applicable	156	
Unknown	36	
<b>Total</b>	<b>690</b>	

Clinical questionnaire data

**Clinical questionnaire data**

An anaesthetic opinion was obtained for 238/638 (37.3%) patients. Of those patients who had an anaesthetic opinion 204/361 (56.5%) had surgery. Furthermore, a critical care opinion was sought for 48/261 (18.4%) patients and not for 213/261 (81.6%) patients.

Case reviewers were of the opinion that in 21/204 (10.3%) patients a critical care opinion should have been obtained but was not; 4/21 (19.0%) of these patients died. A further 18/21 (85.7%) patients who should have had a critical care review but did not, had an operation.

**CASE STUDY 5 - poor risk assessment**

An elderly patient was admitted via the emergency department with vomiting and acute kidney injury, suspected to have gastroenteritis. The patient was treated with fluid resuscitation but gradually developed abdominal distension and persistent faeculent vomiting. The junior medical team arranged a CT scan, after discussion with the surgical registrar, which was delayed to correct the patient’s renal function. The CT showed large bowel obstruction due to a sigmoid cancer with liver metastases. Further discussion between junior medical and surgical teams occurred and four days after admission the patient was reviewed by a consultant surgeon who stated that the patient was too frail to undergo surgery and end-of-life care was commenced.

*Case reviewers were of the opinion that the patient would have been better cared for if earlier surgical assessment had occurred and frailty / risk assessment had been performed to guide the management plan. In this case, the CT should not have been delayed to correct renal function in the opinion of case reviewers, and they also noted that a combined multidisciplinary approach may have been more appropriate than the traditional anatomical diagnosis model.*

**CASE STUDY 6 - good risk assessment**

A middle-aged patient was admitted with small bowel obstruction. The patient was risk scored almost at admission while initially being treated conservatively. The patient was scored as high-risk and surgery was discussed between the patient, their family, and the surgeon prior to making a decision. The discussion was clearly documented in the case notes. The patient underwent a laparotomy with a pre-arranged stay in critical care postoperatively.

*The case reviewers remarked that the care had been exemplary and the early risk assessment along with the use of laparotomy care bundles had led to prompt and efficient care for this patient*

Where a critical care opinion was obtained, the most common reasons for doing this were pre-operative management/optimisation and decision not to escalate/palliate (Table 6.7). It was stated that critical care input influenced management in 36/61 (59.0%) patients. Of those patients who had surgery 99/390 (25.4%) required critical care post operatively. Of those who did not have an operation 7/293 (2.4%) required higher level care.

**Table 6.7 How critical care influenced the treatment plan**

	Number of patients	%
Ceilings of Treatment	36	52.9
Optimisation	17	25.0
Palliation	12	17.6
Not fit for surgery	12	17.6
Not appropriate critical care	8	11.8
Critical care pre-operatively	6	8.8
Changed priority	3	4.4

Answers may be multiple; n=68 Case reviewer data

### Treatment planning

There was a treatment plan for nearly all patients (650/665; 97.7%) (Table 6.8) which included the correction of organ failure in 220/640 (34.4%), initial management strategy in 537/640 (83.9%), intervention timing in 172/640 (26.9%) and a nutrition plan in 121/640 (18.9%).

**Table 6.8 Patient had a treatment plan**

	Number of patients	%
Yes	650	97.7
No	15	2.3
<b>Subtotal</b>	<b>665</b>	
Unknown	25	
<b>Total</b>	<b>690</b>	

Clinical questionnaire data

Clinicians who completed questionnaires within the hospitals were of the opinion that there was room for improvement in decision-making in only 36/558 (6.5%) patients at this stage in the pathway. However, the reviewers found that there was inadequate decision-making in 27/217 (12.4%) cases reviewed.

Clinicians reported that in 579/603 (96.0%) patients the treatment plan was discussed with the patient and in 394/497 (79.3%) it was discussed with the patient's family. However, if the patient had a Rockwood frailty score of 5 or greater, the treatment plan was discussed with 169/186 (90.9%) patients and with their family in 168/190 (88.4%). In seven instances it was discussed with neither (three patients had a Rockwood score of 5 or more). If patients had a Rockwood frailty score of 4 or less the treatment plan was discussed with 310/320 (96.9%) patients and their family in 165/232 (71.1%). Frailty appeared to influence discussions with both the patient and family.

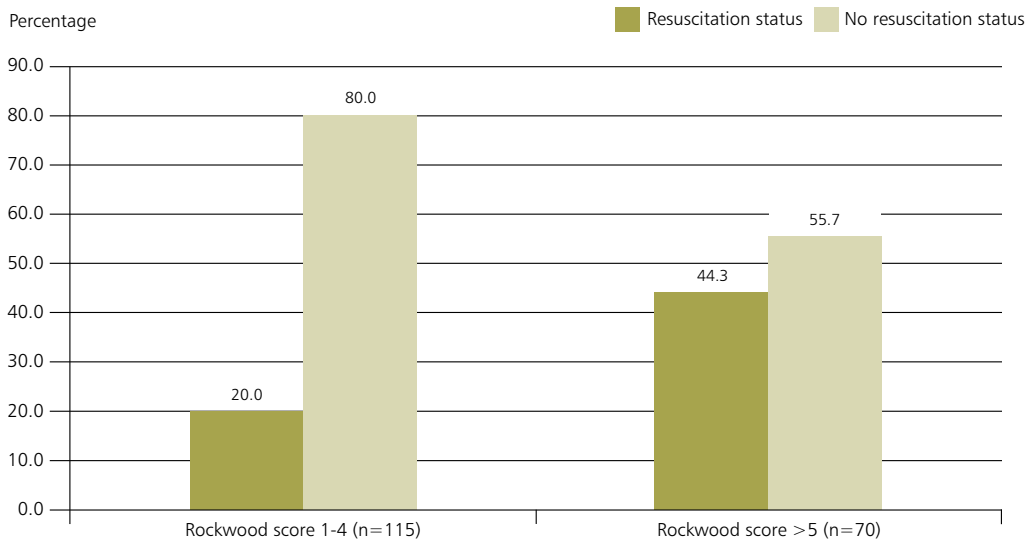
The demographic chapter has shown that patients with bowel obstruction in the study were an older population many of whom were frail. In addition, the overall mortality rate of patients in the study was 129/690 (18.7%), which is higher because of study selection design. It would therefore have been expected that resuscitation status had been discussed and documented for many, if not all, of these patients rather than the 101/279 (36.2%) in which it was (Table 6.9). Where resuscitation status was documented 50/101 (49.5%) patients were recorded as 'not for cardiopulmonary resuscitation' and 51/101 (50.5%) were.

**Table 6.9 Patient's resuscitation status was documented**

	Number of patients	%
Yes	101	36.2
No	178	63.8
<b>Subtotal</b>	<b>279</b>	
Unknown	15	
<b>Total</b>	<b>294</b>	

Case reviewer data





**Figure 6.2 Documentation of resuscitation status and Rockwood score on admissions**

*Case reviewer data*

Figure 6.2 shows that resuscitation status was more likely to be discussed in patients with a frailty score of 5 or more 31/70 (44.3%) than those with a Rockwood score of 1-4

(23/115; 20.0%). However 39/70 (55.7%) patients with a Rockwood score of 5 or more were not discussed.

**Key Findings**

- 35. 42/281 (14.9%) patients experienced a further delay relating to decision-making once a diagnosis had been made and this adversely affected the outcome in 15 of these patient
- 36. 14/41 (34.1%) patients for whom a delayed decision occurred, were admitted under the incorrect specialty compared to 10/237 (4.2%) for whom a delayed decision did not occur
- 37. 98/219 (44.7%) patients did not have an adequate mortality and morbidity risk assessment in the view of the case reviewers
- 38. Care of the elderly input was sought in 61/498 (12.2%) patients in the view of the clinicians completing questionnaires. Of the patients who had no care of the elderly input, 343/437 (78.5%) were over the age of 65
- 39. An anaesthetic opinion was obtained for 238/638 (37.3%) patients
- 40. 21/204 (10.3%) patients who did not have a critical care opinion should have; 4/21 (19.0%) of these patients died and 18/21 (85.7%) patients had an operation
- 41. Where a critical care opinion was obtained, the most common reasons for doing this were pre-operative management/optimisation and decision not to escalate/palliate
- 42. Critical care input influenced care in 36/61 (59.0%) patients. Of those patients who had surgery 99/390 (25.4%) required critical care post operatively
- 43. 579/603 (96.0%) patients had their treatment plan discussed with them and in 394/497 (79.3%) it was discussed with the their family
- 44. If the patient had a Rockwood frailty score of 5 or more, their treatment plan was discussed with them 169/186 (90.9%) cases reviewed and with their family in 168/190 (88.4%)
- 45. 101/279 (36.2%) patients had their resuscitation status documented

## Ongoing inpatient treatment

The care of small and large bowel obstruction differs due to the underlying pathology. Large bowel obstruction is more commonly due to malignancy whilst small bowel obstruction is often due to adhesions from previous surgery. In this study 225/293 (76.8%) of the case notes peer reviewed were for patients with small bowel obstruction and 74/293 (25.3%) for large bowel obstruction. Similarly, of the clinician questionnaires returned 510/668 (76.3%) were for patients with small bowel obstruction and 192/668 (28.7%) for large bowel obstruction. The most common causes of large bowel obstruction were cancer (69 patients) and volvulus (63 patients). Benign strictures and other causes made up the remainder.

### Stenting

In the view of the case reviewers, stenting of large bowel obstruction due to cancer was considered in 18 patients and was not considered but should have been in a further four. In eight patients a colonic stent was inserted with one perforation recorded. Stenting was not considered in 47 patients, which was appropriate in the opinion of the case reviewers.

### Surgery

#### **Pre-operative assessment and multidisciplinary team review**

Pre-operative assessment for surgery is an increasingly important aspect of preparation for emergency laparotomy and was covered in Chapter 6, some aspects are covered here with a specific emphasis on surgical intervention. For many complex, elderly, frail patients undergoing surgery for bowel obstruction the issue of mental capacity to consent can arise. In this study 10/176 (5.7%) patients did not have adequate mental capacity to consent in the view of the case reviewers (Table 7.1).

**Table 7.1 The patient had adequate mental capacity to consent to treatment**

	Number of patients	%
Yes	166	94.3
No	10	5.7
<b>Subtotal</b>	<b>176</b>	
Unknown	5	
<b>Total</b>	<b>181</b>	

*Case reviewer data*

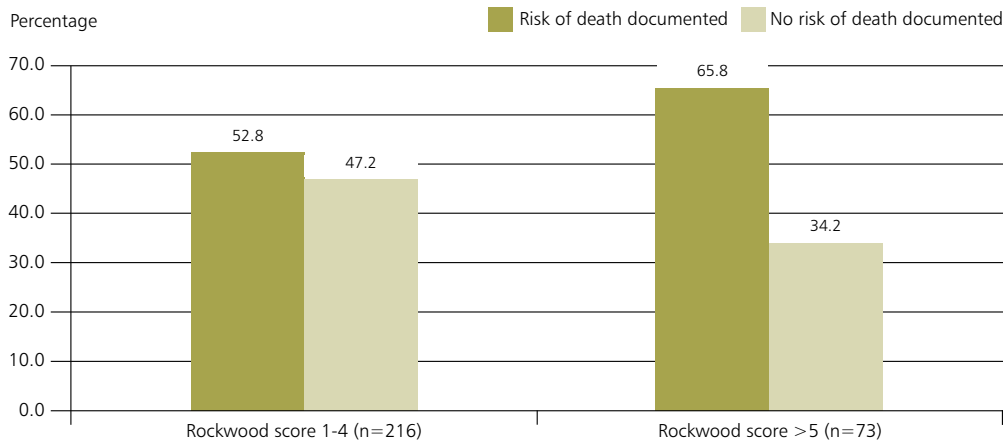
Multidisciplinary input including review by the critical care outreach team may improve the outcome of patients and ensure a combined assessment for surgery. In this study a critical care outreach nurse reviewed 11/159 (6.9%) patients prior to surgery. Case reviewers noted that all patients who had inadequate resuscitation pre-operatively had not been seen by the critical care outreach team (Table 7.2)

**Table 7.2 Patients were reviewed by a critical care outreach nurse pre-operatively**

	Number of patients	%
Yes	11	6.9
No	148	93.1
<b>Subtotal</b>	<b>159</b>	
Unknown	22	
<b>Total</b>	<b>181</b>	

*Case reviewer data*





**Figure 7.1 Documentation of risk of death on the consent form and Rockwood score**

*Clinical questionnaire data*

Risk of death was more likely to be documented on the consent form in patients who had a Rockwood frailty score of 5 or more (48/73; 65.8%) (Figure 7.1). For patients with a Rockwood score of 4 or less 114/216 (52.8%) patients had risk of death documented.

**CASE STUDY 8 - good discussion of treatment**

A very elderly patient was admitted from a nursing home with an incomplete small bowel obstruction. The patient was noted to have an acute kidney injury on admission and a decision was made with the patient, their family, the surgeon, a nephrologist and healthcare for the elderly input to undertake a mini rather than full laparotomy for a hernia repair. The patient made an uneventful recovery and was discharged back to the nursing home.

*Case reviewers were of the opinion that the multidisciplinary input along with consideration of the best treatment options for this patient provided a level of good holistic care.*

**Operation**

Most surgeons making the decision to operate were either general or colorectal surgeons (355/381; 93.2%). All decisions to operate were made by surgeons of ST3 or above experience with 335/381 (87.9%) being consultants, 16/381 (4.2%) SAS doctors and 30/381 (7.9%) senior specialist trainees.

The grade of the surgeon performing the operation was a consultant for 264/384 (68.8%) patients and senior trainee or SAS doctor in a further 106/384 (27.6%) (Table 7.5).

**Table 7.5 Grade of operating clinician**

	Number of patients	%
Consultant	264	68.8
Senior specialist trainee (ST3+ or equivalent)	71	18.5
Staff grade/associate specialist	35	9.1
Trainee with CCT	12	3.1
Junior specialist trainee (ST1 and ST2 or CT equivalent)	2	<1
<b>Subtotal</b>	<b>384</b>	
Unknown	6	
<b>Total</b>	<b>390</b>	

*Clinical questionnaire data*





## Postoperative care and escalation

Emergency laparotomy is one of the most high-risk procedures performed and has a postoperative mortality on average of 10%, although prior to the National Emergency Laparotomy Audit (NELA) this was 15%.<sup>6,9</sup> It would therefore be expected that to ensure the best outcome, patients undergoing an emergency laparotomy would be treated postoperatively in critical care and certainly all patients with a mortality risk >5%.

For patients who underwent surgery, 201/383 (52.5%) went to critical care postoperatively as reported by clinicians completing questionnaires, 20/383 (5.2%) patients went to enhanced recovery and 160/383 (41.8%) returned to a surgical ward (Table 8.1).

There were 99/383 (25.8%) patients who went to Level 2 care and 102/383 (26.6%) patients who went to Level 3 care in the postoperative period. Only seven non-surgical patients were admitted to critical care during their

**Table 8.1 The location to which the patient was admitted postoperatively**

	Number of patients	%
Surgical ward	160	41.8
Level 3 care	102	26.6
Level 2 care	99	25.8
Postoperative enhanced recovery area	20	5.2
Medical ward	2	<1
<b>Subtotal</b>	<b>383</b>	
Unknown	7	
<b>Total</b>	<b>390</b>	

*Clinical questionnaire data*

admission. Clinicians were of the opinion that there were nine patients (all surgical) who were not admitted to critical care who should have been. The outcome of the critical care admission is shown in Table 8.2.

**Table 8.2 The patient outcome of the admission and whether the patient went to critical care**

Patient went to critical care	Outcome of admission				
	Died	Discharged alive	Subtotal	Unknown	Total
Yes	10	83	93	1	94
No	17	171	188	4	192
<b>Subtotal</b>	<b>27</b>	<b>254</b>	<b>281</b>	<b>5</b>	<b>286</b>
Unknown	0	1	1	7	8
<b>Total</b>	<b>27</b>	<b>255</b>	<b>282</b>	<b>12</b>	<b>294</b>

*Case reviewer data*

**Table 8.3 There was a delay in escalation**

	Number of patients	%
Yes	13	5.6
No	220	94.4
<b>Subtotal</b>	<b>233</b>	
Unknown	10	
NA - no escalation necessary	51	
<b>Total</b>	<b>294</b>	

*Case reviewer data*

Case reviewers identified 13/233 (5.6%) patients had a delay in escalation to critical care and they also stated that the delay affected the outcome for five patients (Table 8.3).

**CASE STUDY 9 - under use of postoperative critical care**

A middle-aged patient was admitted with vomiting, abdominal pain and distension. A history of multiple previous laparotomies for gynaecological problems with complications was noted. She had a past history of Type 1 diabetes, high blood pressure, obesity, angina and chronic obstructive pulmonary disease. A CT showed closed-loop small bowel obstruction with ischaemia and the patient was transferred to theatre in a timely manner for division of adhesions and small bowel resection. Postoperatively the patient was transferred to a surgical ward. On day three postoperatively she developed respiratory problems and was transferred to critical care where she developed sepsis, deteriorated and died.

*Case reviewers were of the opinion that inadequate risk assessment led to the inappropriate placement of the patient on the ward postoperatively as there was a failure to recognise that the patient was high-risk. They stated that postoperative critical care may have avoided complications and a poor outcome.*

**CASE STUDY 10 - good use of postoperative critical care**

An elderly patient with a history of bowel cancer and multiple previous operations was admitted with abdominal pain. The patient was frail with a Rockwood score of 6. The patient was seen promptly by a consultant surgeon and a CT undertaken. A tumour was identified and the patient underwent a laparotomy. Due to the patient's frailty and previous medical history, a postoperative critical care admission was agreed pre-operatively.

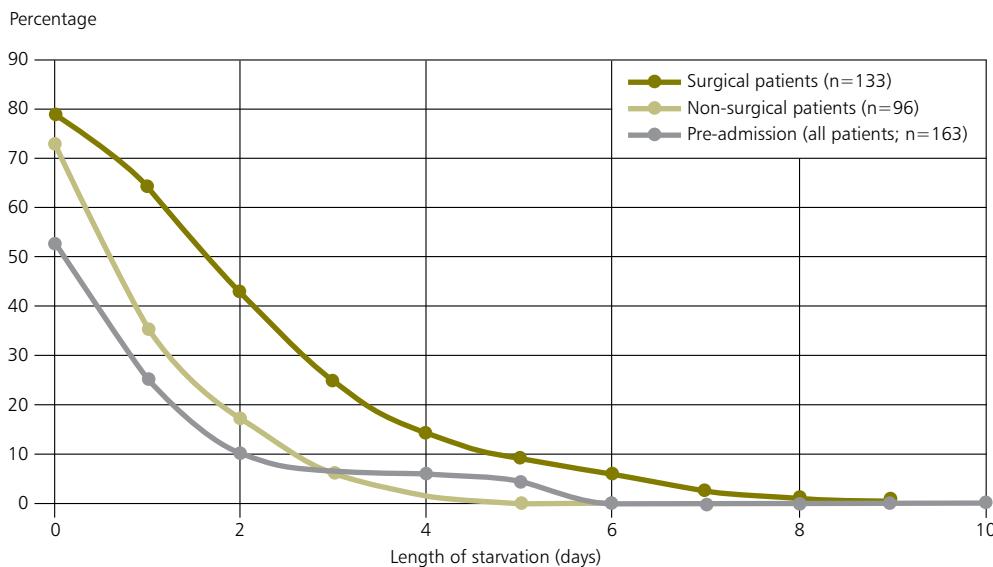
*Case reviewers were of the opinion that the planned critical care stay was an example of good, well thought through care that led to an uneventful hospital stay for the patient.*

establishment of adequate nutritional support. Prolonged starvation therefore increases the risk of malnutrition and can impact on the outcome and associated length of stay following surgery, especially for high-risk patients. It is therefore essential that patients at risk of nutritional problems are identified and supplemental feeding such as parenteral nutrition (PN) is considered.

**Nutrition**

Patients admitted with bowel obstruction are often starved for a prolonged period of time, either because of pre-existing symptoms of gut dysfunction, as well as peri-operative assessment and investigation preventing the

Figure 8.1 shows the cumulative starvation times for all patients prior to admission to hospital where data were available, and during the hospital admission for patients cared for conservatively/medically and for patients undergoing surgery (including both pre- and postoperative starvation).



**Figure 8.1 The number of days of starvation**  
*Clinical questionnaire data*







## Co-ordination of care

The impact of delays at various stages of the pathway has been described in preceding chapters. Delays in diagnosis and treatment can have potentially life-threatening consequences. The cumulative effect of the delays may be as a result of a single delay or multiple pathway delays. This chapter aims to review the issues of delay in more detail.

Clinicians completing the questionnaires reported delays in care that were outside their control in 71/647 (11.0%) patients that they cared for. The reasons for the delays are shown in Table 9.1.

**Table 9.1 The reasons for delays in the pathway of care**

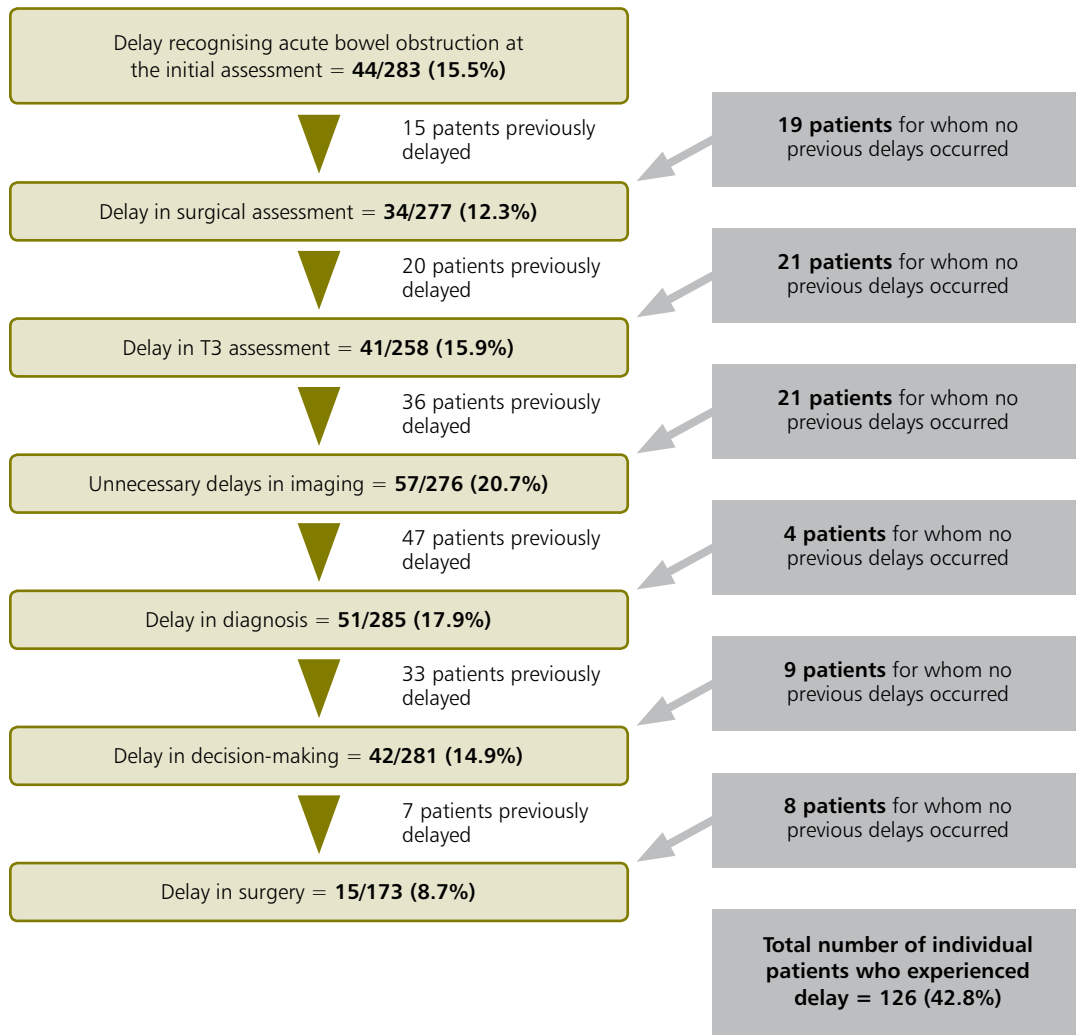
	Number of patients
Delay in access to theatre	18
Admitted under medicine	11
Review by inexperienced medical staff	10
Multiple handovers of care	9
Delay in diagnosis	8
Delay in imaging	8
Infrequent consultant review	7
Delay in consultant/ specialist review	7
Lack of clinical review	4
Delay in discharge planning	3
Delay in decision-making	2
Too many clinical reviews	1
Arranging stenting	1
Other	2

*Answers may be multiple; n =71 Clinical questionnaire data*

As described in Chapter 7, access to an emergency theatre was the most commonly reported delay. Another important delay clinicians identified was review by inexperienced medical staff.

Throughout the pathway, the case reviewers identified that the delivery of care was delayed at many different stages. Figure 9.1, overleaf, shows that some of the same patients were affected by multiple delays in their pathway of care, as delay at one stage has a “knock-on” effect on subsequent care. Thus, of the 57 patients who had a delay in their radiological imaging, 36 also had a previous delay in their care, whereas for 21 patients it was the first time their care had been delayed.

Focusing on where delays affected multiple different patients, it can be seen that a delay in recognising bowel obstruction at initial assessment occurred in 44 patients whilst delay in surgical assessment occurred in an additional 19 patients. There were 21 patients (who had no previous delays) who were delayed in imaging and consultant review respectively. There were, therefore, a total of 126 individual patients who experienced a delay in the delivery of care at some part of the pathway. Of these patients, 34 patients had their outcome affected by delays across the pathway in the view of the case reviewers.



**Figure 9.1 Delays in the pathway of care of patients with acute bowel obstruction showing where the same patients were affected by delays at different stages and where different patients were affected**  
*(Case reviewer data)*







## End of life care

There were 100 patients on an end of life care pathway (Table 10.4) of whom 84/100 (84.0%) patients had their treatment decisions discussed with their family. Advance care planning was in place for 91/486 (18.7%) patients, not for 395/486 (81.3%) and unknown for a further 204 patients.

**Table 10.4 An end of life care pathway was used**

	Number of patients	%
Yes - appropriately	100	15.6
No - appropriately	521	81.5
No - inappropriately	18	2.8
<b>Subtotal</b>	<b>639</b>	
Unknown	51	
<b>Total</b>	<b>690</b>	

*Clinical questionnaire data*

## Key Findings

60. 119/681 (17.5%) patients in the sample died during their hospital admission whilst 20/562 (3.6%) patients died following discharge
61. 84/223 (37.7%) patients noted to be frail (Rockwood score 5-9) on admission, died during the admission compared to 10/333 (3.0%) who had a Rockwood score of 1-4 when they were admitted to hospital
62. 88/233 (37.8%) patients had a nutritional assessment on discharge
63. 147/409 (35.9%) patients received no nutritional advice on discharge and no advice was given to 80/304 (26.3%) patients who had commenced on new medication



## Organisation of services

Organisational questionnaires were received for 176/242 (72.7%) hospitals to which patients with an acute bowel obstruction may have attended (Table 11.1). There was an emergency department in 160/176 (90.9%) hospitals.

**Table 11.1 Type of hospital from which organisational data were received**

	Number of hospitals	%
District General Hospital >500	68	38.6
District General Hospital <500	45	25.6
University Teaching Hospital	54	30.7
Single Specialty Hospital	3	1.7
Independent Hospital	1	<1
Other	5	2.8
<b>Total</b>	<b>176</b>	

### Pathway for acute bowel obstruction

Pathways for the care of patients with large and small bowel obstruction have been developed for use in many hospitals, or have been incorporated into acute abdominal pain pathways.<sup>7-9,24</sup> Where pathways exist they often guide the

timing of CT scanning and surgery, and have been discussed and approved by the relevant departments involved in the pathway. All of which may make it easier to ensure that pathways are followed without organisational delays.

In this study there were only 28/169 (16.6%) hospitals in which a specific pathway for acute bowel obstruction was used. There were 63/169 (37.3%) hospitals where a more generic pathway was used, which could be used for guidance on the care of this group of patients, so overall there was some guidance for the care of patients with acute bowel obstruction in 91/169 (53.8%) hospitals.

The pathways varied in terms of whether advice on the timing of radiology investigations and assessments of frailty and nutrition were included (Table 11.2). In particular, CT scan timing was only part of a pathway in 33/91 (36.3%) hospitals that had a pathway. Pathways only included specific guidance for small bowel obstruction in 29/91 (31.9%) and large bowel obstruction in 26/91 (28.6%) hospitals with a pathway. This was important because there are specific treatment options which may be omitted or not considered in patients if these pathways have not been considered in advance at an organisational level.

**Table 11.2 Guidance included in a pathway for acute bowel obstruction**

	Dedicated acute bowel obstruction pathway (n=28)	Non-specific pathway (n=63)	Total (n=91)	%
Specific for small bowel obstruction	20	9	<b>29</b>	31.9
Specific for large bowel obstruction	16	10	<b>26</b>	28.6
Initial treatment and resuscitation	21	14	<b>35</b>	38.5
Timeframe for CT	12	21	<b>33</b>	36.3
Frailty assessment (patients admitted as an emergency)	7	28	<b>35</b>	38.5
Dementia assessment on all elderly patients	11	NA	<b>NA</b>	NA
Review of elderly patients by care of the elderly	3	9	<b>12</b>	13.2
Nutritional assessment	9	15	<b>24</b>	26.4

### Pain assessment

A guideline for pain scoring should be available in all emergency departments,<sup>25</sup> but in this study no guideline was identified in 15/148 (10.1%) hospitals. It was reported from 151/162 (93.2%) hospitals that there was a guideline for pain scoring on admission, however no guideline was identified in 11/162 (6.8%) hospitals. More generic guidance on the assessment and treatment of pain was available in most hospitals both in the emergency department and on admission to the wards (Table 11.3)

### Resuscitation

Resuscitation is an important preventive measure to stabilise the patient with an acute bowel obstruction whilst diagnosis

is established and treatment is commenced. Fluid loss into the intestine can be significant, with the development of hypovolaemia and acute kidney injury. This can also lead to poor perfusion of the intestine, with an increased risk of ischaemia and perforation.

Guidance for the initial resuscitation of patients was reported to be available in 21 of the hospitals with a dedicated acute bowel obstruction pathway, and in 14 hospitals with non-specific pathways. Some pathways gave specific advice on the recommended initial resuscitation of patients and the subsequent observations, in particular urine output which is relevant considering the high risk of acute kidney injury in this patient group. Many basic measures were omitted from these pathways including oxygen administration and intravenous (IV) fluid administration (Table 11.4).

**Table 11.3 A guideline for pain scoring**

	Emergency department		On admission	
	Number of hospitals	%	Number of hospitals	%
Yes	133	89.9	151	93.2
No	15	10.1	11	6.8
<b>Subtotal</b>	<b>148</b>		<b>162</b>	
Unknown	28		14	
<b>Total</b>	<b>176</b>		<b>176</b>	

**Table 11.4 Details of resuscitation guidance included in dedicated acute bowel obstruction pathway and non-specific pathway**

	Dedicated acute bowel obstruction pathway (n=21)	Non-specific pathway (n=14)	Total (n=35)
Oxygen administration	5	13	<b>18</b>
Urine output measurement	9	13	<b>22</b>
IV fluid administration	10	14	<b>24</b>
Antibiotic administration	3	13	<b>16</b>
Nasogastric tube administration	9	11	<b>20</b>
Frequency of observation	5	11	<b>16</b>
Escalation criteria	5	13	<b>18</b>
Transfer criteria to higher level of care	4	11	<b>15</b>

**Table 11.5 Details of guidance provided by dedicated acute bowel obstruction pathway and non-specific pathway**

	Dedicated acute bowel obstruction pathway (n=28)	Non-specific pathway (n=63)	Total (n=91)	%
Timing of first senior review	12	44	56	61.5
Time limit for treatment decision	9	13	22	24.2
Guidance on which patients are suitable for surgery	15	16	31	34.1
Guidance on who (grade of clinician) can refer for surgical opinion	24	11	35	38.5
Timing of surgery	13	20	33	36.3

Some pathways included specific guidance on the timing of senior review, and interventions which should give the treating teams parameters to work within (Table 11.5). In particular, pathways only included guidelines on time limit to treatment decision in 22/91 (24.2%) hospitals and timing of surgery in 33/91 (36.3%) hospitals. Delays in timing of surgery were considered important by clinicians looking after these patients as patients who wait have an increased risk of ischaemia, perforation and increased complications (See Chapter 7).

## Organisation of imaging

### Access to scanners

As the optimal management of acute bowel obstruction needs CT scanning for diagnostic and prognostic purposes it would be expected that all hospitals in which patients with acute bowel obstruction are cared for would have access to a CT scanner.<sup>7-9</sup>

It was reported that in 168/176 (95.5%) hospitals there was access to CT scanning (Table 11.6), and 126/156 (80.8%) hospitals, had more than one scanner (Table 11.7).

As CT scanning is recommended as a first line investigation in acute bowel obstruction<sup>7-9</sup>, and most patients in this study presented via emergency department, there is an expectation that more CT scanners will be needed in emergency departments and this was reported to be the case in 31/168 (18.5%) hospitals.

**Table 11.6 Available on-site imaging**

	Number of hospitals	%
Abdominal X-ray	171	97.2
CT scanner	168	95.5
Abdominal ultrasound	82	46.6
MRI scanner	52	29.5
Gastrografen follow-through (WSCS)	69	39.2
Other	10	5.7
Unknown	2	1.1

Answers maybe multiple; n=176

**Table 11.7 Number of CT scanners on-site**

	Number of hospitals	%
1	30	17.9
2	86	51.2
3	24	14.3
4	10	6.0
5	3	1.8
6	3	1.8
<b>Subtotal</b>	<b>156</b>	
Unknown	12	
<b>Total</b>	<b>168</b>	

## Requesting imaging

Current guidelines recommend CT scanning as the diagnostic investigation of choice for acute bowel obstruction, so scanning needs to be accessible to all clinicians attempting to make this diagnosis. In 87/168 (51.8%) hospitals there was a restriction as to who could request a CT scan. The detail is shown in Table 11.8.

Where hospitals had a pathway for the management of acute bowel obstruction this often stipulated a timeframe for CT scanning (Table 11.9).

**Table 11.8 The grade of clinician who could request a CT scan**

Grade specified who can request a CT scan	Number of hospitals	%
Consultant or senior trainee only	37	42.5
Consultant, senior or junior trainee only	12	13.8
Specialist nurse, senior trainee or consultant only	6	6.9
Specialist Nurse, junior trainee or more senior doctor only	6	6.9
Specialist nurse, foundation year or more senior doctor	17	19.5
Specialist nurse, foundation year or more senior doctor or other healthcare professional	9	10.3
<b>Total</b>	<b>87</b>	

**Table 11.9 Detail of timing of CT scan specified in dedicated acute bowel obstruction pathway and non-specific pathway**

	Dedicated acute bowel obstruction pathway (n=12)	Non-specific pathway (n=21)	Total (n=33)
Immediately	1	3	4
<4 hours	4	11	15
<12 hours	1	3	4
<24 hours	5	2	7
Other	1	2	3

## Method of performing radiology

There were 70/176 (39.8%) hospitals in which there were protocols for the method of performing a CT scan, and in most the use of intravenous contrast was dependant on estimated renal function (Table 11.10).

**Table 11.10 CT contrast used as standard**

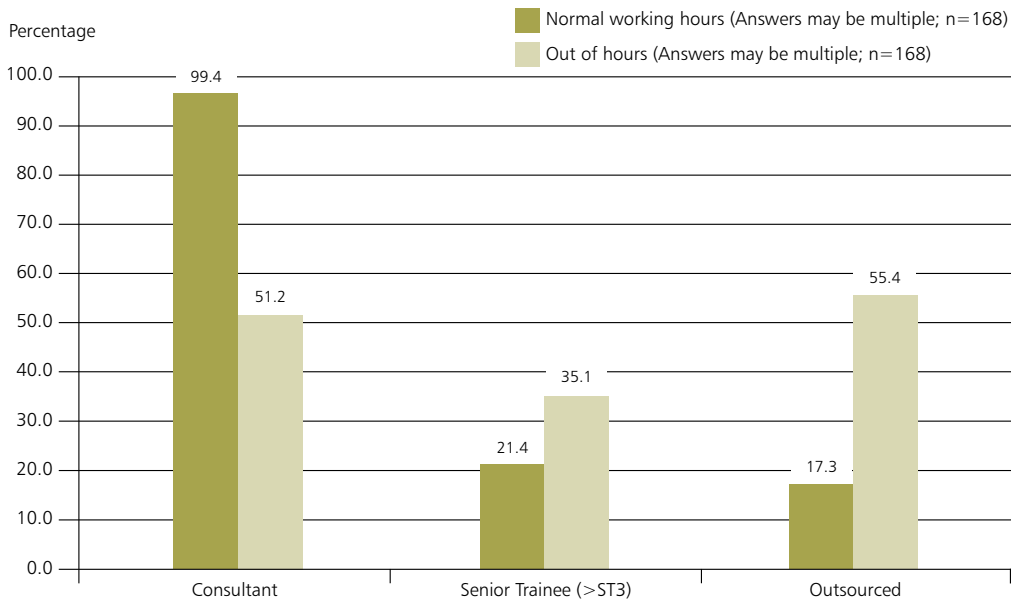
	Number of hospitals	%
Use of EGFR cut-off to avoid use of IV contrast	61	87.1
Detail of IV administration	58	82.9
Detail of decision-maker - radiologist	44	62.9
Detail of oral administration	30	42.9
Detail of decision-maker - surgeon	10	14.3
Other	4	5.7

Answers may be multiple; n=70

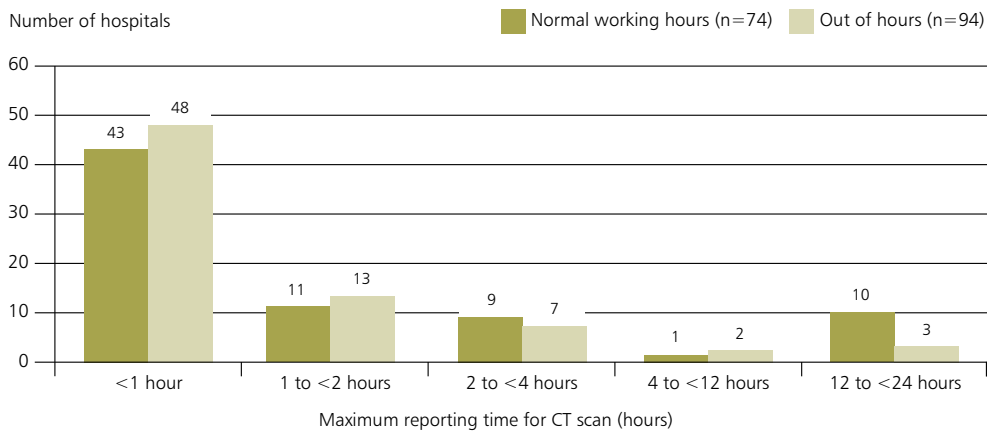
**Reporting of radiology**

Traditionally all imaging was reported within hospital departments but there has been a gradual move to outsourcing reporting to virtual radiologists. In this study it was reported that the majority of scans performed in working hours were reported by consultants. However, CT reporting was outsourced, 'in hours' in 29/168 (17.3%) of hospitals and 'out of hours' in 93/168 (55.4%) hospitals (Figure 11.1).

Guidelines for the timeliness of reporting on radiology was available in 97/140 (69.3%) hospitals, but the parameters for the timeliness of a report varied considerably as shown in Figure 11.2. There was a maximum time reporting of CT of less than 1 hour in 43/74 (58.1%) hospitals ('in hours') and 48/94 (51.1%) hospitals 'out of hours'.



**Figure 11.1 Grade of clinician who reported on the radiology 'in hours'/ 'out of hours'**



**Figure 11.2 Maximum time for CT scan reporting 'in hours'/ 'out of hours'**

It is questionable whether reporting times of over 4 hours are optimal in the management of acutely unwell surgical patients. In 97/137 (70.8%) hospitals there was no routine audit of reporting times for CT in patients with acute bowel obstruction.

Radiological investigations are only useful if the results are communicated to the treating team. There was a wide range of methods used by the radiology departments to achieve this as shown in Table 11.11.

**Table 11.11 Mode by which CT reports were communicated**

	Number of hospitals	%
Electronic reporting	142	84.5
Telephone to required clinician	101	60.1
Telephone to responsible consultant/on-call	66	39.3
Telephone to ward	24	14.3
Unknown	5	3.0
Other	14	8.3

Answers may be multiple; n=168

There were 26 hospitals with no electronic reporting. For hospitals without electronic reporting there needs to be a very clear pathway of how the results are communicated with the treating team if optimal patient care is to be given. This is particularly important in the out of hours scenario when outsourcing is more common and reporting radiologists are not on-site.

**Screening for bowel cancer**

Patients presenting with advanced bowel cancer causing acute large bowel obstruction have often experienced missed opportunities for diagnosis including bowel cancer screening. If bowel cancer screening uptake is poor, or if the service is poorly developed, this may result in missed diagnosis and a higher rate of patients presenting with large bowel obstruction.

There were 131/176 (74.4%) hospitals in the study from which it was reported that a bowel cancer screening programme was in place, with 109/131 (83.2%) of these screening programmes running for more than 5 years. Testing for faecal occult blood was the methodology used in 110/131 (84.0%) of screening programmes. The self-reported percentage of the population suitable for screening, and who participated in the programme, varied dramatically between hospitals (Table 11.12). This study was not set up to identify whether patients presenting with bowel cancer as an emergency had access to screening or whether they had been screened, but data from the national bowel screening programme show that on average 59% of people living in Northern Ireland and England who are sent the bowel cancer screening test for free in the post actually complete it, but this drops to 56% in Scotland and 53% in Wales.”<sup>26</sup>

**Table 11.12 Percentage of population invited for screening**

	Number of hospitals	%
<10%	4	6.7
>11-40%	3	5.0
>51-60%	1	1.7
>61-70%	3	5.0
>71-80%	1	1.7
>81-90%	1	1.7
>91-100%	47	78.3
<b>Subtotal</b>	<b>60</b>	
Unknown	71	
<b>Total</b>	<b>131</b>	

## Staffing

The surgical rotas were staffed mainly by specialist surgeons. However, it was reported from a minority of hospitals that non-gastrointestinal surgeons were on the rotas (Table 11.13).

**Table 11.13 Specialty of surgeons on the on-call rota**

	Number of hospitals	%
Lower gastrointestinal colorectal surgery	151	85.7
Upper gastrointestinal surgery	139	79.0
General surgery	124	70.5
Hepatobiliary and pancreatic surgery	36	20.5
Breast surgery	24	13.69
Other	16	9.1

Answers maybe multiple; n=176

The structure of the rotas in terms of number of hours on-call per day, and the duration of the on-call commitment varied considerably (Table 11.14).

**Table 11.14 Structure of the on-call rota**

	Number of hospitals	%
14/day-1 week on-call	10	5.7
24/day split 2-3 days on-call	55	31.3
24 hour single day on-call	31	17.6
Different consultants cover day/night	17	9.7
Rolling day on-call	4	2.3
Surgeon of the week (with colleagues covering overnight)	39	22.2

Answers maybe multiple; n=176

In terms of non-surgical staffing, nearly all the hospitals reported access to the full range of allied healthcare services at some stage in the working week (Table 11.15).

**Table 11.15 Availability of allied healthcare services**

	Number of hospitals	%
Palliative care	164/171	95.9
Acute pain team	161/171	94.2
Physiotherapy	165/176	93.8
Dietetics	163/176	92.6
Care of the elderly	154/169	91.1
Occupational therapy	158/176	89.8
Social care	156/176	88.6
Critical care outreach team	151/176	85.8
Pharmacy	117/176	66.5
Other	12/176	6.8

There was a discharge planning team in 149/165 (90.3%) hospitals but in 68/149 (45.6%) hospitals this did not include nutrition or dietetic staff (Table 11.16).

**Table 11.16 Discharge team**

	Number of hospitals	%
Social care	116	77.9
Physiotherapy	110	73.8
Occupational therapy	109	73.2
Dietetics	76	51.0
Nutrition team	67	45.0
Other	25	16.8

Answers may be multiple; n=149

## Availability of operating theatres

In previous chapters the importance of availability of operating theatres and staff to ensure timely surgery has been highlighted. Clinicians looking after patients said the most common delay was unavailability of theatre staff. The level of organisation of theatres within hospitals was also reviewed.

There were 136/170 (80.0%) hospitals in which there was a dedicated emergency theatre (CEPOD theatre). In 107/127 (84.3%) hospitals, from which data were obtained, there was only a single theatre available for emergencies. There were 112/170 (65.9%) hospitals had scheduled emergency out of hours lists as shown in Table 11.17.

**Table 11.17 Hospital has scheduled out of hours emergency surgery sessions (CEPOD lists)**

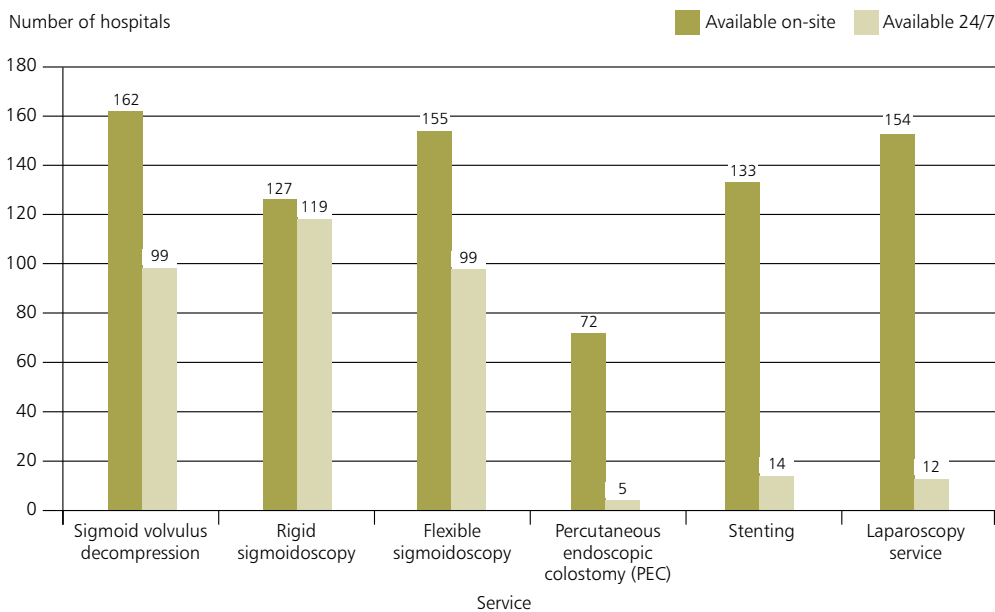
	Number of hospitals	%
Yes	112	65.9
No	58	34.1
<b>Subtotal</b>	<b>170</b>	
Unknown	6	
<b>Total</b>	<b>176</b>	

With inevitable pressure on the use of emergency theatre facilities, choices have to be made as to the relative urgency of patient needs. There were 120/166 (72.3%) hospitals in which a priority grading system was in place and 79/164 (48.2%) hospitals in which a co-ordinator was employed to confirm the fitness of patients for surgery, thus ensuring

optimal utilisation of this limited resource. However, the prioritisation system needs to take into account the high-risk profile of acute bowel obstruction patients and the deleterious consequences of delayed surgery in this group. Guidelines on the time to surgery have already been published by NCEPOD and these timescales should be adhered to and appear in pathways for the care of patients with acute bowel obstruction.<sup>22</sup>

**Access to laparoscopy, endoscopy and colonic stenting**

With increasing specialisation of care this has changed the function of the on-call surgeon who may need the help of other specialists to aid in the management of colonic obstruction. This includes endoscopic management of sigmoid volvulus and stenting of obstructing tumours which may need endoscopic and/or interventional radiological input. There was a perception amongst the Study Advisory Group that the provision of these services is not organised as well as it could be. The access to endoscopic therapy for sigmoid volvulus was available in 162/170 (95.3%) hospitals but was only available 24 hours/day in 99/162 (61.1%) (Figure 11.3).



**Figure 11.3 Access to volvulus decompression, rigid and flexible sigmoidoscopy, percutaneous endoscopic colostomy, stenting and laparoscopy on-site and availability (n=176)**



Access to percutaneous endoscopic colostomies was much more limited, being available in only 72/163 (44.2%) hospitals and only five hospitals had a protocol for access to this procedure 24 hours/day.

For large bowel obstruction, especially in the context of malignant disease, stenting of the colon is a method of relieving the obstruction with low morbidity. Stenting was available in 133/171 (77.8%) hospitals, as shown in Figure 11.3. It was available 24/7 in 14 hospitals and most commonly available Monday-Friday during working hours (106/133; 79.7%).

Of 38/171 (22.2%) hospitals in which there was no on-site access to colonic stenting, only five were reported to be part of a clinical network to improve access to this service and only 40/136 (29.4%) hospitals that had protocols to refer patients for stenting to other units audited the outcome of those transfers.

**Critical care**

There were 168/174 (96.6%) hospitals from which it was reported there was a critical care unit on-site and 140/154 (90.9%) hospitals were part of a critical care network.

**Audit**

It was reported from 162/168 (96.4%) hospitals that an audit of deaths within 30 days of surgery, within the context of a Mortality and Morbidity (M&M) meeting, was undertaken. However, audits of delays to surgical therapy were less frequent (Table 11.18).

**Table 11.18 An audit of delay to surgery for acute bowel obstruction undertaken**

	Number of hospitals	%
Yes	83	56.8
No	63	43.2
<b>Subtotal</b>	<b>146</b>	
Unknown	30	
<b>Total</b>	<b>176</b>	

In terms of participation in national audits 152/163 (93.3%) hospitals reported participation in the National Emergency Laparotomy Audit (NELA), 154/163 (94.5%) in the National Bowel Cancer Audit (NBOCA), 96/139 (69.1%) in the National Audit of Small Bowel Obstruction (NASBO) and 4/7 Scottish hospitals took part in the Emergency Laparotomy and Laparoscopic Scottish Audit (ELLSA). There were 59/140 (42.1%) hospitals from which it was reported that they had gaps in their service provision but only 36/59 (61.0%) had plans in place to address them.

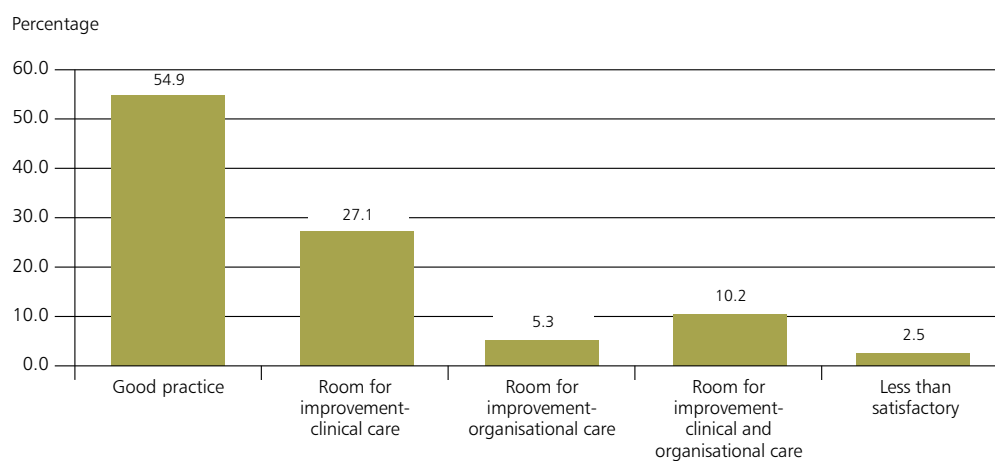
**Key Findings**

64. 131/176 (74.4%) hospitals in the study reported that a bowel cancer screening programme was present and 109/131 (83.2%) of these screening programmes had been running for more than 5 years
65. In 15/148 (10.1%) hospitals there was no guideline for pain scoring in the emergency department
66. 11/162 (6.8%) hospitals did not have a guideline for pain scoring on admission
67. 28/169 (16.6%) hospitals reported a specific pathway for acute bowel obstruction; in 63/169 (37.3%) there was not a specific acute bowel obstruction pathway but a more general acute abdomen pathway
68. Of those hospitals where there was a pathway, they only included guidelines on time limit to treatment decision in 22/91 (24.2%) hospitals and timing of surgery in 33/91 (36.3%) hospitals
69. In 31/168 (18.5%) hospitals there was a CT scanner in the emergency department
70. In 86/168 (51.2%) hospitals there were restrictions on who could request CT scans
71. There was a maximum time reporting of CT of less than 1 hour in 43/74 (58.1%) hospitals (in hours) and 48/94 (51.1%) hospitals out of hours
72. CT reporting was outsourced, in hours in 29/168 (17.3%) of hospitals and out of hours in 93/168 (55.4%)
73. 136/170 (80.0%) hospitals had at least one dedicated emergency (CEPOD) theatre
74. 120/166 (72.3%) hospitals reported that there was priority grading for emergency surgery and in 79/164 (48.2%) hospitals there was a theatre co-ordinator to facilitate this
75. 38/171 (22.2%) hospitals had no on-site access to stenting and only five reported to be part of a clinical network to improve access to this service
76. 149/165 (90.3%) hospitals reported that there was a discharge planning team but in 68/149 (45.6%) hospitals this did not include nutrition or dietetic staff.

## Overall quality of care

Figure 12.1 shows the overall quality of care provided to patients in the study as rated by the case reviewers. There were 156/284 (54.9%) patients for whom the care was rated as good practice, 121/284 (42.6%) rated as requiring

room for improvement either in clinical or organisational factors (or both) and seven cases reviewed were considered as less than satisfactory. For 10 cases reviewed, there was insufficient data to rate the overall quality of care.



**Figure 12.1** The overall quality of care provided to the patients in the study (n=284)

## References

---

1. Association of Surgeons of Great Britain and Ireland and the Royal College of Surgeons of England. Commissioning Guide: Emergency General Surgery (acute abdominal pain) 2014 <https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-general-guide/>
2. Ten Broek RPG, Krielen P, Di Saverio S. 2017. Bologna guidelines for diagnosis and management of adhesive small bowel obstruction (ASBO): update of the evidence-based guidelines from the world society of emergency surgery ASBO working group. *World J Emerg Surg.* Jun 19:13-24
3. Hwang J, Lee J et al. 2009. Value of multidetector CT in decision making regarding surgery in patient with small bowel obstruction due to adhesion. *European Radiology.* 19(10): 2425-31
4. Finan J, Campbell S, Verma R et al. 2007. The Management of Malignant Large Bowel Obstruction: ACPGBI Position Statement. *Colorectal Disease.* 9(4): 1-17
5. Association of Coloproctology of Great Britain and Ireland. 2017. National Audit of Small Bowel Obstruction. <https://www.acpgbi.org.uk/content/uploads/2017/12/NASBO-REPORT-2017.pdf>
6. Saunders DI, Murray D, Pichel AC et al on behalf of the members of the UK Emergency Laparotomy Network. 2012. Variations in mortality after emergency laparotomy: the first report of the UK Emergency Laparotomy Network. *British Journal of Anaesthesia.* 109(3): 368-375
7. Association of Coloproctology of Great Britain and Ireland. 2017. Emergency General Surgery Sub-Committee. Recommendations for the management of large bowel obstruction. <https://www.acpgbi.org.uk/content/uploads/2016/12/Large-Bowel-Obstruction-pathway-2017.pdf>
8. National Institute for Health and Clinical Excellence. 2001. Colorectal Cancer Information for the public. <https://www.nice.org.uk/guidance/cg131/ifp/chapter/About-this-information>
9. National Emergency Laparotomy Audit 4th report. <https://www.nela.org.uk/reports>
10. Rockwood K Song X, MacKnight C et al. 2005. A global clinical measure of fitness and frailty in elderly people. *CMAJ.* 173:489-495
11. RCP Acute care toolkit4: Delivering a 12-hour, 7-day consultant presence on the acute medical unit. 2012. <https://www.rcplondon.ac.uk/resources/acute-caretoolkit-4-delivering-12-hour-7-day-consultant-presenceacute-medical-unit>
12. NHS England. 2013. NHS Services, Seven Days a Week Forum. Everyone Counts: Planning for Patients 2013/14 to 2018/19. <https://www.england.nhs.uk/wp-content/uploads/2013/12/forum-summary-report.pdf>
13. BAPEN. THE 'MUST' REPORT Nutritional screening of adults: a multidisciplinary responsibility. 2003 <https://www.bapen.org.uk/pdfs/must/must-report.pdf>
14. Resuscitation Council. RESPECT process <https://www.resus.org.uk/respect/>
15. Scottish Government. Chief Medical Officer for Scotland annual report. Practising Realistic Medicine. 2018 <https://www.gov.scot/publications/practising-realistic-medicine/>
16. iRefer <https://www.rcr.ac.uk/clinical-radiology/being-consultant/rcr-referral-guidelines/about-irefer>
17. The Royal College of Surgeons of England and Department of Health. The Higher Risk General Surgical Patient - Towards Improved Care for a Forgotten Group. 2011. London <https://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/the-higher-risk-general-surgical-patient/>
18. The National Confidential Enquiry into Patient Outcome and Death. Knowing the Risk. 2011. London <https://www.ncepod.org.uk/2011poc.html>

## REFERENCES

---

19. Parmar KL, Law J, Carter B et al. 2019. Frailty in Older Patients Undergoing Emergency Laparotomy: Results From the UK Observational Emergency Laparotomy and Frailty (ELF) Study. *Ann Surg*. Jun
20. Ng HJ, Yule M, Tsoon M et al. 2015. Current outcomes of Emergency Bowel Surgery. *Ann R Coll Surg Engl*. 97: 151-156
21. Peacock O, Bassett MG, Kuryba A et al. 2018 for the National Emergency Laparotomy Audit (NELA) Project Team. Thirty day mortality in patients undergoing laparotomy for small bowel obstruction. *BJs*. 105: 1006-1013
22. The National Confidential Enquiry into Patient Outcome and Death. Classification of Intervention <https://www.ncepod.org.uk/classification.html>
23. The National Confidential Enquiry into Patient Outcome and Death. A Mixed Bag. 2010. London <https://www.ncepod.org.uk/2010pn.html>
24. Ripamonti C, and Bruera E. 2002. Palliative management of malignant bowel obstruction. *Gynecol Cancer*. 12(2): 135-43
25. The National Confidential Enquiry into Patient Outcome and Death. Treat the Cause. 2016. London <https://www.ncepod.org.uk/2016ap.html>
26. Bowel Cancer UK <https://www.bowelcanceruk.org.uk/about-bowel-cancer/screening/>

## Glossary

Term	Definition
<b>Acute bowel obstruction</b>	Bowel obstruction, also known as intestinal obstruction, is a mechanical or functional obstruction of the intestines which prevents the normal movement of the products of digestion. Either the small bowel or large bowel may be affected.
<b>Acute kidney injury (AKI)</b>	Acute kidney injury (AKI) is a sudden episode of kidney failure or kidney damage that happens within a few hours or a few days. AKI causes a build-up of waste products in the blood and makes it hard for the kidneys to keep the right balance of fluid in the body.
<b>Adhesions</b>	Adhesions are deposits of fibrous strands/scar tissue which can connect organs together. Organs in the peritoneal cavity (pelvic/abdominal space) normally slide freely against each other and adhesions can hinder this movement leading to such complications as pain and bowel obstruction.
<b>Aspiration pneumonia</b>	Aspiration pneumonia is a complication of pulmonary aspiration. Pulmonary aspiration is when someone inhales food, stomach acid, or saliva into their lungs.
<b>CT with IV contrast</b>	Intravenous (IV) contrast dye is injected to highlight blood vessels, organs, and other structures whilst the CT scan is performed. This will likely be an iodine-based dye.
<b>Distention</b>	A distended stomach is a term usually used to refer to distension or swelling of the abdomen and not of the stomach itself.
<b>Faeculent vomiting</b>	An important feature in clinically identifying the level of bowel obstruction. Copious vomiting of bile stained fluid is suggestive of upper small bowel obstruction. Faeculent vomiting, which is thicker and foul-smelling, is suggestive of large bowel obstruction.
<b>Gastrografin</b>	Gastrografin is a contrast medium for the radiological examination of the gastrointestinal tract. It can be administered orally or as an enema.
<b>Hypovolaemia</b>	Hypovolemia is caused by a decrease in the blood volume resulting from loss of blood, plasma and/or plasma water.
<b>Ischaemia</b>	Ischaemia is a restriction in blood supply to tissues, causing a shortage of oxygen that is needed for cellular metabolism (to keep tissue alive). Ischemia is generally caused by problems with blood vessels, with resultant damage to or dysfunction of tissue.
<b>Laparotomy</b>	A laparotomy is a major surgical procedure that involves an incision being made in the abdominal wall. This allows the surgeon access to the contents of the abdomen in order to identify and repair any emergency problems that have occurred.
<b>Large bowel</b>	The large intestine, also known as the large bowel, is the last part of the gastrointestinal tract and of the digestive system in vertebrates. Water is absorbed here and the remaining waste material is stored as feces before being removed by defecation.
<b>Level 2 care</b>	High dependency care.
<b>Level 3 care</b>	Intensive care.

## GLOSSARY

---

Term	Definition
<b>Malnutrition Universal Screening Tool/Score (MUST)</b>	'MUST' is a five-step screening tool to identify adults, who are malnourished, at risk of malnutrition (undernutrition), or obese. It also includes management guidelines which can be used to develop a care plan. It is for use in hospitals, community and other care settings and can be used by all care workers.
<b>Mesentery</b>	The mesentery is a contiguous set of tissues that attaches the intestines to the posterior abdominal wall in humans and is formed by the double fold of peritoneum. It helps in storing fat and allowing blood vessels, lymphatics, and nerves to supply the intestines, among other functions.
<b>Resection</b>	Bowel resection is surgery to remove part of the small intestine, large intestine or both. The large intestine includes the colon, rectum and anus. Depending on which parts of the intestine are removed, a bowel resection may also be called: a small bowel resection or small intestine resection.
<b>ReSPECT guidelines</b>	ReSPECT is a process that creates personalised recommendations for a person's clinical care in a future emergency in which they are unable to make or express choices. The ReSPECT process is a new approach to encourage people to have an individual plan to try to ensure that they get the right care and treatment in an anticipated future emergency in which they no longer have the capacity to make or express choices.
<b>Risk assessment</b>	Preoperative risk scores are designed to guide patient care by providing a means of predicting operative outcome.
<b>Rockwood Score</b>	The Clinical Frailty Scale (CFS), which uses clinical descriptors and pictographs, was developed to provide clinicians with an easily applicable tool to stratify older adults according to level of vulnerability
<b>Small bowel</b>	The small intestine (small bowel) is about 20 feet long and about an inch in diameter. Its job is to absorb most of the nutrients from what we eat and drink. Velvety tissue lines the small intestine, which is divided into the duodenum, jejunum, and ileum.
<b>Stenting</b>	A stent is a self-expanding, wire mesh tube that is designed to hold open the blocked area in the bowel.
<b>Volvulus</b>	A volvulus is when a loop of intestine twists around itself and the mesentery that supports it, resulting in a bowel obstruction. Symptoms include abdominal pain, abdominal bloating, vomiting, constipation, and bloody stool.

# Appendices

## Appendix 1 – Participation

Trust/Health Board	Number of participating hospitals	Number of organisational questionnaires returned	Number of selected cases	Number of clinician questionnaires returned	Number of case notes selected	Number of case notes returned
Aintree Hospitals NHS Foundation Trust	1	1	10	2	2	2
Airedale NHS Foundation Trust	1	1	8	5	4	2
Aneurin Bevan University Health Board	2	0	17	0	6	3
Ashford & St Peter's Hospitals NHS Trust	2	2	2	2	1	1
Barking, Havering & Redbridge University Hospitals NHS Trust	2	2	7	6	3	2
Barnsley Hospital NHS Foundation Trust	1	0	9	4	2	2
Barts Health NHS Trust	4	0	22	2	8	0
Basildon & Thurrock University Hospitals NHS Foundation Trust	1	1	8	8	2	2
Bedford Hospital NHS Trust	1	1	7	1	2	1
Belfast Health and Social Care Trust	2	2	9	2	5	1
Betsi Cadwaladr University Local Health Board	4	4	17	8	7	7
Blackpool Teaching Hospitals NHS Foundation Trust	1	1	7	5	2	2
Bolton Hospital NHS Foundation Trust	1	1	9	7	2	2
Bradford Teaching Hospitals NHS Foundation Trust	1	1	11	6	3	2
Brighton and Sussex University Hospitals NHS Trust	1	1	10	9	3	2
Buckinghamshire Healthcare NHS Trust	1	1	9	7	2	2
Calderdale & Huddersfield NHS Foundation Trust	2	2	9	3	3	2
Cambridge University Hospitals NHS Foundation Trust	1	1	7	4	3	2
Cardiff and Vale University Health Board	2	2	11	8	3	2
Chelsea & Westminster NHS Foundation Trust	2	2	13	10	4	4
Chesterfield Royal Hospital NHS Foundation Trust	1	1	8	8	2	2
Countess of Chester Hospital NHS Foundation Trust	1	1	5	5	2	2
County Durham and Darlington NHS Foundation Trust	2	2	14	12	4	5
Croydon Health Services NHS Trust	1	1	8	5	2	2
Cwm Taf University Health Board	3	2	9	8	4	4
Dartford & Gravesham NHS Trust	1	0	5	0	2	2
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	2	2	13	5	3	2
Dorset County Hospital NHS Foundation Trust	1	1	4	2	3	1
East & North Hertfordshire NHS Trust	1	1	8	7	3	2
East Cheshire NHS Trust	2	0	9	0	3	2
East Kent Hospitals University NHS Foundation Trust	2	0	18	6	4	4
East Lancashire Hospitals NHS Trust	1	1	8	4	2	2



## APPENDICES

Trust/Health Board	Number of participating hospitals	Number of organisational questionnaires returned	Number of selected cases	Number of clinician questionnaires returned	Number of case notes selected	Number of case notes returned
East Suffolk and North Essex NHS Foundation Trust (ESNEFT)	2	1	18	12	5	4
East Sussex Healthcare NHS Trust	2	2	13	12	4	4
Epsom and St Helier University Hospitals NHS Trust	1	1	9	4	4	0
Frimley Health NHS Foundation Trust	2	2	17	15	4	4
Gateshead Health NHS Foundation Trust	1	0	1	0	1	0
George Eliot Hospital NHS Trust	1	1	4	3	1	1
Gloucestershire Hospitals NHS Foundation Trust	2	0	17	10	4	0
Great Western Hospitals NHS Foundation Trust	1	1	7	5	2	2
Guy's & St Thomas' NHS Foundation Trust	2	2	6	3	3	2
Hampshire Hospitals NHS Foundation Trust	2	2	11	3	4	4
Harrogate and District NHS Foundation Trust	1	1	5	5	2	2
Hillingdon Hospitals NHS Foundation Trust	1	1	7	6	2	2
Homerton University Hospital NHS Foundation Trust	1	1	8	7	3	2
Hull University Teaching Hospitals NHS Trust	2	2	8	6	2	2
Hywel Dda University Health Board	4	3	6	5	3	2
Imperial College Healthcare NHS Trust	3	3	11	11	6	6
Isle of Man Department of Health & Social Security	1	1	1	1	1	1
Isle of Wight NHS Trust	1	1	3	2	1	1
James Paget University Hospitals NHS Foundation Trust	1	1	7	5	2	2
Kettering General Hospital NHS Foundation Trust	1	1	9	9	2	2
King's College Hospital NHS Foundation Trust	2	2	15	5	4	4
Kingston Hospital NHS Foundation Trust	1	1	6	5	4	2
Lancashire Teaching Hospitals NHS Foundation Trust	2	0	8	0	3	2
Lewisham and Greenwich NHS Trust	2	0	15	0	4	2
Liverpool Women's NHS Foundation Trust	1	1	0	0	0	0
London North West University Healthcare NHS Trust	3	3	8	6	5	4
Luton and Dunstable Hospital NHS Foundation Trust	1	1	5	2	2	2
Maidstone and Tunbridge Wells NHS Trust	2	0	9	6	3	2
Manchester University NHS Foundation Trust	2	2	13	10	5	2
Medway NHS Foundation Trust	1	1	10	9	2	2
Mid Cheshire Hospitals NHS Foundation Trust	1	1	8	6	2	2
Mid Essex Hospitals NHS Trust	1	1	9	4	3	3
Mid Yorkshire Hospitals NHS Trust	2	0	9	1	2	2
Milton Keynes University Hospital NHS Foundation Trust	1	1	5	2	2	2
Newcastle upon Tyne Hospitals NHS Foundation Trust	2	2	8	5	3	3
NHS Ayrshire & Arran	2	0	9	0	4	4
NHS Borders	1	0	0	0	0	0
NHS Dumfries & Galloway	1	0	0	0	0	0
NHS Fife	1	0	0	0	0	0
NHS Forth Valley	1	1	4	0	2	0
NHS Grampian	2	2	13	10	4	3

## APPENDICES

Trust/Health Board	Number of participating hospitals	Number of organisational questionnaires returned	Number of selected cases	Number of clinician questionnaires returned	Number of case notes selected	Number of case notes returned
NHS Greater Glasgow & Clyde	4	0	0	0	0	0
NHS Highland	4	0	10	1	6	0
NHS Lanarkshire	3	2	20	4	7	0
NHS Lothian	2	0	0	0	0	0
NHS Orkney	1	0	1	1	1	1
NHS Shetland	1	0	0	0	0	0
NHS Tayside	1	1	0	0	0	0
NHS Western Isles	1	0	2	0	1	1
Norfolk & Norwich University Hospital NHS Trust	1	1	8	5	2	2
North Bristol NHS Trust	1	1	9	4	3	3
North Cumbria University Hospitals NHS Trust	1	1	5	2	3	0
North Middlesex University Hospital NHS Trust	1	0	7	4	2	2
North Tees and Hartlepool NHS Foundation Trust	1	1	7	4	2	2
North West Anglia NHS Foundation Trust	2	2	12	10	4	3
Northampton General Hospital NHS Trust	1	1	7	7	2	2
Northern Devon Healthcare NHS Trust	1	1	4	1	2	2
Northern Health & Social Care Trust	4	0	0	0	0	0
Northern Lincolnshire & Goole NHS Foundation Trust	2	2	14	11	5	4
Northumbria Healthcare NHS Foundation Trust	1	1	8	5	2	2
Nottingham University Hospitals NHS Trust	2	0	17	11	7	4
Oxford University Hospitals NHS Foundation Trust	3	3	12	12	5	3
Pennine Acute Hospitals NHS Trust	4	4	13	8	4	5
Poole Hospital NHS Foundation Trust	1	0	3	0	1	0
Portsmouth Hospitals NHS Trust	1	1	9	3	2	2
Rotherham NHS Foundation Trust	1	1	5	4	2	2
Royal Berkshire NHS Foundation Trust	1	1	8	6	2	2
Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	1	1	8	7	2	2
Royal Brompton and Harefield NHS Foundation Trust	1	1	0	0	0	0
Royal Cornwall Hospitals NHS Trust	1	0	3	0	2	0
Royal Devon and Exeter NHS Foundation Trust	1	1	8	8	2	3
Royal Free London NHS Foundation Trust	2	2	17	9	4	4
Royal Liverpool & Broadgreen University Hospitals NHS Trust	1	1	7	2	2	2
Royal Surrey County Hospital NHS Foundation Trust	1	1	9	8	2	2
Royal United Hospitals Bath NHS Foundation Trust	1	1	10	8	3	3
Salford Royal Hospitals NHS Foundation Trust	1	1	9	6	2	2
Salisbury NHS Foundation Trust	1	1	8	8	2	2
Sandwell and West Birmingham Hospitals NHS Trust	2	2	6	4	3	3
Sheffield Teaching Hospitals NHS Foundation Trust	3	3	14	4	5	5
Sherwood Forest Hospitals NHS Foundation Trust	1	1	0	0	0	0
Shrewsbury and Telford Hospitals NHS Trust	2	0	11	2	3	3
South Eastern Health & Social Care Trust	1	1	6	3	2	2



## APPENDICES

---

Trust/Health Board	Number of participating hospitals	Number of organisational questionnaires returned	Number of selected cases	Number of clinician questionnaires returned	Number of case notes selected	Number of case notes returned
Velindre NHS Trust	1	1	0	0	0	0
Walsall Healthcare NHS Trust	1	1	6	6	3	2
Warrington & Halton Hospitals NHS Foundation Trust	2	2	9	1	2	2
West Hertfordshire Hospitals NHS Trust	1	1	9	9	2	2
West Suffolk NHS Foundation Trust	1	0	7	4	3	2
Western Health & Social Care Trust	2	0	7	4	5	3
Western Sussex Hospitals NHS Foundation Trust	2	2	18	11	4	4
Weston Area Health Trust	1	0	5	0	2	0
Whittington Health NHS Trust	1	1	4	1	4	2
Wirral University Teaching Hospital NHS Foundation Trust	2	0	0	0	0	0
Worcestershire Acute Hospitals NHS Trust	2	2	7	7	2	2
Wrightington, Wigan & Leigh NHS Foundation Trust	1	1	6	4	3	2
Wye Valley NHS Trust	1	1	5	5	2	2
Yeovil District Hospital NHS Foundation Trust	1	1	7	6	3	2
York Teaching Hospital NHS Foundation Trust	3	1	13	1	5	4

Published January 2020  
by the National Confidential Enquiry  
into Patient Outcome and Death

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](mailto:info@ncepod.org.uk)  
w [www.ncepod.org.uk](http://www.ncepod.org.uk)

978-1-9995925-4-7

A company limited by guarantee Company no. 3019382  
Registered charity no. 1075588