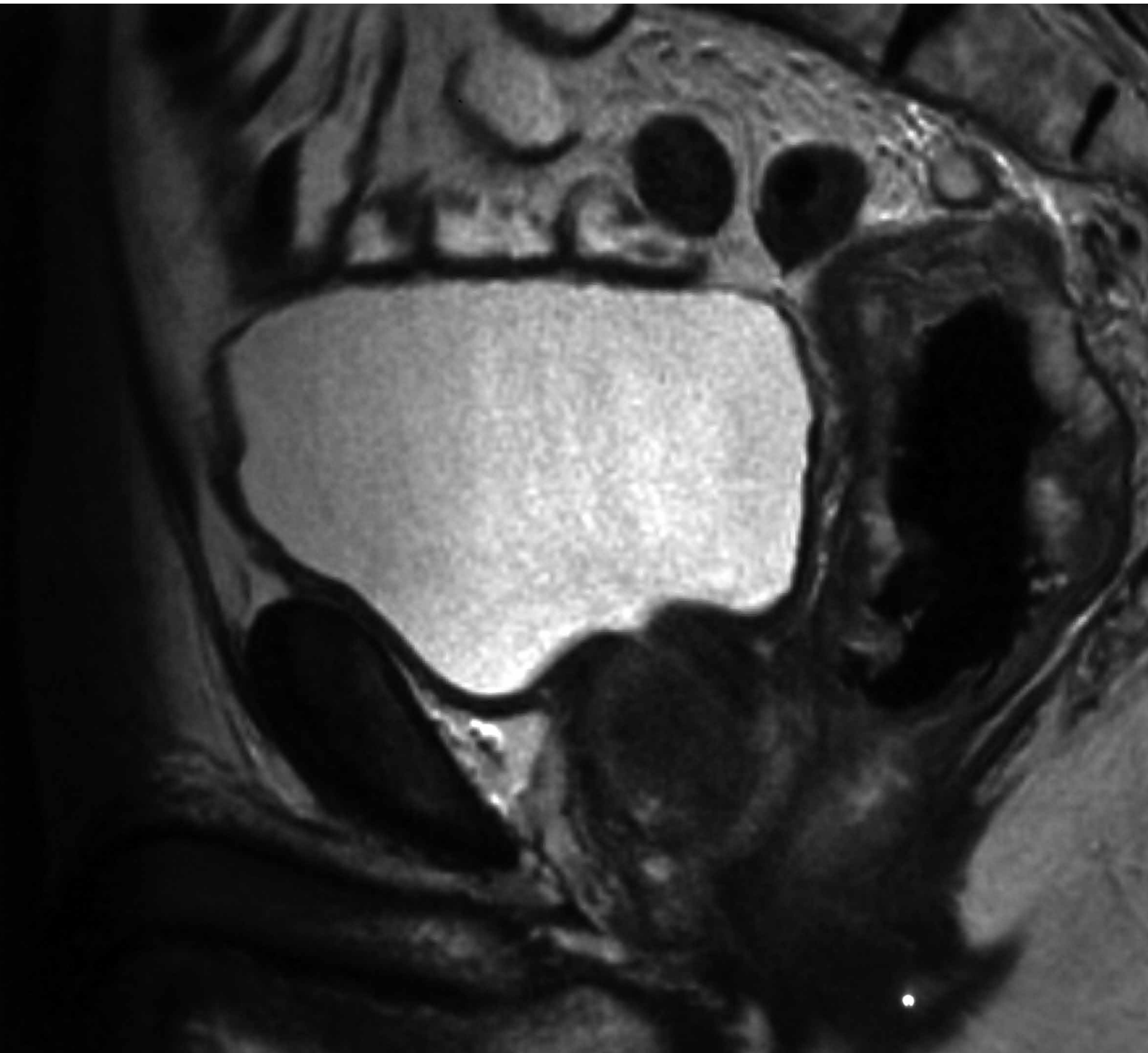
National Bowel Cancer Audit 2012



This 2012 Annual Report contains data from the 2010/ 2011 reporting period which covers patients in England and Wales with a date of diagnosis from 1 August 2010 to 31 July 2011.

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This 2012 Annual Report is available to download at www.ic.nhs.uk/bowel

Prepared in partnership with:

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 2012 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 2012 Annual Report.

The Health and Social Care Information Centre (HSCIC) is England's central, authoritative source of essential data and statistical information for frontline decision makers in health and social care. The HSCIC managed the publication of the 2012 Annual Report.

The Healthcare Quality Improvement Partnership (HQIP) promotes quality in healthcare. HQIP holds commissioning and funding responsibility for the National Bowel Cancer Audit and other national clinical audits as part of the National Clinical Audit & Patient Outcomes Programme (NCAPOP).

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Acknowledgements

The National Bowel Cancer Audit (NBCA), commissioned by the Healthcare Quality Improvement Partnership (HQIP), has been developed by the Association of Coloproctology of Great Britain and Ireland (ACPGBI) and is managed by the Clinical Audit Support Unit within the Health and Social Care Information Centre.

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

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

The clinical direction and writing of the report was undertaken by Paul Finan, Jason Smith and Nigel Scott 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

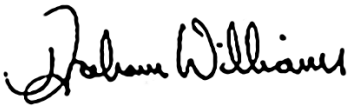
Welcome to the 2012 Annual Report from the National Bowel Cancer Audit. It is an open document, published for anyone to read who has an interest in the management of colorectal cancer, be they a specialist dealing with the disease, cancer manager, hospital manager, commissioner, or patient or relative who has experienced colorectal cancer. Again this year's Audit represents a monumental piece of work, collecting data on nearly 30,000 patients. The dedicated team involved in collating and analysing this data, as well as producing such a clear document as this, should be congratulated. Over the last 20 years, colorectal cancer treatment has become more effective (as demonstrated by reports such as this), but also much more complex, involving many different specialists, not just surgeons. It is for this reason that the detail in the report rightly goes as far as individual Trust's Multidisciplinary Teams (MDTs), rather than to individual surgeons. What is astounding is to consider how far we have come with nationwide audit of bowel cancer. Those surgeons who have been around a while will remember the inauguration of such an audit by the Association of Coloproctology, distributed on 3½" floppy disks, with a limited data set. The 2012 National Report demonstrates just how far we have come.

So what should you do with this report? Well at over 80 pages it seems a daunting document. Please look beyond the headlines, but resist the temptation to print it out if you are reading an electronic version (think of the trees). As the years roll by, the information gathered by the Audit becomes more interesting and varied. We are able to chart improvements in mortality in this report as well as the growing utilisation of minimal access (laparoscopic) surgery. Furthermore, linking data sets to Hospital Episode Statistics (HES) data has added more information on outcomes, such as return to theatre after surgery (an indication of how many patients develop complications that require another operation) and early mortality (how many patients die for whatever reason within 90 days of an operation). Linking separate databases has emerged as a powerful tool for looking at outcomes in a number of diseases and it will continue with future National Bowel Cancer Audits, hopefully reaching the stage where we have robust outcome data on things such as 5 year cancer survival and local recurrence rates following surgical resection.

If you are directly involved in the treatment of colorectal cancer I hope you will find the report particularly interesting and will discuss its findings amongst the MDT you work with. Firstly you are to be congratulated on submitting so much data. Case ascertainment has increased again this year as has the completeness of the data submitted. However, there are still gaps, some of which should be easy to address and there remain some units that are not managing to submit as much data as others. I suspect for individual clinicians, their Trust data will be of more interest than the Network data. Spend some time looking through the information, find you reported 30 and 90 day mortality rates, have a think about your reported rate of stoma still present at 12 months post rectal resection. It is fairly easy to see where your unit sits on the national funnel plots. Discuss this with your colleagues in the MDT. Does the data feel right? What can we do to improve our data and our outcomes? There will be some new outcomes in this year's report that you will want to consider in depth. For instance, why do so many patients with rectal cancer still have a stoma at 12 months? What does return to theatre mean and is it too crude an assessment of outcome? A unit may have a low rate of return to theatre, but higher rate of overall mortality, suggesting that patients who run into trouble don't get the surgical treatment they require to salvage them from the complication. Emergency presentation with colorectal cancer continues to be a concern. The rate remains high and mortality following emergency surgery is significantly higher. This is an area of colorectal cancer that needs much further study and resources to address. By reducing emergency presentations we would make a huge impact on overall survival. This is a conundrum for everyone involved in colorectal cancer, both at the level of the individual patient and the population in general. This report should provide robust evidence for you to have a discussion about resources required to give our patients the best possible treatment for colorectal cancer.

Producing an audit such as this is a very expensive business, not just in the cost of the staff directly involved in collating the data and producing the report, but also in man-hours expended by the MDT co-ordinators and cancer data team in individual Trusts, collecting, "cleaning" and submitting data to the Audit. In this era of financial constraint for the NHS we should question whether the Audit is an appropriate use of resources. The answer has to be yes. Colorectal cancer is a common tumour and the NHS spends millions on treating this disease each year. The Audit serves two functions; firstly it gives robust evidence as to what is achieved with colorectal cancer treatment. More importantly, there is a well-recognised "raising" in performance whenever outcomes of disease management are audited in this way. It is right that we should look at what we are doing and compare this with our peers in other units across the country.

Graham Williams
President Association of Coloproctology of Great Britain and Ireland (ACPGBI)



Executive Summary

- Case ascertainment for England and Wales was high again this year, with 87 per cent of the expected number of patients submitted to the Audit. The denominator for this calculation was derived from Hospital Episode Statistics for England and the PEDW data for Wales. Case ascertainment was 86 per cent for England and 94 per cent for Wales.
- Data completeness on the 7 key items, used for risk adjusted mortality calculations, has improved year on year to 79 per cent this Audit year. This represents a 10 per cent improvement over the past four years. Data completeness on other items, particularly rectal cancer continues to give cause for concern and requires renewed efforts by all trusts.
- Overall, 75 per cent of patients received some sort of surgical intervention, with 60 per cent of the total undergoing a major resection. 78 per cent of colon cancer patients and 69 per cent of rectal cancer patients underwent surgery.
- One-fifth of patients having a major resection had an urgent or emergency procedure. Urgent or emergency procedures were associated with higher postoperative mortality than elective or scheduled procedures.
- Colon cancer patients tended to be diagnosed at a later stage than rectal cancer patients, presenting more frequently as an emergency admission. As a result, colon cancer patients had a poorer outcome in terms of postoperative mortality.
- 90-day postoperative mortality has decreased each year for the last four years from 6.4 per cent in 2007-08 to 5.1 per cent in 2010–11 and the 90-day postoperative mortality for colon and rectal cancer treated electively was 3.8 per cent and 2.5 per cent respectively. Cancer networks and trusts appearing as potential outliers on postoperative mortality have again been informed and, as a first step, asked to review their data.
- The proportion of resections completed laparoscopically has increased each year for the last four years, to 37 per cent in 2010–11. Patients whose resection was planned to be completed laparoscopically had lower postoperative mortality, though it is yet to be established how much of this is down to different types of patient being selected for laparoscopic surgery.

Audit data linked to HES

- 14 per cent of patients had an unplanned readmission within 90 days of having a major resection.
- 8 per cent of patients returned to theatre within 28 days of having a major resection.
- 13 per cent of patients who returned to theatre within 28 days died within 90 days of their major resection. Trusts with higher postoperative mortality did not have higher rates of return-to-theatre, but there was evidence that these trusts had higher rates of mortality after return-to-theatre.
- 57 per cent of rectal cancer patients having a major resection had a stoma 12 months later. There was substantial variability in this rate between cancer networks and trusts, and potential outliers have been informed and, as a first step, asked to review their data.

Recommendations

1. There has to be clinical ownership of the data within Trusts. Data collection and quality is improving year-on-year, but there are still significant and substantial gaps. The Lead Clinician, together with other members of the MDT, should ensure accurate and complete data collection for submission to the audit. There is an urgent need for all MDTs to engage with their Chief Executive and Medical Director together with trust information and coding departments to ensure accuracy prior to uploading of data. There should be an agreed process for clinical sign off of audit data.

2. Emergency care must be better resourced at all levels. The management of the emergency case deserves particular attention. The three to four-fold increase in postoperative mortality and the higher mortality when such patients require a "return to theatre" requires senior surgical involvement in the decision making process. There is an urgent need for all units to re-visit their arrangements for caring for the elderly, high risk patient, particularly those presenting acutely. Pathways that provide preoperative resuscitation, adequate theatre access, postoperative critical care, and early colorectal team involvement, including full radiological support and facilities for colonic stenting, are likely to improve postoperative survival.

3. The impact and length of time a patient may have a stoma needs to be made very clear upfront. The finding that over 50 per cent of patients with rectal cancer will still have, for whatever reason, a stoma in place 12-months post operatively should alert all teams to the on-going necessity for support in the community. All patients with rectal cancer should be alerted to this finding pre-operatively.

4. Laparoscopic surgery is to be considered in all suitable cases. 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 guidance, suitable patients should be offered the opportunity for a laparoscopic resection.

5. Histopathological staging data is vital to determining outcomes. Good quality pathological reporting of resected specimens continues to provide excellent feedback and all units should ensure complete capture of the Royal College of Pathologists Minimum Dataset.

6. Local MDTs should be using the results of the audit to examine their outcomes to improve patient care. The individual feedback on activity should prompt local "deep-dive" audits particularly when the unit would appear to be an outlier. Reasons for non-resection, unplanned returns to theatre, and post-operative deaths are just some examples that could be examined.

1. Introduction

This Annual Report from the National Bowel Cancer Audit follows on closely from the 2011 Supplementary Report and utilises again the power of linked datasets. This report is testament to the hard work in collecting, analysing and interpreting an enormous quantity of data and my thanks go to all those involved: trusts, the Clinical Effectiveness Unit at the Royal College of Surgeons of England (Kate Walker and Jan van der Meulen), the Health and Social Care Information Centre (Kimberley Greenaway and Arthur Yelland) and my clinical colleagues (Nigel Scott and Jason Smith). The data contained within the Report is based on patients diagnosed with bowel cancer between 1 August 2010 and 31 July 2011 and, although some might criticise the time taken to bring the Report together, there now exists a robust pathway which should go a considerable way to achieve an even shorter interval between cessation of data collection and open reporting of important data of this common disease.

The outputs from this audit represent the most up to date information from England and Wales and will be of use to the many providing a service to our patients. Knowing outcomes with a degree of confidence can only serve to, at the very least, encourage reflection on the services we provide as individual units. Gross discrepancies will, I'm sure, be evident but their occurrence reduces as data from other sources is employed. Such robust, accurate, data was indeed the pre-requisite for "open reporting" and the whole colorectal community can be proud of this effort.

The report demonstrates a continued improvement in post-operative mortality, a significant proportion of patients still not undergoing a major resection (for whatever reason), excellence in state of the art imaging for both colonic and rectal cancer, and the successful introduction of newer surgical techniques. The challenge remains however when one observes the proportion of patients treated as an emergency with the associated increase in peri-operative mortality, and the observation of the "true" 12-month stoma rate following surgery for rectal cancer (no different from population-based data from the USA).

As I relinquish the clinical leadership of the audit I am encouraged by the progress over the past four years. We have observed an increase in case ascertainment, better completeness of data submitted, and with both of these, a better understanding of the very real progress being made in diagnosing and treating patients with bowel cancer. Whilst not resting on our laurels, we can, I feel, be proud of this national cancer audit and hopeful of a continued effort to document improvements and identify areas for renewed effort.

Paul Finan
Clinical Lead
National Bowel Cancer Audit

2. Methods

2.1 Data collection

All eligible NHS Trusts in England and Wales submitted data to the audit for inclusion in the 2012 Annual Report. Participation in the National Audits is now mandated in the NHS Standard Contract and hospital providers are required to make a statement in their Quality Accounts about their participation in the National Audits.

This 2012 Annual Report includes patients in England and Wales submitted to the Audit who were diagnosed between 1 August 2010 and 31 July 2011. Data is also available from the previous three 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 submit their data via the Open Exeter system, as described at www.ic.nhs.uk/bowel. The Welsh data is submitted directly from the Cancer Network Information System Cymru (CANISC) to the Open Exeter system.

2.2 Data cleaning

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.

Table 2.1 shows that multiple treatment records per patient is a substantial issue, with over 30% of patients having multiple treatment records. This can affect the quality of data in the Audit if there is conflicting information between the records. The number of patients with multiple treatment records has increased every year since the 2008 audit, in which 22% of patients had multiple treatment records. Multiple tumour records are much less of an issue.

Table 2.1
Distribution of multiple records per patient record on unique identifier

	Number	%
Total number of patients reported	**29,026**	
One tumour record, one treatment record	18,173	62.6
One tumour record and no treatment record	1,825	6.3
One tumour, multiple treatment records	8,199	28.2
Multiple tumours, no treatment record	13	0.0
Multiple tumours, 1 treatment record	127	0.4
Multiple tumours, multiple treatment record	689	2.4

It was assumed that these multiple tumour and multiple treatment records involved the same tumour episode if their dates fell within a period of two years. If that was the case an algorithm developed by the Project Team was applied to reconcile potentially conflicting information between the multiple records.

Multiple tumour records

If multiple tumour records were available, a second tumour diagnosed within two years was considered a duplicate record, irrespective of the tumour site. Second tumours diagnosed more than two years after a first tumour were considered to be separate cancers.

If a second tumour record was present that was diagnosed within two years, the earliest date of diagnosis and the most advanced or most severe results was taken from the available records. In case there was conflicting information about tumour site, this was resolved by choosing the site that was compatible with available treatment information; if no treatment record was available, the most distal site was chosen.

Multiple treatment records

In case of conflicting information on treatment information, the most recent date and the value that reflected the most advanced or severe results was taken. Procedures and treatments were assumed to have been carried out if they were recorded in at least one of the multiple treatment records. In case of conflicting information about the surgical procedure, the procedure selected was the one that was most compatible with the site recorded in the tumour record.

2.3 Case ascertainment

Case ascertainment is expressed as the ratio of 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.

The Hospital Episode Statistics (HES) administrative database, containing records of all admissions to English NHS Trusts, was used to estimate the denominator of this proportion. The corresponding Patient Episode Database for Wales (PEDW) was used to estimate the denominator for Wales. A patient was considered admitted for bowel cancer if a bowel cancer diagnosis was coded (C18, C19 or C20 according to the International Classification of Diseases 10th Revision) in the first diagnosis field. It was assumed that it was a first admission if no other records could be identified since 1 January 2005 with a bowel cancer diagnosis in any of the diagnostic fields.

Case ascertainment is also reported at trust and cancer network level for England, and at country and MDT level for Wales. However, if hospitals within a trust are part of different Cancer Networks, case ascertainment is reported at hospital level.

2.4 Linkage to Hospital Episodes Statistics data

Patients treated at hospital in England were linked to HES records using their NHS numbers. 79 per cent of patients in English trusts in the Audit could be linked 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 readmissions, returns-to-theatre and 12-month stoma rates. The number of comorbidities is defined in HES, according to the Charlson comorbidity score.

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 Networks and Trusts. Distant metastases are defined as M-stage M1 or Dukes' stage D. Mode of admission and number of comorbidities are also used in the model but they come from HES and are therefore not included in data completeness. Data completeness is 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 and the Project Team are looking at how to improve the completeness of poorly recorded data items.

Just as for case ascertainment, data completeness is reported at cancer network level and at trust/hospital level.

2.6 Handling missing data

The Audit data set did not allow the distinction between patients who had not undergone a surgical procedure and those for whom the data item was missing. This problem was addressed by searching for any information that indicated that a patient had undergone a surgical procedure (e.g. number of excised nodes, circumferential margins, and post-operative complications). Patients with missing data on type of surgery, but information indicating that they had undergone surgery, were entered into the category "other procedure". If such information could not be found, we assumed they had not had surgical treatment.

Similar issues arose for diagnostic and staging procedures. For example, it is reported that a CT or MRI scan was carried out if there was information about the patient's results from the scan or a date of scan. Otherwise it was assumed that no scan had been carried out.

2.7 Definition of postoperative complications

Unplanned readmissions within 90 days of surgery and return to theatre within 28 days of surgery were derived from HES data in patients undergoing major surgery.

Unplanned readmission analysis was restricted to patients discharged from hospital within 28 days of surgery, and unplanned readmission was defined as an emergency admission to any hospital for any cause within 90 days of surgery, according to HES. Return to theatre was defined as the occurrence of a set of procedure codes in HES data for return to theatre other than the code for the original procedure, between 1 and 28 days of surgery, in any of the procedure fields in HES, regardless of the date of discharge from hospital. To define return to theatre, the procedure codes developed by Burns et al. were used as a starting point.[1] Additional codes were added using a strategy to identify frequent procedure codes amongst patients with poor outcomes (death within 90 days of surgery, unplanned readmission within 90 days of surgery, or a hospital stay longer than 14 days) as well as a search strategy for keywords amongst procedure codes. All additional procedure codes were clinically verified.

Procedure codes for return to theatre occurring up until midnight on the day of surgery cannot be distinguished from the original procedure, hence the requirement of at least one day between the original surgery and the procedure code identifying return to theatre. A subset of codes, which were either described as a re-operation or which could only occur during a return-to-theatre as a result of a complication and not during the primary procedure, were included as a return to theatre even if they occurred on the day of surgery.

Postoperative mortality after return-to-theatre was defined as any patient who died within 90-days of primary surgery amongst patients who had returned to theatre within 28-days of primary surgery.

2.8 Definition of stoma at 12 months in rectal cancer patients

Rectal cancer 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 were assumed to have had an ileostomy or colostomy if this information was recorded in the Audit (whether 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. As the information on patient follow-up is poorly recorded in the Audit, information on reversal of stomas was taken from procedure codes in HES only.

A procedure code for reversal of ileostomy or reversal of colostomy within 12 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.

2.9 Statistical Analysis

Most results reported in this audit report are descriptive. The results of categorical data items are reported as percentages (%). 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 cancer network and/or trust/hospital/MDT. England's 28 Cancer 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.

[1] Variation in reoperation after colorectal surgery in England as an indicator of surgical performance: retrospective analysis of Hospital Episode Statistics. Burns E et al. BMJ. 2011; 343: d4836.

Funnel plots

Funnel plots are used to make comparisons between networks or between trusts/hospitals on the following outcomes: 90-day mortality after major surgery; 90-day unplanned readmission and 28-day return-to-theatre rates for patients undergoing major surgery; 90-day postoperative mortality after return-to-theatre; rates of emergency admissions for all patients; and 12-month stoma rates for rectal cancer patients undergoing major surgery. The rate for each 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 networks/trusts/hospitals. The funnel limits depend on the target rate and the number of patients included in the estimate; rate estimates have greater uncertainty when estimated from fewer patients. Results fall outside the inner limits if they are statistically significantly different from the target at a 0.05 level, and outside the outer limits if they are statistically significantly different from the target at a 0.002 level. The inner funnel limit is the threshold for an "alert" and the outer funnel level is the threshold for an "alarm". This implies that 95 per cent of the trusts or hospitals are expected to be within the inner funnel limits and 99.8 per cent within the outer funnel limits, if they are all performing according to the target. In this report, those networks, trusts or hospitals with results outside the outer funnel limit are considered as potential outliers. The recommended HQIP procedure for potential outliers was carried out. All networks and trusts/hospitals falling above the inner limit on 90-day mortality after major surgery or 12-month stoma rates for rectal cancer patients undergoing major surgery were informed and, as a first step, asked to check the data they submitted. There were no potential outliers on rates of emergency admission by network and therefore no networks were informed, even if they fell above the inner limits on rate of emergency admission.

The following outcomes need further validation to investigate how much of the variation between networks and trusts/hospitals is due to differences in coding practices, and the network-specific and trust/hospital-specific rates are therefore not given in this report: 90-day unplanned readmission and 28-day return-to-theatre rates for patients undergoing major surgery; 90-day postoperative mortality after return-to-theatre.

Adjusted outcomes

Multivariable logistic regression was carried out to estimate risk-adjusted 30-day/90-day mortality, 90-day unplanned readmission and 28-day return-to-theatre rates for patients undergoing major surgery, 90-day postoperative mortality after return-to-theatre, and 12-month stoma rates for rectal cancer patients undergoing major surgery. The logistic regression models included: the patients' age, age-squared, sex, ASA grade, T-stage, N-stage, distant metastases (according to M-stage or Dukes' stage), site of cancer, mode of admission (according to HES), and Charlson comorbidity score (according to HES). Additionally in the model for 30-day/90-day mortality was an interaction between age and distant metastases. The model for 12-month stoma rate did not include cancer site as it was for rectal cancer patients only. The model for 90-day mortality was developed using Audit data and is in the process of being published in a peer-reviewed journal. Patients with missing date of surgery were excluded, and multiple imputation was used to fill in any missing information on the risk factors. One trust was excluded as date of surgery was missing in all patients; and adjusted outcomes could not be estimated for a further two trusts because all patients were missing on ASA grade and/or TNM-stage. In addition to the variables in the risk-adjustment model, and the outcomes, the following variables were included in the imputation model: surgical urgency, mode of admission according to the Audit, surgical procedure, number of lymph nodes extracted, number of positive lymph nodes extracted, Index of Multiple Deprivation, length of hospital stay, and days from diagnosis to surgery. Amongst patients undergoing major surgery, 12 per cent were missing ASA grade, 11 per cent were missing TNM T-stage, 9 per cent were missing TNM N-stage and 5 per cent were missing distant metastases. Mode of admission and Charlson comorbidity score came from HES and were both missing in all 21 per cent of patients who were not linked to HES. Virtually all patients had complete data on sex, age, and site of cancer.

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 logistic 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.

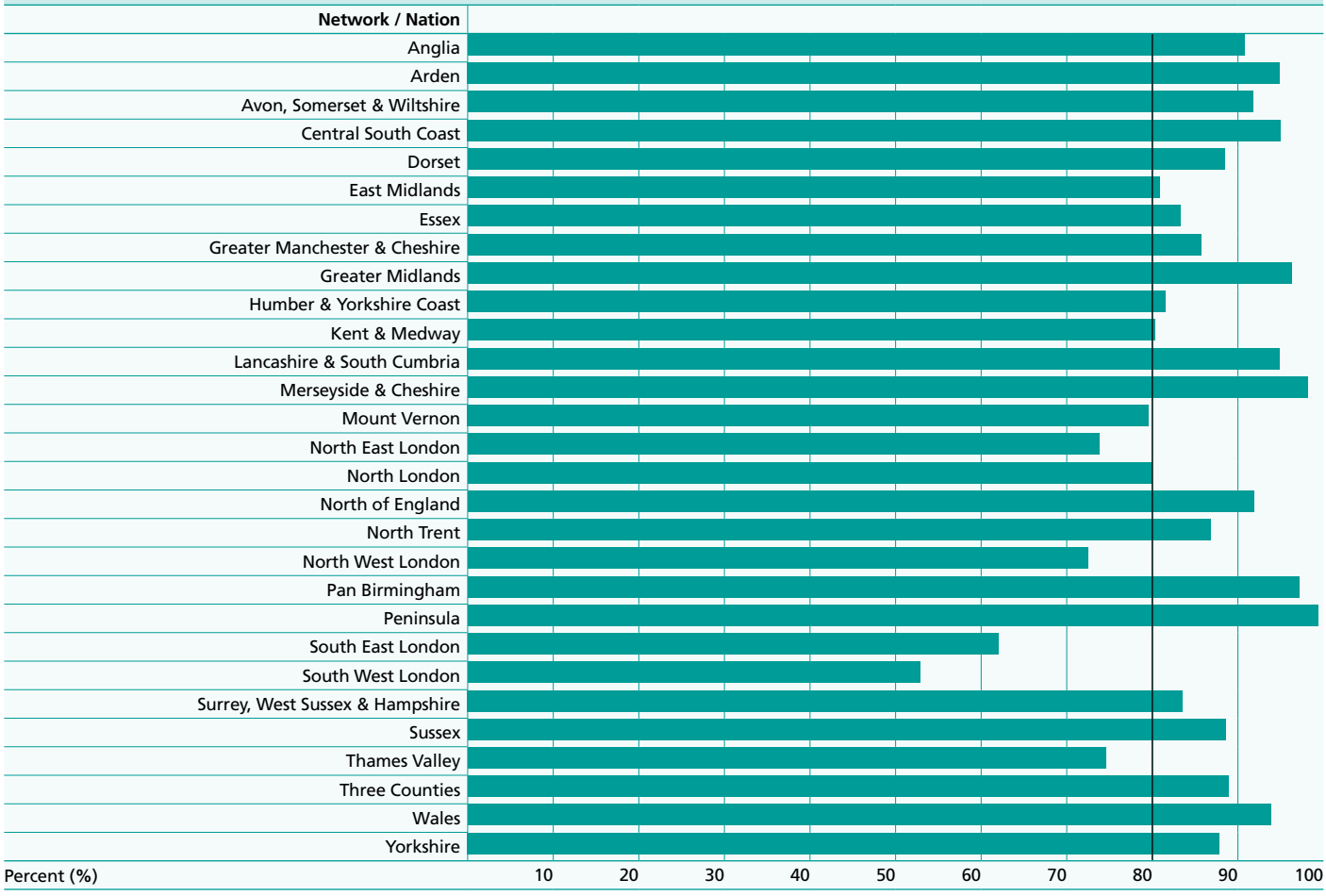
3. Trust Participation, Case Ascertainment and Data Completeness

Overall case ascertainment this year was 87 per cent; 86 per cent for England and 94 per cent for Wales. Table 3.1 shows that case ascertainment for England improved year-on-year between 2007-8 and 2009-10 but that there has been little change over the last year. Case ascertainment varies by network, with 7 networks falling below 80 per cent and 11 networks/Wales achieving greater than 90 per cent case ascertainment, as shown in Figure 3.1. Appendix 1 shows that case ascertainment is good for the majority of trusts/MDTs, with 98 out of 161 trusts/MDTs achieving over 90 per cent case ascertainment. There are, however, 17 trusts/MDTs where case ascertainment is below 70 per cent.

Table 3.1
Case ascertainment in England by year

	2007-08	2008-09	2009-10	2010-11
Patients identified in HES	29,939	29,863	31,117	31,357
Patients identified in audit	19,388	22,292	26,478	27,006
% case ascertainment	**65**	**75**	**85**	**86**

Figure 3.1
Case ascertainment by cancer network/Wales



Case ascertainment figures in this report may be different to those in previous reports. These differences are due to the HES database and the Audit database being continuously updated; the latest extracts of each are used in this report.

The National Bowel Cancer Audit Report 2011 demonstrated that case ascertainment could lead to substantial bias in postoperative mortality estimates, with patients identified in HES but not in the Audit having a higher postoperative mortality than those ascertained in both.

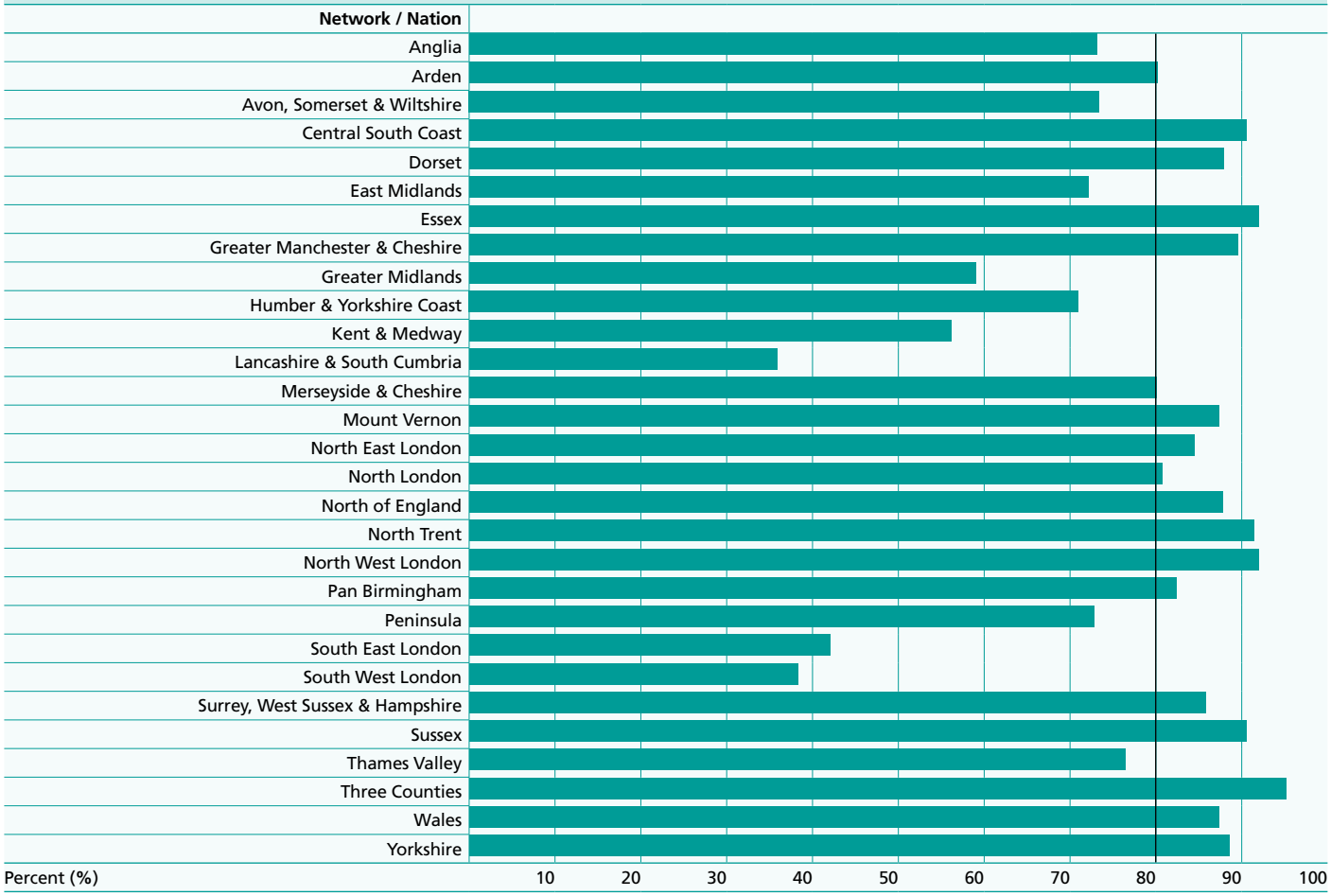
Table 3.2 shows that completeness of data in patients having major surgery has improved year-on-year for the last four years of audit. Data completeness is close to 80 per cent this year compared to less than 70 per cent four years ago. A patient is considered to have complete data if all seven items from the Audit included in the model for risk adjustment of 90-day mortality are reported: age, sex, T-stage, N-stage, distant metastases, ASA grade and site of cancer. Within these 7 items, ASA grade, TNM T-stage were the most incomplete, with 12 per cent and 11 per cent of patients undergoing major surgery missing these items respectively. 9 per cent of patients undergoing major surgery were missing TNM N-stage and 5 per cent were missing distant metastases.

Table 3.2
Data completeness in patients undergoing major surgery by year of the audit

	2007-08		2008-09		2009-10		2010-11	
	Number	%	Number	%	Number	%	Number	%
Total patients undergoing major resection	13,290		14,794		17,387		17,537	
Complete data on 7 key items	8,994	67.7	10,613	71.7	13,160	75.7	13,903	79.3
Incomplete data on 7 key items	4,296	32.3	4,181	28.3	4,227	24.3	3,634	20.7

Figure 3.2 highlights the variation in data completeness by network; three networks have less than 50 per cent data completeness, whilst 16 networks/Wales have greater than 80 per cent data completeness. There is substantial variation in data completeness by trust, as shown in Appendix 1, with 19 trusts/hospitals having less than 50 per cent data completeness for patients having major surgery.

Figure 3.2
Percentage of patients undergoing major surgery with complete data on the 7 items from the Audit used in risk adjustment, by English network/Wales



Although data completeness is measured only on the 7 items in the risk-adjustment model which come from the Audit, other items in this report are often even more incomplete. Tables throughout Sections 4 and 5 report the proportion of missing information for individual data items. It is noteworthy that items describing the management of rectal cancer patients in Section 5 are particularly incomplete.

Data completeness is just as important for patients not undergoing major surgery. For example, staging information of all patients, regardless of surgical treatment, would give a more complete picture of the treatment path of patients, including those with such advanced cancer they are not treated surgically. Staging data submission to The Cancer Quality Improvement Network System (CQUINS) is now a requirement for NHS Trusts and as such the data submitted to the audit should also be complete. Each of TNM T-stage and N-stage is missing in approximately 40 per cent of all patients, and distant metastases is missing in approximately 20 per cent of all patients, including those who do not undergo major surgery.

It was possible to determine the survival status at 30 days and 90 days of over 99.9 per cent of patients who underwent major surgery.

4. Description of patients

Audit population

In total 29,026 new diagnoses of bowel cancer were submitted to the Audit in England and Wales this year, 27,006 from England and 2,020 from Wales. As shown in Table 4.1, more patients were male than female, approximately 40 per cent of patients were aged 75 or older, and roughly two-thirds of patients had colon cancer and one-third rectal cancer.

Table 4.2 allows us to compare the characteristics of patients by site of cancer. Colon cancer patients were more likely to be female, tended to be older, and tended to have more advanced cancer compared to rectal cancer patients.

Table 4.1
Characteristics of all patients with bowel cancer included in the current audit report

		Number	%
Total number of reported cases		**29,026**	
Total number of surgically treated cases		**21,833**	**75.2**
Total number of major resections		**17,537**	**60.4**
Sex	**Male**	16,532	57.0
	Female	12,492	43.0
Age group	**<65 yrs**	8,281	28.5
	65-74 yrs	8,805	30.3
	75-84 yrs	8,521	29.4
	85+ yrs	3,419	11.8
Cancer Site	**Colon**	18,222	63.1
	Rectosigmoid	1,594	5.5
	Rectum	9,070	31.4
	Unknown (% of total)	140 (0.5)	

Table 4.2
Characteristics of 28,886 patients with a known cancer site

		Colon		Rectosigmoid		Rectal	
		Number	%	Number	%	Number	%
Total patients per cancer site		**18,222**		**1,594**		**9,070**	
Sex	**Male**	9,747	53.5	933	58.5	5,769	63.6
	Female	8,474	46.5	661	41.5	3,300	36.4
	Missing (% of total)	1 (0)		0 (0)		1 (0)	
Age-group	**<65 yrs**	4,696	25.8	480	30.1	3,071	33.9
	65-74 yrs	5,454	29.9	510	32.0	2,787	30.7
	75-84 yrs	5,729	31.4	422	26.5	2,334	25.7
	85+ yrs	2,343	12.9	182	11.4	878	9.7
TNM T-stage	**T1**	774	6.5	87	9.0	620	13.4
	T2	1,291	10.8	135	14.0	1,271	27.6
	T3	6,097	51.2	495	51.5	2,264	49.1
	T4	3,746	31.5	245	25.5	457	9.9
	Missing (% of total)	6,314 (34.7)		632 (39.6)		4,458 (49.2)	
TNM N-stage	**N0**	3,049	25.8	253	26.5	1,069	22.9
	N1	6,570	55.6	534	56.0	3,048	65.2
	N2	2,197	18.6	167	17.5	560	12.0
	Missing (% of total)	6,406 (35.2)		640 (40.2)		4,393 (48.4)	
Distant metastases	**No**	11,337	75.4	932	73.6	5,042	77.9
	Yes	3,700	24.6	335	26.4	1,432	22.1
	Missing (% of total)	3,185 (17.5)		327 (20.5)		2,596 (28.6)	
Liver metastasis	**Liver metastasis**	2,443	18.5	248	22.1	952	13.8
	Normal Liver	9,924	75.3	812	72.4	5,534	80.4
	Liver uncertain	805	6.1	62	5.5	398	5.8
	Missing (% of total)	5050 (27.7)		472 (29.6)		2186 (24.1)	

5. Management of patients

Table 5.1 summarises the surgical management of colon and rectal cancer patients. 78 per cent of patients with colon cancer underwent surgery compared to 69 per cent of rectal cancer patients. A higher proportion of colon cancer patients underwent a major resection, and patients with colon cancer were more likely to have urgent or emergency surgery than rectal cancer patients. The proportion of patients having laparoscopic surgery was similar in colon and rectal cancer patients.

Table 5.1
Description of management of the 28,886 patients with known cancer site

		Colon		Rectosigmoid		Rectal	
		Number	%	Number	%	Number	%
Total patients per cancer site		**18,222**		**1,594**		**9,070**	
Patients undergoing surgery		**14,245**		**1,190**		**6,258**	
Discussed at multi-disciplinary team meeting	**Yes**	17,626	97.9	1,551	98.4	8,768	98.2
	No	387	2.1	25	1.6	160	1.8
	Missing (% of total)	209 (1.1)		18 (1.1)		142 (1.6)	
Seen by clinical nurse specialist	**Yes**	12,778	85.7	1,124	87.5	6,633	89.8
	No	2,130	14.3	160	12.5	752	10.2
	Missing (% of total)	3,314 (18.2)		310 (19.4)		1,685 (18.6)	
Had CT scan*	**Yes**	16,087	88.3	1,364	85.6	7,982	88.0
	No	2,135	11.7	230	14.4	1,088	12.0
Surgery type	**Major resection**	11,769	82.6	964	81.0	4,684	74.8
	Local excision	522	3.7	45	3.8	476	7.6
	Non resectional procedure	541	3.8	79	6.6	484	7.7
	Other procedure	1,413	9.9	102	8.6	614	9.8
	No surgery (% of total)	3,977 (21.8)		404 (25.3)		2,812 (31)	
Urgency of operation	**Elective**	8,054	58.7	704	62.2	4,191	69.2
	Scheduled	2,136	15.6	195	17.2	1,229	20.3
	Urgent	1,727	12.6	119	10.5	453	7.5
	Emergency	1,815	13.2	113	10.0	183	3.0
	Missing (% of total)	513 (2.8)		59 (3.7)		202 (2.2)	
Laparoscopy	**Open**	6,848	58.8	520	55.1	2,890	57.7
	Laparoscopic then open	264	2.3	31	3.3	185	3.7
	Laparoscopic converted to open	484	4.2	51	5.4	215	4.3
	Laparoscopic completed	4,055	34.8	342	36.2	1,722	34.4
	Missing (% of total)	2,594 (14.2)		246 (15.4)		1,246 (13.7)	

* Yes if patient has a result of CT scan or date of CT scan

As in last year's audit, the vast majority of patients were discussed at a multi-disciplinary team meeting. The percentage of cases discussed at a multi-disciplinary team meeting was at least 95 per cent in 90 per cent of trusts (Appendix 2).

The percentage of patients seen by a Clinical Nurse Specialist (CNS) is difficult to determine, as close to one-fifth of patients did not have this information recorded (Table 5.1). Amongst patients where this information was available, the proportion seen by a clinical nurse specialist was 87 per cent, an improvement on last year when it was 83 per cent. The percentage of patients seen by a CNS varied between trusts, with 7 trusts reporting that fewer than half of their patients saw a CNS, but in 80 per cent of trusts over 80 per cent of patients were reported to have seen a CNS (Appendix 2).

Overall 88 per cent of patients were reported to have had a CT scan, either by having a CT scan result reported or by having a date of CT scan reported. The true figure could be higher if not all patients having a CT scan had their results or date of scan recorded in the Audit. In 70 per cent of trusts at least 90 per cent of patients were recorded as having had a CT scan.

NICE clinical guideline 131, Staging of colorectal cancer: Offer contrast-enhanced computed tomography (CT) of the chest, abdomen and pelvis, to estimate the stage of disease, to all patients diagnosed with colorectal cancer unless it is contraindicated. No further routine imaging is needed for patients with colon cancer.

Overall 21 per cent of patients having major surgery had an urgent or emergency procedure. In 14 trusts/hospitals over a third of procedures were urgent or emergency (Appendix 3). Particular efforts need to be made in this area as the urgency of procedure has a major effect on post-operative outcome in terms of both 30-day and 90-day mortality.

NICE clinical guideline 131, 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.

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.

Only a healthcare professional experienced in placing colonic stents who has access to fluoroscopic equipment and trained support staff should insert colonic stents.

If a self-expanding metallic stent is suitable attempt insertion urgently and no longer than 24 hours after patients present with colonic obstruction.

*The ACPGBI endorses recruitment into the on-going national stent trial – The **CReST** Trial – The role of endoluminal **stenting** in the acute management of obstructing **colorectal** cancer.*

Characteristics of patients undergoing major surgery and with a known cancer site are shown in Table 5.2. Colon cancer patients had more advanced cancer than rectal cancer patients. Close to a third of colon cancer patients undergoing major surgery had stage T4 cancer, compared to only 10 per cent of rectal cancer patients; around 20 per cent of colon cancer patients had stage N2 cancer compared to 12 per cent of rectal cancer patients, and 14 per cent of colon cancer patients had metastatic disease compared to 8 per cent of rectal cancer patients. Related to this, a much higher proportion of colon cancer patients undergoing major surgery were admitted as an emergency, and were therefore more likely to have advanced disease. 30 per cent of patients undergoing major surgery had at least one comorbidity, a factor which is likely to impact poorly on the outcomes of surgery.

Table 5.2
Description of the 17,417 patients who underwent major surgery by cancer site

		Colon		Rectosigmoid		Rectal	
		Number	%	Number	%	Number	%
Total patients undergoing major resection		**11,769**		**964**		**4,684**	
Sex	**Male**	6,240	53.0	568	58.9	3,042	65.0
	Female	5,528	47.0	396	41.1	1,641	35.0
	Missing (% of total)	1 (0.0)		0 (0.0)		1 (0.0)	
Age-group	**≤64 yrs**	3,187	27.1	313	32.5	1,771	37.8
	65-74 yrs	3,725	31.7	337	35.0	1,646	35.1
	75-84 yrs	3,761	32.0	255	26.5	1,087	23.2
	85+ yrs	1,096	9.3	59	6.1	180	3.8
ASA Grade	**1**	1,434	13.9	133	15.9	773	18.3
	2	5,513	53.6	473	56.6	2,481	58.6
	3	2,965	28.8	201	24.1	910	21.5
	4 or 5	376	3.7	28	3.4	68	1.6
	Missing (% of total)	1,481 (12.6)		129 (13.4)		452 (9.6)	
TNM T-stage	**T1**	538	5.0	66	7.6	412	10.3
	T2	1,171	10.9	124	14.2	1,139	28.4
	T3	5,626	52.6	460	52.8	2,074	51.7
	T4	3,370	31.5	221	25.4	388	9.7
	Missing (% of total)	1,064 (9.0)		93 (9.6)		671 (14.3)	
TNM N-stage	**N0**	5,958	55.5	482	55.4	2,712	64.6
	N1	2,783	25.9	235	27.0	975	23.2
	N2	2,002	18.6	153	17.6	509	12.1
	Missing (% of total)	1,026 (8.7)		94 (9.8)		488 (10.4)	
Distant metastases	**No**	9,758	86.4	805	87.5	4,054	92.5
	Yes	1,541	13.6	115	12.5	329	7.5
	Missing (% of total)	470 (4.0)		44 (4.6)		301 (6.4)	
Mode of admission (from HES)	**Elective**	7,124	78.0	631	85.0	3,663	95.0
	Emergency	2,008	22.0	111	15.0	192	5.0
	Missing (% of total)	2,637 (22.4)		222 (23.0)		829 (17.7)	
Cancer site*	**Caecum/ascending colon**	4,792	40.7	0	0.0	1	0.0
	Hepatic flexure	722	6.1	0	0.0	0	0.0
	Transverse colon	1,041	8.8	0	0.0	4	0.1
	Splenic flexure/descending colon	1,120	9.5	0	0.0	4	0.1
	Sigmoid colon	4,094	34.8	0	0.0	35	0.7
	Rectosigmoid	0	0.0	964	100.0	386	8.2
	Rectal	0	0.0	0	0.0	4,254	90.8
Comorbidities	**0**	5,959	62.2	504	65.4	2,727	67.7
	1	2,673	27.9	194	25.2	1,026	25.5
	2+	951	9.9	73	9.5	274	6.8
	Missing (% of total)	2,186 (18.6)		193 (20.0)		657 (14.0)	

*** Cancer site is defined from ICD-10 code only. Patients are assigned to the rectal cancer column of the table if their ICD-10 code corresponds to rectal cancer or they were recorded as having teletherapy or they were reported to have had an MRI scan.**

Figures 5.1 and 5.2 compare the proportion of patients with distant metastases around the time of treatment by network, amongst all patients in figure 5.1 and amongst those having major surgery in figure 5.2. There is wide variation by network, ranging from just under 10 per cent to over 30 per cent amongst all patients. Only 36 per cent of patients with metastatic cancer underwent major surgery overall, so clearly the proportion of patients with metastases was much lower amongst those undergoing major surgery. The proportion of patients with missing information on metastases varies widely between networks, and this is likely to contribute substantially to the variation in proportion of patients reported as having metastases across networks.

Figure 5.1
Distant metastases around time of initial treatment in all patients by English network/Wales

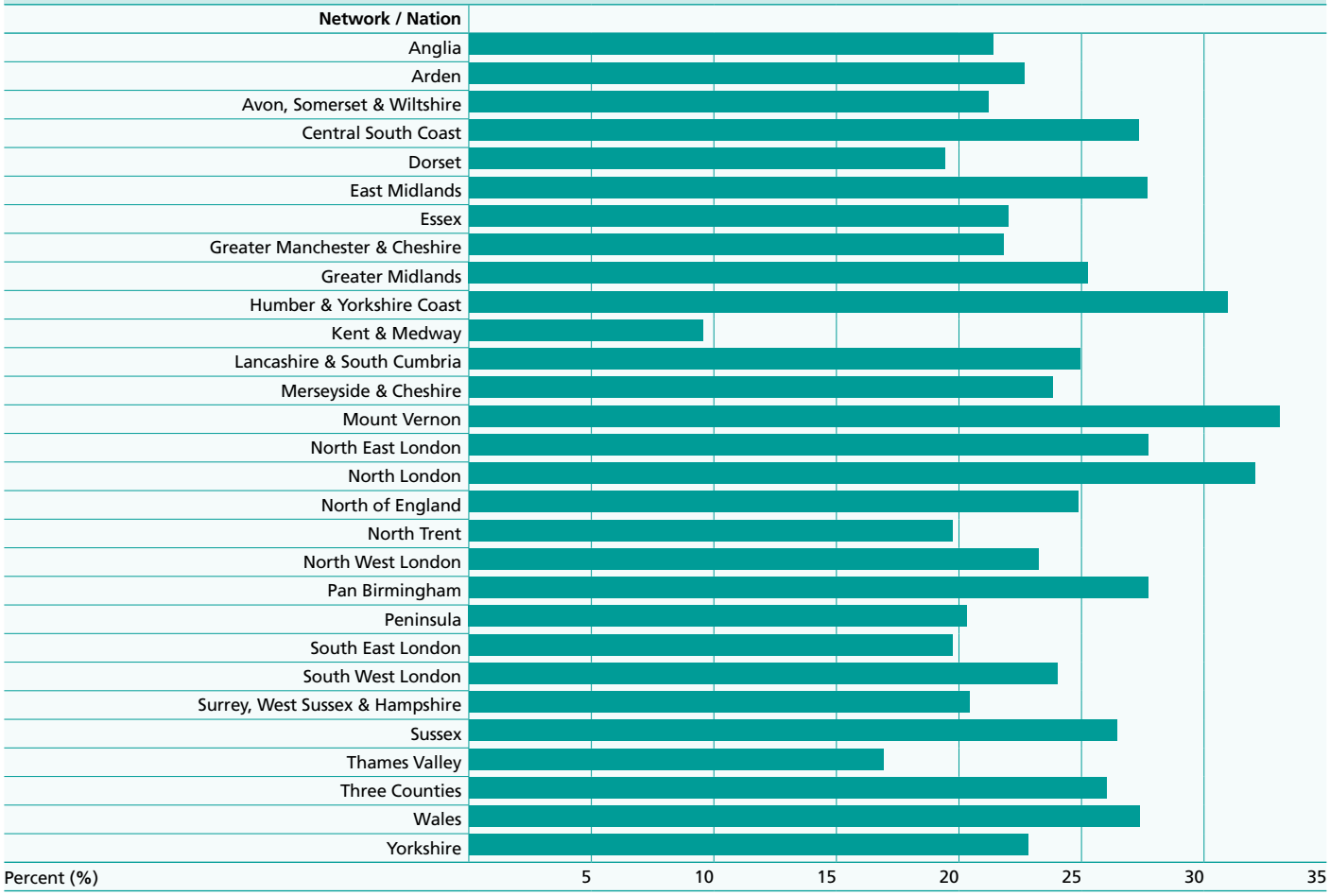


Figure 5.2
Distant metastases around time of initial treatment in patients undergoing major surgery by English network/Wales

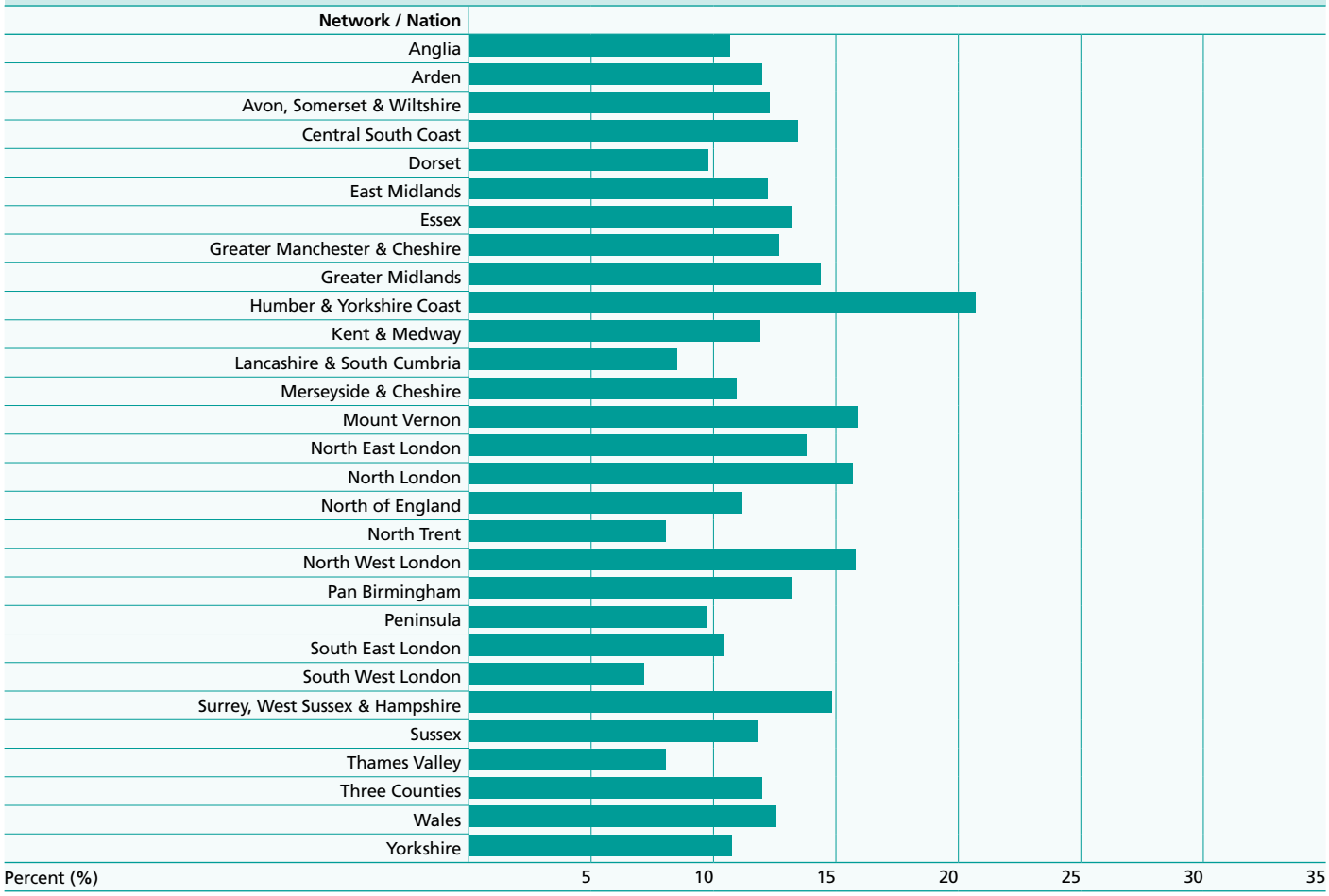


Figure 5.3 relates to figure 5.2 as it compares the proportion of patients having major surgery carried out as an urgent or emergency procedure by network. In Appendix 3 the proportion of patients with metastases and the proportion operated on as urgent or emergency is reported by trust/ hospital. Gross differences shown in the appendix, may well be the result of small sample sizes, incomplete data, or under-reporting and should be interpreted with caution.

Figure 5.3
Major surgery carried out as an urgent or emergency procedure by English network/Wales

6. Outcomes of patients undergoing major surgery

Table 6.1(a) summarises the outcomes of patients undergoing major surgery, by cancer site. It was estimated that extramural vascular invasion was present in approximately 30 per cent of patients undergoing major surgery, although this information was incomplete, and the true proportion could be much higher or much lower than this. The proportion did not differ by cancer site. At least one lymph node was reported as positive in approximately two-fifths of patients overall, although this was higher in colon than rectal cancer patients. Just over two-thirds of patients stayed in hospital for longer than 5 days after their surgery, and this was longer for rectal than colon cancer patients.

Overall 90-day mortality was 5.1 per cent, and was higher in colon cancer patients than rectal cancer patients, as a result of colon cancer patients having more advanced disease than rectal cancer patients when they had major surgery. Colon cancer patients were therefore more likely to have urgent or emergency surgery, having presented more frequently as an acute case. Postoperative mortality was much higher in patients having urgent or emergency surgery, in both colon and rectal cancer patients.

Appendix 3 reports the outcomes of patients undergoing major surgery at the trust/hospital level, including the median number of lymph nodes excised, and 30-day and 90-day postoperative mortality, both observed and adjusted, as described in section 6.1.

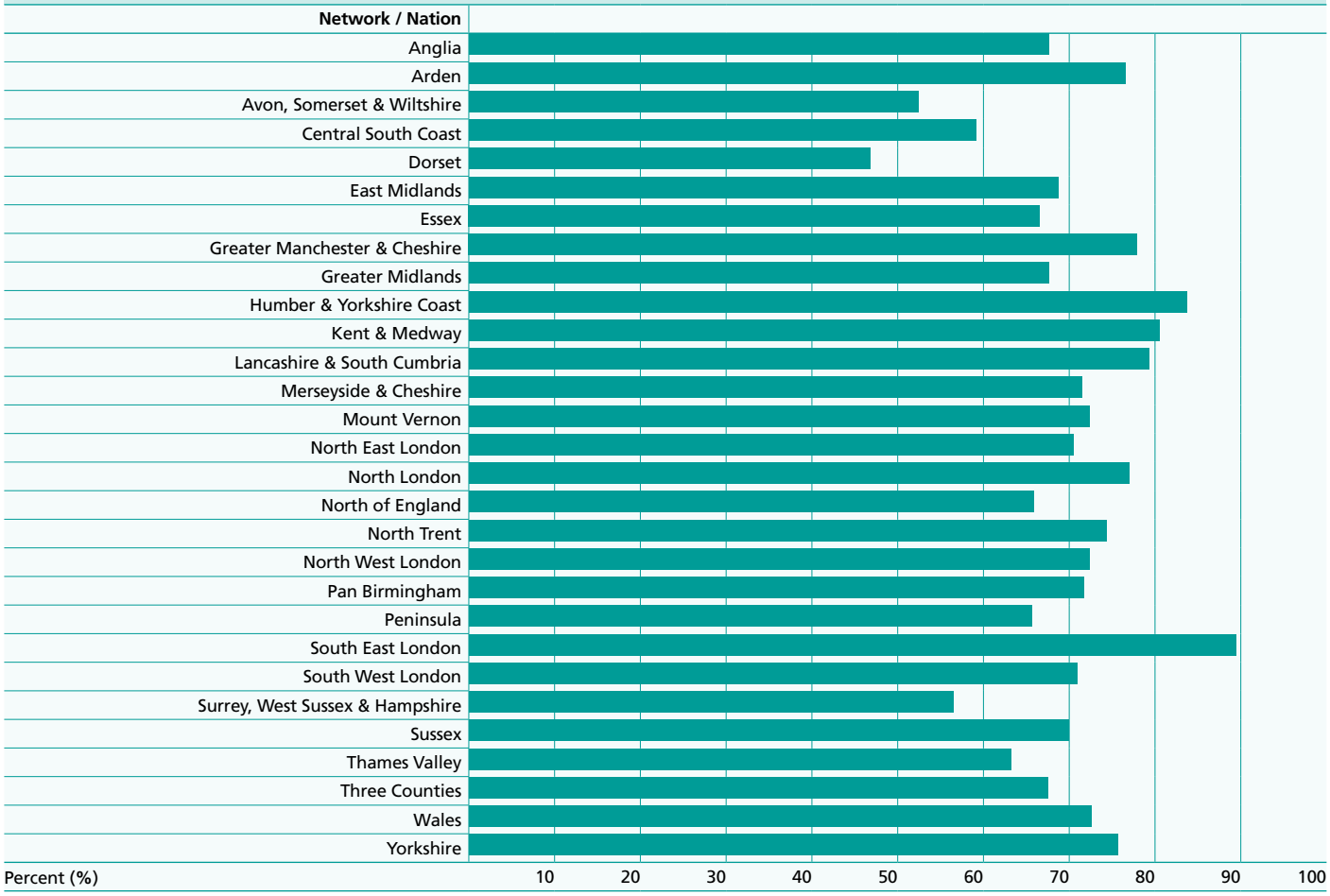
Attention is drawn again to the nearly 6-fold increase in mortality, this time seen also with 90-day mortality as well as previously shown with 30-day mortality, when patients are operated upon as an emergency compared with electively. There are network wide guidelines on the management of emergency presentation of colorectal cancer. All effort should be made to convert an 'emergency' case to an 'elective' one wherever possible.

Table 6.1(a)
Surgical & pathological outcomes in 17,417 patients who had major surgery by cancer site

		Colon		Rectosigmoid		Rectal	
		Number	%	Number	%	Number	%
Total patients undergoing major resection		**11,769**		**964**		**4,684**	
Extramural Vascular Invasion	**Positive**	2,819	34.5	216	32.1	821	25.0
	Negative	5,353	65.5	457	67.9	2,462	75.0
	Missing (% of total)	3,597 (30.6)		291 (30.2)		1,401 (29.9)	
Median number of excised lymph nodes	**Median**	16		16		14	
	Range	0-210		0-88		0-101	
	Interquartile range	12-22		12-23		10-20	
At least one positive node found	**Yes**	4,753	44.5	373	43.7	1,489	35.3
	No	5,930	55.5	481	56.3	2,734	64.7
	Missing (% of total)	1,086 (9.2)		110 (11.4)		461 (9.8)	
Length of hospital stay (LOS)	**Median LOS**	7		7		9	
	Range	0-308		0-174		0-328	
	Interquartile range	5-12		5-12		6-14	
Length of stay longer than 5 days	**Yes**	6,418	65.3	545	68.6	3,079	79.7
	No	3,408	34.7	249	31.4	785	20.3
	Missing (% of total)	1,943 (16.5)		170 (17.6)		820 (17.5)	
90-day mortality following major surgery	**Yes**	677	5.8	49	5.1	151	3.2
	No	11,086	94.2	913	94.9	4,528	96.8
	Missing (% of total)	6 (0.1)		2 (0.2)		5 (0.1)	
90-day mortality by urgency of operation	**Elective**	266/6,912	3.8	24/599	4.0	83/3,278	2.5
	Scheduled	69/1,869	3.7	1/166	0.6	37/989	3.7
	Urgent	135/1,337	10.1	13/86	15.1	14/250	5.6
	Emergency	185/1,380	13.4	10/84	11.9	11/79	13.9
	Missing urgency of operation	22/265	8.3	1/27	3.7	6/83	7.2

Figure 6.1 shows the proportion of patients staying in hospital longer than 5 days after major resection by cancer network. Five days was chosen because most enhanced recovery programmes are set to discharge patients at this point. There was substantial variation amongst English cancer networks/Wales, from below 50 per cent to almost 90 per cent.

Figure 6.1
Length of hospital stay > 5 days after major surgery by English network/Wales



6.1 Postoperative mortality

Table 6.1(b) reports unadjusted 30-day mortality by cancer site and surgical urgency. This is included to aid comparison with countries which report 30-day and not 90-day mortality. The overall 30-day mortality amongst elective/scheduled procedures was 2.2% and amongst urgent/emergency procedures was 7.6%.

Table 6.2 demonstrates that unadjusted 90-day postoperative mortality has decreased year-on-year for the last four years of the Audit. 90-day mortality is presented rather than 30-day, although 30-day mortality estimates are reported by trust in Appendix 3. It was felt by the Project Team that this added significantly to the Audit. With advances in medical management of surgical patients post-operatively and anaesthetic and surgical techniques improving to allow those patients with advanced disease or co-morbidity to undergo surgery, a longer term outlook of mortality beyond 30-days is now required.

Table 6.1(b)
30-day mortality by cancer site and surgical urgency in 17,417 patients who had major surgery

		Colon		Rectosigmoid		Rectal	
		Number	%	Number	%	Number	%
Total patients undergoing major resection		**11,769**		**964**		**4,684**	
30-day mortality following major surgery	**Yes**	448	3.8	31	3.2	91	1.9
	No	11,315	96.2	931	96.8	4,588	98.1
	Missing (% of total)	6 (0.1)		2 (0.2)		5 (0.1)	
30-day mortality by urgency of operation	**Elective**	181/6,912	2.6	11/599	1.8	52/3,278	1.6
	Scheduled	43/1,869	2.3	1/166	0.6	20/989	2.0
	Urgent	93/1,337	7.0	9/86	10.5	9/250	3.6
	Emergency	118/1,380	8.6	9/84	10.7	7/79	8.9
	Missing urgency of operation	13/265	4.9	1/27	3.7	3/83	3.6

Table 6.2
90-day postoperative mortality by audit year

	2007-08		2008-09		2009-10		2010-11	
	Number	%	Number	%	Number	%	Number	%
Total patients undergoing major resection	13,290		14,794		17,387		17,537	
Dead at 90 days after surgery	841	6.4	894	6.1	976	5.6	890	5.1
Alive at 90 days after surgery	12,307	93.6	13,794	93.9	16,304	94.4	16,634	94.9
Missing (% of total)	142 (1.1)		106 (0.7)		107 (0.6)		13 (0.1)	

Adjusted mortality has also significantly decreased over the 4 audit years, as shown in Table 6.3 (P<0.0001 for year of audit, after risk-adjustment).

Table 6.3 describes the prognostic model for 90-day mortality, which is used to estimate adjusted mortality in Figures 6.3 and 6.4 and Appendix 3. The model discriminates postoperative mortality very well, with an area under the receiver operating characteristic curve of 80 per cent, and the model fits the data well, with good agreement between the observed and predicted risks.

Table 6.3 shows the relative importance of each of the predictors, and the importance of recording and submitting these values. The model predicts mortality by age separately in patients with and without metastases. The effect of metastases on postoperative mortality is much larger in young patients, and has little effect at all on elderly patients.

Table 6.3
Logistic regression model of 90-day post-operative mortality after major surgery for bowel cancer

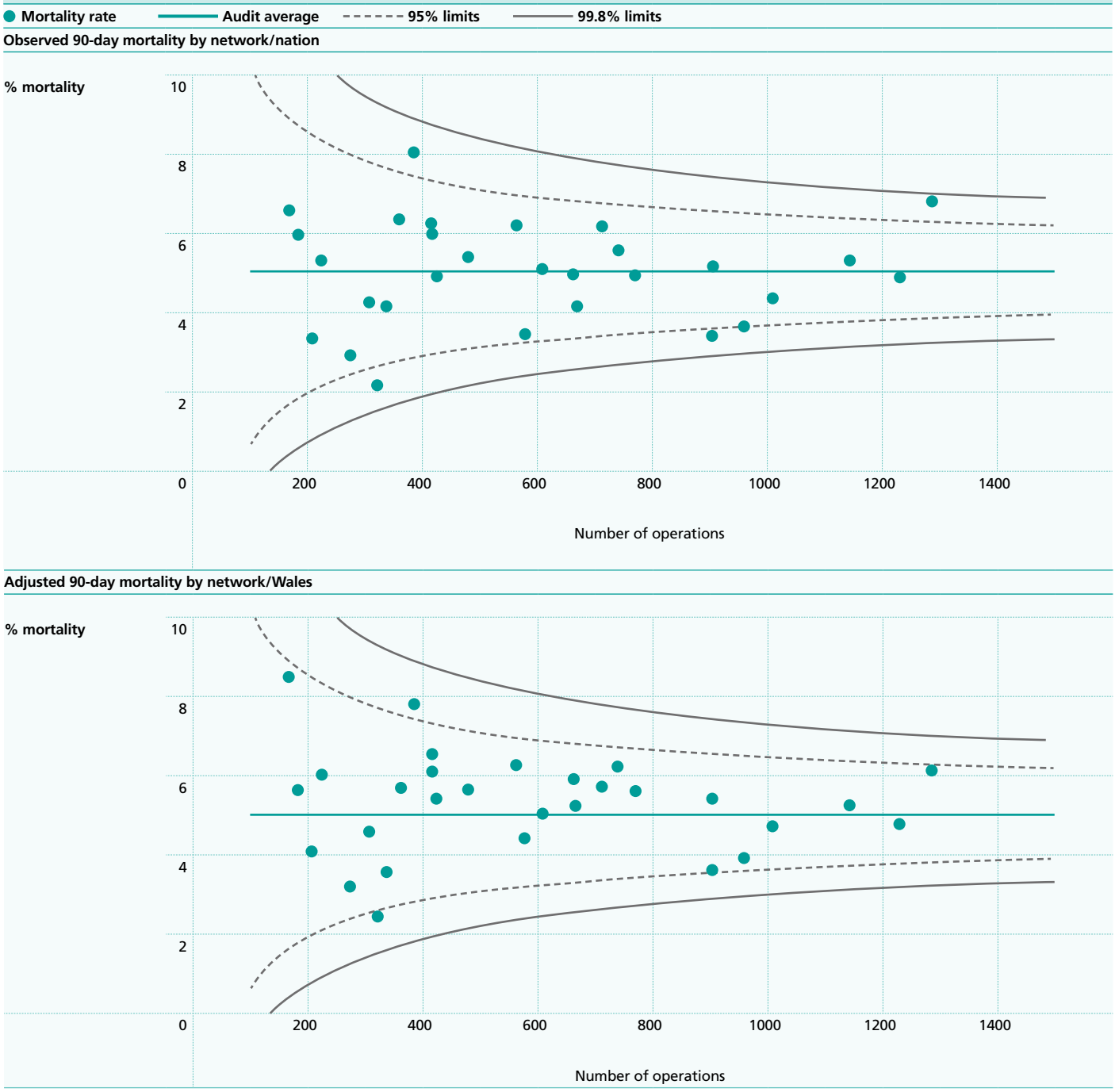
		Odds ratio*	95% CI
Audit year	**2010-2011**	1	
	2009-2010	1.06	0.96 to 1.17
	2008-2009	1.19	1.08 to 1.32
	2007-2008	1.28	1.15 to 1.42
Sex	**Male**	1	
	Female	0.77	0.71 to 0.83
Association with age in patients *without* metastases*	**50 yrs**	0.36	0.29 to 0.45
	60 yrs	0.57	0.53 to 0.62
	70 yrs	1	
	80 yrs	1.92	1.82 to 2.02
	90 yrs	4.04	3.54 to 4.61
Association with age in patients *with* metastases*	**50 yrs**	0.66	0.53 to 0.81
	60 yrs	0.76	0.71 to 0.82
	70 yrs	1	
	80 yrs	1.48	1.41 to 1.55
	90 yrs	2.47	2.16 to 2.81
ASA grade	**1**	1	
	2	1.61	1.31 to 1.96
	3	2.72	2.22 to 3.34
	4	7.47	6.01 to 9.28
TNM T-stage	**T1**	1	
	T2	1.10	0.84 to 1.45
	T3	1.37	1.07 to 1.75
	T4	2.04	1.58 to 2.62
TNM N-stage	**N0**	1	
	N1	1.06	0.96 to 1.16
	N2	1.34	1.20 to 1.48
Distant metastases	**No**	1	
	Yes	1.92	1.69 to 2.17
Mode of admission	**Elective**	1	
	Emergency	2.24	2.05 to 2.45
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	1.12	0.94 to 1.33
	Transverse colon	1.34	1.17 to 1.54
	Splenic flexure/descending colon	1.30	1.12 to 1.49
	Sigmoid colon	0.94	0.85 to 1.04
	Rectosigmoid	1.03	0.88 to 1.20
	Rectal	1.35	1.20 to 1.51
Comorbidities	**0**	1	
	1	1.36	1.24 to 1.48
	2+	1.70	1.52 to 1.90

* Age modelled as a linear and quadratic term, separately in patients with and without metastases
Area under ROC curve =0.80 (95% CI: 0.79 to 0.81)
P for audit year<0.0001

Figure 6.2 shows the variation in 90-day mortality across English networks/Wales, without any risk-adjustment. Figure 6.3 plots 90-day mortality against number of procedures at each network/Wales in funnel plots and shows that, after risk adjustment, no networks/Wales fell above the outer limit and only one network/Wales fell above the inner limit on adjusted 90-day mortality.

Figure 6.2
Overall observed (unadjusted) 90-day post-operative mortality after major surgery by English network/Wales

Figure 6.3
Observed and adjusted 90-day post-operative mortality by English network/Wales



Funnel plots for 90-day mortality by trust/site, both observed and risk-adjusted, are presented in Figure 6.4. One trust/site fell above the outer limit and a further four fell above the inner limit on adjusted 90-day mortality. If all 160 trusts/sites had the same underlying 90-day mortality, four would be expected to lie above the inner limit and 0.2 above the outer limit by chance alone.

Figure 6.4
Observed and adjusted 90-day post-operative mortality by trust/site with more than 10 operations

The observed and adjusted 30-day and 90-day mortality of each trust/site is reported in Appendix 3. Incomplete or inaccurate case-mix data and differences in case ascertainment can affect postoperative mortality estimates, sometimes causing a trust/site to appear as a potential outlier. All networks/Wales and trusts/sites falling above the inner or outer limit on adjusted 90-day mortality were informed. As a first step to investigating performance quality, networks/trusts/sites were asked to check their data completeness and data accuracy before the publication of this report.

The cancer network and five trusts were all contacted as part of the Department of Health Detection and Management of Outliers policy, as published by the Department in January 2011, and given the opportunity to check their data and provide a response to the National Bowel Cancer Audit Project Team. The cancer network responded that they had asked the trusts within the network to check their data. Three of the five trusts responded that they had carried out a check on their data.

Comparing the cancer networks and trusts which appeared outside the funnel limits in the 2010, 2011 and 2012 Annual Reports, no cancer networks have appeared above the funnel limits on postoperative mortality in more than one report, and two trusts have appeared above the funnel limits in two Annual Reports. For both of these trusts there was an issue with the reporting of ASA grade in patients having major surgery, and once the ASA grades were corrected the trusts no longer appeared as outliers. In one trust this issue with ASA grade seems to have been resolved whereas for the other trust it has not.

6.2 Postoperative complications

Unplanned readmissions

The analysis of unplanned readmissions was restricted to the 13,431 patients linked to HES who were discharged from their admission for major surgery within 28 days. The results were affected very little by this choice of time to discharge: overall 14.2 per cent of patients who were discharged within 28 days of surgery had an unplanned readmission within 90 days, compared to 13.7 per cent of patients who were discharged within 14 days of surgery, and 14.4 per cent of patients who were discharged within 56 days of surgery. Neither did excluding patients who were still in hospital at 28 days result in a large amount of data loss, causing the loss of only 7 per cent of patients.

The overall rate of 90-day unplanned readmissions for patients discharged within 28 days of surgery was 14.2 per cent. Unplanned readmission was more common in younger patients, in patients with advanced cancer, and in those patients admitted as an emergency (Table 6.4(a)). Patients with a long hospital stay and who died within 90 days of surgery were also more likely to have had an unplanned readmission within 90 days.

Table 6.4(a)
Rates of unplanned readmission for the 13,431 patients who underwent major surgery and were discharged within 28 days, linked to HES, by patient characteristics and patient outcomes

			Unplanned readmission within 90 days	
		Total number	Number	%
	Overall	**13,431**	1,905	14.2
Cancer site	**Colon**	**8,981**	1,238	13.8
	Rectosigmoid	**727**	101	13.9
	Rectal	**3,722**	566	15.2
Sex	**Male**	**7,566**	1,083	14.3
	Female	**5,864**	822	14.0
	Missing	**1**		
Age-group	**≤64 yrs**	**4,152**	695	16.7
	65-74 yrs	**4,462**	650	14.6
	75-84 yrs	**3,847**	464	12.1
	85+ yrs	**970**	96	9.9
Mode of admission	**Elective**	**10,826**	1,489	13.8
	Emergency	**2,015**	344	17.1
	Missing	**590**	72	12.2
TNM T-stage	**T1**	**760**	87	11.4
	T2	**1,912**	223	11.7
	T3	**6,407**	907	14.2
	T4	**2,937**	510	17.4
	Missing	**1,415**	178	12.6
TNM N-stage	**N0**	**7,044**	764	10.8
	N1	**3,123**	549	17.6
	N2	**2,051**	428	20.9
	Missing	**1,213**	164	13.5
Distant metastases	**No**	**11,340**	1,539	13.6
	Yes	**1,481**	295	19.9
	Missing	**610**	71	11.6
ASA grade	**1**	**1,927**	260	13.5
	2	**6,727**	941	14.0
	3	**2,924**	439	15.0
	4 or 5	**295**	42	14.2
	Missing	**1,558**	223	14.3
Comorbidities	**0**	**8,679**	1,225	14.1
	1	**3,603**	499	13.8
	2+	**1,149**	181	15.8
		Patient outcomes		
Length of stay	**≤1 week**	**7,258**	961	13.2
	1 to 2 weeks	**4,246**	621	14.6
	2 to 3 weeks	**1,355**	212	15.6
	> 3 weeks	**572**	111	19.4
Died within 90 days of surgery?	**No**	**12,844**	1,801	14.0
	Yes	**576**	99	17.2

The variables in Table 6.4(b) were used to risk-adjust rates of unplanned readmission when comparing cancer networks and trusts. Unplanned readmission was not found to be as strongly associated with these risk factors as postoperative mortality was. In the funnel plots in Figure 6.5 no networks fell above the inner limit on adjusted unplanned readmission rate.

In the funnel plots in Figure 6.6 one trust/site fell above the outer limit and a further three fell above the inner limit on adjusted unplanned readmission rate. Further work is being carried out to explore to what extent these variations are due to coding practices. This is the reason why no figures for individual trusts are given in the appendices.

Table 6.4(b)
Logistic regression model of 90-day unplanned readmission after major surgery for bowel cancer

		Odds ratio*	95% CI
Audit year	**2010-2011**	1	
	2009-2010	1.51	1.42 to 1.61
	2008-2009	1.41	1.32 to 1.51
	2007-2008	1.42	1.32 to 1.52
Sex	**Male**	1	
	Female	0.97	0.92 to 1.01
Age*	**50 yrs**	1.30	1.23 to 1.36
	60 yrs	1.14	1.12 to 1.17
	70 yrs	1	
	80 yrs	0.87	0.84 to 0.90
	90 yrs	0.75	0.69 to 0.82
ASA grade	**1**	1	
	2	1.11	1.03 to 1.20
	3	1.31	1.20 to 1.44
	4 or 5	1.04	0.87 to 1.25
TNM T-stage	**T1**	1	
	T2	0.93	0.82 to 1.05
	T3	1.03	0.93 to 1.15
	T4	1.07	0.95 to 1.21
TNM N-stage	**N0**	1	
	N1	1.38	1.31 to 1.46
	N2	1.61	1.50 to 1.73
Distant metastases	**No**	1	
	Yes	1.10	1.01 to 1.18
Mode of admission	**Elective**	1	
	Emergency	1.04	0.97 to 1.11
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	1.04	0.92 to 1.17
	Transverse colon	0.96	0.86 to 1.07
	Splenic flexure/descending colon	1.05	0.94 to 1.17
	Sigmoid colon	0.92	0.86 to 0.99
	Rectosigmoid	1.04	0.95 to 1.15
	Rectal	1.46	1.36 to 1.56
Comorbidities	**0**	1	
	1	1.10	1.04 to 1.16
	2+	1.28	1.17 to 1.39

* Age modelled as a linear and quadratic term

Figure 6.5
Observed and adjusted 90-day unplanned readmission rate by English network

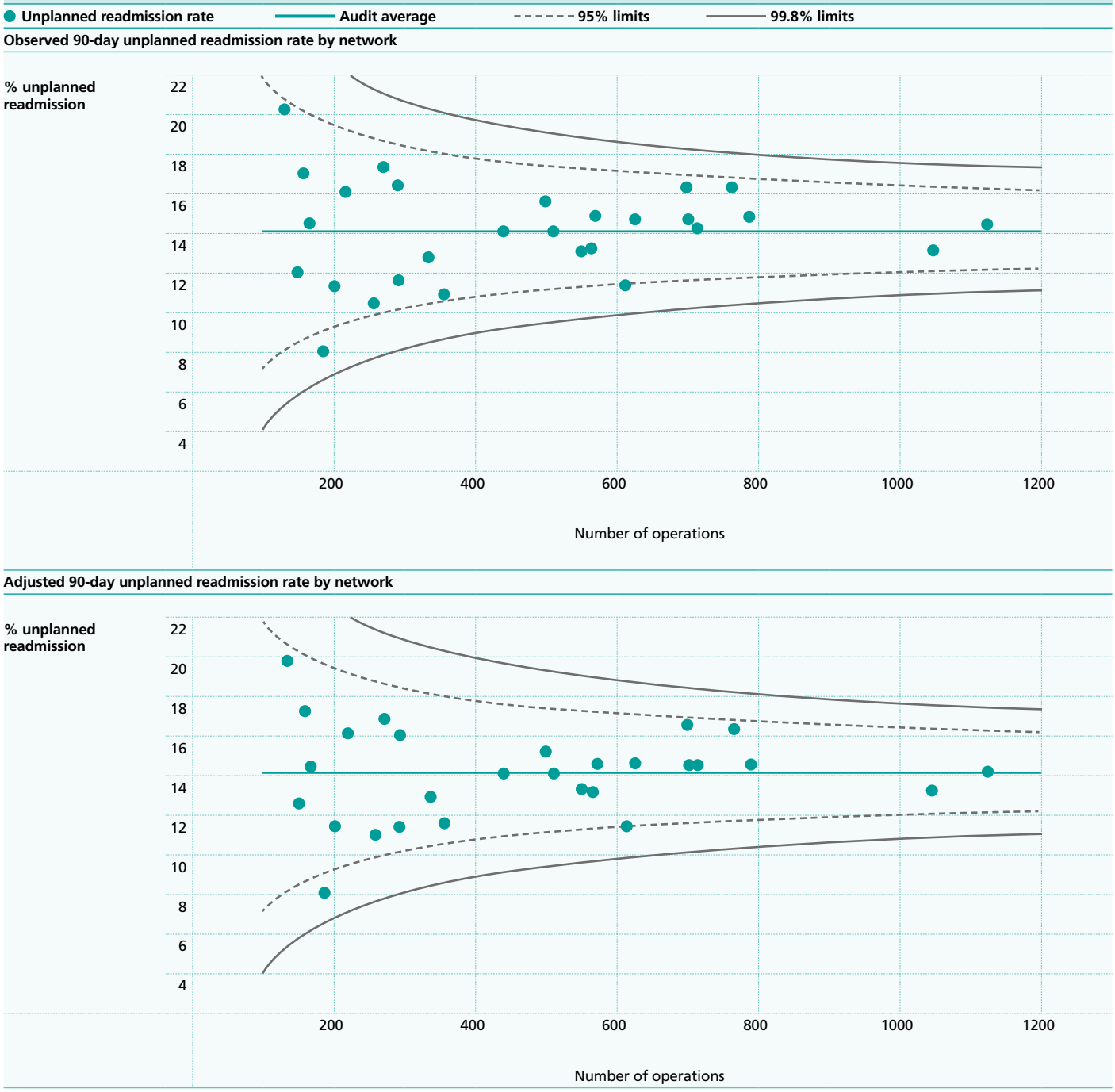


Figure 6.6
Observed and adjusted 90-day unplanned readmission rate by trust/hospital site

Return-to-theatre

Overall 1,188 out of 14,457 patients (8.2 per cent) were identified as having returned to theatre within 28 days. Table 6.5(a) shows that return to theatre was more common in men, in rectal cancer patients, those who had a higher ASA grade, those with a longer hospital stay, those with more co-morbidities, and patients who were admitted as an emergency.

Table 6.5(a)
Rates of return-to-theatre for the 14,457 patients who underwent major surgery, linked to HES, by patient characteristics and patient outcomes

			Return to theatre within 28 days	
		Total number	Number	%
	Overall	**14,457**	1,188	8.2
Cancer site	**Colon**	**9,631**	660	6.9
	Rectosigmoid	**778**	57	7.3
	Rectal	**4,046**	470	11.6
	Missing	**2**		
Sex	**Male**	**8,160**	754	9.2
	Female	**6,296**	434	6.9
	Missing	**1**		
Age-group	**≤64 yrs**	**4,354**	351	8.1
	65-74 yrs	**4,766**	389	8.2
	75-84 yrs	**4,241**	362	8.5
	85+ yrs	**1,096**	86	7.8
Mode of admission	**Elective**	**11,480**	918	8.0
	Emergency	**2,323**	207	8.9
	Missing	**654**	63	9.6
TNM T-stage	**T1**	**817**	76	9.3
	T2	**2,054**	178	8.7
	T3	**6,837**	525	7.7
	T4	**3,250**	283	8.7
	Missing	**1,499**	126	8.4
TNM N-stage	**N0**	**7,590**	598	7.9
	N1	**3,359**	290	8.6
	N2	**2,213**	191	8.6
	Missing	**1,295**	109	8.4
Distant metastases	**No**	**12,178**	1,012	8.3
	Yes	**1,621**	128	7.9
	Missing	**658**	48	7.3
ASA grade	**1**	**2,000**	133	6.7
	2	**7,119**	535	7.5
	3	**3,287**	326	9.9
	4 or 5	**360**	56	15.6
	Missing	**1,691**	138	8.2
Comorbidities	**0**	**9,236**	736	8.0
	1	**3,915**	328	8.4
	2+	**1,306**	124	9.5
		Patient outcomes		
Length of stay	**≤1 week**	**7,258**	185	2.5
	1 to 2 weeks	**4,246**	219	5.2
	2 to 3 weeks	**1,355**	208	15.4
	> 3 weeks	**1,580**	572	36.2
	Missing	**18**	4	22.2
Died within 90 days of surgery?	**No**	**13,764**	1,035	7.5
	Yes	**681**	152	22.3
	Missing	**12**	1	8.3

The multivariable model estimates in Table 6.5(b) were used for case-mix adjustment in order to compare cancer networks and trusts/sites. The model has only moderate discriminatory power (c-statistic=0.64 (95 per cent CI: 0.62, 0.65)) and there was no lack of fit in plots of observed versus expected rates by deciles of risk.

The variables independently associated with return to theatre were: sex, age, ASA grade, emergency admission, cancer site, and number of comorbidities.

Table 6.5(b)
Logistic regression model of 28-day return-to-theatre after major surgery for bowel cancer

		Odds ratio*	95% CI
Audit year	**2010-2011**	1	
	2009-2010	1.03	0.95 to 1.12
	2008-2009	1.02	0.93 to 1.11
	2007-2008	0.88	0.80 to 0.97
Sex	**Male**	1	
	Female	0.70	0.65 to 0.75
Age*	**50 yrs**	1.05	0.98 to 1.13
	60 yrs	1.04	1.01 to 1.08
	70 yrs	1	
	80 yrs	0.92	0.88 to 0.97
	90 yrs	0.82	0.73 to 0.93
ASA grade	**1**	1	
	2	1.17	1.05 to 1.31
	3	1.57	1.39 to 1.77
	4 or 5	2.35	1.96 to 2.81
TNM T-stage	**T1**	1	
	T2	0.90	0.77 to 1.05
	T3	1.01	0.88 to 1.16
	T4	1.12	0.96 to 1.32
TNM N-stage	**N0**	1	
	N1	0.97	0.90 to 1.05
	N2	1.02	0.92 to 1.12
Distant metastases	**No**	1	
	Yes	1.03	0.93 to 1.14
Mode of admission	**Elective**	1	
	Emergency	1.22	1.12 to 1.34
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	1.20	1.00 to 1.45
	Transverse colon	1.45	1.25 to 1.69
	Splenic flexure/descending colon	1.92	1.67 to 2.21
	Sigmoid colon	1.58	1.43 to 1.75
	Rectosigmoid	1.73	1.52 to 1.97
	Rectal	2.60	2.36 to 2.86
Comorbidities	**0**	1	
	1	1.02	0.95 to 1.10
	2+	1.19	1.07 to 1.33

* Age modelled as a linear and quadratic term

Figure 6.7 shows the variation in return to theatre between cancer networks. No networks were above the outer limit on adjusted rates of return to theatre. Three networks were above the inner limit on adjusted rates of return to theatre.

Figure 6.8 shows the variation in return to theatre between trusts/sites. Two trusts/sites were above the outer limit, and a further five trusts/sites were above the inner limit and below the outer limit on adjusted rates of return to theatre. As with unplanned readmissions, further work is being carried out to explore to what extent these variations are due to coding practice. This is the reason why no figures for individual trusts are given in the appendices.

Figure 6.7
Observed and adjusted 28-day return-to-theatre rate by English network

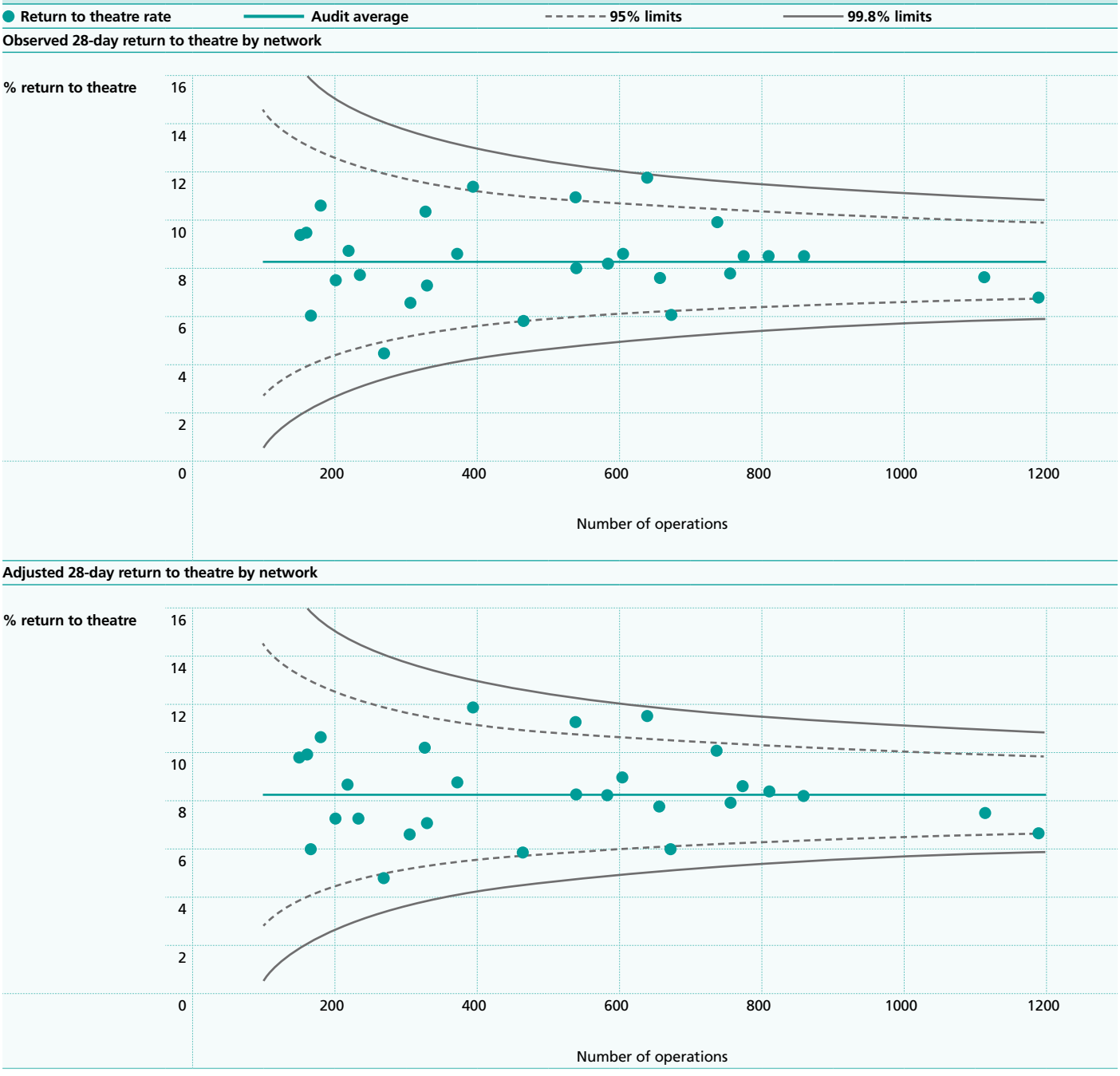


Figure 6.8
Observed and adjusted 28-day return-to-theatre rate by trust/hospital site

Postoperative mortality after return-to-theatre

Studying postoperative complications gives us a greater understanding of the clinical processes that lead to death following surgery. Investigating the postoperative mortality amongst patients who have an identified return to theatre adds to this understanding. A provider could potentially have a high rate of postoperative mortality because their rate of complications is high. Alternatively, their rate of complications may be no higher than average, but their success rate at rescuing patients with a postoperative complication may be poor. Postoperative mortality after return-to-theatre is defined here as patients who died within 90 days of primary surgery amongst those who had a return-to-theatre within 28 days of primary surgery.

First, the rate of postoperative mortality after return-to-theatre was estimated by patient characteristics, and then the adjusted risk of postoperative mortality after return-to-theatre was estimated for a set of risk factors in a logistic regression model. This model was used to case-mix adjust rates of postoperative mortality after return-to-theatre to compare rates between networks. No comparison was made between trusts/sites as the sample size was insufficient to make valid comparisons. Finally, trusts were ranked according to their adjusted 90-day mortality, and then trusts were assigned to five equally sized groups according to the trust's adjusted 90-day mortality. The rate of 28-day return-to-theatre and 90-day postoperative mortality after return-to-theatre was compared between these quintiles of trust adjusted 90-day mortality, to investigate whether the rate of return-to-theatre of a trust was associated with the trust's postoperative mortality, or whether in fact it was a high rate of postoperative mortality after return-to-theatre at the trust that was associated with high postoperative mortality.

Overall, 152 of the 1,184 patients who returned to theatre within 28 days died within 90 days of surgery (12.8 per cent). Whilst rectal cancer patients were more likely to return to theatre, Table 6.6(a) shows that colon cancer patients were less likely to survive short-term once they returned to theatre. Rates of postoperative mortality after return-to-theatre were highest in older patients with a high ASA grade and comorbidities, who had advanced stage cancer and were admitted as an emergency at the time of their diagnosis. Table 6.6(b) shows that the strongest independent risk factors for postoperative mortality after return-to-theatre were older age and high ASA grade, whilst advanced cancer stage, emergency admission and comorbidities also independently increased the risk of postoperative mortality after return-to-theatre. The results also demonstrate that the rate of postoperative mortality after return-to-theatre has decreased over the last four years of audit, after adjusting for case-mix.

Table 6.6(a)
Rates of postoperative mortality after return-to-theatre for the 1,184 patients who returned to theatre following major surgery with a date of surgery recorded, linked to HES, by patient characteristics

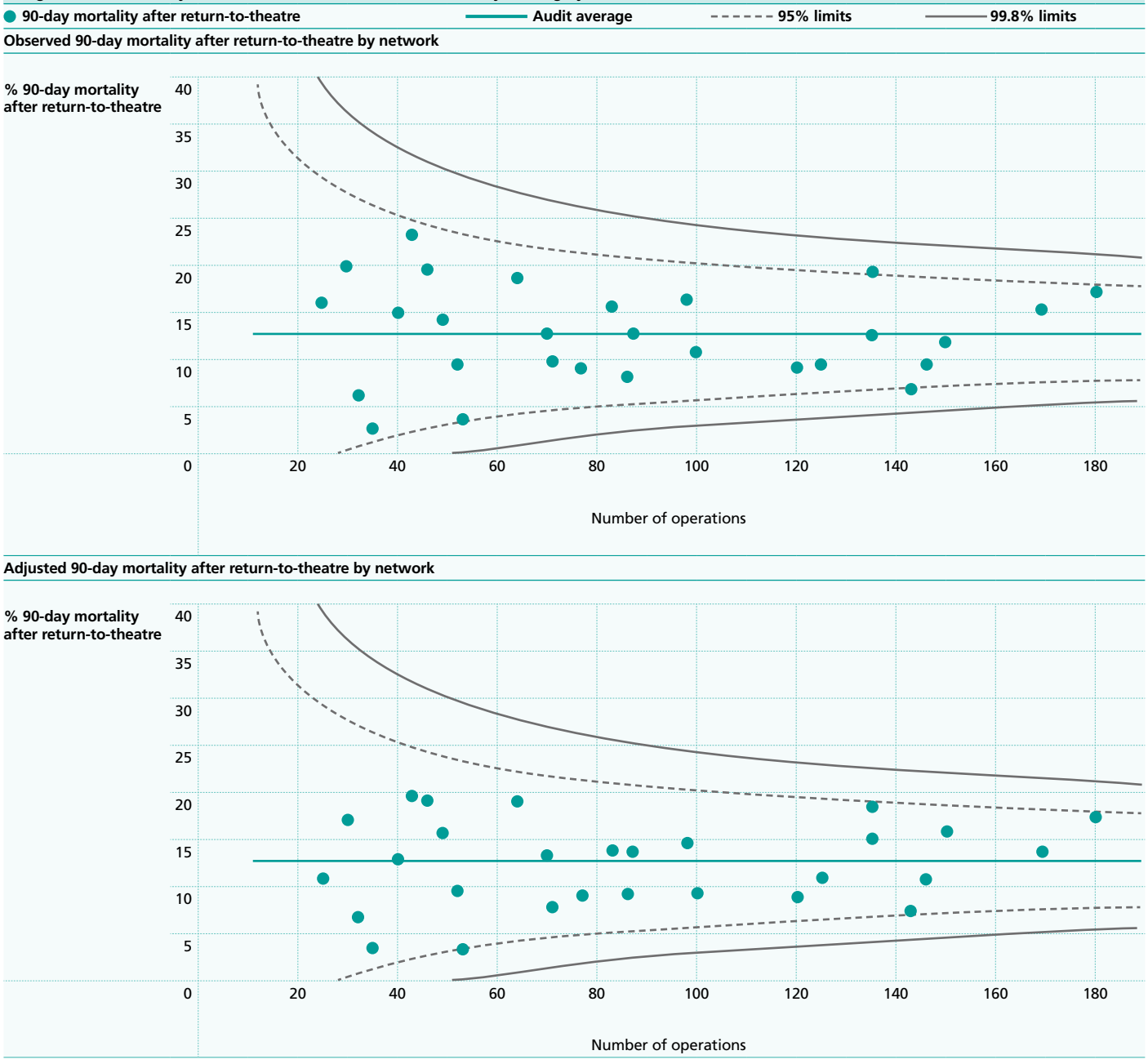
			90-day postoperative mortality after return-to-theatre	
		Total number	Number	%
	Overall	**1,184**	152	12.8
Cancer site	**Colon**	**656**	97	14.8
	Rectosigmoid	**57**	6	10.5
	Rectal	**470**	49	10.4
	Missing	**1**		
Sex	**Male**	**753**	93	12.4
	Female	**431**	59	13.7
	Missing	**0**		
Age-group	**≤64 yrs**	**349**	20	5.7
	65-74 yrs	**387**	40	10.3
	75-84 yrs	**362**	66	18.2
	85+ yrs	**86**	26	30.2
Mode of admission	**Elective**	**915**	99	10.8
	Emergency	**206**	40	19.4
	Missing	**63**	13	20.6
TNM T-stage	**T1**	**76**	7	9.2
	T2	**178**	16	9.0
	T3	**522**	61	11.7
	T4	**282**	51	18.1
	Missing	**126**	17	13.5
TNM N-stage	**N0**	**595**	75	12.6
	N1	**290**	39	13.4
	N2	**190**	22	11.6
	Missing	**109**	16	14.7
Distant metastases	**No**	**1,010**	129	12.8
	Yes	**126**	19	15.1
	Missing	**48**	4	8.3
ASA grade	**1**	**132**	6	4.5
	2	**533**	48	9.0
	3	**326**	61	18.7
	4 or 5	**56**	20	35.7
	Missing	**137**	17	12.4
Comorbidities	**0**	**733**	70	9.5
	1	**327**	53	16.2
	2+	**124**	29	23.4

Table 6.6(b)
Logistic regression model of 90-day postoperative mortality after return-to-theatre following major surgery for bowel cancer

		Odds ratio*	95% CI
Audit year	**2010-2011**	1	
	2009-2010	0.96	0.75 to 1.25
	2008-2009	1.31	1.01 to 1.69
	2007-2008	1.55	1.19 to 2.02
Sex	**Male**	1	
	Female	0.92	0.76 to 1.12
Age	**50 yrs**	0.42	0.31 to 0.58
	60 yrs	0.60	0.54 to 0.67
	70 yrs	1	
	80 yrs	1.96	1.75 to 2.20
	90 yrs	4.53	3.32 to 6.18
ASA grade	**1**	1	
	2	1.94	1.20 to 3.13
	3	2.70	1.66 to 4.40
	4 or 5	6.30	3.60 to 10.80
TNM T-stage	**T1**	1	
	T2	1.23	0.72 to 2.10
	T3	1.22	0.75 to 1.98
	T4	1.62	0.96 to 2.75
TNM N-stage	**N0**	1	
	N1	1.22	0.97 to 1.53
	N2	1.15	0.88 to 1.50
Distant metastases	**No**	1	
	Yes	1.12	0.84 to 1.49
Mode of admission	**Elective**	1	
	Emergency	1.40	1.11 to 1.77
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	1.34	0.85 to 2.14
	Transverse colon	0.93	0.62 to 1.40
	Splenic flexure/descending colon	1.05	0.73 to 1.51
	Sigmoid colon	0.56	0.42 to 0.75
	Rectosigmoid	0.88	0.60 to 1.28
	Rectal	0.79	0.60 to 1.03
Comorbidities	**0**	1	
	1	1.42	1.15 to 1.75
	2+	1.69	1.30 to 2.21

A comparison of rates of postoperative mortality after return-to-theatre by network (Figure 6.9) identified no networks above the inner limit on adjusted postoperative mortality after return-to-theatre. The number of patients at each network is, however, relatively small, and therefore there is limited power to identify potential outliers.

Figure 6.9
Observed and adjusted 90-day postoperative mortality after return-to-theatre by English cancer network, for patients having major surgery between 1 August 2009 and 31 July 2011, with a return-to-theatre within 28 days of surgery

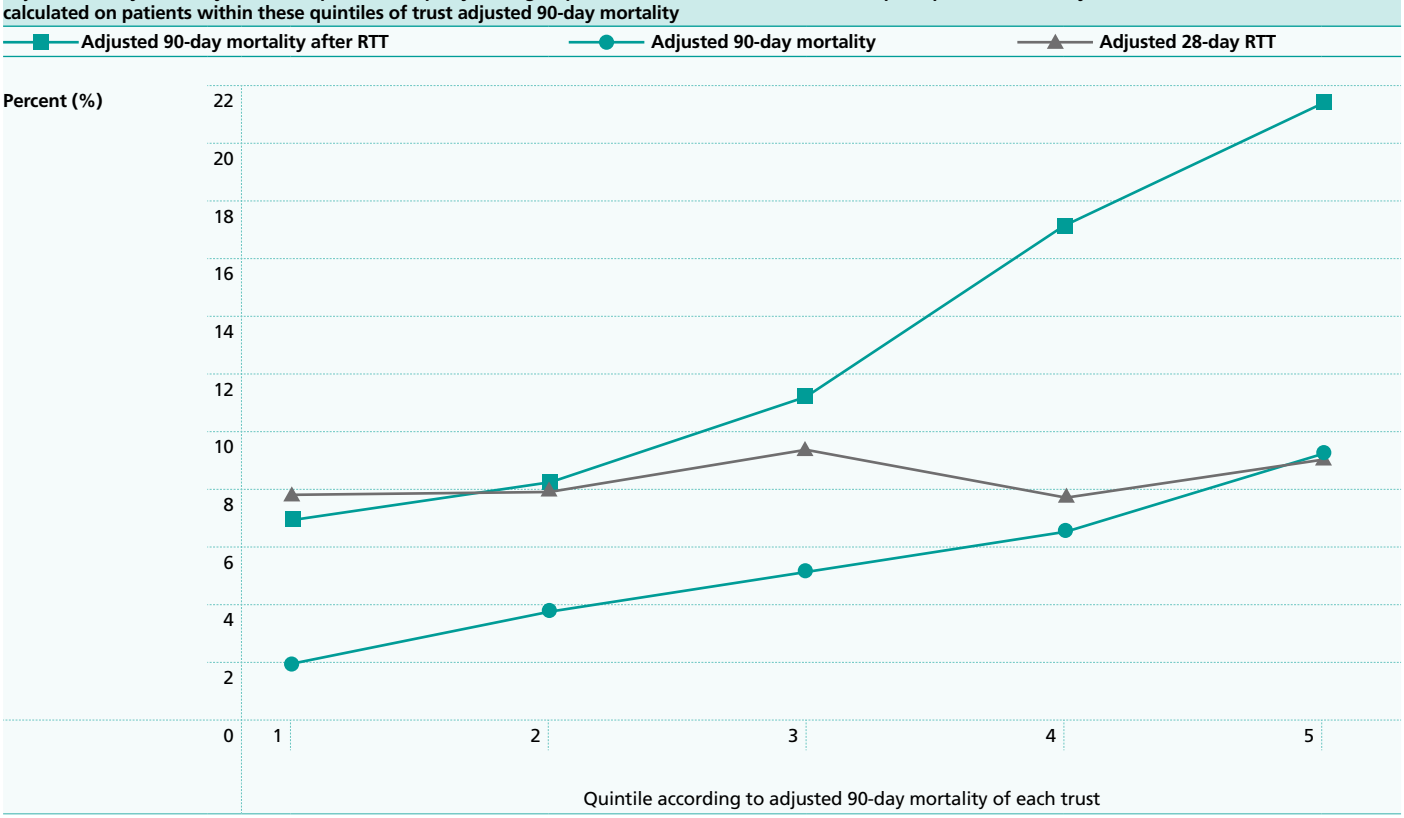


In Table 6.7 trusts are ranked according to adjusted 90-day mortality, and then split into quintiles according to the trust's adjusted 90-day mortality. There is no trend in the rate of return-to-theatre across the quintiles, either observed or adjusted for case-mix. In contrast the rate of postoperative mortality after return-to-theatre increases in every increasing quintile of trust adjusted mortality, both observed and adjusted for case-mix, from 7 per cent in the bottom quintile to over 20 per cent in the top quintile. This provides evidence to suggest that trusts with the highest postoperative mortality perform less well in trying to salvage patients who have to return to theatre. It is not clear from this analysis why this may be occurring, but further exploration of patients who return to theatre needs to be done, to ensure these patients receive prompt care on the most clinically relevant pathways.

Table 6.7
Average rates of return-to-theatre and postoperative mortality after return-to-theatre by quintiles of trust adjusted 90-day mortality. Trusts are ranked by their adjusted 90-day mortality and then split into 5 equally sized groups. The rate of return-to-theatre and postoperative mortality after return-to-theatre is then calculated on patients within these quintiles of trust adjusted 90-day mortality

	Mean 90-day mortality %		Mean 28-day return-to-theatre %		Mean 90-day postoperative mortality after return-to-theatre %	
Quintile of trust adjusted 90-day mortality	Observed	Adjusted	Observed	Adjusted	Observed	Adjusted
1	1.8	2.0	7.8	7.8	7.0	6.9
2	3.8	3.8	8.0	8.0	8.9	8.2
3	4.9	5.1	9.2	9.3	10.5	11.2
4	6.1	6.5	7.7	7.7	17.5	17.2
5	8.4	9.3	9.0	9.2	21.3	21.4

Figure 6.10
Average rates of return-to-theatre and postoperative mortality after return-to-theatre by quintiles of trust adjusted 90-day mortality. Trusts are ranked by their adjusted 90-day mortality and then split into 5 equally sized groups. The rate of return-to-theatre and postoperative mortality after return-to-theatre is then calculated on patients within these quintiles of trust adjusted 90-day mortality



7. Patients Undergoing Major Surgery for Rectal Cancer

This section is presented in two parts. In the first, the management of rectal cancer patients is described using data from the Audit. As in previous years, much of this information is incomplete or inaccurate. The proportion of rectal cancer patients getting a stoma according to the Audit is implausible, as explained below. In the second part of this section, HES data linked to Audit data is used to obtain information on reversal of stomas so that 12-month stoma rates can be estimated more accurately.

7.1. Information from the Audit

As shown in Table 7.1, 84 per cent of rectal cancer patients undergoing major surgery were reported to have had an MRI scan, either by having a date of scan or result of scan.

NICE clinical guideline 131, 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.

Table 7.1
Description of management of patients with rectal cancer who had major surgery

		Number	%
Total number of patients with rectal cancer who had major surgery		**4,684**	
MRI scan reported*	**Yes**	3,950	84.3
	No	734	15.7
Radiotherapy†	**Short course pre-operative**	695	14.8
	Long course pre-operative	1,132	24.2
	Postoperative	78	1.7
	Unknown type	55	1.2
	No radiotherapy or not reported	2,724	58.2
Circumferential resection margins	**Negative**	2,570	92.1
	Positive	221	7.9
	Missing (% of total)	1,893 (40.4)	
Rectal surgical procedures	**Anterior Resection (AR)**	3,059	65.3
	APER	1,137	24.3
	Hartmann's	366	7.8
	Other procedure	122	2.6
Stoma‡	**Permanent**	1,054	24.5
	Temporary	1,407	32.7
	Type unknown	52	1.2
	None	1,791	41.6
	Missing (% of total)	380 (8.1)	

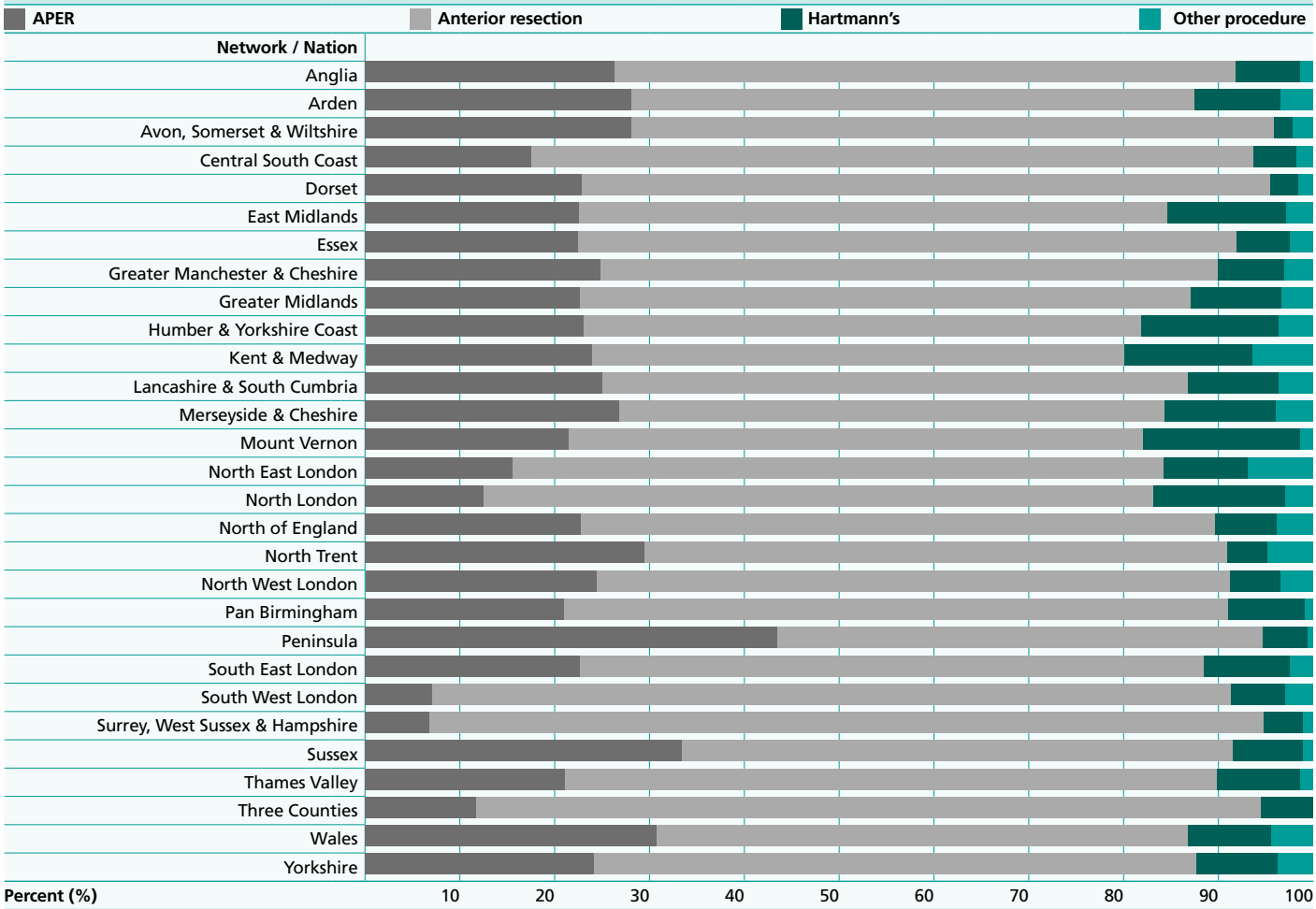
* Yes if patient has a result of MRI scan or date of MRI scan
† Unknown radiotherapy type if date of radiotherapy is recorded, but not type.
‡ Unknown stoma type if patient was recorded as having a Hartmann's procedure but their stoma type was not recorded.

Many of the items in Table 7.1 are very incomplete. It is not possible to determine whether a patient with missing information on radiotherapy had no radiotherapy or whether the type of radiotherapy they had was not recorded, and this accounts for almost 60 per cent of patients. Of those patients with type of radiotherapy reported, the majority had long-course pre-operative. 40 per cent of patients had no information recorded on circumferential resection margins, and margins were positive in 8 per cent of those with the information recorded. The majority of rectal cancer patients undergoing major surgery had an anterior resection, a quarter had an abdomino perineal excision of the rectum (APER), and 8 per cent had a Hartmann's procedure. Over 40 per cent of rectal cancer patients were reported in the Audit to have had no stoma, whether temporary or permanent. This is implausible 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. In section 7.2 information from HES is combined with information in the Audit to more accurately estimate the proportion of rectal cancer patients with a stoma 12 months after surgery.

Figure 7.1 summarises the types of procedure rectal cancer patients underwent at each cancer network. The proportion of patients having an APER varied between networks, from below 10 per cent at two networks to above 40 per cent at one network. Appendix 4 reports the management of rectal cancer patients at each trust/hospital. Very incomplete or inaccurate data can vastly affect trust/hospital estimates as the number of rectal cancer patients at each trust/hospital is often small. 53 trusts/hospitals were reported to have an APER rate above 30 per cent.

The AGPGBI Guidelines for the Management of Colorectal Cancer (2007) recommend that the overall proportion of resectable rectal cancers treated by APER should be less than 30 per cent.

Figure 7.1
Major Surgery for rectal cancer by network/Wales



7.2. 12-month stoma in rectal cancer patients

In this section the proportion of patients with a stoma 12 months after surgery for rectal cancer is estimated using HES-linked data. All 7,326 rectal cancer patients having major surgery between 1 August 2008 and 31 July 2010, who are linked to HES, are included. Inclusion for these analyses is based on date of surgery rather than date of diagnosis, because at least 12 months follow-up is required in HES. Patients operated on up until the end of July 2010 are included to ensure there is 12 months of follow-up in HES on all patients, and 2-years of data are included so that the sample size is sufficient to compare 12-month stoma rates at the trust level.

A follow-up time of 12 months from surgery may be too close to the end of chemotherapy. In future the Audit may estimate stoma rate at a longer follow-up if this is considered the clinically relevant question.

As described in the Methods section, rectal cancer 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 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. Where this information was missing, it was updated from procedure codes for colostomy or ileostomy in HES from the time of the primary procedure onwards. As the information on patient follow-up is poorly recorded in the Audit, information on reversal of stomas was taken from procedure codes in HES only.

Overall, 6,067 out of 7,326 (83 per cent) of rectal cancer patients had a stoma initially. 31 per cent of these were reversed within 12 months, and the 12 month stoma rate was 57 per cent overall. Table 7.2 shows that 12 months after undergoing an anterior resection, 38 per cent of patients still had a stoma, 38 per cent had a stoma which had since been reversed, and the remaining quarter of patients never had a stoma.

Table 7.2
Description of stoma types by procedure for the 7,326 rectal cancer patients linked to HES having a major resection between 1 August 2008 and 31 July 2010

		AR		APER		Hartmann's		Other	
		Number	%	Number	%	Number	%	Number	%
Total rectal cancer patients undergoing major resection		**4,965**		**1,727**		**476**		**158**	
Any stoma	**No**	1,203	24.2	0	0.0	0	0.0	56	35.4
	Yes	3,762	75.8	1,727	100.0	476	100.0	102	64.6
Stoma location	**None**	1,203	24.2	0	0.0	0	0.0	56	35.4
	Ileostomy	3,029	61.0	90	5.2	28	5.9	79	50.0
	Colostomy	733	14.8	1,637	94.8	448	94.1	23	14.6
Stoma type at 12 months, ignoring deaths	**None**	1,203	24.2	0	0.0	0	0.0	56	35.4
	Reversed ileostomy	1,725	34.7	0	0.0	7	1.5	8	5.1
	Ileostomy at 12 months	1,304	26.3	90	5.2	21	4.4	71	44.9
	Reversed colostomy	139	2.8	0	0.0	7	1.5	1	0.6
	Colostomy at 12 months	594	12.0	1,637	94.8	441	92.6	22	13.9
Stoma at 12 months?	**No**	3,067	61.8	0	0.0	14	2.9	65	41.1
	Yes	1,898	38.2	1,727	100.0	462	97.1	93	58.9

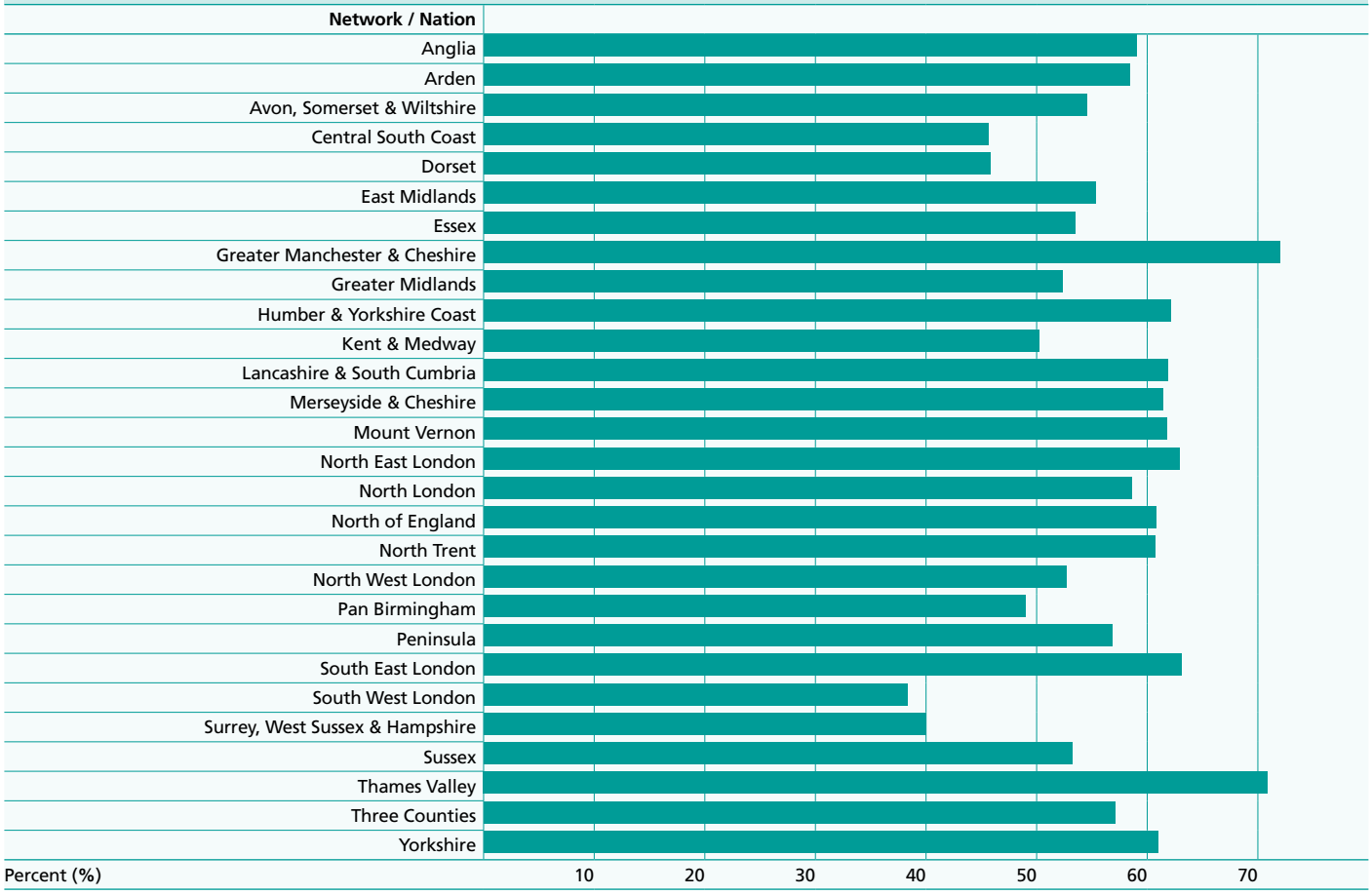
The adjusted associations between 12-month stoma rate and patient risk-factors are presented in Table 7.3. The strongest risk-factors were ASA grade and emergency admission. Age, sex, cancer stage and comorbidities were also independently associated with the risk of a stoma at 12 months.

Table 7.3
Logistic regression model of 12-month stoma rate after major resection for rectal cancer

		Odds ratio*	95% CI
Year of surgery	**2009-2010**	1	
	2008-2009	0.93	0.85 to 1.02
Sex	**Male**	1	
	Female	0.80	0.72 to 0.88
Age	**50 yrs**	0.90	0.82 to 1.00
	60 yrs	0.92	0.88 to 0.96
	70 yrs	1	
	80 yrs	1.16	1.08 to 1.25
	90 yrs	1.44	1.18 to 1.74
ASA grade	**1**	1	
	2	1.24	1.08 to 1.43
	3	1.65	1.39 to 1.97
	4 or 5	2.92	1.80 to 4.73
TNM T-stage	**T1**	1	
	T2	1.23	1.02 to 1.49
	T3	1.34	1.12 to 1.61
	T4	1.44	1.12 to 1.85
TNM N-stage	**N0**	1	
	N1	1.25	1.11 to 1.41
	N2	1.16	0.98 to 1.35
Distant metastases	**No**	1	
	Yes	1.56	1.29 to 1.89
Mode of admission	**Elective**	1	
	Emergency	1.94	1.51 to 2.50
Comorbidities	**0**	1	
	1	1.07	0.95 to 1.20
	2+	1.33	1.07 to 1.64

Figure 7.2 shows the 12-month stoma rate by cancer network. Two networks had an unadjusted 12-month stoma rate above 70 per cent, whilst two networks had a rate below 40 per cent.

Figure 7.2
12-month stoma rate by English cancer network



The risk-factors in Table 7.2 were used to case-mix adjust 12-month stoma rates in order to make comparisons between networks (Figure 7.3) and between trusts/sites (Figure 7.4). There was considerable variation between networks with two falling above and three falling below the outer limits, and a further two falling below the inner limits on adjusted 12-month stoma rate. The variation by trust/site was also large, with four trusts/sites falling above and four trusts/sites falling below the outer limits, and a further 8 falling above and 7 falling below the inner limits. The amount of variation between trusts and networks may in part reflect differences in time to reversal of stoma and not just permanent stoma rates. As mentioned above, a longer follow-up time may be considered for future audits.

The observed and adjusted 12-month stoma rates of each trust/site are reported in Appendix 4.

All networks and trusts/sites falling above the funnel limits have been informed, and given the opportunity to check the data that they submitted. The two cancer networks and twelve trusts were all contacted as part of the Department of Health Detection and Management of Outliers policy and given the opportunity to check their data and provide a response to the National Bowel Cancer Audit Project Team. Both of the cancer networks responded that they had asked the trusts within their networks to check their data. Eleven of the twelve trusts responded that they had carried out a check of their data.

Figure 7.3
Observed and adjusted 12-month stoma rate by English network/Wales

Figure 7.4
Observed and adjusted 12-month stoma rate by English trust/hospital

8. Laparoscopic compared to open surgery

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

First we compared the characteristics of patients and their surgical and pathological outcomes according to surgical access, and examined how surgical access has changed over the last four years. Finally postoperative mortality was compared between laparoscopic and open surgery, using an intention-to-treat analysis. Patients whose resection was planned to be completed laparoscopically (laparoscopic resection and laparoscopic converted to open resection) were compared to patients in whom an open resection was planned.

Table 8.1 describes the characteristics of patients undergoing major surgery according to surgical access, for the 15,165 with information on surgical access reported. The vast majority of patients having a planned laparoscopic resection were elective admissions and were operated on as elective or scheduled, they tended to have less advanced cancer and a lower ASA grade than patients having a planned open resection.

Table 8.1
Description of the 15,165 patients undergoing major surgery by surgical access

		Open		Laparoscopic converted to open		Laparoscopic completed	
		Number	%	Number	%	Number	%
Total patients undergoing major resection		**8,440**		**1,164**		**5,561**	
Sex	**Male**	4,780	56.6	741	63.7	3,068	55.2
	Female	3,659	43.4	423	36.3	2,493	44.8
	Missing (% of total)	1 (0)		0 (0)		0 (0)	
Age-group	**≤64 yrs**	2,447	29.0	350	30.1	1,768	31.8
	65-74 yrs	2,699	32.0	454	39.0	1,807	32.5
	75-84 yrs	2,582	30.6	288	24.7	1,598	28.7
	85+ yrs	712	8.4	72	6.2	388	7.0
ASA Grade	**1**	1,006	13.4	163	14.8	883	16.8
	2	3,878	51.8	639	58.2	3,112	59.3
	3	2,264	30.2	275	25.0	1,169	22.3
	4 or 5	338	4.5	21	1.9	84	1.6
	Missing (% of total)	954 (11.3)		66 (5.7)		313 (5.6)	
TNM T-stage	**T1**	414	5.4	85	7.9	416	8.0
	T2	996	13.1	196	18.2	964	18.6
	T3	3,752	49.4	576	53.6	2,939	56.7
	T4	2,439	32.1	218	20.3	864	16.7
	Missing (% of total)	839 (9.9)		89 (7.6)		378 (6.8)	
TNM N-stage	**N0**	4,221	54.9	664	60.8	3,291	62.5
	N1	1,993	25.9	276	25.3	1,258	23.9
	N2	1,477	19.2	153	14.0	718	13.6
	Missing (% of total)	749 (8.9)		71 (6.1)		294 (5.3)	
Distant metastases	**No**	6,871	84.8	1,007	90.2	4,949	91.9
	Yes	1,232	15.2	110	9.8	439	8.1
	Missing (% of total)	337 (4.0)		47 (4.0)		173 (3.1)	
Mode of admission (from HES)	**Elective**	4,757	74.5	948	92.8	4,140	93.5
	Emergency	1,631	25.5	74	7.2	288	6.5
	Missing (% of total)	2052 (24.3)		142 (12.2)		1133 (20.4)	
Surgical urgency	**Elective**	4,824	57.8	751	65.2	4,146	75.1
	Scheduled	1,240	14.9	318	27.6	1,019	18.5
	Urgent	1,015	12.2	56	4.9	256	4.6
	Emergency	1,271	15.2	26	2.3	100	1.8
	Missing (% of total)	90 (1.1)		13 (1.1)		40 (0.7)	
Cancer site	**Caecum/ascending colon**	2,250	26.7	262	22.5	1,652	29.7
	Hepatic flexure	346	4.1	42	3.6	225	4.0
	Transverse colon	613	7.3	47	4.0	255	4.6
	Splenic flexure/descending colon	654	7.7	71	6.1	244	4.4
	Sigmoid colon	1,883	22.3	287	24.7	1,431	25.7
	Rectosigmoid	600	7.1	131	11.3	437	7.9
	Rectal	2,094	24.8	324	27.8	1,317	23.7
Comorbidities	**0**	4,174	62.3	672	63.5	3,032	65.8
	1	1,862	27.8	300	28.4	1,201	26.1
	2+	662	9.9	86	8.1	377	8.2
	Missing (% of total)	1742 (20.6)		106 (9.1)		951 (17.1)	

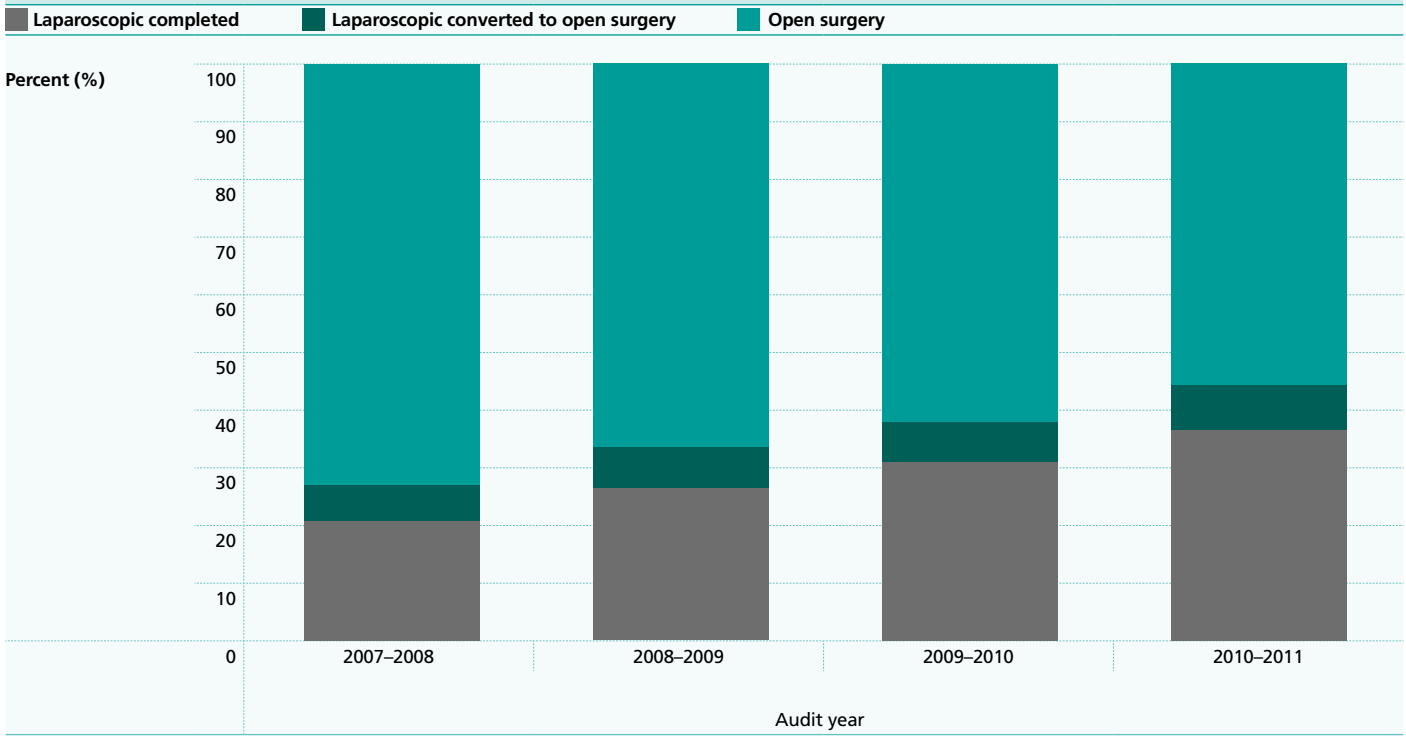
The outcomes of patients by surgical access is summarised in Table 8.2. Patients having a laparoscopically completed resection had a shorter hospital stay on average than patients whose surgery was open or converted to open. Unadjusted postoperative mortality was also lower in these patients.

Table 8.2
Surgical & pathological outcomes in 15,165 patients who had major surgery by surgical access

		Open		Laparoscopic converted to open		Laparoscopic completed	
		Number	%	Number	%	Number	%
Total patients undergoing major resection		**8,440**		**1,164**		**5,561**	
Extramural Vascular Invasion	**Positive**	1,987	35.1	266	28.5	1,237	27.7
	Negative	3677	64.9	667	71.5	3230	72.3
	Missing (% of total)	2776 (32.9)		231 (19.8)		1094 (19.7)	
Median number of excised lymph nodes	**Median**	16		16		16	
	Range	0-210		0-72		0-210	
	Interquartile range	12-22		12-22		12-21	
At least one positive node found	**Yes**	3,444	45.0	438	39.7	1,980	37.3
	No	4207	55.0	664	60.3	3326	62.7
	Missing (% of total)	789 (9.3)		62 (5.3)		255 (4.6)	
Length of hospital stay (LOS)	**Median LOS**	9		8		6	
	Range	0-328		0-217		0-308	
	Interquartile range	6-15		5-14		4-9	
Hospital stay longer than 5 days	**Yes**	5,845	82.0	747	72.2	2,565	50.7
	No	1285	18.0	287	27.8	2496	49.3
	Missing (% of total)	1310 (15.5)		130 (11.2)		500 (9.0)	
90-day mortality following major surgery	**Dead at 90 days**	568	6.7	44	3.8	142	2.6
	Alive at 90 days	7870	93.3	1120	96.2	5415	97.4
	Missing (% of total)	2 (0)		0 (0)		4 (0.1)	

The proportion of patients with a planned laparoscopic resection has increased over the last four audit years (Figure 8.1), from approximately 25 per cent in patients diagnosed in 2007-08 to over 40 per cent in patients diagnosed in 2010-11 (the current audit year). Of those patients whose resection was planned to be laparoscopic, the proportion completed laparoscopically has increased slightly over that time from 77 per cent in patients diagnosed in 2007-08 to 83 per cent in patients diagnosed in 2010–11.

Figure 8.1
Surgical access by audit year



The proportion of patients whose resection was planned to be completed laparoscopically varied widely between cancer networks, from under 30 per cent in 3 networks to over 60 per cent in 5 networks (Figure 8.2).

Figure 8.2
Planned laparoscopic resection by network

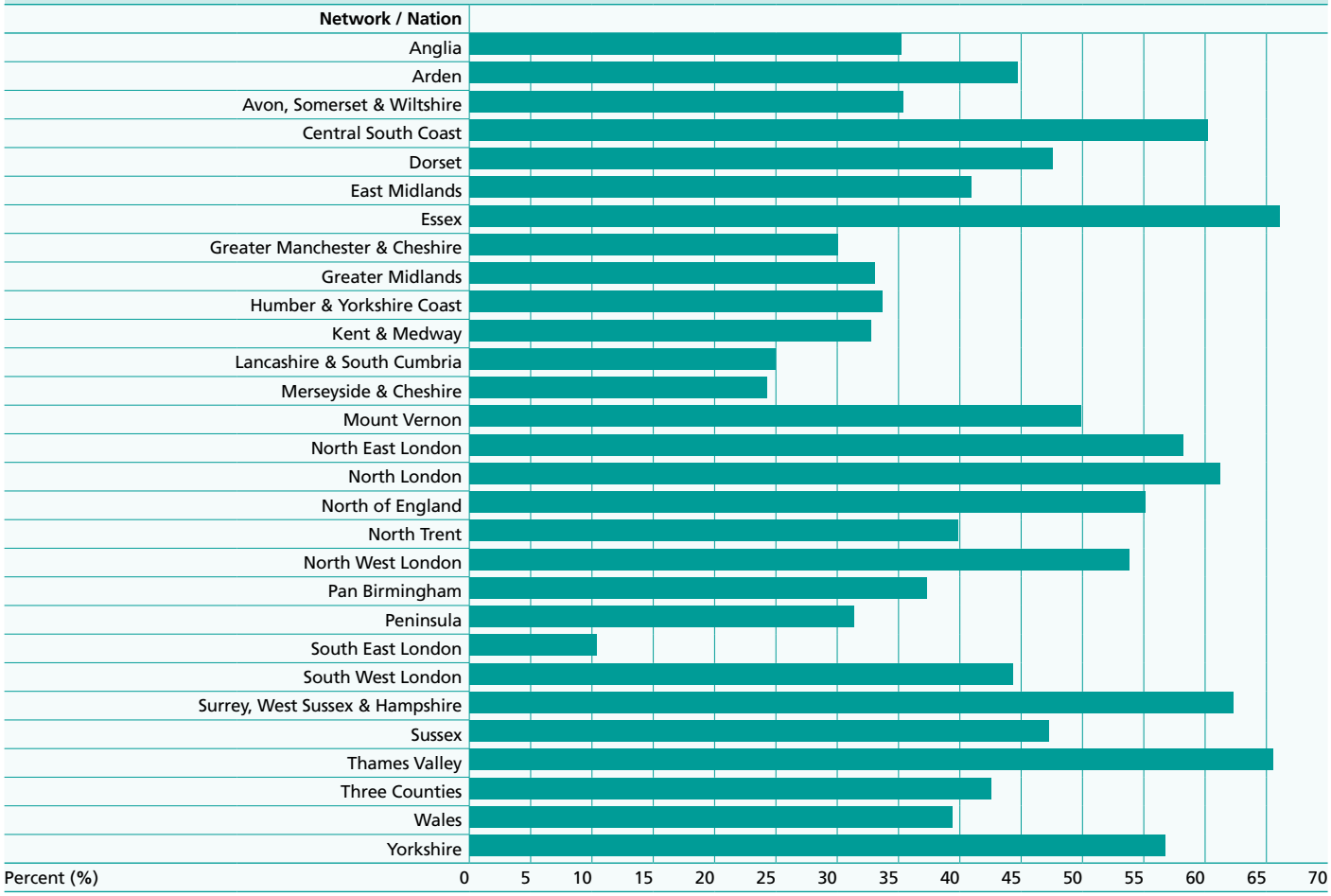


Table 8.3 shows that, after adjusting for case-mix, the 90-day mortality of patients whose resection was planned to be laparoscopic was approximately 25 per cent lower than that of patients whose resection was planned to be open. Whilst the analysis was adjusted for patient case-mix, it is still possible that some of this difference in postoperative mortality reflects a difference in patient risk-factors between patients selected for laparoscopic resection and those selected for open surgery, or that other confounding factors have contributed to the estimated reduction in mortality.

NICE clinical guideline 131, Laparoscopic surgery: 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.

Table 8.3
Risk-adjusted 90-day mortality for planned laparoscopic compared to planned open resection

		Odds ratio	95% CI
Planned surgical access	**Open**	1	
	Laparoscopic	0.74	0.68 to 0.82
Audit year	**2010-2011**	1	
	2009-2010	1.04	0.94 to 1.15
	2008-2009	1.17	1.05 to 1.29
	2007-2008	1.23	1.11 to 1.36
Sex	**Male**	1	
	Female	0.77	0.71 to 0.83
Association with age in patients *without* metastases*	**50 yrs**	0.36	0.30 to 0.44
	60 yrs	0.57	0.53 to 0.62
	70 yrs	1	
	80 yrs	1.91	1.82 to 2.01
	90 yrs	4.03	3.54 to 4.59
Association with age in patients *with* metastases*	**50 yrs**	0.67	0.54 to 0.81
	60 yrs	0.76	0.71 to 0.82
	70 yrs	1	
	80 yrs	1.49	1.42 to 1.56
	90 yrs	2.52	2.21 to 2.87
ASA grade	**1**	1	
	2	1.65	1.34 to 2.03
	3	2.76	2.24 to 3.40
	4 or 5	7.53	6.03 to 9.39
TNM T-stage	**T1**	1	
	T2	1.11	0.84 to 1.46
	T3	1.35	1.05 to 1.74
	T4	1.99	1.53 to 2.58
TNM N-stage	**N0**	1	
	N1	1.07	0.97 to 1.17
	N2	1.34	1.21 to 1.48
Distant metastases	**No**	1	
	Yes	1.87	1.66 to 2.11
Mode of admission	**Elective**	1	
	Emergency	2.10	1.92 to 2.30
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	1.12	0.94 to 1.33
	Transverse colon	1.32	1.15 to 1.51
	Splenic flexure/descending colon	1.27	1.10 to 1.46
	Sigmoid colon	0.94	0.84 to 1.04
	Rectosigmoid	1.03	0.88 to 1.20
	Rectal	1.32	1.18 to 1.47
Comorbidities	**0**	1	
	1	1.34	1.22 to 1.47
	2+	1.72	1.53 to 1.94

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

9. Emergency admissions

This section is in two parts. The first is an analysis of the proportion of patients whose first hospital admission with a diagnosis of bowel cancer was at an emergency admission. After risk adjustment, rates of emergency admissions were compared between cancer networks. The second part is restricted to patients who were admitted as an emergency. The proportion of these patients who had non-emergency surgery at least one day after admission was estimated, and the characteristics and outcomes of these patients were explored.

9.1 Emergency admissions

The analyses in this section on emergency admissions included all 21,816 patients linked to HES with known admission type in HES (49 patients had unknown admission type). Emergency admission was defined as the first diagnosis of bowel cancer in HES occurring at an emergency admission.

Results

Overall, 21.1 per cent of patients were first admitted with a diagnosis of bowel cancer at an emergency admission (Table 9.1(a)). The set of patients admitted as an emergency includes a group whose cancer has not been detected until the point at which symptoms become very severe and possibly life-threatening. This was reflected in patients' TNM stage and ASA grade, with only 4 per cent of patients with stage T1 admitted as an emergency compared to 37 per cent of patients with stage T4, and only 12 per cent of patients with ASA grade 1 admitted as an emergency compared to over 40 per cent of patients with ASA grade 4 or 5. The rate was also much higher in colon cancer patients than patients with rectal cancer, and was higher in older patients and patients with a greater number of co-morbidities.

Table 9.1(a)
Rates of emergency admissions by patient characteristics for the 21,816 patients linked to HES with mode of admission recorded in HES

			Diagnosis was at emergency admission	
		Total number	Number	%
	Overall	21,816	4,600	21.1
Cancer site	Colon	13,603	3,593	26.4
	Rectosigmoid	1,197	255	21.3
	Rectal	7,016	752	10.7
Sex	Male	12,522	2,430	19.4
	Female	9,292	2,170	23.4
	Missing	2		
Age-group	≤64 yrs	6,416	1,155	18.0
	65-74 yrs	6,757	1,067	15.8
	75-84 yrs	6,373	1,492	23.4
	85+ yrs	2,270	886	39.0
Comorbidities	0	13,950	2,612	18.7
	1	5,805	1,370	23.6
	2+	2,060	618	30.0
	For the 14,221 patients undergoing major surgery			
TNM T-stage	T1	786	31	3.9
	T2	2,000	77	3.9
	T3	6,760	930	13.8
	T4	3,201	1,195	37.3
	Missing	1,474	196	13.3
TNM N-stage	N0	7,449	968	13.0
	N1	3,296	656	19.9
	N2	2,189	617	28.2
	Missing	1,287	188	14.6
Distant metastases	No	11,970	1,797	15.0
	Yes	1,625	545	33.5
	Missing	626	87	13.9
ASA grade	1	1,974	234	11.9
	2	6,985	879	12.6
	3	3,238	791	24.4
	4 or 5	349	153	43.8
	Missing	1,675	372	22.2

Patients admitted as an emergency were less likely to have a surgical intervention, and only just over half of patients admitted as an emergency underwent a major resection compared to over two-thirds of patients not admitted as an emergency (Table 9.1(b)). The majority of patients admitted as an emergency undergoing a major resection had urgent or emergency surgery. The hospital stay of patients admitted as an emergency was longer and the postoperative mortality of these patients was much higher. The rate of return-to-theatre was only slightly higher in these patients.

Table 9.1(b)
Patient outcomes by mode of admission for the 21,816 patients linked to HES with mode of admission recorded in HES

		First admission was emergency?			
		No		Yes	
		Number	%	Number	%
Overall		**17,216**		**4,600**	
Surgical intervention?	**No**	3,178	18.5	1,355	29.5
	Yes	14,038	81.5	3,245	70.5
Major surgery?	**No**	5,424	31.5	2,171	47.2
	Yes	11,792	68.5	2,429	52.8
	For the 14,221 patients undergoing major surgery				
Length of stay	**≤1 week**	6,396	54.6	673	28.1
	1 to 2 weeks	3,299	28.2	847	35.4
	2 to 3 weeks	955	8.2	389	16.2
	3 to 4 weeks	1,059	9.0	486	20.3
	Missing (%)	83 (0.7)		34 (1.4)	
Surgical urgency	**Elective**	8206	71.2	580	24.5
	Scheduled	2,419	21.0	190	8.0
	Urgent	671	5.8	647	27.3
	Emergency	233	2.0	952	40.2
	Missing (%)	263 (2.2)		60 (2.5)	
Died within 90 days of major surgery?	**No**	11,401	96.8	2,138	88.1
	Yes	380	3.2	290	11.9
	Missing (%)	11 (0.1)		1 (0.0)	
Return to theatre within 28 days of major surgery?	**No**	10,874	92.2	2,222	91.5
	Yes	918	7.8	207	8.5

Figure 9.1 shows the variation in rates of emergency admissions between English cancer networks, both observed and adjusted for case-mix using funnel plots. Rates were adjusted for the risk factors in Table 9.2, the strongest predictors being age, cancer site, number of comorbidities and population quintile of Index of Multiple Deprivation. The funnel plots of emergency admission by cancer network showed no networks falling outside the funnel limits, before and after adjusting for patient case-mix.

The focus here was on variation between networks. Funnel plots by trust were not included. This was because emergency admissions reflect the referral practices of PCTs referring to the hospital trusts, and the interest was in variation between referral practices across regions of the country. Referral practices of PCTs are beyond the control of the hospital trusts.

Table 9.2
Adjusted risk of emergency admission for the 21,816 patients linked to HES with mode of admission recorded in HES

		Odds ratio	95% CI
Audit year	**2011**	1	
	2010	1.05	1.01 to 1.10
	2009	1.07	1.02 to 1.12
	2008	1.09	1.04 to 1.15
Sex	**Male**	1	
	Female	1.12	1.08 to 1.16
Age	**50 yrs**	1.08	1.05 to 1.12
	60 yrs	0.89	0.88 to 0.91
	70 yrs	1	
	80 yrs	1.52	1.49 to 1.55
	90 yrs	3.13	2.97 to 3.29
Cancer site	**Caecum/ascending colon**	1	
	Hepatic flexure	0.89	0.82 to 0.97
	Transverse colon	1.31	1.22 to 1.41
	Splenic flexure/descending colon	1.64	1.53 to 1.75
	Sigmoid colon	0.82	0.79 to 0.86
	Rectosigmoid	0.58	0.54 to 0.63
	Rectal	0.35	0.34 to 0.37
Comorbidities	**0**	1	
	1	1.22	1.17 to 1.27
	2+	1.57	1.49 to 1.66
IMD quintile	**1: Most deprived**	1	
	2	0.86	0.82 to 0.91
	3	0.76	0.72 to 0.80
	4	0.70	0.66 to 0.74
	5: Least deprived	0.65	0.61 to 0.69

Figure 9.1
Observed and adjusted rates of emergency admissions by English network

9.2 Surgical urgency of emergency admissions

Patients having urgent or emergency surgery had a much higher postoperative mortality than those having elective or scheduled procedures. Particular interest was in patients with an emergency admission who had elective/scheduled surgery at a later date, as this will include a group of patients who were stabilised sufficiently at the time of their admission that they could have elective/scheduled surgery. Mode of admission was taken from HES, and surgical urgency was recorded in the Audit.

Table 9.3 shows that 30 per cent of patients admitted as an emergency had elective/scheduled surgery at a later date. The vast majority of patients recorded as having an emergency admission and elective/scheduled surgery had at least 1 day between admission and surgery. The 39 patients recorded as having an emergency admission and elective/scheduled surgery on the same day were likely to have been coded incorrectly.

The analysis of delayed non-emergency surgery was restricted to the 2,261 patients who were admitted as an emergency, amongst those patients having major surgery, linked to HES, with urgency of surgery, date of admission and date of surgery recorded. The 5 patients who had an emergency admission and elective/scheduled surgery whose date of surgery was recorded as before their date of admission or over a year after their date of admission were excluded from the analysis.

Table 9.3
Surgical urgency by mode of admission for 13,494 patients linked to HES having major surgery, mode of admission, surgical urgency and date of surgery recorded

Admission	Surgical urgency	Number	%
Elective	Elective/scheduled	10,363	92.3
	Urgent/emergency	865	7.7
	Total	**11,228**	**100**
Emergency	Urgent/emergency	1,533	67.7
	Elective/scheduled same day	39	1.7
	Elective/scheduled 1 day to 1 year later	689	30.4
	Unknown*	5	0.2
	Total	**2,266**	**100**

* Date of surgery is before admission date or more than 1 year after admission date

Table 9.4(a) shows that 65 per cent of rectal cancer patients admitted as an emergency had elective/scheduled surgery between one day and one year from their admission date, compared to only 27 per cent of colon cancer patients. Patients admitted as an emergency were more likely to have delayed elective/scheduled surgery if they had more comorbidities and if they had less advanced stage cancer. Patients admitted as an emergency who had delayed elective/scheduled surgery had a shorter hospital stay on average, lower postoperative mortality, and a slightly lower rate of return-to-theatre (Table 9.4(b)), unadjusted for patient case-mix. Interpretation of these findings is difficult until it is established whether the patients presenting at an emergency admission had complications of bowel cancer such as bowel obstruction or haemorrhage, and whether or not the patients with delayed non-emergency surgery had a procedure at the time of their presentation which would have stabilised their condition sufficiently for them to have non-emergency surgery at a later date.

Table 9.4(a)
Amongst patients admitted as an emergency, proportions of patients having elective/scheduled surgery 1 day to 1 year following admission, by patient characteristics

			Elective/scheduled surgery 1 day to 1 year after admission	
		Total number	Number	%
	Overall	**2,261**	689	30.5
Cancer site	**Colon**	**1,960**	536	27.3
	Rectosigmoid	**106**	27	25.5
	Rectal	**195**	126	64.6
Sex	**Male**	**1,140**	361	31.7
	Female	**1,121**	328	29.3
Age-group	**≤64 yrs**	**628**	168	26.8
	65-74 yrs	**558**	184	33.0
	75-84 yrs	**778**	246	31.6
	85+ yrs	**297**	91	30.6
Comorbidities	**0**	**1,346**	357	26.5
	1	**637**	208	32.7
	2+	**278**	124	44.6
TNM T-stage	**T1**	**28**	15	53.6
	T2	**75**	50	66.7
	T3	**870**	306	35.2
	T4	**1,130**	261	23.1
	Missing	**158**	57	36.1
TNM N-stage	**N0**	**905**	330	36.5
	N1	**621**	182	29.3
	N2	**584**	126	21.6
	Missing	**151**	51	33.8
Distant metastases	**No**	**1,684**	573	34.0
	Yes	**512**	93	18.2
	Missing	**65**	23	35.4
ASA grade	**1**	**221**	64	29.0
	2	**840**	281	33.5
	3	**739**	250	33.8
	4 or 5	**145**	32	22.1
	Missing	**316**	62	19.6

Table 9.4(b)
Outcomes of patients admitted as an emergency, according to whether they have elective/scheduled surgery 1 day to 1 year after their admission

		Elective/scheduled surgery 1 day to 1 year after admission			
		No		Yes	
		Number	%	Number	%
Overall		**1,572**		**689**	
Length of stay	**≤1 week**	407	25.9	237	34.4
	1 to 2 weeks	578	36.8	219	31.8
	2 to 3 weeks	256	16.3	102	14.8
	3 to 4 weeks	329	21.0	130	18.9
	Missing (%)	2 (0.1)		1 (0.1)	
Died within 90 days of major surgery?	**No**	1,369	87.1	624	90.6
	Yes	203	12.9	65	9.4
Return to theatre within 28 days of major surgery?	**No**	1,424	90.6	633	91.9
	Yes	148	9.4	56	8.1

10. Future Direction of the Audit

So another year - another successful audit but where do we and our patients go from here?

The essence of clinical audit is improving care against professional standards, recognising good care and identifying outcomes that can be improved. The National Bowel Cancer Audit has done just that, in its present form, year on year from 2007 for the English and Welsh Networks and increasingly for Scotland, Northern Ireland and some parts of Ireland. This has been delivered by a fusion of clinical leadership from Association of Coloproctology of Great Britain and Ireland (ACPGBI), the organisation and collation of the Health and Social Care Information Centre and the analytical expertise of the Clinical Effectiveness Unit at the Royal College of Surgeons of England.

But changes are taking place at all levels. Cancer treatment data for radiotherapy and chemotherapy is now routinely collected within the NHS. NHS activity data for cancer patients including MDT data collection and pathology data will be subsumed into cancer registry activity. By the end of 2012 all English registries will have migrated to the English National Cancer Online Registration Environment (ENCORE) so that all electronic data feeds from local and national sources will be processed automatically through this single, central clearing house. At the same time major change continues in clinical practices that have a major influence on patient outcomes - bowel screening, symptom awareness campaigns, laparoscopic resection, patient selection with cardiopulmonary exercise testing (CPEX) and enhanced recovery pathways.

What is the future of the National Bowel Cancer Audit in this new world?

The answer has to be in posing and answering **questions in depth** as to the patient experience with bowel cancer in the NHS. Very large swathes of patients - almost 40% - are not having a surgical resection. Routine data collection cannot answer why - not fit enough, too much cancer or too little cancer (complete response after chemo radiotherapy or endoscopic removal of polyp cancers) - to benefit from surgery. Postoperative care pathways determined by CPEX, are patients receiving high dependency care when needed? Enhanced recovery is preached but can we see it practised in length of patient stay? Emergency colorectal cancer admission - the real Cinderella of bowel cancer - are there facilities for resuscitation and optimisation, stenting if appropriate and/or timely surgical intervention? We know that patients die in the post-operative period - why is this - was the death expected or unexpected, avoidable or unavoidable? And yes the patient survives the cancer surgery, but do they get home, can they get back to work, do they need therapy for impotence - do they need to know where every supermarket toilet is on every shopping trip?

There is a complexity to colorectal cancer care management and a need to explore the patient experience that can only be met by careful clinically led questions. The improved routine collection of patient data is just the opportunity that the National Bowel Cancer Audit needs to explore the intricacy of processes of care and outcome that have a bearing on both the lives of patients that need palliative solutions and those that survive with the consequences of altered bowel activity and changed body image.

However, there remains in all of this, one very definite constant. None of this aspiration to understand and improve patient outcome can possibly succeed without the clinician's ownership of the data. Data entry and uploads from MDTs must have clinical sign off. Just as importantly you need to know that your operations and outcomes are being accurately submitted by your Trust as administrative data to HES or similar data system. All this data is going into a big analytical pot, possibly the most comprehensive anywhere in the world - the accuracy of your data is crucial to safeguarding care and practice. It's the future, you have to embrace it!

Appendix 1: Case ascertainment and data completeness

According to trust/hospital site in England and Wales for the data collected on patients diagnosed between 1 August 2010 and 31 July 2011.

Case ascertainment and data completeness are allocated to trusts by place of surgery. 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 the calculations.

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.

Appendix 1

Cancer Network/Trust Name	Number of cases reported to the audit	Number of cases identified in HES/PEDW	Case ascertainment %	Number of cases having major surgery according to the audit	Data completeness for patients having major surgery %
Overall	**29,026**	**33,509**	**87 ●**	**17,537**	**79 ■**
Lancashire & South Cumbria					
University Hospitals of Morecambe Bay NHS Trust	225	214	105 ●	84	0 ▲
Blackpool Teaching Hospitals NHS Foundation Trust	237	240	99 ●	114	68 ■
Lancashire Teaching Hospitals NHS Foundation Trust	223	264	84 ●	101	19 ▲
East Lancashire Hospitals NHS Trust	219	234	94 ●	119	44 ▲
Greater Manchester & Cheshire					
The Mid Cheshire Hospitals NHS Trust	143	156	92 ●	65	89 ●
East Cheshire NHS Trust	109	117	93 ●	67	75 ■
University Hospitals of South Manchester NHS Foundation Trust	129	143	90 ●	88	100 ●
Salford Royal NHS Foundation Trust	115	129	89 ●	67	90 ●
Trafford Healthcare NHS Trust	54	76	71 ■	48	92 ●
Bolton NHS Foundation Trust	177	186	95 ●	113	93 ●
Tameside Hospital NHS Foundation Trust	112	121	93 ●	86	97 ●
Wrightington, Wigan & Leigh NHS Foundation Trust	129	170	76 ■	61	77 ■
Central Manchester University Hospitals NHS Foundation Trust	128	125	102 ●	90	94 ●
Pennine Acute Hospitals NHS Trust	357	405	88 ●	222	86 ●
Stockport NHS Foundation Trust	148	188	79 ■	82	84 ●
Merseyside & Cheshire					
Wirral University Teaching Hospital NHS Foundation Trust	194	210	92 ●	131	94 ●
St Helens & Knowsley Hospitals NHS Trust	216	208	104 ●	118	94 ●
Aintree University Hospital NHS Foundation Trust	211	216	98 ●	123	79 ■
Countess of Chester Hospital NHS Foundation Trust	153	156	98 ●	74	78 ■
Royal Liverpool & Broadgreen University Hospitals NHS Trust	193	199	97 ●	113	70 ■
Southport & Ormskirk Hospital NHS Trust	160	151	106 ●	79	65 ■
Warrington & Halton Hospitals NHS Foundation Trust	154	139	111 ●	106	70 ■
Yorkshire					
Bradford Teaching Hospitals NHS Foundation Trust	132	183	72 ■	88	97 ●
York Teaching Hospital NHS Foundation Trust	221	220	100 ●	152	90 ●
Harrogate & District NHS Foundation Trust	112	116	97 ●	78	94 ●
Airedale NHS Foundation Trust	112	115	97 ●	67	99 ●
Leeds Teaching Hospitals NHS Trust	343	392	88 ●	228	80 ●
Calderdale & Huddersfield NHS Foundation Trust	164	233	70 ■	129	94 ●
Mid Yorkshire Hospitals NHS Trust	257	268	96 ●	165	82 ●

Appendix 1 (continued)

Cancer Network/Trust Name	Number of cases reported to the audit	Number of cases identified in HES/PEDW	Case ascertainment %	Number of cases having major surgery according to the audit	Data completeness for patients having major surgery %
Overall	**29,026**	**33,509**	**87** ●	**17,537**	**79** ■
Humber & Yorkshire Coast					
Scarborough & North East Yorkshire Health Care NHS Trust	117	112	104 ●	73	90 ●
Northern Lincolnshire & Goole Hospitals NHS Foundation Trust	155	261	59 ■	115	59 ■
Hull & East Yorkshire Hospitals NHS Trust	286	307	93 ●	202	70 ■
North Trent					
Barnsley Hospital NHS Foundation Trust	107	122	88 ●	78	82 ●
The Rotherham NHS Foundation Trust	145	144	101 ●	90	99 ●
Chesterfield Royal Hospital NHS Foundation Trust	200	199	101 ●	135	97 ●
Sheffield Teaching Hospitals NHS Foundation Trust	313	343	91 ●	212	96 ●
Doncaster & Bassetlaw Hospitals NHS Foundation Trust	188	290	65 ■	158	80 ■
Pan Birmingham					
Walsall Hospitals NHS Trust	116	116	100 ●	86	73 ■
Heart of England NHS Foundation Trust	401	386	104 ●	237	88 ●
University Hospitals Birmingham NHS Foundation Trust	194	207	94 ●	127	68 ■
Sandwell & West Birmingham Hospitals NHS Trust	193	222	87 ●	118	92 ●
Arden					
South Warwickshire NHS Foundation Trust	148	152	97 ●	108	93 ●
University Hospitals Coventry & Warwickshire NHS Trust	212	227	93 ●	126	94 ●
George Eliot Hospital NHS Trust	100	86	116 ●	73	97 ●
Worcestershire Acute Hospitals NHS Trust	333	370	90 ●	174	54 ■
Mount Vernon					
Luton & Dunstable Hospital NHS Foundation Trust	34	139	24 ▲	1	0 ▲
West Hertfordshire Hospitals NHS Trust	244	230	106 ●	171	89 ●
East & North Hertfordshire NHS Trust	244	287	85 ●	137	85 ●
North West London					
The Hillingdon Hospitals NHS Foundation Trust	83	98	85 ●	70	96 ●
Ealing Hospital NHS Trust	59	52	113 ●	29	83 ●
West Middlesex University Hospital NHS Trust	94	77	122 ●	64	92 ●
Chelsea & Westminster Hospital NHS Foundation Trust	85	54	157 ●	45	93 ●
North West London Hospitals NHS Trust	106	272	39 ▲	48	94 ●
Imperial College Healthcare NHS Trust	151	244	62 ■	89	89 ●
North London					
Royal Free London NHS Foundation Trust	81	97	84 ●	50	74 ■
North Middlesex University Hospital NHS Trust	68	93	73 ■	47	89 ●
The Whittington Hospital NHS Trust	82	84	98 ●	44	98 ●
The Princess Alexandra Hospital NHS Trust	57	145	39 ▲	33	0 ▲
University College London Hospitals NHS Foundation Trust	121	134	90 ●	72	83 ●
Barnet & Chase Farm Hospitals NHS Trust	204	215	95 ●	120	93 ●
North East London					
Barking, Havering & Redbridge Hospitals NHS Trust	219	295	74 ■	6	17 ▲
Whipps Cross University Hospital NHS Trust	93	144	65 ■	53	81 ●
Newham University Hospital NHS Trust	62	64	97 ●	40	83 ●
Barts & The London NHS Trust	54	95	57 ■	41	93 ●
Homerton University Hospital NHS Foundation Trust	53	55	96 ●	29	93 ●

Appendix 1 (continued)

Cancer Network/Trust Name	Number of cases reported to the audit	Number of cases identified in HES/PEDW	Case ascertainment %	Number of cases having major surgery according to the audit	Data completeness for patients having major surgery %
Overall	**29,026**	**33,509**	**87** ●	**17,537**	**79** ■
South East London					
Guy's & St Thomas' NHS Foundation Trust	67	158	42 ▲	55	4 ▲
The Lewisham Healthcare NHS Trust	64	88	73 ■	27	89 ●
King's College Hospital NHS Foundation Trust	118	113	104 ●	63	81 ●
South London Healthcare NHS Trust	200	366	55 ■	84	23 ▲
South West London					
Kingston Hospital NHS Trust	131	133	98 ●	89	83 ●
Croydon Health Services NHS Trust	108	118	92 ●	62	42 ▲
St George's Healthcare NHS Trust	27	181	15 ▲	25	4 ▲
Epsom & St Helier University Hospitals NHS Trust	210	195	108 ●	102	0 ▲
Peninsula					
South Devon Healthcare NHS Foundation Trust	223	214	104 ●	123	89 ●
Northern Devon Healthcare NHS Trust	155	161	96 ●	99	96 ●
Royal Cornwall Hospitals NHS Trust	321	310	104 ●	229	90 ●
Royal Devon & Exeter NHS Foundation Trust	286	304	94 ●	194	72 ■
Plymouth Hospitals NHS Trust	272	274	99 ●	135	10 ▲
Dorset					
Dorset County Hospital NHS Foundation Trust	146	170	86 ●	51	71 ■
Poole Hospital NHS Foundation Trust	166	175	95 ●	93	94 ●
Royal Bournemouth & Christchurch Hospitals NHS Foundation Trust	186	218	85 ●	131	90 ●
Avon, Somerset & Wiltshire					
Weston Area Health NHS Trust	127	114	111 ●	84	96 ●
Yeovil District Hospital NHS Foundation Trust	111	131	85 ●	68	51 ■
University Hospitals Bristol NHS Foundation Trust	164	185	89 ●	72	58 ■
Taunton & Somerset NHS Foundation Trust	190	237	80 ●	65	62 ■
Royal United Hospital Bath NHS Trust	241	265	91 ●	154	90 ●
North Bristol NHS Trust	263	262	100 ●	174	66 ■
Three Counties					
Wye Valley NHS Trust	137	111	123 ●	101	96 ●
Gloucestershire Hospitals NHS Foundation Trust	389	481	81 ●	222	94 ●
Thames Valley					
Heatherwood & Wexham Park Hospitals NHS Foundation Trust	172	175	98 ●	67	51 ■
Milton Keynes Hospital NHS Foundation Trust	108	140	77 ■	64	8 ▲
Royal Berkshire NHS Foundation Trust	198	236	84 ●	153	75 ■
Great Western Hospitals NHS Foundation Trust	171	188	91 ●	115	89 ●
Oxford University Hospitals NHS Trust	236	442	53 ■	210	96 ●
Buckinghamshire Healthcare NHS Trust	170	232	73 ■	60	88 ●

Appendix 1 (continued)

Cancer Network/Trust Name	Number of cases reported to the audit	Number of cases identified in HES/PEDW	Case ascertainment %	Number of cases having major surgery according to the audit	Data completeness for patients having major surgery %
Overall	**29,026**	**33,509**	**87** ●	**17,537**	**79** ■
Central South Coast					
Isle of Wight NHS PCT	114	99	115 ●	79	89 ●
University Hospital Southampton NHS Foundation Trust	283	320	88 ●	163	97 ●
Portsmouth Hospitals NHS Trust	347	330	105 ●	237	92 ●
Winchester & Eastleigh Healthcare NHS Trust	175	95	184 ●	115	66 ■
Hampshire Hospitals NHS Foundation Trust	99	224	44 ▲	86	95 ●
Salisbury NHS Foundation Trust	156	173	90 ●	105	93 ●
Western Sussex Hospitals NHS Trust (Central South Coast)	179	183	98 ●	125	98 ●
Surrey, West Sussex & Hampshire					
Royal Surrey County Hospital NHS Trust	179	181	99 ●	114	86 ●
Frimley Park Hospital NHS Foundation Trust	123	222	55 ■	109	95 ●
Ashford & St Peter's Hospitals NHS Foundation Trust	189	187	101 ●	93	73 ■
Surrey & Sussex Healthcare NHS Trust	117	138	85 ●	106	86 ●
Sussex					
East Sussex Hospitals NHS Trust	351	363	97 ●	203	97 ●
Brighton & Sussex University Hospitals NHS Trust	186	257	72 ■	89	65 ■
Western Sussex Hospitals NHS Trust (Sussex)	209	222	94 ●	137	98 ●
Kent & Medway					
Dartford & Gravesham NHS Trust	67	117	57 ■	67	90 ●
Medway NHS Foundation Trust	170	209	81 ●	*	*
East Kent Hospitals University NHS Foundation Trust	307	403	76 ■	46	0 ▲
Maidstone & Tunbridge Wells NHS Trust	273	287	95 ●	142	58 ■
Greater Midlands					
Mid Staffordshire NHS Foundation Trust	108	110	98 ●	67	99 ●
University Hospital of North Staffordshire NHS Trust	334	306	109 ●	185	49 ▲
The Royal Wolverhampton Hospitals NHS Trust	239	272	88 ●	170	85 ●
The Dudley Group NHS Foundation Trust	174	198	88 ●	110	83 ●
Shrewsbury & Telford Hospital NHS Trust	320	335	96 ●	182	15 ▲
North of England					
South Tyneside NHS Foundation Trust	91	100	91 ●	60	80 ■
City Hospitals Sunderland NHS Foundation Trust	162	190	85 ●	104	90 ●
North Cumbria University Hospitals NHS Trust	170	216	79 ■	108	76 ■
Gateshead Health NHS Foundation Trust	132	150	88 ●	86	86 ●
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	212	243	87 ●	147	97 ●
Northumbria Healthcare NHS Foundation Trust	323	347	93 ●	186	89 ●
South Tees Hospitals NHS Trust	284	302	94 ●	175	74 ■
North Tees & Hartlepool NHS Foundation Trust	237	238	100 ●	157	92 ●
County Durham & Darlington NHS Foundation Trust	314	309	102 ●	213	95 ●
Anglia					
Bedford Hospital NHS Trust	134	149	90 ●	92	70 ■
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	168	162	104 ●	114	78 ■
Peterborough & Stamford Hospitals NHS Foundation Trust	114	206	55 ■	77	16 ▲
James Paget University Hospitals NHS Foundation Trust	149	135	110 ●	78	92 ●
Ipswich Hospital NHS Trust	250	242	103 ●	172	72 ■
West Suffolk NHS Foundation Trust	175	174	101 ●	112	99 ●
Cambridge University Hospitals NHS Foundation Trust	227	299	76 ■	162	73 ■
Norfolk & Norwich University Hospital NHS Trust	476	491	97 ●	292	69 ■
Hinchingbrooke Health Care NHS Trust	96	114	84 ●	58	88 ●

Appendix 1 (continued)

Cancer Network/Trust Name	Number of cases reported to the audit	Number of cases identified in HES/PEDW	Case ascertainment %	Number of cases having major surgery according to the audit	Data completeness for patients having major surgery %
Overall	**29,026**	**33,509**	**87** ●	**17,537**	**79** ■
Essex					
Southend University Hospital NHS Foundation Trust	226	226	100 ●	166	93 ●
Basildon & Thurrock University Hospitals NHS Foundation Trust	143	198	72 ■	104	90 ●
Colchester Hospital University NHS Foundation Trust	263	303	87 ●	186	94 ●
Mid Essex Hospital Services NHS Trust	156	220	71 ■	123	89 ●
East Midlands					
Burton Hospitals NHS Foundation Trust	164	152	108 ●	84	98 ●
Sherwood Forest Hospitals NHS Foundation Trust	170	204	83 ●	96	96 ●
Kettering General Hospital NHS Foundation Trust	161	168	96 ●	57	60 ■
Northampton General Hospital NHS Trust	165	196	84 ●	101	86 ●
Derby Hospitals NHS Foundation Trust	288	302	95 ●	146	84 ●
United Lincolnshire Hospitals NHS Trust	58	421	14 ▲	38	11 ▲
University Hospitals of Leicester NHS Trust	460	433	106 ●	275	91 ●
Nottingham University Hospitals NHS Trust	384	413	93 ●	171	13 ▲
Wales					
Ysbwyty Glan Clwydd MDT	176	193	91 ●	105	93 ●
Ysbwyty Gwynedd MDT	172	140	123 ●	113	80 ■
Ysbwyty Maelor MDT	178	170	105 ●	97	74 ■
Nevill Hall Hospital MDT	117	123	95 ●	83	76 ■
Royal Gwent Hospital MDT	279	173	161 ●	174	97 ●
Cardiff MDT	232	223	104 ●	130	88 ●
Prince Charles Hospital MDT	105	92	114 ●	69	64 ■
Royal Glamorgan Hospital MDT	106	107	99 ●	74	96 ●
Princess of Wales MDT	170	162	105 ●	122	92 ●
Swansea MDT	187	202	93 ●	137	87 ●
Bronglais MDT	57	69	83 ●	46	98 ●
West Wales General & Prince Phillip MDT	147	160	92 ●	83	86 ●
Withybush General Hospital MDT	94	99	95 ●	63	94 ●

* No data submitted for this data item

Appendix 2: Selected Indicators for all patients reported to the Audit according to trust/hospital site

Appendix 2				
Cancer Network/Trust Name	**Number of patients reported to the audit**	**Discussed at MDT meeting (%)**	**Seen by clinical nurse specialist (%)**	**CT scan reported (%)**
Overall	**29,026**	**98.0**	**87.0**	**88.0**
Lancashire & South Cumbria				
University Hospitals Of Morecambe Bay NHS Foundation Trust	225	99.5	0.5	88.4
Blackpool Teaching Hospitals NHS Foundation Trust	237	94.8	90.4	94.9
Lancashire Teaching Hospitals NHS Foundation Trust	223	98.7	2.0	96.4
East Lancashire Hospitals NHS Trust	219	99.1	95.4	79.9
Greater Manchester & Cheshire				
Mid Cheshire Hospitals NHS Foundation Trust	143	100.0	92.6	83.2
The Christie NHS Foundation Trust	41	92.7	82.5	97.6
East Cheshire NHS Trust	109	100.0	89.7	96.3
University Hospital Of South Manchester NHS Foundation Trust	129	97.7	99.1	93.8
Salford Royal NHS Foundation Trust	115	100.0	96.3	93.9
Trafford Healthcare NHS Trust	54	94.4	98.1	96.3
Bolton NHS Foundation Trust	177	100.0	85.9	100.0
Tameside Hospital NHS Foundation Trust	112	99.1	99.0	96.4
Wrightington, Wigan & Leigh NHS Foundation Trust	129	99.2	76.8	98.4
Central Manchester University Hospitals NHS Foundation Trust	128	100.0	100.0	6.3
Pennine Acute Hospitals NHS Trust	357	99.7	31.8	84.3
Stockport NHS Foundation Trust	148	98.6	94.8	91.9
Merseyside & Cheshire				
Wirral University Teaching Hospital NHS Foundation Trust	194	98.4	64.6	90.2
St Helens & Knowsley Hospitals NHS Trust	216	100.0	96.2	91.7
Aintree University Hospital NHS Foundation Trust	211	99.5	64.5	93.4
The Clatterbridge Cancer Centre NHS Foundation Trust	8	100.0	100.0	87.5
Countess Of Chester Hospital NHS Foundation Trust	153	100.0	85.0	86.9
Royal Liverpool & Broadgreen University Hospitals NHS Trust	193	99.5	79.0	78.2
Southport & Ormskirk Hospital NHS Trust	160	100.0	76.7	98.1
Warrington & Halton Hospitals NHS Foundation Trust	154	99.3	93.9	90.9
Yorkshire				
Bradford Teaching Hospitals NHS Foundation Trust	132	98.5	98.5	90.2
York Teaching Hospital NHS Foundation Trust	221	100.0	91.2	97.3
Harrogate & District NHS Foundation Trust	112	99.1	96.0	99.1
Airedale NHS Foundation Trust	112	100.0	84.8	100.0
Leeds Teaching Hospitals NHS Trust	343	98.0	74.1	88.6
Calderdale & Huddersfield NHS Foundation Trust	164	86.0	92.8	93.3
Mid Yorkshire Hospitals NHS Trust	257	100.0	93.4	96.1
Humber & Yorkshire Coast				
Scarborough & North East Yorkshire Health Care NHS Trust	117	100.0	99.0	94.0
Northern Lincolnshire & Goole Hospitals NHS Foundation Trust	155	98.7	92.8	96.1
Hull & East Yorkshire Hospitals NHS Trust	286	84.0	84.0	89.9
North Trent				
Barnsley Hospital NHS Foundation Trust	107	99.1	97.0	93.5
The Rotherham NHS Foundation Trust	145	100.0	87.4	90.3
Chesterfield Royal Hospital NHS Foundation Trust	200	99.5	91.5	96.5
Sheffield Teaching Hospitals NHS Foundation Trust	313	100.0	94.8	96.8
Doncaster & Bassetlaw Hospitals NHS Foundation Trust	188	100.0	97.3	98.4
Pan Birmingham				
Walsall Healthcare NHS Trust	116	95.5	79.4	77.6
Heart Of England NHS Foundation Trust	401	100.0	92.5	94.3
University Hospitals Birmingham NHS Foundation Trust	194	99.5	100.0	85.6
Sandwell & West Birmingham Hospitals NHS Trust	193	100.0	92.7	93.8
Arden				
South Warwickshire NHS Foundation Trust	148	97.3	91.3	92.6
University Hospitals Coventry & Warwickshire NHS Trust	212	100.0	96.3	91.0
George Eliot Hospital NHS Trust	100	100.0	85.7	97.0
Worcestershire Acute Hospitals NHS Trust	333	99.1	18.0	85.9

Appendix 2 (continued)

Cancer Network/Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)
Overall	**29,026**	**98.0**	**87.0**	**88.0**
Mount Vernon				
Luton & Dunstable Hospital NHS Foundation Trust	34	100.0	*	97.1
West Hertfordshire Hospitals NHS Trust	244	100.0	100.0	93.9
East & North Hertfordshire NHS Trust	244	99.6	100.0	86.5
North West London				
The Hillingdon Hospitals NHS Foundation Trust	83	100.0	100.0	97.6
Ealing Hospital NHS Trust	59	98.3	100.0	89.8
West Middlesex University Hospital NHS Trust	94	100	100	97.9
Chelsea & Westminster Hospital NHS Foundation Trust	85	98.8	100	98.8
North West London Hospitals NHS Trust	106	96.8	86.8	31.1
Imperial College Healthcare NHS Trust	151	100	72	98.7
North London				
Royal Free London NHS Foundation Trust	81	100	100	95.1
North Middlesex University Hospital NHS Trust	68	100	100	95.6
The Whittington Hospital NHS Trust	82	98.8	97.3	93.9
The Princess Alexandra Hospital NHS Trust	57	100.0	*	57.9
University College London Hospitals NHS Foundation Trust	121	98.3	99.1	94.2
Barnet & Chase Farm Hospitals NHS Trust	204	99.5	94.3	97.1
North East London				
Barking, Havering & Redbridge University Hospitals NHS Trust	219	94.4	50.0	84.5
Whipps Cross University Hospital NHS Trust	93	100.0	93.4	91.4
Newham University Hospital NHS Trust	62	100.0	94.3	96.8
Barts & The London NHS Trust	54	100.0	95.8	92.6
Homerton University Hospital NHS Foundation Trust	53	100.0	100.0	94.3
South East London				
Guy's & St Thomas' NHS Foundation Trust	67	100.0	100.0	7.5
Lewisham Healthcare NHS Trust	64	100.0	92.1	90.6
King's College Hospital NHS Foundation Trust	118	98.3	88.0	1.7
South London Healthcare NHS Trust	200	99.0	100.0	82.0
South West London				
Kingston Hospital NHS Trust	131	98.5	79.8	93.9
Croydon Health Services NHS Trust	108	99.1	100.0	95.4
St George's Healthcare NHS Trust	27	100.0	100.0	88.9
The Royal Marsden NHS Foundation Trust	20	100.0	100.0	90.0
Epsom & St Helier University Hospitals NHS Trust	210	98.5	100.0	86.2
Peninsula				
South Devon Healthcare NHS Foundation Trust	223	100.0	100.0	95.5
Northern Devon Healthcare NHS Trust	155	100.0	93.3	94.8
Royal Cornwall Hospitals NHS Trust	321	100.0	99.7	93.8
Royal Devon & Exeter NHS Foundation Trust	286	99.0	99.6	93.7
Plymouth Hospitals NHS Trust	272	100.0	78.7	90.4
Dorset				
Dorset County Hospital NHS Foundation Trust	146	98.6	93.8	87.7
Poole Hospital NHS Foundation Trust	166	99.4	80.2	92.2
The Royal Bournemouth & Christchurch Hospitals NHS Foundation Trust	186	97.3	93.8	90.3
Avon, Somerset & Wiltshire				
Weston Area Health NHS Trust	127	100.0	78.2	89.8
Yeovil District Hospital NHS Foundation Trust	111	100.0	100.0	95.5
University Hospitals Bristol NHS Foundation Trust	164	100.0	68.8	86.0
Taunton & Somerset NHS Foundation Trust	190	97.3	41.4	90.5
Royal United Hospital Bath NHS Trust	241	100.0	70.1	83.8
North Bristol NHS Trust	263	100.0	96.9	91.6
Three Counties				
Wye Valley NHS Trust	137	98.5	96.7	97.1
Gloucestershire Hospitals NHS Foundation Trust	389	94.1	98.7	96.4

Appendix 2 (continued)

Cancer Network/Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)
Overall	**29,026**	**98.0**	**87.0**	**88.0**
Thames Valley				
Heatherwood & Wexham Park Hospitals NHS Foundation Trust	172	97.7	94.4	59.3
Milton Keynes Hospital NHS Foundation Trust	108	99.1	99.0	53.7
Royal Berkshire NHS Foundation Trust	198	94.4	98.3	82.8
Great Western Hospitals NHS Foundation Trust	171	98.2	78.0	91.8
Oxford University Hospitals NHS Trust	236	97.9	100.0	78.0
Buckinghamshire Healthcare NHS Trust	170	100.0	92.9	93.5
Central South Coast				
Isle Of Wight NHS PCT	114	100.0	80.0	96.5
University Hospital Southampton NHS Foundation Trust	283	98.9	100.0	93.3
Portsmouth Hospitals NHS Trust	347	100.0	99.0	98.8
Winchester & Eastleigh Healthcare NHS Trust	175	98.9	98.4	93.7
Hampshire Hospitals NHS Foundation Trust	99	91.9	89.6	92.9
Salisbury NHS Foundation Trust	156	100.0	89.5	94.9
Western Sussex Hospitals NHS Trust (Central South Coast)	179	100.0	75.2	95.0
Surrey, West Sussex & Hampshire				
Royal Surrey County Hospital NHS Foundation Trust	179	98.3	89.4	91.6
Frimley Park Hospital NHS Foundation Trust	123	92.7	100.0	94.3
Ashford & St Peter's Hospitals NHS Foundation Trust	189	78.8	70.5	98.9
Surrey & Sussex Healthcare NHS Trust	117	100.0	96.6	98.3
Sussex				
East Sussex Healthcare NHS Trust	351	100.0	90.5	96.0
Brighton & Sussex University Hospitals NHS Trust	186	99.5	85.2	88.2
Western Sussex Hospitals NHS Trust (Sussex)	209	100.0	81.2	94.3
Kent & Medway				
Dartford & Gravesham NHS Trust	67	100.0	97.0	98.5
Medway NHS Foundation Trust	170	100.0	100.0	0.0
East Kent Hospitals University NHS Foundation Trust	307	71.3	100.0	0.0
Maidstone & Tunbridge Wells NHS Trust	273	99.2	98.5	89.0
Greater Midlands				
Mid Staffordshire NHS Foundation Trust	108	99.0	86.0	91.7
University Hospital Of North Staffordshire NHS Trust	334	100.0	74.3	85.6
The Royal Wolverhampton Hospitals NHS Trust	239	97.1	78.9	92.9
The Dudley Group NHS Foundation Trust	174	84.9	73.6	86.2
Shrewsbury & Telford Hospital NHS Trust	320	100.0	89.9	98.1
North Of England				
South Tyneside NHS Foundation Trust	91	98.9	98.7	73.6
City Hospitals Sunderland NHS Foundation Trust	162	96.9	90.1	97.5
North Cumbria University Hospitals NHS Trust	170	100.0	90.0	88.2
Gateshead Health NHS Foundation Trust	132	100.0	95.5	96.2
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	212	97.6	97.2	94.8
Northumbria Healthcare NHS Foundation Trust	323	100.0	96.0	88.2
South Tees Hospitals NHS Foundation Trust	284	97.5	93.7	96.8
North Tees & Hartlepool NHS Foundation Trust	237	97.5	88.7	97.0
County Durham & Darlington NHS Foundation Trust	314	100.0	99.3	97.8
Anglia				
Bedford Hospital NHS Trust	134	97.0	99.0	97.0
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	168	97.6	84.2	86.3
Peterborough & Stamford Hospitals NHS Foundation Trust	114	99.1	68.0	71.1
James Paget University Hospitals NHS Foundation Trust	149	100.0	37.9	90.6
Ipswich Hospital NHS Trust	250	98.0	98.4	8.0
West Suffolk NHS Foundation Trust	175	98.9	97.9	94.9
Cambridge University Hospitals NHS Foundation Trust	227	100.0	96.5	97.4
Norfolk & Norwich University Hospitals NHS Foundation Trust	476	99.8	88.1	90.3
Hinchingbrooke Health Care NHS Trust	96	97.9	36.0	86.5

Appendix 2 (continued)

Cancer Network/Trust Name	Number of patients reported to the audit	Discussed at MDT meeting (%)	Seen by clinical nurse specialist (%)	CT scan reported (%)
Overall	**29,026**	**98.0**	**87.0**	**88.0**
Essex				
Southend University Hospital NHS Foundation Trust	226	98.7	94.7	95.6
Basildon & Thurrock University Hospitals NHS Foundation Trust	143	97.9	98.5	95.8
Colchester Hospital University NHS Foundation Trust	263	98.5	100.0	92.0
Mid Essex Hospital Services NHS Trust	156	99.3	97.1	92.9
East Midlands				
Burton Hospitals NHS Foundation Trust	164	93.3	96.1	3.0
Sherwood Forest Hospitals NHS Foundation Trust	170	99.4	100.0	92.4
Kettering General Hospital NHS Foundation Trust	161	91.2	100.0	93.8
Northampton General Hospital NHS Trust	165	93.3	53.0	82.4
Derby Hospitals NHS Foundation Trust	288	95.1	85.7	91.3
United Lincolnshire Hospitals NHS Trust	58	96.6	94.0	86.2
University Hospitals Of Leicester NHS Trust	460	97.6	96.3	97.0
Nottingham University Hospitals NHS Trust	384	96.1	94.3	66.1
Wales				
Ysbwyty Glan Clwydd MDT	176	100.0	92.6	100.0
Ysbwyty Gwynedd MDT	172	100.0	88.4	100.0
Ysbwyty Maelor MDT	178	99.4	98.9	100.0
Nevill Hall Hospital MDT	117	98.3	95.7	100.0
Royal Gwent Hospital MDT	279	99.3	97.1	100.0
Cardiff MDT	232	98.7	84.8	100.0
Prince Charles Hospital MDT	105	97.1	99.0	100.0
Royal Glamorgan Hospital MDT	106	99.1	64.2	100.0
Princess Of Wales MDT	170	97.6	87.6	100.0
Swansea MDT	187	98.4	82.4	100.0
Bronglais MDT	57	98.2	89.5	100.0
West Wales General & Prince Phillip MDT	147	100.0	72.8	100.0
Withybush General MDT	94	95.7	70.2	100.0

* No data submitted for this data item

Appendix 3: Results for patients who had major surgery according to trust/hospital site

Appendix 3

Cancer Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency procedure (%)	Median number of lymph nodes excised	Observed 30-day mortality (%)	Adjusted 30-day mortality (%)	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)
Overall	**17,537**	**12.0**	**18.9**	**18**	**3.3***	**3.3***	**5.0***	**5.0***
Lancashire & South Cumbria								
University Hospitals Of Morecambe Bay NHS Foundation Trust	84	1.4	10.7	14	3.6	5.3	4.8	7.4
Blackpool Teaching Hospitals NHS Foundation Trust	114	11.5	23.6	13	4.4	3.3	7.9	6.2
Lancashire Teaching Hospitals NHS Foundation Trust	101	7.9	6.0	10	4.0	5.7	4.0	5.9
East Lancashire Hospitals NHS Trust	119	10.4	63.0	18	5.9	5.3	7.6	6.9
Greater Manchester & Cheshire								
Mid Cheshire Hospitals NHS Foundation Trust	65	1.6	96.5	14	3.1	4.3	3.1	4.5
The Christie NHS Foundation Trust	32	21.9	6.3	19.5	0.0	0.0	0.0	0.0
East Cheshire NHS Trust	67	9.2	17.9	15	3.0	2.7	4.5	4.3
University Hospital Of South Manchester NHS Foundation Trust	88	19.3	11.4	25	1.1	1.2	1.1	1.1
Salford Royal NHS Foundation Trust	67	15.9	16.9	14	1.5	2.9	1.5	2.7
Trafford Healthcare NHS Trust	48	14.9	18.8	15	8.3	6.5	8.3	6.7
Bolton NHS Foundation Trust	113	9.7	20.4	12	1.8	1.9	5.3	5.8
Tameside Hospital NHS Foundation Trust	86	9.6	9.3	12	4.7	4.2	5.8	5.6
Wrightington, Wigan & Leigh NHS Foundation Trust	61	8.5	18.3	13.5	0.0	0.0	4.9	5.0
Central Manchester University Hospitals NHS Foundation Trust	90	27.8	13.3	15	3.3	4.8	4.4	5.8
Pennine Acute Hospitals NHS Trust	222	11.0	12.3	16	3.2	3.1	6.8	6.8
Stockport NHS Foundation Trust	82	7.4	11.1	13	0.0	0.0	0.0	0.0
Merseyside & Cheshire								
Wirral University Teaching Hospital NHS Foundation Trust	131	3.8	14.5	19	4.6	5.2	6.1	7.0
St Helens & Knowsley Hospitals NHS Trust	118	10.4	8.5	14	5.1	7.6	5.9	8.5
Aintree University Hospital NHS Foundation Trust	123	11.8	88.6	17	1.6	2.7	2.4	3.7
Countess Of Chester Hospital NHS Foundation Trust	74	14.1	31.5	15	1.4	1.4	4.1	4.2
Royal Liverpool & Broadgreen University Hospitals NHS Trust	113	13.7	17.0	18.5	1.8	2.1	4.4	5.2
Southport & Ormskirk Hospital NHS Trust	79	13.2	22.8	14	2.5	2.6	3.8	4.0
Warrington & Halton Hospitals NHS Foundation Trust	106	13.1	28.4	15	5.7	4.0	11.3	8.7
Yorkshire								
Bradford Teaching Hospitals NHS Foundation Trust	88	9.3	9.1	16	3.4	3.2	4.5	4.4
York Teaching Hospital NHS Foundation Trust	152	6.0	16.0	22	4.6	5.4	5.9	7.0
Harrogate & District NHS Foundation Trust	78	7.8	16.7	16	5.1	4.5	9.0	8.0
Airedale NHS Foundation Trust	67	10.4	14.9	21	1.5	1.4	1.5	1.4
Leeds Teaching Hospitals NHS Trust	228	10.6	10.9	19	3.5	3.5	5.7	5.8
Calderdale & Huddersfield NHS Foundation Trust	129	15.7	20.5	18	4.7	4.9	7.0	7.4
Mid Yorkshire Hospitals NHS Trust	165	13.5	25.5	17	1.8	2.2	2.4	2.8
Humber & Yorkshire Coast								
Scarborough & North East Yorkshire Health Care NHS Trust	73	13.7	17.8	12	5.5	4.8	12.3	11.3
Northern Lincolnshire & Goole Hospitals NHS Foundation Trust	115	16.0	27.0	17	4.4	5.0	7.0	8.2
Hull & East Yorkshire Hospitals NHS Trust	202	25.6	13.6	16	3.5	3.3	6.9	6.4
North Trent								
Barnsley Hospital NHS Foundation Trust	78	11.5	12.8	17	5.1	6.9	7.7	9.7
The Rotherham NHS Foundation Trust	90	17.0	16.7	15	5.6	7.0	7.8	9.7
Chesterfield Royal Hospital NHS Foundation Trust	135	3.8	12.6	16	2.2	3.2	3.7	5.5
Sheffield Teaching Hospitals NHS Foundation Trust	212	5.2	13.2	29	2.4	2.7	2.4	2.7
Doncaster & Bassetlaw Hospitals NHS Foundation Trust	158	8.6	8.5	17	2.6	3.5	3.2	4.0
Pan Birmingham								
Walsall Healthcare NHS Trust	86	1.2	31.3	17	2.3	2.1	5.8	5.5
Heart Of England NHS Foundation Trust	237	17.0	14.3	21	4.6	4.4	6.8	6.2
University Hospitals Birmingham NHS Foundation Trust	127	20.3	20.5	20.5	1.6	1.8	3.9	4.2
Sandwell & West Birmingham Hospitals NHS Trust	118	6.9	10.2	22.5	5.9	8.9	7.6	10.4
Arden								
South Warwickshire NHS Foundation Trust	108	14.0	16.7	15	6.5	5.8	7.4	6.7
University Hospitals Coventry & Warwickshire NHS Trust	126	18.5	24.0	23	0.8	0.8	2.4	2.3
George Eliot Hospital NHS Trust	73	9.9	19.2	15	5.5	6.3	5.5	6.2
Worcestershire Acute Hospitals NHS Trust	174	6.6	43.6	14	4.0	4.9	6.3	7.6

Appendix 3 (continued)

Cancer Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency procedure (%)	Median number of lymph nodes excised	Observed 30-day mortality (%)	Adjusted 30-day mortality (%)	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)
Overall	**17,537**	**12.0**	**18.9**	**18**	**3.3***	**3.3***	**5.0***	**5.0***
Mount Vernon								
Luton & Dunstable Hospital NHS Foundation Trust	1		0.0		0.0	0.0	0.0	0.0
West Hertfordshire Hospitals NHS Trust	171	16.0	18.1	15	2.9	2.3	4.7	4.1
East & North Hertfordshire NHS Trust	137	15.6	16.2	19	4.4	5.5	4.4	5.4
North West London								
The Hillingdon Hospitals NHS Foundation Trust	70	26.1	18.6	15	1.4	1.3	4.3	3.8
Ealing Hospital NHS Trust	29	11.1	19.2	16	0.0	0.0	0.0	0.0
West Middlesex University Hospital NHS Trust	64	17.7	23.4	14	6.3	3.7	7.8	5.0
Chelsea & Westminster Hospital NHS Foundation Trust	45	9.3	15.6	19	0.0	0.0	0.0	0.0
North West London Hospitals NHS Trust	48	4.3	6.3	17	2.1	2.4	6.3	7.5
Imperial College Healthcare NHS Trust	89	17.0	21.3	21	2.2	2.4	3.4	3.5
North London								
Royal Free London NHS Foundation Trust	50	14.6	6.0	15	2.0	4.0	6.0	11.1
North Middlesex University Hospital NHS Trust	47	8.9	8.5	14	4.3	4.9	6.4	7.5
The Whittington Hospital NHS Trust	44	18.2	59.1	18	6.8	3.1	9.1	4.3
The Princess Alexandra Hospital NHS Trust	33	21.2	77.8	16	0.0	0.0	3.0	3.1
University College London Hospitals NHS Foundation Trust	72	18.1	7.0	18	4.2	6.7	8.3	12.1
Barnet & Chase Farm Hospitals NHS Trust	120	14.8	10.8	15	3.4	2.3	5.0	3.7
North East London								
Barking, Havering & Redbridge University Hospitals NHS Trust	6	20.0	50.0	14	0.0	0.0	0.0	0.0
Whipps Cross University Hospital NHS Trust	53	16.3	1.9	18	3.8	8.0	5.7	10.9
Newham University Hospital NHS Trust	40	10.5	32.5	16	5.0	4.2	7.5	7.0
Barts & The London NHS Trust	41	7.5	46.3	19	4.9	8.7	9.8	15.6
Homerton University Hospital NHS Foundation Trust	29	21.4	10.3	16.5	0.0	0.0	3.4	3.7
South East London								
Guy's & St Thomas' NHS Foundation Trust	55	2.0	0.0	16	0.0	0.0	0.0	0.0
Lewisham Healthcare NHS Trust	27	26.9	18.5	21	11.1	8.3	11.1	8.9
King's College Hospital NHS Foundation Trust	63	15.1	14.3	18.5	3.2	4.6	3.2	4.5
South London Healthcare NHS Trust	84	6.8	26.5	17	4.8	4.7	8.3	7.9
South West London								
Kingston Hospital NHS Trust	89	3.5	27.3	14	5.6	5.5	5.6	5.9
Croydon Health Services NHS Trust	62	9.8	22.0	14	6.5	4.8	8.1	6.3
St George's Healthcare NHS Trust	25	12.5	4.3	28.5	4.0	3.7	4.0	3.8
The Royal Marsden NHS Foundation Trust	9	0.0	0.0	30	0.0	0.0	0.0	0.0
Epsom & St Helier University Hospitals NHS Trust	102	9.7	0.0	+	7.3	‡	13.5	‡
Peninsula								
South Devon Healthcare NHS Foundation Trust	123	8.5	17.2	14	5.7	7.4	7.3	9.7
Northern Devon Healthcare NHS Trust	99	4.2	13.1	14	1.0	1.4	1.0	1.5
Royal Cornwall Hospitals NHS Trust	229	13.2	17.5	16	3.1	3.2	5.2	5.5
Royal Devon & Exeter NHS Foundation Trust	194	8.9	9.3	15	3.1	3.4	5.7	6.4
Plymouth Hospitals NHS Trust	135	9.4	18.7	19.5	0.7	0.8	3.7	4.0
Dorset								
Dorset County Hospital NHS Foundation Trust	51	10.0	23.4	18	3.9	3.9	5.9	5.8
Poole Hospital NHS Foundation Trust	93	12.9	9.7	19	1.1	1.1	1.1	1.1
The Royal Bournemouth & Christchurch Hospitals NHS Foundation Trust	131	7.3	7.6	15	2.3	2.6	3.1	3.6
Avon, Somerset & Wiltshire								
Weston Area Health NHS Trust	84	16.7	17.9	16	10.7	7.2	11.9	8.4
Yeovil District Hospital NHS Foundation Trust	68	17.9	47.1	16	1.5	2.1	2.9	3.9
University Hospitals Bristol NHS Foundation Trust	72	15.9	23.6	15.5	4.2	3.6	4.2	3.8
Taunton & Somerset NHS Foundation Trust	65	4.9	6.2	16	3.1	3.2	4.6	5.2
Royal United Hospital Bath NHS Trust	154	9.7	7.2	17	1.9	1.7	2.6	2.4
North Bristol NHS Trust	174	11.9	14.8	20.5	2.3	2.7	5.2	6.3

Appendix 3 (continued)

Cancer Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency procedure (%)	Median number of lymph nodes excised	Observed 30-day mortality (%)	Adjusted 30-day mortality (%)	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)
Overall	**17,537**	**12.0**	**18.9**	**18**	**3.3***	**3.3***	**5.0***	**5.0***
Three Counties								
Wye Valley NHS Trust	101	11.3	17.8	12	2.0	2.5	3.0	3.5
Gloucestershire Hospitals NHS Foundation Trust	222	12.3	20.0	24	1.8	2.1	1.8	2.0
Thames Valley								
Heatherwood & Wexham Park Hospitals NHS Foundation Trust	67	9.5	26.6	16	4.5	4.2	9.0	7.8
Milton Keynes Hospital NHS Foundation Trust	64	13.7	96.9	13.5	0.0	0.0	0.0	0.0
Royal Berkshire NHS Foundation Trust	153	6.1	12.9	17	2.0	2.5	4.6	5.7
Great Western Hospitals NHS Foundation Trust	115	12.5	12.2	16	7.0	6.9	8.7	8.3
Oxford University Hospitals NHS Trust	210	4.0	16.2	16	3.3	4.5	4.8	6.4
Buckinghamshire Healthcare NHS Trust	60	12.3	18.3	16	0.0	0.0	0.0	0.0
Central South Coast								
Isle Of Wight NHS PCT	79	13.9	11.8	18	7.6	6.5	11.4	9.9
University Hospital Southampton NHS Foundation Trust	163	17.4	20.9	18	1.8	2.1	3.7	4.0
Portsmouth Hospitals NHS Trust	237	16.1	16.9	15	2.1	2.1	2.5	2.5
Winchester & Eastleigh Healthcare NHS Trust	115	13.0	11.3	15	0.9	0.9	2.6	2.7
Hampshire Hospitals NHS Foundation Trust	86	2.6	11.6	13	0.0	0.0	1.2	1.9
Salisbury NHS Foundation Trust	105	11.4	14.9	16	2.9	3.4	2.9	3.2
Western Sussex Hospitals NHS Trust (Central South Coast)	125	12.0	12.8	14	0.0	0.0	2.4	2.5
Surrey, West Sussex & Hampshire								
Royal Surrey County Hospital NHS Foundation Trust	114	14.5	15.9	27	4.4	4.9	7.9	8.9
Frimley Park Hospital NHS Foundation Trust	109	16.2	12.8	18	6.4	7.5	6.4	7.3
Ashford & St Peter's Hospitals NHS Foundation Trust	93	25.9	23.9	14	1.1	0.9	4.3	3.8
Surrey & Sussex Healthcare NHS Trust	106	4.7	16.0	15	2.8	2.7	4.7	4.7
Sussex								
East Sussex Healthcare NHS Trust	203	12.1	29.1	16	3.4	3.4	5.4	5.3
Brighton & Sussex University Hospitals NHS Trust	89	9.5	62.5	16	2.2	3.7	4.5	7.2
Western Sussex Hospitals NHS Trust (Sussex)	137	12.5	21.9	16	2.9	3.3	4.4	4.8
Kent & Medway								
Dartford & Gravesham NHS Trust	67	6.3	17.9	18	3.0	2.9	7.5	7.2
East Kent Hospitals University NHS Foundation Trust	46	0.0	0.0	+	2.2	‡	4.3	‡
Maidstone & Tunbridge Wells NHS Trust	142	14.6	15.9	15	0.0	0.0	1.4	2.0
Greater Midlands								
Mid Staffordshire NHS Foundation Trust	67	9.0	17.9	17	7.5	5.2	11.9	8.8
University Hospital Of North Staffordshire NHS Trust	185	15.7	24.8	17	3.8	3.5	5.9	5.6
The Royal Wolverhampton Hospitals NHS Trust	170	19.5	27.6	19	5.3	3.7	5.9	4.2
The Dudley Group NHS Foundation Trust	110	17.2	24.5	15	5.5	4.8	7.3	6.4
Shrewsbury & Telford Hospital NHS Trust	182	8.1	4.5	12.5	1.1	1.7	3.8	6.0
North Of England								
South Tyneside NHS Foundation Trust	60	19.2	8.3	15	8.3	7.5	8.3	7.5
City Hospitals Sunderland NHS Foundation Trust	104	12.5	14.4	14	2.9	1.8	4.8	3.1
North Cumbria University Hospitals NHS Trust	108	13.3	14.3	15	7.4	12.5	9.3	15.0
Gateshead Health NHS Foundation Trust	86	6.4	6.2	15	0.0	0.0	0.0	0.0
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	147	13.1	15.6	17	5.4	4.1	6.1	4.8
Northumbria Healthcare NHS Foundation Trust	186	11.2	12.4	16	2.2	2.7	3.2	4.0
South Tees Hospitals NHS Foundation Trust	175	13.9	20.0	17	1.7	1.4	4.0	3.2
North Tees & Hartlepool NHS Foundation Trust	157	7.0	14.6	18	1.3	1.1	3.2	2.9
County Durham & Darlington NHS Foundation Trust	213	9.0	15.5	13	3.8	4.8	6.1	7.8
Anglia								
Bedford Hospital NHS Trust	92	10.8	19.8	13.5	2.2	2.6	4.3	3.9
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	114	5.1	14.0	11	3.5	3.1	4.4	4.2
Peterborough & Stamford Hospitals NHS Foundation Trust	77	17.2	15.6	12.5	3.9	4.4	5.2	5.8
James Paget University Hospitals NHS Foundation Trust	78	7.9	28.2	15	5.1	4.7	6.4	6.0
Ipswich Hospital NHS Trust	172	8.9	14.6	12	5.8	5.8	9.9	9.3
West Suffolk NHS Foundation Trust	112	8.0	22.3	16	3.6	2.9	5.4	4.7

Appendix 3 (continued)

Cancer Network/Trust Name	No. patients having major surgery	Patients with distant metastases at time of surgery (%)	Major surgery carried out as urgent or emergency procedure (%)	Median number of lymph nodes excised	Observed 30-day mortality (%)	Adjusted 30-day mortality (%)	Observed 90-day mortality (%)	Adjusted 90-day mortality (%)
Overall	**17,537**	**12.0**	**18.9**	**18**	**3.3***	**3.3***	**5.0***	**5.0***
Cambridge University Hospitals NHS Foundation Trust	162	10.7	19.2	15	1.9	1.7	3.7	3.4
Norfolk & Norwich University Hospitals NHS Foundation Trust	292	12.0	15.1	14	3.1	3.4	4.5	4.8
Hinchingbrooke Health Care NHS Trust	58	20.8	63.8	15	5.2	4.8	5.2	4.7
Essex								
Southend University Hospital NHS Foundation Trust	166	10.2	16.3	15	3.6	4.0	4.8	5.2
Basildon & Thurrock University Hospitals NHS Foundation Trust	104	13.7	7.7	12	0.0	0.0	1.9	3.2
Colchester Hospital University NHS Foundation Trust	186	15.1	14.2	13	3.2	4.2	4.3	5.4
Mid Essex Hospital Services NHS Trust	123	13.9	14.6	17	1.6	2.2	1.6	2.3
East Midlands								
Burton Hospitals NHS Foundation Trust	84	6.0	29.1	16.5	7.1	6.3	8.3	7.9
Sherwood Forest Hospitals NHS Foundation Trust	96	8.6	17.7	20	1.0	1.8	1.0	1.7
Kettering General Hospital NHS Foundation Trust	57	10.5	22.8	14	1.8	2.0	3.5	3.8
Northampton General Hospital NHS Trust	101	6.6	13.0	14	0.0	0.0	0.0	0.0
Derby Hospitals NHS Foundation Trust	146	9.6	15.9	16	3.4	2.9	4.8	4.4
United Lincolnshire Hospitals NHS Trust	38	20.0	89.2	16	2.6	1.7	2.6	1.8
University Hospitals Of Leicester NHS Trust	275	22.2	17.1	13	1.8	1.9	3.3	3.0
Nottingham University Hospitals NHS Trust	171	5.7	2.9	15	4.1	5.3	5.3	7.1
Wales								
Ysbwyty Glan Clwydd MDT	105	10.7	35.2	17	0.0	0.0	4.8	3.0
Ysbwyty Gwynedd MDT	113	14.5	11.5	10	6.2	5.2	7.1	6.4
Ysbwyty Maelor MDT	97	14.1	19.6	19	6.2	7.0	6.2	7.3
Nevill Hall Hospital MDT	83	9.0	22.9	16	7.2	5.4	7.2	5.5
Royal Gwent Hospital MDT	174	10.1	19.0	12.5	2.3	2.6	4.0	4.5
Cardiff MDT	130	11.5	18.5	15	3.8	3.5	5.4	4.8
Prince Charles Hospital MDT	69	4.7	4.3	13	4.3	4.3	5.8	6.2
Royal Glamorgan Hospital MDT	74	23.3	21.6	11	9.5	6.9	12.2	8.5
Princess Of Wales MDT	122	11.2	5.7	15.5	4.9	5.3	9.0	9.3
Swansea MDT	137	12.7	22.6	17	0.7	0.7	5.1	4.6
Bronglais MDT	46	27.3	8.7	10	2.2	1.7	6.5	5.2
West Wales General & Prince Phillip MDT	83	11.1	20.5	12	6.0	5.2	10.8	10.5
Withybush General MDT	63	12.7	23.8	12	9.5	8.6	9.5	8.8

* Excluding those trusts/hospitals which could not have their adjusted mortality estimated because all patients were missing at least one of the risk factors
‡ Adjusted mortality could not be estimated because all patients were missing at least one of the risk factors
+ No data submitted for this data item

Appendix 4: Results for patients with rectal cancer who had major surgery according to trust/hospital site

Appendix 4

Cancer 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 12-month stoma estimate using HES*	12-month stoma rate using HES (%)
Overall	**4,684**	**84**	**39**	**24**	**7,325**	**57**
Lancashire & South Cumbria						
University Hospitals Of Morecambe Bay NHS Foundation Trust	19	89	37	47	7	86
Blackpool Teaching Hospitals NHS Foundation Trust	22	95	45	27	62	50
Lancashire Teaching Hospitals NHS Foundation Trust	23	96	48	4	51	63
East Lancashire Hospitals NHS Trust	20	75	45	25	31	77
Greater Manchester & Cheshire						
Mid Cheshire Hospitals NHS Foundation Trust	15	93	93	33	10	70
The Christie NHS Foundation Trust	8	100	75	38	20	70
East Cheshire NHS Trust	24	96	71	25	20	45
University Hospital Of South Manchester NHS Foundation Trust	13	85	54	8	41	68
Salford Royal NHS Foundation Trust	15	87	0	13	22	73
Trafford Healthcare NHS Trust	14	100	64	36	28	79
Bolton NHS Foundation Trust	32	94	91	28	49	69
Tameside Hospital NHS Foundation Trust	19	95	68	37	35	69
Wrightington, Wigan & Leigh NHS Foundation Trust	7	100	43	57	8	75
Central Manchester University Hospitals NHS Foundation Trust	31	87	58	16	1	100
Pennine Acute Hospitals NHS Trust	50	88	44	24	97	80
Stockport NHS Foundation Trust	17	100	71	12	30	67
Merseyside & Cheshire						
Wirral University Teaching Hospital NHS Foundation Trust	29	86	55	17	74	57
St Helens & Knowsley Hospitals NHS Trust	30	87	63	57	46	67
Aintree University Hospital NHS Foundation Trust	30	97	83	33	53	58
Countess Of Chester Hospital NHS Foundation Trust	26	100	62	0	28	57
Royal Liverpool & Broadgreen University Hospitals NHS Trust	30	73	77	30	55	60
Southport & Ormskirk Hospital NHS Trust	9	89	67	33	34	59
Warrington & Halton Hospitals NHS Foundation Trust	33	94	45	18	82	66
Yorkshire						
Bradford Teaching Hospitals NHS Foundation Trust	16	69	38	13	52	60
York Teaching Hospital NHS Foundation Trust	58	98	14	16	71	49
Harrogate & District NHS Foundation Trust	23	87	61	22	38	61
Airedale NHS Foundation Trust	20	95	90	50	43	65
Leeds Teaching Hospitals NHS Trust	81	74	36	19	107	62
Calderdale & Huddersfield NHS Foundation Trust	37	86	5	32	67	49
Mid Yorkshire Hospitals NHS Trust	46	91	48	33	133	71
Humber & Yorkshire Coast						
Scarborough & North East Yorkshire Health Care NHS Trust	28	100	71	25	30	67
Northern Lincolnshire & Goole Hospitals NHS Foundation Trust	28	71	21	18	75	59
Hull & East Yorkshire Hospitals NHS Trust	61	89	64	25	108	63
North Trent						
Barnsley Hospital NHS Foundation Trust	23	83	0	17	43	72
The Rotherham NHS Foundation Trust	23	96	0	13	50	60
Chesterfield Royal Hospital NHS Foundation Trust	44	93	27	23	53	55
Sheffield Teaching Hospitals NHS Foundation Trust	54	96	70	46	88	60
Doncaster & Bassetlaw Hospitals NHS Foundation Trust	46	93	20	30	28	57
Pan Birmingham						
Walsall Healthcare NHS Trust	16	75	44	25	47	49
Heart Of England NHS Foundation Trust	60	82	47	12	113	40
University Hospitals Birmingham NHS Foundation Trust	34	88	56	35	72	54
Sandwell & West Birmingham Hospitals NHS Trust	38	97	55	21	71	58
Arden						
South Warwickshire NHS Foundation Trust	22	91	27	14	54	56
University Hospitals Coventry & Warwickshire NHS Trust	35	94	66	23	74	61
George Eliot Hospital NHS Trust	15	93	40	20	45	49
Worcestershire Acute Hospitals NHS Trust	49	90	51	41	86	63

Appendix 4 (continued)

Cancer 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 12-month stoma estimate using HES*	12-month stoma rate using HES (%)
Overall	**4,684**	**84**	**39**	**24**	**7,325**	**57**
Mount Vernon						
West Hertfordshire Hospitals NHS Trust	44	95	25	20	32	63
East & North Hertfordshire NHS Trust	40	58	20	23	83	63
North West London						
The Hillingdon Hospitals NHS Foundation Trust	18	78	17	39	32	50
Ealing Hospital NHS Trust	4	100	0	25	12	67
West Middlesex University Hospital NHS Trust	22	100	59	9	38	53
Chelsea & Westminster Hospital NHS Foundation Trust	13	92	38	46	19	68
North West London Hospitals NHS Trust	12	33	0	0	13	31
Imperial College Healthcare NHS Trust	25	96	72	28	80	51
North London						
Royal Free London NHS Foundation Trust	10	80	60	10	25	36
North Middlesex University Hospital NHS Trust	4	75	0	25	1	100
The Whittington Hospital NHS Trust	6	83	17	33	35	60
The Princess Alexandra Hospital NHS Trust	6	33	0	17	13	69
University College London Hospitals NHS Foundation Trust	13	92	54	8	7	71
Barnet & Chase Farm Hospitals NHS Trust	33	97	52	9	68	62
North East London						
Whipps Cross University Hospital NHS Trust	22	100	50	9	36	67
Newham University Hospital NHS Trust	11	100	64	27	19	58
Barts & The London NHS Trust	8	75	63	13	19	68
Homerton University Hospital NHS Foundation Trust	4	75	25	25	7	57
South East London						
Guy's & St Thomas' NHS Foundation Trust	15	13	7	47	3	67
Lewisham Healthcare NHS Trust	6	100	67	33	25	64
King's College Hospital NHS Foundation Trust	13	0	0	0	29	72
South London Healthcare NHS Trust	10	60	50	10	13	38
South West London						
Kingston Hospital NHS Trust	22	82	23	14	27	22
Croydon Health Services NHS Trust	13	69	0	0	32	38
St George's Healthcare NHS Trust	12	83	33	17	10	60
The Royal Marsden NHS Foundation Trust	4	100	25	0	6	33
Epsom & St Helier University Hospitals NHS Trust	20	85	5	0	27	48
Peninsula						
South Devon Healthcare NHS Foundation Trust	45	78	13	100	55	53
Northern Devon Healthcare NHS Trust	26	100	38	15	31	48
Royal Cornwall Hospitals NHS Trust	67	97	30	34	89	47
Royal Devon & Exeter NHS Foundation Trust	54	91	9	20	83	66
Plymouth Hospitals NHS Trust	26	85	46	46	49	67
Dorset						
Dorset County Hospital NHS Foundation Trust	7	86	43	14	37	51
Poole Hospital NHS Foundation Trust	23	78	35	26	36	47
The Royal Bournemouth & Christchurch Hospitals NHS Foundation Trust	40	95	30	23	67	42
Avon, Somerset & Wiltshire						
Weston Area Health NHS Trust	12	75	25	17	30	73
Yeovil District Hospital NHS Foundation Trust	21	95	43	43	51	51
University Hospitals Bristol NHS Foundation Trust	9	89	56	44	20	55
Taunton & Somerset NHS Foundation Trust	20	90	35	30	14	36
Royal United Hospital Bath NHS Trust	46	83	46	41	101	55
North Bristol NHS Trust	45	76	33	7	84	51
Three Counties						
Wye Valley NHS Trust	31	84	32	23	62	58
Gloucestershire Hospitals NHS Foundation Trust	63	62	22	6	47	55

Appendix 4 (continued)

Cancer 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 12-month stoma estimate using HES*	12-month stoma rate using HES (%)
Overall	**4,684**	**84**	**39**	**24**	**7,325**	**57**
Thames Valley						
Heatherwood & Wexham Park Hospitals NHS Foundation Trust	13	69	31	31	2	100
Milton Keynes Hospital NHS Foundation Trust	22	32	36	18	22	77
Royal Berkshire NHS Foundation Trust	43	67	21	16	15	60
Great Western Hospitals NHS Foundation Trust	30	77	30	17	64	81
Oxford University Hospitals NHS Trust	53	64	0	25	76	64
Buckinghamshire Healthcare NHS Trust	19	84	58	26	29	62
Central South Coast						
Isle Of Wight NHS PCT	20	95	40	20	30	53
University Hospital Southampton NHS Foundation Trust	33	82	42	30	109	48
Portsmouth Hospitals NHS Trust	85	72	35	19	134	51
Winchester & Eastleigh Healthcare NHS Trust	25	100	12	8	39	38
Hampshire Hospitals NHS Foundation Trust	36	100	0	0	61	18
Salisbury NHS Foundation Trust	25	96	4	16	58	50
Western Sussex Hospitals NHS Trust (Central South Coast)	27	81	22	30	51	57
Surrey, West Sussex & Hampshire						
Royal Surrey County Hospital NHS Foundation Trust	24	67	0	4	25	12
Frimley Park Hospital NHS Foundation Trust	40	100	0	13	21	52
Ashford & St Peter's Hospitals NHS Foundation Trust	30	67	3	7	21	62
Surrey & Sussex Healthcare NHS Trust	24	88	0	0	53	40
Sussex						
East Sussex Healthcare NHS Trust	52	96	56	38	65	54
Brighton & Sussex University Hospitals NHS Trust	33	91	36	27	52	46
Western Sussex Hospitals NHS Trust (Sussex)	35	83	34	31	60	58
Kent & Medway						
Dartford & Gravesham NHS Trust	26	88	42	15	23	57
East Kent Hospitals University NHS Foundation Trust	24	0	8	46	0	
Maidstone & Tunbridge Wells NHS Trust	46	93	26	17	43	47
Greater Midlands						
Mid Staffordshire NHS Foundation Trust	10	90	20	60	46	54
University Hospital Of North Staffordshire NHS Trust	38	87	13	16	29	55
The Royal Wolverhampton Hospitals NHS Trust	57	91	44	32	71	41
The Dudley Group NHS Foundation Trust	28	89	29	14	43	44
Shrewsbury & Telford Hospital NHS Trust	56	93	25	16	96	63
North Of England						
South Tyneside NHS Foundation Trust	20	75	20	40	45	64
City Hospitals Sunderland NHS Foundation Trust	37	70	41	30	52	58
North Cumbria University Hospitals NHS Trust	22	64	36	14	60	48
Gateshead Health NHS Foundation Trust	24	79	38	21	66	62
The Newcastle Upon Tyne Hospitals NHS Foundation Trust	33	94	70	24	77	60
Northumbria Healthcare NHS Foundation Trust	56	95	82	18	113	72
South Tees Hospitals NHS Foundation Trust	37	92	65	27	78	77
North Tees & Hartlepool NHS Foundation Trust	47	96	62	30	62	44
County Durham & Darlington NHS Foundation Trust	59	95	42	12	102	53
Anglia						
Bedford Hospital NHS Trust	27	85	26	15	34	68
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust	41	95	51	22	36	81
Peterborough & Stamford Hospitals NHS Foundation Trust	29	72	41	48	36	78
James Paget University Hospitals NHS Foundation Trust	19	37	5	21	57	75
Ipswich Hospital NHS Trust	52	54	23	10	21	43
West Suffolk NHS Foundation Trust	20	95	10	10	57	40
Cambridge University Hospitals NHS Foundation Trust	56	79	46	30	91	53
Norfolk & Norwich University Hospitals NHS Foundation Trust	82	80	34	37	136	49
Hinchingbrooke Health Care NHS Trust	12	83	58	33	40	73

Appendix 4 (continued)

Cancer 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 12-month stoma estimate using HES*	12-month stoma rate using HES (%)
Overall	**4,684**	**84**	**39**	**24**	**7,325**	**57**
Essex						
Southend University Hospital NHS Foundation Trust	56	93	61	29	98	60
Basildon & Thurrock University Hospitals NHS Foundation Trust	35	89	49	20	61	49
Colchester Hospital University NHS Foundation Trust	62	82	19	18	58	48
Mid Essex Hospital Services NHS Trust	25	76	12	24	38	50
East Midlands						
Burton Hospitals NHS Foundation Trust	22	27	36	18	49	45
Sherwood Forest Hospitals NHS Foundation Trust	25	88	64	16	61	52
Kettering General Hospital NHS Foundation Trust	20	75	5	5	28	50
Northampton General Hospital NHS Trust	35	80	37	26	51	57
Derby Hospitals NHS Foundation Trust	37	86	57	14	57	49
United Lincolnshire Hospitals NHS Trust	7	100	29	43	14	64
University Hospitals Of Leicester NHS Trust	76	92	82	37	144	67
Nottingham University Hospitals NHS Trust	40	70	8	13	86	45
Wales+						
Ysbwyty Glan Clwydd MDT	20	95	85	35		
Ysbwyty Gwynedd MDT	23	100	57	30		
Ysbwyty Maelor MDT	24	88	79	21		
Nevill Hall Hospital MDT	16	94	56	19		
Royal Gwent Hospital MDT	39	82	59	26		
Cardiff MDT	32	94	59	28		
Prince Charles Hospital MDT	21	90	19	29		
Royal Glamorgan Hospital MDT	20	95	25	45		
Princess Of Wales MDT	30	93	63	30		
Swansea MDT	43	65	16	37		
Bronglais MDT	8	100	0	25		
West Wales General & Prince Phillip MDT	13	100	15	46		
Withybush General MDT	10	100	40	30		

* Patients linked to HES having major surgery between 1 August 2008 and 31 July 2010
+ No12-month stoma estimates for Wales as HES data does not include Wales

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