National Bowel Cancer Audit Report 2014

This 2014 Annual Report contains data from the 2012/2013 reporting period which covers patients in England and Wales with a date of diagnosis from 1 April 2012 to 31 March 2013.

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The Association of Coloproctology of Great Britian and Ireland (ACPGBI) is the professional body that represents UK colorectal surgeons. ACPGBI provided a clinical interpretation of the data analysed in the 2014 Annual Report.

The Royal College of Surgeons of England (RCS) is an independent professional body committed to enabling surgeons to achieve and maintain the highest standards of surgical practice and patient care. The RCS carried out the analysis of the data for the 2014 Annual Report.

Health and Social Care Information Centre (HSCIC) is the trusted source of authoritative data and information relating to health and care. HSCIC's information, data and systems plays a fundamental role in driving better care, better services and better outcomes for patients. HSCIC managed the publication of this annual report.

The Healthcare Quality Improvement Partnership (HQIP)
The National Bowel Cancer Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit Programme (NCA). 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, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP holds the contract to manage and develop the NCA Programme, comprising more than 30 clinical audits that cover 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 audits, also funded by the Health Department of the Scottish Government, DHSSPS Northern Ireland and the Channel Islands.

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The data for Wales has been supplied by the Cancer Information System Cymru (CaNISC).

The analyses for this report were carried out by the Clinical Effectiveness Unit (CEU) of the Royal College of Surgeons of England (Angela Kuryba, Kate Walker and Jan van der Meulen) with support from the Health and Social Care Information Centre (Arthur Yelland and Claire Meace).

The clinical direction and writing of the report was undertaken by Nigel Scott and Jim Hill from the ACPGBI.

The Project Team and Board would like to thank the clinical and non-clinical staff at all NHS Trusts and Welsh Health Boards who collected and submitted data to the Audit for their hard work, support and leadership.

We would like to acknowledge the contribution of the Open Exeter Helpdesk.

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Foreword

Welcome to the 2014 Annual Report for the National Bowel Cancer Audit. Publication of the Annual Report has been delayed this year due to problems with linking with the HES national database. This audit has been run successfully for many years under the auspices of the Association of Coloproctology of Great Britain and Ireland, and the purpose of the audit is to improve outcomes. It is pleasing to see that the 90 day surgical mortality has fallen over the last five years and that laparoscopic elective colorectal resection has increased to 60 per cent of cases.

Post-operative death at 90 days after emergency resection of colorectal cancer remains stubbornly high at 16 per cent. In addition almost one third of all colorectal cancer patients are not offered a resection with an associated two year survival of only 43 per cent versus 80 per cent if a resection is completed. We need to work at improving the early diagnosis in patients and so their suitability to undergo surgery. How we do better in responding to both of these challenges needs to be the future focus of all MDT working.

This year ACPGBI has appointed Nicola Fearnhead as Executive Lead for Consultant Outcome Publication and produced surgeon's specific outcomes on the ACPGBI website in November 2014. The format allows patients and surgeons to look through the funnel plots of individual hospitals down to each individual surgeon within that hospital this year with three years of outcome data. Outcomes in context is essential for patient decision making as it is not just the surgeon who influences the patient's pathway but the whole team; nurses, anaesthetists and facilities within the hospital, which can alter the course for a patient. HQIP have asked us to release more data for surgeon specific outcomes but until the accuracy can be assured, we have left this year's output at 90 day surgical mortality.

At the heart of all of this activity remains data accuracy and data completeness – still an imperfect aspect of the MDT upload sent from too many Colorectal MDTs. Clinical ownership and oversight of the data submitted by each Trust is crucial. The Lead Clinician, together with other members of the MDT, should ensure accurate and complete data collection for submission to the Audit. From October 2014 the Clinical Audit Platform will allow clinician scrutiny of the MDT data upload. Colorectal cancer MDT upload should move to a monthly configuration allowing all Consultant Colorectal Surgeons to actively inspect their data in real time. This will both enhance the accuracy of the Audit and ensure accurate Consultant Outcome Publication. I urge you to get involved and complete the process for your personal login to the Clinical Audit Platform (https://login.hscic.gov.uk/) – in a transparent NHS you are only as good as the data uploaded alongside your GMC number.

Asha Senapati
President,
Association of Coloproctology of Great Britain and Ireland

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Executive Summary

- **Audit data completeness increasing** – completeness of the seven data items used in the risk adjustment for the Audit has increased from 70 per cent in 2008/09 to 87 per cent in 2012/13
- **Audit participation at a new high of 31,723 cases** – Audit of Colorectal Cancer has been a core ACPGBI activity for nearly 20 years. In this time data submission has advanced from 8000 "enthusiast" cases to 31,723 people who were diagnosed with colorectal cancer between April 2012 and March 2013. Surgical removal of a locally confined cancer remains the most certain modality of cure but patient suitability and disease characteristics have a profound influence on treatment decisions.
- **Audit data submission changing** – for the 2014 Audit all participating trusts in England submitted their data via the Open Exeter system. The Welsh data is submitted directly from the CaNISC system to the Open Exeter system. The Audit dataset is linked to HES/PEDW (where available) at the patient level to obtain further information on patient care and follow-up, such as stoma reversal and emergency readmissions. Data for the 2015 Audit will be submitted via the Clinical Audit Platform, as described at www.hscic.gov.uk/bowel.
- **The new HSCIC Clinical Audit Platform (CAP)** – is available for submission of data on patients diagnosed from 1 April 2013. Within CAP there is a Consultant Check Report, which enables consultants to view their surgical cases submitted to the Audit against their GMC (General Medical Council) code. There is also a Data Manager's Report which shows at trust level all the cases for inclusion in the Consultant Outcome Publication. It is hoped that this will be a useful tool in aiding the checking of data prior to submission to the Audit.
- **Death after surgical resection falling** – overall post-operative mortality has fallen to 4.6 per cent after major surgery for colorectal cancer. It is striking that emergency admission with colorectal cancer remains at a stubborn 21 per cent of all cases. The significance of this mode of admission is that emergency major surgery is associated with a risk of death of 16 per cent at 90 days.
- **Length of stay shows large variation across Strategic Clinical Networks** – despite the widespread adoption of Enhanced Recovery Programmes, 65 per cent of colon cancer patients and 79 per cent of rectal cancer patients are still in hospital five days after resection. Additionally, there is substantial regional variation in this percentage (between 55 and nearly 80 per cent) by Strategic Clinical Network. This has potentially significant consequences to episode based hospital costs.
- **Two year patient survival shows large variation across Strategic Clinical Networks** – both amongst all patients and those undergoing a major resection. There are many potential causes of this variation, each with very different implications. The Audit is unable to fully investigate the variation because very little information has been collected on patients not treated surgically, but with the redesign of the Audit dataset, this is a priority for the Audit in the future.
- **Two year patient survival 80 per cent if cancer resected** – between April 2012 and March 2013 one in three colorectal cancer patients did not undergo resection. Non-resection as a treatment option represents a complex mixture of early stage disease, patient frailty and advanced cancer. Two-year survival was 67 per cent for all 78,609 colorectal cancer patients diagnosed between the 1 April 2008 and the 31 March 2011 – 80 per cent if resected and 43 per cent if not resected.
- **Rectal Cancer** – 86 per cent of cases had evidence of MRI staging and 93 per cent of those undergoing resection were CRM negative. Neoadjuvant therapy data is still too incomplete to be meaningful. Five per cent of rectal cancer patients had a local excision; 51 per cent a major resection (63 per cent of major resections were anterior resection, 26 per cent APER and 12 per cent Hartmann's or unknown) and 44 per cent had no tumour surgery. Two-year survival was 48 per cent in those having no tumour surgery; 87 per cent in those treated surgically.

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Recommendations

1. NBOCA is only as good as the data submitted by the contributing MDTs, (Multi-disciplinary Teams). For this reason clinical ownership and oversight of the data submitted by each Trust is crucial. The Lead Clinician, together with other members of the MDT, should ensure accurate and complete data collection for submission to the Audit. For patients diagnosed from 1 April 2013 the Clinical Audit Platform allows clinician scrutiny of the MDT data upload by providing them with easy access to the data entered. Colorectal cancer MDT upload should move to a monthly configuration allowing all Consultant Colorectal Surgeons to actively inspect their data in real time. This will both enhance the accuracy of the Audit and ensure accurate Consultant Outcome Publication.

   To register for the clinical audit platform please go to https://clinicalaudit.hscic.gov.uk and complete the registration form. This then needs to be signed by your Trust's Caldicott Guardian and forwarded to enquiries@hscic.gov.uk (HSCIC Contact Centre). Once you have received your single sign on account you will be able to use it to access the clinical audit platform via https://clinicalaudit.hscic.gov.uk/nboca

2. Emergency colorectal cancer admission remains a substantial challenge. The poorer outcome associated with this mode of admission emphasises the need for strategic clinical networks and units to re-visit their arrangements for caring for the elderly, high risk patient presenting acutely. Pathways that provide preoperative resuscitation, adequate theatre access, post-operative critical care, and early colorectal team involvement, including full radiological support and facilities for colonic stenting, are likely to improve post-operative survival. (see Invited Review Professor Ian Peter Bissett, Department of Surgery, University of Auckland)

   NBOCA is planning to link to the National Emergency Laparotomy Audit (NELA) dataset. This will allow us to investigate the variation in emergency care for colorectal cancer patients.

3. Laparoscopic surgery for elective colorectal cancer represents a real success for surgical practice in England and Wales. Laparoscopic colorectal surgery has clear advantages for selected patients in terms of length of stay and possibly outcome measures. In line with the current NICE (National Institute for Health and Care Excellence) guidance, suitable patients should be offered the opportunity for a laparoscopic resection. (see Invited Review Tracy L. Hull, MD Professor of Surgery Cleveland Clinic Department of Colorectal Surgery Cleveland, Ohio)

4. Rectal cancer care remains complex with pathways that aim at both organ preservation and using different combinations of chemoradiotherapy to reduce the problem of local recurrence. A move to synoptic reports by pathologists should improve the reporting of circumferential resection margins. The utilisation of stomas in anterior resection is high and the problem of delayed closure of "temporary" stomas requires addressing. In addition explanation is required for the variation in the use of delayed rectal cancer surgery amongst Strategic Clinical Networks. (see Invited Review Steven Wexner Chairman of Colorectal Surgery – Director Digestive Disease Center Cleveland Clinic Florida)

5. Strategic Clinical Networks, each based on a population of approximately 1.5million, represent a new focus for clinical care. There needs to be further study of the substantial variation amongst English Strategic Clinical Networks/Wales in the proportion of patients who spend longer than five days in hospital after colorectal resection (55 per cent to 80 per cent), with the associated hospital costs, and in the two-year mortality, both of all patients with colorectal cancer and in those undergoing a major resection. NBOCA is planning to investigate both of these issues further.

6. NBOCA continues to evolve in scope, methodology and purpose. As well as elucidating successes and shortcomings in clinical pathways the Audit requires focus on the patient and family seeking information and guidance in making treatment decisions. Professional leadership of Surgeon Level Reporting along with a Clinical Reference Group both aim to have the patient interest at the centre of NBOCA endeavours.

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Patient Summary

What is the National Bowel Cancer Audit?

The National Bowel Cancer Audit is a national clinical audit, which records the care of patients with bowel cancer taking place in the NHS over a period of time.

What are the aims of the Audit and why is it important?

The Audit's main aim is to improve the quality of care and survival of patients with bowel cancer.

By collecting a large amount of information, it is easier to identify the most effective treatments, which can benefit patients. This can change cancer care so that in future patients will survive longer and have better quality of life after treatment.

The Audit compares the performance of hospitals and areas of the country known as Strategic Clinical Networks and the results are fed back to them. In this way, if problems are identified, the causes can be looked at and corrected. The trusts which do best can help others to improve by sharing best practice.

What are the practical steps the Audit advises hospitals and networks to do to improve after this Audit?

The Audit not only produces an Annual Report each year, but also a local action plan which provides suggested actions for hospitals and trusts to help them achieve the recommendations of the Report.

How does the Audit do this?

It collects data on the care and outcomes (what happens to patients in terms of their survival after treatment) from hospitals in England and Wales.

The results are reported at national, network and hospital trust level, so that they can be compared with each other, and also with national standards of care for patients with colorectal cancer which have been set out by NICE (The National Institute for Health and Care Excellence).

The Audit comes out every year so that it can show quality of care and survival from year to year. The Audit in its professional form has collected data since 2005.

How does the Audit collect reliable data to analyse?

The Audit collects information about the patient, their cancer and their treatment. The data item recorded for each patient is selected from a set of categories, to make sure that the data is entered in the same way by all hospitals.

It is important to have complete information about every patient. However, in such a large Audit some items are bound to be missing, which is why an Audit of all patients diagnosed/treated is virtually impossible.

The strength of this Audit is that data is collected on most of the patients treated. This year the Audit included 94 out of every 100 patients treated. These large numbers mean that the Audit is likely to give a very accurate picture of national colorectal cancer care.

Patients are all different. How does this affect the data?

Factors such as age and general health mean that the risk of surgery is different for every patient. Hospitals and networks are made up of different types of patients: some will have larger numbers of patients in good health and others larger numbers of those with less good health. This means that in some areas, even though their care may be good, patients are more likely to die following surgery.

In order to compare hospitals in a fair way the Audit adjusts their results to take into account how well or sick their patients are.

Who manages the Audit?

The Audit is commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP).

It is delivered by the Health and Social Care Information Centre (HSCIC), which manages the project and makes sure that the data is collected, kept secure, and is given to the analysis team in a way that they can analyse it.

Clinical leadership and direction is supplied by the Association of Coloproctology of Great Britain and Northern Ireland (ACPGBI) and statistical expertise comes from analysts at the Clinical Effectiveness Unit based at the Royal College of Surgeons of England.

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Who is included in the Audit?

All patients over the age of 18 with a first diagnosis of bowel cancer who are treated by an NHS Trust in England or a Health Board in Wales should be included in the Audit.

Can we find out the names of the patients in the Audit?

Data protection and privacy is an important part of the Audit so that no individual patients' names can be identified in the results.

What time period is covered by this Audit?

The Audit collects data every year and reports the results in an Annual Report the next year, as this allows enough time to analyse the data. This means that the Audit always looks at a time period in the past. The 2014 Annual Report shows the data for the care of patients diagnosed between 1 April 2012 and 31 March 2013.

Why collect data for some areas of care and not others?

The Audit collects data on items which have been identified and generally accepted as measures of good care. Each year the Audit looks at these indicators to assess which items would give the best picture of care for colorectal cancer patients and may then change some items.

Why pick the survival periods of 90 days and two years?

Whilst 5 year survival is the normal measure for people to be clear of cancer, for colorectal cancer, in most patients whose cancer returns this happens in the first two years after treatment. Therefore two year survival is a good measure of long term survival.

In the past, 30 day survival after an operation (surgery) was recorded, but survival to 90 days after surgery is now thought to be a better measure not only for surgery but also for total hospital care. A 90 day survival period will include those who have a long period of intensive care, which can happen after resection surgery (major surgery to remove a section of the bowel containing the cancer).

Audit Findings

Two year survival rates for patients who have a surgical resection

On average, out of every ten patients having a surgical resection, eight will survive for at least two years. Better survival rates after surgery may be due to better choice of who will benefit most from surgery. Operating on patients who have a high risk of dying after surgery is not in their best interests.

Two year survival rates for patients who do not have surgical resection

Two-year survival for patients who do not have a surgical resection is lower, at around four out of ten. However, this group is a mixture of very different patients. Many of these patients may be too ill or have cancer which is too advanced or in too difficult a position to be removed by surgery. Others may have very early stage cancer which can be treated by other non-surgical treatments.

90 day death rate after surgery has fallen

Since 2008 the risk of dying after resection surgery has fallen and is at an all-time low of less than five out of every 100 patients.

Use of Laparoscopic (key-hole) Surgery

The numbers having surgery by this method continues to increase and is now over four out of ten across the country as a whole. For patients who can have this operation, it brings benefits in faster recovery than an open operation (where a larger cut is made in the abdomen/stomach). Those patients who are an emergency case, have advanced cancer (tumour is large and/or has spread) or other health problems are more likely to have open surgery. However, NICE guidelines suggest that suitable patients should be offered laparoscopic resection.

Length of hospital stay

Early discharge from hospital after a five day stay is promoted as a measure of good care. Enhanced Recovery Programmes after surgery get patients up and about soon after their operation. Across the country as a whole, over two-thirds of patients stayed in hospital for longer than five days after their surgical resection. This was higher for rectal cancer patients (eight out of ten) than colon cancer patients (just under seven out of ten) and was higher for older patients. However, for colorectal cancer patients there may be reasons why they stay longer than five days such as the need for training about care of their stoma or there may be delays due to the need to organise help at home.

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What is the national picture?

There are some differences between regions of the country and hospital trusts in:

- length of hospital stay for colorectal cancer patients
- the number of resections carried out laparoscopically (key hole)
- the number of patients who get resection surgery
- two-year survival for all colorectal cancer patients, and for patients having a surgical resection.

The Audit needs to understand why these variations happen and discover the reasons to see if steps can be taken to make improvements.

The future – the way forward for the Audit

Further work is needed to collect information on how patients are selected for surgery (identifying patients who should do well after surgery and those who are unlikely to benefit from surgery). Four out of ten patients do not have surgery, and this will include those who have so little cancer that non-surgical treatments will be better for them. Understanding how patients are selected for surgery is the next step.

The Audit has changed the data set to collect fewer, but important items to help answer these questions. It hopes to link to other NHS databases, which could provide useful information on non-surgical treatments such as chemotherapy and radiotherapy. This should improve understanding about the treatment choices and how best they can be combined to benefit patient care and survival.

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1. Introduction

Quality Measures in Colorectal Cancer Management

There is little doubt that the National Audit of Bowel Cancer is on a journey and, as with many journeys, is faced, en route, with crossroads and roundabouts. The advantage of the former is the opportunity to make changes otherwise one is destined to make little progress and experience the sensation of "having been there before!" Anyone who has followed the progress of the audit cannot but be impressed so far, but the time has come to consider whether a turn has to be taken for fear of making no progress in light of the perceived "direction of travel."

We have been fortunate to have a profusion of guidelines on the management of colorectal cancer but they are exactly that, guidelines. They are open to interpretation, are advisory and readily acknowledge complexity in management and patient preference. The quality agenda, however, has moved on in all areas of medical care and the past decade has seen many efforts at converting colorectal, evidence-based, practice guidelines into performance measures or quality indicators. The experience last year of individual surgeons' outcomes should leave no-one in doubt that such measures are here to stay. What then is the role of the audit in this changing scene?

The latest NICE quality standards cover much of what can be found within the audit. Accurate staging of colonic cancers with a CT of chest and abdomen and the addition of pelvic MR imaging of rectal cancers are just two that have been identified and can, or should, be mandated fields within the audit. Similarly the audit should be able to record whether the colon has been fully evaluated pre-operatively or, in the case of obstructing lesions, in the months following resection. Other aspects are not so easy to record but one would like to surmise that discussion at the MDT would allow a pre-treatment strategy in cases of rectal cancer "appropriate to their risk of developing local recurrence."

The observation of seemingly inferior results in the UK compared with similar developed countries (The International Cancer Benchmarking Project) has certainly prompted further in depth investigations as to the management of patients with colorectal cancer. This audit report shows differences, even between strategic health authorities within England, for overall mortality at two years!

There is now a large literature on the development of quality indicators and in one study they numbered almost a hundred! The audit cannot be expected to track all such measures but the encouraging aspects of the work to date are the similarities that are agreed by independent groups. Accurate staging and colonic evaluation have already been noted. Added to this is additional information, often aided by the use of synoptic reporting in pathology and radiology. Retrieval and examination of at least twelve lymph nodes in resected specimens (allowing for the reduced number in cases of rectal cancer undergoing pre-operative neoadjuvant therapy), and a comment on the adequacy of margins of excision, both longitudinal and radial, feature in most agreed recommendations.

The management of colorectal cancer is complex and involves many specialties. The recorded involvement of clinical oncologists in cases of rectal cancer is an important auditable measure as is the use of adjuvant chemotherapy in cases of Stage III, node positive, colorectal cancer.

The challenge for the future is to demonstrate that we "do what others do!" Quality measures are classically divided into structural, process and outcomes. We are in a position to measure outcomes for example 30- and 90-day post-operative mortality, and two and five-year survival but we arrive at these outcomes through a complicated series of process measures which need to be audited albeit in an environment which may not be easy to change. It is clear that the process measures, what we do to our patients with colorectal cancer, are the most actionable as a unit.

Whilst much of what has been demanded in some countries relates to reimbursement, we are in the enviable position within the NHS, of having the opportunity of auditing our work with the emphasis on "quality." The UK has been at the forefront of linkage of administrative and registry datasets, a task hopefully made easier with the centralisation of cancer registration. The Scottish Cancer Taskforce is well advanced, through their colorectal cancer clinical quality performance indicator project, in setting targets against many of the measures outlined above. Similarly the Danish National Indicator Project has, in eight disease areas, shown how feedback of quality measures can be achieved. We have to assume that the very measurement of quality indicators will ultimately improve quality but we will only prove such a hypothesis if the audit moves past the roundabout and, through the Association of Coloproctology of Great Britain and Ireland, takes the correct turn.

Paul Finan
Past Clinical Lead
National Bowel Cancer Audit

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2. Methods

Methodology - NBOCA 2014

- All participating trusts in England submitted their data via the Open Exeter system. The Welsh data is submitted directly from the CaNISC system to the Open Exeter system.
- All patients diagnosed from 1 April 2013 will be entered into the HSCIC Clinical Audit Platform https://clinicalaudit.hscic.gov.uk/nboca which does not accept multiple tumour or multiple treatment records.
- Multiple tumour and treatment records were consolidated into a single record for the tumour, using rules developed to resolve conflicting entries between multiple records. To view those rules, see the Supportive Document.
- Case ascertainment is calculated for English Strategic Clinical Networks and trusts, using HES to estimate the denominators.
- The Audit dataset is linked to HES at the patient level to obtain further information on patient care and follow-up, such as stoma reversal and emergency readmissions in England. The equivalent data for Wales (PEDW) was not available.
- Most results are descriptive and are presented in simple tables with percentages of patients in each group.
- Funnel plots are used to compare the following four outcomes between Strategic Clinical Networks/Wales and between trusts/sites: 90-day mortality after major resection; 90-day emergency readmission after major resection; two-year mortality after major resection and 18-month stoma rate after major resection for rectal cancer. All outcomes are adjusted for patient case-mix.
- Potential outliers on these four risk-adjusted outcomes are reported back to Strategic Clinical Networks/Wales and to trusts/sites in advance of the report being published.

2.1 Data collection

All eligible NHS trusts in England and all Health Boards in Wales submitted data to the Audit for inclusion in the 2014 Annual Report. The majority of analyses in this report include patients in England and Wales submitted to the Audit who were diagnosed between 1 April 2012 and 31 March 2013, but for certain patient outcomes different, more relevant, inclusion criteria are used. Data is also available from the previous four audits and comparisons are made across years for certain key statistics. Patients submitted to the Audit in a previous year are excluded from subsequent audits. All participating trusts submitted their data for this annual report via the Open Exeter system. The Welsh data was submitted directly from the CaNISC system to the Open Exeter system. Note that in April 2013 a new data entry platform, the HSCIC's Clinical Audit Platform, was introduced, as described at www.hscic.gov.uk/bowel.

2.2 Data processing

Multiple records

The data set that is collected through the Open Exeter system consists of separate tables on characteristics of the patient, the tumour, the treatment, and the follow-up of the patient, which are linked using a unique patient identifier.

Although decreasing, the number of patients with multiple treatment records per patient is still a substantial issue, this year affecting 20 per cent of patients. This can affect the quality of data in the Audit if there is conflicting information between the records. Details of how multiple records are dealt with are given in the Supportive Document. For the 2015 Annual Report this will no longer be an issue as the introduction of the new data entry platform only allows the creation of one record per patient.

2.3 Case ascertainment

Case ascertainment is expressed as a ratio of the number of patients reported to the Audit compared to the number of patients admitted for the first time to the participating units with a date of diagnosis of bowel cancer within the audit period, according to HES. Further details are given in the Supportive Document.

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2.4 Linkage to HES

Audit data linked to HES data allows the possibility of exploiting HES data for items not available in the Audit as well as information that is poorly recorded in the Audit. In particular HES is useful for analysing patient follow-up, such as emergency readmissions and stoma reversals. The mode of admission (elective or emergency) is defined in HES, as is the number of co-morbidities, which is defined according to the Charlson co-morbidity score.

Patients treated at hospitals in England were linked to HES records using their NHS numbers, date of birth, sex and postcode. 90.5 per cent of patients undergoing major surgery at English trusts in the Audit could be linked to HES.

For this Annual Report the audit has been unable to obtain PEDW data for those patients receiving treatment in Wales, therefore all risk adjusted outcomes for Welsh patients included imputed data.

2.5 Data completeness

Data completeness is defined as the proportion of patients with complete data items on all seven of the variables: age, sex, ASA grade, TNM T-stage, TNM N-stage, distant metastases and site of cancer, as these are the variables from the Audit that are used for risk adjustment when comparing post-operative mortality between Strategic Clinical Networks and trusts. Distant metastases are defined as M-stage M1 or Dukes' stage D. Mode of admission and number of co-morbidities are also used in the model but they come from HES and are therefore not included in data completeness. Data completeness is only assessed in patients who underwent major surgery, because only in these patients could all seven data items be expected to be complete. The completeness of other data items in the Audit is mixed, as can be seen in the tables of results throughout this report. Data completeness reports have been sent to each Strategic Clinical Network and trust both to provide feedback on the data submitted and to point to areas that need to be addressed in individual trusts if the Audit is extended to answer additional clinical questions. The improvement in data completeness over the past five years is shown in Table 2.1.

Table 2.1
Percentage of patients undergoing major surgery with complete data on the 7 items from the Audit used in risk adjustment, by Audit year

	2008-09		2009-10		2010-11		2011-12		2012-13	
	Number	%	Number	%	Number	%	Number	%	Number	%
Total patients undergoing major resection	14,530		16,773		19,074		19,362		20,193	
Complete data on 7 key items	10,181	70.1	12,293	73.3	15,136	79.4	15,762	81.4	17,538	86.9
Incomplete data on 7 key items	4,349	29.9	4,480	26.7	3,938	20.6	3,600	18.6	2,655	13.1

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2.6 Handling missing data

The details of how missing data was handled are given in the Supportive Document.

2.7 Definition of outcomes derived from HES

Emergency readmission within 90 days of surgery was derived from HES data in patients undergoing major surgery, and was defined as an emergency admission to any hospital for any cause within 90 days of surgery. HES records mode of admission as one of elective, emergency, maternity, or transfer from another hospital. Emergency admissions include admission via Accident and Emergency services, or emergency admission via general practitioner, Bed Bureau, or consultant outpatient clinic.

18-month stoma rate was estimated on rectal cancer patients undergoing major surgery. Patients undergoing an abdomino perineal excision of the rectum (APER) or Hartmann's procedure according to the Audit were assumed to have had a colostomy at the time of their primary procedure. In patients having an APER this colostomy is clearly permanent. Patients undergoing an anterior resection (AR) were assumed to have had an ileostomy or colostomy if this information was recorded in the Audit (whether recorded as permanent or temporary). This information was missing in a large proportion of patients, and was updated from procedure codes for colostomy or ileostomy in HES from the time of the primary procedure onwards.

In patients having an AR or Hartmann's procedure, information on reversal of stomas was taken from procedure codes in HES only, regardless of whether recorded as permanent or temporary in the Audit. A procedure code for reversal of ileostomy or colostomy within 18 months of surgery was assumed to mean that the patient had their stoma reversed, regardless of whether the stoma was coded as an ileostomy or colostomy. This approach to dealing with coding inconsistencies was taken on the grounds that if a procedure code for stoma reversal was recorded in HES it was probable that a stoma reversal took place, and that the details of the procedure were incorrectly coded.

2.8 Definition of Surgical Urgency

Surgical urgency is the timescale within which a patient is thought to need their operation. An early operation indicates that a patient is more unwell and would be unlikely to survive without the operation. This means that automatically the risk of death following the surgery is likely to be higher than someone who is well and can wait days/weeks for their operation. The audit uses the pre-2004 National Confidential Enquiry into Patient Outcomes and Death (NCEPOD) classification of surgical urgency:

- Elective: Operation at a time to suit both patient and surgeon e.g. after an elective admission
- Scheduled: An early operation but not immediately life-saving. Operation usually within three weeks
- Urgent: As soon as possible after resuscitation and usually within 24 hours
- Emergency: Immediate and life-saving operation, resuscitation simultaneous with surgical treatment. Operation usually within two hours.

The arguments to maintain the pre-2004 NCEPOD definition are that the classification based on this definition correlates strongly with:

- known risk factors for emergency treatment (age, socio-economic deprivation, and presence of co-morbidity),
- the mode of admission coded in HES,
- the observed 90-day mortality.

Introducing a new classification system for a key characteristic of the surgical procedure would make it impossible to compare outcomes in different audit periods which would in turn make it impossible to monitor trends in outcome over time, which is one of the key functions of the audit.

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2.9 Statistical Analysis

Most results reported in this audit report are descriptive. The results of categorical data items are reported as percentages (per cent). The denominator of these proportions is in most cases the number of patients for whom the value of the data item was not missing.

Results are typically grouped by Strategic Clinical Network and/or trust/hospital/MDT. England's 12 Strategic Clinical Networks were used in the analyses, and compared to Wales as a whole. The results for Wales are reported according to where the multidisciplinary team who discussed the patients' management were located, rather than by trust/hospital. With almost 32,000 cases across 167 trusts/sites/MDTs, there were approximately 2,500 cases per Strategic Clinical Network, and of the order 200 per trust/hospital/MDT.

Funnel plots

Funnel plots are used to make comparisons between Strategic Clinical Networks or between trusts/hospitals on the following outcomes: 90-day mortality after major surgery; 90-day emergency readmission after major surgery; two-year mortality after major surgery; and 18-month stoma rates for rectal cancer patients undergoing major surgery. The rate for each Strategic Clinical Network or for each trust or hospital is plotted against the total number of patients used to estimate the rate. The "target" is specified as the average rate across all Strategic Clinical Networks/trusts/hospitals.

For all of the funnel plots by trust/site in this report, if all trusts/sites had the same underlying rate, four would be expected to lie above the inner limits and 0.2 above the outer limit by chance alone.

In this report, those Strategic Clinical Networks, trusts or hospitals with results outside the outer (99.8 per cent) funnel limit are considered as *potential* outliers and are contacted according to the recommended HQIP procedure. See the Supportive Document for more information about the interpretation of funnel plots.

Adjusted outcomes

Multivariable logistic regression was carried out to estimate risk-adjusted 90-day post-operative mortality, 90-day emergency readmission, and 18-month stoma rates for rectal cancer patients undergoing major surgery. A Poisson model was fitted to estimate risk-adjusted two-year mortality after major surgery. Unlike the 90-day mortality, 90-day emergency readmission rate and 18-month stoma rate, the two-year mortality rate takes into account the length of time each patient was followed up for. The observed two-year mortality is the number of patients who died within two years divided by the sum of the amount of time each patient is followed for. For example, in two trusts/sites with the same proportion of patients dying within two years, the trust in which patients die earlier will have a higher two-year mortality rate.

Multivariable Regression Model Variables	
Patient Characteristics	Age; Age squared Sex
Morbidity and Presentation	ASA grade; Charlson co-morbidity score (according to HES). Mode of admission (according to HES)
Cancer	T-stage, N-stage, Distant metastases (according to M-stage or Dukes' stage), Site of tumour

An interaction between age and distant metastases was also included in the models to allow age to have a different effect in patients with and without metastases. Once patients have metastatic disease the effect of age is found to be far less important than in patients without metastases. The model for two-year survival additionally included interactions between epoch (0-three months after surgery vs. three-24 months after surgery) and all of the risk factors. This allows risk factors to have a different effect shortly after surgery and in the longer term. For example, the effect of ASA grade is much larger peri-operatively than in the longer-term, whilst cancer stage has a much larger impact on longer-term than short-term mortality. The model for 18-month stoma rate did not include cancer site as it was for rectal cancer patients only.

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Patients with missing date of surgery were excluded, and multiple imputation was used to fill in any missing information on the risk factors. The following Trusts were excluded from the listed analysis because most patients were missing on ASA grade and/or TNM-stage:

- 90 day mortality and 90 day readmission:
  - Heatherwood and Wexham Park Hospitals NHS Foundation Trust.
- Two-year survival:
  - East Kent Hospitals University NHS Foundation Trust
  - Luton and Dunstable Hospital NHS Foundation Trust
  - Medway NHS Foundation Trust
  - Peterborough And Stamford Hospitals NHS Foundation Trust
  - Royal Free Hampstead NHS Trust
  - Royal United Hospital Bath NHS Trust
  - St George's Healthcare NHS Trust.
- 18 month stoma rate:
  - East Kent Hospitals University NHS Foundation Trust
  - Luton and Dunstable Hospital NHS Foundation Trust
  - Medway NHS Foundation Trust.

The adjusted outcomes were estimated using indirect standardisation. The observed number of events for a trust or hospital was divided by the number expected on the basis of the multivariable regression model. The adjusted rate was then estimated by multiplying this ratio by the average rate in all patients included in the analysis.

All statistical analyses were performed using Stata version 11.

2.10 Surgeon Level Outcomes and Data Modification

As part of the 'Everyone Counts: Offer 2' initiative, the National Bowel Cancer Audit was required to publish outcome data for colorectal surgeons in autumn 2013. Following publication of the 2013 Annual Report, some trusts amended part of their data for patients diagnosed between 1 April 2010 - 31 March 2012 to ensure that data used in this Consultant Outcomes Publication was as accurate as possible.

This has led to both the addition of new patients to the audit dataset and amendment of data that had been published previously. Consequently, where audit data is presented over several years, the totals for the years 2010-2011 and 2011-2012 are often different to those presented in the 2013 Annual Report – altering some of the trends presented in the 2013 Annual Report.

The Consultant Outcomes Publication is available at http://www.acpgbi.org.uk/surgeon-outcomes/ and has been updated during autumn 2014 to include the data that has been submitted for the 2014 Annual Report.

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3. Colorectal Cancer – Surgical Care

Overview Colorectal Cancer – NBOCA 2014

- Overall 90 day mortality after major surgery has reduced over five years to 4.6 per cent.
- Emergency admission with colorectal cancer remains at a stubborn 21 per cent of all cases in England (Welsh data unavailable).
- Emergency major surgery is associated with a risk of death of 15.8 per cent at 90 days.
- 66 per cent of colon cancer patients and 80 per cent of rectal cancer patients are still in hospital five days after resection. Additionally, there is substantial regional variation in this percentage (between 55 and nearly 80 per cent). This has potentially significant consequences to episode based hospital costs.
- From 25 per cent of resections being laparoscopic in 2008, the progressive use of laparoscopic resections has increased to around 45 per cent; 60 per cent of elective/scheduled resections are attempted/completed laparoscopically.

Colorectal cancer is a major cause of illness, disability and death in England and Wales. This 2014 Audit includes 31,723 people who were diagnosed with colorectal cancer between April 2012 and March 2013. Surgical removal of a locally confined cancer remains the most certain modality of cure but patient suitability and disease characteristics have a profound influence on treatment.

Important markers of patient outcome after major surgery for colorectal cancer include patient death after an operation, the length of time you need to be in hospital for and the need to be readmitted in the first few months after getting home. Another marker of surgical care is the use of laparoscopic surgery to remove the cancer. In this section of the Annual Report we present the 2012-2013 experience with respect to these outcomes.

3.1 Chances of Death after Major Surgery

Table 3.1
Per cent undergoing major surgery and chance of death after major surgery, by audit year

	2008-09		2009-10		2010-11		2011-12		2012-13	
	Number	%	Number	%	Number	%	Number	%	Number	%
Total patients	22,977		27,389		29,140		30,542		31,723	
Undergoing major resection	14,530	63.2	16,773	61.2	19,074	65.5	19,362	63.4	20,193	63.7
Died within 30 days of major resection	579	4.0	645	3.9	640	3.4	555	2.9	578	2.9
Died within 90 days of major resection	876	6.1	969	5.8	995	5.2	886	4.6	924	4.6

Although conventional surgical outcomes describe post-operative mortality at 30 days the audit has explored this outcome at three months for the following reasons:

- from a patient perspective the risk of post-operative death at three months is just as significant an outcome as death within one month of surgery
- post-operative death at three months captures those deaths that occur after prolonged critical care support which is now a much more common feature of colorectal cancer resection and adds significantly to the procedure associated death rate
- exploration of post-operative death beyond three months adds little additional outcome information.

Table 3.1 demonstrates that unadjusted post-operative mortality has decreased over the last five years of the Audit indicating better surgical outcomes for those undergoing major resection. As the proportion of patients undergoing major resection has remained fairly constant the decrease in unadjusted post-operative mortality may indicate improvement of patient care is leading to a reduction in post-operative death.

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Figure 3.1 shows the variation in 90-day post-operative mortality across English Strategic Clinical Networks/ Wales, without and with risk-adjustment. When making comparisons between Strategic Clinical Networks and between trusts/sites, 90-day mortality was adjusted for the following 10 risk factors (see Table 6.3 of the 2012 Annual Report for details):

- age
- sex
- ASA grade
- T-stage
- N-stage
- distant metastases
- mode of admission
- cancer site
- number of co-morbidities
- interaction between age and distant metastases (described in Section 2.9).

After risk-adjustment there were no networks above the inner limits. Across Strategic Clinical Networks there is no more variation in 90 day post-operative mortality than might be expected by chance. This implies that there is no postcode lottery in post-operative mortality across the English Strategic Clinical Networks and Wales when analysed in large patient populations.

Previous reports have given outcomes by Cancer Network with average populations of about 1.5 million and approximately 1,500 new colorectal cancer patients each. The new English Strategic Clinical Networks are much larger with proportionately more cases of colorectal cancer each year.

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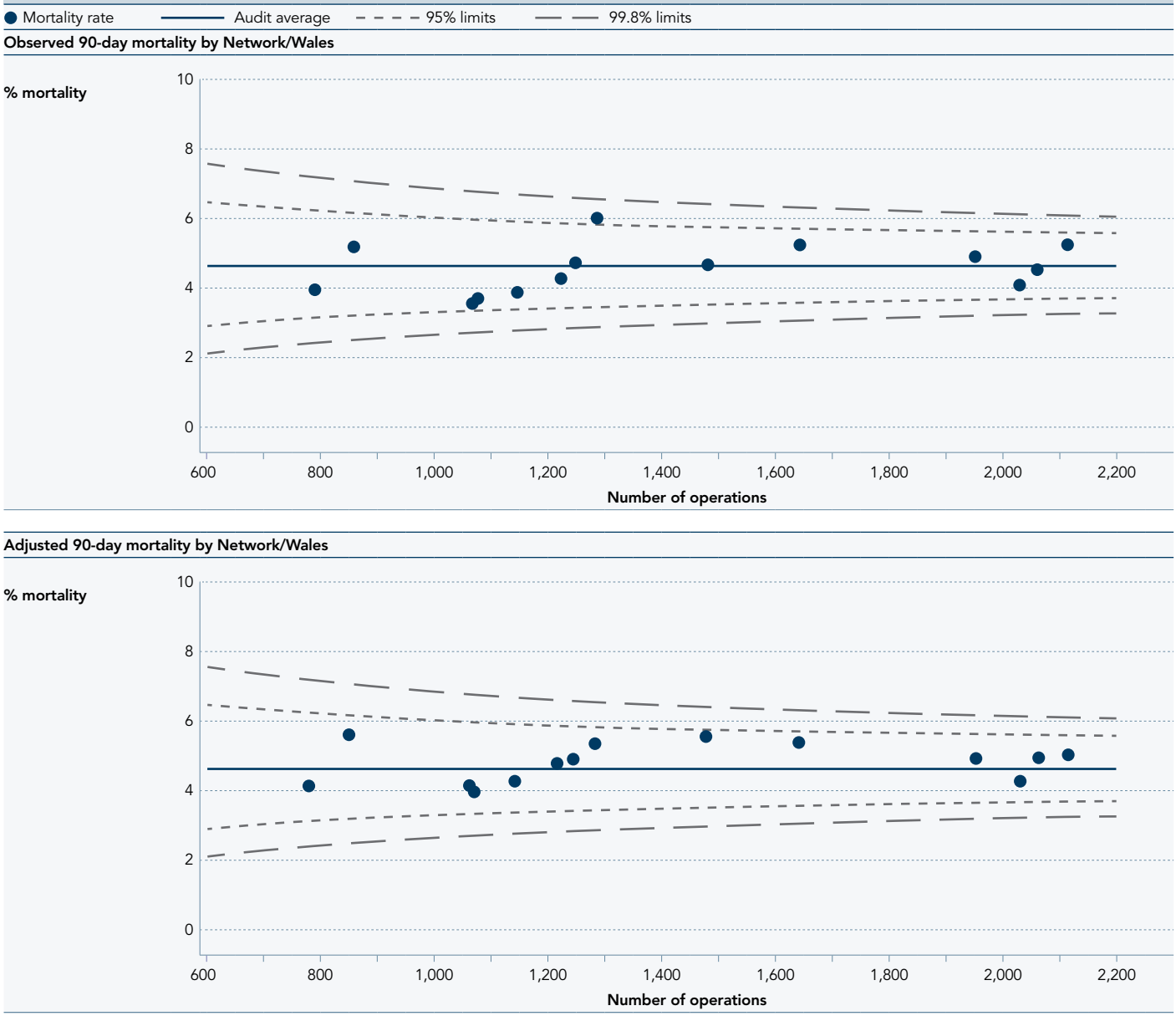
Figure 3.1
Observed and adjusted 90-day post-operative mortality (Elective and Emergency admissions) by English Strategic Clinical Network/Wales for patients diagnosed between 1 April 2012 and 31 March 2013



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Funnel plots for 90-day post-operative mortality by trust/site, both observed and risk-adjusted, are presented in Figure 3.2. There were no trusts above the outer limit for adjusted 90-day mortality.

Figure 3.2
Observed and adjusted 90-day post-operative mortality (Elective and Emergency admissions) by trust/site with more than ten operations for patients diagnosed between 1 April 2012 and 31 March 2013

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3.2 Death after Surgery and Mode of Admission

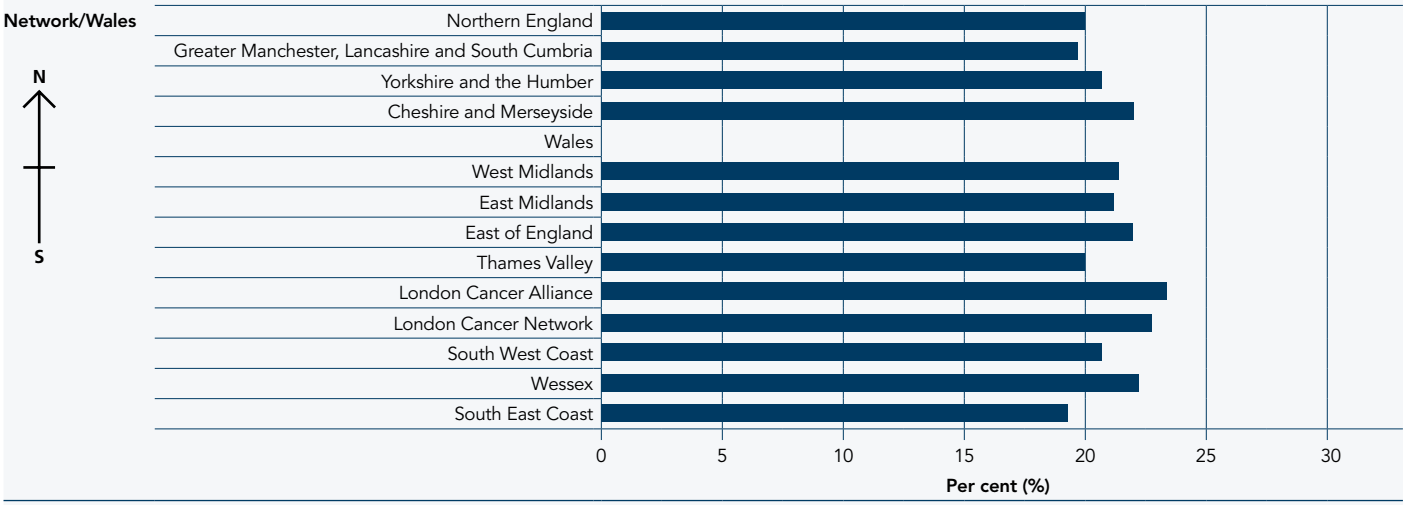
Emergency admission with colorectal cancer has been an unchanging feature of clinical practice in England and Wales, accounting for a stubborn 21 to 22 per cent of all admissions across the previous four years of audit data submissions. Table 3.2 shows that this pattern has not changed over the last year of audit data from England. It might be hoped that Bowel Symptom Awareness and the Bowel Screening Programme may in due course diminish this aspect of clinical presentation.

Table 3.2
Emergency admissions in England (from HES), by audit year

	2008-09		2009-10		2010-11		2011-12		2012-13	
	N	%	N	%	N	%	N	%	N	%
Total patients	21,086		25,382		27,794		28,510		29,681	
Emergency admission	4,149	21.7	5,074	22.1	5,462	21.7	5,198	20.3	5,402	21.0
Elective admission	14,972	78.3	17,909	77.9	19,729	78.3	20,441	79.7	20,357	79.0
Missing (% of total)	1,965 (9.3)		2,399 (9.5)		2,603 (9.4)		2,871 (10.1)		3,922 (13.2)	

Mode of admission, according to HES, shows far less variation between Strategic Clinical Networks than previous Annual Reports showed between Cancer Networks (Figure 3.3 2013 Annual Report).

Figure 3.3
Emergency admissions according to HES, in all patients linked to HES, by English Strategic Clinical Network *



* Equivalent data (PEDW) is not available for Welsh patients

As a consequence of this pattern of colorectal cancer admissions, 15 per cent of patients having major surgery had an urgent or emergency procedure. However, there was again substantial variation in the data submitted to the audit with 14 trusts/hospitals indicating that at least a quarter of the procedures for patients with colorectal cancer were classified as urgent or emergency (Table 6.3).

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Table 3.3
Mortality in patients who had major surgery by surgical urgency

		2008-09		2009-10		2010-11		2011-12		2012-13	
		Number	%	Number	%	Number	%	Number	%	Number	%
Total patients undergoing major resection		14,530		16,773		19,074		19,362		20,193	
Overall 90-day mortality*		876/14,430	6.1	969/16,667	5.8	995/19,059	5.2	886/19,362	4.6	924/20,192	4.6
90-day mortality by urgency of operation	**Elective**	362/9,027	4.0	404/10,076	4.0	432/12,321	3.5	353/12,631	2.8	366/13,023	2.8
	Scheduled	99/2,187	4.5	97/2,515	3.9	112/3,279	3.4	100/3,380	3.0	121/3,932	3.1
	Urgent	160/1,381	11.6	169/1,866	9.1	160/1,513	10.6	156/1,423	11.0	159/1,360	11.7
	Emergency	206/1,149	17.9	251/1,460	17.2	274/1,672	16.4	255/1,708	14.9	274/1,738	15.8
	Missing urgency of operation	49/686	7.1	48/750	6.4	17/274	6.2	22/220	10.0	4/139	2.9

*some patients are missing mortality data

The very real consequence of emergency presentation is the increased risk of post-operative death that this mode of admission poses when followed by surgical resection. Elective or scheduled surgery for colorectal cancer results in about three patients in one hundred dying by 90 days. By contrast, those patients who have major surgery on an urgent or emergency basis fare significantly worse with about 14 patients in one hundred dying by 90 days; a figure which has remained stable over the time period above.

Reducing the need for emergency and urgent surgery in colorectal cancer is clearly a priority given the post-operative outcomes associated with these interventions. Stenting strategies that allow emergency admissions with obstruction to be converted to planned resections may also have a role in improving the outcome of this poor prognosis group.

NICE clinical guideline 131, November 2011, 1.2.2 Colonic stents in acute large bowel obstruction

- If considering the use of a colonic stent in patients presenting with acute large bowel obstruction, offer CT of the chest, abdomen and pelvis to confirm the diagnosis of mechanical obstruction, and to determine whether the patient has metastatic disease or colonic perforation. [2011]
- Do not use contrast enema studies as the only imaging modality in patients presenting with acute large bowel obstruction. [2011]
- For patients with acute left sided large bowel obstruction caused by colorectal cancer that is potentially curable, and for whom surgery is suitable:
  - Resuscitate patients and explain to them and their family members or carers (as appropriate) that acute bowel obstruction can initially be managed either with emergency surgery or a colonic stent, and that there is no clear evidence that one treatment is better than the other. [new 2014]
  - Offer patients the chance to take part in a randomised controlled trial[2] (if available) that compares emergency surgery with colonic stent insertion to initially manage acute bowel obstruction. [new 2014]
- For patients with acute left sided large bowel obstruction caused by colorectal cancer that is not potentially curable, or for whom surgery is unsuitable:
  - Resuscitate patients with acute large bowel obstruction, then consider placing a self expanding metallic stent to initially manage a left sided complete or near complete colonic obstruction. [2011]
  - A consultant colorectal surgeon should consider inserting a colonic stent in patients presenting with acute large bowel obstruction. They should do this together with an endoscopist or a radiologist (or both) who is experienced in using colonic stents. [2011]
- Do not place self expanding metallic stents:
  - in low rectal lesions **or**
  - to relieve right sided colonic obstruction **or**
  - if there is clinical or radiological evidence of colonic perforation or peritonitis. [2011]
- Do not dilate the tumour before inserting the self expanding metallic stent. [2011]
- Only a healthcare professional experienced in placing colonic stents who has access to fluoroscopic equipment and trained support staff should insert colonic stents. [2011]

[2] At the time of publication (December 2014), the CReST trial was recruiting patients with acute bowel obstruction caused by suspected colorectal cancer for randomisation to either colonic stent insertion or emergency surgery.

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Invited Tripartite 2014 Commentary

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It is surprising that despite the national implementation of bowel cancer screening and increased awareness of bowel cancer there has been a relatively constant rate (21 per cent) of emergency admissions in patients since 2008. Although the audit data does not provide direct information that may explain this, it does provide a hint in relative rates of emergency admissions across geographical areas. One could imagine that the very patient groups that avoid screening are the ones that ignore symptoms. There is already ample evidence of differences in uptake of bowel cancer screening between different deprivation groups. There are also several studies that have identified deprivation index and older age as risk factors for emergency admission with bowel cancer. It would be of great interest to determine whether those who present acutely have ever undergone screening.

It is also sobering to note that emergency major surgery is associated with a risk of death about five and a half times higher than those for elective surgery. The reasons for this increased risk are multifactorial including differences in the patient's physiological state, hospital staffing, and anaesthetic and surgical proficiency of those operating among other things. These differences may be reduced using interventions such as physiological optimisation by more experienced staff, improved access to emergency operating theatres during normal working hours and innovative rostering of specialist staff. Emergency stenting as a 'bridge' to elective surgery in those with non-perforated obstruction may also provide a way to reduce risk in individual patients. However, despite several attempts to conduct a randomised trial for stenting in this setting, there is no robust evidence to confirm its benefit. The theoretical benefit hinges on the safety of stenting and the supposed conversion of patients from an emergency risk rate to that of elective surgery. Ideally, patients for whom this is a suitable alternative should be entered in to the CReST trial. The greatest reduction in mortality rates after surgery would be obtained by shifting patients from the emergency admission to the elective group. Efforts to achieve this will require more research into the underlying reasons why these particular patients have not presented at an earlier time.

3.3 Length of Hospital Stay

For those patients that survive surgical resection, the length of time they are ill and need to remain as an inpatient is another marker of quality of care. The widespread adoption of enhanced recovery programmes means that discharge home about five days after resection has become an accepted "ideal" in defining length of stay after colorectal cancer resection.

The Enhanced Recovery Programme is about getting patients back to good health as soon as possible after a colorectal cancer operation. This is done by both patient education and multiple interventions designed to aid early mobilisation and early resumption of normal eating and drinking. As a consequence of good patient progress, many patients should be able to go home earlier and so avoid prolonged hospital stays associated with "traditional care" after cancer surgery.

Table 3.4 summarises the outcomes of patients undergoing major surgery, by cancer site. Just over two-thirds of patients stayed in hospital for longer than five days after their surgery, and this was more often seen after surgery for rectal cancer surgery (80 per cent) than after colon cancer surgery (65 per cent). Post-operative teaching of stoma care may be part of the explanation for a longer inpatient stay after rectal cancer surgery. There appears to be an increase in the length of stay after surgery after the age of 75 in each cancer site group. It is likely that this represents a combination of increased co-morbidity and social dependency in determining the discharge date.

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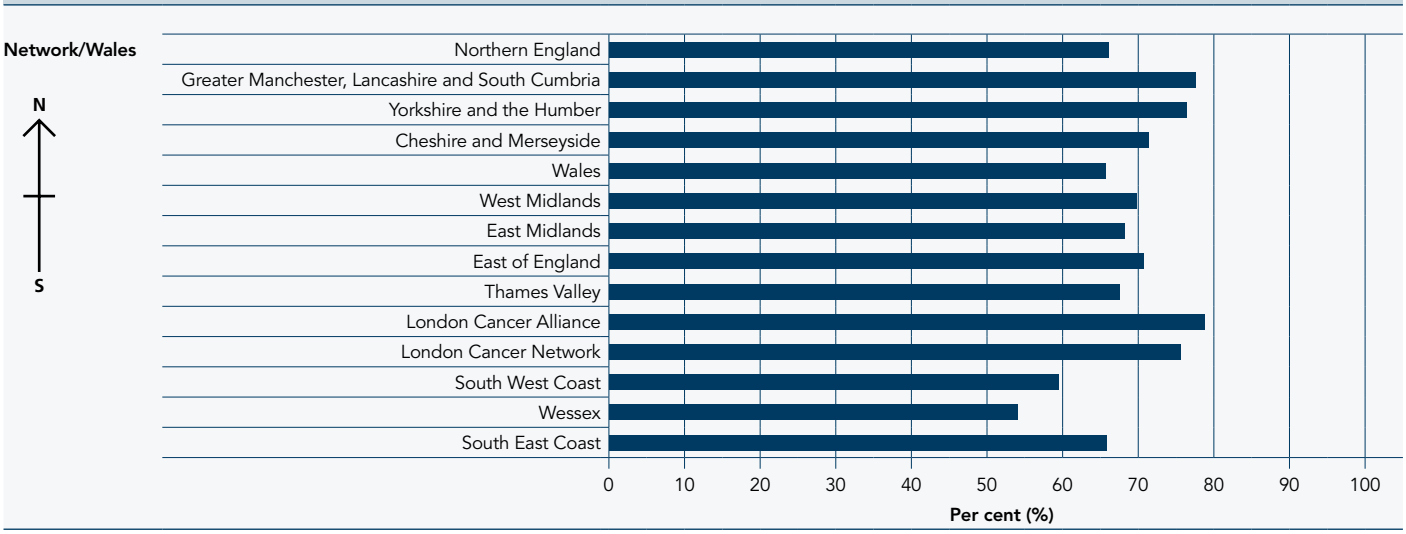
Table 3.4
Length of hospital stay of patients undergoing major resection, by cancer site

			Colon		Rectosigmoid		Rectal	
			Number	%	Number	%	Number	%
Total patients undergoing major resection			**13,768**		**1,371**		**5,054**	
Length of hospital stay (LOS)		**Median LOS**	7		7		9	
		Range	0-375		0-374		0-336	
		Interquartile range	5-12		5-12		6-14	
Length of stay longer than 5 days		**Yes**	8,078	65.5	814	66.6	3,558	79.9
		No	4,264	34.5	409	33.4	894	20.1
		Missing (% of total)	1,426 (10.4)		148 (10.8)		602 (11.9)	
Length of hospital stay by age group	**≤64 years**	**Median LOS**	6		6		8	
		Range	0-368		0-374		0-151	
		Interquartile range	4-10		4-11		5-12	
	65-74 years	**Median LOS**	6		7		9	
		Range	0-315		1-85		0-336	
		Interquartile range	4-11		5-11		6-14	
	75-84 years	**Median LOS**	8		8		10	
		Range	0-375		0-130		0-124	
		Interquartile range	5-13		6-14		7-17	
	85+ years	**Median LOS**	10		11		11	
		Range	0-213		2-88		1-108	
		Interquartile range	6-18		7-15		8-16	

Figure 3.4 shows the proportion of patients staying in hospital longer than five days after major resection by Strategic Clinical Network. There was substantial variation amongst English Strategic Clinical Networks/Wales, from 55 per cent to nearly 80 per cent of patients still in hospital five days or longer after resection. It is unlikely that large differences in clinical approach might account for all of this variation. Hospital discharge in an elderly population of colorectal cancer patients is likely to be extremely dependent on aspects of social care provision and have significant consequences to the episode based hospital costs.

Figure 3.4
Length of hospital stay > 5 days after major surgery by English Strategic Clinical Network/Wales



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3.4 Emergency Readmissions within 90 days

The other side of the coin to hospital discharge is the need for unplanned hospital admission shortly after getting home. Therefore, an important part of assessing quality of hospital care for colorectal cancer patients is to determine the emergency readmission rate of patients undergoing major surgery.

For the purposes of this analysis we used HES data linked to the cases submitted to the audit by English Trusts to determine emergency readmissions within 90 days of surgery.

Overall, one in five patients had an emergency readmission within 90 days of surgery, and this has remained stable over the last five years.

Table 3.5
Emergency hospital readmission (HES definition) within 90 days of surgery for patients undergoing major resection in England, by audit year

		2008-09		2009-10		2010-11		2011-12		2012-13	
		n	%	n	%	n	%	n	%	n	%
Total patients undergoing major resection		**13,233**		**15,345**		**18,162**		**18,110**		**18,904**	
Emergency readmission within 90 days	Yes	2,301	19.0	2,751	19.4	3,357	20.0	3,414	20.2	3,391	19.8
	No	9,810	81.0	11,402	80.6	13,429	80.0	13,500	79.8	13,719	80.2
	Missing (% of total)	1,122 (8.5)		1,192 (7.8)		1,376 (7.6)		1,196 (6.6)		1,794 (9.5)	

The same risk factors were used to adjust hospital readmission rates as were used to adjust 90-day mortality. In this analysis the ten risk factors described before, were not found to be as strongly associated with hospital readmission as they were with post-operative mortality.

The strongest risk factors associated with readmission within 90 days of admission were:

- young age
- advanced N-stage
- cancer site
- greater number of co-morbidities.

Elderly age appeared to protect against readmission which was more commonly seen in the younger patient. Patients aged 90 had a 25 per cent reduced risk of an emergency readmission compared to patients aged 70, and patients aged 50 had a 30 per cent increased risk compared to those aged 70. See the 2012 Annual Report Table 6.4(b) for details.

We plan to investigate whether there is a relationship between length of stay and hospital readmission and how it affects this finding. It is possible that because elderly patients tend to stay in hospital longer after their surgery, complications of surgery are dealt with during the original admission.

In the funnel plots in Figure 3.5, none of the Strategic Clinical Networks fell above the inner or outer limits for adjusted readmission rate.

In the funnel plots in Figure 3.6 no trust fell above the outer limit and five fell above the inner limit on adjusted readmission rate.

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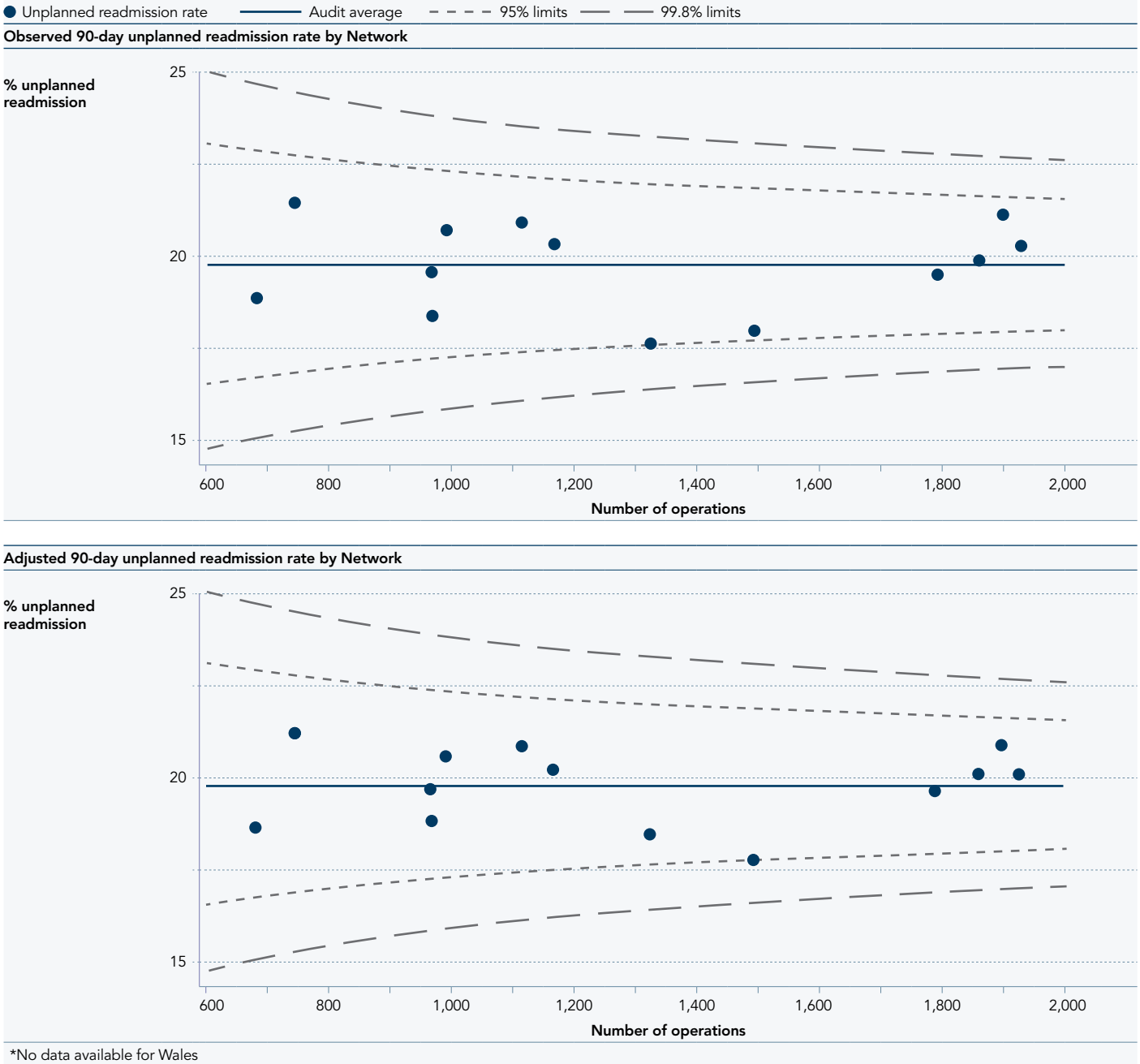
Figure 3.5
Observed and adjusted 90-day emergency readmission rate by English Strategic Clinical Network for patients diagnosed between 1 April 2012 and 31 March 2013*



*No data available for Wales

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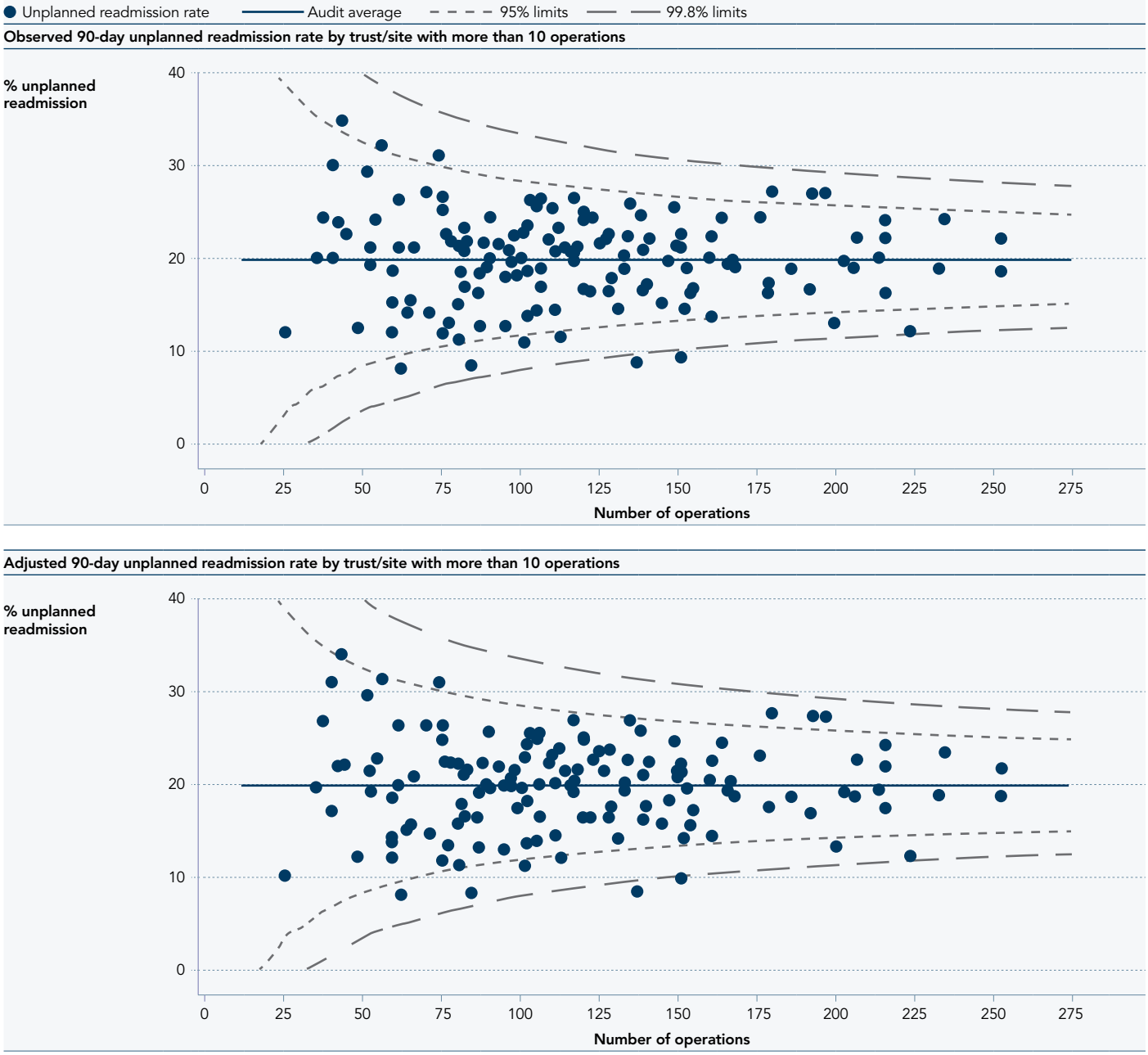
Figure 3.6
Observed and adjusted 90-day emergency readmission rate by English NHS Trust for patients diagnosed between 1 April 2012 and 31 March 2013



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3.5 Laparoscopic surgery

The adoption of laparoscopic resection of colorectal cancer has been a significant success story for UK colorectal surgery over the last five years. From 25 per cent of all resections being laparoscopic in 2008, the progressive use of laparoscopic resections has increased to approximately 45 per cent overall.

NICE Recommendations for Laparoscopic surgery TA105 August 2006

- Laparoscopic (including laparoscopically assisted) resection is recommended as an alternative to open resection for individuals with colorectal cancer in whom both laparoscopic and open surgery are considered suitable.
- Laparoscopic colorectal surgery should be performed only by surgeons who have completed appropriate training in the technique and who perform this procedure often enough to maintain competence. The exact criteria to be used should be determined by the relevant national professional bodies. Cancer Networks and constituent trusts should ensure that any local laparoscopic colorectal surgical practice meets these criteria as part of their clinical governance arrangements.
- The decision about which of the procedures (open or laparoscopic) is undertaken should be made after informed discussion between the patient and the surgeon. In particular, they should consider:
  - the suitability of the lesion for laparoscopic resection
  - the risks and benefits of the two procedures
  - the experience of the surgeon in both procedures.

Surgical access falls into three categories: open resection; laparoscopic converted to open resection; and fully completed laparoscopic resection.

The Audit compared the characteristics of patients and their surgical and pathological outcomes according to surgical access, examined how surgical access has changed over the last five years, and compared the use of laparoscopic surgery between networks. Use of laparoscopic surgery by trust/site is reported in Table 6.3.

Table 3.6 describes the surgical access of patients undergoing major surgery according to patient and tumour characteristics. The majority of patients undergoing urgent or emergency surgery had open surgery. In addition patients with advanced cancer or a high ASA grade were also likely to have an open resection.

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Table 3.6
Surgical access by patient characteristics for the 19,635 patients undergoing major surgery where surgical access recorded

			Open		Laparoscopic converted to open		Laparoscopic completed	
		Total number	Number	%	Number	%	Number	%
	Overall	**17,732**	8,010	45.2	1,785	10.1	7,937	44.8
Sex	**Male**	**10,009**	4,432	44.3	1,132	11.3	4,445	44.4
	Female	**7,722**	3,577	46.3	653	8.5	3,492	45.2
	Missing	**1**	1	100.0	0	0.0	0	0.0
Age-group	**≤64 yrs**	**5,354**	2,325	43.4	537	10.0	2,492	46.5
	65-74 yrs	**5,910**	2,551	43.2	643	10.9	2,716	46.0
	75-84 yrs	**5,183**	2,454	47.3	504	9.7	2,225	42.9
	85+ yrs	**1,285**	680	52.9	101	7.9	504	39.2
ASA grade	**1**	**2,143**	792	37.0	188	8.8	1,163	54.3
	2	**9,492**	3,849	40.5	1,017	10.7	4,626	48.7
	3	**4,850**	2,510	51.8	486	10.0	1,854	38.2
	4 or 5	**550**	421	76.5	35	6.4	94	17.1
	Missing	**697**	438	62.8	59	8.5	200	28.7
TNM T-stage	**T1**	**1,154**	339	29.4	143	12.4	672	58.2
	T2	**2,732**	1,014	37.1	300	11.0	1,418	51.9
	T3	**8,608**	3,582	41.6	874	10.2	4,152	48.2
	T4	**4,205**	2,635	62.7	376	8.9	1,194	28.4
	Missing	**1,033**	440	42.6	92	8.9	501	48.5
TNM N-stage	**N0**	**9,854**	4,105	41.7	1,062	10.8	4,687	47.6
	N1	**4,322**	2,042	47.2	410	9.5	1,870	43.3
	N2	**2,723**	1,499	55.0	242	8.9	982	36.1
	Missing	**833**	364	43.7	71	8.5	398	47.8
TNM M-stage	**M0**	**15,100**	6,480	42.9	1,560	10.3	7,060	46.8
	M1	**2,111**	1,292	61.2	172	8.1	647	30.6
	Missing	**521**	238	45.7	53	10.2	230	44.1
Mode of admission (from HES)	**Elective**	**12,472**	4,666	37.4	1,403	11.2	6,403	51.3
	Emergency	**2,482**	1,878	75.7	150	6.0	454	18.3
	Missing *	**2,778**	1,466	52.8	232	8.4	1,080	38.9
Surgical urgency	**Elective**	**11,434**	4,356	38.1	1,260	11.0	5,818	50.9
	Scheduled	**3,566**	1,464	41.1	385	10.8	1,717	48.1
	Urgent	**1,185**	874	73.8	63	5.3	248	20.9
	Emergency	**1,485**	1,288	86.7	68	4.6	129	8.7
	Missing	**62**	28	45.2	9	14.5	25	40.3
Cancer site	**Caecum/ascending colon**	**5,113**	2,326	45.5	427	8.4	2,360	46.2
	Hepatic flexure	**696**	300	43.1	76	10.9	320	46.0
	Transverse colon	**1,167**	693	59.4	86	7.4	388	33.2
	Splenic flexure/descending colon	**1,039**	621	59.8	102	9.8	316	30.4
	Sigmoid colon	**4,146**	1,726	41.6	463	11.2	1,957	47.2
	Rectosigmoid	**1,203**	440	36.6	155	12.9	608	50.5
	Rectal	**4,368**	1,904	43.6	476	10.9	1,988	45.5
Co-morbidities (from HES)	**0**	**9,093**	3,827	42.1	922	10.1	4,344	47.8
	1	**4,317**	1,937	44.9	475	11.0	1,905	44.1
	2+	**1,560**	793	50.8	156	10.0	611	39.2
	Missing *	**2,762**	1,453	52.6	232	8.4	1,077	39.0

* includes patients from Wales who could not be linked to Welsh equivalent of HES (PEDW)

Figure 3.7 highlights the increasing use of laparoscopic surgery over time. It also indicates that this increase is a predominately elective surgery phenomenon. In 2008/09, around 36 per cent of elective/scheduled major resections were attempted/completed by laparoscopy; by 2012/13 this has increased to around 61 per cent. For emergency/urgent surgery the proportions have barely changed, increasing from 14.5 per cent in 2008/09 to 19 per cent in 2012/13.

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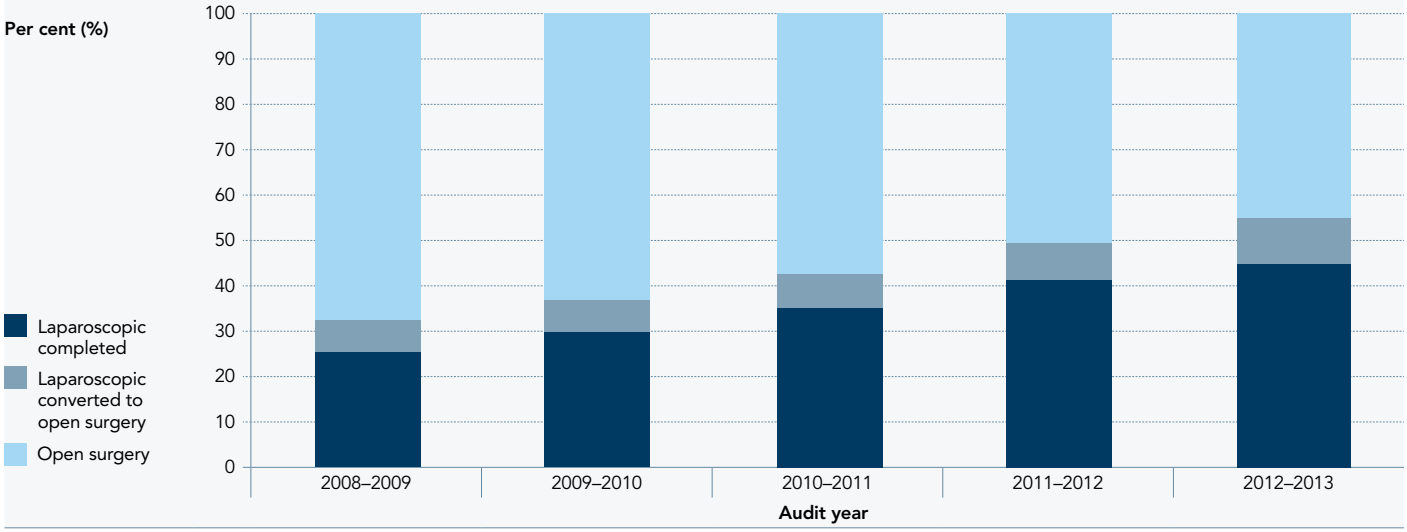
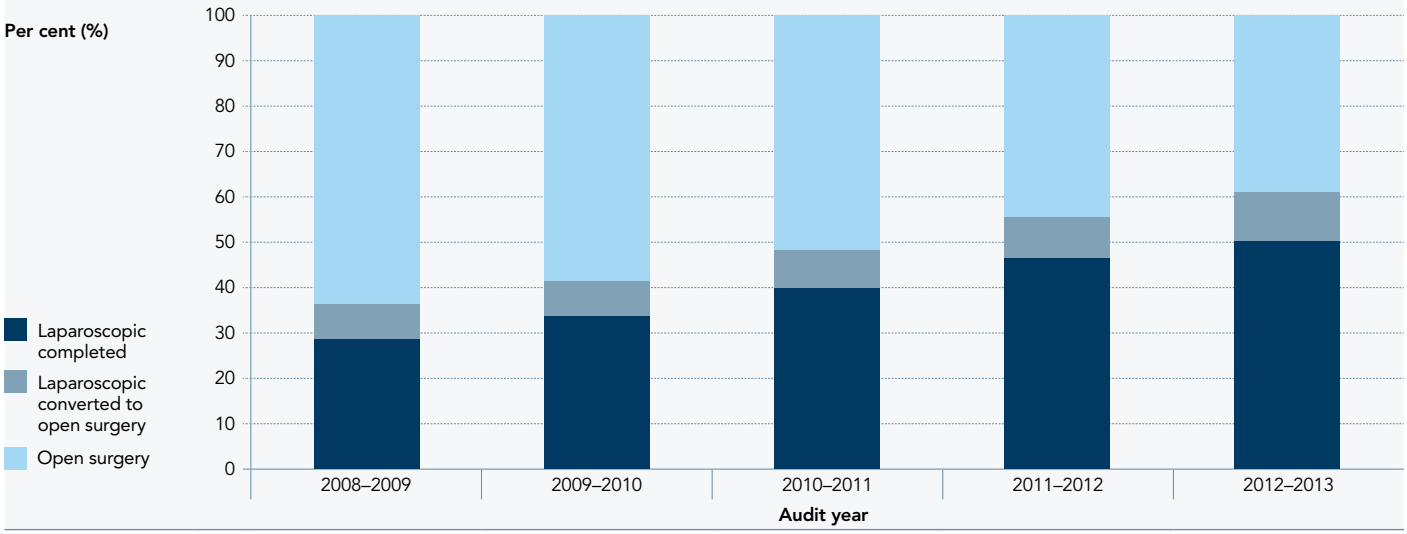
Figure 3.7
Surgical access by audit year

a) All Surgery



b) Elective/scheduled Surgery



c) Emergency/urgent Surgery

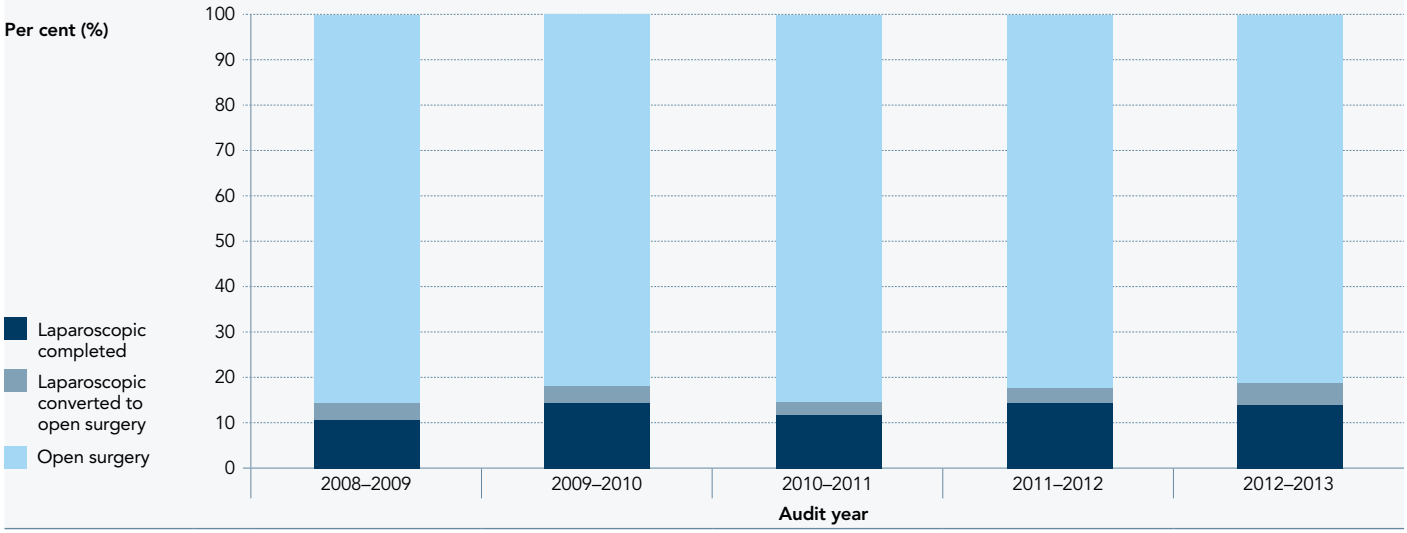


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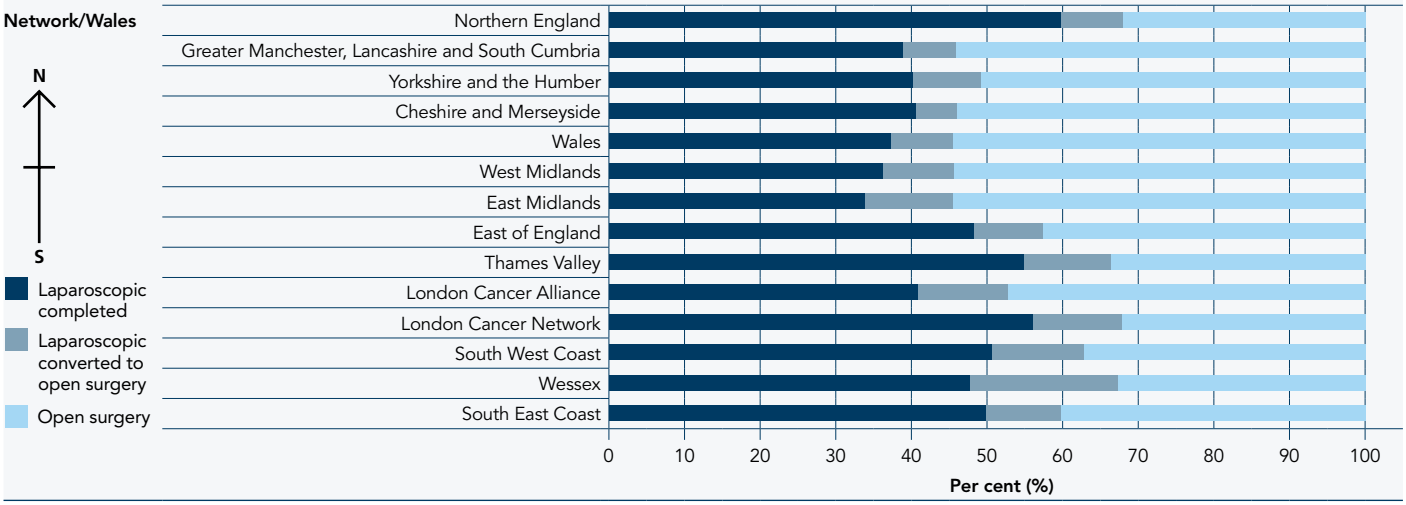
Figure 3.8
Surgical access by English Strategic Clinical Network/Wales



Laparoscopic access by Strategic Clinical Network is presented in Figure 3.8. There appears to be a trend towards higher rates of completed laparoscopic resection in the south of England. However, it is noteworthy that the Northern England Strategic Clinical Network has the highest rate of completed laparoscopic resections.

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Invited Tripartite 2014 Commentary

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Since the early 1990's laparoscopic colorectal surgery has gained traction as an acceptable approach to treat intra-abdominal bowel conditions. Unlike other areas of abdominal surgery (such as cholecystectomy) the complexity of colon operations has made universal acceptance slow. The instruments can be cumbersome to use with colorectal surgery and visualization in the pelvis may be suboptimal. In addition, bowel requiring mobilization or resection may be located in multiple quadrants of the abdomen further contributing to the difficulty of a laparoscopic approach. The lack of a generally standardised approach has hampered education and added to the steep learning curve.

Surgeons were hesitant to promote the laparoscopic approach for their colorectal cancer patients due to safety concerns. Twenty plus years ago there were reports of recurrence at the extraction and trochar sites. They worried that a laparoscopic approach would not accomplish the same oncologic outcomes as the open approach. Through studies such as the American COLOR and British CLASSIC trials, laparoscopic colorectal surgery was proven to be safe and feasible with equivalent long term cancer outcomes. In addition, it has been shown that although the Operating Room (OR) time is longer, the length of stay is shorter and recovery appears quicker with laparoscopic surgery.

Despite educational efforts and increased training, incorporation of the laparoscopic approach has not been universal – but progress is being made. As seen in the most recent report from The National Bowel Cancer Audit the number of laparoscopic cases has increased over the past five years from 25 per cent in 2008 to 45 per cent demonstrating real progress in adaption of the technique. In addition, the data showed as the age of patients increased and their general health was worse (by ASA score), there tended to be decreased rates of utilisation of the laparoscopic approach. If the laparoscopic approach confers benefits for patients such as less morbidity, then the elderly and sicker patients may benefit more. As seen for rectal prolapse surgery, the laparoscopic approach has altered the definition of a frail patient with nearly all patients being eligible for laparoscopic rectopexy surgery. Understanding why "frail" colorectal cancer patients are not offered this approach may merit investigation. Another interesting observation is that less than 50 per cent of right colon and sigmoid resections are completed laparoscopically. These two types of resections may be "easier" to master while overcoming the learning curve. Understanding the lack of utilisation for these two operations would be enlightening.

Also noted in this report is disparity and variation for laparoscopically attempted/completed cases, ranging from 60 to 35 per cent across geographic networks in England. This observation most likely is multifactorial and may reflect OR availability since laparoscopic surgery does take longer. From the educational standpoint, this may be due to lack of training and/or mentoring, or just lack of acceptance of the approach. Overcoming these hurdles would entail education and peer pressure.

Laparoscopic rectal cancer resection deserves to be singled out since the prospect of operating in the bony box of the pelvis with current instruments makes this surgery even more challenging. It is interesting to note that nearly 50 per cent of surgeries for rectal cancer were done laparoscopically and their long term outcomes will assist in judging this method of resection.

The British surgeons are to be commended for their increase in utilising the laparoscopic approach over the past five years. While there will be patients who are unquestionably not candidates for laparoscopic surgery (perhaps due to multiple prior surgeries and difficult adhesions), the majority probably would be eligible. Further in depth analysis may point to areas that can be addressed such as education and mentoring to further increase acceptance.

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4. Survival and Colorectal Cancer

Survival and Colorectal Cancer – NBOCA 2014

- One in three colorectal cancer patients do not undergo resection.
- Non-resection as a treatment option represents a complex mixture of early stage disease, patient frailty and advanced cancer.
- Two-year survival was 67 per cent for all 78,609 colorectal cancer patients diagnosed between the 1 April 2008 and the 31 March 2011.
- Two-year survival was 80 per cent if resected and 43 per cent if not resected.

4.1. Patients not undergoing major surgery

Surgical resection remains the major treatment modality for colorectal cancer and of the 31,723 cases submitted to the Audit more than 63 per cent were managed by major resection, such as right hemicolectomy, sigmoid colectomy and anterior resection. A small percentage (4.6 per cent) of patients had a local excision or polypectomy. However, a very large proportion of patients, the remaining 32 per cent, had a diagnosis of colorectal cancer made but did not have any surgery directed at removing their cancer. This implies that at each MDT meeting for every two patients discussed and worked up for surgical resection, another is not offered major resection. There are several possible reasons for this.

Too Little Cancer (Stage 1)

There are an increasing number of situations in which pre-treatment of a primary cancer does not leave any visible residual disease. Examples are the polyp cancer removed at endoscopy, rectal cancers treated by TEMS or local excision and rectal cancers that undergo apparent complete response to long course chemo/radiotherapy and subsequently follow a watch and wait policy. The data available to this Audit is unable to accurately reflect this as the pre-treatment stage of only 60 per cent of all cases is available. However given this limitation fewer of the pre-treatment T1 cancers were subjected to major resection than was the case for cancers with more advanced T-stage, and amongst patients with pre-treatment staging recorded, nearly a third of T1 cancers underwent local excision or polypectomy.

NICE guidelines [CG131] December 2014
1.2.3 Stage I colorectal cancer

- The colorectal MDT should consider further treatment for patients with locally excised, pathologically confirmed stage I cancer, taking into account pathological characteristics of the lesion, imaging results and previous treatments. **[2011]**
- Offer further treatment to patients whose tumour had involved resection margins (less than 1 mm). **[2011]**

1.2.4 Stage I rectal cancer

- An early rectal cancer MDT should decide which treatment to offer to patients with stage I rectal cancer, taking into account previous treatments, such as radiotherapy. **[2011]**
- After discussion in the MDT responsible for the management of stage I rectal cancer, discuss uncertainties about the potential risks and benefits of all treatment options with patients and their family members and carers (as appropriate), taking into account each patient's circumstances. **[new 2014]**
- Explain to patients and their family members or carers (as appropriate) that there is very little good quality evidence comparing treatment options for stage I rectal cancer. **[new 2014]**
- Offer patients the chance to take part in a randomised controlled trial (if available) that compares treatment options for stage I rectal cancer. **[new 2014]**

Too Much Cancer (Stage IV)

It remains unclear as to what constitutes the best approach for those patients that present with advanced colorectal cancer. The two potential choices for otherwise fit individuals being chemotherapy first followed by resection or primary resection first followed by chemotherapy.

When the tumour burden is extensive with multiple distant metastases, it is possible that surgical resection, particularly if the primary tumour is asymptomatic, might not benefit either patient survival or quality of life. Thus in the Audit, 70 per cent of those patients recorded as having disseminated systemic disease (M1) on pre-treatment staging did not undergo a major surgical resection. Similarly when compared to earlier stage disease, proportionately fewer (56 per cent) of the 3,659 patients with pre-treatment T4 disease underwent surgical resection (Table 4.1).

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NICE guidelines [CG131] December 2014
1.3.1 Patients presenting with stage IV colorectal cancer

- Prioritise treatment to control symptoms if at any point the patient has symptoms from the primary tumour. [2011]
- If both primary and metastatic tumours are considered resectable, anatomical site specific MDTs should consider initial systemic treatment followed by surgery, after full discussion with the patient. The decision on whether the operations are done at the same time or separately should be made by the site specialist MDTs in consultation with the patient. [2011]

Too Frail (Easily Broken or Damaged)

The third common reason for not subjecting an individual to the toxicity of a major surgical resection is the inability of some individuals to withstand the surgical insult and survive with a reasonable quality of life thereafter. Within the data submitted to the Audit, age is an obvious discriminator of frailty; of 3,738 patients aged over 85 years at diagnosis, only 40 per cent were offered major surgical resection.

We hope future Audit data collection will better determine the pattern of surgical decision making in relation to co-morbidity by collecting Cardiopulmonary Exercise Testing (CPET) assessments after preoperative testing.

There is no association between either tumour site or patient gender and the use of major surgical resection for the management of colorectal cancer. As might be expected those patients that present as an emergency with colorectal cancer are less likely to undergo surgery to remove their cancer (44 per cent of emergency patients have no tumour surgery versus 24 per cent of elective patients); this finding almost certainly reflects the more advanced age, the more advanced disease and associated co-morbidity seen in those patients that present as an emergency (Table 4.1).

Table 4.1
Surgery type according to patient characteristics on all 31,723 patients diagnosed between 1 April 2012 and 31 March 2013

			No tumour surgery		Local excision / polypectomy		Major resection	
		Total number	Number	%	Number	%	Number	%
	Overall	**31,723**	10,079	31.8	1,451	4.6	20,193	63.7
Age-group	**≤64 yrs**	**8,854**	2,334	26.4	406	4.6	6,114	69.1
	65-74 yrs	**9,640**	2,356	24.4	585	6.1	6,699	69.5
	75-84 yrs	**9,491**	3,230	34.0	357	3.8	5,904	62.2
	85+ yrs	**3,738**	2,159	57.8	103	2.8	1,476	39.5
Pre-treatment T-stage	**T1**	**1,074**	146	13.6	341	31.8	587	54.7
	T2	**3,960**	732	18.5	193	4.9	3,035	76.6
	T3	**9,606**	2,690	28.0	77	0.8	6,839	71.2
	T4	**3,659**	1,589	43.4	5	0.1	2,065	56.4
	Missing	**13,424**	4,922	36.7	835	6.2	7,667	57.1
Pre-treatment N-stage	**N0**	**9,457**	2,088	22.1	668	7.1	6,701	70.9
	N1	**6,388**	1,886	29.5	42	0.7	4,460	69.8
	N2	**3,309**	1,441	43.5	13	0.4	1,855	56.1
	Missing	**12,569**	4,664	37.1	728	5.8	7,177	57.1
Pre-treatment M-stage	**M0**	**15,411**	2,939	19.1	751	4.9	11,721	76.1
	M1	**4,155**	2,917	70.2	15	0.4	1,223	29.4
	Missing	**12,157**	4,223	34.7	685	5.6	7,249	59.6
Co-morbidities (from HES)	**0**	**15,407**	4,107	26.7	613	4.0	10,687	69.4
	1	**7,276**	2,008	27.6	232	3.2	5,036	69.2
	2+	**2,975**	1,032	34.7	89	3.0	1,854	62.3
	Missing*	**6,065**	2,932	48.3	517	8.5	2,616	43.1
Mode of admission (from HES)	**Elective**	**20,363**	4,812	23.6	922	4.5	14,629	71.8
	Emergency	**5,402**	2,354	43.6	15	0.3	3,033	56.1
	Missing*	**5,958**	2,913	48.9	514	8.6	2,531	42.5

* includes patients from Wales who could not be linked to Welsh equivalent of HES (PEDW)

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As discussed in Section 3.1, the proportion of patients undergoing a major resection has remained fairly stable over the last five years. Over the same time-period the proportion of patients treated by local excision or polypectomy has increased from 2.0 per cent to 3.5 cent (Figure 4.1).

As shown in Figure 4.2, there is variation between Strategic Clinical Networks in the proportion of patients reported to have had a surgical resection; varying from 56 per cent to 67 per cent of cases within a Strategic Clinical Network. The proportion of patients undergoing local excision in the Network with the highest proportion (Northern England 6.2 per cent) is 2.4 times that of the Network with the lowest (East Midlands 2.6 per cent).

Figure 4.1
Type of surgery by audit year

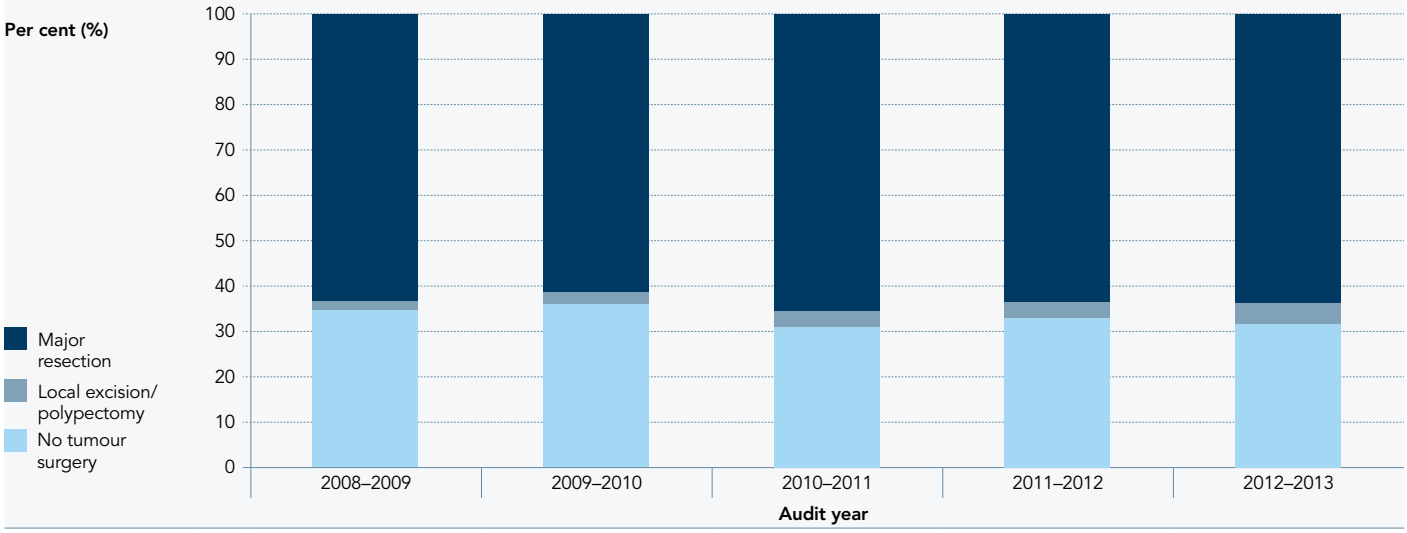
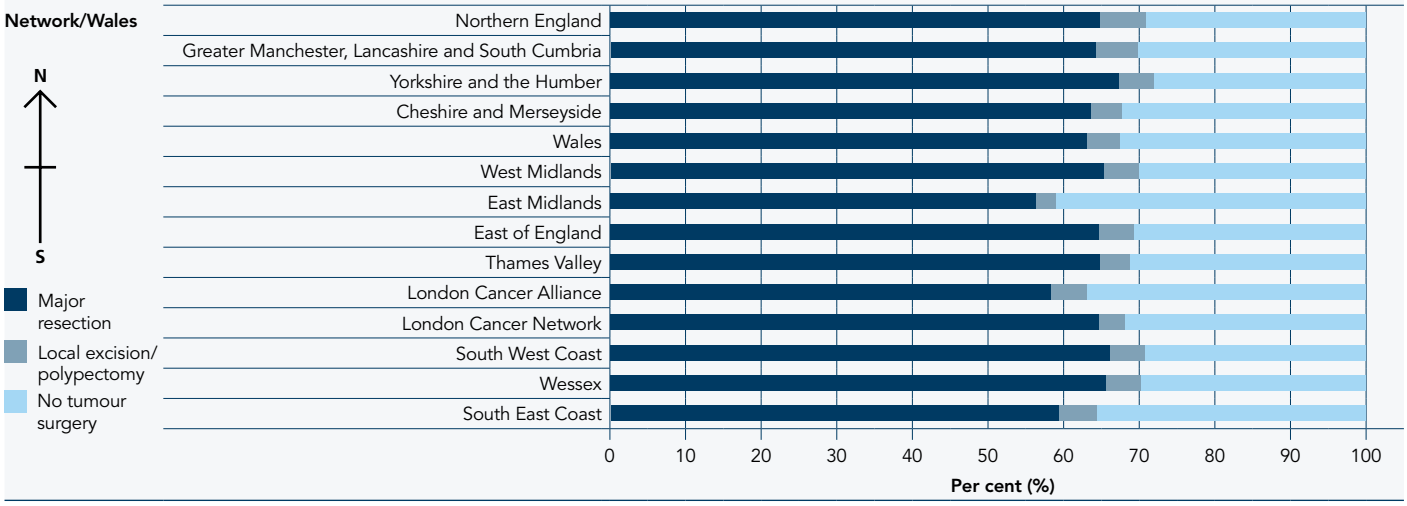


Figure 4.2
Type of surgery by Strategic Clinical Network/Wales



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For those patients not having a surgical resection, survival has been examined for the nearly 27,000 patients diagnosed between April 2008 and March 2011 who did not undergo surgery on their tumour (Table 4.2). Of those who were still alive 90 days after diagnosis (80 per cent) half were still alive at two years (40 per cent).

As outlined above the mix of reasons for non-resection is complex, too little cancer, advanced unresectable cancer and resectable disease in an otherwise frail individual. Identifying the overall survival within these subsets will be the aim of future audits.

Table 4.2
Outcomes of patients by type of surgery for all patients diagnosed between 1 April 2008 and 31 March 2011

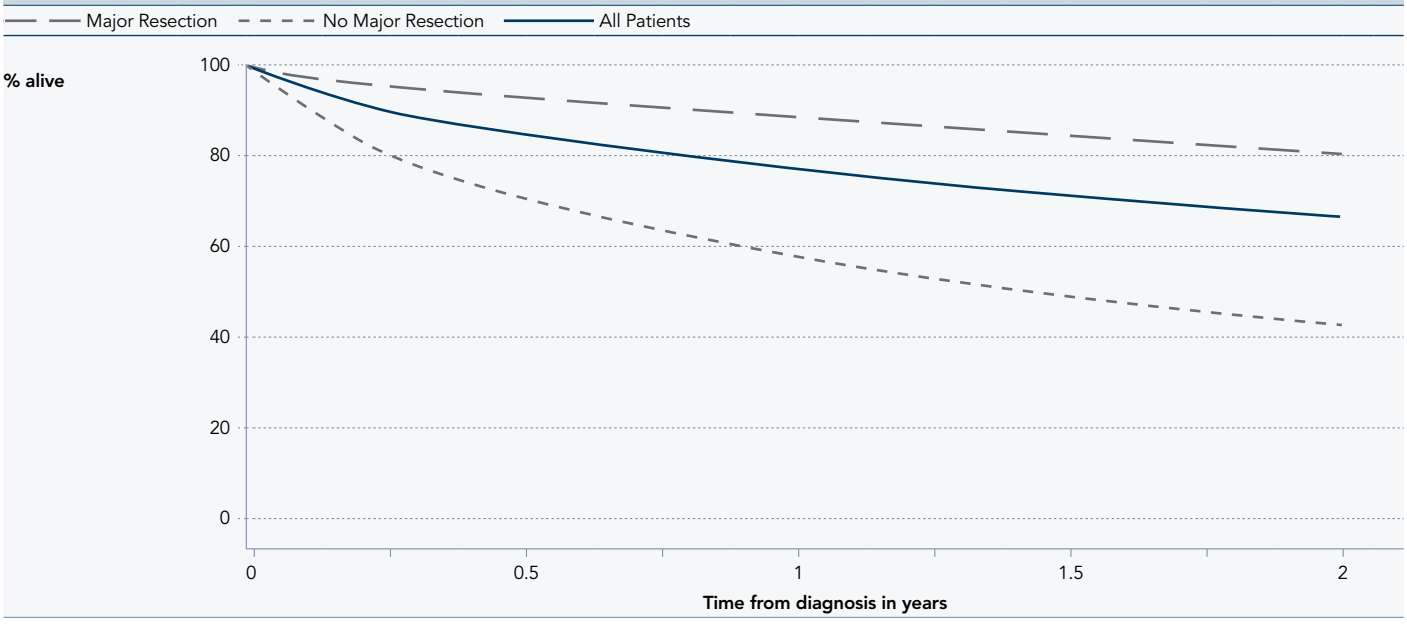
		No tumour surgery		Local excision/ polypectomy		Major resection	
		Number	%	Number	%	Number	%
Total patients		26,902		2,227		50,377	
Died within 90 days of diagnosis	**Yes**	5,388	20.1	27	1.2	2,269	4.5
	No	21,370	79.9	2,200	98.8	47,993	95.5
	Missing (% of total)	144 (0.5)		0 (0)		115 (0.2)	
Died within 24 months of diagnosis	**Yes**	16,197	60.5	221	9.9	9,960	19.8
	No	10,561	39.5	2,006	90.1	40,302	80.2
	Missing (% of total)	144 (0.5)		0 (0)		115 (0.2)	

4.2 All Colorectal Cancer – Two-year Survival

For the large majority of colorectal cancer patients survival and cure remain the primary concern after diagnosis. Although conventionally five years of follow-up is used to determine when an individual with colorectal cancer is cured, the large majority of patients that will develop recurrent disease do so within the first two years of follow-up. A very significant strength of the case ascertainment available to the National Bowel Cancer Audit is the ability to report the two-year survival outcome for 78,609 colorectal cancer patients diagnosed between the 1 April 2008 and the 31 March 2011.

The overall chances of surviving to two years after presenting with colorectal cancer between 2008 and 2011 in England and Wales was 67 per cent. Amongst the cases subjected to major resection and associated oncology therapy the two-year survival figure was 80 per cent, and amongst the cases not having a major resection this figure was 43 per cent, see Figure 4.3.

Figure 4.3
Kaplan-Meier survival curve over 2 years for all patients diagnosed between 1 April 2008 and 31 March 2011



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4.3 All Colorectal Cancer – Two-year Survival by Strategic Clinical Network

The management of colorectal cancer is complex and multidisciplinary with numerous possible pathways and patterns of care. Patients may be selected for resection or non-resection for many perfectly valid reasons. In addition stage at presentation is impacted by Bowel Screening Initiatives and potentially Bowel Cancer Symptom Awareness campaigns. The summation of this activity is best seen in the survival of all colorectal cancer patients presenting to a trust or Strategic Clinical Network, regardless of whether or not they underwent a surgical resection.

Figure 4.4 shows that there is large variation in the two-year mortality of all patients between Strategic Clinical Networks/Nations. This variation is of concern as it is more than would be expected by chance alone, with three networks falling above and four falling below the outer limits. The estimates are not adjusted for patient case-mix and there are many potential causes of the variation, all the way through the patient pathway from before diagnosis to follow-up care after surgery, and also possible differences in the quality and completeness of data.

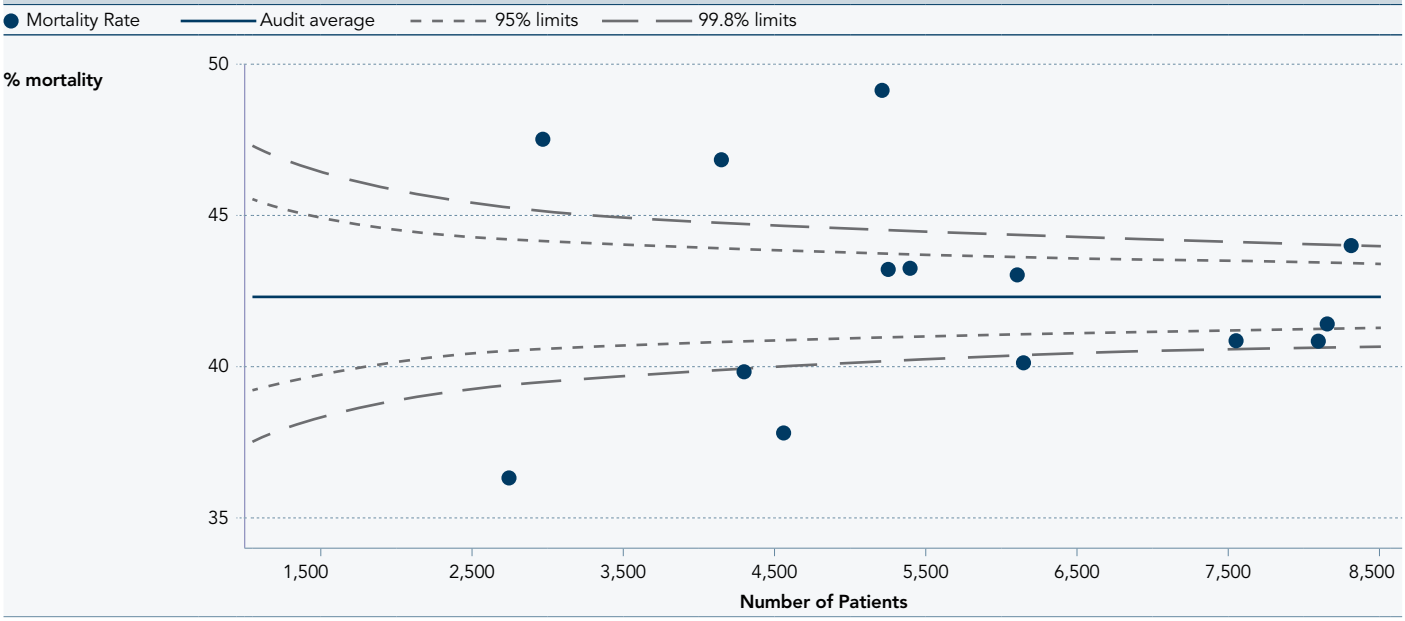
Potential explanations include differences between the regions in the completeness and accuracy of data submitted to the Audit, differences in patient characteristics such as deprivation and co-morbidity, the impact of the bowel cancer screening programme, health-seeking behaviour, the quality of primary care, the selection of patients for major resection, the quality of surgery, short- and long-term care of patients after surgery, including surveillance. All of these possible explanations for the variation have very different implications.

The Audit will investigate the causes of variation once more complete data are available for all patients diagnosed with bowel cancer, not just for those treated surgically as is currently the case. Since the data was collected for this Annual Report the Audit dataset has been redesigned to contain far fewer items, many of which are mandatory, with the aim of collecting more complete information on all patients. Using this information, the aim is to get closer to the causes of this variation so that recommendations can be made to reduce it. Until then these results have not been reported back to Strategic Clinical Networks.

In the next section and in Section 6.4 risk-adjusted two-year mortality is presented by Strategic Clinical Network and by trust/site for patients undergoing major resection.

Figure 4.4
Observed two-year mortality for all patients (with and without resection) diagnosed between 1 April 2008 and 31 March 2011, by English Strategic Clinical Network/Wales, including trusts/MDTs with more than ten operations

These results are not adjusted and cannot be used for regional comparisons



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4.4 Colorectal Cancer treated by major resection – Two-year Mortality by Strategic Clinical Network and Trust

In this section comparisons are made between Strategic Clinical Networks and between trusts/sites on unadjusted and adjusted two-year mortality amongst patients undergoing major resection. The risk-factors in Table 4.3, previously used in the adjustment of 90-day mortality, were used to adjust two-year mortality for case-mix. Because staging data was so incomplete in patients not undergoing a major resection, comparisons are only made between Strategic Clinical Networks and between trusts/sites on patients undergoing a major resection.

Because each risk-factor may have a very different effect on the risk of death soon after surgery to its effect on longer-term mortality, the effect of each risk factor was modelled separately at 0 to 3 months after surgery and 3 to 24 months after surgery, as explained in Section 2.8.

For each risk-factor, the effect on mortality in the three months following surgery is very similar to that estimated in the risk-adjustment model for 90-day mortality (see 2012 Annual Report Table 6.3). However, the effects in the 3 to 24 months after surgery are often quite different.

- ASA grade, has a much stronger effect shortly after surgery than at two years
- in patients without metastases, age has a stronger effect shortly after surgery than at two years
- number of co-morbidities, has a stronger effect shortly after surgery than at two years
- stage of cancer, affects two-year mortality more than short-term mortality.

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Table 4.3
Risk adjustment model for two-year mortality amongst patients undergoing a major resection

		0 to 3 months after surgery		3 to 24 months after surgery	
		Rate ratio	95% CI	Rate ratio	95% CI
Audit year	**2010-2011**	1.00		1.00	
	2009-2010	1.11	1.01 to 1.22	0.99	0.93 to 1.04
	2008-2009	1.23	1.12 to 1.35	1.05	1.00 to 1.12
Sex	**Male**	1.00		1.00	
	Female	0.80	0.74 to 0.87	0.94	0.90 to 0.99
No metastases: Age**	**50 yrs**	0.36	0.29 to 0.45	0.65	0.60 to 0.71
	60 yrs	0.58	0.53 to 0.63	0.76	0.74 to 0.79
	70 yrs	1.00		1.00	
	80 yrs	1.86	1.77 to 1.96	1.47	1.42 to 1.52
	90 yrs	3.73	3.27 to 4.26	2.42	2.22 to 2.65
Metastases: Age**	**50 yrs**	0.61	0.49 to 0.75	0.43	0.34 to 0.56
	60 yrs	0.74	0.68 to 0.80	0.65	0.59 to 0.72
	70 yrs	1.00		1.00	
	80 yrs	1.51	1.38 to 1.65	1.56	1.44 to 1.69
	90 yrs	2.54	2.00 to 3.24	2.49	2.03 to 3.06
ASA	**1**	1.00		1.00	
	2	1.74	1.37 to 2.20	1.16	1.05 to 1.28
	3	2.95	2.34 to 3.71	1.65	1.49 to 1.83
	4 or 5	7.07	5.41 to 9.23	2.00	1.70 to 2.35
TNM T stage	**T1**	1.00		1.00	
	T2	1.19	0.87 to 1.62	1.19	0.95 to 1.48
	T3	1.42	1.08 to 1.87	1.97	1.61 to 2.40
	T4	2.11	1.58 to 2.80	3.57	2.91 to 4.37
TNM N stage	**N0**	1.00		1.00	
	N1	1.04	0.94 to 1.14	1.62	1.53 to 1.72
	N2	1.33	1.20 to 1.48	2.80	2.63 to 2.98
Distant metastases	**No**	1.00		1.00	
	Yes	1.87	1.65 to 2.13	2.91	2.72 to 3.12
Cancer site	**Caecum/ascending colon**	1.00		1.00	
	Hepatic flexure	1.07	0.89 to 1.29	1.02	0.91 to 1.14
	Transverse colon	1.37	1.20 to 1.57	0.89	0.81 to 0.98
	Splenic flexure/descending colon	1.29	1.11 to 1.49	0.80	0.73 to 0.89
	Sigmoid colon	0.92	0.83 to 1.03	0.75	0.70 to 0.80
	Rectosigmoid	1.15	0.98 to 1.35	0.87	0.73 to 0.89
	Rectal	1.30	1.15 to 1.46	1.11	1.04 to 1.19
Mode of admission	**Elective**	1.00		1.00	
	Emergency	2.08	1.90 to 2.28	1.60	1.51 to 1.69
Co-morbidities	**0**	1.00		1.00	
	1	1.30	1.18 to 1.44	1.09	1.02 to 1.16
	2+	1.62	1.44 to 1.81	1.32	1.21 to 1.44

**Age modelled as a linear and quadratic term, separately in patients with and without metastases

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Figures 4.5 and 4.6 show observed and adjusted two-year mortality amongst patients undergoing a major resection by Strategic Clinical Network and by trust/site. Across all trusts/sites (and all Strategic Clinical Networks), two-year mortality was 24 per cent. There is substantial variability in the estimates, particularly between trusts/sites, although the range in two-year mortality estimates for patients having a major resection is not as wide as that in two-year mortality estimates of all patients (Figures 4.4 and 4.5). One Strategic Clinical Network fell above the outer limits and a further two fell above the inner limits. Thirteen trusts/sites fell above the outer limits and a further 15 fell above the inner limits.

The Strategic Clinical Networks and trusts/sites falling above the outer limits were all informed, and all of them responded, please see Appendix 1 for details.

Whilst short-term post-operative mortality is used to capture death from the surgery, longer-term mortality will also capture death from the cancer itself as well as from other causes. Variation in two-year mortality is likely to reflect, at least in part, differences in the quality of surgery to remove the cancer. An important indicator of quality of surgery is whether the tissue surrounding the tumour that was removed during the operation, known as the resection margin, is free from cancerous cells. The Audit will use this indicator in the future when comparing networks and trusts, in order to investigate further any variation in quality of surgery. Other possible explanations for the variation in two-year mortality after major surgery include:

- Differences in patient characteristics
- Differences in the completeness and accuracy of data submitted to the Audit
- Differences in the quality of care for people with colorectal cancer, both before and after surgery.

The mortality result for Wales falls above the outer limits in Figure 4.5. In addition to the possible explanations listed above, the risk-adjusted estimate for Wales may be high because mode of admission and number of co-morbidities was not available for Wales when carrying out the case-mix adjustment, as PEDW data were not available, and these values had to be imputed for patients treated in Wales based on what could be observed in patients treated in England. Also, case ascertainment may be higher for Wales and therefore the estimate for this nation may be more representative than for the networks in England. Lastly, socio-economic differences may be part of the explanation for Wales having a higher adjusted two-year mortality. The results reported by NBOCA are not adjusted for differences in socio-economic deprivation because it was felt that with adjustment for ASA and comorbidity there is no reason to accept that patients from poorer socio-economic background have higher mortality. However, this argument for not adjusting for the patients' socioeconomic background may be stronger for 90-day than for two-year mortality. We cannot explore to what extent socio-economic differences explain the higher two-year mortality in patients who had a major resection in Wales as we only have IMD results ranked separately within England and Wales.

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Figure 4.5
Observed and adjusted two-year surgical outcomes for patients undergoing a major surgical resection between 1 April 2008 and 31 March 2011, by English Strategic Clinical Network/Wales, including trusts/MDTs with more than ten operations

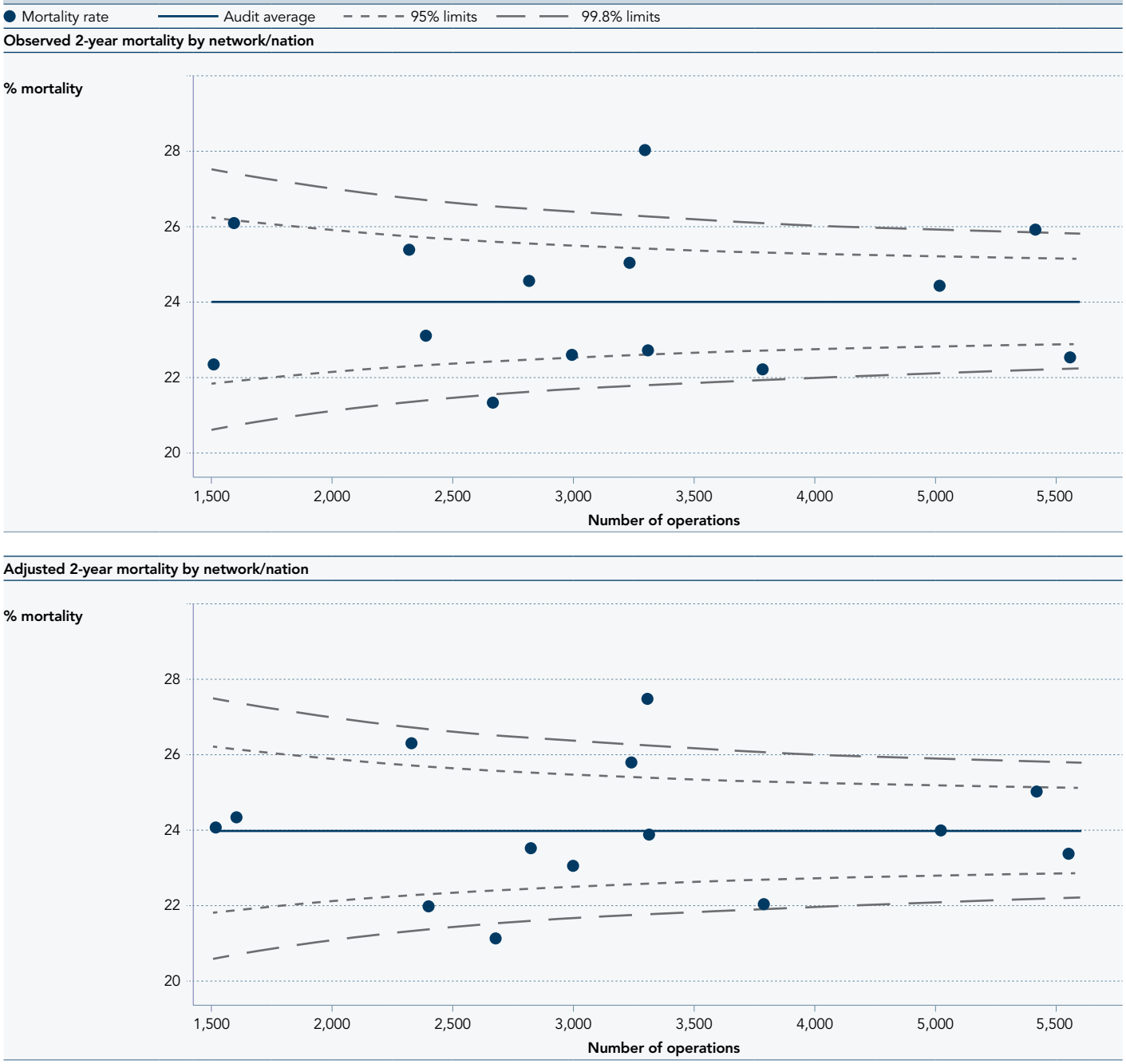

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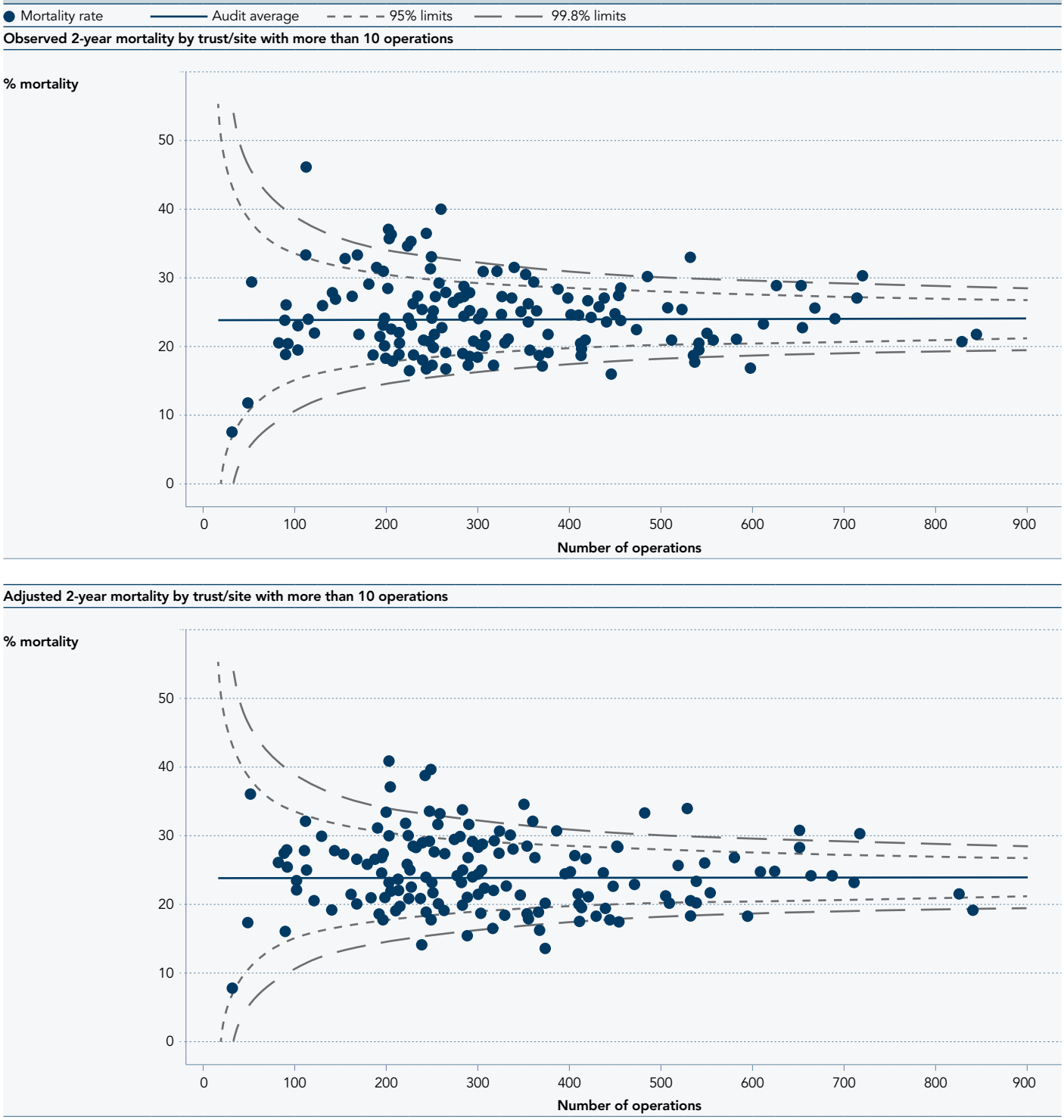
Figure 4.6
Observed and adjusted two-year mortality for patients undergoing a major resection between 1 April 2008 and 31 March 2011, by trust/site with more than ten operations



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5. Rectal cancer patients

Rectal Cancer – NBOCA 2014

- 86 per cent of cases had evidence of MRI staging.
- Neoadjuvant therapy data was too incomplete to be meaningful.
- Five per cent of rectal cancer patients had a local excision; 51 per cent a major resection; and 44 per cent no tumour surgery.
- 63 per cent of major resections were anterior resection, 26 per cent APER and 12 per cent Hartmann's or unknown.
- 93 per cent of those undergoing resection were CRM negative.
- 79 per cent of anterior resections had a "temporary" ileostomy.
- At 18 months 28 per cent of anterior resections still had a stoma.
- Two-year survival was 48 per cent in those having no tumour surgery; 87 per cent in those treated surgically.

5.1. Management of rectal cancer patients

The treatment of patients with rectal cancer has characteristics that make the patient pathway quite distinct from that followed by patients with colonic cancer. Carcinoma of the rectum has to be treated within the confines of the pelvis and so this malignancy is prone to local recurrence. Preventing local recurrence requires an understanding of the use of local staging (MRI scan) to identify threatened margins, preoperative adjuvant therapy (radiotherapy and chemoradiotherapy) and the quality assurance of completeness of excision (circumferential margin) determined by systematic scrutiny of the resected specimen. In addition surgery for rectal cancer is much more likely to lead to an intestinal stoma, either permanent or "temporary", which begs the question what does temporary actually mean?

NICE guidelines [CG131] December 2014
1.1.2 Staging of colorectal cancer

- Offer magnetic resonance imaging (MRI) to assess the risk of local recurrence, as determined by anticipated resection margin, tumour and lymph node staging, to all patients with rectal cancer unless it is contraindicated. [2011]

Table 5.1
Description of management of patients who had a major resection following a diagnosis of rectal cancer, by Audit year. Data are from the Audit only.

		2008-09		2009-10		2010-11		2011-12		2012-13	
		n	%	n	%	n	%	n	%	n	%
Total number of patients with rectal cancer who had major surgery		**3,787**		**4,231**		**4,909**		**4,936**		**5,054**	
MRI scan reported	**Yes***	2,836	74.9	3,328	78.7	3,943	80.3	4,121	83.5	4,337	85.8
	No	951	25.1	903	21.3	966	19.7	815	16.5	717	14.2
Preoperative radiotherapy	**Short course**	552	14.6	629	14.9	705	14.4	619	12.5	477	9.4
	Long course	954	25.2	1,077	25.5	1,293	26.3	1,173	23.8	1,259	24.9
	Post operative	79	2.1	51	1.2	73	1.5	77	1.6	57	1.1
	Unknown type†	45	1.2	53	1.3	101	2.1	84	1.7	83	1.6
	No radiotherapy or not reported	2,157	57.0	2,421	57.2	2,737	55.8	2,983	60.4	3,178	62.9
Circumferential resection margins	**Negative**	1,747	90.3	2,280	91.3	2,592	91.1	2,674	91.8	3,062	92.8
	Positive	188	9.7	216	8.7	252	8.9	238	8.2	237	7.2
	Missing (% of total)	1852 (48.9)		1735 (41.0)		2065 (42.1)		2024 (41.0)		1755 (34.7)	
Rectal surgical procedures	**Anterior Resection (AR)**	2,329	61.5	2,675	63.2	3,053	62.2	3,123	63.3	3,157	62.5
	APER	1,032	27.3	1,091	25.8	1,281	26.1	1,231	24.9	1,292	25.6
	Hartmann's	288	7.6	272	6.4	401	8.2	400	8.1	420	8.3
	Other procedure	138	3.6	193	4.6	174	3.5	182	3.7	185	3.7
Stoma	**Permanent**	1,122	33.7	1,148	29.5	1,195	26.5	1,162	25.8	1,223	25.5
	Temporary	1,105	33.2	1,356	34.8	1,449	32.2	1,448	32.2	1,626	33.9
	Type unknown ‡	42	1.3	36	0.9	60	1.3	59	1.3	42	0.9
	None	1,061	31.9	1,354	34.8	1,800	40.0	1,833	40.7	1,910	39.8
	Missing (% of total)	457 (12.1)		337 (8.0)		405 (8.3)		434 (8.8)		253 (5.0)	

* Yes if patient has a result of MRI scan or date of MRI scan
† Unknown radiotherapy type if date of radiotherapy is recorded but not type
‡ Unknown stoma type if patient was recorded as having a Hartmann's but their stoma type was not recorded in the Audit.

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In terms of the preoperative assessment of rectal cancer, from the data submitted to the audit during the past five years, there has been a steady increase in the percentage of rectal cancer patients undergoing major surgery who were reported to have had an MRI scan, either by having a date of scan or result of scan (Table 5.1).

Information on the preoperative use of chemotherapy is not available to this Audit and the preoperative neoadjuvant use of radiotherapy is very incomplete (Table 5.1). Amongst rectal cancer patients submitted to the Audit, 63 per cent did not have details of radiotherapy recorded; it is impossible to determine whether this represents the non-recording of radiotherapy or no radiotherapy. However, the reduction in the percentage receiving short course radiotherapy appears to be mirrored by an increase in those with no (or not reported) radiotherapy. For the minority in whom data about the use of preoperative radiotherapy is available, long course radiotherapy with its associated delay in surgical resection is the dominant pathway. Future linkage to the Radiotherapy and Chemotherapy Datasets is planned to explore this crucial aspect of rectal cancer management.

Quality assurance of rectal cancer neoadjuvant and surgical therapy is provided by the pathologist's determination of the involvement of the circumferential resection margin. The recording of this item is poor, but has improved from approximately 50 per cent of records to 65 per cent over the past five years (Table 5.1). During this time period, over 90 per cent of those who underwent surgical resection (with or without neoadjuvant therapy) and have this item recorded had negative circumferential margins, indicating suitable patient selection and MDT working.

5.2. Pathways and Rectal Cancer

As well as changing patterns of neoadjuvant therapy in rectal cancer treatment, there are choices to be made in the surgical removal of the disease. Surgical resection of the rectum remains the foremost intervention for treatment of rectal cancer. Nearly two thirds of rectal cancer patients undergoing major surgery had an anterior resection, a quarter had an abdominoperineal excision of the rectum (APER), and eight per cent had a Hartmann's procedure (Table 5.1). Over the past three years the proportion of patients reported to receive a permanent stoma has mirrored the proportion undergoing APER which is what would be expected.

While locally advanced disease is best managed by resection, organ preservation is another option that can be considered for suitable early cases of rectal cancer. In the data submitted to the Audit we have seen a steady increase in the use of local excision (TEMS or other local procedure) over the last four Audit periods from 2.8 per cent to 5.3 per cent (Table 5.2).

Table 5.2
Treatment pathways of rectal cancer patients by Audit year, defined by type of surgery and time from diagnosis to surgery

	2008-09		2009-10		2010-11		2011-12	
	N	%	N	%	N	%	N	%
Total rectal cancer patients	7,032		8,138		8,677		9,117	
Local excision within 8 months	196	2.8	303	3.7	423	4.9	485	5.3
Major resection within 8 weeks	1,890	26.9	2,020	24.8	2,341	27.0	2,501	27.4
Major resection between 8 weeks and 8 months	1,716	24.4	1,989	24.4	2,304	26.6	2,136	23.4
No excision within 8 months	3,230	45.9	3,826	47.0	3,609	41.6	3,995	43.8

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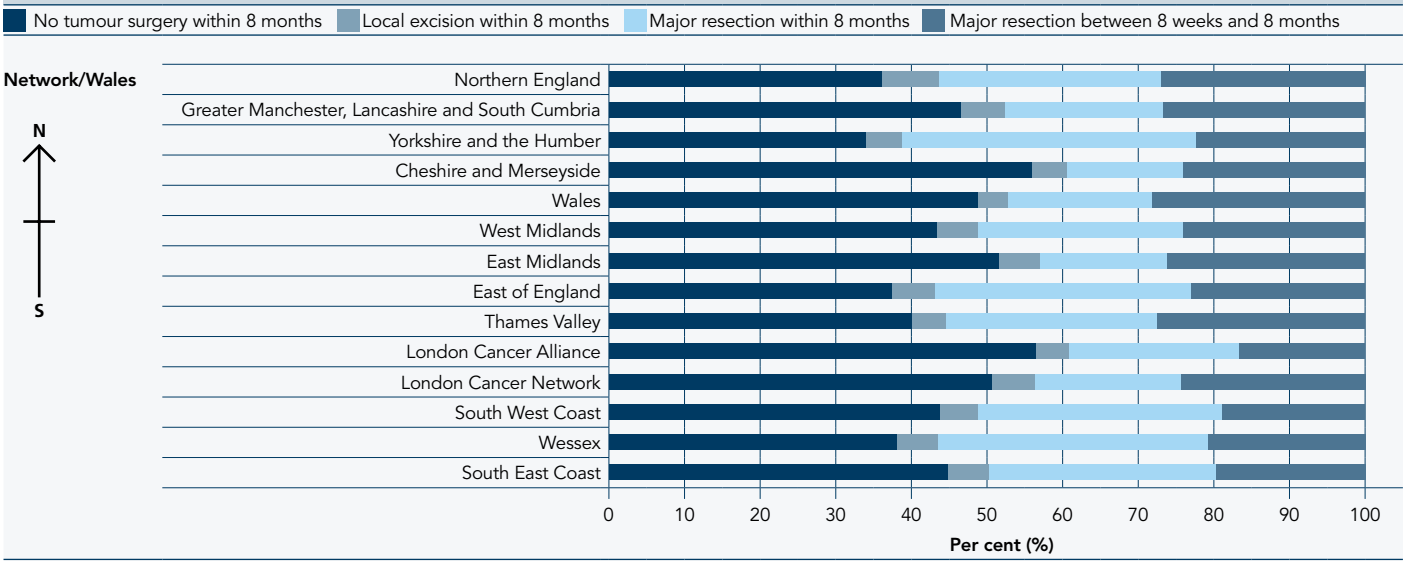
The challenges of achieving a good patient outcome: avoidance of local recurrence and preservation of function; has spawned a complexity of approaches to rectal cancer treatment. Preoperative adjuvant chemoradiotherapy over 10 to 12 weeks may be followed by a 6 to 12 week of delay to assess tumour response before resection; potentially delaying surgery for six months or more after diagnosis. Thus in rectal cancer patients the median time from diagnosis to major resection was seven weeks compared with only three weeks in colon cancer patients. Variations in the technical and temporal management of rectal cancer may include:

- organ preservation or resection
- neoadjuvant therapy or not
- neoadjuvant therapy and immediate surgery or delayed surgery
- no surgery due to unsuitability (frailty/systemic disease) or watch and wait after complete response to neoadjuvant therapy.

The current data upload submitted to the Audit cannot describe in detail how these approaches are being employed – but the Audit can establish the temporal pattern of surgical intervention from date of diagnosis and date of any surgical intervention.

Figure 5.1
Treatment pathways of rectal cancer patients by Strategic Clinical Network, for patients diagnosed between 1 April 2011 and 31 March 2012



As we have seen, local excision is employed in about five per cent of patients whilst major resection is used in about 50 per cent of patients. Amongst the 4,637 patients having a major surgical resection of a rectal cancer in this Audit, just over half had their surgery within eight weeks of diagnosis, but the remainder had their surgery delayed by up to eight months, almost certainly reflecting the use of long course chemo/radiotherapy followed by a delay to assess response before proceeding to surgical resection. There is an interesting variation in the use of delayed rectal cancer surgery (eight weeks to eight months) by Strategic Clinical Network which may reflect the different usage of long course radiotherapy and the different periods of waiting to assess response. Again future linkage to the Radiotherapy and Chemotherapy Datasets will help our understanding of these variations.

Consistent with this use of different regimens in rectal cancer are the reported preoperative characteristics of patients being subjected to different care pathways (Table 5.3). Those patients not subjected to either local excision or major resection were most likely to have advanced disease e.g. tumour invasion, nodal involvement or metastatic disease, to be admitted as an emergency and to have the most co-morbidity. By contrast, early T1/T2 tumours formed the majority of those rectal cancers subjected to local excision, whilst T2/T3/T4 rectal cancers predominated in those patients undergoing major resection.

Resections for patients with locally advanced rectal cancers with the potential for a threatened margin, the majority of T4 cancers and those cancers with N1/N2 disease were more likely to be delayed for between eight weeks and eight months after diagnosis. This observation is consistent with a period of long course chemo/radiotherapy and delay before carrying out surgical resection.

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Table 5.3
Patient characteristics by treatment pathway, for 9,117 rectal cancer patients diagnosed between 1 April 2011 and 31 March 2012

		No excision within 8 months		Local excision within 8 months		Major resection within 8 weeks		Major resection between 8 weeks and 8 months	
		Number	%	Number	%	Number	%	Number	%
Total rectal cancer patients		**3,995**		**485**		**2,501**		**2,136**	
Sex	**Male**	2,488	62.3	295	60.8	1,619	64.7	1,425	66.7
	Female	1,507	37.7	190	39.2	882	35.3	711	33.3
	Missing (% of total)	0 (0.0)		0 (0.0)		0 (0.0)		0 (0.0)	
Age-group	**≤64 yrs**	1,172	29.3	139	28.7	895	35.8	910	42.6
	65-74 yrs	1,037	26.0	165	34.0	856	34.2	704	33.0
	75-84 yrs	1,140	28.5	130	26.8	640	25.6	461	21.6
	85+ yrs	646	16.2	51	10.5	110	4.4	61	2.9
Pre-treatment TNM T-stage	**T1**	68	3.1	91	40.1	56	3.4	46	3.0
	T2	332	15.0	99	43.6	645	39.4	351	22.8
	T3	1,262	57.0	34	15.0	844	51.5	975	63.3
	T4	551	24.9	3	1.3	93	5.7	169	11.0
	Missing (% of total)	1,782 (44.6)		258 (53.2)		863 (34.5)		595 (27.9)	
Pre-treatment TNM N-stage	**N0**	730	33.7	199	84.0	964	59.5	592	39.1
	N1	782	36.1	33	13.9	515	31.8	563	37.1
	N2	657	30.3	5	2.1	141	8.7	361	23.8
	Missing (% of total)	1826 (45.7)		248 (51.1)		881 (35.2)		620 (29.0)	
Pre-treatment TNM M-stage	**M0**	1,236	61.9	212	95.9	1,317	95.2	1,197	92.9
	M1	762	38.1	9	4.1	67	4.8	91	7.1
	Missing (% of total)	1,997 (50.0)		264 (54.4)		1,117 (44.7)		848 (39.7)	
Mode of admission (from HES)	**Elective**	2,584	82.6	343	96.6	2,213	94.9	1,859	96.2
	Emergency	546	17.4	12	3.4	119	5.1	74	3.8
	Missing (% of total)	865 (21.7)		130 (26.8)		169 (6.8)		203 (9.5)	
Comorbidities (from HES)	**0**	1,931	61.8	223	63.0	1,593	68.6	1,254	64.9
	1	832	26.6	90	25.4	575	24.8	513	26.6
	2+	361	11.6	41	11.6	155	6.7	165	8.5
	Missing (% of total)	871 (21.8)		131 (27.0)		178 (7.1)		204 (9.6)	

From the data submitted to the audit a substantial proportion of all rectal cancer patients (44 per cent) would appear not to be offered surgical resection – presumably for the reasons of patient frailty and/or metastatic disease (Table 5.3). However, it is possible that a third albeit numerically small reason for non-resection, lies in some patients opting for "watch and wait" after an apparent complete response to chemoradiotherapy. As noted previously, future linkage to the Radiotherapy and Chemotherapy Datasets may clarify this possibility.

The two-year outcome for patients subjected to no surgery, local excision and major resection respectively is reported in Table 5.4. Not surprisingly around 50 per cent of patients who did not receive surgical treatment have died by the end of two years follow up. By contrast, the two-year survival outcomes for all the surgical pathways are in excess of 86 per cent, indicating appropriate MDT patient selection for each management modality. The 90 day post-operative mortality of surgical excision/resection is low, but particularly low for surgical resection delayed between eight weeks and eight months (0.6 per cent) despite the patients having more advanced local disease.

Table 5.4
Two year outcome by treatment pathway for all rectal cancer patients diagnosed between 1 April 2008 and 31 March 2011

		No excision within 8 months		Local excision within 8 months		Major resection within 8 weeks		Major resection between 8 weeks and 8 months	
		Number	%	Number	%	Number	%	Number	%
Total patients		**10,665**		**922**		**6,251**		**6,009**	
Died within 90 days of diagnosis	**Yes**	1,279	12.0	12	1.3	198	3.2	39	0.6
	No	9,349	88.0	910	98.7	6,051	96.8	5,970	99.4
	Missing (% of total)	37 (0.3)		0 (0.0)		2 (0.0)		0 (0.0)	
Died within 24 months of diagnosis	**Yes**	5,514	51.9	121	13.1	863	13.8	789	13.1
	No	5,114	48.1	801	86.9	5,386	86.2	5,220	86.9
	Missing (% of total)	37 (0.3)		0 (0.0)		2 (0.0)		0 (0.0)	

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5.3. Stomas in Rectal Surgery – What is "Temporary"?

A very significant feature of the patient experience of surgical resection for rectal cancer is the need for an intestinal stoma. If the anal canal has to be removed because of a low rectal cancer then an abdo-perineal excision of the rectum (APER) results in a permanent colostomy. Hartmann's operation, although potentially reversible, in rectal cancer often means a permanent stoma.

Around 40 per cent of rectal cancer patients were reported in the Audit to have had no stoma, whether temporary or permanent. This is due to incomplete or inaccurate Audit data as all patients undergoing an APER have a permanent stoma, all patients having a Hartmann's procedure have a stoma which may be reversed, and a substantial proportion of patients having an anterior resection have a stoma, some of which will be reversed. For this reason 18-month stoma rates are estimated from Audit data linked to HES.

Patients having an APER or Hartmann's were assumed to have a stoma, which was assumed to be permanent for APERs. The Audit was used to determine whether patients having an AR were given a stoma, but where this information was missing in the Audit it was updated from HES. Reversal of stomas in patients having an AR or a Hartmann's was identified in HES only; therefore this has only been calculated for English patients.

Between April 2009 and March 2012, 84 per cent of rectal cancer patients had a stoma at the time of a surgical resection (Audit data linked to HES data). In addition to all patients undergoing APER and Hartmann's, around 79 per cent of anterior resections were given a "temporary stoma" – the large majority of these stomas consisting of an ileostomy.

Temporary in the preoperative discussion implies that at some point (often quoted as between three and six months) a further surgical procedure would be used to close the ileostomy and restore intestinal continuity. To understand the outcome of the "temporary stoma" after rectal cancer surgery the audit has followed this group of patients in HES for 18 months to detect subsequent stoma closure.

Over this three year period, the percentage of patients undergoing an Anterior Resection who still have a stoma 18 months after resection has decreased slightly from 28.6 per cent in 2009/10 to 25.6 per cent in 2011/12. With 18 months of completed HES follow up, 65 per cent of all "temporary stomas" associated with anterior resection had been closed. Across all rectal cancer patients having a major resection, 51 per cent had a stoma at 18 months (Table 5.5).

Table 5.5
Presence of stoma at major resection and 18 months for rectal cancer patients linked to HES having a major resection between 1 April 2009 and 31 March 2012, by procedure

			AR				APER				Hartmann's				Other			
			stoma at resection		stoma at 18 months		stoma at resection		stoma at 18 months		stoma at resection		stoma at 18 months		stoma at resection		stoma at 18 months	
			No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
2009-10	Number	3,434	504	1,805	1,648	661	0	794	0	794	0	249	13	236	40	42	44	38
	%		21.8	78.2	71.4	28.6	0.0	100.0	0.0	100.0	0.0	100.0	5.2	94.8	48.8	51.2	53.7	46.3
2010-11	Number	4,264	570	2,218	1,968	820	0	1,046	0	1,046	0	330	14	316	53	47	59	41
	%		20.4	79.6	70.6	29.4	0.0	100.0	0.0	100.0	0.0	100.0	4.2	95.8	53.0	47.0	59.0	41.0
2011-12	Number	4,432	631	2,247	2,141	737	0	1,090	0	1,090	0	352	18	334	59	53	62	50
	%		21.9	78.1	74.4	25.6	0.0	100.0	0.0	100.0	0.0	100.0	5.1	94.9	52.7	47.3	55.4	44.6

In order to make comparisons between Strategic Clinical Networks (Figure 5.3) and between trusts/sites (Figure 5.4), 18-month stoma rates for all resection surgery (APER, Hartmanns and Anterior Resection) were adjusted for case-mix. This is because rectal cancer resection without a stoma – either permanent or a never closed "temporary" stoma – is a very reasonable patient aspiration.

All of the risk factors used to adjust 90-day mortality except cancer site, were used to adjust the 18-month stoma rate (see the 2012 Annual Report Table 7.3 for details of the model used). There was considerable variation between Strategic Clinical Networks with two falling above and two falling below the outer limits on adjusted 18-month stoma rate. The variation by trust/site was also large, with seven trusts/sites falling above and five trusts/sites falling below the outer limits. A further nine trusts/sites fell above the inner limits.

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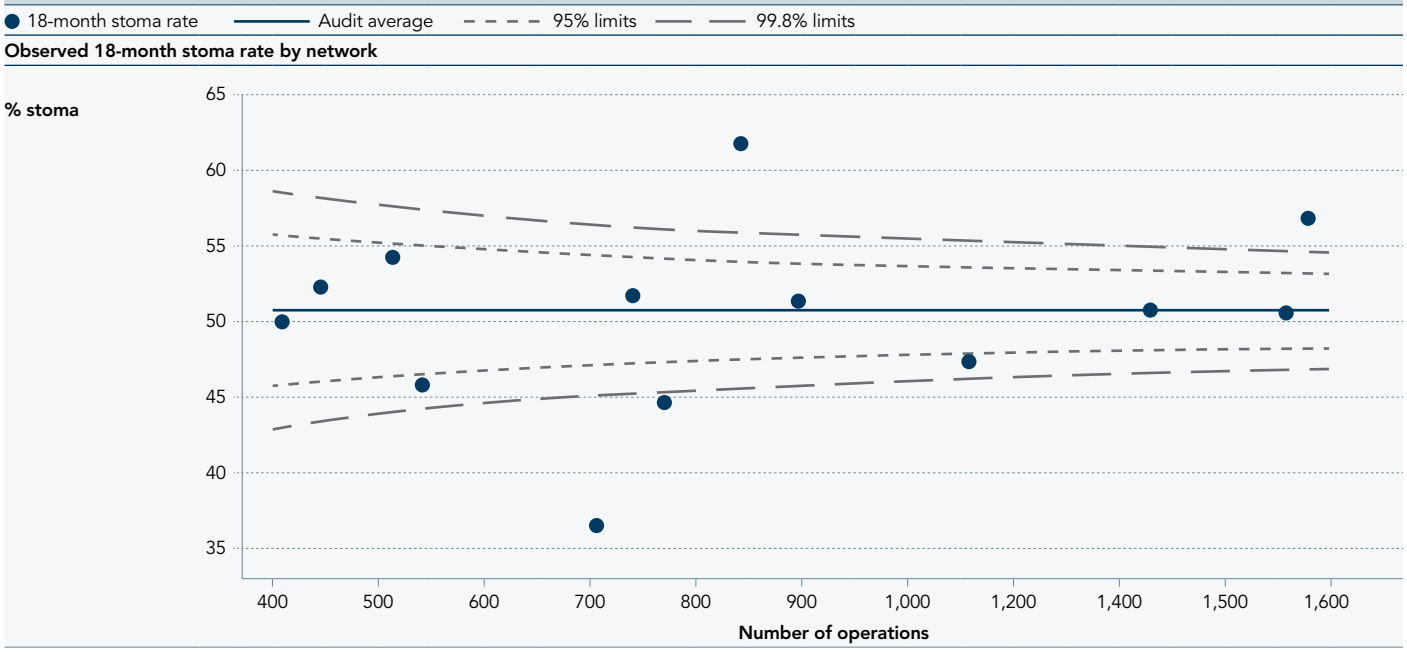
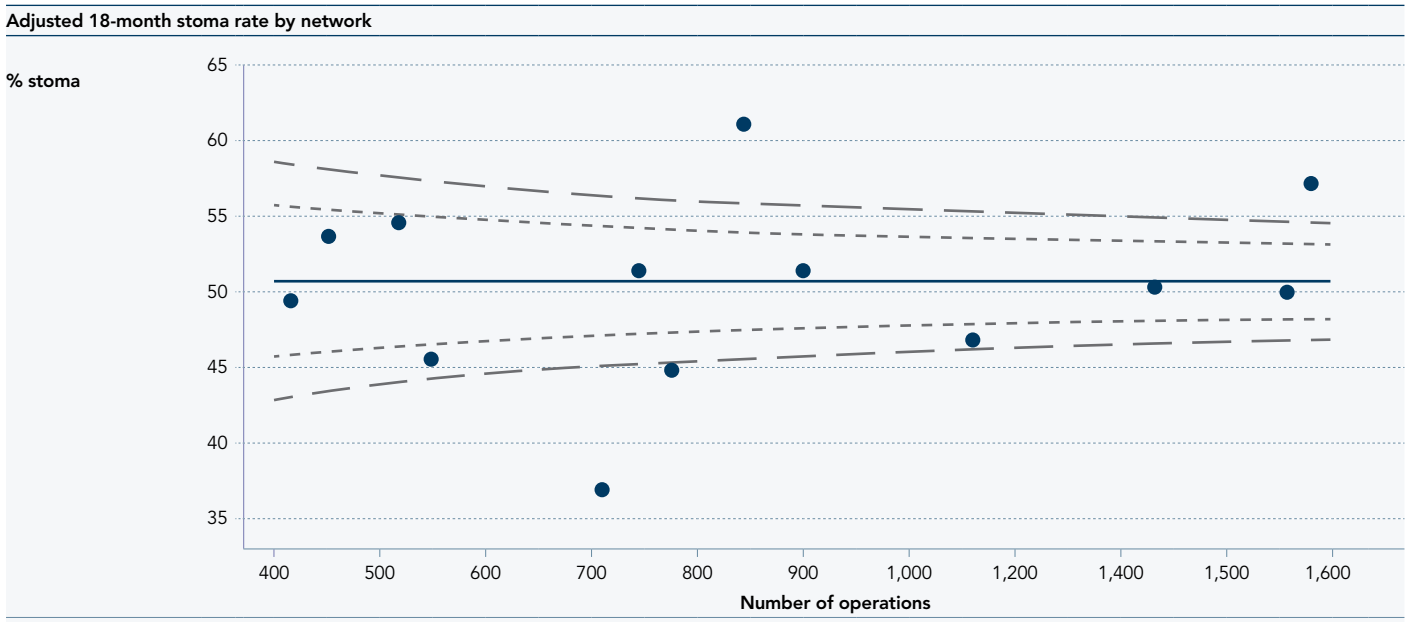
This analysis of stoma at 18 months includes all surgical resections for rectal cancer (APER, Hartmann's and Anterior Resection). Therefore, variation is very likely to reflect different ways of working: selection of patients for APER, the use of adjuvant therapy following anterior resection and/or resources for "temporary" stoma closure after completion of cancer treatment.

The observed and adjusted 18-month stoma rates of each trust/site are reported in Section 6.5.

All Strategic Clinical Networks and trusts/sites falling above the funnel limits have been informed, and given the opportunity to check the data that they submitted. The Strategic Clinical Networks and trusts identified as potential outliers were all informed, and all of them responded, please see detail in Appendix 1.

Figure 5.3
Observed and adjusted 18-month stoma rate by English Strategic Clinical Network* for rectal cancer patients undergoing a major resection between 1 April 2009 and 31 March 2012





*Equivalent data (PEDW) not available for Wales

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Figure 5.4
Observed and adjusted 18-month stoma rate by English* trust/hospital for rectal cancer patients undergoing a major resection between 1 April 2009 and 31 March 2012

*Equivalent data (PEDW) not available for Wales

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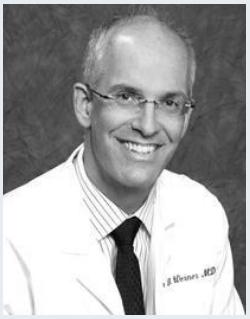
Invited Tripartite 2014 Commentary



Steven Wexner MD,PhD(Hon),FACS,FRCS,FRCS(Ed)
Chairman of Colorectal Surgery - Director Digestive Disease Center Cleveland Clinic Florida

The National Bowel Cancer Audit are to be congratulated upon creating the latest report. Section 5 "Rectal cancer patients", reveals some very enlightening and important statistics. Firstly, only 86 per cent of cases had evidence of MRI staging. It is possible that the other 14 per cent were lesions situated in the upper portion of the rectum in which case the compliance rate with appropriate preoperative MRI staging may be close to 100 per cent. However, that variable was not stipulated and would be useful to evaluate.

Secondly, the use of short course preoperative radiotherapy in 9.4 per cent of patients and long course in 24.9 per cent is very different than would be seen in North America where the short course radiotherapy does not tend to be employed. Of concern is the fact that in the majority of patients, 62.9 per cent, either no radiotherapy was used or the use of radiotherapy was not reported. It would be useful for future editions of the National Bowel Cancer Audit to include the entire denominator of patients into this analysis.

Also of interest is the fact that the circumferential resection margin was not reported in 34.7 per cent of patients. It has been very well shown initially in the United Kingdom that the circumferential resection margin positivity has a high independent correlation with local recurrence. The adoption of synoptic reports by pathologists should obviate inadvertently failing to report circumferential resection margins not only in terms of positive versus negative but in the actual number of millimeters.

According to Table 5.1, 60 per cent of rectal cancer patients undergoing resection* had a stoma at some point in time, but according to Table 5.5* overall 85 per cent of rectal cancer patients linked to HES between 2009 and 2011 had a stoma at the time of a surgical resection; with 51 per cent having a stoma at 18 months. Regardless of which number is focused upon, this very frequent utilisation of stomas is certainly noteworthy and is much higher than one might otherwise surmise.

Another area of surprise is that although just over half of the 16,897 patients who had a major surgical resection did so within eight weeks of diagnosis, the rest had their surgery delayed by up to eight months. This delay may be attributable to the use of long course neoadjuvant chemo radiotherapy followed by a delay to assess response prior to proceeding to resection. I was intrigued to see the interesting variation in the use of delayed rectal cancer surgery amongst Strategic Clinical Networks. This variation may reflect the different practice patterns relative to reassessment of response after completion of neoadjuvant chemo radiotherapy. In addition, the longer waiting periods could be at least in part due to the use of longer waiting periods in patients with locally advanced cancers.

Figure 5.1 did not appear to show huge discrepancies in the treatment pathways of rectal cancer patients according to Strategic Clinical Network. These data may well be testimony to the implementation of this extensive, in-depth, and publicly available audit. It is my hope that through the Commission on Cancer of the American College of Surgeons, the American Society of Colon and Rectal Surgeons, and the OSTRiCh Group (a consortium for Optimizing the Surgical Therapy of Rectal Cancer) similar laudable results can one day be achieved in North America. The initial step towards such a goal is the public reporting and audit of the results of these same variables on the eastern shores of the Atlantic Ocean.

I again congratulate the NBOCA Team on their data analysis and production of this comprehensive, informative, and highly relevant document. I thank them for having afforded me the opportunity to review and comment upon their excellent publication.

*see NBOCA 2013 Annual Report

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6. Colorectal Cancer Management – Trust by Trust

For the 2014 NBOCA report each Trust in England and Wales uploaded their colorectal cancer data to Open Exeter. The project team adopted the following approach to help ensure that trusts' submission of data was as complete and accurate as possible.

- In 2013 data completeness reports showing the trust's activity were circulated to trusts on 8 August, 5 September, 16 September, 25 September, 23 October and 5 December.
- On 6 November 2013 trusts were sent an email asking them to verify the data recorded in the Audit and explaining the process the Audit was adopting. Spreadsheets detailing activity at surgeon level for the period 1 April 2012 to 31 March 2013 were made available to trusts who requested them. Trusts were notified that they had until 6 January 2014 to amend data in the Open Exeter system.
- On 5 December 2013 updated spreadsheets were made available showing changes made between 6 November and beginning of December. All trusts that had not requested the spreadsheets were contacted, expressing the project team's concerns that their data had not been verified.
- On 6 January data were extracted for the 2014 Annual Report and 2014 Consultant Outcomes Publication.

The results reported for each trust reflect the information submitted by the trust to NBOCA.

Trust Changes since data submission:

- London Cancer Network: Barnet and Chase Farm Hospitals NHS Trust is now part of the Royal Free London NHS Foundation Trust
- London Cancer Alliance: South London Healthcare NHS Trust no longer exists (see http://www.slh.nhs.uk/ for further details)

Table 6.1
Case ascertainment and data completeness according to trust/hospital site

The Royal Marsden, Clatterbridge Centre for Oncology NHS Foundation Trust and The Christie Hospital NHS Foundation Trust are tertiary cancer centres that mainly provide oncological treatment for bowel cancer patients and were excluded from this Table.

Grade	Case Ascertainment (CA)
Good ●	>80% case ascertainment or data completeness
Fair ■	50-80% case ascertainment or data completeness
Poor ▲	<50% case ascertainment or data completeness

Please note grades were assigned to case ascertainment and data completeness before the figures were rounded to whole numbers.

Network/Trust Name	No. cases reported to the Audit (excluding Wales)	No. cases identified in HES	Case ascertainment %	No. cases having major surgery according to the Audit	Data completeness for patients having major surgery %
Overall	**29,681**	**31,602**	**94** ●	**20,193**	**87** ●
North Of England					
City Hospitals Sunderland NHS Foundation Trust	173	195	89 ●	109	86 ●
Durham and Darlington NHS Foundation Trust	299	287	104 ●	205	93 ●
Gateshead Health NHS Foundation Trust	145	157	92 ●	106	93 ●
North Cumbria University Hospitals NHS Trust	201	235	86 ●	108	79 ■
North Tees and Hartlepool NHS Foundation Trust	235	257	91 ●	155	92 ●
Northumbria Healthcare NHS Foundation Trust	266	282	94 ●	158	94 ●
South Tees Hospitals NHS Foundation Trust	286	281	102 ●	195	88 ●
South Tyneside NHS Foundation Trust	112	125	90 ●	65	95 ●
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	218	213	102 ●	152	97 ●
Greater Manchester, Lancashire and South Cumbria					
Blackpool Teaching Hospitals NHS Foundation Trust	244	233	105 ●	125	94 ●
Central Manchester University Hospitals NHS Foundation Trust	204	195	105 ●	115	97 ●
East Lancashire Hospitals NHS Trust	240	223	108 ●	148	90 ●
Lancashire Teaching Hospitals NHS Foundation Trust	216	236	92 ●	125	78 ■
Pennine Acute Hospitals NHS Trust	387	405	96 ●	267	84 ●
Royal Bolton Hospital NHS Foundation Trust	178	206	86 ●	127	91 ●
Salford Royal NHS Foundation Trust	136	130	105 ●	90	98 ●
Stockport NHS Foundation Trust	187	185	101 ●	120	98 ●
Tameside Hospital NHS Foundation Trust	138	139	99 ●	90	92 ●
University Hospital Of South Manchester NHS Foundation Trust	133	151	88 ●	88	95 ●
University Hospitals Of Morecambe Bay NHS Trust	255	243	105 ●	175	89 ●
Wrightington, Wigan and Leigh NHS Foundation Trust	183	169	108 ●	127	93 ●

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Network/Trust Name	No. cases reported to the Audit (excluding Wales)	No. cases identified in HES	Case ascertainment %	No. cases having major surgery according to the Audit	Data completeness for patients having major surgery %
Yorkshire and the Humber					
Airedale NHS Trust	133	133	100 ●	85	94 ●
Barnsley Hospital NHS Foundation Trust	143	151	95 ●	86	27 ▲
Bradford Teaching Hospitals NHS Foundation Trust	177	184	96 ●	119	85 ●
Calderdale and Huddersfield NHS Foundation Trust	249	261	95 ●	164	98 ●
Chesterfield Royal Hospital NHS Foundation Trust	181	175	103 ●	122	100 ●
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	205	296	69 ■	175	98 ●
Harrogate and District NHS Foundation Trust	100	109	92 ●	77	92 ●
Hull and East Yorkshire Hospitals NHS Trust	256	310	83 ●	182	86 ●
Leeds Teaching Hospitals NHS Trust	354	352	101 ●	230	81 ●
Mid Yorkshire Hospitals NHS Trust	279	279	100 ●	177	83 ●
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	215	235	91 ●	161	89 ●
Sheffield Teaching Hospitals NHS Foundation Trust	331	326	102 ●	213	97 ●
The Rotherham NHS Foundation Trust	136	150	91 ●	67	100 ●
York Teaching Hospital NHS Foundation Trust - Scarborough Hospital	96	114	84 ●	58	97 ●
York Teaching Hospital NHS Foundation Trust - The York Hospital	225	244	92 ●	159	95 ●
Cheshire and Merseyside					
Aintree University Hospital NHS Foundation Trust	235	229	103 ●	134	75 ■
Countess Of Chester Hospital NHS Foundation Trust	159	165	96 ●	100	91 ●
East Cheshire NHS Trust	128	132	97 ●	88	70 ■
Mid Cheshire Hospitals NHS Foundation Trust	153	178	86 ●	93	94 ●
Royal Liverpool and Broadgreen University Hospitals NHS Trust	226	219	103 ●	147	81 ●
Southport and Ormskirk Hospital NHS Trust	145	141	103 ●	92	62 ■
St Helens and Knowsley Hospitals NHS Trust	249	241	103 ●	164	94 ●
Warrington and Halton Hospitals NHS Foundation Trust	180	174	103 ●	124	81 ●
Wirral University Teaching Hospital NHS Foundation Trust	210	213	99 ●	130	96 ●
Wales					
Bronglais MDT	48	No PEDW	No PEDW	33	100 ●
Cardiff MDT	242	No PEDW	No PEDW	152	94 ●
Nevill Hall Hospital MDT	103	No PEDW	No PEDW	63	87 ●
Prince Charles Hospital MDT	108	No PEDW	No PEDW	75	97 ●
Princess Of Wales MDT	173	No PEDW	No PEDW	119	96 ●
Royal Glamorgan Hospital MDT	146	No PEDW	No PEDW	90	91 ●
Royal Gwent Hospital MDT	236	No PEDW	No PEDW	162	88 ●
Swansea MDT	238	No PEDW	No PEDW	190	92 ●
West Wales General and Prince Phillip MDT	146	No PEDW	No PEDW	87	84 ●
Withybush General MDT	121	No PEDW	No PEDW	57	82 ●
Ysbyty Glan Clwyd MDT	157	No PEDW	No PEDW	91	98 ●
Ysbyty Gwynedd MDT	146	No PEDW	No PEDW	85	84 ●
Ysbyty Maelor MDT	178	No PEDW	No PEDW	85	82 ●
West Midlands					
George Eliot Hospital NHS Trust	106	102	104 ●	68	96 ●
Heart Of England NHS Foundation Trust	462	463	100 ●	277	95 ●
Mid Staffordshire NHS Foundation Trust	137	135	101 ●	81	96 ●
Sandwell and West Birmingham Hospitals NHS Trust	220	219	100 ●	154	96 ●
Shrewsbury and Telford Hospital NHS Trust	309	328	94 ●	205	76 ■
South Warwickshire NHS Foundation Trust	139	150	93 ●	104	88 ●
The Dudley Group Of Hospitals NHS Foundation Trust	216	193	112 ●	134	93 ●
The Royal Wolverhampton Hospitals NHS Trust	217	247	88 ●	140	98 ●
University Hospital Birmingham NHS Foundation Trust	237	226	105 ●	163	91 ●
University Hospital Of North Staffordshire NHS Trust	322	306	105 ●	203	39 ▲
University Hospitals Coventry and Warwickshire NHS Trust	267	272	98 ●	167	94 ●
Walsall Healthcare NHS Trust	119	126	94 ●	83	71 ■
Worcestershire Acute Hospitals NHS Trust	355	351	101 ●	240	93 ●
Wye Valley NHS Trust	164	135	121 ●	117	97 ●

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Network/Trust Name	No. cases reported to the Audit (excluding Wales)	No. cases identified in HES	Case ascertainment %	No. cases having major surgery according to the Audit	Data completeness for patients having major surgery %
East Midlands					
Burton Hospitals NHS Foundation Trust	155	158	98 ●	113	97 ●
Circle - Nottingham NHS Treatment Centre	34	114	30 ▲	†	†
Derby Hospitals NHS Foundation Trust	283	290	98 ●	166	69 ■
Kettering General Hospital NHS Foundation Trust	171	170	101 ●	116	88 ●
Northampton General Hospital NHS Foundation Trust	176	190	93 ●	120	79 ■
Nottingham University Hospitals NHS Trust	363	287	126 ●	255	98 ●
Sherwood Forest Hospitals NHS Foundation Trust	186	215	87 ●	121	85 ●
United Lincolnshire Hospitals NHS Trust	347	404	86 ●	80	89 ●
University Hospitals Of Leicester NHS Trust	461	459	100 ●	256	89 ●
East of England					
Basildon and Thurrock University Hospitals NHS Foundation Trust	135	193	70 ■	95	72 ■
Bedford Hospital NHS Trust	132	134	99 ●	91	85 ●
Cambridge University Hospitals NHS Foundation Trust	269	272	99 ●	213	93 ●
Colchester Hospital University NHS Foundation Trust	226	264	86 ●	148	89 ●
East and North Hertfordshire NHS Trust	229	238	96 ●	145	92 ●
Hinchingbrooke Health Care NHS Trust	83	94	88 ●	52	96 ●
Ipswich Hospital NHS Trust	209	220	95 ●	145	68 ■
James Paget University Hospitals NHS Foundation Trust	152	149	102 ●	103	95 ●
Luton and Dunstable Hospital NHS Foundation Trust	158	144	110 ●	56	77 ■
Mid Essex Hospital Services NHS Trust	162	158	103 ●	94	33 ▲
Norfolk and Norwich University Hospitals NHS Foundation Trust	425	420	101 ●	238	92 ●
Peterborough and Stamford Hospitals NHS Foundation Trust	203	214	95 ●	147	84 ●
Southend University Hospital NHS Foundation Trust	215	207	104 ●	140	96 ●
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	152	175	87 ●	109	83 ●
West Hertfordshire Hospitals NHS Trust	220	216	102 ●	133	59 ■
West Suffolk NHS Foundation Trust	184	190	97 ●	132	97 ●
Thames Valley					
Buckinghamshire Healthcare NHS Foundation Trust	271	239	113 ●	167	94 ●
Great Western NHS Foundation Trust	219	228	96 ●	149	85 ●
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	171	173	99 ●	121	11 ▲
Milton Keynes NHS Foundation Trust	103	120	86 ●	64	55 ■
Oxford University Hospitals	371	417	89 ●	228	94 ●
Royal Berkshire NHS Foundation Trust	261	265	98 ●	177	97 ●
London Cancer Alliance					
Chelsea and Westminster Hospital NHS Foundation Trust	87	81	107 ●	48	100 ●
Croydon Health Services NHS Trust	117	117	100 ●	72	92 ●
Ealing Hospital NHS Trust	66	69	96 ●	42	76 ■
Epsom and St Helier University Hospitals NHS Trust	190	204	93 ●	120	73 ■
Guy's and St Thomas' NHS Foundation Trust	162	164	99 ●	112	67 ■
Imperial College Healthcare NHS Trust	212	267	79 ■	133	68 ■
Kings College Hospital NHS Foundation Trust	128	110	116 ●	70	96 ●
Kingston Hospital NHS Trust	152	137	111 ●	101	93 ●
North West London Hospitals NHS Trust	144	236	61 ■	79	30 ▲
South London Healthcare NHS Trust	236	341	69 ■	73	64 ■
St George's Healthcare NHS Trust	142	182	78 ■	90	42 ▲
The Hillingdon Hospital NHS Trust	96	98	98 ●	60	98 ●
The Lewisham Hospital NHS Trust	100	100	100 ●	66	88 ●
West Middlesex University Hospital NHS Trust	98	94	104 ●	59	93 ●

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Network/Trust Name	No. cases reported to the Audit (excluding Wales)	No. cases identified in HES	Case ascertainment %	No. cases having major surgery according to the Audit	Data completeness for patients having major surgery %
London Cancer Network					
Barking, Havering and Redbridge University Hospitals NHS Trust	286	292	98 ●	176	74 ■
Barnet and Chase Farm Hospitals NHS Trust	225	212	106 ●	144	94 ●
Barts Health NHS Trust	275	325	85 ●	180	59 ■
Homerton University Hospital NHS Foundation Trust	71	71	100 ●	46	100 ●
North Middlesex University Hospital NHS Trust	64	90	71 ■	44	91 ●
Royal Free London NHS Foundation Trust	94	86	109 ●	62	95 ●
The Princess Alexandra Hospital NHS Trust	132	157	84 ●	89	93 ●
The Whittington Hospital NHS Trust	66	71	93 ●	49	98 ●
University College London Hospitals NHS Foundation Trust	115	136	85 ●	69	74 ■
South West Coast					
Gloucestershire Hospitals NHS Foundation Trust	426	468	91 ●	285	98 ●
North Bristol NHS Trust	276	267	103 ●	191	96 ●
Northern Devon Healthcare NHS Trust	121	132	92 ●	79	85 ●
Plymouth Hospitals NHS Trust	316	282	112 ●	186	91 ●
Royal Cornwall Hospitals NHS Trust	307	286	107 ●	193	90 ●
Royal Devon and Exeter NHS Foundation Trust	285	263	108 ●	193	95 ●
Royal United Hospital Bath NHS Trust	235	231	102 ●	155	95 ●
Salisbury NHS Foundation Trust	153	170	90 ●	105	93 ●
South Devon Healthcare NHS Foundation Trust	204	188	109 ●	141	98 ●
Taunton and Somerset NHS Foundation Trust	222	218	102 ●	149	89 ●
University Hospitals Bristol NHS Foundation Trust	197	173	114 ●	124	95 ●
Weston Area Health NHS Trust	108	101	107 ●	85	89 ●
Yeovil District Hospital NHS Foundation Trust	125	129	97 ●	85	65 ■
Wessex					
Dorset County Hospital NHS Foundation Trust	174	161	108 ●	113	91 ●
Hampshire Hospitals NHS Foundation Trust	291	363	80 ■	210	88 ●
Isle Of Wight Health NHS Trust	107	99	108 ●	81	93 ●
Poole Hospital NHS Foundation Trust	178	177	101 ●	108	96 ●
Portsmouth Hospitals NHS Trust	376	368	102 ●	236	92 ●
Southampton University Hospitals NHS Trust	262	293	89 ●	179	93 ●
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	236	230	103 ●	138	92 ●
South East Coast					
Ashford and St Peters Hospitals NHS Foundation Trust	149	161	93 ●	104	96 ●
Brighton and Sussex University Hospitals NHS Trust	210	202	104 ●	117	79 ■
Dartford and Gravesham NHS Trust	138	159	87 ●	57	82 ●
East Kent Hospitals University NHS Foundation Trust	356	439	81 ●	147	76 ■
East Sussex Healthcare NHS Trust	303	323	94 ●	169	98 ●
Frimley Park Hospital NHS Foundation Trust	237	241	98 ●	174	97 ●
Maidstone and Tunbridge Wells NHS Trust	307	312	98 ●	181	62 ■
Medway NHS Foundation Trust	146	195	75 ■	99	80 ■
Royal Surrey County Hospital NHS Foundation Trust	163	151	108 ●	107	98 ●
Surrey and Sussex Healthcare NHS Trust	133	185	72 ■	107	82 ●
Western Sussex Hospitals NHS Trust	366	373	98 ●	229	98 ●

† No major surgery reported

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Table 6.2
Management of all patients reported to the Audit according to trust/hospital site

Network/ Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)	Underwent major surgery (%)
Overall	**31,723**	**99.1**	**87.8**	**89.3**	**63.7**
Northern England	**1,935**	**99.4**	**95.5**	**97.4**	**64.8**
City Hospitals Sunderland NHS Foundation Trust	173	98.3	92.9	97.7	63.0
Durham and Darlington NHS Foundation Trust	299	100.0	100.0	99.0	68.6
Gateshead Health NHS Foundation Trust	145	100.0	97.8	97.2	73.1
North Cumbria University Hospitals NHS Trust	201	98.0	87.4	97.0	53.7
North Tees and Hartlepool NHS Foundation Trust	235	100.0	92.9	98.7	66.0
Northumbria Healthcare NHS Foundation Trust	266	99.6	97.3	89.5	59.4
South Tees Hospitals NHS Foundation Trust	286	99.3	96.4	99.7	68.2
South Tyneside NHS Foundation Trust	112	99.1	89.9	100.0	58.0
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	218	99.5	100.0	99.1	69.7
Greater Manchester, Lancashire and South Cumbria	**2,576**	**98.0**	**74.5**	**91.8**	**64.3**
Blackpool Teaching Hospitals NHS Foundation Trust	244	94.5	93.7	93.0	51.2
Central Manchester University Hospitals NHS Foundation Trust	204	98.0	95.1	90.2	56.4
East Lancashire Hospitals NHS Trust	240	94.5	82.7	90.8	61.7
Lancashire Teaching Hospitals NHS Foundation Trust	216	97.7	70.5	93.5	57.9
Pennine Acute Hospitals NHS Trust	387	99.7	35.5	82.7	69.0
Royal Bolton Hospital NHS Foundation Trust	178	100.0	77.1	88.2	71.3
Salford Royal NHS Foundation Trust	136	97.8	97.8	96.3	66.2
Stockport NHS Foundation Trust	187	99.5	58.0	95.2	64.2
Tameside Hospital NHS Foundation Trust	138	98.5	98.4	98.6	65.2
The Christie NHS Foundation Trust	75	91.9	94.3	97.3	77.3
University Hospital of South Manchester NHS Foundation Trust	133	97.0	94.6	97.7	66.2
University Hospitals of Morecambe Bay NHS Trust	255	100.0	45.0	89.4	68.6
Wrightington, Wigan and Leigh NHS Foundation Trust	183	100.0	94.0	98.9	69.4
Yorkshire and The Humber	**3,080**	**98.8**	**91.1**	**94.8**	**67.4**
Airedale NHS Trust	133	97.7	84.0	97.0	63.9
Barnsley Hospital NHS Foundation Trust	143	100.0	99.3	97.2	60.1
Bradford Teaching Hospitals NHS Foundation Trust	177	98.3	97.7	94.9	67.2
Calderdale and Huddersfield NHS Foundation Trust	249	97.1	85.5	94.8	65.9
Chesterfield Royal Hospital NHS Foundation Trust	181	100.0	89.0	96.7	67.4
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	205	96.1	96.9	96.6	85.4
Harrogate and District NHS Foundation Trust	100	100.0	100.0	98.0	77.0
Hull and East Yorkshire Hospitals NHS Trust	256	99.6	98.7	89.8	71.1
Leeds Teaching Hospitals NHS Trust	354	97.1	70.9	87.3	65.0
Mid Yorkshire Hospitals NHS Trust	279	100.0	100.0	96.1	63.4
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	215	98.6	92.5	94.4	74.9
Sheffield Teaching Hospitals NHS Foundation Trust	331	100.0	89.9	96.4	64.4
The Rotherham NHS Foundation Trust	136	100.0	92.4	96.3	49.3
York Teaching Hospital NHS Foundation Trust – Scarborough Hospital	96	98.9	93.0	96.9	60.4
York Teaching Hospital NHS Foundation Trust - The York Hospital	225	100.0	97.3	99.1	70.7
Cheshire and Merseyside	**1,685**	**99.8**	**90.2**	**93.8**	**63.6**
Aintree University Hospital NHS Foundation Trust	235	100.0	69.8	94.0	57.0
Countess of Chester Hospital NHS Foundation Trust	159	100.0	98.4	83.6	62.9
East Cheshire NHS Trust	128	100.0	85.6	100.0	68.8
Mid Cheshire Hospitals NHS Foundation Trust	153	100.0	96.3	83.7	60.8
Royal Liverpool and Broadgreen University Hospitals NHS Trust	226	100.0	89.8	98.7	65.0
Southport and Ormskirk Hospital NHS Trust	145	100.0	80.5	95.9	63.4
St Helens and Knowsley Hospitals NHS Trust	249	100.0	99.1	95.6	65.9
Warrington and Halton Hospitals NHS Foundation Trust	180	98.3	92.2	98.3	68.9
Wirral University Teaching Hospital NHS Foundation Trust	210	99.5	99.5	92.4	61.9

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Network/ Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)	Underwent major surgery (%)
Wales	**2,042**	**99.5**	**90.8**	**95.8**	**63.1**
Bronglais MDT	48	100.0	83.3	93.8	68.8
Cardiff MDT	242	99.2	87.9	96.3	62.8
Nevill Hall Hospital MDT	103	99.0	99.0	98.1	61.2
Prince Charles Hospital MDT	108	100.0	94.4	97.2	69.4
Princess of Wales MDT	173	99.4	89.6	98.3	68.8
Royal Glamorgan Hospital MDT	146	100.0	80.0	92.5	61.6
Royal Gwent Hospital MDT	236	100.0	93.6	99.6	68.6
Swansea MDT	238	98.7	89.9	97.5	79.8
West Wales General and Prince Phillip MDT	146	100.0	90.4	92.5	59.6
Withybush General MDT	121	98.3	78.5	83.5	47.1
Ysbyty Glan Clwyd MDT	157	100.0	95.5	98.7	58.0
Ysbyty Gwynedd MDT	146	99.3	93.8	91.8	58.2
Ysbyty Maelor MDT	178	100.0	98.9	98.3	47.8
West Midlands	**3,270**	**99.6**	**87.8**	**94.1**	**65.3**
George Eliot Hospital NHS Trust	106	99.1	85.6	99.1	64.2
Heart of England NHS Foundation Trust	462	100.0	94.7	94.4	60.0
Mid Staffordshire NHS Foundation Trust	137	100.0	98.3	97.1	59.1
Sandwell and West Birmingham Hospitals NHS Trust	220	100.0	94.9	95.9	70.0
Shrewsbury and Telford Hospital NHS Trust	309	100.0	59.1	91.6	66.3
South Warwickshire NHS Foundation Trust	139	94.1	91.3	99.3	74.8
The Dudley Group of Hospitals NHS Foundation Trust	216	100.0	84.7	89.8	62.0
The Royal Wolverhampton Hospitals NHS Trust	217	100.0	80.8	94.5	64.5
University Hospital Birmingham NHS Foundation Trust	237	99.6	96.3	89.9	68.8
University Hospital of North Staffordshire NHS Trust	322	100.0	87.6	90.7	63.0
University Hospitals Coventry and Warwickshire NHS Trust	267	98.4	96.9	98.1	62.5
Walsall Healthcare NHS Trust	119	100.0	77.1	95.8	69.7
Worcestershire Acute Hospitals NHS Trust	355	100.0	83.7	93.8	67.6
Wye Valley NHS Trust	164	100.0	100.0	97.0	71.3
East Midlands	**2,176**	**99.0**	**95.8**	**73.7**	**56.4**
Burton Hospitals NHS Foundation Trust	155	100.0	100.0	100.0	72.9
Circle - Nottingham NHS Treatment Centre	34	100.0	50.0	5.9	0.0
Derby Hospitals NHS Foundation Trust	283	98.6	93.3	83.0	58.7
Kettering General Hospital NHS Foundation Trust	171	95.9	88.0	97.7	67.8
Northampton General Hospital NHS Foundation Trust	176	100.0	98.6	93.2	68.2
Nottingham University Hospitals NHS Trust	363	99.7	85.7	20.7	70.2
Sherwood Forest Hospitals NHS Foundation Trust	186	100.0	99.4	94.1	65.1
United Lincolnshire Hospitals NHS Trust	347	98.8	97.8	51.3	23.1
University Hospitals of Leicester NHS Trust	461	98.7	96.8	98.3	55.5
East of England	**3,154**	**98.7**	**92.0**	**89.2**	**64.7**
Basildon and Thurrock University Hospitals NHS Foundation Trust	135	86.4	99.0	79.3	70.4
Bedford Hospital NHS Trust	132	99.2	91.5	98.5	68.9
Cambridge University Hospitals NHS Foundation Trust	269	98.9	99.2	96.3	79.2
Colchester Hospital University NHS Foundation Trust	226	99.1	97.7	97.3	65.5
East and North Hertfordshire NHS Trust	229	98.2	100.0	79.0	63.3
Hinchingbrooke Health Care NHS Trust	83	100.0	50.0	95.2	62.7
Ipswich Hospital NHS Trust	209	95.7	96.4	96.7	69.4
James Paget University Hospitals NHS Foundation Trust	152	100.0	88.6	99.3	67.8
Luton and Dunstable Hospital NHS Foundation Trust	158	100.0	93.5	48.1	35.4
Mid Essex Hospital Services NHS Trust	162	100.0	88.4	46.9	58.0
Norfolk and Norwich University Hospitals NHS Foundation Trust	425	100.0	82.0	92.7	56.0
Peterborough and Stamford Hospitals NHS Foundation Trust	203	98.5	91.5	98.5	72.4
Southend University Hospital NHS Foundation Trust	215	99.5	89.9	96.7	65.1
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	152	100.0	90.4	89.5	71.7
West Hertfordshire Hospitals NHS Trust	220	100.0	99.0	96.4	60.5
West Suffolk NHS Foundation Trust	184	100.0	94.4	98.9	71.7

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Network/ Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)	Underwent major surgery (%)
Thames Valley	**1,396**	**97.8**	**94.2**	**86.0**	**64.9**
Buckinghamshire Healthcare NHS Foundation Trust	271	99.3	94.5	97.0	61.6
Great Western NHS Foundation Trust	219	99.5	90.7	96.3	68.0
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	171	84.3	75.9	74.3	70.8
Milton Keynes NHS Foundation Trust	103	98.0	93.1	93.2	62.1
Oxford University Hospitals	371	100.0	100.0	65.5	61.5
Royal Berkshire NHS Foundation Trust	261	100.0	99.6	99.6	67.8
London Cancer Alliance	**1,974**	**99.4**	**86.0**	**82.6**	**58.4**
Chelsea and Westminster Hospital NHS Foundation Trust	87	100.0	100.0	100.0	55.2
Croydon Health Services NHS Trust	117	99.1	89.5	97.4	61.5
Ealing Hospital NHS Trust	66	98.5	84.9	93.9	63.6
Epsom and St Helier University Hospitals NHS Trust	190	99.5	96.4	98.9	63.2
Guy's and St Thomas' NHS Foundation Trust	162	100.0	71.4	71.0	69.1
Imperial College Healthcare NHS Trust	212	97.9	55.3	90.6	62.7
Kings College Hospital NHS Foundation Trust	128	100.0	98.4	100.0	54.7
Kingston Hospital NHS Trust	152	98.7	84.1	100.0	66.4
North West London Hospitals NHS Trust	144	100.0	79.2	9.7	54.9
South London Healthcare NHS Trust	236	100.0	100.0	67.8	30.9
St George's Healthcare NHS Trust	142	99.2	97.6	68.3	63.4
The Hillingdon Hospital NHS Trust	96	100.0	100.0	96.9	62.5
The Lewisham Hospital NHS Trust	100	100.0	89.4	89.0	66.0
The Royal Marsden NHS Foundation Trust	44	100.0	97.7	100.0	63.6
West Middlesex University Hospital NHS Trust	98	97.9	62.8	98.0	60.2
London Cancer Network	**1,328**	**99.4**	**75.5**	**83.5**	**64.7**
Barking, Havering and Redbridge University Hospitals NHS Trust	286	99.3	16.8	90.9	61.5
Barnet and Chase Farm Hospitals NHS Trust	225	99.6	96.2	99.6	64.0
Barts Health NHS Trust	275	100.0	80.2	82.2	65.5
Homerton University Hospital NHS Foundation Trust	71	100.0	95.1	90.1	64.8
North Middlesex University Hospital NHS Trust	64	100.0	100.0	100.0	68.8
Royal Free London NHS Foundation Trust	94	100.0	100.0	97.9	66.0
The Princess Alexandra Hospital NHS Trust	132	99.2	*	0.8	67.4
The Whittington Hospital NHS Trust	66	100.0	98.4	98.5	74.2
University College London Hospitals NHS Foundation Trust	115	97.4	99.1	98.3	60.0
South West Coast	**2,975**	**99.2**	**89.1**	**94.7**	**66.3**
Gloucestershire Hospitals NHS Foundation Trust	426	98.4	95.7	96.0	66.9
North Bristol NHS Trust	276	99.6	97.5	97.8	69.2
Northern Devon Healthcare NHS Trust	121	100.0	93.3	95.9	65.3
Plymouth Hospitals NHS Trust	316	95.2	46.6	89.6	58.9
Royal Cornwall Hospitals NHS Trust	307	100.0	94.1	95.8	62.9
Royal Devon and Exeter NHS Foundation Trust	285	100.0	99.6	97.5	67.7
Royal United Hospital Bath NHS Trust	235	100.0	85.5	88.1	66.0
Salisbury NHS Foundation Trust	153	100.0	96.7	98.7	68.6
South Devon Healthcare NHS Foundation Trust	204	100.0	96.6	99.5	69.1
Taunton and Somerset NHS Foundation Trust	222	99.5	87.5	90.5	67.1
University Hospitals Bristol NHS Foundation Trust	197	100.0	81.7	93.4	62.9
Weston Area Health NHS Trust	108	100.0	97.0	93.5	78.7
Yeovil District Hospital NHS Foundation Trust	125	100.0	98.2	96.0	68.0
Wessex	**1,624**	**99.5**	**91.9**	**96.6**	**65.6**
Dorset County Hospital NHS Foundation Trust	174	100.0	98.7	98.3	64.9
Hampshire Hospitals NHS Foundation Trust	291	99.0	84.3	92.8	72.2
Isle of Wight Health NHS Trust	107	99.1	63.0	99.1	75.7
Poole Hospital NHS Foundation Trust	178	100.0	90.6	92.7	60.7
Portsmouth Hospitals NHS Trust	376	99.7	98.5	98.4	62.8
Southampton University Hospitals NHS Trust	262	98.9	93.6	98.9	68.3
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	236	100.0	97.2	96.6	58.5

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Network/ Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)	Underwent major surgery (%)
South East Coast	**2,508**	**99.5**	**75.9**	**71.3**	**59.5**
Ashford and St Peters Hospitals NHS Foundation Trust	149	100.0	93.6	96.0	69.8
Brighton and Sussex University Hospitals NHS Trust	210	100.0	92.9	91.4	55.7
Dartford and Gravesham NHS Trust	138	100.0	72.6	29.0	41.3
East Kent Hospitals University NHS Foundation Trust	356	100.0	1.4	0.6	41.3
East Sussex Healthcare NHS Trust	303	100.0	95.2	98.0	55.8
Frimley Park Hospital NHS Foundation Trust	237	99.2	100.0	97.0	73.4
Maidstone and Tunbridge Wells NHS Trust	307	96.7	86.9	41.7	59.0
Medway NHS Foundation Trust	146	100.0	79.1	80.1	67.8
Royal Surrey County Hospital NHS Foundation Trust	163	99.4	90.1	98.2	65.6
Surrey and Sussex Healthcare NHS Trust	133	100.0	92.3	99.2	80.5
Western Sussex Hospitals NHS Trust	366	100.0	73.6	95.1	62.6

* No data entered for this item

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Table 6.3
Management of patients who had major surgery according to trust/hospital site

Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency (%)	Median number of lymph nodes excised	Laparoscopic surgery attempted (%)	Length of hospital stay > 5 days (%)
Overall	**20,193**	**12.1**	**15.5**	**16**	**54.8**	**69.1**
Northern England	**1,253**	**9.3**	**13.1**	**16**	**68.0**	**66.0**
City Hospitals Sunderland NHS Foundation Trust	109	9.7	9.2	15	78.6	78.0
Durham and Darlington NHS Foundation Trust	205	6.5	11.7	14	56.9	67.6
Gateshead Health NHS Foundation Trust	106	10.9	10.4	16	64.2	52.8
North Cumbria University Hospitals NHS Trust	108	10.0	12.1	13.5	62.3	51.9
North Tees and Hartlepool NHS Foundation Trust	155	6.0	12.3	17	85.0	65.8
Northumbria Healthcare NHS Foundation Trust	158	7.9	11.4	16	52.5	68.8
South Tees Hospitals NHS Foundation Trust	195	9.3	12.4	18	85.6	55.3
South Tyneside NHS Foundation Trust	65	15.6	18.5	13	29.2	90.8
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	152	13.4	21.7	19	76.3	74.3
Greater Manchester, Lancashire and South Cumbria	**1,655**	**12.3**	**18.9**	**15**	**45.8**	**77.6**
Blackpool Teaching Hospitals NHS Foundation Trust	125	8.1	15.2	13	63.0	85.8
Central Manchester University Hospitals NHS Foundation Trust	115	8.7	20.9	16	47.0	73.7
East Lancashire Hospitals NHS Trust	148	19.6	27.7	15	27.9	80.7
Lancashire Teaching Hospitals NHS Foundation Trust	125	13.1	2.4	10	27.8	84.6
Pennine Acute Hospitals NHS Trust	267	13.8	18.0	19	61.8	78.3
Royal Bolton Hospital NHS Foundation Trust	127	11.8	38.8	12	21.5	79.4
Salford Royal NHS Foundation Trust	90	12.2	17.8	15.5	62.2	77.5
Stockport NHS Foundation Trust	120	15.1	17.5	16	36.7	76.9
Tameside Hospital NHS Foundation Trust	90	5.7	14.4	13.5	66.3	74.4
The Christie NHS Foundation Trust	58	23.2	0.0	15	26.3	89.5
University Hospital of South Manchester NHS Foundation Trust	88	19.3	15.9	22	37.5	75.6
University Hospitals of Morecambe Bay NHS Trust	175	6.4	28.7	13	58.7	51.7
Wrightington, Wigan and Leigh NHS Foundation Trust	127	8.7	11.9	14	37.0	65.1
Yorkshire and The Humber	**2,075**	**10.7**	**9.9**	**18**	**49.2**	**76.4**
Airedale NHS Trust	85	12.9	17.9	26	72.9	65.8
Barnsley Hospital NHS Foundation Trust	86	16.5	19.0	16.5	0.0	85.9
Bradford Teaching Hospitals NHS Foundation Trust	119	6.9	0.8	16	90.7	79.7
Calderdale and Huddersfield NHS Foundation Trust	164	10.5	0.6	17	36.0	83.4
Chesterfield Royal Hospital NHS Foundation Trust	122	8.2	17.2	17	32.2	76.7
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	175	5.2	8.6	15	80.0	57.9
Harrogate and District NHS Foundation Trust	77	9.3	13.0	17	77.9	74.0
Hull and East Yorkshire Hospitals NHS Trust	182	9.9	7.7	15	33.7	82.3
Leeds Teaching Hospitals NHS Trust	230	14.7	0.0	19	66.4	74.9
Mid Yorkshire Hospitals NHS Trust	177	11.8	20.3	16	43.7	78.8
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	161	18.2	13.7	17	21.1	80.6
Sheffield Teaching Hospitals NHS Foundation Trust	213	8.5	8.0	29	35.7	76.8
The Rotherham NHS Foundation Trust	67	14.9	14.9	17	55.2	68.7
York Teaching Hospital NHS Foundation Trust - Scarborough Hospital	58	10.3	6.9	18	50.0	69.6
York Teaching Hospital NHS Foundation Trust - The York Hospital	159	6.3	14.6	23	36.3	81.9
Cheshire and Merseyside	**1,072**	**11.7**	**14.0**	**16**	**45.9**	**71.4**
Aintree University Hospital NHS Foundation Trust	134	14.9	16.4	17	45.9	68.5
Countess of Chester Hospital NHS Foundation Trust	100	10.4	11.0	16	34.7	53.0
East Cheshire NHS Trust	88	14.9	19.3	14	50.6	79.5
Mid Cheshire Hospitals NHS Foundation Trust	93	6.5	19.4	15	66.7	80.6
Royal Liverpool and Broadgreen University Hospitals NHS Trust	147	5.5	10.3	16	31.1	70.4
Southport and Ormskirk Hospital NHS Trust	92	18.9	5.4	14	78.4	74.7
St Helens and Knowsley Hospitals NHS Trust	164	13.8	14.0	17	39.0	76.7
Warrington and Halton Hospitals NHS Foundation Trust	124	8.0	15.6	15	37.1	70.2
Wirral University Teaching Hospital NHS Foundation Trust	130	13.3	15.4	20	41.7	69.4

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Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency (%)	Median number of lymph nodes excised	Laparoscopic surgery attempted (%)	Length of hospital stay > 5 days (%)
Wales	**1,289**	**10.8**	**16.5**	**15**	**45.5**	**65.7**
Bronglais MDT	33	12.1	18.2	12	18.2	78.8
Cardiff MDT	152	11.3	17.8	15	52.0	57.3
Nevill Hall Hospital MDT	63	15.5	25.4	17.5	49.2	66.7
Prince Charles Hospital MDT	75	9.5	12.0	12	85.3	50.7
Princess of Wales MDT	119	17.2	0.0	17	28.6	67.2
Royal Glamorgan Hospital MDT	90	14.5	12.2	12.5	12.2	68.9
Royal Gwent Hospital MDT	162	7.6	16.3	14	51.3	71.9
Swansea MDT	190	10.8	21.1	17	37.4	70.5
West Wales General and Prince Phillip MDT	87	11.5	23.0	16	57.0	58.8
Withybush General MDT	57	6.0	14.0	15	70.2	59.6
Ysbyty Glan Clwyd MDT	91	10.1	24.2	17	47.3	68.1
Ysbyty Gwynedd MDT	85	5.4	20.0	10	66.7	71.8
Ysbyty Maelor MDT	85	8.8	11.9	20	21.4	61.9
West Midlands	**2,136**	**13.6**	**17.2**	**17**	**45.6**	**69.7**
George Eliot Hospital NHS Trust	68	10.6	13.2	13.5	55.9	62.7
Heart of England NHS Foundation Trust	277	15.4	15.2	20	56.7	65.0
Mid Staffordshire NHS Foundation Trust	81	16.5	17.3	16	53.5	71.3
Sandwell and West Birmingham Hospitals NHS Trust	154	14.5	17.5	25	32.5	71.3
Shrewsbury and Telford Hospital NHS Trust	205	5.2	17.2	17	52.4	50.5
South Warwickshire NHS Foundation Trust	104	13.6	21.4	13	61.2	65.4
The Dudley Group of Hospitals NHS Foundation Trust	134	12.8	21.6	17	15.4	64.7
The Royal Wolverhampton Hospitals NHS Trust	140	16.4	17.1	19	42.9	86.4
University Hospital Birmingham NHS Foundation Trust	163	18.1	16.1	20	46.5	75.6
University Hospital of North Staffordshire NHS Trust	203	11.1	18.3	17	58.1	61.5
University Hospitals Coventry and Warwickshire NHS Trust	167	15.2	15.0	23.5	44.3	76.5
Walsall Healthcare NHS Trust	83	8.6	33.7	17	33.3	79.2
Worcestershire Acute Hospitals NHS Trust	240	15.6	12.9	15	41.7	79.5
Wye Valley NHS Trust	117	13.8	14.5	13	35.0	75.2
East Midlands	**1,227**	**12.9**	**18.3**	**15**	**45.5**	**68.2**
Burton Hospitals NHS Foundation Trust	113	21.2	15.0	16	63.7	53.6
Circle - Nottingham NHS Treatment Centre	†	†	†	†	†	†
Derby Hospitals NHS Foundation Trust	166	7.9	13.4	16	16.7	64.9
Kettering General Hospital NHS Foundation Trust	116	18.8	26.7	14	34.9	62.1
Northampton General Hospital NHS Foundation Trust	120	11.7	20.8	16	58.7	70.0
Nottingham University Hospitals NHS Trust	255	5.6	15.3	14.5	72.2	55.2
Sherwood Forest Hospitals NHS Foundation Trust	121	5.1	14.9	18	51.2	66.1
United Lincolnshire Hospitals NHS Trust	80	15.6	27.5	17.5	21.3	88.0
University Hospitals of Leicester NHS Trust	256	20.6	19.5	13	48.6	75.1
East of England	**2,041**	**13.2**	**19.3**	**15**	**57.4**	**70.7**
Basildon and Thurrock University Hospitals NHS Foundation Trust	95	7.5	8.7	16	73.3	69.4
Bedford Hospital NHS Trust	91	13.3	15.4	15	53.2	77.0
Cambridge University Hospitals NHS Foundation Trust	213	16.1	16.8	15.5	52.6	60.0
Colchester Hospital University NHS Foundation Trust	148	7.6	13.5	13	95.2	62.2
East and North Hertfordshire NHS Trust	145	15.5	22.4	21	57.0	80.4
Hinchingbrooke Health Care NHS Trust	52	11.8	100.0‡	18	55.1	82.7
Ipswich Hospital NHS Trust	145	9.6	17.2	12	33.1	71.8
James Paget University Hospitals NHS Foundation Trust	103	28.7	24.3	14	54.9	85.0
Luton and Dunstable Hospital NHS Foundation Trust	56	10.6	16.7	17	51.9	*
Mid Essex Hospital Services NHS Trust	94	9.1	11.8	16.5	65.9	56.0
Norfolk and Norwich University Hospitals NHS Foundation Trust	238	10.6	16.0	14.5	48.4	72.6
Peterborough and Stamford Hospitals NHS Foundation Trust	147	14.3	13.7	18	55.8	71.3
Southend University Hospital NHS Foundation Trust	140	13.7	23.6	16	75.7	72.9
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	109	7.3	12.8	10	17.1	70.0
West Hertfordshire Hospitals NHS Trust	133	18.0	13.5	14	58.1	74.2
West Suffolk NHS Foundation Trust	132	12.9	28.0	17	43.9	62.6

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Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency (%)	Median number of lymph nodes excised	Laparoscopic surgery attempted (%)	Length of hospital stay > 5 days (%)
Thames Valley	**906**	**11.5**	**16.8**	**17**	**66.3**	**67.6**
Buckinghamshire Healthcare NHS Foundation Trust	167	11.4	7.8	16	68.7	47.7
Great Western NHS Foundation Trust	149	21.2	14.8	17	38.3	78.5
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	121	3.3	15.8	17	52.4	78.6
Milton Keynes NHS Foundation Trust	64	11.1	26.6	17	56.8	*
Oxford University Hospitals	228	9.5	19.7	19	77.5	64.4
Royal Berkshire NHS Foundation Trust	177	10.2	20.3	16	77.4	67.2
London Cancer Alliance	**1,153**	**13.8**	**11.1**	**16**	**52.7**	**78.8**
Chelsea and Westminster Hospital NHS Foundation Trust	48	10.4	20.8	22	47.9	87.0
Croydon Health Services NHS Trust	72	10.0	9.7	13	41.3	*
Ealing Hospital NHS Trust	42	12.2	12.1	17.5	73.8	90.2
Epsom and St Helier University Hospitals NHS Trust	120	8.6	16.7	13	29.3	82.1
Guy's and St Thomas' NHS Foundation Trust	112	14.1	0.0	17	100.0	*
Imperial College Healthcare NHS Trust	133	24.6	9.1	22.5	83.3	95.0
Kings College Hospital NHS Foundation Trust	70	24.3	14.3	18	77.1	80.9
Kingston Hospital NHS Trust	101	12.9	9.9	15	36.6	72.3
North West London Hospitals NHS Trust	79	2.3	2.5	17.5	83.8	100.0
South London Healthcare NHS Trust	73	5.7	22.6	15	61.3	71.9
St George's Healthcare NHS Trust	90	7.0	12.9	20	65.1	61.5
The Hillingdon Hospital NHS Trust	60	23.3	15.0	12.5	58.3	78.0
The Lewisham Hospital NHS Trust	66	6.1	12.1	16	18.2	69.4
The Royal Marsden NHS Foundation Trust	28	22.2	3.7	21	42.9	85.7
West Middlesex University Hospital NHS Trust	59	19.0	18.6	20	51.0	67.3
London Cancer Network	**859**	**11.3**	**16.7**	**16**	**67.8**	**75.6**
Barking, Havering and Redbridge University Hospitals NHS Trust	176	5.4	25.6	16	52.9	73.5
Barnet and Chase Farm Hospitals NHS Trust	144	13.3	13.9	15	67.8	68.8
Barts Health NHS Trust	180	11.9	13.4	19	85.0	75.2
Homerton University Hospital NHS Foundation Trust	46	15.2	30.4	16	52.2	84.4
North Middlesex University Hospital NHS Trust	44	4.7	22.7	13	84.1	90.9
Royal Free London NHS Foundation Trust	62	14.8	6.6	15	53.2	74.1
The Princess Alexandra Hospital NHS Trust	89	10.2	2.2	15	74.1	42.9
The Whittington Hospital NHS Trust	49	22.4	14.3	20	71.4	78.7
University College London Hospitals NHS Foundation Trust	69	11.6	24.6	17	58.0	80.6
South West Coast	**1,971**	**12.6**	**14.8**	**18**	**62.7**	**59.5**
Gloucestershire Hospitals NHS Foundation Trust	285	8.4	18.0	25	58.7	51.2
North Bristol NHS Trust	191	27.4	17.4	19	77.9	51.4
Northern Devon Healthcare NHS Trust	79	15.7	15.2	15	59.5	58.2
Plymouth Hospitals NHS Trust	186	14.1	15.7	18	44.2	72.5
Royal Cornwall Hospitals NHS Trust	193	14.0	18.1	17	88.1	57.1
Royal Devon and Exeter NHS Foundation Trust	193	8.4	7.8	14	56.3	56.9
Royal United Hospital Bath NHS Trust	155	7.8	14.8	19	66.2	64.7
Salisbury NHS Foundation Trust	105	11.4	12.4	17	80.0	50.0
South Devon Healthcare NHS Foundation Trust	141	11.3	14.3	15.5	58.9	58.1
Taunton and Somerset NHS Foundation Trust	149	5.5	15.0	15	74.3	62.0
University Hospitals Bristol NHS Foundation Trust	124	9.8	10.5	15	46.3	69.2
Weston Area Health NHS Trust	85	19.0	14.1	16	26.7	47.4
Yeovil District Hospital NHS Foundation Trust	85	16.5	14.1	19	25.0	72.7
Wessex	**1,065**	**13.6**	**12.6**	**17**	**67.2**	**54.1**
Dorset County Hospital NHS Foundation Trust	113	11.6	15.2	18	78.0	58.4
Hampshire Hospitals NHS Foundation Trust	210	10.0	13.8	14	67.8	60.3
Isle of Wight Health NHS Trust	81	15.4	8.8	19	41.8	49.4
Poole Hospital NHS Foundation Trust	108	14.8	15.7	20	65.7	44.4
Portsmouth Hospitals NHS Trust	236	12.9	8.9	21	80.1	56.8
Southampton University Hospitals NHS Trust	179	20.3	14.5	18	64.8	54.0
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	138	10.9	12.3	17	54.7	49.2

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Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency (%)	Median number of lymph nodes excised	Laparoscopic surgery attempted (%)	Length of hospital stay > 5 days (%)
South East Coast	**1,491**	**10.8**	**16.0**	**16**	**59.8**	**65.7**
Ashford and St Peters Hospitals NHS Foundation Trust	104	16.8	25.0	13.5	57.7	67.0
Brighton and Sussex University Hospitals NHS Trust	117	9.3	16.5	18.5	77.4	59.3
Dartford and Gravesham NHS Trust	57	7.4	30.2	17	44.9	82.7
East Kent Hospitals University NHS Foundation Trust	147	3.3	9.5	17.5	*	*
East Sussex Healthcare NHS Trust	169	7.7	12.4	17	36.3	69.2
Frimley Park Hospital NHS Foundation Trust	174	12.7	19.0	20	74.6	54.6
Maidstone and Tunbridge Wells NHS Trust	181	9.9	18.2	16	40.9	78.5
Medway NHS Foundation Trust	99	12.4	18.9	16	71.1	60.0
Royal Surrey County Hospital NHS Foundation Trust	107	21.5	6.5	24	84.0	37.4
Surrey and Sussex Healthcare NHS Trust	107	6.8	15.9	16	40.0	76.6
Western Sussex Hospitals NHS Trust	229	11.4	14.4	13	72.7	69.6

* No data entered for this item
† No major surgery reported
‡ Hinchingbrooke Health Care NHS Trust have incorrectly recorded all major surgery as Urgent or Emergency

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Table 6.4
Outcomes of patients who had major surgery according to trust/hospital site (excludes those recorded as <18 years or ICD-10 code C18.1 (Malignant neoplasm of appendix))

Network/Trust Name	No. patients having major surgery	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)	No. patients having major surgery linked to HES	Observed 90-day unplanned readmission rate (%)	Adjusted 90-day unplanned readmission rate (%)	No. patients having major resection 1 Apr 08-31 Mar 11	Observed 2-year mortality (%)	Adjusted 2-year mortality (%)
Overall	**20,043**	**4.6**	**4.6**	**17,006**	**19.8**	**19.8**	**48,859**	**24.0**	**24.0**
Northern England	**1,243**	**4.7**	**4.8**	**1,164**	**20.4**	**20.2**	**3,561**	**22.7**	**23.9**
City Hospitals Sunderland NHS Foundation Trust	108	6.5	6.5	103	26.2	25.4	287	18.7	21.1
Durham and Darlington NHS Foundation Trust	203	7.4	9.7	180	27.2	27.6	582	21.1	26.8
Gateshead Health NHS Foundation Trust	105	4.8	4.4	105	25.7	24.8	294	24.3	24.1
North Cumbria University Hospitals NHS Trust	108	6.5	8.3	102	23.5	24.2	330	21.0	22.8
North Tees and Hartlepool NHS Foundation Trust	152	2.6	2.4	139	16.5	16.1	411	18.6	17.5
Northumbria Healthcare NHS Foundation Trust	157	3.2	3.7	153	19.0	19.4	549	22.0	26.2
South Tees Hospitals NHS Foundation Trust	194	1.5	1.9	186	18.8	18.6	472	22.4	23.0
South Tyneside NHS Foundation Trust	64	9.4	7.8	59	18.6	18.5	200	36.9	30.1
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	152	4.6	3.3	137	8.8	8.4	436	26.9	24.8
Greater Manchester, Lancashire and South Cumbria	**1,641**	**5.2**	**5.4**	**1,492**	**18.0**	**17.8**	**3,478**	**25.0**	**25.8**
Blackpool Teaching Hospitals NHS Foundation Trust	124	6.5	8.6	113	11.5	12.0	406	24.6	27.2
Central Manchester University Hospitals NHS Foundation Trust	113	6.2	6.8	98	22.4	21.5	276	27.0	24.2
East Lancashire Hospitals NHS Trust	145	3.4	2.8	131	14.5	14.1	362	25.1	26.9
Lancashire Teaching Hospitals NHS Foundation Trust	125	1.6	2.3	120	16.7	16.4	316	17.2	22.0
Pennine Acute Hospitals NHS Trust	265	7.5	8.2	253	22.1	21.6	530	33.0	33.9
Royal Bolton Hospital NHS Foundation Trust	126	5.6	4.6	120	25.0	24.9	282	24.5	24.9
Salford Royal NHS Foundation Trust	90	8.9	8.4	82	17.1	16.5	194	20.0	18.0
Stockport NHS Foundation Trust	116	3.4	3.7	102	18.6	18.2	249	21.8	21.6
Tameside Hospital NHS Foundation Trust	90	6.7	7.6	86	16.3	16.3	241	36.4	39.0
The Christie NHS Foundation Trust	58	3.4	5.3	40	20.0	17.1	80	20.4	26.1
University Hospital Of South Manchester NHS Foundation Trust	87	6.9	5.1	75	12.0	11.7	237	17.9	14.3
University Hospitals Of Morecambe Bay NHS Trust	175	3.4	3.4	161	13.7	14.3	165	21.8	26.7
Wrightington, Wigan and Leigh NHS Foundation Trust	127	3.9	4.2	111	20.7	20.1	140	27.0	27.9
Yorkshire and the Humber	**2,061**	**4.5**	**5.0**	**1,928**	**20.3**	**20.1**	**5,553**	**22.5**	**23.4**
Airedale NHS Trust	85	1.2	1.3	80	11.3	11.2	248	19.8	17.7
Barnsley Hospital NHS Foundation Trust	85	9.4	9.0	81	18.5	17.8	247	24.1	29.2
Bradford Teaching Hospitals NHS Foundation Trust	118	4.2	4.1	110	25.5	23.1	328	20.6	18.5
Calderdale and Huddersfield NHS Foundation Trust	163	3.1	4.2	152	14.5	14.1	305	21.5	22.5
Chesterfield Royal Hospital NHS Foundation Trust	122	3.3	3.6	117	26.5	26.9	293	20.8	29.1
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	174	3.4	5.0	167	19.8	20.2	237	20.9	29.0
Harrogate and District NHS Foundation Trust	77	5.2	5.6	75	26.7	26.3	193	24.0	26.8
Hull and East Yorkshire Hospitals NHS Trust	179	3.9	5.0	166	19.3	19.3	626	28.8	25.0
Leeds Teaching Hospitals NHS Trust	229	7.4	7.3	214	20.1	19.3	689	24.0	24.4
Mid Yorkshire Hospitals NHS Trust	177	5.1	5.5	161	22.4	22.4	540	19.5	20.3
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	158	5.7	5.0	147	19.7	18.3	401	24.5	24.8
Sheffield Teaching Hospitals NHS Foundation Trust	213	1.4	1.8	197	26.9	27.2	597	16.8	18.4
The Rotherham NHS Foundation Trust	67	6.0	7.8	64	14.1	15.1	288	25.2	31.7
York Teaching Hospital NHS Foundation Trust - Scarborough Hospital	56	5.4	6.0	52	19.2	19.1	151	32.7	27.3
York Teaching Hospital NHS Foundation Trust - The York Hospital	158	5.1	4.5	145	15.2	15.7	410	20.6	21.6
Cheshire and Merseyside	**1,069**	**3.6**	**4.0**	**963**	**19.6**	**19.7**	**2,436**	**25.4**	**26.3**
Aintree University Hospital NHS Foundation Trust	134	3.0	3.1	118	21.2	21.5	350	30.4	34.7
Countess Of Chester Hospital NHS Foundation Trust	99	1.0	0.7	93	21.5	21.8	221	23.9	25.9
East Cheshire NHS Trust	88	5.7	4.4	83	21.7	21.4	118	21.9	20.7
Mid Cheshire Hospitals NHS Foundation Trust	92	2.2	3.7	87	18.4	19.1	87	18.9	27.8
Royal Liverpool and Broadgreen University Hospitals NHS Trust	146	4.8	6.7	111	14.4	14.5	302	24.8	25.1
Southport and Ormskirk Hospital NHS Trust	92	4.3	5.0	88	21.6	22.2	235	25.4	20.9
St Helens and Knowsley Hospitals NHS Trust	164	3.0	2.9	154	16.2	15.5	323	24.7	30.6
Warrington and Halton Hospitals NHS Foundation Trust	124	6.5	8.6	117	20.5	20.4	352	26.1	28.6
Wirral University Teaching Hospital NHS Foundation Trust	130	2.3	3.0	112	23.2	23.8	448	24.7	22.7

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Network/Trust Name	No. patients having major surgery	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)	No. patients having major surgery linked to HES	Observed 90-day unplanned readmission rate (%)	Adjusted 90-day unplanned readmission rate (%)	No. patients having major resection 1 Apr 08-31 Mar 11	Observed 2-year mortality (%)	Adjusted 2-year mortality (%)
Wales	**1,282**	**6.0**	**5.4**	**No PEDW**	**No PEDW**	**No PEDW**	**3,550**	**28.0**	**27.5**
Bronglais MDT	32	6.3	3.6	No PEDW	No PEDW	No PEDW	108	46.1	27.8
Cardiff MDT	151	3.3	3.2	No PEDW	No PEDW	No PEDW	414	20.6	19.7
Nevill Hall Hospital MDT	62	4.8	3.3	No PEDW	No PEDW	No PEDW	202	36.1	37.1
Prince Charles Hospital MDT	75	5.3	6.5	No PEDW	No PEDW	No PEDW	245	31.3	33.5
Princess of Wales MDT	118	7.6	7.2	No PEDW	No PEDW	No PEDW	318	30.9	29.4
Royal Glamorgan Hospital MDT	90	7.8	7.2	No PEDW	No PEDW	No PEDW	194	30.8	27.5
Royal Gwent Hospital MDT	162	5.6	4.7	No PEDW	No PEDW	No PEDW	385	28.3	30.7
Swansea MDT	188	5.9	4.9	No PEDW	No PEDW	No PEDW	395	27.0	24.6
West Wales General and Prince Phillip MDT	87	8.0	6.9	No PEDW	No PEDW	No PEDW	255	29.1	31.7
Withybush General MDT	57	7.0	6.8	No PEDW	No PEDW	No PEDW	193	23.1	24.7
Ysbyty Glan Clwyd MDT	91	5.5	3.7	No PEDW	No PEDW	No PEDW	247	25.1	23.3
Ysbyty Gwynedd MDT	84	8.3	8.6	No PEDW	No PEDW	No PEDW	323	27.2	27.5
Ysbyty Maelor MDT	85	4.7	7.6	No PEDW	No PEDW	No PEDW	271	26.6	29.5
West Midlands	**2,114**	**5.3**	**5.0**	**1,898**	**21.2**	**20.9**	**5,393**	**25.9**	**25.0**
George Eliot Hospital NHS Trust	65	3.1	4.1	61	26.2	26.4	201	35.8	40.9
Heart Of England NHS Foundation Trust	273	4.4	4.9	233	18.9	18.8	714	27.1	23.4
Mid Staffordshire NHS Foundation Trust	81	6.2	5.4	74	31.1	30.9	228	26.3	28.6
Sandwell and West Birmingham Hospitals NHS Trust	154	5.2	4.0	123	24.4	22.7	358	29.3	32.3
Shrewsbury and Telford Hospital NHS Trust	200	6.5	8.5	192	16.7	16.9	535	17.9	20.7
South Warwickshire NHS Foundation Trust	104	4.8	4.5	84	8.3	8.3	302	19.9	18.8
The Dudley Group Of Hospitals NHS Foundation Trust	134	7.5	7.2	116	20.7	19.9	334	27.0	30.1
The Royal Wolverhampton Hospitals NHS Trust	138	2.2	1.4	129	17.8	17.5	430	25.8	18.4
University Hospital Birmingham NHS Foundation Trust	162	5.6	6.0	151	22.5	22.2	421	24.2	21.1
University Hospital Of North Staffordshire NHS Trust	201	3.5	3.5	193	26.9	27.3	299	24.0	28.2
University Hospitals Coventry and Warwickshire NHS Trust	167	4.2	4.0	150	21.3	20.8	374	19.0	20.4
Walsall Healthcare NHS Trust	82	7.3	5.8	70	27.1	26.3	257	40.0	33.2
Worcestershire Acute Hospitals NHS Trust	236	7.2	6.2	216	22.2	21.9	652	28.9	28.4
Wye Valley NHS Trust	117	6.0	6.9	106	17.0	16.4	288	27.8	26.8
East Midlands	**1,218**	**4.3**	**4.8**	**1,111**	**21.0**	**20.9**	**3,202**	**22.6**	**23.1**
Burton Hospitals NHS Foundation Trust	111	7.2	5.4	99	18.2	17.4	280	27.3	23.3
Derby Hospitals NHS Foundation Trust	165	3.6	5.4	155	16.8	17.2	444	16.1	17.8
Kettering General Hospital NHS Foundation Trust	114	6.1	5.3	105	14.3	13.9	246	32.9	39.6
Northampton General Hospital NHS Foundation Trust	120	4.2	4.6	114	21.1	21.3	282	28.7	33.5
Nottingham University Hospitals NHS Trust	252	4.0	5.5	216	24.1	24.2	653	22.8	30.8
Sherwood Forest Hospitals NHS Foundation Trust	120	3.3	4.3	109	22.0	22.2	367	17.2	16.3
United Lincolnshire Hospitals NHS Trust	80	6.3	5.5	78	21.8	22.2	86	26.1	16.3
University Hospitals Of Leicester NHS Trust	256	2.7	3.1	235	24.3	23.5	844	21.8	19.3
East of England	**2,029**	**4.1**	**4.3**	**1,861**	**19.9**	**20.1**	**4,942**	**24.4**	**24.0**
Basildon and Thurrock University Hospitals NHS Foundation Trust	93	6.5	9.6	82	20.7	21.1	296	18.4	24.4
Bedford Hospital NHS Trust	91	0.0	0.0	89	19.1	19.8	231	27.2	28.4
Cambridge University Hospitals NHS Foundation Trust	211	3.8	3.4	203	19.7	19.1	411	19.7	20.0
Colchester Hospital University NHS Foundation Trust	148	2.7	4.4	133	18.8	19.7	452	27.4	28.6
East and North Hertfordshire NHS Trust	145	4.8	5.1	128	22.7	23.7	454	23.7	17.6
Hinchingbrooke Health Care NHS Trust	50	6.0	4.3	43	34.9	34.0	201	22.4	23.1
Ipswich Hospital NHS Trust	145	4.1	4.3	135	25.9	26.8	198	28.5	33.5
James Paget University Hospitals NHS Foundation Trust	103	10.7	7.3	96	20.8	19.9	303	30.9	28.6
Luton and Dunstable Hospital NHS Foundation Trust	55	5.5	4.6	48	12.5	12.2	80	21.0	†
Mid Essex Hospital Services NHS Trust	94	2.1	4.5	80	15.0	15.7	256	22.6	20.2
Norfolk and Norwich University Hospitals NHS Foundation Trust	235	1.3	1.6	224	12.1	12.3	830	20.8	21.7
Peterborough and Stamford Hospitals NHS Foundation Trust	147	4.8	5.5	139	20.9	20.9	283	27.0	†
Southend University Hospital NHS Foundation Trust	139	3.6	3.1	127	22.0	21.4	453	28.5	28.3
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	108	3.7	3.9	97	19.6	19.8	250	27.2	27.7
West Hertfordshire Hospitals NHS Trust	133	5.3	5.1	120	24.2	24.5	262	28.0	27.5
West Suffolk NHS Foundation Trust	132	5.3	4.1	117	19.7	19.1	345	25.0	21.4

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Network/Trust Name	No. patients having major surgery	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)	No. patients having major surgery linked to HES	Observed 90-day unplanned readmission rate (%)	Adjusted 90-day unplanned readmission rate (%)	No. patients having major resection 1 Apr 08-31 Mar 11	Observed 2-year mortality (%)	Adjusted 2-year mortality (%)
Thames Valley	**781**	**4.0**	**4.1**	**677**	**18.9**	**18.7**	**1,505**	**22.3**	**24.1**
Buckinghamshire Healthcare NHS Foundation Trust	167	0.6	0.7	128	16.4	16.4	222	16.3	20.9
Great Western NHS Foundation Trust	146	6.2	4.8	133	20.3	20.1	337	31.5	28.1
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	121	0.8	†	106	22.6	†	84	23.7	27.5
Milton Keynes NHS Foundation Trust	64	7.8	6.8	59	15.3	13.8	110	24.0	25.1
Oxford University Hospitals	227	1.8	2.4	206	18.9	18.7	540	20.3	23.4
Royal Berkshire NHS Foundation Trust	177	6.8	6.7	151	21.2	21.4	212	18.9	19.7
London Cancer Alliance	**1,141**	**3.9**	**4.3**	**988**	**20.7**	**20.6**	**2,515**	**23.1**	**22.0**
Chelsea and Westminster Hospital NHS Foundation Trust	47	8.5	5.6	37	24.3	26.7	138	27.8	19.4
Croydon Health Services NHS Trust	72	6.9	9.9	62	8.1	8.1	196	18.2	21.0
Ealing Hospital NHS Trust	41	2.4	1.9	40	30.0	31.0	99	22.9	22.1
Epsom and St Helier University Hospitals NHS Trust	120	5.8	5.2	106	18.9	20.1	242	20.7	24.0
Guy's and St Thomas' NHS Foundation Trust	110	2.7	3.8	82	23.2	21.3	44	11.8	17.5
Imperial College Healthcare NHS Trust	131	0.8	0.8	106	26.4	25.4	438	23.3	19.5
Kings College Hospital NHS Foundation Trust	68	4.4	4.3	59	15.3	14.3	190	21.4	18.8
Kingston Hospital NHS Trust	100	6.0	7.8	90	24.4	25.7	211	20.5	22.1
North West London Hospitals NHS Trust	78	3.8	13.7	71	14.1	14.6	247	17.1	18.3
South London Healthcare NHS Trust	72	4.2	4.3	61	21.3	19.8	177	29.0	26.0
St George's Healthcare NHS Trust	89	2.2	4.6	80	21.3	22.1	65	22.1	†
The Hillingdon Hospital NHS Trust	60	3.3	2.0	56	32.1	31.3	220	34.6	31.7
The Lewisham Hospital NHS Trust	66	0.0	0.0	59	11.9	12.0	127	25.9	30.0
The Royal Marsden NHS Foundation Trust	28	0.0	0.0	25	12.0	10.2	27	7.5	7.9
West Middlesex University Hospital NHS Trust	59	6.8	5.2	54	24.1	22.7	159	27.4	21.6
London Cancer Network	**851**	**5.2**	**5.6**	**740**	**21.5**	**21.2**	**1,607**	**26.1**	**24.4**
Barking, Havering and Redbridge University Hospitals NHS Trust	175	5.1	6.8	150	21.3	21.4	262	19.1	19.1
Barnet and Chase Farm Hospitals NHS Trust	141	4.3	3.7	122	16.4	16.3	353	23.5	18.6
Barts Health NHS Trust	177	5.1	4.6	149	25.5	24.6	483	30.1	33.4
Homerton University Hospital NHS Foundation Trust	46	6.5	5.2	42	23.8	22.0	99	19.5	23.4
North Middlesex University Hospital NHS Trust	44	4.5	4.6	35	20.0	19.6	48	29.3	36.1
Royal Free London NHS Foundation Trust	62	8.1	8.8	51	29.4	29.6	172	27.6	†
The Princess Alexandra Hospital NHS Trust	89	5.6	8.3	82	20.7	20.9	109	33.4	32.1
The Whittington Hospital NHS Trust	49	4.1	4.4	44	22.7	22.1	165	33.4	20.2
University College London Hospitals NHS Foundation Trust	68	4.4	10.1	65	15.4	15.5	88	20.4	25.5
South West Coast	**1,952**	**4.9**	**4.9**	**1,791**	**19.5**	**19.7**	**4,107**	**22.2**	**22.0**
Gloucestershire Hospitals NHS Foundation Trust	285	4.9	4.9	253	18.6	18.7	354	19.5	18.0
North Bristol NHS Trust	188	3.2	2.3	176	24.4	23.0	510	21.1	20.2
Northern Devon Healthcare NHS Trust	78	2.6	2.5	75	25.3	24.8	261	16.7	19.2
Plymouth Hospitals NHS Trust	184	3.8	4.2	168	19.0	18.7	418	26.6	26.8
Royal Cornwall Hospitals NHS Trust	190	5.8	5.3	179	17.3	17.5	611	23.2	24.8
Royal Devon and Exeter NHS Foundation Trust	191	5.8	6.1	179	16.2	17.6	506	25.7	21.3
Royal United Hospital Bath NHS Trust	153	3.3	4.6	140	17.1	17.6	443	23.1	†
Salisbury NHS Foundation Trust	105	1.9	2.1	101	22.8	22.8	287	17.2	15.6
South Devon Healthcare NHS Foundation Trust	139	7.9	9.9	133	18.8	19.3	299	20.3	21.6
Taunton and Somerset NHS Foundation Trust	149	8.7	8.3	134	22.4	22.6	210	22.0	23.6
University Hospitals Bristol NHS Foundation Trust	121	4.1	3.9	100	20.0	19.4	203	17.9	21.9
Weston Area Health NHS Trust	85	8.2	7.2	76	22.4	22.3	222	35.2	30.2
Yeovil District Hospital NHS Foundation Trust	84	2.4	2.9	77	13.0	13.4	226	18.7	22.4
Wessex	**1,063**	**3.6**	**4.2**	**965**	**18.4**	**18.8**	**2,833**	**21.3**	**21.2**
Dorset County Hospital NHS Foundation Trust	113	0.9	1.1	101	10.9	11.2	210	18.9	19.2
Hampshire Hospitals NHS Foundation Trust	210	2.4	3.0	200	13.0	13.3	555	20.9	21.7
Isle Of Wight Health NHS Trust	81	11.1	11.4	66	21.2	20.8	188	30.9	31.2
Poole Hospital NHS Foundation Trust	108	4.6	4.0	102	13.7	13.6	315	17.3	16.6
Portsmouth Hospitals NHS Trust	236	2.1	2.9	207	22.2	22.6	667	25.6	24.4
Southampton University Hospitals NHS Trust	178	2.8	3.1	164	24.4	24.5	534	18.8	18.5
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	137	5.8	6.7	125	21.6	23.4	364	18.7	18.9

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Network/Trust Name	No. patients having major surgery	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)	No. patients having major surgery linked to HES	Observed 90-day unplanned readmission rate (%)	Adjusted 90-day unplanned readmission rate (%)	No. patients having major resection 1 Apr 08-31 Mar 11	Observed 2-year mortality (%)	Adjusted 2-year mortality (%)
South East Coast	**1,477**	**4.7**	**5.6**	**1,322**	**17.7**	**18.5**	**3,004**	**24.6**	**23.5**
Ashford and St Peters Hospitals NHS Foundation Trust	103	2.9	3.5	97	19.6	20.7	186	31.4	26.6
Brighton and Sussex University Hospitals NHS Trust	116	5.2	6.8	95	12.6	13.0	277	26.7	29.9
Dartford and Gravesham NHS Trust	57	10.5	11.4	52	21.2	21.5	181	18.7	21.0
East Kent Hospitals University NHS Foundation Trust	144	0.0	0.0	138	24.6	25.8	24	35.9	†
East Sussex Healthcare NHS Trust	164	6.7	7.6	151	9.3	9.9	520	25.3	25.7
Frimley Park Hospital NHS Foundation Trust	174	4.6	5.0	141	22.0	22.3	282	19.0	20.0
Maidstone and Tunbridge Wells NHS Trust	179	4.5	4.7	160	20.0	20.4	374	21.7	13.7
Medway NHS Foundation Trust	99	4.0	5.1	90	20.0	19.6	106	20.7	†
Royal Surrey County Hospital NHS Foundation Trust	106	2.8	3.5	87	12.6	13.1	241	16.6	18.9
Surrey and Sussex Healthcare NHS Trust	106	6.6	8.3	95	17.9	19.8	224	23.1	25.2
Western Sussex Hospitals NHS Trust	229	5.7	6.8	216	16.2	17.4	719	30.3	30.3

† Adjusted estimates not reported because most patients missing ASA grade (also not included in associated Network totals)

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Table 6.5
Results for patients with rectal cancer who had major surgery according to trust/hospital site

Network/Trust Name	Number of patients with rectal cancer undergoing major surgery	MRI scan reported (%)	Pre-operative radiotherapy (short or long course) (%)	APER rate (%)	Number of patients in HES 18-month stoma estimate*	Observed 18-month stoma rate using HES (%)	Adjusted 18-month stoma rate using HES (%)
Overall	**5,054**	**86**	**34**	**26**	**12,027**	**51**	**51**
Northern England	**318**	**92**	**44**	**25**	**997**	**51**	**52**
City Hospitals Sunderland NHS Foundation Trust	34	79	62	24	103	55	54
Durham and Darlington NHS Foundation Trust	56	96	57	20	141	45	48
Gateshead Health NHS Foundation Trust	28	93	29	36	78	69	68
North Cumbria University Hospitals NHS Trust	26	85	58	27	82	35	37
North Tees and Hartlepool NHS Foundation Trust	41	100	51	24	122	41	40
Northumbria Healthcare NHS Foundation Trust	34	85	24	21	184	51	52
South Tees Hospitals NHS Foundation Trust	45	96	44	40	118	62	60
South Tyneside NHS Foundation Trust	12	92	17	33	60	63	62
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	42	95	29	10	109	50	48
Greater Manchester, Lancashire and South Cumbria	**406**	**89**	**44**	**28**	**929**	**62**	**61**
Blackpool Teaching Hospitals NHS Foundation Trust	22	82	45	45	75	67	69
Central Manchester University Hospitals NHS Foundation Trust	26	88	15	19	70	61	61
East Lancashire Hospitals NHS Trust	42	86	45	31	116	62	59
Lancashire Teaching Hospitals NHS Foundation Trust	33	82	36	33	92	65	64
Pennine Acute Hospitals NHS Trust	66	95	44	24	163	75	72
Royal Bolton Hospital NHS Foundation Trust	38	79	66	29	67	60	63
Salford Royal NHS Foundation Trust	20	100	5	10	45	58	61
Stockport NHS Foundation Trust	30	90	53	33	77	44	47
Tameside Hospital NHS Foundation Trust	28	89	71	14	49	61	57
The Christie NHS Foundation Trust	28	93	86	46	31	58	59
University Hospital Of South Manchester NHS Foundation Trust	12	92	8	17	51	47	47
University Hospitals Of Morecambe Bay NHS Trust	41	88	17	22	60	58	59
Wrightington, Wigan and Leigh NHS Foundation Trust	20	100	45	35	33	55	55
Yorkshire and the Humber	**559**	**87**	**38**	**30**	**1,576**	**57**	**57**
Airedale NHS Trust	17	94	76	53	44	75	75
Barnsley Hospital NHS Foundation Trust	23	83	13	35	64	61	59
Bradford Teaching Hospitals NHS Foundation Trust	32	75	59	25	64	53	48
Calderdale and Huddersfield NHS Foundation Trust	43	95	33	28	113	49	48
Chesterfield Royal Hospital NHS Foundation Trust	26	96	27	31	88	58	62
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	51	86	27	35	106	55	57
Harrogate and District NHS Foundation Trust	22	86	68	18	53	49	48
Hull and East Yorkshire Hospitals NHS Trust	52	87	35	19	157	54	53
Leeds Teaching Hospitals NHS Trust	75	68	39	40	225	64	63
Mid Yorkshire Hospitals NHS Trust	45	96	51	24	175	63	69
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	54	85	31	15	87	60	58
Sheffield Teaching Hospitals NHS Foundation Trust	63	90	41	37	140	56	58
The Rotherham NHS Foundation Trust	6	100	0	33	74	51	53
York Teaching Hospital NHS Foundation Trust - Scarborough Hospital	12	92	50	17	53	66	63
York Teaching Hospital NHS Foundation Trust - The York Hospital	38	97	26	32	132	44	45
Cheshire and Merseyside	264	91	58	22	535	54	55
Aintree University Hospital NHS Foundation Trust	13	100	77	31	48	46	48
Countess Of Chester Hospital NHS Foundation Trust	23	91	48	13	51	45	46
East Cheshire NHS Trust	28	93	75	18	52	52	50
Mid Cheshire Hospitals NHS Foundation Trust	26	85	69	27	36	58	65
Royal Liverpool and Broadgreen University Hospitals NHS Trust	40	90	70	33	70	54	53
Southport and Ormskirk Hospital NHS Trust	17	88	53	12	30	57	54
St Helens and Knowsley Hospitals NHS Trust	48	92	50	31	91	56	58
Warrington and Halton Hospitals NHS Foundation Trust	40	93	43	18	76	59	61
Wirral University Teaching Hospital NHS Foundation Trust	29	93	52	7	81	57	56

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Network/Trust Name	Number of patients with rectal cancer undergoing major surgery	MRI scan reported (%)	Pre-operative radiotherapy (short or long course) (%)	APER rate (%)	Number of patients in HES 18-month stoma estimate*	Observed 18-month stoma rate using HES (%)	Adjusted 18-month stoma rate using HES (%)
Wales	**318**	**91**	**35**	**30**	**No PEDW**	**No PEDW**	**No PEDW**
Bronglais MDT	8	88	13	0	No PEDW	No PEDW	No PEDW
Cardiff MDT	37	97	24	27	No PEDW	No PEDW	No PEDW
Nevill Hall Hospital MDT	10	100	40	30	No PEDW	No PEDW	No PEDW
Prince Charles Hospital MDT	22	86	14	18	No PEDW	No PEDW	No PEDW
Princess Of Wales MDT	29	93	28	24	No PEDW	No PEDW	No PEDW
Royal Glamorgan Hospital MDT	14	79	21	29	No PEDW	No PEDW	No PEDW
Royal Gwent Hospital MDT	57	91	40	25	No PEDW	No PEDW	No PEDW
Swansea MDT	57	91	11	44	No PEDW	No PEDW	No PEDW
West Wales General and Prince Phillip MDT	12	100	33	58	No PEDW	No PEDW	No PEDW
Withybush General MDT	12	75	25	25	No PEDW	No PEDW	No PEDW
Ysbyty Glan Clwyd MDT	16	81	69	25	No PEDW	No PEDW	No PEDW
Ysbyty Gwynedd MDT	19	95	74	26	No PEDW	No PEDW	No PEDW
Ysbyty Maelor MDT	25	92	88	40	No PEDW	No PEDW	No PEDW
West Midlands	**516**	**86**	**29**	**24**	**1,398**	**51**	**50**
George Eliot Hospital NHS Trust	13	100	23	38	59	53	54
Heart of England NHS Foundation Trust	68	79	28	19	163	40	42
Mid Staffordshire NHS Foundation Trust	14	71	43	50	49	63	61
Sandwell and West Birmingham Hospitals NHS Trust	36	92	25	6	113	48	48
Shrewsbury and Telford Hospital NHS Trust	49	78	31	24	144	47	47
South Warwickshire NHS Foundation Trust	33	88	39	24	70	51	50
The Dudley Group of Hospitals NHS Foundation Trust	34	79	21	21	81	42	42
The Royal Wolverhampton Hospitals NHS Trust	30	90	27	40	118	45	43
University Hospital Birmingham NHS Foundation Trust	33	88	39	45	112	58	58
University Hospital of North Staffordshire NHS Trust	39	82	10	26	104	37	37
University Hospitals Coventry and Warwickshire NHS Trust	45	93	38	9	104	54	54
Walsall Healthcare NHS Trust	19	89	63	26	55	45	44
Worcestershire Acute Hospitals NHS Trust	62	87	29	29	155	72	72
Wye Valley NHS Trust	41	90	20	20	71	56	54
East Midlands	**335**	**73**	**36**	**29**	**809**	**52**	**51**
Burton Hospitals NHS Foundation Trust	31	74	19	16	86	43	43
Derby Hospitals NHS Foundation Trust	46	91	39	35	91	41	43
Kettering General Hospital NHS Foundation Trust	38	84	18	13	82	49	49
Northampton General Hospital NHS Foundation Trust	29	97	45	41	75	59	58
Nottingham University Hospitals NHS Trust	71	11	1	18	156	49	49
Sherwood Forest Hospitals NHS Foundation Trust	30	97	33	20	83	39	39
United Lincolnshire Hospitals NHS Trust	18	78	22	44	20	70	77
University Hospitals of Leicester NHS Trust	72	94	88	46	216	64	60
East of England	**550**	**86**	**28**	**26**	**1,550**	**51**	**50**
Basildon and Thurrock University Hospitals NHS Foundation Trust	27	89	22	22	86	44	47
Bedford Hospital NHS Trust	22	77	23	23	69	57	56
Cambridge University Hospitals NHS Foundation Trust	67	73	33	22	165	47	48
Colchester Hospital University NHS Foundation Trust	37	100	14	24	129	43	43
East and North Hertfordshire NHS Trust	33	85	15	33	107	57	57
Hinchingbrooke Health Care NHS Trust	5	100	40	20	43	56	54
Ipswich Hospital NHS Trust	35	91	43	23	89	43	42
James Paget University Hospitals NHS Foundation Trust	30	90	30	33	70	57	56
Luton and Dunstable Hospital NHS Foundation Trust	17	94	24	35	11	73	†
Mid Essex Hospital Services NHS Trust	23	57	9	17	82	40	38
Norfolk and Norwich University Hospitals NHS Foundation Trust	74	77	22	12	245	46	46
Peterborough and Stamford Hospitals NHS Foundation Trust	42	98	57	48	93	71	69
Southend University Hospital NHS Foundation Trust	45	93	51	44	137	52	52
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	30	80	3	27	81	75	70
West Hertfordshire Hospitals NHS Trust	32	97	6	13	88	50	47
West Suffolk NHS Foundation Trust	31	94	42	26	66	33	32

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Network/Trust Name	Number of patients with rectal cancer undergoing major surgery	MRI scan reported (%)	Pre-operative radiotherapy (short or long course) (%)	APER rate (%)	Number of patients in HES 18-month stoma estimate*	Observed 18-month stoma rate using HES (%)	Adjusted 18-month stoma rate using HES (%)
Thames Valley	**232**	**94**	**24**	**25**	**453**	**52**	**54**
Buckinghamshire Healthcare NHS Foundation Trust	40	100	40	35	66	50	56
Great Western NHS Foundation Trust	23	87	30	43	94	60	59
Heatherwood and Wexham Park Hospitals NHS Foundation Trust	37	78	27	30	14	64	69
Milton Keynes NHS Foundation Trust	20	85	35	15	55	51	49
Oxford University Hospitals	71	100	3	14	157	45	46
Royal Berkshire NHS Foundation Trust	41	98	34	27	67	61	64
London Cancer Alliance	**257**	**78**	**24**	**20**	**571**	**46**	**46**
Chelsea and Westminster Hospital NHS Foundation Trust	6	100	33	17	23	57	56
Croydon Health Services NHS Trust	15	87	27	7	35	37	38
Ealing Hospital NHS Trust	7	100	0	29	12	58	53
Epsom and St Helier University Hospitals NHS Trust	25	88	32	12	46	33	33
Guy's and St Thomas' NHS Foundation Trust	31	68	16	32	34	76	74
Imperial College Healthcare NHS Trust	29	93	14	48	87	53	51
Kings College Hospital NHS Foundation Trust	12	100	0	33	38	66	61
Kingston Hospital NHS Trust	15	93	33	13	39	31	32
North West London Hospitals NHS Trust	24	21	0	13	61	28	29
South London Healthcare NHS Trust	16	56	38	19	26	31	31
St George's Healthcare NHS Trust	23	70	30	9	25	24	26
The Hillingdon Hospital NHS Trust	13	92	23	8	45	62	61
The Lewisham Hospital NHS Trust	12	92	33	17	31	55	55
The Royal Marsden NHS Foundation Trust	10	100	90	10	17	24	25
West Middlesex University Hospital NHS Trust	19	84	21	11	52	48	46
London Cancer Network	**187**	**80**	**53**	**18**	**410**	**50**	**49**
Barking, Havering and Redbridge University Hospitals NHS Trust	41	88	76	24	61	51	54
Barnet and Chase Farm Hospitals NHS Trust	38	95	50	26	75	64	62
Barts Health NHS Trust	36	75	39	8	125	47	46
Homerton University Hospital NHS Foundation Trust	13	85	62	15	11	27	28
North Middlesex University Hospital NHS Trust	12	75	42	8	2	0	0
Royal Free London NHS Foundation Trust	14	100	50	14	33	39	39
The Princess Alexandra Hospital NHS Trust	13	0	23	8	46	43	44
The Whittington Hospital NHS Trust	5	100	60	20	31	48	45
University College London Hospitals NHS Foundation Trust	15	73	67	27	26	62	62
South West Coast	**504**	**90**	**30**	**26**	**1,190**	**47**	**47**
Gloucestershire Hospitals NHS Foundation Trust	81	88	28	14	145	39	38
North Bristol NHS Trust	52	83	21	31	113	43	42
Northern Devon Healthcare NHS Trust	26	96	27	27	54	41	45
Plymouth Hospitals NHS Trust	38	100	58	42	95	60	57
Royal Cornwall Hospitals NHS Trust	39	90	33	28	145	47	49
Royal Devon and Exeter NHS Foundation Trust	52	94	35	25	122	55	55
Royal United Hospital Bath NHS Trust	41	88	32	27	140	51	49
Salisbury NHS Foundation Trust	30	93	7	13	84	44	46
South Devon Healthcare NHS Foundation Trust	28	93	18	25	91	40	40
Taunton and Somerset NHS Foundation Trust	34	94	38	56	56	50	47
University Hospitals Bristol NHS Foundation Trust	39	79	28	26	37	32	31
Weston Area Health NHS Trust	20	90	35	30	52	69	67
Yeovil District Hospital NHS Foundation Trust	24	96	25	8	56	41	40
Wessex	**273**	**88**	**26**	**19**	**766**	**36**	**37**
Dorset County Hospital NHS Foundation Trust	28	82	14	21	48	46	45
Hampshire Hospitals NHS Foundation Trust	60	85	5	13	153	31	32
Isle of Wight Health NHS Trust	22	86	50	32	49	45	48
Poole Hospital NHS Foundation Trust	21	86	43	24	59	37	38
Portsmouth Hospitals NHS Trust	73	82	30	14	216	32	32
Southampton University Hospitals NHS Trust	42	100	48	29	133	46	45
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	27	96	7	15	108	33	34

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Network/Trust Name	Number of patients with rectal cancer undergoing major surgery	MRI scan reported (%)	Pre-operative radiotherapy (short or long course) (%)	APER rate (%)	Number of patients in HES 18-month stoma estimate*	Observed 18-month stoma rate using HES (%)	Adjusted 18-month stoma rate using HES (%)
South East Coast	**335**	**74**	**22**	**25**	**844**	**45**	**45**
Ashford and St Peters Hospitals NHS Foundation Trust	5	100	0	20	63	46	45
Brighton and Sussex University Hospitals NHS Trust	33	76	21	21	85	58	59
Dartford and Gravesham NHS Trust	10	80	50	10	49	55	54
East Kent Hospitals University NHS Foundation Trust	45	16	49	51	24	79	†
East Sussex Healthcare NHS Trust	27	93	33	33	124	53	53
Frimley Park Hospital NHS Foundation Trust	49	100	0	6	100	37	37
Maidstone and Tunbridge Wells NHS Trust	36	56	33	22	108	44	43
Medway NHS Foundation Trust	27	85	7	11	65	48	†
Royal Surrey County Hospital NHS Foundation Trust	32	88	19	34	54	28	29
Surrey and Sussex Healthcare NHS Trust	20	95	10	15	92	28	29
Western Sussex Hospitals NHS Trust	51	78	20	29	169	48	48

† Adjusted estimates not reported because most patients missing ASA grade
* Equivalent data (PEDW) is not available for Welsh patients

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Appendix 1 – Outlier Communications

Two year Mortality	
Strategic Clinical Network/Wales	**Comment**
Wales	"The Welsh outlier information is not consistent with previous reports, and could be related to data quality rather than poorly performing services and the two health boards involved are undertaking a review of their data as a matter of urgency."

NHS Trust/MDT	
George Eliot Hospital NHS Trust	"The trust carried out a local audit on all the patients that died within 2 years of surgery for the time period 2008-2011. The data from the NBOCAP clearly identifies that the rate of advanced cancers (T4 N1/2) operated upon in our trust is 10% higher than the national average. We would like to mention that we requested a colorectal service review from the Royal College of Surgeons in 2012 as a result of NBOCAP audit 2009/10 and Dr Foster data relating to HSMR in 2010/11. Following the service review no major concerns were identified."
Kettering General Hospital NHS Foundation Trust	Kettering General Hospital NHS Foundation Trust has acknowledged receipt of our letter informing them of their potential outlier status and have reviewed their data. At the time of publication they had given no response to be published in this report.
Tameside Hospital NHS Foundation Trust	"The failings in delivery of care and systematic monitoring were identified in the Keogh review. The improvement plan put in place following the Keogh review has resulted in demonstrable improvement in the delivery of care, in line with the Quality Improvement Strategy agreed by the organisation and its stakeholders. This improvement includes robust monitoring and governance systems which have been significantly strengthened. The recognition of poor performance with respect to the mortality data for patients including those within this study has been recognised as part of this process and are included within the improvement programme monitoring. An initial review of the data submitted has identified a number of patients had incomplete data submitted. A number of ASA grades were not included so the acuity of these patients was not taken into account. We are conducting a thorough review of each case identified by the national audit to ensure these are fully understood. In addition, we have recently commissioned Dr Foster to review the related data presented through SUS to assess whether this information can be correlated with other reported data as part of the organisational understanding and learning and ensure we are providing high quality care."
Nevill Hall Hospital MDT	"Nevill Hall Hospital MDT have investigated the data. Of the 59 deaths only 32 patients (54%) had treatment with curative intent. Most of these patients had Duke's C cancers at presentation, with only 8 of the 32 (25%) Duke's B. Of the latter, one patient developed an inoperable ovarian cancer. The quality of surgery can be assured by the nodal harvest rate which was above NBOCAP average. A significant proportion of these patients (just over 50%) presented as emergencies with obstruction or perforation. The introduction of National Bowel Screening since then may decrease the number of emergencies in the future. The 2010 data did not always contain ASA data, and the default position of ASA 1 has skewed the correction for co-morbidity. This error has been addressed and will not occur in future data returns."
Aintree University Hospital NHS Foundation Trust	"It was a surprise to find that we are an outlier to such a magnitude in our two year mortality 2008-2011. As a colorectal unit we constantly audit our practice and as a surrogate we audited our 2006-2010 2 year mortality which overall including emergencies came out at 3.7% against a national average of 6.7%. Our recent 90 day mortality was in the best 30% in the country. I recognise that the number of deaths has been captured accurately. However the number of patients operated on per year is low. In addition to this we sampled the ASA scoring of our patients and this again appears to be under estimated. I am going to try and correct this both in our interest and the interest of the national bowel cancer audit to ensure the delivery of our service is at the most high standard as it is being measured by other parameters."
Pennine Acute Hospitals NHS Trust	"We take these outcomes very seriously and the Chief Executive, Dr Gillian Fairfield immediately commissioned an oversight group to investigate the issues raised. The oversight group is led by the medical director and supported by our senior clinical audit lead. This group has produced reports for the senior management team and the issue has been reported at board level."
Prince Charles Hospital MDT	"Prince Charles Hospital responded that they have carried out a validation exercise looking at patients' records. The internal validation of the data via medical records review identified the following issues: • Incorrect allocation of some patients as colo-rectal cancer at PCH (8 out of 246 patients) • Under-recording of TNM staging • Under-recording of co-morbidity conditions (no co-morbidity was recorded at all for 245 patients) • Under-recording of patients undergoing surgery as emergency procedure (28 patients) • Under-recording of patients undergoing surgery as palliative procedure (30 patients)"

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Strategic Clinical Network/Wales	Comment
Northampton General Hospital NHS Foundation Trust	"We have reviewed our mortality following colorectal cancer procedures. We are already aware that prior to 2010 our mortality was significantly higher than expected. Since 2010 we have shown substantial improvement and we are now as expected or better. Furthermore we know that data quality in the period prior to 2010 was poor. We are not able to rectify this, but it further confuses the picture. There have been very important changes in our service since 2010: members of the team have changed, laparoscopic surgery has been introduced, colorectal preoperative assessment clinics started, enhanced recovery adopted and routine booking of critical care beds introduced. Although historically our performance appears to have been worse than expected, this is no longer the case. The historical data will however persist in our performance data for the next few years, but to a progressively reducing extent until data prior to 2010-11 is no longer included. We need to take this into account this year and in the next year or two, but emphasise that current performance is good. We are in the process of reviewing the raw data of 282 patients in the audit, 69 have died for various reasons during the referred period above. The breakdown for these cases will be established and discussed internally once that piece of work is completed."
Barts Health NHS Trust	"We have already investigated this data over the last few years with the trust with a large retrospective audit and have put in place regular prospective audit with the full consultation with medical director. We do have a lot of late presentations in a socially deprived area and are working with GP's to improve the uptake of bowel cancer screening and more referrals."
Walsall Healthcare NHS Trust	"We have looked at the data from March 2008 – March 2011, according to NBOCAP figures there were 257 resections with 82 deaths which puts our 2 year mortality adjusted at 33.22% which is higher than the national average. In our audit we found 300 patients who had had resection during this period and 96 of these died. 43 patients are missing from NBOCAP data and our 30 and 90 day mortality are within nationally accepted ranges at 6.3% and 9.3% respectively. Our audit reveals that metastatic disease was present in 38 patients compared to the NBOCAP data which shows 27 patients, we are undertaking more emergency surgery and we have more advanced tumours at the time of presentation. We feel that there are 14.3% of patients missing from NBOCAP and also some inaccuracy on our part in data entry, patients with advanced cancer were not picked up in that. We have put processes in place to address the issues of clinical input in data entry with an annual presentation and robust discussions in MDT for decision making in patients with co-morbidities and advanced disease in order to plan the right action for them. In order to increase stenting of obstructive tumour clinical teams will be trained for this and the plan is to regularly audit and discuss in MDT the outcome for the patient."
Sandwell and West Birmingham Hospitals NHS Trust	"We think the glaring difference in outcome is partly explained by our inaccurate ASA grades. We have 30% ASA1 vs 13% nationally. In last year's report it was 43%. We believe cancer services were defaulting to ASA1 in those without a recorded score. This is something we only corrected following last years' outlier letter. If we are unable to correct this for data already submitted for previous years, I imagine this will continue to adversely affect our adjusted figures for another 2 years. There may well be other explanations, so we will be performing an in depth audit into the care all these patients have received."
Nottingham University Hospital NHS Trust	"Nottingham University Hospitals has investigated why our reported 2 year survival rates appear to be lower than expected. We acknowledge that there have been problems with accurate recording of the stage of disease at presentation and so our data did not support effective adjustment for comorbidity and stage at presentation. This means that the patients that we have treated appear to be healthier and to have earlier stage cancers in this analysis than in real life. Review of individual patient records, and adjusted survival in the most recent period (when our data recording has been much improved), support our conclusion that our patients adjusted survival at 2 years is actually very similar to that reported nationally. We aim to continue to improve the quality of our data."
Western Sussex Hospitals	"The two year mortality data has been interrogated and validated and discussed at the surgical clinical governance meeting. The conclusion was that the status of the trust as an outlier for this measure is due to variable data quality, especially during 2008 and 2009. This problem has been addressed and data quality continues to be a high priority."

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18 month Stoma Rate	
Strategic Clinical Network/Wales	**Comment**
Greater Manchester, Lancashire and South Cumbria	"We have looked at the data you have provided and have been unable so far to analyse the cause, as the data did not show specific information about each of the Trusts in the SCN. We intend to analyse the data across all our Trusts where it shows that they are higher the England norm. This will be an in-depth piece of work and will require input from each of the Trusts concerned. We appreciate that you will not have any audit response in readiness for your 2014 Annual Report, but we confirm that this piece of work will be undertaken in the coming months and will be reported back to yourself."
Yorkshire and the Humber	Waiting for response

NHS Trust/MDT	
Airedale NHS Trust	"Airedale has challenged the published data as it is incomplete and inaccurate, it does not match its own figures. It also raises concerns that this will be an issue every year until more robust and timely data is available."
Leeds Teaching Hospitals NHS Trust	"The Trust reported that they had carried out an internal review and identified that a number (9) of locally advanced primary rectal cancers which required permanent stomas were referred in from other Trusts. In addition the trust had several patients whose stomas had subsequently been closed (>18 months). A further comment was that, in adding data to the pre-existing data, one may mask changes year on year and therefore we would ask that the analyses could be presented such that we could see any obvious changes which may have occurred. Finally, having been through two years' worth of data last year (Mr Saunders) and now a further 12 months of data (Prof Finan) we are concerned that obvious errors, based on the HES data used to identify whether stomas are closed or not, cannot be corrected. Hopefully, if permanent stomas at 18 months is to be a "quality measure", the new platform for data collection will ask for details of the presence or absence of a stoma rather than relying on data linkage to data which can't be corrected (HES)."
Mid Yorkshire Hospitals NHS Trust	"We have discussed this at our Colorectal Cancer Education event on the 18th of November. The National Project Team supplied information on 175 patients who had a major resection for rectal cancer, of these 111, (63%) were deemed to have a 'permanent stoma'. All of these patients were reviewed by the Head of Clinical Service (HOC). Two patients had their stoma reversed marginally outside the 18 month time frame, (within a month of the 18 month) and two additional patients had their stomas reversed, that were not included in the original data from the national team, (one reversal performed in a private hospital and the other had their reversal but the information appears not to have been captured on the HES data). This would have improved our figures and may have brought the results to within the normal expected range. The figures have improved from the last national audit and we will continue to work towards reducing the permanent stoma rate at 18 months where clinically appropriate."
Pennine Acute Hospitals NHS Trust	"On receipt of the letter our CEO, Dr Gillian Fairfield expressed concern at the data and immediately ensured that an oversight group was established to examine our data, outcomes and care for patients with colorectal cancer." This oversight group has already reported some initial findings to the Senior Management Team weekly meeting within the trust and also to the Trust's Quality and Performance Committee. I would like to assure the National Audit team that outcomes in colorectal cancer surgery will continue to be reviewed within the trust and that the action plan developed in the course of this review will be subject to board oversight."
Peterborough and Stamford Hospitals NHS Foundation Trust	"Responded that the Trust are fully committed to the submission of data to the audit and recognise the importance of audits in benchmarking and reporting standards across the NHS in the treatment of colorectal cancer. Have carried out an internal review of their stoma patients."

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Strategic Clinical Network/Wales	Comment
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	"We recently audited our figures for an 18 month period of activity at our trust. I would like to summarise the process undertaken and our findings. We developed a Proforma to look at all aspects of patient care. Data collected included: Generic data, Level of Rectal cancer, ASA grade of the patient, Co-morbidity, CT and MRI staging, Date of operation, name of operating surgeon, Type of operation – High Anterior Resection, Low Anterior Resection, Hartmann's, Abdomino-Perineal Resection, Type of Stoma – End Colostomy, Loop Colostomy, Loop Ileostomy, Permanent or Temporary Stoma, Re-operation, Reversal of Stoma, Reason for Non-reversal of Stoma, The results showed that we had treated 35 patients during the period. Our ASA grading was of a normal distribution as was Co-morbidity, Staging etc. Of the 35 patients we found the following: 1 patients had ulcerative colitis, 6 patients had Anterior Resection without Stoma, 15 patients had Low Anterior resection with Stoma, 7 patients had a Hartmann's Procedure with permanent stoma, 6 patients and an Abdomino-Perineal Resection. So in the group we had 15 patients with a planned Temporary stoma and of these 9 patients did not have their stoma reversed. The reason for non-reversal included the following: 4 – Patient choice, 2 - MI post operatively, 1 - Post operative anastomotic leak, 1 – Early metastases, 1 – melanoma. So in our recent audit we found the following: 1. Our Planned Permanent Stoma rate was 38% 2. Our Planned for Non-Permanent Stoma rate was 62%. We have discussed these findings at our Annual MDT and noted the issues. We have to acknowledge that we seem to be a bit higher than the UK average and are carefully looking at this prospectively. We are particularly looking at the patient group who had an Elective Hartmann's Procedure versus a Low Anterior Resection with or without a covering stoma."
Worcestershire Acute Hospitals NHS Trust	"Worcestershire Acute Hospitals NHS Trust have responded and reviewed their data and have resolved to improve the quality of future data entry."

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Appendix 2 – Patient Guide to Audit Terms

Patient Summary Glossary

Abdomen – tummy

ACPGBI – Association of Coloproctology of Great Britain and Ireland. An association of colorectal surgeons and others involved in the care of patients with colon cancer. The charity aims to advance the science and practice of coloproctology for the public to benefit by ensuring that people suffering the disease receive the best treatment available. It aims to promote the best clinical practice amongst members of the medical and allied professions by education and training in the specialty. It also aims to provide and circulate information to healthcare professionals and the public on this area of medicine and promote the study and research and disseminating it by way of scientific meetings and publication in medical literature.

Bowel Cancer Screening – The NHS Bowel Cancer Screening Programme currently offers screening every two years to all men and woman aged 60 to 69. Those over 70 can request a screening kit from the Programme.

Colorectal Cancer – Colon cancer is cancer of the large intestine (colon), the lower part of your digestive system. Rectal cancer is cancer of the last several inches of the colon. Together they are referred to as colorectal cancers.

Colostomy – is the surgical procedure in which a stoma is formed by drawing the end of the large intestine or colon through an incision (cut) in the abdominal wall and sewing it into place forming a stoma. It can either be permanent (forever) or for some patients it can be reversed so that they can return to remove food waste from their body in the normal way through the anus.

Stoma – is the opening created by surgery, which connects the end of the large or small intestine to the outside of the body. The removal of waste products then takes place through this opening into a bag.

HQIP – Healthcare Quality Improvement Partnership

HSCIC – Health and Social Care Information Centre

Multi-Disciplinary Team (MDT) – This is the team of healthcare professionals who come together to look at diagnostic tests and treatment plans for the individual patient. The team will be made up of specialists and will include such specialists as colorectal surgeons, an oncologist (specialist doctor with experience in chemotherapy and radiotherapy), diagnostic radiologist (who can interpret X ray pictures), histopathologist (who is an expert in any samples which may have been taking during tests) and a clinical nurse specialist (who can provide support and information to patients and their families).

NCAPOP – National Clinical Audit and Patient Outcomes Programme.

NICE – National Institute for Health and Care Excellence

Surgical resection for bowel cancer – the operation to remove the cancer tissue and some of the bowel around it to try to ensure all of the tumour is removed.

Tumour – abnormal growth of tissue which can be cancerous.

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