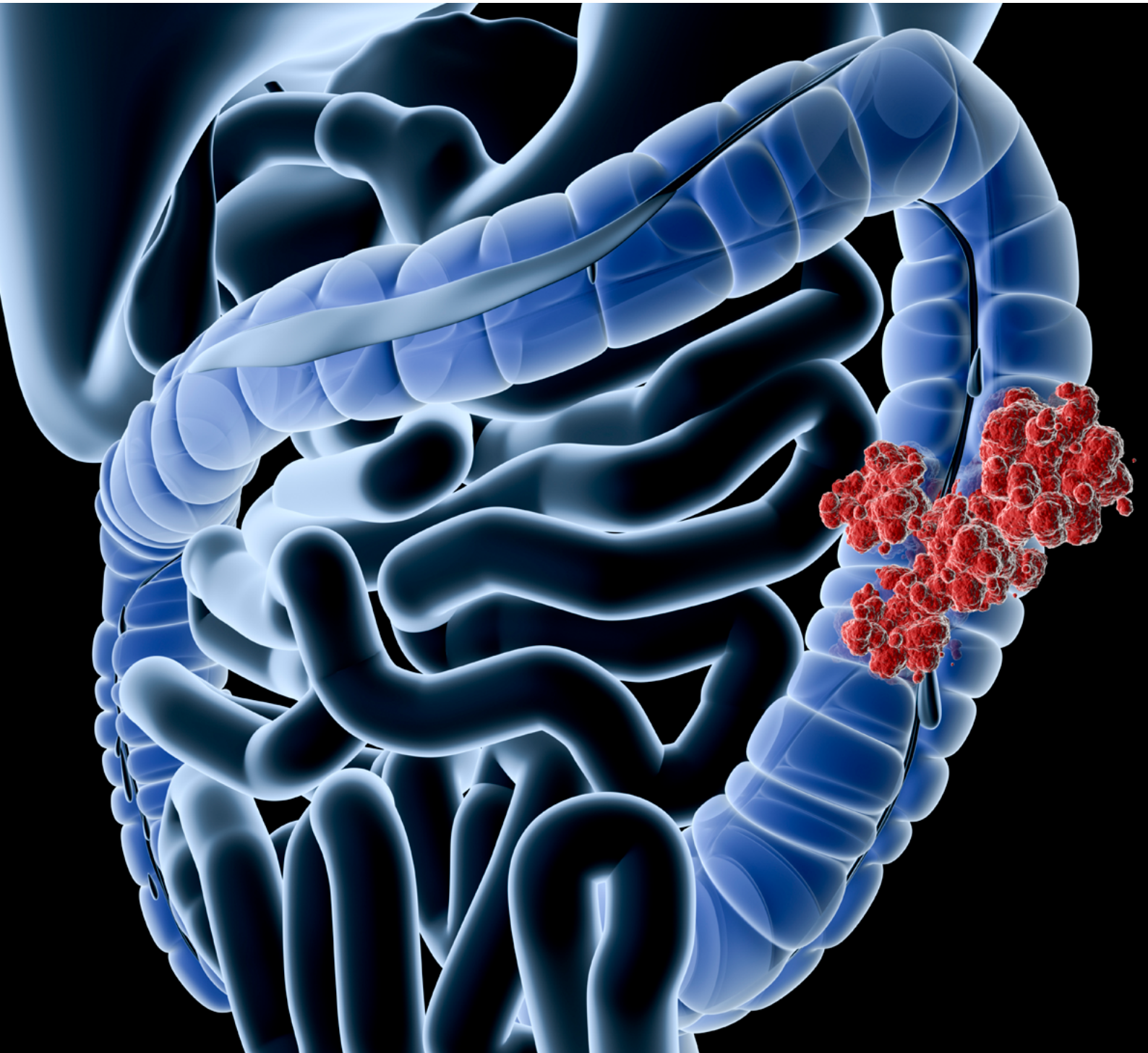
National Bowel Cancer Audit

Annual Report 2019

An audit of the care received by people with Bowel Cancer in England and Wales



Prepared in partnership with:

The Association of Coloproctology of Great Britain and Ireland (ACPGBI) is the professional body that represents UK colorectal surgeons. ACPGBI assisted in the clinical interpretation of the data presented in the 2019 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 Project Team based in the Clinical Effectiveness Unit (CEU) at the RCS carried out the analysis of the data for the 2019 Annual Report.

NHS Digital is the new trading name for the Health and Social Care Information Centre (HSCIC). They provide 'Information and Technology for better health and care'. The Clinical Audit and Registries Management Service of NHS Digital manages a number of national clinical audits in the areas of cancer, diabetes and heart disease. It manages the audit on behalf of the RCS.

The Healthcare Quality Improvement Partnership (HQIP) is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies. www.hqip.org.uk/national-programmes

Contents

Acknowledgements

The National Bowel Cancer Audit (NBOCA), commissioned by the Healthcare Quality Improvement Partnership (HQIP), has been developed by the Association of Coloproctology of Great Britain and Ireland (ACPGBI). It is managed by the Clinical Audit and Registries Management Service within NHS Digital on behalf of the Clinical Effectiveness Unit (CEU) of the Royal College of Surgeons of England (RCS). The audit is funded by NHS England and the Welsh Government.

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

The NBOCA now forms part of the National Gastrointestinal Cancer Audit Programme alongside the National Oesophago-gastric Cancer Audit (NOGCA). The National Gastrointestinal Cancer Audit Programme has an overarching Project Board team with representatives from both audits. Each audit retains its own Clinical Advisory Group and Project Team.

The analyses and writing for this report were carried out by the NBOCA Project Team within the Clinical Effectiveness Unit of the Royal College of Surgeons of England with support from NHS Digital, Miss Nicola Fearnhead (Consultant Colorectal Surgeon and President of ACPGBI) and Dr Michael Braun (Consultant Oncologist).

The NBOCA Clinical Advisory Group consists of a wide range of professionals who provide input from a diverse range of perspectives on the Annual Report, including patient representatives. Patient and bowel cancer charity representatives have been involved in the production of the Patient Report.

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

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The National Gastrointestinal Audit Project Board consists of:

Chair

Neil Mortensen	RCS Senior Council Member

Members

Robert Arnott	Patient Representative, ACPGBI
Chris Dew	Programme Head, NHS Digital
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James Wheeler	Executive Lead for COP, ACPGBI

The Project Board also includes members of the Bowel Cancer and OG Cancer Project Teams.

The NBOCA Clinical Advisory Group consists of:

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Lisa Wilde	Bowel Cancer UK Representative

Foreword

It is my pleasure to introduce the 2019 Annual Report from the National Bowel Cancer Audit (NBOCA).
The Association of Coloproctology of Great Britain and Ireland (ACPGBI) remains proud to partner NHS Digital and the Clinical Effectiveness Unit at the Royal College of Surgeons in producing the NBOCA Annual Reports.

Recent reports have shown increasing breadth and relevance for clinicians involved in all aspects of caring for patients with colorectal cancer. The 2019 report again highlights incremental improvements in delivering high quality care overall and provides benchmarking for English trusts and Welsh multidisciplinary teams to facilitate their own quality improvement initiatives. In addition to the report, NBOCA provides presentations and summaries for each English trust and Welsh multidisciplinary team via its website, as well as comprehensive information on services available via the organisational survey.

NBOCA has had input and guidance from patient and bowel cancer charities for several years in publishing a summary of the Annual Report intended for patients and the public. Presentation and style of the standalone Patient Report was transformed last year with use of infographics and a similar style has been used again this year following overwhelmingly positive feedback. NBOCA has now formalised broader stakeholder involvement during 2019 with creation of a new Patient and Carer Panel to provide the Audit with yet greater patient focus and oversight.

Another innovation this year is access to National Cancer Registry data, allowing linkage to NBOCA. This has highlighted fundamental differences in patients identified in the two data sets, and has provided greater insight into the small proportion of patients with colorectal cancer who are managed solely in primary care and the community.

We are indebted to all the NBOCA partners and to the advisory groups to the Audit for delivering such a comprehensive synopsis of current colorectal cancer care in England and Wales. We hope you find this year's report helpful in directing further improvement in future patient care.

Nicola Fearnhead
President
Association of Coloproctology
of Great Britain and Ireland

1. Executive summary

1.1 Audit background

Bowel cancer is currently the second most common cause of cancer death in the United Kingdom (UK). The National Bowel Cancer Audit (NBOCA) aims to describe and compare the quality of care and outcomes of patients diagnosed with bowel cancer in England and Wales.

The audit is now well established and has collected data in its professional form since 2005. The 2019 Annual Report is the tenth report to date and includes data on over 30,000 patients diagnosed with bowel cancer between 01 April 2017 and 31 March 2018.

The key audience of the Annual Report and the Patient Report is those who deliver care to bowel cancer patients. At a regional level this includes English cancer alliances and Wales as a nation, and at a local level English trusts/ hospitals and Welsh multidisciplinary teams (MDTs), those who commission bowel cancer services, and patients.

1.2 What the audit measures

The NBOCA collects data on items which have been identified and generally accepted as good measures of clinical care. It compares regional variation in outcomes between English cancer alliances and Wales as a nation. It also compares local variation between English NHS trusts or hospitals and Welsh MDTs. A summary of the performance indicators measured in patients with bowel cancer is available at https://www.nboca.org.uk/resources/performance-indicators-description/

The majority of data items are collected by NHS trusts in England as part of the Cancer Outcomes and Services Dataset (COSD). Risk adjusted outcomes reported include: 90-day post-operative mortality, 30-day unplanned readmission rate, two-year mortality for patients having major resection and 18-month stoma rate.

1.3 Clinical Outcome Publication

The NBOCA publishes data at individual surgeon and trust level for English NHS trusts. This information is available on the ACPGBI website as part of the Clinical Outcomes Publication (COP) programme. The COP programme represents an ambitious endeavour aimed to improve transparency around clinical outcomes.

These results will be available at http://www.acpgbi.org.uk/surgeon-outcomes/

Key findings

Chapter 3 – Care pathways

- The majority of patients (55%) are referred via their GP but a considerable proportion (17%) of referral sources remain unknown.
- Approximately, one fifth of patients present with bowel cancer as an emergency and are less likely to have favourable outcomes.
- Only 10% of patients are referred via screening programmes with uptake rates of 58% and 56% in England and Wales respectively, despite these patients being identified at an earlier stage and treated more often with curative intent.
- Bowel cancer screening is undergoing some significant changes with FIT (Faecal Immunochemical Test) being rolled out across England and Wales, and Bowel Scope screening now being offered in 53% of GP practices in England.
- The rate of major resection for potentially 'curable' disease is only 25% for patients aged 75 and over.
- Considerable variation in major resection rates for potentially 'curable' disease exists between trusts/hospitals/MDTs with 24 sites falling outside the inner funnel limits.
- 62% of patients undergoing major resection for stage III colon cancer received adjuvant chemotherapy.
- Significant variation exists at trust/hospital level in receipt of adjuvant chemotherapy with 32 sites falling outside the inner funnel limits.

Chapter 4 – Surgical care

- Overall 90-day post-operative mortality rates continue to improve with a current rate of 3% in patients undergoing major resection.
- There is limited geographical variation at both cancer alliance/Wales level as well as hospital/trust/MDT level in 90-day post-operative mortality rates.
- There are continued improvements in 90-day post-operative mortality rates across all categories of surgical urgency.
- Overall, median length of stay remains at 7 days with longer inpatient admissions in patients undergoing open or emergency procedures.
- There has been some increased variation in 30-day emergency readmission rates at trust/hospital/MDT level.
- 8% of patients had an unplanned return to theatre (URTT) with 50% of these occurring within the first 7 days post-operatively.
- Mortality in patients with URTT is 8% compared to 2% in those who do not return to theatre.
- Rates of laparoscopic surgery continue to increase, however, considerable geographical variation persists with rates of 38% to 76%.
- 30 English NHS trusts/hospitals are now performing regular robotic colorectal cancer surgery primarily in male patients with rectal cancers.

Chapter 5 – Survival

- Overall two-year survival rates remain stable (67%).
- There remains considerable variation in two-year survival rates at trust/hospital/MDT level.
- There exists less variation in cancer-specific two-year mortality rates between trusts/hospitals/MDTs compared to all-cause two-year mortality with 10 sites falling outside the inner funnel limits (8 would be expected by chance).
- There is good agreement between the outlier status of cancer-specific two-year mortality and all-cause two-year mortality.
- A risk-adjustment model needs to be developed for all-cause and cancer-specific two-year mortality rate for all patients with bowel cancer, not just those undergoing major resection, so that long-term mortality can be explored in these patients.

Chapter 6 – Rectal cancer

- Rectal cancer patients are treated with major resection (52%), local excision (7%), non-resectional surgery (7%) and no surgery (34%).
- The proportion of patients who are not having any procedures has increased from 29% to 34% which may reflect increased use of neo-adjuvant chemoradiotherapy and 'watchful waiting' strategies (close surveillance following complete response to chemoradiotherapy which negates immediate surgery).
- Approximately one third of patients with rectal cancer received neo-adjuvant radiotherapy.
- There exists considerable geographical variation in the use of neo-adjuvant radiotherapy itself with rates of 23% to 57%, as well as variation in the type of neo-adjuvant therapy being administered.
- Data quality for circumferential resection margins has improved significantly from 25% missing in the 2013/14 report to 10% this year.
- Negative circumferential resection margin rates remain stable at 90%.
- Almost one third of patients undergoing anterior resection do not have reversal of their stoma within 18 months following surgery.
- There continues to exist significant variation in 18-month stoma rates at both cancer alliance/Wales and trust/hospital/MDT levels.

Chapter 7 – National Cancer Registry data

- For the first time this year, NBOCA had access to National Cancer Registry data.
- Initial exploratory work suggests that there are fundamental differences in the patients identified within National Cancer Registration and Analysis Service (NCRAS) who do not link to NBOCA. These patients tend to be older, without a tissue diagnosis and often die rapidly after diagnosis. This likely precludes them from accessing secondary care pathways (a prerequisite for NBOCA inclusion).
- Further development work, including adjustment of the NBOCA case ascertainment denominator, will be undertaken and form a short report.

Main recommendations

Number	Recommendation	Related national guidance	Where in the report and rationale	Primary audience
1	Uptake rates for bowel cancer screening in England and Wales remain under 60% in the eligible population. Reinvigorate national publicity campaigns for bowel cancer screening, explore opportunities for improving the commissioning of screening services, and emphasise that: • People who present via screening often have less advanced disease • People diagnosed via screening are more likely to undergo curative treatment • People diagnosed via screening are more likely to have bowel cancer amenable to local resection rather than major surgery.	Commissioning Cancer Services. Department of Health. (2011) Manual for Cancer Services. Colorectal Measures. NHS England. (2014) Report of The Independent Review of Adult Screening Programmes in England (2019)	Full report, Chapter 3, p13 Only 10% of all colorectal cancer patients are diagnosed via bowel cancer screening programmes despite improved prognosis within this group of patients.	Public Health England Public Health Wales NHS England Bowel Cancer Screening Programme Bowel Screening Wales Bowel cancer charities Primary care Patients
2	Monitor and explore variation in post-operative mortality rates after bowel cancer surgery. Notify outlying status on postoperative mortality together with proposed internal action plan to individual Trust Board via Medical Director for senior management review and engagement. Aim for 90-day post-operative mortality rates of: • <20% for emergency cases • <5% for elective cases.	Association of Coloproctology of Great Britain & Ireland (ACPGBI): Guidelines for the Management of Cancer of the Colon, Rectum and Anus (2017) The Fourth Patient Report of the National Emergency Laparotomy Audit 2018 – Executive Summary	Full report, Chapter 4, p21–24 Improving trends in 90-day post-operative mortality rates across all surgical urgencies need to be maintained and improved, especially in emergency care.	NBOCA Commissioners Care Quality Commission Individual English & Welsh MDTs Medical Directors English NHS Trust Boards Welsh NHS Health Boards Individual English and Welsh MDTs
3	Monitor and explore regional and institutional variation in bowel cancer care and outcomes, focussing on:	Healthcare Quality Improvement Programme: A guide to quality improvement methods (2015)		NHS England Welsh Government Commissioners Care Quality Commission Getting It Right First Time Bowel cancer charities
	• Radiotherapy use in rectal cancer	NICE: Colorectal cancer diagnosis and management. [CG131] (2011, updated 2014) NICE: Improving outcomes in colorectal cancers (2004) Commissioning Cancer Services. Department of Health. (2011)	Full report, Chapter 6, p44–46 To better understand variations in radiotherapy use and compare practice to current guidelines.	
	• Laparoscopic surgery rates	NICE: Laparoscopic surgery for colorectal cancer (TA105) (2006) Association of Coloproctology of Great Britain & Ireland (ACPGBI): Guidelines for the Management of Cancer of the Colon, Rectum and Anus (2017)	Full report, Chapter 4, p31–32 To establish reasons for institutional variation and ensure all patients undergoing colonic resection are being considered for laparoscopic surgery.	

3	• Unplanned readmissions after major surgery	NHS Outcomes Framework, Department of Health. (2019) Commissioning Cancer Services. Department of Health. (2011)	Full report, Chapter 4, p26–28 To identify potential reasons for variation in unplanned readmission rates and facilitate targeted quality improvement.	
	• 18-month stoma rates	Association of Coloproctology of Great Britain & Ireland (ACPGBI): Guidelines for the Management of Cancer of the Colon, Rectum and Anus (2017)	Full report, Chapter 6, p47–49 To better understand reasons for variation in 18-month stoma rates and facilitate improvements in reversal rates.	
	Develop multidisciplinary action plans to address variation where it exists.			Individual English & Welsh MDTs
4	Review and ensure evidence-based local policies for offering adjuvant chemotherapy to people following major resection for pathological stage III colon cancer.	NICE: Colorectal cancer diagnosis and management. [CG131] (2011, updated 2014) Association of Coloproctology of Great Britain & Ireland (ACPGBI): Guidelines for the Management of Cancer of the Colon, Rectum and Anus (2017)	Full report, Chapter 3, p19 To optimise rates of adjuvant chemotherapy administration in patients with stage III colon cancer.	Individual English & Welsh MDTs Commissioners Care Quality Commission
5	Review and where relevant take action to improve participation, coding, data quality and timely reporting for the National Bowel Cancer Audit, particularly for:			Individual English & Welsh MDTs Institution-level Information Governance Commissioners
	• Case ascertainment	Not applicable	Full report, Chapter 2, p12 3 trust/hospital/MDTs excluded from analyses due to not submitting enough data by the data linkage deadline	
	• Correct surgical and pathological data (particularly pre-treatment staging)	NHS Long Term Plan for Cancer (2019)	Full report, Chapter 3, p16 Data completion important for interpretation of pre-treatment staging and major resection rates.	
	• Accurate coding and recording, for example, use of robotic surgery	Not applicable	Full report, Chapter 4, p33 Selecting either 'Laparoscopic' or 'Laparoscopy converted to open' under the 'Surgical Access' data item and then selecting 'Yes' within the stand alone NBOCA 'Robotic Surgery' data item.	

New to NBOCA for 2019

Return to theatre

Further development of this indicator will help us to better understand the incidence and variation in significant post-operative complications.

Robotic surgery

For the first time we report on the uptake of robotic surgery, over time, by NHS trust/hospital, and by surgeon. We map which NHS trusts/hospitals are currently performing robotic surgery for colorectal cancer and what proportion of their cases are recorded as robotic.

National Cancer Registry data

This year we have access to National Cancer Registry data from the National Cancer Registration and Analysis Service (NCRAS) of Public Health England (PHE) for the first time.

We have undertaken some initial exploratory work to compare case ascertainment between the two datasets and to begin to investigate any discrepancies. Further development work will form a short report later in the year.

Adjuvant chemotherapy for stage III colon cancer

Following on from our short report regarding variation in the use of adjuvant chemotherapy in patients undergoing major resection for pathological stage III colon cancer, we now report this measure at trust/hospital level for England.

Cancer-specific mortality

We have carried out development work to enable us to report on two-year cancer-specific mortality, in addition to all-cause mortality, in this year's report.

Organisational audit

The updated 2019 organisational survey detailing the colorectal cancer facilities available at each trust/hospital/MDT can be accessed on the NBOCA website here: www.nboca.org.uk/reports/organisational-survey-results-2019/

New sections this year include robotic surgery, genetic testing and advanced disease management (see Page 37).

Short reports

The NBOCA will publish two short reports in 2019/2020. These will include 'Evaluation of NBOCA data compared to National Cancer Registry data' and 'Adjuvant chemotherapy regimens for stage III colon cancer'. All short reports are available from: https://www.nboca.org.uk/reports/

Peer-reviewed articles

The NBOCA are involved in the ongoing publication of high-quality peer-reviewed articles. Publications are listed here: https://www.nboca.org.uk/reports/nboca-peer-reviewed-publications/

Twitter

Follow @NBOCA_CEU for regular updates, including any new publications.

2. Methods

An updated Methodology supplement for 2019 is available at: www.nboca.org.uk/reports/methodology-supplement-2019. The supplement includes a description of the methodology used to estimate the four measures which undergo outlier analyses. Potential outliers are dealt with following the NBOCA Outlier Policy, available at https://www.nboca.org.uk/resources/nboca-outlier-policy

2.1 Data sources

Eligible NHS trust/hospital sites in England and Health Boards in Wales submit data to the audit. To generate the audit report the NBOCA records are linked to multiple other datasets including Hospital Episode Statistics (HES), Patient Episode Database for Wales (PEDW), Office for National Statistics (ONS), the Radiotherapy dataset (RTDS), the Systemic Anti-Cancer Therapy dataset (SACT), National Cancer Registry data and the National Emergency Laparotomy Audit (NELA). RTDS, SACT and National Cancer Registry data are only available for patients treated in England.

In England and Wales, 95% of colorectal cancer patients recorded in HES/PEDW were reported to NBOCA.

2.2 Type 2 Objections

Patients in England who do not want their personal confidential information to be shared outside of NHS Digital for purposes other than their direct care could previously register a type 2 objection with their GP practice. This precludes linkage of these patients to HES and ONS meaning that we are unable to include mortality data or risk-adjusted results for them. On 25th May 2018, this was replaced by the national data opt-out. Further information is provided in our methodology supplement.

2.3 Exclusions

The following trusts were excluded from the corresponding risk-adjusted analyses because overall data completeness was less than 20% or ASA grade and/or TNM stage was missing in more than 80% of patients included in the analyses.

90-day mortality and 30-day emergency readmission:

- Barts Health NHS Trust
- East and North Hertfordshire NHS Trust
- Hull and East Yorkshire Hospitals NHS Trust
- The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
- University Hospitals Birmingham NHS Foundation Trust – Queen Elizabeth Hospital

Two-year survival:

- East And North Hertfordshire NHS Trust
- Mid Essex Hospital Services NHS Trust
- The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
- University Hospitals Birmingham NHS Foundation Trust - Queen Elizabeth Hospital

18-month stoma rate:

- East and North Hertfordshire NHS Trust
- The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust

All trust/hospital/MDTs submitted data. However, the following trusts had submitted low numbers of cases by the data linkage deadline and had insufficient linked cases to report 90-day mortality and 30-day readmission:

Trusts with not enough cases linked to ONS/HES to report:

- Lancashire Teaching Hospitals NHS Foundation Trust
- Southport and Ormskirk Hospital NHS Trust
- The Whittington Hospital NHS Trust

Chapter Recommendations – Methods

1. Trusts/hospitals/MDTs that have low ascertainment of bowel cancer cases in NBOCA are encouraged to improve their NBOCA data submissions.

3. Care pathways

Care pathways – NBOCA 2019

- The majority of patients (55%) are referred via their GP but a considerable proportion (17%) of referral sources remain unknown.
- Approximately, one fifth of patients present with bowel cancer as an emergency and are less likely to have favourable outcomes.
- Only 10% of patients are referred via screening programmes with uptake rates of 58% and 56% in England and Wales respectively, despite these patients being identified at an earlier stage and treated more often with curative intent.
- Bowel cancer screening is undergoing some significant changes with FIT (Faecal Immunochemical Test) being rolled out across England and Wales, and Bowel Scope screening now being offered in 53% of GP practices in England.
- The rate of major resection for potentially 'curable' disease is only 25% for patients aged 75 and over.
- Considerable variation in major resection rates for potentially 'curable' disease exists between trusts/hospitals/MDTs with 24 sites falling outside the inner funnel limits.
- 62% of patients undergoing major resection for stage III colon cancer received adjuvant chemotherapy.
- Significant variation exists at trust/hospital level in receipt of adjuvant chemotherapy with 32 sites falling outside the inner funnel limits.

3.1 Where are patients diagnosed with bowel cancer presenting?

Referral source

The proportion of patients presenting via each modality remains stable (Table 3.1). The majority of patients are referred via GP (55%), followed by emergency presentation (18%) and then screening (10%). There remains a significant proportion of patients for whom the referral pathway is not known (17%) which limits further analyses.

Patients presenting as an emergency are generally older and more likely to have right-sided disease. Patients presenting as an emergency are also more likely to have metastatic disease at presentation but have higher rates of missing staging information. In addition, these patients are less likely to undergo curative treatment.

Diagnosis from screening

Currently, both England and Wales are inviting patients aged 60-74 years old to complete a home testing kit every two years. Additionally, English patients may request a home screening kit if they are aged 75 and over. 4.5 million patients in England were invited to participate in home screening over this audit period with a stable uptake rate of 58% (NHS Screening Programmes in England 2017 to 2018). In Wales, the uptake rate over this audit period has increased from 53% to 56% (Bowel Screening Wales Annual Statistical Report 2017-18).

Historically, guaiac-based faecal occult blood testing has been used. A new screening method called the Faecal Immunochemical Test (FIT) was introduced in England from June 2019, and Wales completed a phased roll-out in September 2019. Preliminary findings have suggested that there may be higher uptake rates with FIT. Possible explanations for this are the need for only one sample (compared to six) and not needing to store these samples thus reducing barriers to participation. FIT testing is also being offered in some places as part of NICE DG30 guidance to test patients presenting without rectal bleeding but with low-risk unexplained symptoms.

Also, rollout of the Bowel Scope screening programme has started in England. This involves a one-off flexible sigmoidoscopy for patients aged 55. According to Public Health England, 53% of GP practices are currently offering this test. The NBOCA cannot currently distinguish patients within the Screening category who present via home testing kits or bowel scopes.

Patients who present via screening often have less advanced disease. They are also more likely to undergo curative treatment.

Table 3.1
Description of the 31,676 patients diagnosed with bowel cancer between 01 April 2017 and 31 March 2018, by referral source

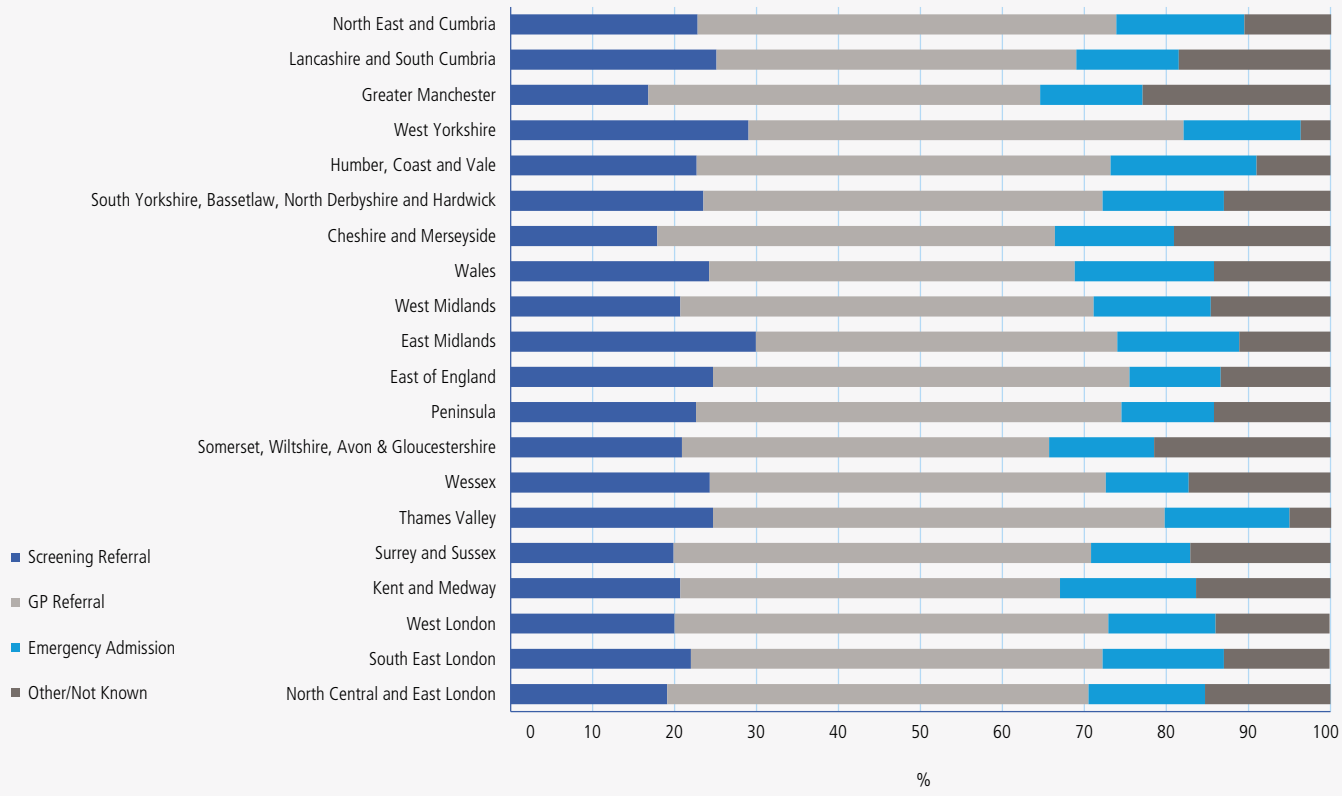
		Emergency Admission		GP Referral		Screening Referral		Other/ Not Known	
		N	%	N	%	N	%	N	%
Total no. patients		**5,764**		**17,352**		**3,144**		**5,416**	
Sex	**Male**	3,005	52.2	9,861	56.9	2,021	64.3	3,040	56.2
	Female	2,756	47.8	7,475	43.1	1,122	35.7	2,372	43.8
	Missing (% of total)	3 (0.1)		16 (0.1)		1 (0.0)		4 (0.1)	
Age-group	**<50 yrs**	566	9.8	916	5.3	3	0.1	506	9.3
	50–64 yrs	650	11.3	2,234	12.9	170	5.4	752	13.9
	65–74 yrs	1,727	30.0	6,197	35.7	2,851	90.7	1,993	36.8
	75–84 yrs	1,728	30.0	5,741	33.1	113	3.6	1,566	28.9
	85+ yrs	1,093	19.0	2,264	13.0	7	0.2	599	11.1
Cancer site	**Caecum/ascending colon**	2,061	35.8	4,469	25.8	522	16.6	1,610	29.7
	Hepatic flexure	274	4.8	722	4.2	115	3.7	262	4.8
	Transverse colon	483	8.4	939	5.4	186	5.9	375	6.9
	Splenic flexure/descending colon	590	10.2	809	4.7	206	6.6	336	6.2
	Sigmoid colon	1,356	23.5	3,556	20.5	952	30.3	1,133	20.9
	Rectosigmoid	274	4.8	1,087	6.3	190	6.0	295	5.4
	Rectal	726	12.6	5,770	33.3	973	30.7	1,405	25.9
TNM version	**5**	3,555	68.3	10,346	66.1	1,895	67.1	3,427	68.5
	8	1,647	31.7	5,296	33.9	931	32.9	1,575	31.5
	Missing (%)	562 (9.8)		1,710 (9.9)		318 (10.1)		414 (7.6)	
Pre-treatment TNM T-stage	**T1**	148	2.6	789	4.5	343	10.9	486	9.0
	T2	423	7.3	2,904	16.7	841	26.7	925	17.1
	T3	1,875	32.5	8,123	46.8	1,224	38.9	2,121	39.2
	T4	1,718	29.8	3,083	17.8	190	6.0	768	14.2
	Tx	670	11.6	1,216	7.0	289	9.2	506	9.3
	T9	922	16.0	1,210	7.0	245	7.8	590	10.9
Pre-treatment TNM N-stage	**N0**	1,753	30.4	6,824	39.3	1,674	53.2	2,321	42.9
	N1	1,527	26.5	5,480	31.6	848	27.0	1,422	26.3
	N2	926	16.1	2,854	16.4	240	7.6	687	12.7
	Nx	634	11.0	969	5.6	143	4.5	396	7.3
	N9	924	16.0	1,225	7.1	239	7.6	590	10.9
Pre-treatment TNM M-stage	**M0**	3,185	55.3	12,533	72.2	2,620	83.3	3,829	70.7
	M1	1,653	28.7	3,416	19.7	226	7.2	886	16.4
	Mx	197	3.4	448	2.6	83	2.6	168	3.1
	M9	729	12.6	955	5.5	215	6.8	533	9.8
Performance Status	**Normal activity**	1,582	34.4	7,569	49.5	1,868	69.9	2,243	49.6
	Walk & light work	1,192	25.9	4,478	29.3	628	23.5	1,335	29.5
	Walk & all self care: up >50%	917	19.9	2,142	14.0	146	5.5	635	14.1
	Ltd self care: confined >50%	725	15.7	975	6.4	29	1.1	250	5.5
	Completely disabled	188	4.1	133	0.9	3	0.1	56	1.2
	Missing (% of total)	1,160 (20.1)		2,055 (11.8)		470 (14.9)		897 (16.6)	
Care Plan Intent	**Curative**	2,820	48.9	12,112	69.8	2,778	88.4	3,918	72.3
	Non Curative	1,803	31.3	3,060	17.6	133	4.2	807	14.9
	No Cancer Treatment	584	10.1	1,004	5.8	53	1.7	298	5.5
	Not Known	557	9.7	1,176	6.8	180	5.7	393	7.3
ASA grade*	**1**	413	12.9	1,374	12.0	456	17.7	522	14.4
	2	1,330	41.4	6,316	55.2	1,686	65.5	1,901	52.5
	3	1,221	38.0	3,472	30.3	414	16.1	1,110	30.6
	4 or 5	245	7.6	288	2.5	19	0.7	90	2.5
	Missing/Not Known (% of total)	2,555 (44.3)		5,902 (34.0)		569 (18.1)		1,793 (33.3)	
Surgical Treatment	**Major Resection**	2,894	50.2	10,659	61.4	2,420	77.0	3,245	59.9
	Local Excision	41	0.7	588	3.4	290	9.2	341	6.3
	Stoma	233	4.0	566	3.3	13	0.4	117	2.2
	Stent	119	2.1	135	0.8	2	0.1	30	0.6
	Other	224	3.9	281	1.6	39	1.2	165	3.0
	None Reported	2,253	39.1	5,123	29.5	380	12.1	1,518	28.0

* ASA grade only required if patient undergoes surgical treatment

Geographical variation in screening diagnoses in eligible patients

There is wide geographical variation in the referral pathway amongst patients who are within the eligible age range for bowel cancer screening (Figure 3.1). However, there are also considerable regional differences in the proportion of patients with an unknown referral pathway which limits further interpretation of this variation.

Figure 3.1
Referral source of the 12,718 patients aged 60 to 74 years diagnosed with bowel cancer between 01 April 2017 and 31 March 2018 by cancer alliance/Wales



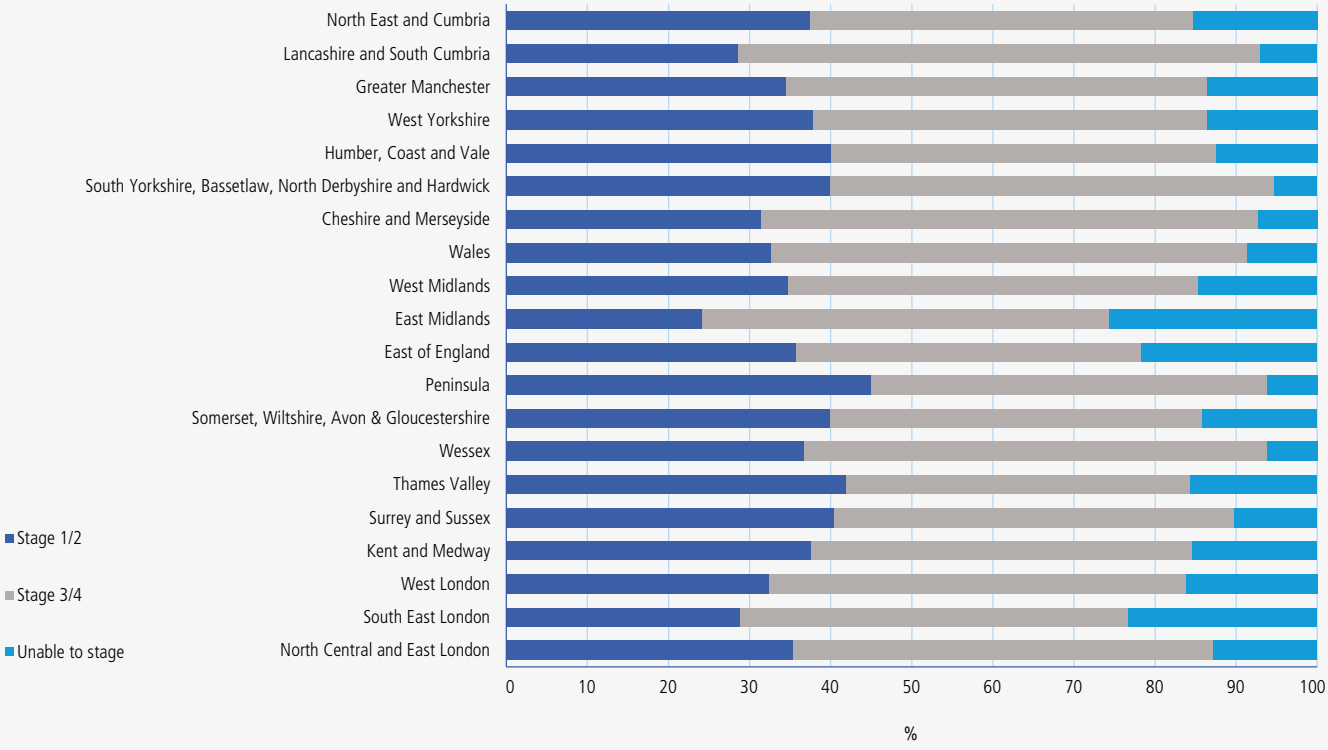
Recording of pre-treatment staging

Accurate recording of pre-treatment staging is vital to enable NBOCA to investigate whether patients are receiving appropriate treatment after diagnosis. Since pre-treatment staging became a required item (patients diagnosed after April 2014), the proportion of patients who have usable data has increased from 80% to 86%.

Currently there is wide variation between cancer alliances/ Wales in the proportion of patients who have usable pre-treatment staging (between 74% and 95%). This makes interpretation of differences in stage at diagnosis difficult (Figure 3.2).

One of the key ambitions in the NHS Long Term Plan for Cancer (https://www.england.nhs.uk/cancer/strategy/) is that by 2028, 75% of cancer patients will be diagnosed with stage 1 or 2 disease (before there has been spread to local lymph nodes or other organs). Measurement of progress towards this goal also requires improvement in the accurate recording of pre-treatment staging. The detection of earlier, more treatable cancers is also a key focus of the Cancer Delivery Plan for Wales.

Figure 3.2
Pre-treatment staging of patients diagnosed with bowel cancer between 01 April 2017 and 31 March 2018 by cancer alliance/Wales



Stage 1: T1/T2, N0, M0, Stage 2: T3/T4, N0, M0, Stage 3: any T, N1/N2, M0, Stage 4: any T, any N, M1.
Unable to stage: missing N or M-stage

3.2 Major resection in patients with potentially "curable" disease

The vast majority of colorectal cancer patients who present electively with non-metastatic disease would be expected to undergo major resection unless they had an early stage tumour amenable to local excision. Patients with colon cancer would be expected to proceed straight to surgery, whereas the varied pre-surgery treatment pathway of rectal cancer patients may lead to delayed surgery after neo-adjuvant treatment.

Our definition of patients considered to have curable disease for this analysis is patients who present electively with stage T2 to T4 non-metastatic colon cancer. More detail is given in section 11 of the methodological document. Table 3.2 describes these patients by age (pre-screening age, screening age and post-screening age). HES/PEDW was used to update whether patients underwent a major resection if this was not their recorded procedure in NBOCA.

Table 3.2
Description of the 7,416 patients who presented electively with stage T2 to T4 non-metastatic colon cancer, diagnosed between 01 April 2017 and 31 March 2018, by age band and major resection

		< 60 years				60 - 74 years				>=75 years			
		MR		No MR		MR		No MR		MR		No MR	
		N	%	N	%	N	%	N	%	N	%	N	%
Total no. patients		820	93.7	55	6.3	2,999	94.4	178	5.6	2,562	76.2	802	23.8
Sex	**Male**	440	53.7	35	63.6	1,691	56.4	99	55.6	1,267	49.5	373	46.5
	Female	380	46.3	20	36.4	1,307	43.6	79	44.4	1,291	50.5	429	53.5
	Missing (% of total)	0 (0)				1 (0)		0 (0)		4 (.2)		0 (0)	
Cancer site	**Caecum/ascending colon**	251	30.6	9	16.4	1,160	38.7	64	36.0	1,254	48.9	366	45.6
	Hepatic flexure	46	5.6	5	9.1	202	6.7	13	7.3	205	8.0	46	5.7
	Transverse colon	68	8.3	4	7.3	286	9.5	14	7.9	250	9.8	109	13.6
	Splenic flexure/descending colon	76	9.3	5	9.1	259	8.6	15	8.4	185	7.2	61	7.6
	Sigmoid colon	379	46.2	32	58.2	1,092	36.4	72	40.4	668	26.1	220	27.4
Referral Source	**GP**	794	96.8	54	98.2	1,914	63.8	144	80.9	2,518	98.3	797	99.4
	Screening	26	3.2	1	1.8	1,085	36.2	34	19.1	44	1.7	5	0.6
Pre-treatment TNM T-stage	**T2**	155	18.9	13	23.6	862	28.7	47	26.4	620	24.2	188	23.4
	T3	495	60.4	16	29.1	1,721	57.4	85	47.8	1,556	60.7	391	48.8
	T4	170	20.7	26	47.3	416	13.9	46	25.8	386	15.1	223	27.8
Pre-treatment TNM N-stage	**N0**	340	41.8	27	51.9	1,459	48.9	81	46.0	1,374	54.1	443	55.9
	N1	341	41.9	15	28.8	1,185	39.7	63	35.8	918	36.1	271	34.2
	N2	132	16.2	10	19.2	341	11.4	32	18.2	248	9.8	79	10.0
	Missing	7 (.9)		3 (5.5)		14 (.5)		2 (1.1)		22 (.9)		9 (1.1)	
Performance Status	**Normal activity**	593	78.5	40	78.4	1,752	64.2	55	38.7	904	39.0	91	13.8
	Walk & light work	125	16.6	10	19.6	769	28.2	38	26.8	926	39.9	178	27.0
	Walk & all self care: up >50%	30	4.0	1	2.0	175	6.4	35	24.6	402	17.3	222	33.6
	Ltd self care: confined >50%	7	0.9	0	0.0	31	1.1	14	9.9	88	3.8	169	25.6
	Completely disabled	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	Missing (% of total)	65 (7.9)		4 (7.3)		272 (9.1)		36 (20.2)		242 (9.4)		142 (17.7)	
Care Plan Intent	**Curative**	786	98.9	37	78.7	2,866	98.9	85	71.4	2,427	98.9	181	39.3
	Non curative	9	1.1	10	21.3	32	1.1	34	28.6	26	1.1	279	60.7
	Missing	25 (3)		8 (14.5)		101 (3.4)		59 (33.1)		109 (4.3)		342 (42.6)	
CPET performed	**Not Recorded**	761	92.8	55	100.0	2,726	90.9	177	99.4	2,354	91.9	786	98.0
	Yes	59	7.2	0	0.0	273	9.1	1	0.6	208	8.1	16	2.0
Co-morbidities	**0**	503	66.4	28	73.7	1,530	55.2	48	46.6	965	41.5	153	37.0
	1	201	26.6	6	15.8	853	30.8	28	27.2	780	33.5	114	27.6
	2	44	5.8	3	7.9	276	10.0	14	13.6	382	16.4	89	21.5
	>=3	9	1.2	1	2.6	112	4.0	13	12.6	199	8.6	57	13.8
	Missing	63 (7.7)		17 (30.9)		228 (7.6)		75 (42.1)		236 (9.2)		389 (48.5)	
Planned treatment	**Surgery**	772	94.1	40	72.7	2,864	95.5	86	48.3	2,436	95.1	227	28.3
	Radiotherapy	6	0.7	2	3.6	23	0.8	3	1.7	7	0.3	28	3.5
	Chemotherapy	91	11.1	13	23.6	201	6.7	22	12.4	89	3.5	19	2.4
	Specialist Palliative Care	0	0.0	1	1.8	3	0.1	22	12.4	6	0.2	221	27.6
	Brachytherapy	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	None	20	2.4	7	12.7	66	2.2	54	30.3	93	3.6	328	40.9
1 yr mortality from diagnosis date	**Alive**	757	97.9	27	61.4	2735	95.9	104	65.8	2242	92.5	407	55.1
	Dead	16	2.1	17	38.6	118	4.1	54	34.2	181	7.5	332	44.9
	Missing (%)	47 (5.7)		11 (20)		146 (4.9)		20 (11.2)		139 (5.4)		63 (7.9)	

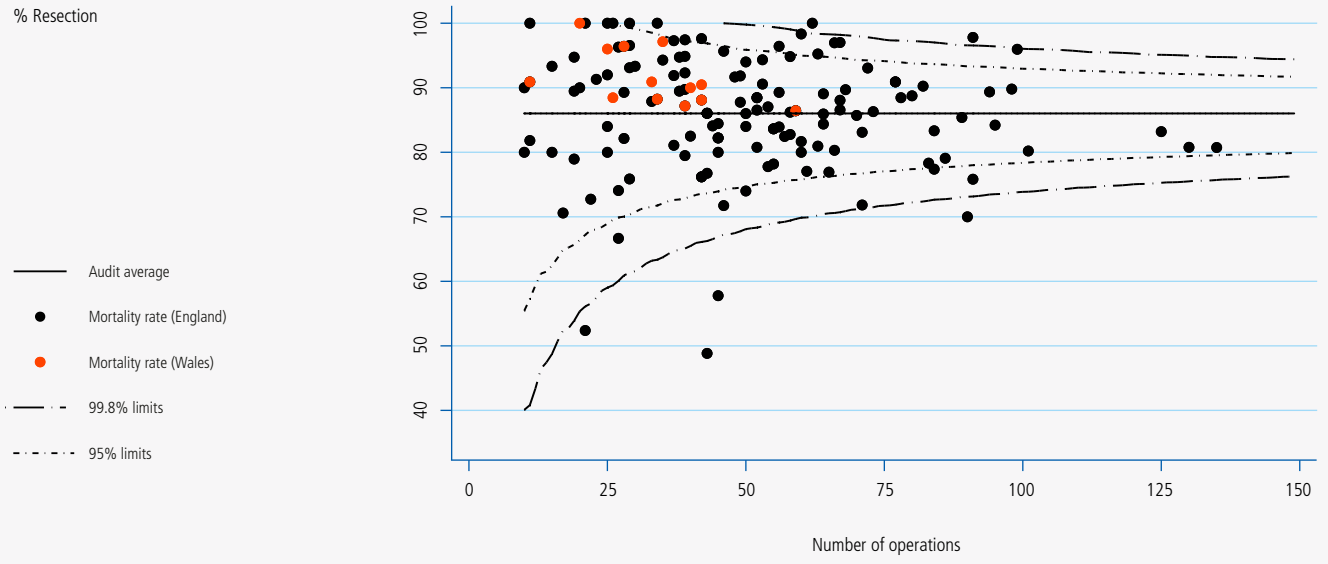
The proportion of patients undergoing a major resection decreased markedly after the age of 75, with a quarter of these patients not undergoing a major resection. Almost all patients under 75 underwent a major resection.

Patients aged over 60 years who underwent a major resection were fitter than those who did not (lower performance status and fewer comorbidities) whereas there was little difference in those under 60 years. Patients in the pre-screening age-group had a higher proportion of T4 tumours perhaps suggesting that locally advanced disease was the limiting factor to major resection within this relatively small group.

For all age bands mortality one year from diagnosis was much higher in those who did not undergo major resection compared to those who did. However, even in those aged 75 and over, 55% of patients who did not undergo a major resection were still alive at one year. Further work is needed to investigate the treatment pathways of the substantial group of potentially curative patients who are not recorded as having a major resection, including more validation of the data to check for data quality.

Despite selecting a relatively homogenous patient group, there is very wide variation between trusts/hospitals/MDTs in the proportion undergoing major resection, with 24 trusts/hospitals/MDTs falling outside the inner limits on the funnel plot in Figure 3.3, compared to the 8 that would be expected by chance alone. The variation is likely to be due to a combination of local differences in decision-making and data quality, and trusts/hospitals/MDTs should ensure their data on surgical procedures is entered correctly so that this issue can be investigated more accurately.

Figure 3.3
Major resection rate in colon cancer patients with an elective presentation and stage T2 to T4 non-metastatic disease, by English NHS trust/hospital/Welsh MDT*



*Excludes 2 tertiary referral providers and 4 trusts with <10 patients fulfilling criteria

3.3 What proportion of patients undergoing major resection for stage III colon cancer receive adjuvant chemotherapy?

National Institute for Health and Care Excellence (NICE) guidelines currently recommend that patients with stage III colon cancer should be considered for adjuvant chemotherapy. The benefits of adjuvant chemotherapy in this group of patients are well-established and current International Society of Geriatric Oncology (SIOG) guidelines advocate the use of fluoropyrimidine therapy in those aged 70 years and above.

Previous NBOCA work has evaluated the use of adjuvant chemotherapy in patients with colon and rectal cancer as a whole. Given the distinct differences in the management of each, we are now reporting on the use of adjuvant chemotherapy in patients with stage III colon cancer alone.

The methodology for this section of work can be found in section 11 of the methodology supplement. Additional work looking at determinants of variation in adjuvant chemotherapy in this group of patients can be found in our short report: https://www.nboca.org.uk/reports/short-report-1-2019/

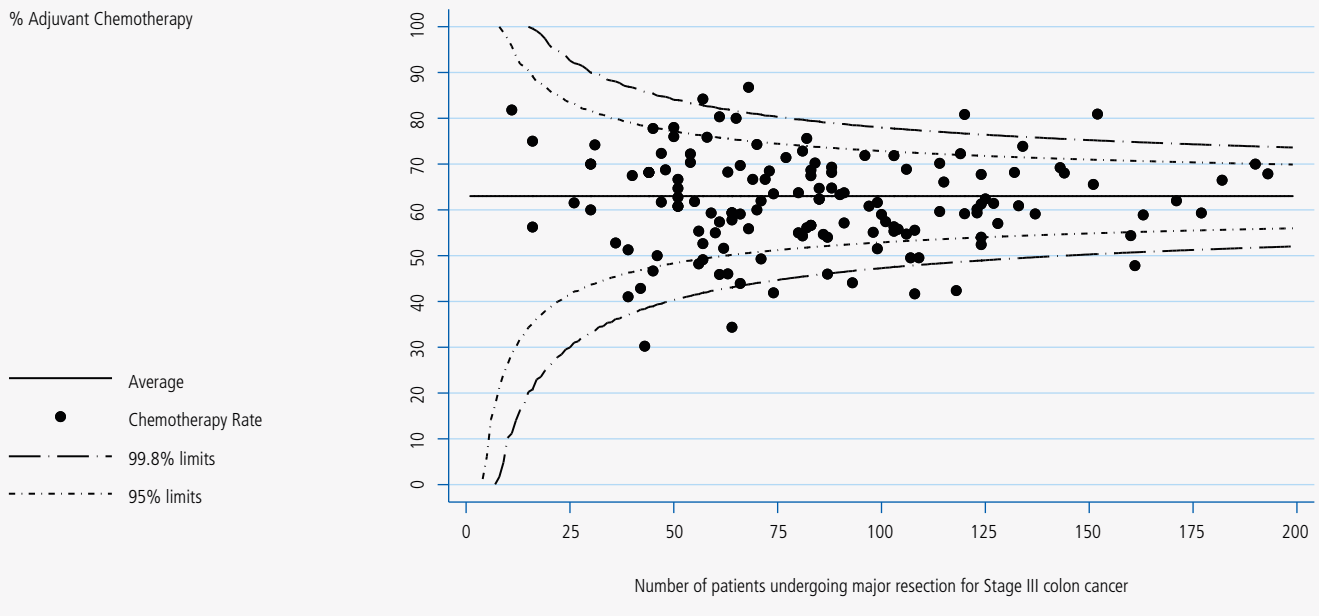
Geographical variation in adjuvant chemotherapy

Overall, 62% of patients with stage III colon cancer received adjuvant chemotherapy. Unadjusted adjuvant chemotherapy rates varied at cancer alliance level from 55% to 73%.

Figure 3.4 demonstrates variation in unadjusted adjuvant chemotherapy rates at the surgical trust/hospital level within England. Two trusts were excluded because they had less than 10 patients. There is considerable variation between trusts/hospitals with 32 sites outside the inner limits and 12 of these outside the outer limits.

This variation may be partially explained by differences in case-mix, however, in our related short report risk-adjustment made little difference to overall chemotherapy rates. Patient choice cannot be accounted for although, again, this is unlikely to fully explain the variation demonstrated. There is robust evidence that adjuvant chemotherapy within this setting improves outcomes, even in the elderly, and therefore reducing unwarranted variation is hugely important.

Figure 3.4
Adjuvant chemotherapy in patients with stage III colon cancer by English trust/hospital for patients undergoing major resection between 01 June 2014 and 31 August 2017



Chapter Recommendations – Care Pathways

1. Efforts should continue to increase public awareness of screening programmes and facilitate engagement with them.

2. Trusts/hospitals/MDTs should ensure that they are entering surgical and pathological data correctly and in a timely manner to facilitate more accurate interpretation of major resection rates and pre-treatment staging.

3. Trusts/hospitals/MDTs should explore their current policies for determining whether patients should receive adjuvant chemotherapy following major resection for stage III colon cancer in order to optimise rates of administration.

4. Surgical care

Surgical care – NBOCA 2019

- Overall 90-day post-operative mortality rates continue to improve with a current rate of 3% in patients undergoing major resection.
- There is limited geographical variation at both cancer alliance/Wales level as well as hospital/trust/MDT level in 90-day post-operative mortality rates.
- There are continued improvements in 90-day post-operative mortality rates across all categories of surgical urgency.
- Overall, median length of stay remains at 7 days with longer inpatient admissions in patients undergoing open or emergency procedures.
- There has been some increased variation in 30-day emergency readmission rates at trust/hospital/MDT level.
- 8% of patients had an unplanned return to theatre (URTT) with 50% of these occurring within the first 7 days post-operatively.
- Mortality in patients with URTT is 8% compared to 2% in those who do not return to theatre.
- Rates of laparoscopic surgery continue to increase, however, considerable geographical variation persists with rates of 38% to 76%.
- 30 English NHS trusts/hospitals are now performing regular robotic colorectal cancer surgery primarily in male patients with rectal cancers.

4.1 How many patients die within 90 days of major surgery?

90-day post-operative mortality is defined as death within 90 days of the NBOCA date of surgery. Date of death is obtained from ONS.

90-day post-operative mortality over time

The proportion of patients undergoing major resection has remained relatively stable over time. There is a continuing downward trend in 90-day mortality with a rate of 3.0% for this audit cohort. There has been a gradual small increase in the numbers of patients with missing mortality data, mostly due to National Data Opt-out, but this is unlikely to be large enough to have affected the findings.

Table 4.1
Patients undergoing major surgery and chance of death after major surgery, by audit year

	2013–14		2014–15		2015–16		2016–17		2017–18	
	N	%	N	%	N	%	N	%	N	%
Total patients*	30,629		30,972		30,690		30,491		30,854	
Undergoing major resection	19,674		19,564		19,347		19,243		18,796	
Dead at 90 days after surgery, out of those undergoing major resection	762	4.0	724	3.8	653	3.5	635	3.4	544	3.0
Missing mortality	577 (2.9)		641 (3.3)		625 (3.2)		690 (3.6)		682 (3.6)	

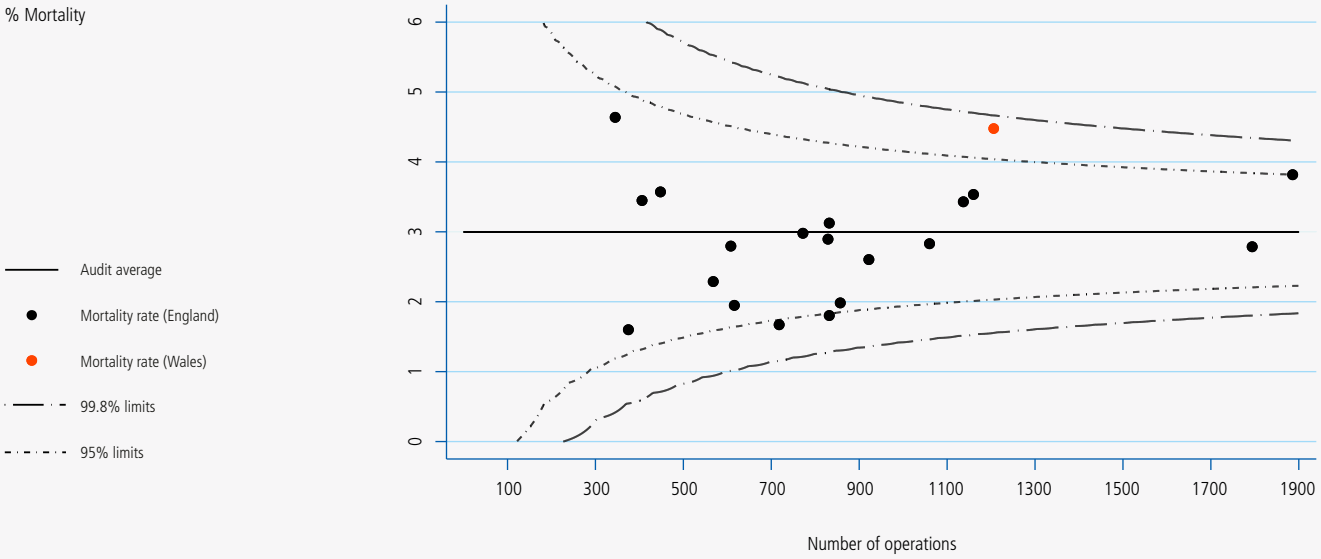
* Total patients entered onto CAP when patient identifiers sent for linkage to ONS/HES/PEDW: 822 patients were added to the 2017–18 cohort after linkage

Variation in 90-day post-operative mortality between care providers

Figure 4.1 shows observed and adjusted analyses for 90-day post-operative mortality for English cancer alliances and Wales. In 2016/17 a single cancer alliance lay above the inner funnel limits. This year there are no potential outliers.

Figure 4.1
Observed and adjusted 90-day post-operative mortality (elective and emergency admissions) by English cancer alliances/Wales for patients diagnosed between 01 April 2017 and 31 March 2018

Observed 90-day mortality by cancer alliance/Wales



Adjusted 90-day mortality by cancer alliance/Wales

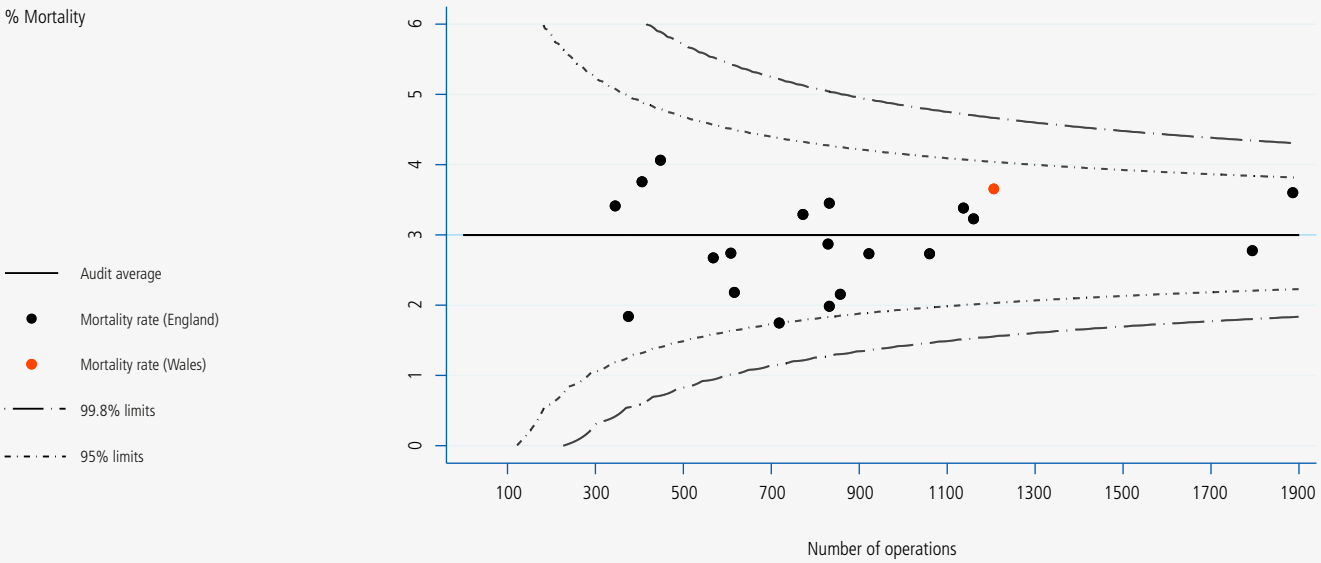
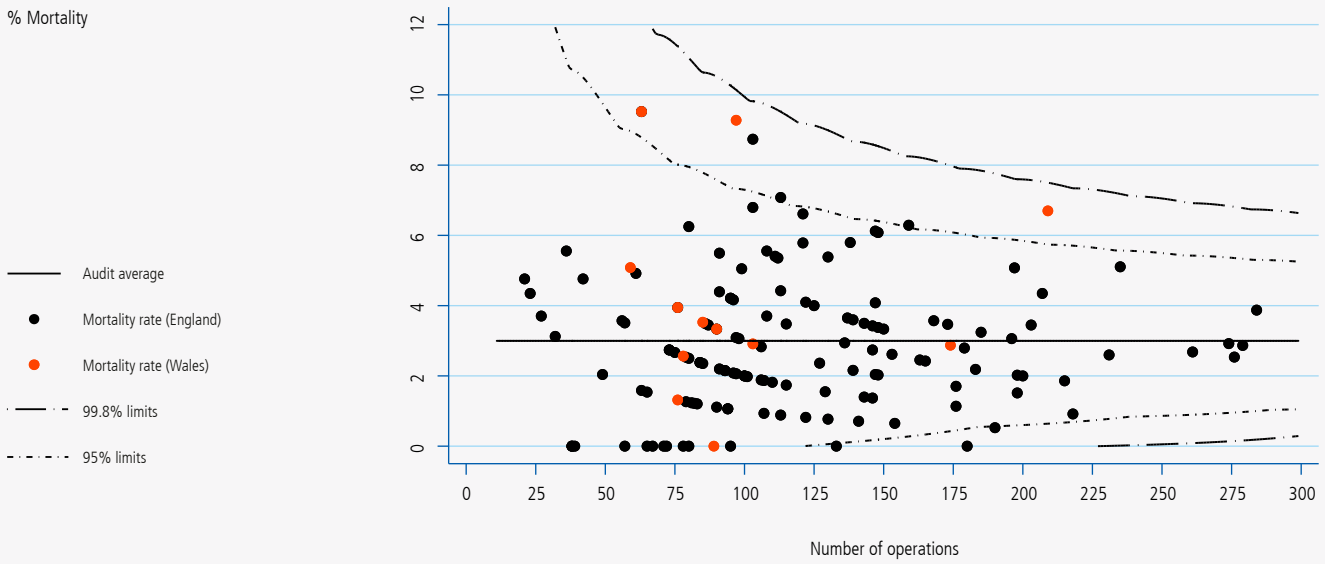


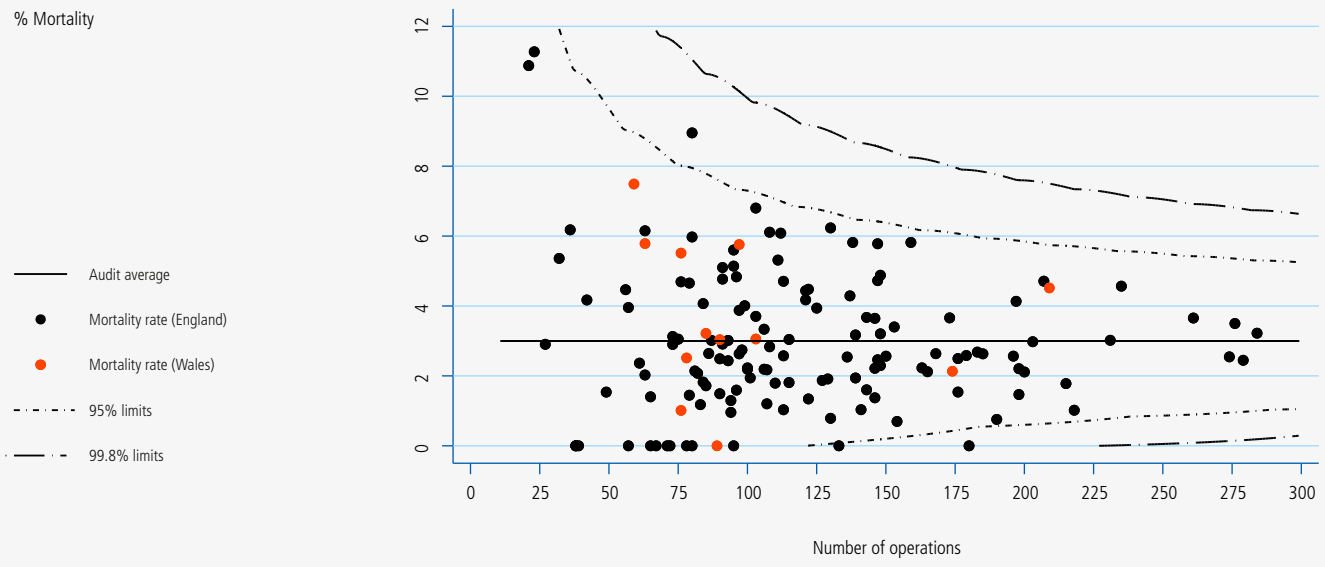
Figure 4.2 shows observed and adjusted 90-day post-operative mortality for English NHS trusts and Welsh MDTs. In 2016/17 a single site lay above the outer funnel limits. This audit period there are no potential outliers.

Figure 4.2
Observed and adjusted 90-day post-operative mortality (elective and emergency admissions) by trust/hospital/MDT with more than ten operations for patients diagnosed between 01 April 2017 and 31 March 2018

Observed 90-day mortality by trust/site with more than 10 operations



Adjusted 90-day mortality by trust/site with more than 10 operations



90-day post-operative mortality according to operative urgency

The proportion of patients presenting as an emergency with colorectal cancer has reduced slightly year on year from 22% in 2013/14 to 19% in 2017/18 (Table 4.2).

Table 4.2
Emergency presentation in England & Wales (from HES/PEDW), by audit year

	2013–14		2014–15		2015–16		2016–17		2017–18	
	N	%	N	%	N	%	N	%	N	%
Total patients*	30,629		30,972		30,690		30,491		30,854	
Emergency admission	5,636	21.6	5,643	21.0	5,515	20.8	5,302	20.2	4,999	19.1
Elective admission	20,445	78.4	21,258	79.0	21,001	79.2	20,897	79.8	21,112	80.9
Missing (% of total)	4,548 (14.8)		4,071 (13.1)		4,174 (13.6)		4,292 (14.1)		4,743 (15.4)	

* Total patients entered onto CAP when patient identifiers sent for linkage to ONS/HES/PEDW: 822 patients were added to the 2017–18 cohort after linkage

There continues to be a downward trend in 90-day mortality across all categories of surgical urgency (Table 4.3). 90-day mortality following elective surgery has reduced from 2.3% in 2013/14 to 1.7% in 2017/18. Similarly, 90-day mortality following emergency surgery has reduced from 14.2% to 11.5%.

Table 4.3
Mortality in patients who had major surgery, by surgical urgency

		2013–14		2014–15		2015–16		2016–17		2017–18	
		N	%	N	%	N	%	N	%	N	%
Total patients undergoing major resection eligible for linkage		19,674		19,564		19,347		19,243		18,796	
Overall 90-day mortality*		762/19,097	4.0	724/18,923	3.8	653/18,721	3.5	635/18,553	3.4	544/18,058	3.0
90-day mortality by urgency of operation	Elective	281/12,437	2.3	255/12,196	2.1	233/11,698	2.0	238/11,604	2.1	192/11,468	1.7
	Scheduled	91/3,586	2.5	87/3,664	2.4	76/3,987	1.9	85/3,832	2.2	72/3,699	1.9
	Urgent	133/1,258	10.6	112/1,226	9.1	101/1,144	8.8	98/1,241	7.9	80/1,050	7.6
	Emergency	254/1,784	14.2	268/1,806	14.8	243/1,860	13.1	212/1,793	11.8	196/1,708	11.5
	Missing urgency of operation	3/32	9.4	2/31	6.5	0/32	0.0	2/83	2.4	4/133	3.0

* Some patients are missing mortality data due to Type 2 objections/National data opt-out, others due to ONS date of death occurring prior to the reported date of surgery.

4.2 How long do patients stay in hospital after major bowel cancer resection?

Trends in length of stay over time

Median length of stay following major resection remains stable at 7 days (IQR 5-11).

Median length of stay is 7 days (IQR 5-10) for elective major resection compared to 11 days (IQR 7-17) for emergency major resection which remains unchanged. Patients undergoing emergency major resections remain in hospital longer with almost one third still in hospital at 14 days compared to 15% of elective patients.

Patients who underwent open or laparoscopic converted to open procedures had a median length of stay of 9 days (IQR 6-15) compared to 6 days (IQR 4-9) in those undergoing laparoscopic procedures.

Geographical variation in length of stay

Considerable variation persists in the length of stay according to cancer alliance/Wales for both elective and emergency major resection, as shown in Figure 4.3a and Figure 4.3b.

For patients staying 5 days or less there was variation from 24% to 45% in the elective/scheduled group. Variation in the emergency/urgent group for patients staying 5 days or less has improved this year and is now 5% to 20%.
For elective/scheduled patients, all cancer alliances/Wales have at least 50% of patients out of hospital within 7 days.

The risk-adjusted proportion of patients with a length of stay of greater than or equal to 5 days by trust/hospital/MDT is reported in Table A.3.

Figure 4.3a
Length of hospital stay after elective major surgery in HES/PEDW by cancer alliance/Wales

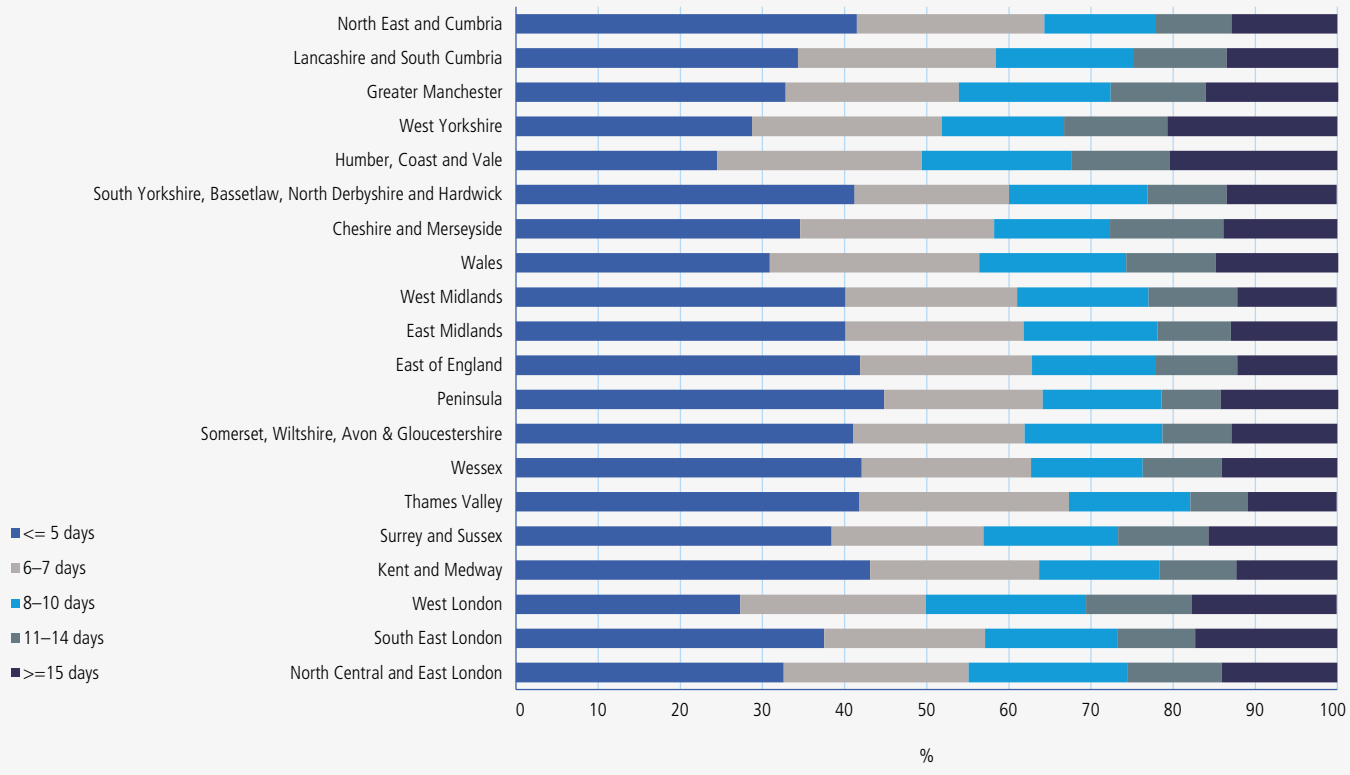
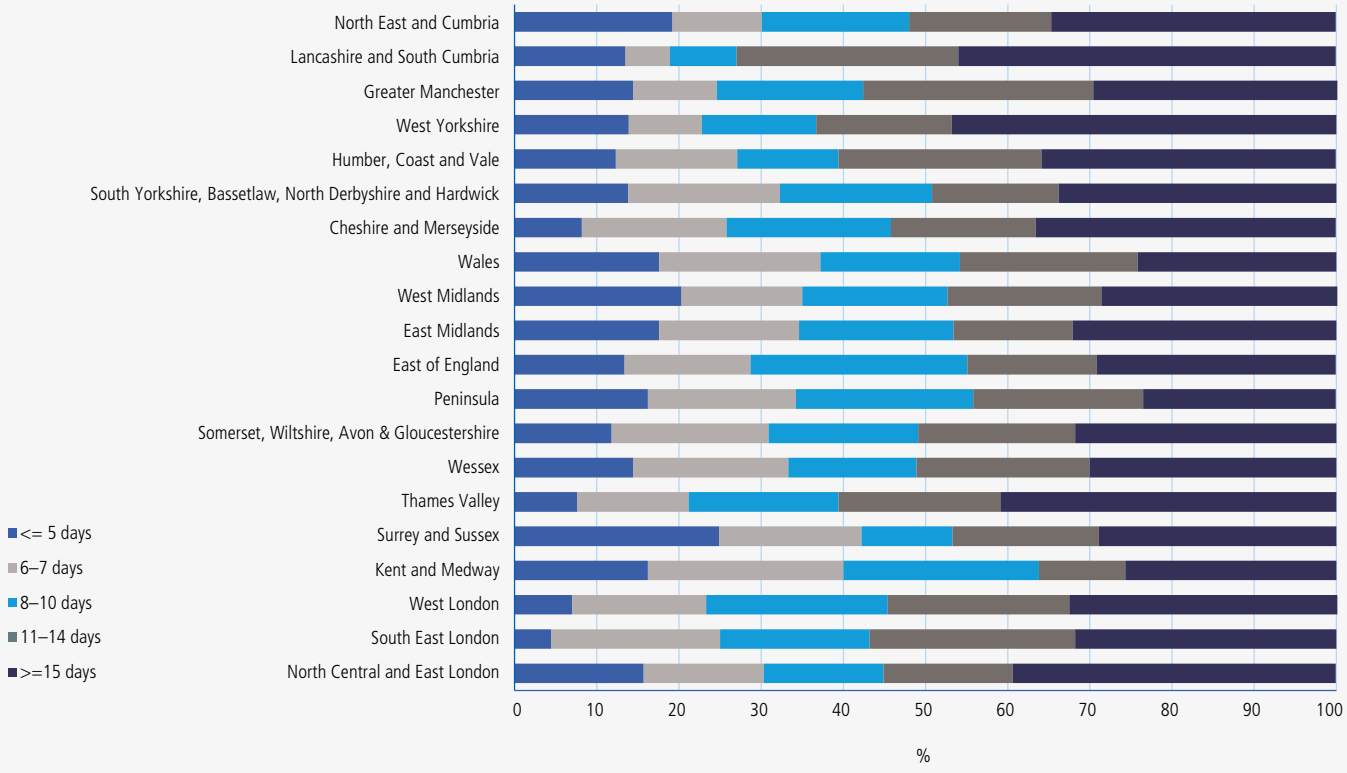


Figure 4.3b
Length of hospital stay after emergency major surgery in HES/PEDW by cancer alliance/Wales



4.3 How many patients have an unplanned readmission within 30 days of discharge from hospital after major bowel cancer surgery?

30-day unplanned readmission after major resection is derived from HES/PEDW and is defined as an emergency admission to any hospital for any cause within 30 days of surgery. Emergency admissions include those via Accident and Emergency, general practitioners, bed bureaus (point of contact for GPs to arrange urgent admission), or consultant outpatient clinics.

Trends in unplanned readmissions within 30 days

Overall, 10.8% of patients had an unplanned readmission within 30 days of surgery (Table 4.4). This has remained relatively stable over time.

Table 4.4
Unplanned readmission rate within 30 days of surgery for patients linked to HES/PEDW who underwent major resection in England and Wales, by audit year*

		2013–14		2014–15		2015–16		2016–17		2017–2018	
		N	%	N	%	N	%	N	%	N	%
Total patients undergoing major resection		**19,674**		**19,564**		**19,344**		**19,242**		**18,452**	
Emergency readmission within 30 days	**Yes**	1,815	10.3	1,822		1,782	10.1	1,832	10.6	1,777	10.8
	No	15,840	89.7	16,107		15,793	89.9	15,518	89.4	14,743	89.2
	Missing (% of total)	2,019 (10.3)		1,635 (8.4)		1,769 (9.1)		1,892 (9.8)		1,932 (10.5)	

*Patients treated in Wales: surgery prior to 28 February 2018
*Patients treated in England: surgery on or before 31 October 2018

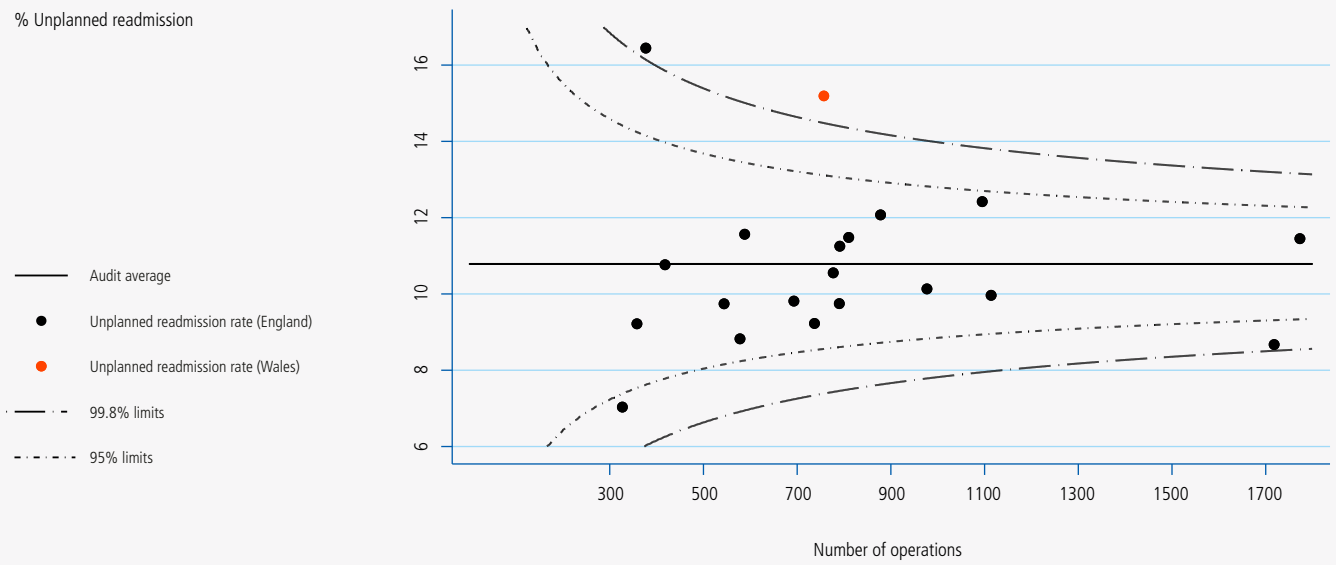
Geographical variation in 30-day unplanned readmission

Figure 4.4 shows the observed and adjusted rates of 30-day unplanned readmission at a cancer alliance/Wales level. In the adjusted funnel plot, one cancer alliance and Wales lie above the inner limits, compared to two cancer alliances and Wales last year. 30-day unplanned readmission rates vary from 7% in Humber, Coast and Vale to 16% in South East London.

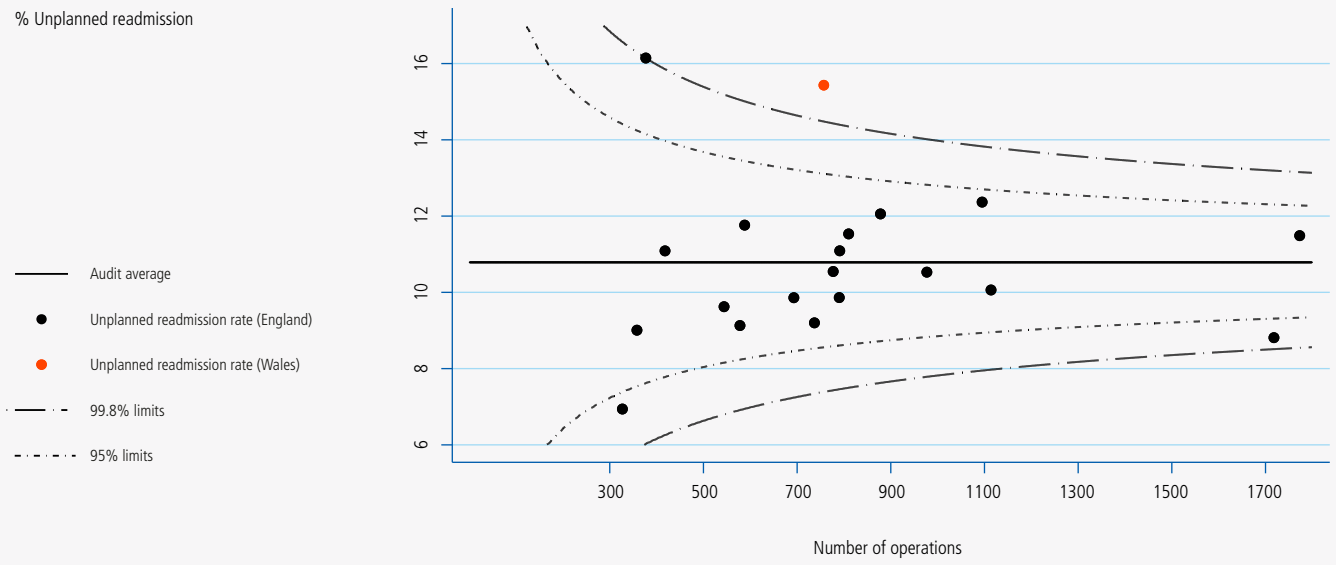
Figure 4.5 shows the observed and adjusted rates of 30-day unplanned readmission by English trust/hospital and Welsh MDT. In the adjusted funnel plot, 4 sites lie above the outer limits and an additional 6 above the inner limits. This is more than would be expected by chance.
The same number of sites were above the inner limits last year but only one site was above the outer funnel limit, demonstrating increased variation.

Figure 4.4
Observed and adjusted 30-day unplanned readmission rate by cancer alliance/Wales for patients diagnosed between 01 April 2017 and 31 March 2018*

Observed 30-day unplanned readmission rate by Cancer Alliance/Wales



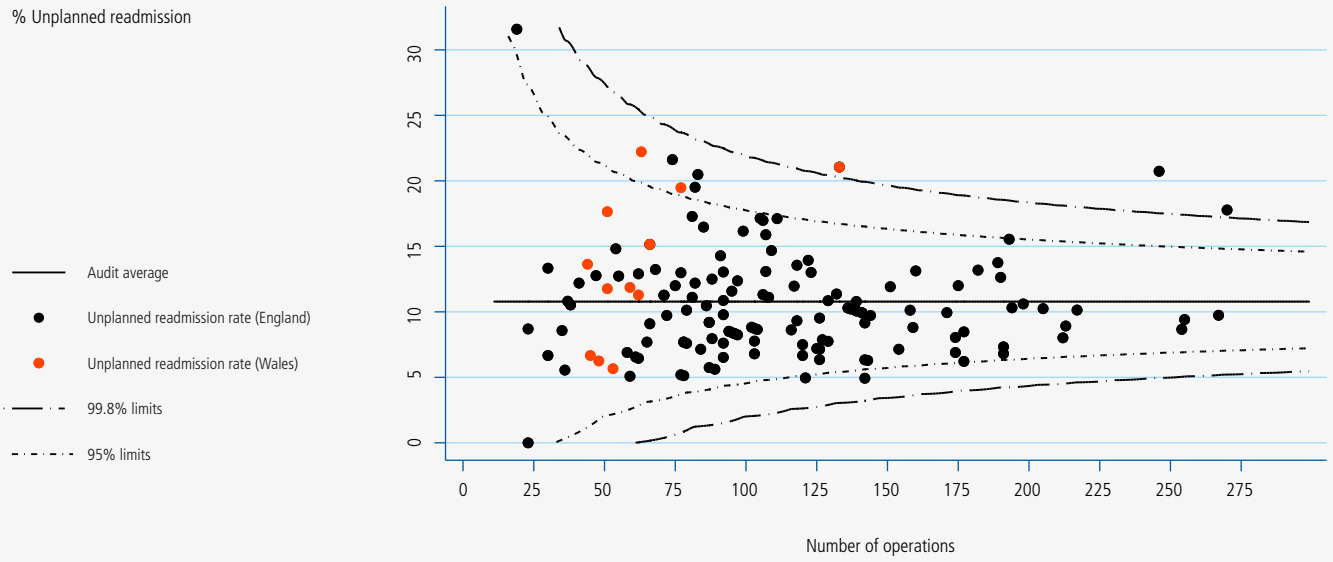
Adjusted 30-day unplanned readmission rate by Cancer Alliance/Wales



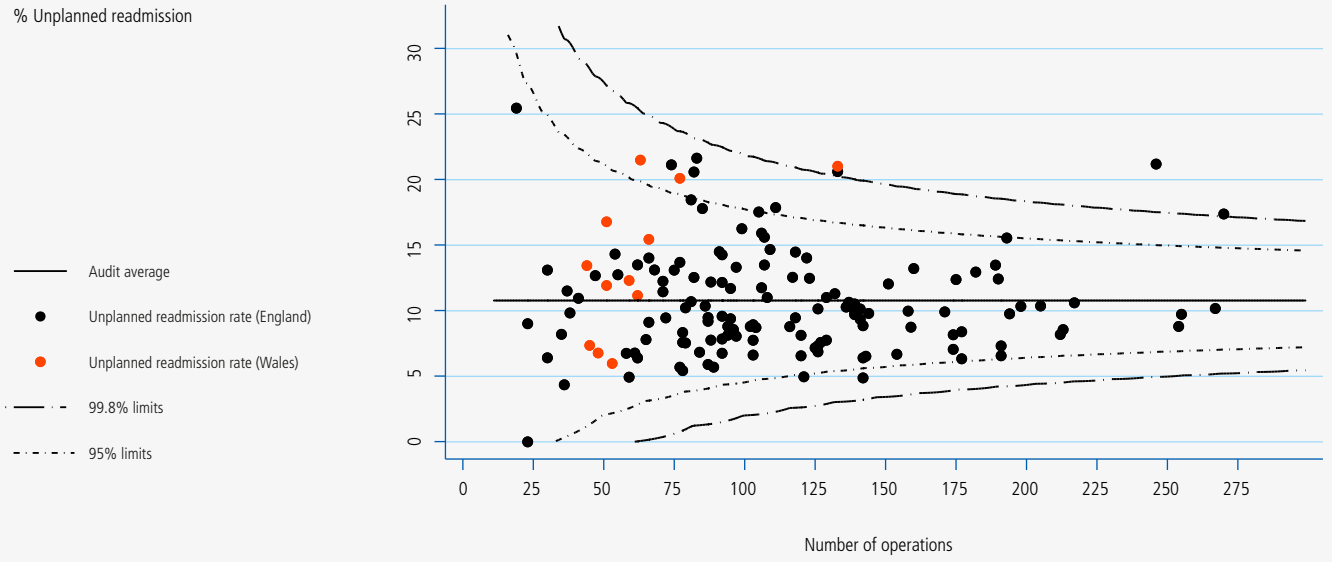
*Patients treated in Wales: surgery on or before 28 February 2018
*Patients treated in England: surgery on or before 31 October 2018

Figure 4.5
Observed and adjusted 30-day unplanned readmission rate by English NHS trust/Welsh MDT for patients diagnosed between 01 April 2017 and 31 March 2018*

Observed 30-day unplanned readmission rate by trust/hospital/MDT with more than 10 operations



Adjusted 30-day unplanned readmission rate by trust/hospital/MDT with more than 10 operations



*Patients treated in Wales: surgery on or before 28 February 2018
*Patients treated in England: surgery on or before 31 October 2018

4.4 Unplanned Return to Theatre (URTT)

Unplanned return to theatre (URTT) is an important outcome measure which allows us to evaluate serious post-operative complications. These complications have been shown to impact significantly upon morbidity, short and long-term mortality and oncological outcomes, as well as placing a considerable burden on hospital resources.

This new performance indicator will enable us to better understand the frequency, determinants, cause and timing of such complications and, ultimately, the impact on subsequent outcomes such as receipt of adjuvant chemotherapy and post-operative mortality.

High URTT rates may reflect suboptimal primary surgical technique but need to be examined in the context of other relevant information, such as postoperative mortality, as appropriate early intervention of serious postoperative complications can be life-saving. Evaluating outcomes following URTT can provide important information about the quality of salvage surgery.

As with other indicators, rates of URTT are influenced by case-mix, making adequate risk-adjustment important. The methods used to identify patients undergoing URTT within 30 days of their original major resection in HES/PEDW are described in the methodology document.

Overall, 16,520 patients of the patients diagnosed between 1 April 2017 and 31 March 2018 underwent a major resection and could be linked to HES/PEDW with sufficient follow-up. 7.8% (1,294) of these patients were identified as having URTT within 30 days of their original procedure. Just over 50% of these procedures occurred within 7 days of the original procedure, with around 20% in the first 2-3 days (Figure 4.6). Generally, best practice is considered to be returned to theatre as soon as indicated after the index procedure and ideally no later than 10-14 days after primary surgery, given the high rates of enteric injury that occur during laparotomy after this time in the first 3 months post-operatively. Transanal or wound dressing procedures may of course occur at any time.

Figure 4.6
Proportion of patients undergoing URTT by number of days from original procedure

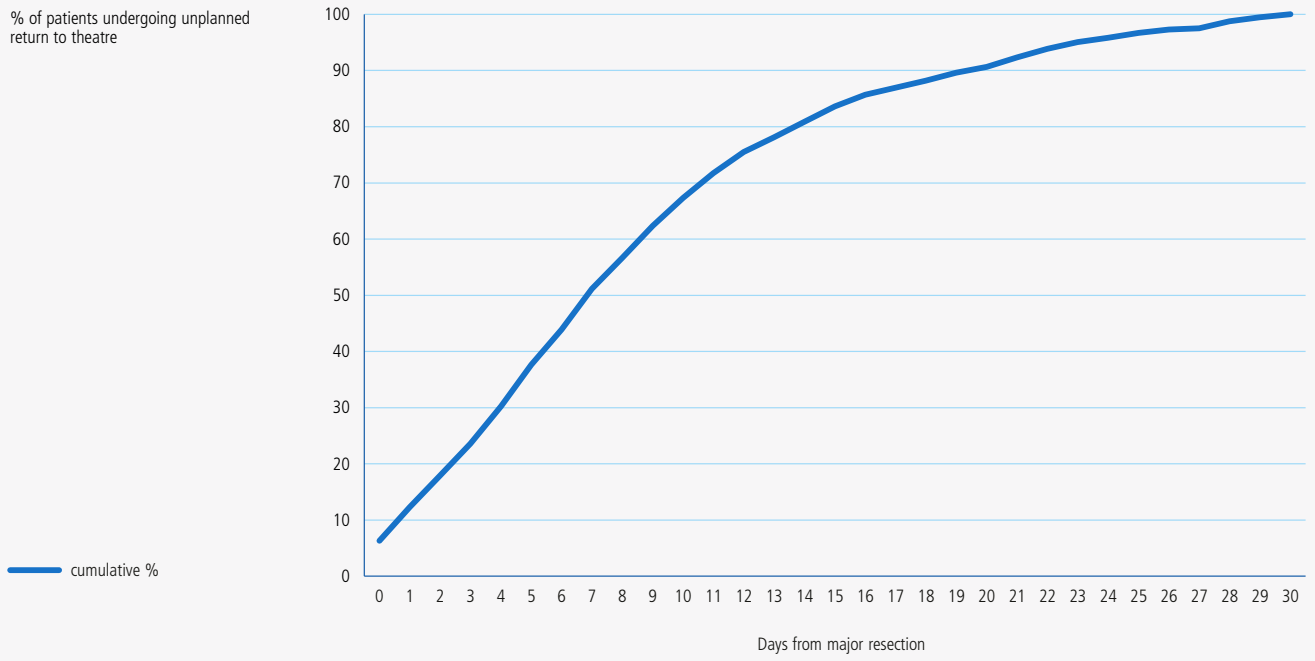


Table 4.5
URTT according to patient, tumour and surgical factors for the 16,520 patients

		Overall	Re-operation	
		N	N	%
	Total	**16,520**	**1,294**	**7.8**
Gender	**Male**	9,346	840	9.0
	Female	7,161	453	6.3
	Missing	13	1	7.7
Age-group	**<50**	1,041	104	10.0
	50-59	2,173	200	9.2
	60-74	7,549	608	8.1
	75-84	4,644	319	6.9
	>=85	1,113	63	5.7
Cancer site	**Appendix/ caecum/ asc colon**	4,936	254	5.2
	Hepatic flexure	820	51	6.2
	Transverse colon	1,102	69	6.3
	Splenic flexure/ desc colon	1,063	103	9.7
	Sigmoid colon	3,722	284	7.6
	Rectosigmoid	940	78	8.3
	Rectal	3,937	455	11.6
ASA grade	**1**	1,886	146	7.7
	2	8,767	627	7.2
	3	4,687	412	8.8
	4	415	47	11.3
	Missing	765	62	8.1
Comorbidities (from HES/PEDW)	**1**	8,548	594	7.0
	2	5,080	424	8.4
	3	2,892	276	9.5
Mode of admission (from HES/PEDW)	**Elective**	14,090	1,051	7.5
	Emergency	2,413	241	10.0
	Missing	17	2	11.8
Surgical urgency	**Elective/Scheduled**	13,982	1,039	7.4
	Emergency/Urgent	2,418	244	10.1
	Missing	120	11	9.2
Surgical procedure	**Right hemicolectomy**	6,894	384	5.6
	Transverse colectomy	63	5	7.9
	Left hemicolectomy	689	55	8.0
	Sigmoid colectomy	596	55	9.2
	Total/subtotal colectomy	523	66	12.6
	Anterior resection	5,415	454	8.4
	APER	1,036	138	13.3
	Hartmann	1,245	124	10.0
	Pelvic Exenteration	59	13	22.0
Surgical access	**Open**	4,847	497	10.3
	Laparoscopic converted	1,397	146	10.5
	Laparoscopic completed	10,187	644	6.3
	Missing	89	7	7.9
TNM T-stage	**T0**	193	17	8.8
	T1	1,077	76	7.1
	T2	2,511	204	8.1
	T3	8,073	617	7.6
	T4	3,719	297	8.0
	Tx	26	1	3.9
	T9	71	3	4.2
	Missing	850	79	9.3
TNM N-stage	**N0**	9,050	714	7.9
	N1	4,055	313	7.7
	N2	2,422	179	7.4
	Nx	24	4	16.7
	N9	118	5	4.2
	Missing	851	79	9.3
TNM M-stage	**M0**	13,997	1,077	7.7
	M1	1,151	100	8.7
	Mx	447	36	8.1
	M9	75	2	2.7
	Missing	850	79	9.3
Status 90 days postoperatively	**Alive**	16,058	1,192	7.4
	Dead	458	101	22.1
	Missing	4	1	25.0

URTT was more common in males; patients <60 years; in those with higher ASA grade or increased comorbidity; after an emergency admission or procedure; after surgery for rectal tumours (especially those involving stoma formation) and after open or laparoscopic converted to open surgery. The 90-day postoperative mortality of patients undergoing URTT was just over three times (7.8% n=101) that of those who did not (2.4% n=357) (Table 4.5).

In order to be a valid performance indicator for unit comparisons, a measure should meet certain criteria: differences in rates of the indicator should reflect differences in quality of care; the outcome measured should be sufficiently common that there is statistical power to identify variation outside of an expected range; it should be possible in the data to adequately measure the indicator, identify the relevant population, and any relevant case mix factors; and it should be possible to accurately adjust for case mix.

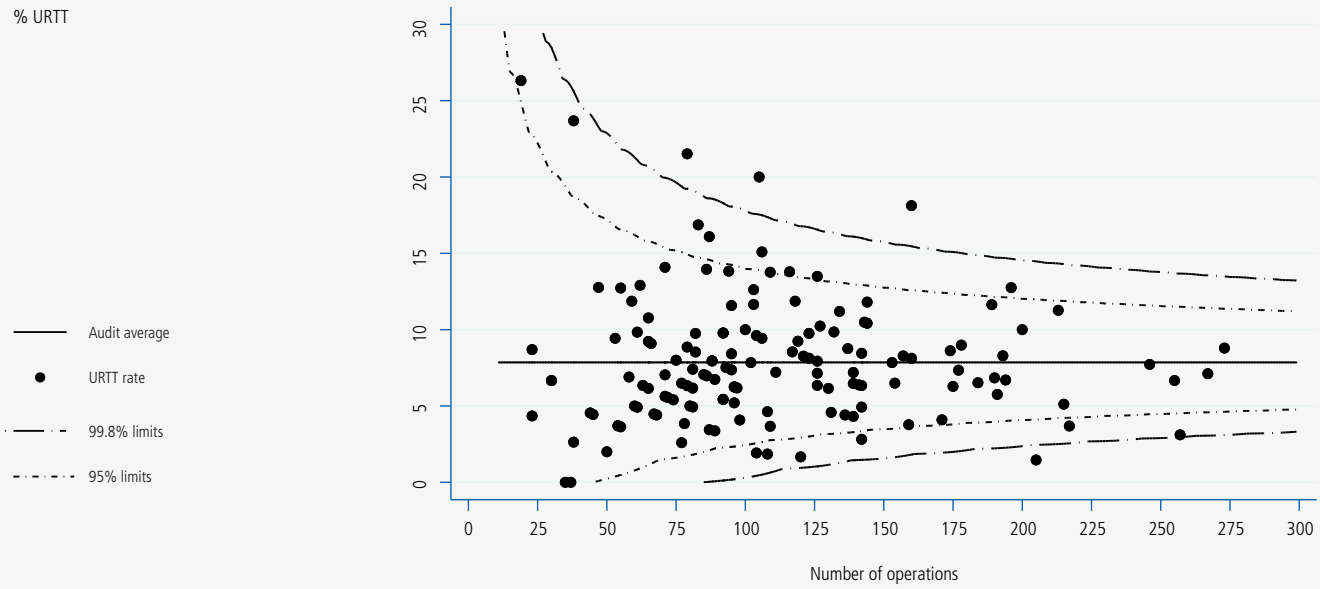
Clinically it is known that URTT may reflect quality of care. URTT is sufficiently common to have statistical power as an indicator. Table 4.5 suggests that the indicator is correlated with many patient and tumour characteristics, and with postoperative mortality, suggesting that it is a valid measure of URTT and that case mix adjustment will be feasible.

Geographical variation in URTT rates

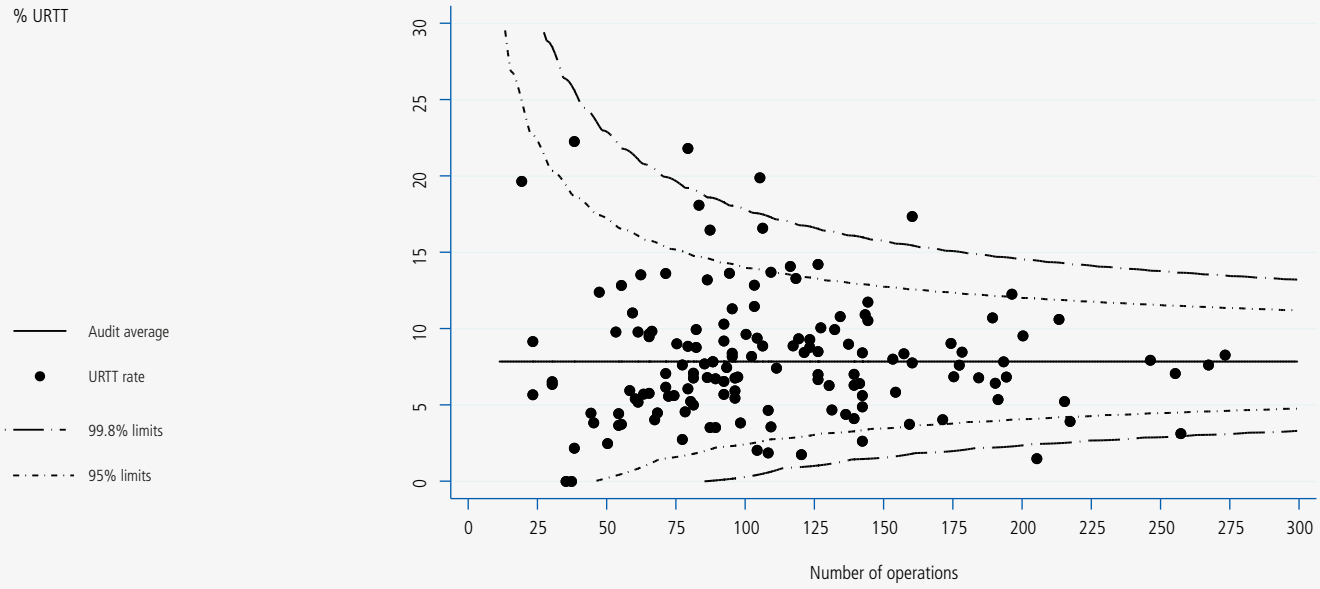
Due to the developmental nature of this work, we are not currently publishing individual trust/hospital/MDT level results. However, we have produced observed and adjusted funnel plots to show the variation in URTT between providers (Figure 4.7). These funnel plots show considerable variation despite risk-adjustment. Further validation work will be carried out to ensure robust reporting of this important outcome measure.

Figure 4.7
Observed and adjusted 30-day URTT (elective and emergency admissions) by trust/hospital/MDT with more than ten operations for patients diagnosed between 01 April 2017 and 31 March 2018

Observed 30-day URTT by trust/hospital/MDT with more than 10 operations



Adjusted 30-day URTT by trust/hospital/MDT with more than 10 operations



4.5 How many patients have laparoscopic surgery?

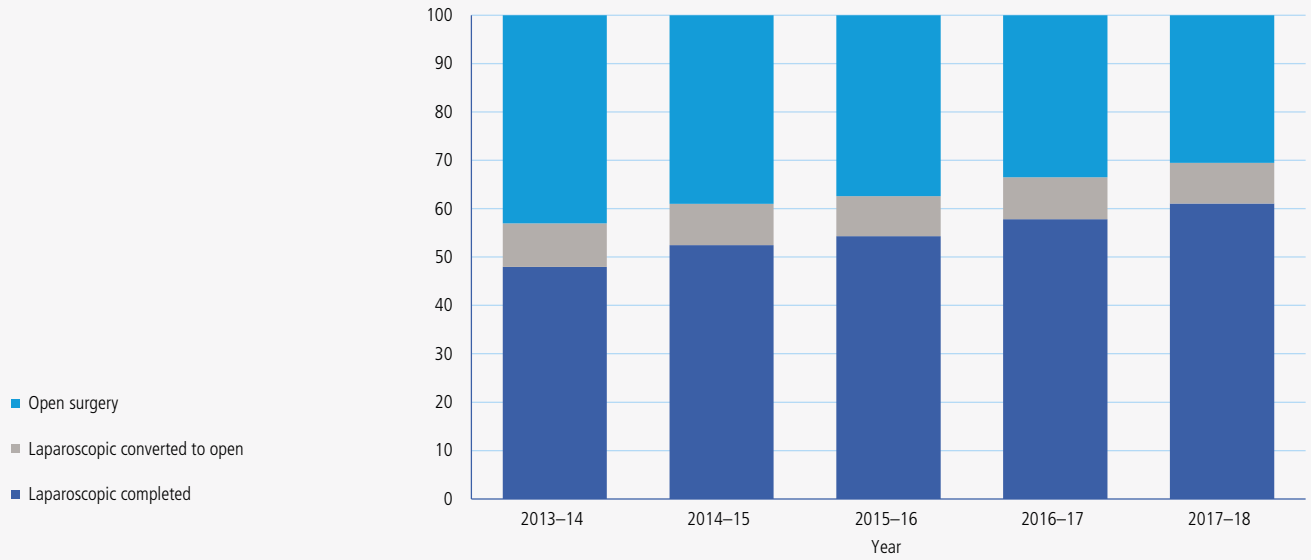
The audit divides surgical access into three categories:

1. Open resection
2. Laparoscopic converted to open resection
3. Completed laparoscopic resection

Trends in the use of laparoscopic surgery

The proportion of patients undergoing laparoscopic surgery continues to increase (Figure 4.8). This audit period 61% of patients had laparoscopic procedures. This has increased from 48% in the 2013/14 period. Reassuringly, the proportion of laparoscopic converted to open cases remains stable at approximately 8%.

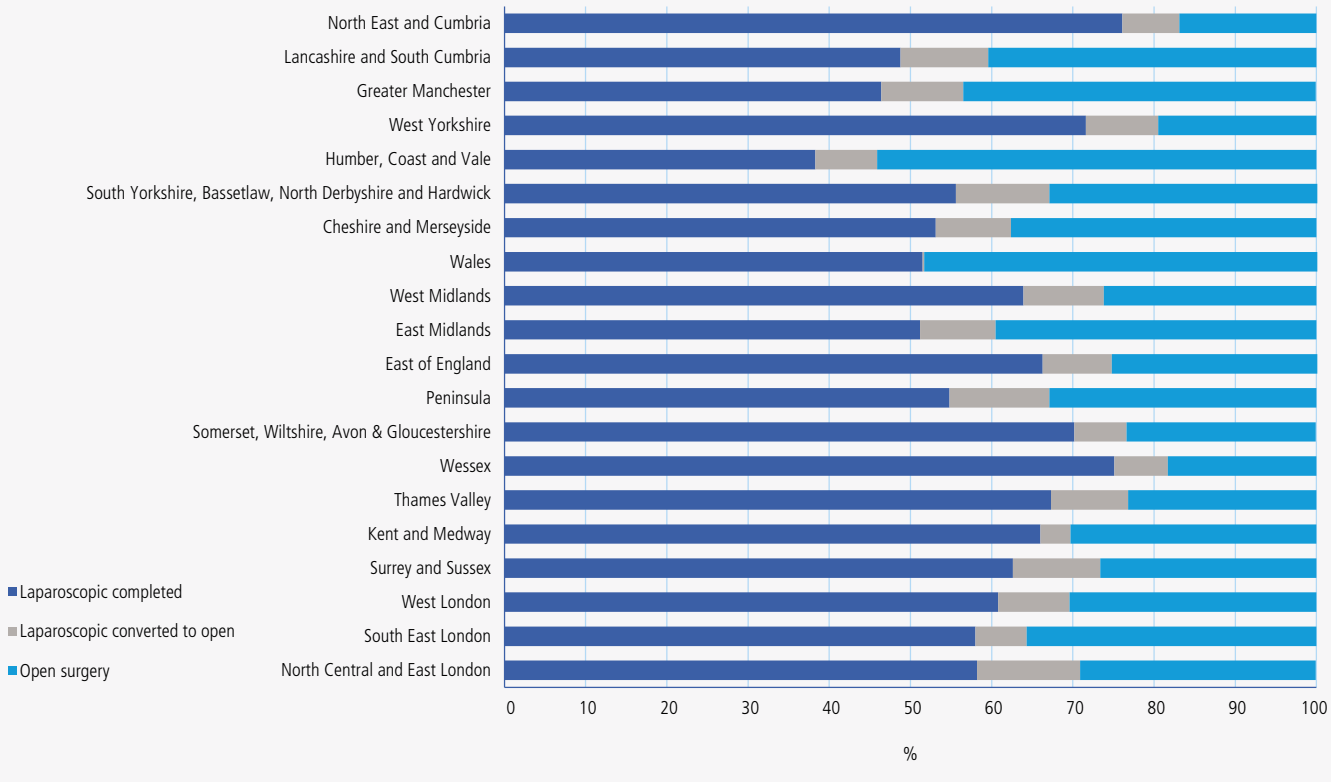
Figure 4.8
Surgical access, by audit year



Geographical variation in laparoscopic surgery

There is considerable variation in the use of laparoscopic surgery across English cancer alliances and Wales (38% to 76%, Figure 4.9). The use of laparoscopic surgery also varies widely between trusts/hospitals/MDTs (Table A.3). There were 19 trusts/hospitals/MDTs with less than 50% of major resections attempted laparoscopically and 46 trusts/hospitals/MDTs with more than 80% of major resections attempted laparoscopically.

Figure 4.9
Surgical access, by cancer alliance/Wales



4.6 Robotic surgery

Robotic surgery for colorectal cancer is an emerging field. The technical advantages include improved 3-D visualisation, ergonomics, dexterity and instrument manipulation. However, the superiority of robotic surgery over laparoscopic techniques remains uncertain and there is currently no national evidence-based guidance to support its use.

NBOCA introduced a robotics data item in spring 2016. The 2019 NBOCA organisational audit collected information regarding the regular use of robotic surgery for colorectal cancer for each English NHS trust/hospital. OPCS-4 codes for robotic surgery are also available in HES inpatient data .

Which NHS trusts/health boards are currently performing robotic surgery?

The 2019 organisational audit reports that 30 English NHS trusts/hospitals are currently regularly performing robotic colorectal cancer surgery (Figure 4.10 and Table 4.6). No MDTs in Wales perform any colorectal robotic surgery at present. The map can be accessed and the individual trust/hospital/MDT names viewed at: https://batchgeo.com/map/45072fe44cd81062cdea32d2deb55ec1

Validation of NBOCA robotics

We used HES to validate the NBOCA robotic surgery data item. 93% of patients recorded as having robotic surgery in NBOCA had robotics codes in HES. There were a number of additional cases with robotics codes in HES which had not been captured within NBOCA. For the remainder of the analyses, we therefore used the presence of robotic surgery recorded in NBOCA and/or HES for patients diagnosed between 01 April 2015 to 31 March 2018 (n=884) within the trusts/hospitals who reported performing regular colorectal cancer surgery in the organisational audit.

Figure 4.10
Map showing all English NHS trusts/hospitals and Welsh MDTs with blue markers for those performing regular robotic colorectal cancer surgery

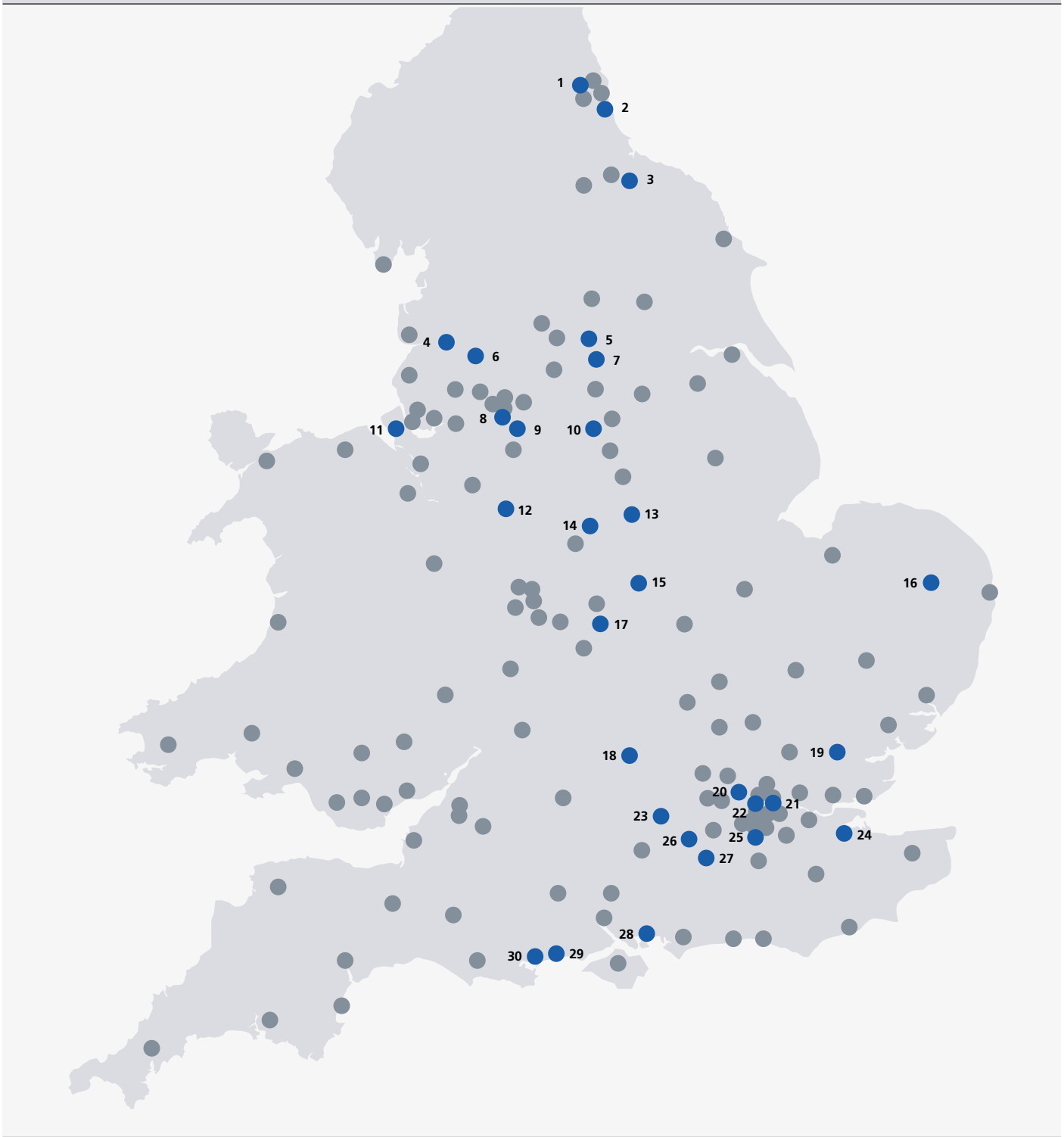


Table 4.6
Key for English NHS trusts performing regular robotic surgery for colorectal cancer according to 2019 Organisational Audit

No.	NHS trust
1	The Newcastle Upon Tyne Hospitals NHS Foundation Trust
2	City Hospitals Sunderland NHS Foundation Trust
3	South Tees Hospitals NHS Foundation Trust
4	Lancashire Teaching Hospitals NHS Foundation Trust
5	Leeds Teaching Hospitals NHS Trust
6	East Lancashire Hospitals NHS Trust
7	Mid Yorkshire Hospitals NHS Trust
8	The Christie NHS Foundation Trust
9	Stockport NHS Foundation Trust
10	Sheffield Teaching Hospitals NHS Foundation Trust
11	Wirral University Teaching Hospital NHS Foundation Trust
12	University Hospitals of North Midlands NHS Trust
13	Nottingham University Hospitals NHS Trust
14	Derby Hospitals NHS Foundation Trust
15	University Hospitals of Leicester NHS Trust
16	Norfolk and Norwich University Hospitals NHS Foundation Trust
17	University Hospitals of Coventry and Warwickshire NHS Trust
18	Oxford University Hospitals NHS Trust
19	Mid Essex Hospital Services NHS Trust
20	London North West University Healthcare NHS Trust
21	Barts Health NHS Trust
22	Imperial College Healthcare NHS Trust
23	Royal Berkshire NHS Foundation Trust
24	Medway NHS Foundation Trust
25	The Royal Marsden NHS Foundation Trust
26	Frimley Health NHS Foundation Trust - Frimley Park Hospital
27	Royal Surrey County Hospital NHS Foundation Trust
28	Portsmouth Hospitals NHS Trust
29	The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
30	Poole Hospital NHS Foundation Trust

Who is performing robotic surgery?

The number of robotic cases recorded has increased over time from 240 cases in the 2015/16 period to 374 cases for 2017/18. This likely reflects both increased use of robotics and improved data completion.

74 surgeons are recorded as performing robotic surgery. Of those, 21 surgeons (28%) have procedures recorded for all three audit periods, 12 surgeons (16%) for either 2015/16 or 2016/17 only, 17 surgeons (23%) for two audit periods and 24 surgeons (32%) for 2017/18 only. We have evaluated the number of cases that are performed by the same surgeon over this timeframe (Figure 4.11). We also looked at the proportion of all cases which are being performed using robotics (Figure 4.12), with all sites offering robotic surgery to just a minority of selected patients.

Figure 4.11
Volume of robotic cases recorded as being performed by each surgeon

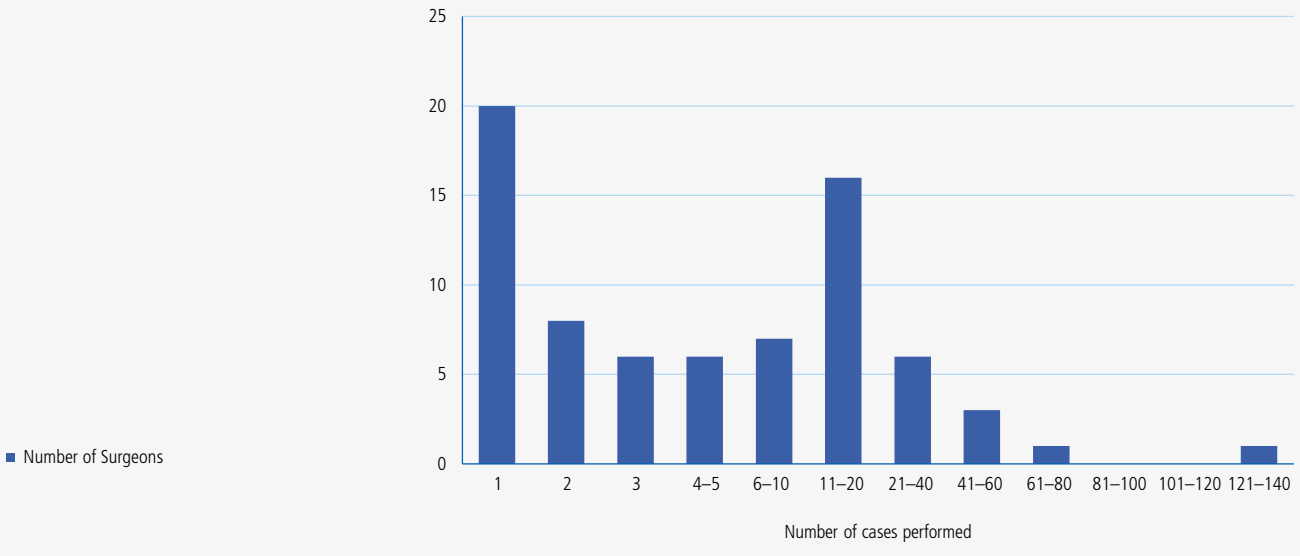
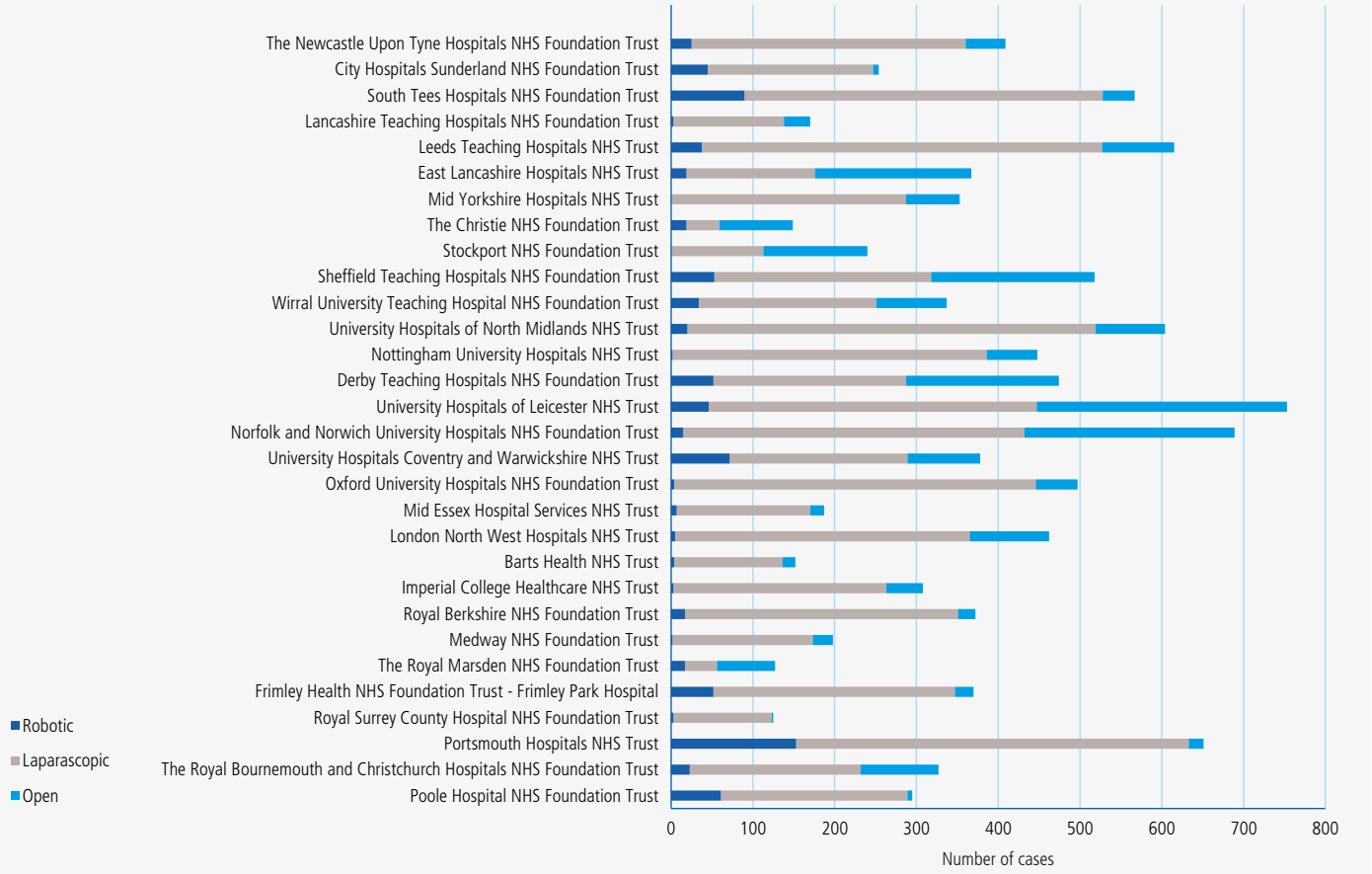


Figure 4.12
Surgical access of elective major resections on patients diagnosed between 01 April 2015 and 31 March 2018 in the English NHS trusts who report that they regularly perform robotic colorectal cancer surgery*



*Stockport NHS Foundation Trust and Mid Yorkshire Hospitals NHS Trust do not have any robotic cases currently recorded in NBOCA or HES but have confirmed their robotic surgery status.

Which patients are having robotic surgery?

The median age of patients receiving robotic surgery is 68 years (IQR 58–74 years). Almost two thirds of robotic surgery is performed in males (64%). The majority of cases are performed for rectal cancer (62%) with the most common procedure performed being anterior resection (68%) followed by APR (14%) and right hemicolectomy (11%).

NBOCA Organisational Survey 2019

This year we have added some important new sections to the organisational survey.

Routine Genetic Testing

Current NICE guidelines recommend that all patients diagnosed with colorectal cancer should undergo genetic testing to identify those patients who may have cancer due to Lynch syndrome. This includes performing either immunohistochemistry for mismatch repair proteins or microsatellite instability testing. Lynch syndrome is an inherited condition. Recognition of this condition allows surveillance measures to be commenced and also allows prompt screening of other family members.

Despite these guidelines, not all trusts/hospitals/MDTs are currently able to offer this service or only offer it in particular age groups. Bowel Cancer UK are currently campaigning for UK-wide testing. We have established which English hospital trusts and Welsh MDTs are currently offering routine genetic testing. All health boards in Wales are able to offer genetic testing to the highest risk patients and this is currently being rolled out to full access.

Robotic Surgery

Robotic surgery is an emerging field. For the first time this year, we established that 30 English hospital trusts are currently performing robotic surgery for colorectal cancer (see Section 4.6).

Advanced Disease Management

The management of locally advanced and locally recurrent disease is complex. We provide information as to which English hospital trusts and Welsh MDTs are offering specialist surgical procedures including multivisceral resection, pelvic exenteration, distal/high sacrectomy, complex vascular reconstruction, extended lymphadenectomy and intra-operative radiotherapy. In addition, we have established the presence of dedicated specialist advanced disease nurses, multidisciplinary team meetings and outpatient clinics.

This work will help to map multidisciplinary team referrals and better understand management patterns for locally advanced and recurrent colorectal cancer.

Chapter Recommendations – Surgical care

1. Bowel cancer units should continue to aim to achieve an operative mortality rate of <20% for emergency cases and <5% for elective cases. 90-day mortality rates continue to improve across all surgical urgencies with no significant geographical variation.
2. Trusts/hospitals/MDTs should examine their unplanned readmission rates. Further work is needed to explore reasons for the large variation in rates between trusts/hospitals/MDTs.
3. Further methodological work is required on the URTT indicator to enable robust risk-adjusted outlier reporting and ensure valid results.
4. Further work is required to explore the significant geographical variation in the use of laparoscopic surgery.
5. Trusts/hospitals/MDTs should ensure that robotics cases are being recorded accurately by selecting either ‘Laparoscopic’ or ‘Laparoscopy converted to open’ under the ‘Surgical Access’ data item and then by selecting ‘Yes’ within the stand alone NBOCA ‘Robotic Surgery’ data item.

5. Survival

Survival – NBOCA 2019

- Overall two-year survival rates remain stable (67%).
- There remains considerable variation in two-year survival rates at trust/hospital/MDT level.
- There exists less variation in cancer-specific two-year mortality rates between trusts/hospitals/MDTs compared to all-cause two-year mortality with 10 sites falling outside the inner funnel limits (8 would be expected by chance).
- There is good agreement between the outlier status of cancer-specific two-year mortality and all-cause two-year mortality.
- A risk-adjustment model needs to be developed for all-cause and cancer-specific two-year mortality rate for all patients with bowel cancer, not just those undergoing major resection, so that long-term mortality can be explored in these patients.

5.1 What is the two-year survival of patients with bowel cancer?

Two-year mortality rate after major resection – the observed rate is the number of patients who died within two years (of any cause) divided by the sum of the amount of time each patient is followed up. Taking into account the amount of follow-up time means that the estimate compares not just the proportion of patients who died within two years but also how quickly they died.

Trends in two-year overall survival over time

Although conventionally five years of follow-up is used to determine when an individual with colorectal cancer is cured, the large majority of patients that will develop recurrent disease will do so within the first two years.

Two-year overall survival rates remain stable for all patients and across the different treatment modalities (Table 5.1). Two-year overall survival in patients who do not undergo surgical resection appears to be on an upward trend improving from 28% for the 2013/14 cohort to 30% in the 2015/16 cohort.

Table 5.1
Two-year survival over time for all patients diagnosed between 01 April 2012 and 31 March 2015

		2013–14		2014–15		2015–16	
		N	%	N	%	N	%
All patients		**30,226**		**30,556**		**30,211**	
Died within 24 months of diagnosis	**Yes**	9,864	33.6	9,951	33.7	9,688	33.2
	No	19,503	66.4	19,541	66.3	19,496	66.8
	Missing (% of total)	859 (2.8)		1064 (3.5)		1027 (3.4)	
Underwent Major Resection		**19,537**	64.6	**19,418**	63.5	**19,176**	63.5
Died within 24 months of diagnosis	**Yes**	3,159	16.7	3,026	16.2	3,005	16.2
	No	15,767	83.3	15,698	83.8	15,516	83.8
	Missing (% of total)	611 (2.0)		694 (2.3)		655 (2.2)	
Underwent Local Excision		**1,287**	4.3	**1,199**	3.9	**1,263**	4.2
Died within 24 months of diagnosis	**Yes**	109	8.8	111	9.6	103	8.4
	No	1,134	91.2	1,041	90.4	1,127	91.6
	Missing (% of total)	44 (0.1)		47 (0.2)		33 (0.1)	
No Excision of Tumour		**9,402**	31.1	**9,939**	32.5	**9,772**	32.3
Died within 24 months of diagnosis	**Yes**	6,596	71.7	6,814	70.9	6,580	69.8
	No	2,602	28.3	2,802	29.1	2,853	30.2
	Missing (% of total)	204 (0.7)		323 (1.1)		339 (1.1)	

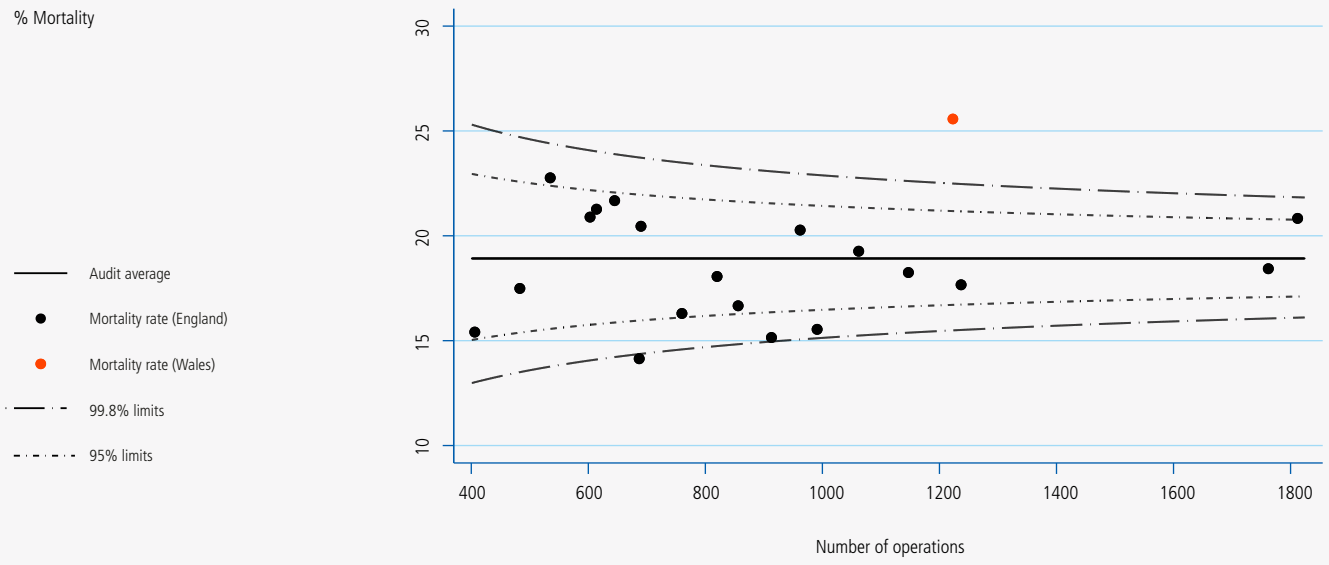
Geographical variation in two-year all-cause mortality in patients undergoing major resection

Figure 5.1 demonstrates observed and adjusted two-year all-cause mortality for patients undergoing major resection for cancer alliances/Wales. In the adjusted analysis, there are no regions above the outer limits. However, Wales and seven English cancer alliances lie outside the inner funnel limits. This demonstrates increased variation compared to last year.

Figure 5.2 shows observed and adjusted two-year all-cause mortality for patients undergoing major resection at a trust/hospital/MDT level. 14 sites lie above the inner limits which is more than would be expected by chance but remains the same as last year. Of these, 7 sites are above the outer limits which has increased from 3 last year. After re-analysis of corrected data there were 4 confirmed outliers.

Figure 5.1
Observed and adjusted two-year all-cause mortality for patients undergoing a major surgical resection between 01 April 2015 and 31 March 2016, by cancer alliance/Wales, including hospital/trust/MDTs with more than ten operations

Observed 2-year mortality by cancer alliance/Wales



Adjusted 2-year mortality by cancer alliance/Wales

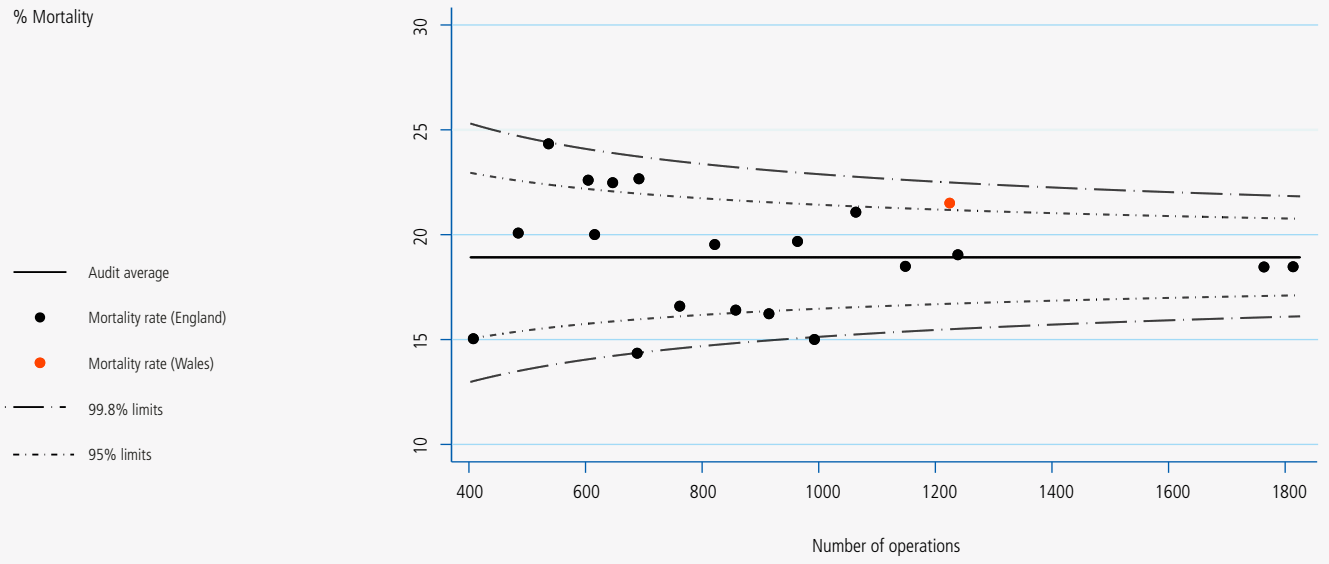
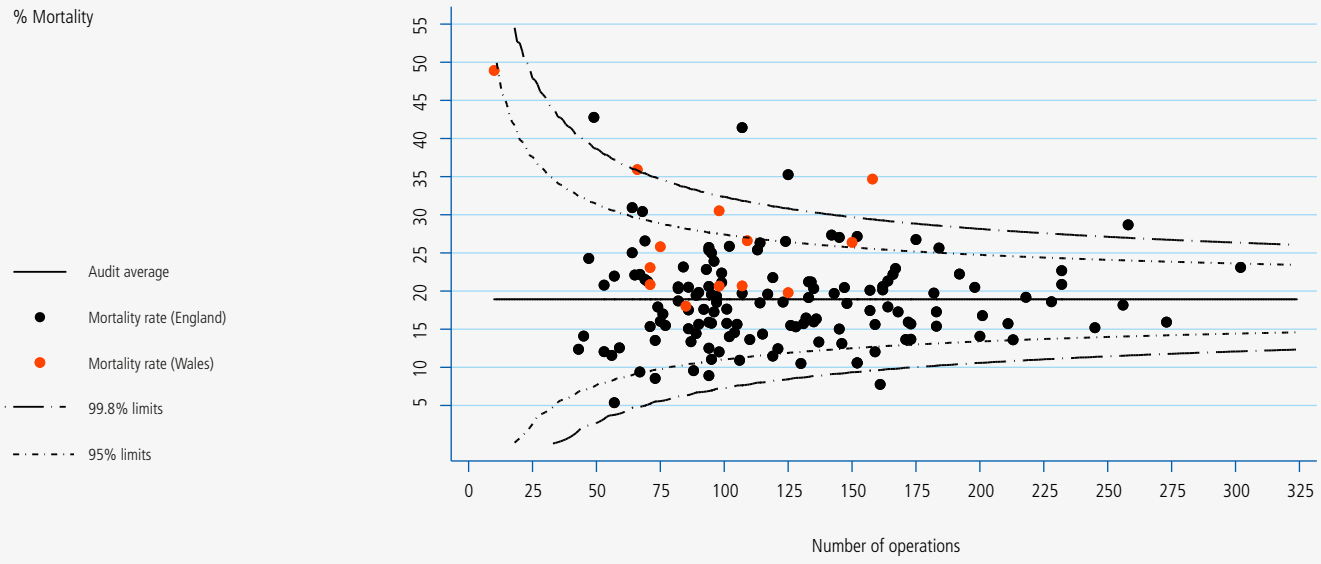
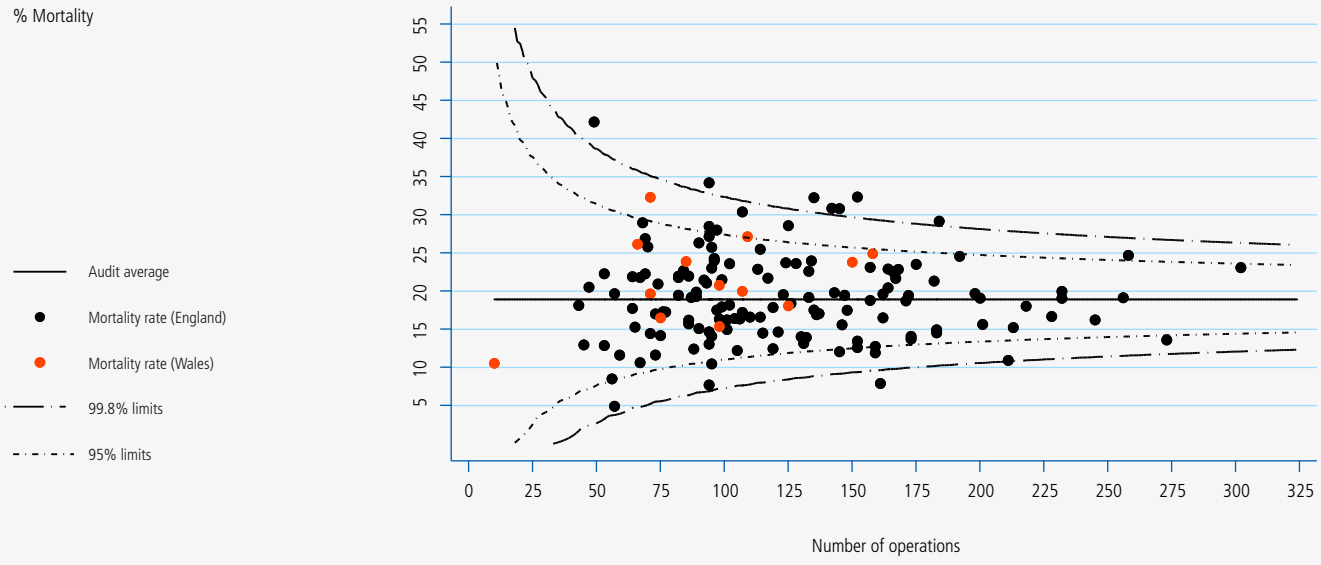


Figure 5.2
Observed and adjusted two-year all-cause mortality for patients undergoing a major resection between 01 April 2015 and 31 March 2016, by hospital/trust/MDTs with more than ten operations

Observed 2-year mortality by hospital/trust/MDT with more than ten operations



Adjusted 2-year mortality by hospital/trust/MDT with more than ten operations



5.2 Cancer specific two-year mortality

NBOCA published a short report in 2017 on the validity of cancer-specific mortality as a performance indicator in patients having major surgery for bowel cancer, https://www.nboca.org.uk/reports/short-report-2-2017/ All-cause mortality includes deaths from causes other than the cancer itself or treatment for the cancer, and these will often be beyond the control of the healthcare provider. Comparing cancer-specific mortality between trusts/hospitals/MDTs offers the potential to make fairer comparisons of long-term mortality. The short report provided evidence that cancer-specific mortality, defined according to ONS underlying cause of death, is a valid measure to make comparisons between healthcare providers on cancer mortality.

Building on this work, we have now developed methods to estimate risk-adjusted cancer-specific two-year mortality rates for cancer alliances and for trusts/hospitals/MDTs. This requires competing risks models to allow separate risk-adjustment of deaths from cancer and of deaths from other causes. See the Methodology supplement for more details.

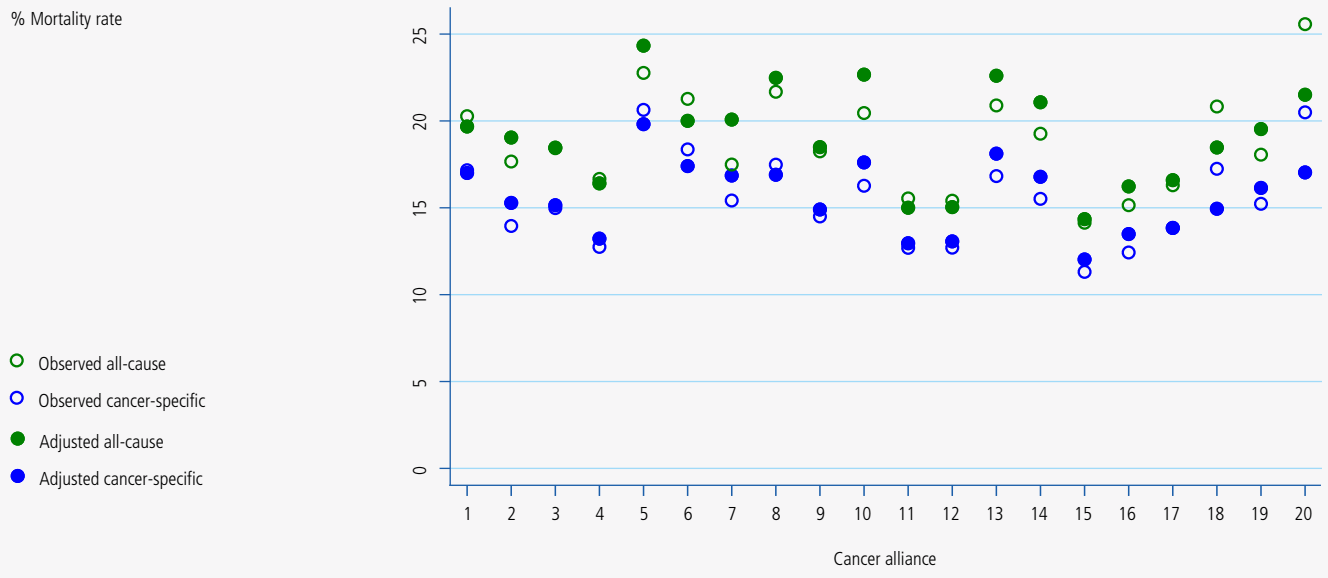
Here we assess what the impact would be of NBOCA reporting cancer-specific two-year mortality by cancer alliance and by trust/hospital/MDT, in addition to/instead of all-cause two-year mortality. Cancer-specific and all-cause two-year mortality are compared in terms of their correlation, the agreement between cancer alliance observed and adjusted estimates of the two measures, the amount of variation between trusts/hospitals/MDTs on adjusted estimated of the two measures, and the effect on potential outlier status of using the two measures.

Comparison of all-cause and cancer specific two-year mortality

Across England and Wales as a whole, the all-cause two-year mortality rate for the 18,208 patients undergoing major resection 1 April 2016 to 31 March 2016 was estimated to be 18.9% (95% CI: 18.3% to 19.6%) per person-two-years. The cancer-specific two-year mortality rate in the same patients was estimated to be 15.5% (95% CI: 14.9% to 16.1%) per person-two-years.

Trust/hospital/MDT estimates of cancer-specific and all-cause two-year mortality were highly correlated (correlation coefficient 0.93 between observed measures and 0.89 between adjusted measures). Although the measures are highly correlated there is a systematic difference between the two, and Figure 5.3 shows that for most cancer alliances there is a moderate absolute difference between adjusted cancer-specific two-year mortality and all-cause two-year mortality. For 10 cancer alliances the absolute difference is between 2 and 3%, for 9 cancer alliances it is between 4 and 5% and for the remaining cancer alliance the absolute difference is 6%.

Figure 5.3
Observed and adjusted cancer-specific and all-cause mortality by cancer alliance for patients undergoing major resection between 01 April 2015 and 31 March 2016



Variation between trust/hospital/MDT all-cause and cancer-specific two-year mortality

If cancer-specific two-year mortality is better at capturing factors which are in the control of the provider then we would expect less variation between trust/hospital/MDT estimates for this measure than for all-cause mortality. There was less variation between trusts/hospitals/MDTs in adjusted cancer-specific two-year mortality than in adjusted all-cause two-year mortality, comparing the adjusted funnel plots in Figures 5.2 and 5.4. For adjusted all-cause two-year mortality, 22 trusts fell outside the inner limits (8 would be expected by chance alone), of which 8 fell outside the outer limits (0.3 would be expected by chance alone). In comparison, for adjusted cancer-specific two-year mortality, only 10 trusts fell outside the inner limits, of which 2 fell outside the outer limits.

All of the 10 trusts that fell outside the inner limits on adjusted cancer-specific two-year mortality also fell outside the inner limits on adjusted all-cause two-year mortality. And the two trusts that fell outside the outer limits on adjusted cancer-specific mortality were also outside the outer limits on adjusted all-cause two-year mortality, demonstrating good agreement in outlier status between the measures.

These findings, together with the findings of our short report, support the use of cancer-specific two-year mortality as a performance indicator. Further work is required to validate the cancer-specific mortality measure fully, including a comparison between the method used here, which uses the ONS underlying cause of death to define cancer-specific deaths, and relative survival methods, which use deaths from all causes and subtract the 'background mortality' in the population.

A risk-adjustment model needs to be developed for all-cause and cancer-specific two-year mortality rate for all patients with bowel cancer, not just those undergoing major resection, so that long-term mortality can be explored in these patients.

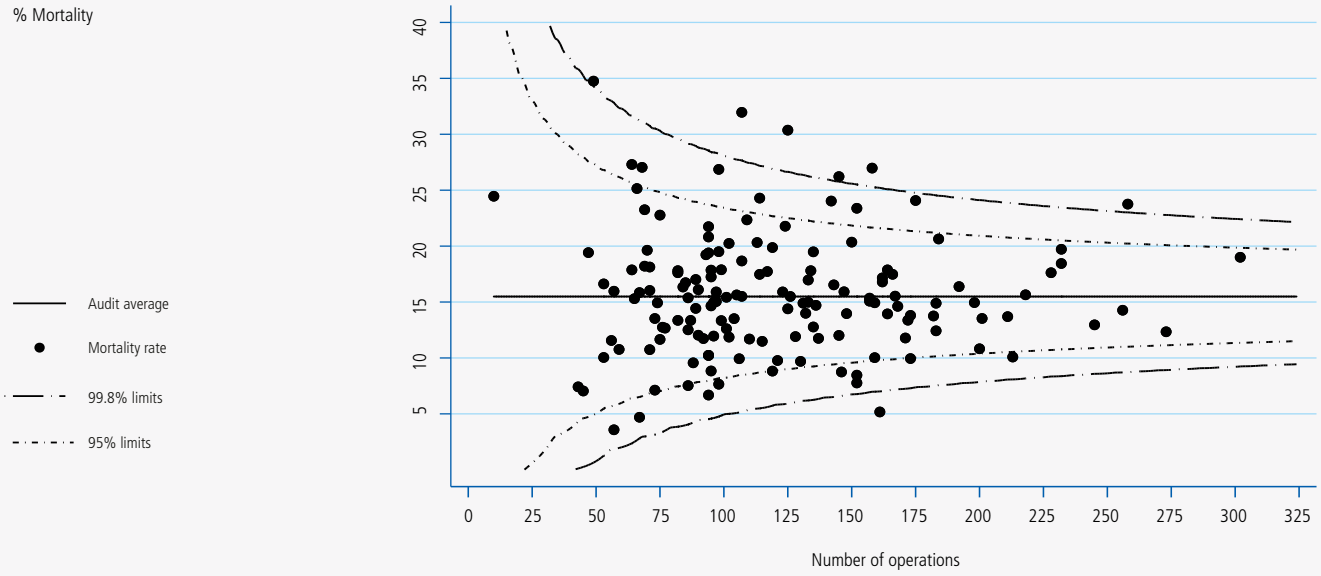
Chapter Recommendations – Survival

1. A risk-adjustment model needs to be developed for all-cause and cancer-specific two-year mortality rate for all patients with bowel cancer, not just those undergoing major resection, so that long-term mortality can be explored in these patients.

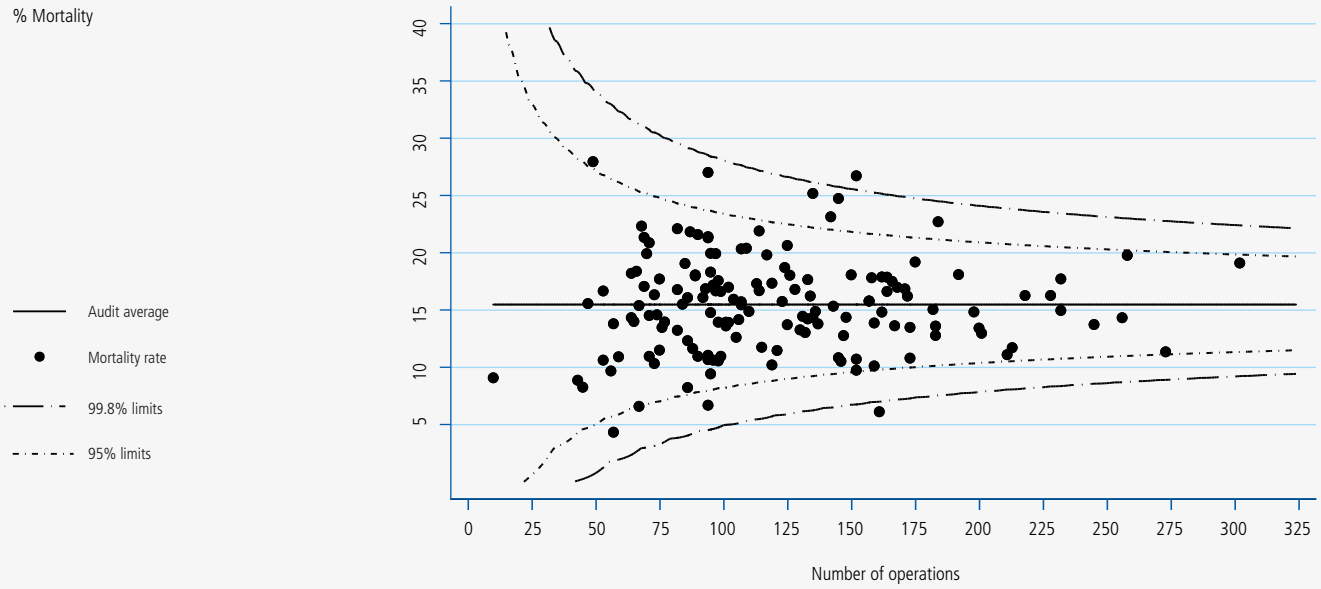
2. Further work is required to validate the cancer-specific mortality measure fully, including a comparison between the method used here, which uses the ONS underlying cause of death, and relative survival methods, which include deaths from all causes and subtract the 'background mortality' in the population.

Figure 5.4
Observed and adjusted cancer-specific two-year mortality for patients undergoing a major resection between 01 April 2015 and 31 March 2016, by hospital/trust/MDTs with at least 10 patients

Observed 2-year cancer-specific mortality by hospital/trust/MDT with more than ten operations



Adjusted 2-year cancer-specific mortality by hospital/trust/MDT with more than ten operations



6. Rectal Cancer

Rectal Cancer – NBOCA 2019

- Rectal cancer patients are treated with major resection (52%), local excision (7%), non-resectional surgery (7%) and no surgery (34%).
- The proportion of patients who are not having any procedures has increased from 29% to 34% which may reflect increased use of neo-adjuvant chemoradiotherapy and 'watchful waiting' strategies (close surveillance following complete response to chemoradiotherapy which negates immediate surgery).
- Approximately one third of patients with rectal cancer received neo-adjuvant radiotherapy.
- There exists considerable geographical variation in the use of neo-adjuvant radiotherapy itself with rates of 23% to 57%, as well as variation in the type of neo-adjuvant therapy being administered.
- Data quality for circumferential resection margins has improved significantly from 25% missing in the 2013/14 report to 10% this year.
- Negative circumferential resection margin rates remain stable at 90%.
- Almost one third of patients undergoing anterior resection do not have reversal of their stoma within 18 months following surgery.
- There continues to exist significant variation in 18-month stoma rates at both cancer alliance/Wales and trust/hospital/MDT levels

6.1 How are patients with rectal cancer treated?

Trends over time

During this audit period, 8,874 patients were diagnosed with rectal cancer with the majority undergoing major resection (Table 6.1). There has been a steady decline in the proportion of patients undergoing major resection (56% to 52%) and an increase in the proportion of patients not having any procedure (29% to 34%). This may be explained by an increase in 'watchful waiting' for patients with a complete pathological response to neo-adjuvant chemoradiotherapy and a proportion of patients who undergo palliative radiotherapy. The proportion of patients undergoing local excision (e.g. transanal endoscopic microsurgery) and non-resectional procedures (e.g. stoma formation) has remained stable.

Table 6.1
Management of rectal cancer patients, by audit year

	2013–14		2014–15		2015–16		2016–17		2017–18	
	N	%	N	%	N	%	N	%	N	%
Total Rectal Cancer Patients	**9,028**		**9,092**		**8,587**		**8,580**		**8,874**	
Major resection	5,056	56.0	4,969	54.7	4,587	53.4	4,628	53.9	4,604	51.9
Local excision	644	7.1	608	6.7	609	7.1	626	7.3	644	7.3
Non-resectional surgery	672	7.4	699	7.7	632	7.4	606	7.1	619	7.0
No Surgery	2,656	29.4	2,816	31.0	2,759	32.1	2,720	31.7	3,007	33.9

Use of radiotherapy

1,643 patients (36%) who underwent major resection for their rectal cancer received neo-adjuvant radiotherapy (Table 6.2). Of these, 72% received long-course chemoradiotherapy, 19% short-course radiotherapy and 9% unclassified regimens. The proportions of patients receiving either long- or short-course radiotherapy have remained stable.

Patients who receive radiotherapy are generally younger with more advanced pre-treatment T- and N-stage disease. Patients with tumours <5cm from the anal verge are more likely to receive radiotherapy and this is more likely to be long-course. Patients receiving short-course radiotherapy are generally older and more co-morbid, with less-advanced pre-treatment T- and N-stage disease than those receiving long-course.

Table 6.2
Patient characteristics by treatment type, for 4,614 rectal cancer patients diagnosed between 01 January 2017 and 31 December 2017 who underwent a major resection

		No preop treatment recorded		Long-course RT pre-surgery		Short-course RT pre-surgery		Other treatment pre-surgery *	
		N	%	N	%	N	%	N	%
Total no. rectal cancer patients		**2,971**		**1,189**		**310**		**144**	
Sex	**Male**	1,941	65.4	849	65.1	227	73.2	96	66.7
	Female	1,028	34.6	424	34.9	83	26.8	48	33.3
	Missing (% of total)	2 (.1)		1 (0.1)		0 (0)		0 (0.0)	
Age-group	**<50 yrs**	152	5.1	148	12.5	20	6.5	16	11.1
	50-64 yrs	470	15.8	298	25.1	37	11.9	27	18.8
	65-74 yrs	1,512	50.9	549	46.2	163	52.6	73	50.7
	75-84 yrs	713	24.0	182	15.3	77	24.8	28	19.4
	85+ yrs	124	4.2	12	1.0	13	4.2	0	0.0
Pre-treatment TNM T-stage	**T1**	175	5.9	7	0.6	5	1.6	1	0.7
	T2	1,052	35.4	82	6.9	57	18.4	13	9.0
	T3	1,387	46.7	837	70.4	218	70.3	94	65.3
	T4	180	6.1	225	18.9	25	8.1	31	21.5
	TX	82	2.8	15	1.3	1	0.3	2	1.4
	T9	94	3.2	22	1.9	4	1.3	3	2.1
Pre-treatment TNM N-stage	**N0**	1,693	57.0	220	18.5	101	32.6	28	19.4
	N1	855	28.8	483	40.6	152	49.0	54	37.5
	N2	248	8.3	438	36.8	52	16.8	55	38.2
	Nx	73	2.5	22	1.9	1	0.3	4	2.8
	N9	102	3.4	25	2.1	4	1.3	3	2.1
Pre-treatment TNM M-stage	**M0**	2,669	89.8	1,022	86.0	269	86.8	80	55.6
	M1	107	3.6	89	7.5	32	10.3	55	38.2
	Mx	103	3.5	48	4.0	6	1.9	5	3.5
	M9	92	3.1	30	2.5	3	1.0	4	2.8
Surgical Procedure	**Anterior Resection**	1,988	66.9	523	44.0	176	56.8	73	50.7
	APER/Pelvic Exenteration	566	19.1	551	46.3	98	31.6	40	27.8
	Hartmann's	303	10.2	98	8.2	34	11.0	24	16.7
	Other	114	3.8	17	1.4	2	0.6	7	4.9
Mode of admission (from HES)	**Elective**	2,500	96.5	1,051	95.6	265	97.4	117	93.6
	Emergency	91	3.5	48	4.4	7	2.6	8	6.4
	Missing (% of total)	380 (12.8)		90 (7.6)		38 (12.3)		19 (13.2)	
Comorbidities (from HES)	**0**	1,487	57.4	661	60.1	139	51.1	54	42.9
	1	724	27.9	314	28.5	79	29.0	43	34.1
	2+	381	14.7	125	11.4	54	19.9	29	23
	Missing (% of total)	379 (12.8)		89 (7.5)		38 (12.3)		18 (12.5)	
Tumour height from anal verge (cm)	**0–5**	615	28.4	413	45.2	87	35.8	33	28.9
	6–10	973	45.0	369	40.4	120	49.4	48	42.1
	11–15	488	22.6	117	12.8	31	12.8	29	25.4
	16–20	88	4.1	15	1.6	5	2.1	4	3.5
	Missing	807 (27.2)		275 (23.1)		67 (21.6)		30 (20.8)	
Grade (differentiation)	**G1 Well**	152	6.0	47	5.2	9	3.5	7	6.6
	G2 Moderate	2,195	87.1	782	86.6	234	90.7	94	88.7
	G3/G4 Poor/Undifferentiated/ anaplastic	174	6.9	74	8.2	15	5.8	5	4.7
	Missing	450 (15.1)		286 (24.1)		52 (16.8)		38 (26.4)	
Vascular/ Lymphatic Invasion	**None**	1,406	58.8	601	63.2	140	55.8	66	57.9
	Vascular +/- Lymphatic	834	34.9	299	31.4	76	30.3	46	40.4
	Uncertain/Not assessed/NK	150	6.3	51	5.4	35	13.9	2	1.8
	Missing	581 (19.6)		238 (20)		59 (19)		30 (20.8)	

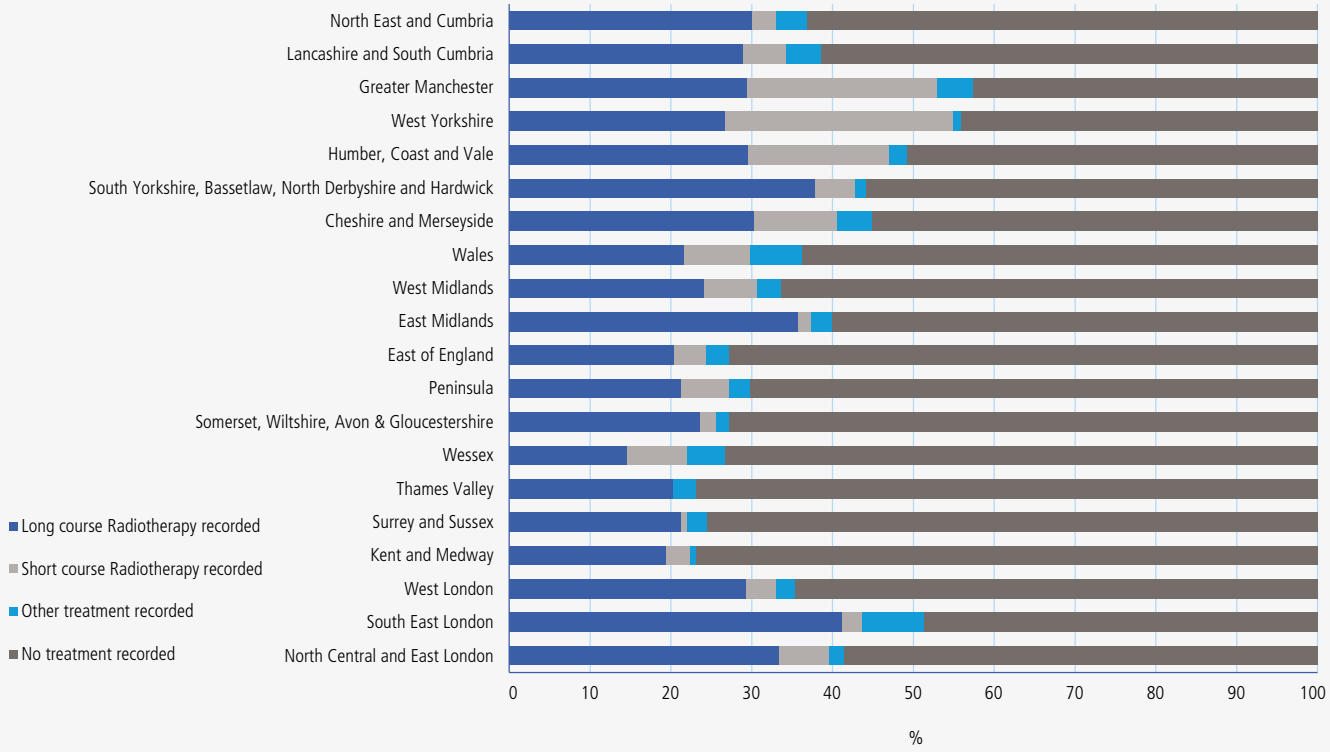
* Chemotherapy, brachytherapy or radiotherapy that cannot be classified into our definitions of long/short-course

Geographical variation in the use of neo-adjuvant radiotherapy

There is considerable variation in the use of neo-adjuvant radiotherapy across cancer alliances and Wales (Figure 6.1). Of note, the radiotherapy dataset (RTDS) is only available for England and therefore audit data alone is currently used for Welsh patients. This could contribute to observed differences between Wales and English cancer alliances.

Overall, the use of neo-adjuvant radiotherapy ranges from 23% for both Kent and Medway and the Thames Valley to 57% in Greater Manchester. Additionally, there is significant variation in the proportion of patients undergoing long-course (15-41%) and short-course (0-28%) radiotherapy.

Figure 6.1
Treatment pathways for rectal cancer patients diagnosed between 01 January 2017 and 31 December 2017 who underwent major resection, by cancer alliance/nation performing surgery



6.2 How many patients having rectal cancer surgery have a negative circumferential resection margin?

A negative circumferential resection margin (CRM) is defined as the edge of the tumour being greater than 1mm from the CRM. This means that the margin is not involved according to the histopathologist.

Data quality continues to improve significantly for this measure from 16.1% missing data in 2016/17 to 10.3% this audit year (Table 6.3). The proportion of patients with negative CRM status remains relatively stable at 90%.

Table 6.3
Resection margin status for those with rectal cancer undergoing major resection, by audit year

		2013–14		2014–15		2015–16		2016–17		2017–18	
		N	%	N	%	N	%	N	%	N	%
Total No. Patients		5,056		4,969		4,587		4,628		4,604	
Recorded Margin Status	Negative	3,526	92.8	3,258	90.8	3,163	90.3	3,564	91.8	3,704	89.7
	Positive	273	7.2	342	9.2	340	9.7	317	8.2	424	10.3
	Missing	1,257	24.9	1,269	25.5	1,084	23.6	747	16.1	476	10.3

6.3 How are stomas used in rectal cancer surgery and how often are 'temporary' stomas reversed?

Formation of stoma and stoma reversal

In total, 85% of rectal cancer patients undergoing major resection had a stoma formed at the time of surgical resection (Table 6.4). This includes all patients undergoing APER and Hartmann's by default, and 78% of patients undergoing anterior resection. Overall, 53% of rectal cancer patients undergoing major resection had a stoma at 18 months which remains stable. Almost one third of patients undergoing anterior resection have a stoma remaining at 18 months and, again, this figure remains stable.

Table 6.4
Description of stoma types by procedure for 13,044 rectal cancer patients linked to HES/PEDW having a major resection between 01 April 2014 and 31 March 2017*, by procedure

		AR		APER		Hartmann's		Other	
		N	%	N	%	N	%	N	%
Total rectal cancer patients undergoing major resection		**8,067**		**3,443**		**1,209**		**325**	
Any stoma	**No**	1,767	21.9	0	0.0	0	0.0	221	68.0
	Yes	6,300	78.1	3,443	100.0	1,209	100.0	104	32.0
Stoma at 18 months, ignoring deaths	**No**	5,769	71.5	0	0.0	124	10.3	239	73.5
	Yes	2,298	28.5	3,443	100.0	1,085	89.7	86	26.5

* 30 September 2016 for Welsh MDTs

Geographical variation in 18-month stoma rates

18-month stoma rate (proportion of patients who still have a stoma at 18 months) - estimated for rectal cancer patients undergoing major surgery. Patients undergoing an abdomino-perineal excision of the rectum (APER) or Hartmann's procedure according to the audit were assumed to have had a stoma at the time of their primary procedure. This was classified as permanent in patients having an APER. HES/PEDW data were used to capture whether anterior resection patients received a stoma.

In patients having an anterior resection or Hartmann's procedure, subsequent stoma reversal was also obtained from HES/PEDW. A procedure code for reversal of ileostomy/colostomy within 18-months of surgery was assumed to mean that the patient had their stoma reversed. To make comparisons between cancer alliances and between trust/hospital/MDTs, 18-month stoma rates for APER, Hartmann's and anterior resection were adjusted for case-mix using the same risk factors as for 90-day mortality (except cancer site). Data for patients undergoing major resection from 01 April 2014 to 31 March 2017 were used to ensure there were sufficient numbers of operations per trust/hospital/MDT in order to make comparisons.

Figure 6.2 demonstrates observed and adjusted 18-month stoma rates for cancer alliances and Wales. There is considerable variation but this remains stable compared to last year with 4 cancer alliances and Wales above the outer limits. Apart from one cancer alliance, three of the cancer alliances and Wales were also potential outliers last year.

Figure 6.3 shows observed and adjusted 18-month stoma rates for trusts/hospitals/MDTs. Again, there exists considerable variation in the adjusted analyses with 7 sites above the outer limits and an additional 15 sites above the inner limits. There are 10 sites below the outer limits and 16 sites below the inner limits. This variation has increased further from last year.

The analysis of stoma presence at 18 months includes all surgical resections for rectal cancer (abdominoperineal excision of the rectum, Hartmann's and anterior resection). Variation is therefore likely to reflect differences in practice with respect to patient selection for permanent stoma, use of adjuvant chemotherapy, local service prioritisation of stoma closure and patient preference.

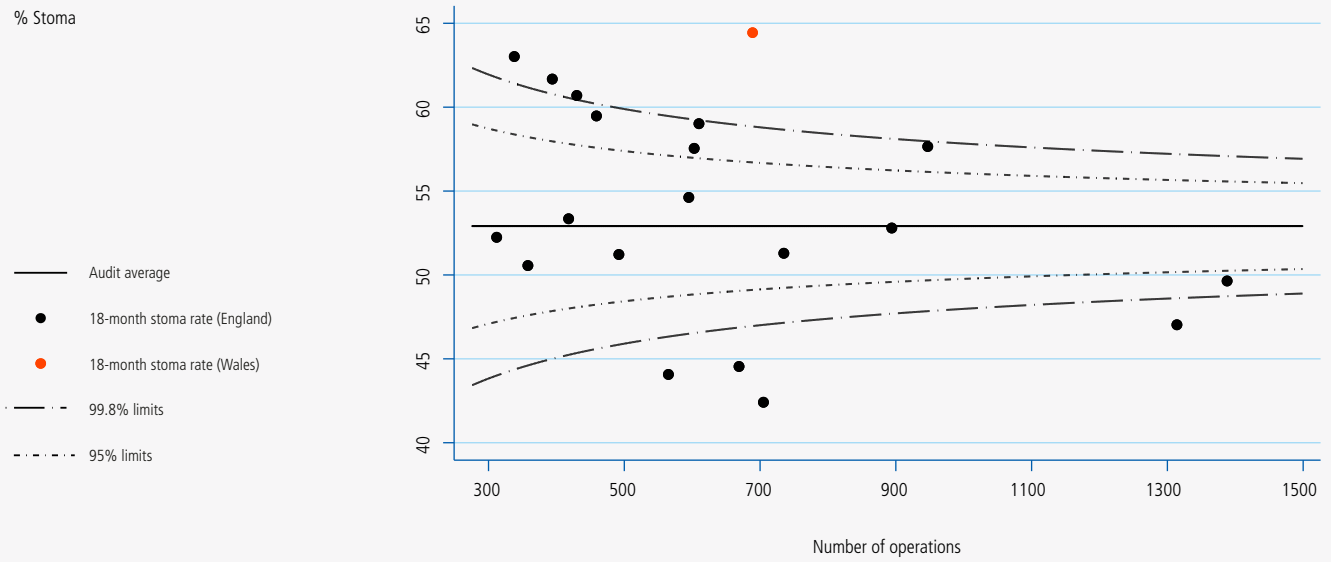
Chapter Recommendations – Rectal cancer

1. Further work is required to explore the reasons for significant geographical variation in radiotherapy use and the consequences those decisions have on patient outcomes.

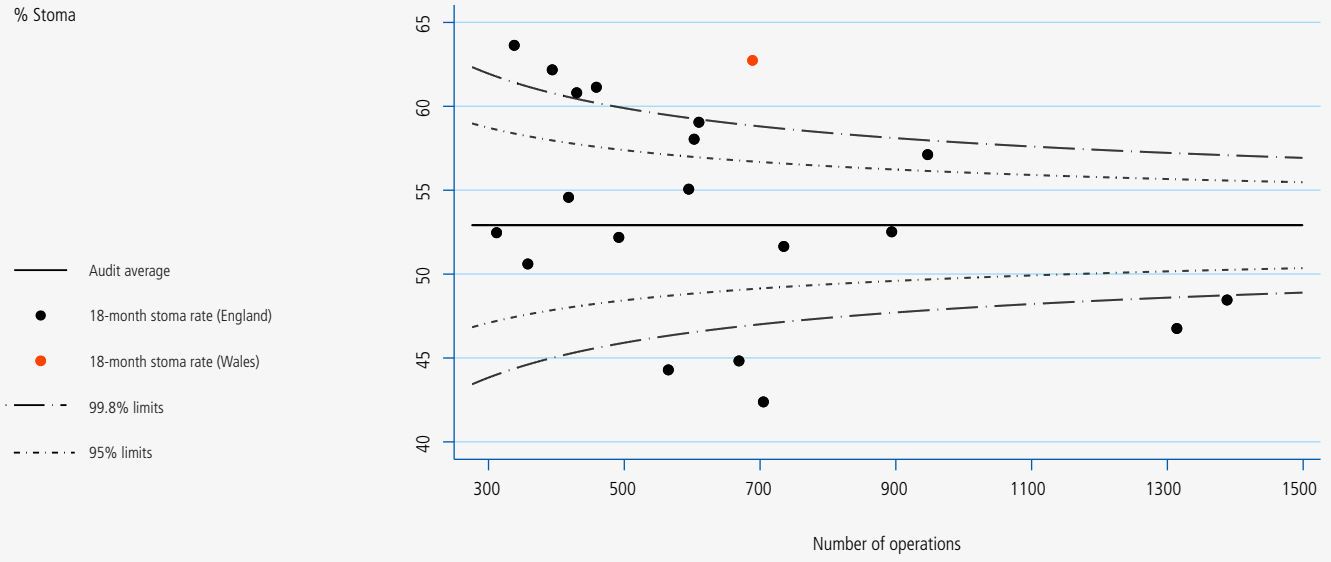
2. Stoma reversal still requires attention and prioritisation with little improvement shown in geographical variation for 18 month stoma rates, particularly at trust/hospital/MDT level.

Figure 6.2
Observed and adjusted 18-month stoma rate by cancer alliance/Wales for rectal cancer patients undergoing a major resection between 01 April 2014 and 31 March 2017*

Observed 18-month stoma rate by Cancer Alliance/Wales



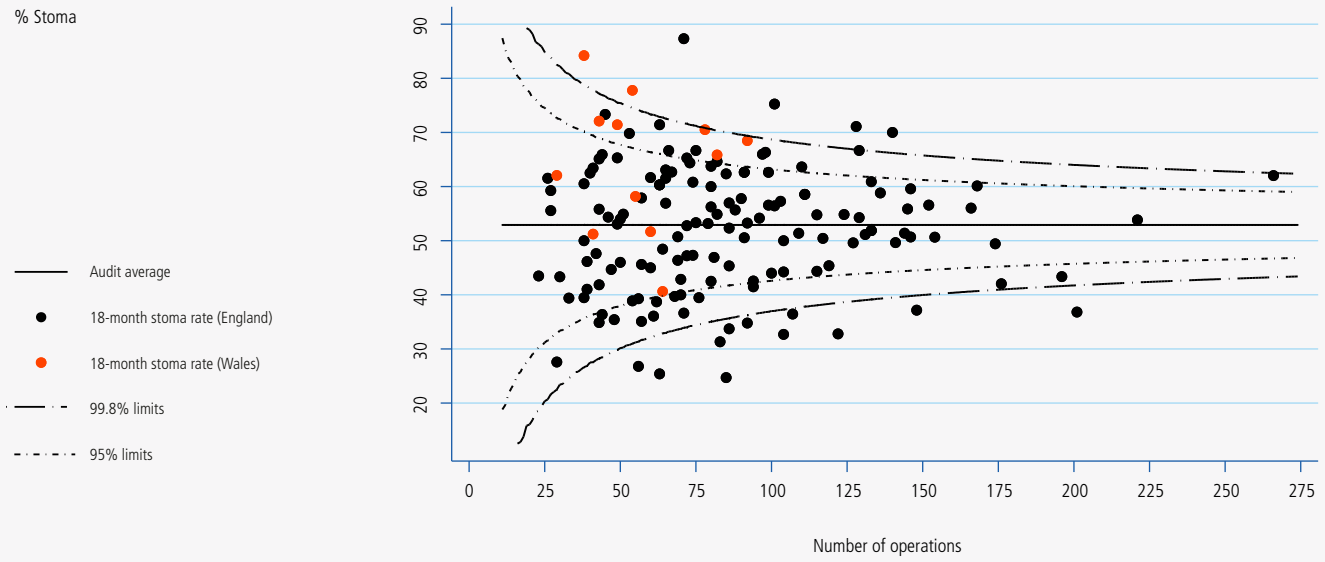
Adjusted 18-month stoma rate by Cancer Alliance/Wales



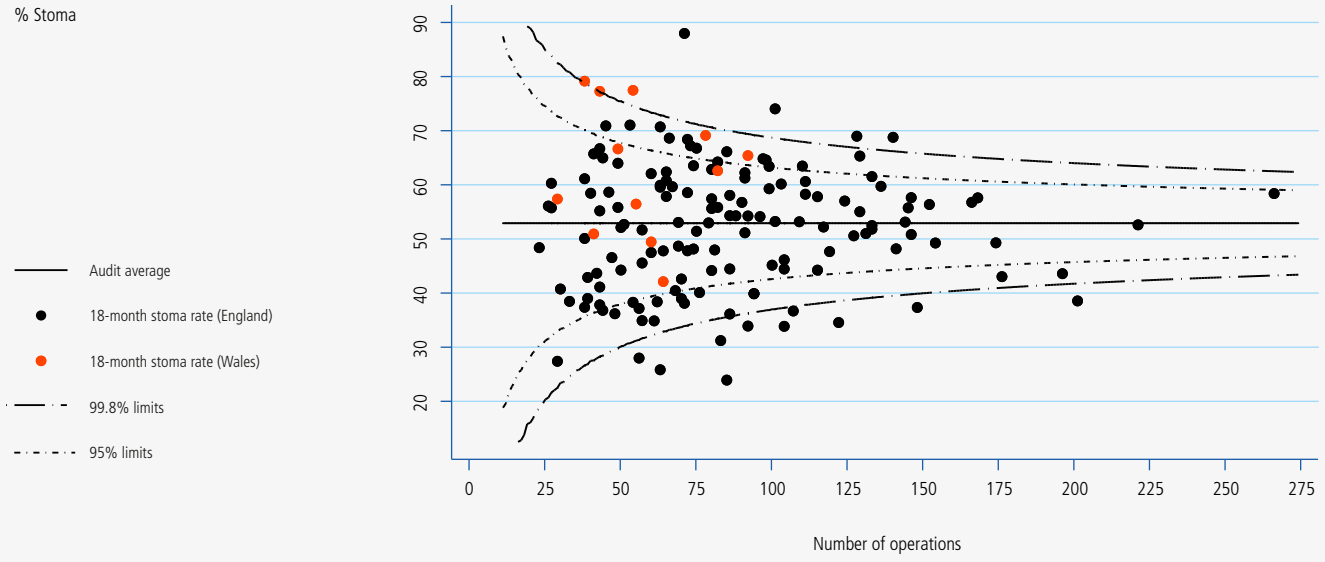
*30 September 2016 for Welsh MDTs

Figure 6.3
Observed and adjusted 18-month stoma rate by trust/hospital/MDT for rectal cancer patients undergoing a major resection between 01 April 2014 and 31 March 2017*

Observed 18-month stoma rate by trust/hospital/MDT with more than 10 operations



Adjusted 18-month stoma rate by trust/hospital/MDT with more than 10 operations



*30 September 2016 for Welsh MDTs

7. National Cancer Registry data

National Cancer Registry data – NBOCA 2019

- For the first time this year, NBOCA had access to National Cancer Registry data.
- Initial exploratory work suggests that there are fundamental differences in the patients identified within National Cancer Registration and Analysis Service (NCRAS) who do not link to NBOCA. These patients tend to be older, without a tissue diagnosis and often die rapidly after diagnosis. This likely precludes them from accessing secondary care pathways (a prerequisite for NBOCA inclusion).
- Further development work, including adjustment of the NBOCA case ascertainment denominator, will be undertaken and form a short report.

NBOCA data were sent to PHE for linkage to National Cancer Registry and Analysis Service (NCRAS) data in June 2019 by NHS Digital; excluding patients with a registered National Data Opt-out.

Restrictions were applied to the NBOCA and NCRAS datasets in order to obtain two datasets that were as close as possible in terms of eligibility for inclusion (Figure 7.1). NCRAS data are only collected in England, therefore data with Welsh MDT codes were excluded. Patients <18 years at diagnosis and carcinoid/neuroendocrine tumours are specifically excluded from NBOCA; therefore these exclusions were applied to NCRAS. Tumour site C181 (Appendix) was removed from both in an attempt to ensure that all carcinoid tumours were excluded.

NBOCA cleaning

- Data restricted to records with a diagnosis date between April 2017 – March 2018
    - NBOCA data is submitted as a single record
- Records with a Welsh MDT code were excluded
- Records with an ICD-10 code for tumour site C181 (Appendix) site removed

NCRAS cleaning

- Data restricted to records with a diagnosis date between April 2017– March 2018
    - 3% patients had records for multiple tumour sites
- Records with a Welsh MDT code were excluded
- Records with an age at diagnosis <18 removed
- Records with an ICD-10 code for tumour site C181 (Appendix) site removed
- Records with carcinoid or neuroendocrine histology removed
- Record with earliest diagnosis date kept

Comparison between linked and unlinked patients shows systematic differences between the two groups. Patients submitted to NBOCA are required to have a diagnosing trust recorded in their data; approximately 7.5% of patients in NCRAS unlinked to NBOCA did not have a diagnosing trust recorded in NCRAS compared to approximately 0.1% of linked patients. Patients without a diagnosing trust recorded in NCRAS are likely to be those who did not enter secondary care and were therefore not discussed by an MDT.

Table 7.1 compares NCRAS data between patients unlinked and linked to NBOCA. Those unlinked to NBOCA are further broken down into patients recorded as entering secondary care (i.e. with a diagnosing trust recorded) and patients not entering secondary care (i.e. without a diagnosing trust recorded). This highlights substantial differences between linked and unlinked patients. NCRAS patients who could not be linked to NBOCA data were more likely to be female, older, without a tissue diagnosis and died sooner after diagnosis than those who did link to NBOCA. These differences were more pronounced in those not entering secondary care, with a third of these patients diagnosed only at death certificate and a further half without a tissue diagnosis.

Figure 7.1
Cleaning of NCRAS and NBOCA data for English trusts/hospitals only

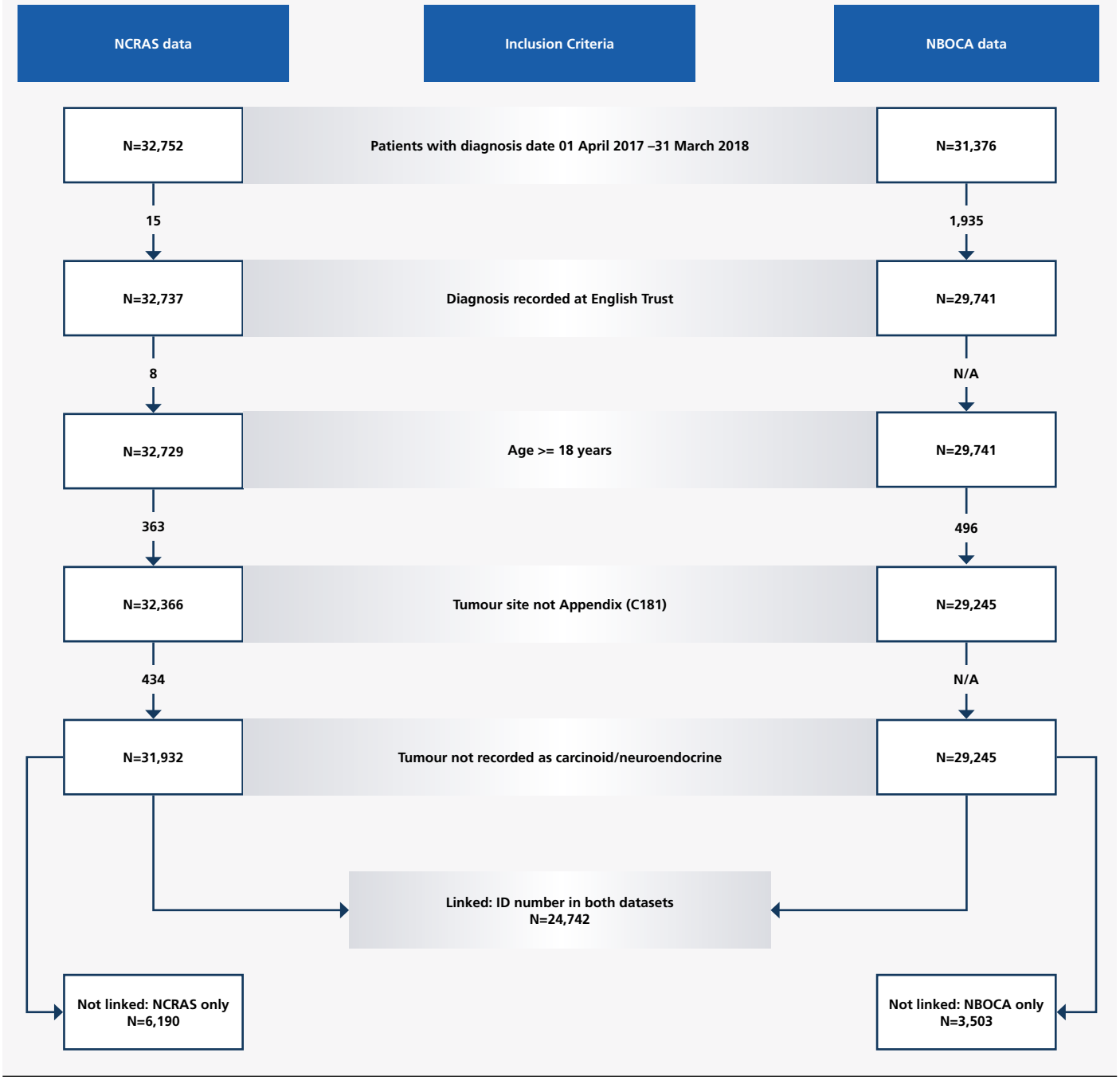


Table 7.1
NCRAS demographic data according to NBOCA linkage and recording of secondary care

		Not linked to NBOCA: Not entering secondary care		Not linked to NBOCA: Entering secondary care		Linked to NBOCA*	
		473		5,717		25,712	
Sex	Male	225	47.6	2,977	52.1	14,702	57.2
	Female	248	52.4	2,740	47.9	11,010	42.8
	Missing						
Age	<50 years	7	1.5	281	4.9	1,501	5.8
	50-64 years	37	7.8	1,030	18.0	5,887	22.9
	65-74 years	72	15.2	1,443	25.2	7,652	29.8
	75-84 years	135	28.5	1,712	30.0	7,528	29.3
	>=85 years	222	46.9	1,251	21.9	3,144	12.2
Tumour Site	Ascending colon	15	3.2	519	9.1	2,802	10.9
	Caecum	52	11.0	880	15.4	3,821	14.9
	Colon, not otherwise specified	212	44.8	522	9.1	232	0.9
	Descending colon	6	1.3	186	3.3	925	3.6
	Hepatic flexure	7	1.5	206	3.6	1,061	4.1
	Overlapping lesion of colon	0	0.0	28	0.5	55	0.2
	Colon with rectum (Rectosigmoid)	32	6.8	337	5.9	1,513	5.9
	Rectum, not otherwise specified	92	19.5	1,361	23.8	7,470	29.1
	Sigmoid colon	47	9.9	1,140	19.9	5,561	21.6
	Splenic flexure	1	0.2	164	2.9	634	2.5
	Transverse colon	9	1.9	374	6.5	1,638	6.4
Basis of diagnosis	Death certificate	161	34.0	0	0.0	0	0.0
	Clinical diagnosis before death with listed investigations	50	10.6	53	0.9	64	0.3
	Clinical investigations without tissue diagnosis	197	41.7	1,354	23.7	1,830	7.1
	Specific tumour markers	0	0.0	1	0.0	3	0.0
	Cytology	2	0.4	20	0.4	19	0.1
	Histology of a metastasis	3	0.6	441	7.7	491	1.9
	Histology of primary tumour	47	9.9	3,788	66.3	23,296	90.6
	Unknown e.g. PAS only	13	2.8	60	1.1	9	0.0
Highest recorded tumour Staging	1	6	1.3	803	14.1	4,417	17.2
	2	8	1.7	788	13.8	6,554	25.5
	3	3	0.6	1,056	18.5	7,780	30.3
	4	21	4.4	1,869	32.7	5,573	21.7
	Missing	435	92.0	1,201	21.0	1,388	5.4
Mortality from diagnosis	7 days	356	75.3	343	6.0	173	0.7
	30 days	383	81.0	910	15.9	792	3.1
	90 days	409	86.5	1,611	28.2	2,223	8.7
	182 days	424	89.6	2,083	36.4	3,640	14.2
	365 days	432	91.3	2,573	45.0	5,544	21.6

*excludes 30 cases missing diagnosing trust in NCRAS

These differences suggest that some patients are not submitted to NBOCA because they do not start a secondary care treatment pathway due to early mortality, lack of histological tumour confirmation and advanced age. These are potentially all interlinked e.g. frail patients presenting with end stage disease for whom tissue confirmation would not affect treatment. Not all NBOCA patients could be sent for linkage to NCRAS, due to National Data Opt-out, and incomplete or inaccurate patient identifiers in each dataset will also lead to incomplete linkage. This makes it likely that there is some overlap between patients in NCRAS unlinked to NBOCA and patients in NBOCA unlinked to NCRAS.

Further work will be done by NBOCA to investigate more fully the reasons for non-submission of certain patients to NBOCA and to NCRAS, and to attempt to quantify the number of records in the two groups of unlinked datasets who are the same patients. This will be published as a short report later in 2020.

NBOCA produces case ascertainment for NHS trusts, using HES as the denominator for English trusts and PEDW as the denominator for Welsh MDTs. A preliminary analysis estimating case ascertainment using NCRAS as the denominator, summarised in Table 7.2, produces very similar results to HES. Linkage of NBOCA to NCRAS results in three groups of patients: those in NCRAS only, those in NBOCA only and those linked between the two. Table 7.2 shows the relative size of these groups according to the estimated case ascertainment using NCRAS as the denominator. This suggests that, particularly for trusts with lower estimated case ascertainment, there is a combination of incomplete linkage between the datasets and lower submission of patients to NBOCA than NCRAS. Part of the work carried out for the short report will be to investigate this further in order to explore changing the denominator data source for case ascertainment.

Table 7.2
NBOCA Case Ascertainment using NCRAS data as the denominator, with corresponding linkage rate between NCRAS and NBOCA

NBOCA trust case ascertainment using NCRAS as denominator (%)	Number of trusts	Proportion of total patients at these trusts in NCRAS only, NBOCA only or linked (%)*		
		NCRAS only	NBOCA only	Linked NCRAS - NBOCA
100	42	11	12	77
>90, <=100	46	13	9	78
>80, <=90	26	21	7	72
>60, <=80	11	29	6	65
<=60	5	58	6	37

*Mean across all trusts in Case Ascertainment group

Chapter Recommendations – National Cancer Registry data

1. Further development work should be carried out comparing capture into National Cancer Registry data and NBOCA data to better understand reasons for the differences. The findings should guide how National Cancer Registry data can be incorporated into NBOCA analyses.

Appendix 1 – Bowel cancer management – by English trust & Welsh MDT

Please access your individual Trust/hospital/MDT results by clicking on the relevant hyperlink below.

Trust/hospital/MDT results are also available in an Excel spreadsheet at: https://www.nboca.org.uk/reports/appendix_2019

North East and Cumbria

South Tyneside and Sunderland NHS Foundation Trust - Sunderland Royal Hospital

County Durham and Darlington NHS Foundation Trust

Gateshead Health NHS Foundation Trust

North Cumbria University Hospitals NHS Trust

North Tees and Hartlepool NHS Foundation Trust

Northumbria Healthcare NHS Foundation Trust

South Tees Hospitals NHS Foundation Trust

South Tyneside and Sunderland NHS Foundation Trust - South Tyneside District Hospital

The Newcastle Upon Tyne Hospitals NHS Foundation Trust

Lancashire & South Cumbria

Blackpool Teaching Hospitals NHS Foundation Trust

East Lancashire Hospitals NHS Trust

Lancashire Teaching Hospitals NHS Foundation Trust

University Hospitals of Morecambe Bay NHS Foundation Trust

Greater Manchester

Bolton NHS Foundation Trust

Manchester University NHS Foundation Trust

Pennine Acute Hospitals NHS Trust

Salford Royal NHS Foundation Trust

Stockport NHS Foundation Trust

Tameside Hospital NHS Foundation Trust

The Christie NHS Foundation Trust

Wrightington, Wigan and Leigh NHS Foundation Trust

Humber, Coast and Vale

Hull and East Yorkshire Hospitals NHS Trust

Northern Lincolnshire and Goole NHS Foundation Trust

York Teaching Hospital NHS Foundation Trust- Scarborough Hospital

York Teaching Hospital NHS Foundation Trust- The York Hospital

South Yorkshire, Bassetlaw, North Derbyshire and Hardwick

Barnsley Hospital NHS Foundation Trust

Chesterfield Royal Hospital NHS Foundation Trust

Doncaster and Bassetlaw Hospitals NHS Foundation Trust

Sheffield Teaching Hospitals NHS Foundation Trust

The Rotherham NHS Foundation Trust

West Yorkshire

Airedale NHS Foundation Trust

Bradford Teaching Hospitals NHS Foundation Trust

Calderdale and Huddersfield NHS Foundation Trust

Harrogate and District NHS Foundation Trust

Leeds Teaching Hospitals NHS Trust

Mid Yorkshire Hospitals NHS Trust

Cheshire and Merseyside

Aintree University Hospital NHS Foundation Trust

Countess of Chester Hospital NHS Foundation Trust

Royal Liverpool and Broadgreen University Hospitals NHS Trust

Southport and Ormskirk Hospital NHS Trust

St Helens and Knowsley Hospitals NHS Trust

Warrington and Halton Hospitals NHS Foundation Trust

Wirral University Teaching Hospital NHS Foundation Trust

East Cheshire NHS Trust

Mid Cheshire Hospitals NHS Foundation Trust

West Midlands

George Eliot Hospital NHS Trust

University Hospitals of Derby and Burton NHS Foundation Trust - Queens Hospital (Burton)

University Hospitals Birmingham NHS Foundation Trust - Heartlands Hospital

Sandwell and West Birmingham Hospitals NHS Trust

Shrewsbury and Telford Hospital NHS Trust

South Warwickshire NHS Foundation Trust

The Dudley Group NHS Foundation Trust

The Royal Wolverhampton NHS Trust

University Hospitals Birmingham NHS Foundation Trust - Queen Elizabeth Hospital

University Hospitals Coventry and Warwickshire NHS Trust

University Hospitals of North Midlands NHS Trust

Walsall Healthcare NHS Trust

Worcestershire Acute Hospitals NHS Trust

Wye Valley NHS Trust

East Midlands
University Hospitals of Derby and Burton NHS Foundation Trust - Royal Derby Hospital
Kettering General Hospital NHS Foundation Trust
Northampton General Hospital NHS Trust
Nottingham University Hospitals NHS Trust
Sherwood Forest Hospitals NHS Foundation Trust
United Lincolnshire Hospitals NHS Trust – Lincoln and Grantham
United Lincolnshire Hospitals NHS Trust – Pilgrim Hospital Boston
University Hospitals of Leicester NHS Trust
East of England
Basildon and Thurrock University Hospitals NHS Foundation Trust
Bedford Hospital NHS Trust
Cambridge University Hospitals NHS Foundation Trust
East and North Hertfordshire NHS Trust
East Suffolk and North Essex NHS Foundation Trust - Colchester Hospital
East Suffolk and North Essex NHS Foundation Trust - Ipswich Hospital
James Paget University Hospitals NHS Foundation Trust
Luton and Dunstable University Hospital NHS Foundation Trust
Mid Essex Hospital Services NHS Trust
Norfolk and Norwich University Hospitals NHS Foundation Trust
North West Anglia NHS Foundation Trust
Southend University Hospital NHS Foundation Trust
The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust
West Hertfordshire Hospitals NHS Trust
West Suffolk NHS Foundation Trust
The Princess Alexandra Hospital NHS Trust
Milton Keynes Hospital NHS Foundation Trust
Thames Valley
Buckinghamshire Healthcare NHS Trust
Great Western Hospitals NHS Foundation Trust
Oxford University Hospitals NHS Trust
Royal Berkshire NHS Foundation Trust
South East London
Guy's and St Thomas' NHS Foundation Trust
King's College Hospital NHS Foundation Trust - King's College Hospital
King's College Hospital NHS Foundation Trust - Princess Royal University Hospital
Lewisham and Greenwich NHS Trust

West London
Chelsea and Westminster Hospital NHS Foundation Trust
Croydon Health Services NHS Trust
Epsom and St Helier University Hospitals NHS Trust
Imperial College Healthcare NHS Trust
Kingston Hospital NHS Foundation Trust
London North West Hospitals NHS Trust
St George's Healthcare NHS Trust
The Hillingdon Hospitals NHS Foundation Trust
The Royal Marsden NHS Foundation Trust
North Central and East London
Barking, Havering and Redbridge University Hospitals NHS Trust
Barts Health NHS Trust
Homerton University Hospital NHS Foundation Trust
North Middlesex University Hospital NHS Trust
Royal Free London NHS Foundation Trust
The Whittington Hospital NHS Trust
University College London Hospitals NHS Foundation Trust
Peninsula
Northern Devon Healthcare NHS Trust
Plymouth Hospitals NHS Trust
Royal Cornwall Hospitals NHS Trust
Royal Devon and Exeter NHS Foundation Trust
Torbay and South Devon Healthcare NHS Foundation Trust
Somerset, Wiltshire, Avon and Gloucestershire
Gloucestershire Hospitals NHS Foundation Trust
North Bristol NHS Trust
Royal United Hospitals Bath NHS Foundation Trust
Salisbury NHS Foundation Trust
Taunton and Somerset NHS Foundation Trust
University Hospitals Bristol NHS Foundation Trust
Weston Area Health NHS Trust
Yeovil District Hospital NHS Foundation Trust

Wessex
Dorset County Hospital NHS Foundation Trust
Hampshire Hospitals NHS Foundation Trust - Basingstoke and North Hampshire Hospital
Hampshire Hospitals NHS Foundation Trust - Royal Hampshire County Hospital
Isle of Wight NHS Trust
Poole Hospital NHS Foundation Trust
Portsmouth Hospitals NHS Trust
The Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust
University Hospital Southampton NHS Foundation Trust
Kent & Medway
Dartford and Gravesham NHS Trust
East Kent Hospitals University NHS Foundation Trust
Maidstone and Tunbridge Wells NHS Trust
Medway NHS Foundation Trust
Surrey & Sussex
Ashford and St Peter's Hospitals NHS Foundation Trust
Brighton and Sussex University Hospitals NHS Trust
East Sussex Healthcare NHS Trust
Frimley Health NHS Foundation Trust - Heatherwood and Wexham Park Hospitals
Frimley Health NHS Foundation Trust - Frimley Park Hospital
Royal Surrey County Hospital NHS Foundation Trust
Surrey and Sussex Healthcare NHS Trust
Western Sussex Hospitals NHS Foundation Trust- St. Richard's Hospital
Western Sussex Hospitals NHS Foundation Trust- Worthing Hospital

Wales
Bronglais MDT
Cardiff MDT
Nevill Hall Hospital MDT
Prince Charles Hospital MDT
Princess of Wales MDT
Royal Glamorgan Hospital MDT
Royal Gwent Hospital MDT
Swansea MDT
West Wales General & Prince Phillip MDT
Withybush General MDT
Ysbyty Glan Clwydd MDT
Ysbyty Gwynedd MDT
Ysbyty Maelor MDT

Appendix 2 – Outlier communications

30 day unplanned re-admission			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
North Bristol NHS Trust	Thank you for your letter of 9th September 2019 indicating that the Trust had been identified in the National Bowel Cancer Audit as a potential outlier for 30 day unplanned readmission. I am grateful for the opportunity to respond to this alert. Firstly can I point out that whilst your original letter was copied to me and the Chief Exec of North Bristol NHS Trust, it was erroneously emailed to a number of colleagues at University Hospitals of Bristol Foundation Trust. I would be grateful if you could check your systems so that such an error is not repeated. Our Clinical Lead for coloproctology has reviewed the data available in our systems. In your letter you cite the observed rate of 30-day unplanned readmissions after major resection, at North Bristol NHS Trust as an adjusted rate of 20.6% compared to a rate for England and Wales of 10.8%. Unadjusted 30-day readmission rate was quoted as 21.1% We have instituted a local review of this data by examining individual patient records. We have not yet completed this work but can report interim findings. We have identified that coding practice in North Bristol NHS Trust includes Surgical Hot Clinic day attendances, some day Stoma therapy attendances and all ward day attendances for catheter removal as readmissions. 53% of readmissions on our ERAS database of 158 patients for this period fall within these codes. The rate of actual unadjusted readmission into the inpatient service in this group is 9.4%. NHS Digital has helpfully provided the raw NHS numbers of those patients logged nationally as readmissions, a total of 28 patients. We have audited each of these and note that 12 were clinic or day attenders. 16 were readmissions to the ward from a cohort of 133 patients giving an unadjusted 30-day readmission rate of 12%. We believe that these coding issues explain the apparent outlying data and that the information from our audit is reassuring that true readmission to the inpatient service in North Bristol NHS Trust is at an 'as expected' level. We will of course complete our audit work and if it is helpful can provide further information in the future.	Alert	No
Swansea MDT	Thank you for your letter dated the 6th September 2019 in relation to the 30-day readmission rate for the Swansea MDT. I am grateful to your colleague Andrew Whitehead for assistance in identifying the patients in order for us to undertake a timely local review. A total of 28 patient records were identified. We have reviewed each record and reason for readmission and can provide the following summary: Eleven patients had unplanned admissions in relation to surgery, however 1 of these had bowel resection and cholecystectomy; the readmission was in relation to a collection in the gallbladder bed. There were 6 unplanned admissions under the physicians relating to pre-existing medical conditions. 4 patients were reviewed in the Short Stay Surgical Unit for wound related problems, these patients were brought to this unit for review only but were recorded as admissions. All 4 patients went home following wound review. We are awaiting further information on 7 patients, our records do not show 30 day readmissions with any of the hospitals within Swansea Bay University Health Board. Based on the above we have 17 unplanned admissions only, which we understand would be a readmission rate of 12.7%, however this will be adjusted depending on further information received. I have been assured that we will have opportunity to finalise the response that will be published once we have had the opportunity to review the additional data requested from the RCS in relation to the patients that we have not been able to identify a local readmission within 30 days of discharge, and will provide further comment thereafter.	Alert	No
University Hospitals of Leicester NHS Trust	Thank you for your letter dated the 9th September, and for the opportunity to allow us to analyse our data, specifically readmissions within 30 days of discharge after major colorectal resection. Major colorectal cancer resections within University Hospitals of Leicester take place at two hospital sites, Leicester Royal Infirmary (LRI) and Leicester General Hospital (LRI). We identified 295 patients in our database who were diagnosed with colorectal cancer between 1st April 2017 and 31st March 2018 and who underwent a major resection before 31st October 2018. Of these 295, 56 patients were coded as a readmission. Of these 56, 14 attended one of our two surgical triage areas for a 'ward attender' review, for example checking a wound or removal of a drain. They were not admitted. Of the 56, 42 patients were therefore readmitted to a ward for one day or more; their data were analysed carefully to identify potential predictive factors. At operation for the primary cancer, the patients' median age was 72 years and BMI 28. 37 operations were elective and 5 emergency. The readmissions were evenly split between the two hospital sites (22 LRI, 20 LGH). There was no trend between site of primary tumour/operation performed and readmission, nor was there any association with mode of access (lap/open/robotic). Length of hospital stay at the index admission for the primary tumour was 9 days (IQR 7-14). The number of days between surgery and readmission was a median of 17 days (IQR 12-26); between date of discharge after primary surgery and readmission was a median of 8 days (IQR 4-10). Once readmitted, length of stay was a median of 5 days (IQR 2-9). No patients died during their readmission. Of the 42 patients readmitted, 38 came in under the care of GI surgeons (1 oncology, 1 renal, 2 general medicine). • Nine patients (21%) underwent further surgery and one a radiological drain. Of those who underwent surgery, 4 were to drain a pelvic collection, one to treat an anastomotic leak, one to resuture of a dehiscence, one to perform early reversal of ileostomy and one to perform a palliative gastrojejunostomy for rapidly progressive nodal disease. • 32 patients were managed conservatively. In retrospect 10 cases might have been managed in an ambulatory setting. Actions taken: 1. Work is underway to ensure ward attender visits (planned and unplanned) are correctly coded 2. We will work towards strengthening our assessment pathways so that patients with early and relatively minor complications can be managed efficiently in an ambulatory manner without admission 3. This data will be discussed in detail at our next colorectal team meeting in order to identify any potential changes in practice that may reduce readmissions I trust the action taken as detailed above resolves the issue, and we await your full report in due course.	Alert	No

30 day unplanned re-admission			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
University Hospitals of North Midlands NHS Trust	Thank you very much for your letter of the 9th October informing me of the potential outlier outcome measure. You identified that we might have a higher than expected rate of readmission following elective colorectal surgery. This is an ongoing issue for a few years related mainly to the coding system utilised by our hospital. In summary, patients who undergo elective colorectal surgery are enrolled to enhanced recovery programme. As a safety net they're allowed direct access to the surgical assessment unit for the forthcoming weeks following discharge. Any attendance to SAU, regardless how trivial it might be (i.e. Drain check, wound check, reassurance, blood check, additional imaging etc) is recorded as an admission even if patients are present for a few hrs only. We are in the process of reviewing all the case notes of all patients readmitted following elective colorectal surgery for the period concerned and the primary review suggests exactly that. However, we feel that safety netting is vital for patient's safety and ensuring high quality of patient care. We are working with the trust to change the way we code these attendances and towards establishing a hot clinic.	Alert	No
Royal Berkshire NHS Foundation Trust	Thank you for your letter dated 9th September 2019 informing the Royal Berkshire NHS Foundation Trust that it has been identified as an outlier for 30-day unplanned readmissions after major resection in both 2018 & 2019 annual reports. The 2019 report, although not published, identified an adjusted 30-day unplanned readmission rate of 17.9% for the Trust in comparison to the overall 30-day unplanned readmission rate for England and Wales of 10.8%. The 2018 report identified an adjusted 30-day unplanned readmission rate of 18.1% for the Trust in comparison to the overall 30-day unplanned readmission rate for England and Wales of 10.8%. The Trust had been aware of this issue after the publication of the 2017 report, as part of its review process for all relevant National audit reports and results. Although not identified as an outlier in the 2017 report it was noted that the adjusted readmission rate was higher for this trust compared to the national average. Review by the Clinical Lead established that this was a data issue – post surgical patients who attended for a wound check, drain removal & review were reviewed on the Surgical Assessment Unit and sent home within several hours, and were never admitted to a bed. However, because of the way the data was captured within the Trust these patients were being 'admitted' on the Trust's electronic systems, resulting in an apparent re-admission. Within the last 12 months this anomaly has been rectified so that this cohort of patients will now be recorded as a clinic attendance. We are confident that these amendments will be rectified when the 2020 report, based on 2018/19 data is released. We appreciate you bringing this to our attention and giving us the opportunity to respond.	Alert	No

24 Month Mortality			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
Barking, Havering and Redbridge University Hospitals NHS Trust	Thank you for asking us to respond to the 2019 report findings prior to publication. The data accepted by NBOCAP for publication has suggested that our trust has suddenly become an outlier for 2 year mortality (2015-16 outcomes) with an unadjusted figure of 27.3% and an adjusted figure of 30.9%. This compares to the preceding years figure of 20.0% and 19.8% respectively. During the period of 2015-16 there were no obvious changes to the hospital catchment area, departmental structure, surgical staff or management protocols and therefore it has been an unexpected finding. It was postulated that the explanation was likely inadequate data capture and/or upload issues during that period. From additional data sent from NHS digital we could see that there were many data points missing during this time period compared to the national average. For example, 18.3% unknown T or N staging (average 5.8%), unknown M staging 27.4% (average 11.5%). ASA grading missing in 10.6% (average 5.5%). Data quality issues were identified as a potential risk in 2017 and this was addressed by the employment of a dedicated colorectal data manager who works closely with us to this day. We therefore hope that these types of data issues have been sorted for future audits. Following audit and investigation, an additional 24 confirmed major cancer resections were identified which significantly alters the unadjusted mortality rate to 19.9%. Calculations used for adjusted mortality unknown. **Audit and investigation** Following the letter of potential outlier status, the medical director, relevant divisional, governance and clinic leads were all informed and a registered audit commenced. NHS Digital identified 33 mortalities from 142 major resections. Identifying details of the 33 mortalities were shared with us but not of the remaining 109 cases. *Inclusion Criteria* *All patients aged 18 or over undergoing a major resection between 1 April 2015 and 31 March 2016, according to NBOCA. Patients with cancer of the appendix and patients missing date of surgery or whose date of surgery is reported to be after their date of death were excluded. Patients for whom ONS date of death was unavailable were also excluded, and this includes patients who made a type 2 objection.* The Somerset Cancer Registry is utilised for cancers within our trust. A search for all colorectal cancer patients undergoing procedures during 1st April 2015 - 31st March 2016 was performed. A total of 226 procedures were identified.	No	No

24 Month Mortality			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
Barking, Havering and Redbridge University Hospitals NHS Trust **/continued**	All non-resections were identified and excluded • Operative colonoscopies • TEMS resections • Polypectomy/polyp cancer • Appendix surgery or surgery for appendiceal cancer • Defunctioning procedures • By-pass procedures • Diagnostic/Biopsy only • Duplicates (more than 1 procedure registered the patient twice) • Colonic stenting Following this evaluation, 173 patients remained. Each of these 173 cases was individually cross checked with pathology reports on Cyberlab (the trusts pathology reporting database) to ensure all had major cancer resection specimens reported. We now report 166 confirmed cases that had a major cancer resection that met the inclusion criteria. This is 24 more major cancer resections than previously reported. An exact match for the identified 33 mortalities was found within the 166 cases. Using this data the trust has a basic unadjusted mortality rate of 19.9% which has been fed back to NHS digital prior to this formal response. **Case Review** It was decided that a review of the 33 mortalities should be performed at this opportunity. All 33 sets of notes were requested. 31 complete sets of notes have been identified and reviewed in parallel with Somerset Cancer Registry, EPRO digital dictation, Cyberlab pathology reporting, Medway database and our radiology reporting PACS system. The full audit is beyond the requirements of this response but in summary of the 33 mortalities: 39% of mortalities were resected with palliative intent (further 6% unknown) ASA grading – 21.2% were ASA 4 51% were ASA 3 or above. 48.4% died with known metastatic disease within the 2 years. 36% died within 90 days of surgery and of these 12 patients, 7 were listed as potentially curable and will be the focus of further evaluation. **Conclusion** The findings of the audit (basic unadjusted mortality rate of 19.9%) have clarified that we have significantly less 2 year mortality than has been reported in the provisional findings of NBOCA presented to us. This aligns us back to the national average. This data has been highlighted to NHS digital prior to the writing of this letter but currently it is unclear whether any correction will take place. It has been impossible to crosscheck our data fully with the NHS digital data due to issues of data sharing/GDPR. We have identified significant gaps with our own data uploading although all cases were on the Somerset Cancer Registry. Further investigation into how this occurred will happen to try and prevent future issues. The clinical audit of cases is ongoing and will be presented at the appropriate departmental and governance meetings when finalised.	No	No
East Suffolk and North Essex NHS Foundation Trust	East Suffolk and North East Essex NHS Foundation Trust are pleased that the Ipswich Hospital provision has improved over the last audit cycle (2015/2016 period) and that the service is no longer an outlier for expected 2-year mortality rate after major resection. We acknowledge that under the NBOCA Outlier Policy the service remains at an 'alert status' due to our previous audit outcomes (that being an alert outlier for two out of the last three years). We would like to thank NBOCA for work that they do and for highlighting areas for improvement. ESNEFT clinicians will continue to use NBOCA information and undertake case note reviews to continuously improve the service we provide to our local community.	Alert	Alert

24 Month Mortality			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
Royal Cornwall Hospitals NHS Trust	For the 2015/16 cohort RCHT has flagged as a national outlier in the 2 year mortality data. The 2 year mortality figure includes all patients having surgery for cancer of the colon or rectum. It is distinct from the 30 and 90 day mortality figures that are calculated for elective cases only. Our unadjusted 2 year mortality of 25.6% is calculated by taking the total number of deaths in the group and dividing by the total number of 2 year follow up intervals achieved by the group. This figure is then adjusted using comorbidity data from HES to give an adjusted mortality figure of 29.2%. Using the same methodology on our data for 2014/15 and 2016/17 we find our unadjusted 2 year mortality for RCHT to be 18% and 17% respectively. Thus the 2015/16 data can be placed into context as a deviation from our normal performance rather than as part of a larger trend of poor outcomes. Reviewing all the deaths in the 2015/16 cohort has been undertaken and we have found no pattern within the group relating to operation, patient or individual surgeon. Further we were surprised that adjusting for comorbidity acted to increase our mortality figure. This implies that both those that survive and those that die are fitter than the national average. This for a hospital with an above average age population in an economically deprived area and a consequently low market forces factor seems unlikely. Review of the patient deaths has found 2 patients coded as elective and curative who were in fact emergency and palliative, both presented with metastatic disease and perforation and were taken to theatre within 24 hours of presentation. A further 4 patients (2 elective and 2 emergency) were coded as curative when having metastatic disease at presentation so were actually palliative. The level of comorbidity within the patient death group has been reviewed and across the group was high with almost all patients having at least one recognised comorbidity and many having 2 or 3. We suspect that our coding in 2015 did not reflect the level of chronic illness present within the group that died. We also believe that our depth of coding for the group that survived is unlikely to be representative of their level of comorbidity and are checking into this. Finally, the numerator was slightly higher in 2015/16 (41) compared to 2014/15 (35) and 2016/17 (32). At the same time the denominator at NBOCA was slightly lower at 185 compared to 220 and 204 respectively. We have found that the denominator data for the 2015/16 data is incomplete and have an additional 12 cases of resection, all survivors, who were not in the NBOCA data.	No	No
St Helens and Knowsley Hospital Services NHS Trust	This response has been prepared by St Helens and Knowsley Teaching Hospitals NHS Trust (STHK) following information supplied by the National Bowel Cancer Audit (NBCA) indicating that the Trust may be a potential outlier with regard to the 2 year mortality rate post-operative resection. We thank you for bringing this to our attention and hope to work closely with you to interpret the data and respond in a way that best supports patient care. For 2019 our **adjusted** 2 year mortality was **28.6%** (unadjusted 35.5%) with a national rate of **18.9%**. In 2018 the **adjusted** 2 year mortality was **30.4%** (unadjusted 30.1%) with a national rate of **18.9%**. Our surgeons have completed a review of the 37 patients reported to have died within 2 years of surgery. Two were excluded as they were not colorectal cancer. Five patients died in hospital in the post-operative period. One patient death was unexpected and related to post-operative aspiration pneumonia despite ITU admission and Level 3 care. All deaths were reviewed via our morbidity and mortality review process and no concerns over care have been raised, nor a pattern of concern identified. We have worked to understand these data as we take surgical performance extremely seriously, look to learn and improve by identifying weakness, demonstrating quality and predicting risk. To this end we utilise the Copeland's Risk Adjusted Barometer (CRAB) System to review our performance and have sought independent analysis by Graham Copeland himself. This system is already embedded in the Trust to support our understanding of surgical outcomes. In your correspondence you describe that the Survival Analysis is calculated by the equation: - **Number of patients who died within 2 years/the sum of the amount of time each patient was followed for.** The observation of Graham Copeland, who has supported our analysis, was that this methodology has the potential to adversely affects Trusts who are prepared to operate on patients who are elderly (where death from other causes is more likely), patients with significant comorbidities (again where death from the comorbidity is more likely), patients in whom surgery is performed as an emergency (where complications are more likely and may contribute to death within 90-days) and in patients with metastatic death (where death within 2 years is very likely). CRAB algorithms (based upon a worldwide database of 85 million operative procedures) have revealed that, when compared with other trusts within the UK, St Helens and Knowsley patients operated in the trust are more elderly, have a significantly increased comorbidity (almost double the national average) and more likely to be operated on as an emergency (35% higher than National mean). With regard to tumour characteristics the cancers resected are larger, more likely to be node positive and the metastatic rate is significantly higher (75% higher than National mean). As such, a higher percentage of patients sit within the 10-30% mortality risk band and the 40-50% complication band. Patients within these risk spectra often have significant co-morbidities, undergo emergency surgery and have more advanced malignancies and are more likely to die early. This is illustrated by the higher 90 day mortality rate. It is well recognised that with a significantly increased rate of major comorbidities and distant metastases a higher death rate at 2 years would be expected. The NBCA document we have received does not state how the adjusted mortality rate is determined. It is not clear whether the risk adjustment is based on patient specific factors, overall unit demographics or a weighted combination of the two. I would be extremely grateful if this could be clarified in order for us to better compare our outcomes to the National picture. I have worked closely with our Colorectal Surgery colleagues to address the concerns raised by the NBCA as we strive to deliver the highest quality care. I believe, supported by our data that our surgeons are prepared to offer a surgical option to improve the quality of life and to elevate distressing symptoms, even when cure cannot be expected. As such I am committed to engaging with NBCA to better understand methodology and ensuring the most robust comparison is made, such that our apparently worrying performance can be fully understood and any changes we need to make implemented promptly. I very much look forward to exploring these issues with you to further the understanding of our own surgical performance, and how it compares to others as we strive to always improve the care we deliver.	Alert	No

18 Month Stoma Reversal			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
Calderdale and Huddersfield NHS Foundation Trust	On reviewing the data, we have identified a number of discrepancies relating to patients that have died and variance in the centrally documented operation performed compared to local records. We are working with our informatics team and your analysts to identify the source of these issues as we do check the NBOCAP data prior to upload individually. Of the data that you sent us there are only two patients who have waited over 18 months for reversal who have not done so for reasons of either personal choice, significant disease progression or other treatment reasons. The data provided demonstrate a large number of APER procedures particularly in the first year of the period examined. We have reviewed all these APER cases, and although particularly in that initial period many of these were performed by one surgeon, they were all ratified by MDT discussion. In addition, the pathology reports for all the APER cases have been reviewed combined with their preoperative staging. All these cases appear to be have undergone appropriate surgery. We continue to work with informatics with the aim of identifying how there is discrepancy between HES, our annual upload via PPM and our EPR and Bluespier systems. The correct information exists digitally but seems to get 'lost in translation' at some point in the transfer process.	No	No
East Kent Hospitals University NHS Foundation Trust	Since the trust received the data from the National Bowel Screening audit, we reviewed our data across the Trust. Since then, we have taken the following steps: 1. We setup extra operating lists and managed to reduce the waiting list to under 12 months. 2. We have now a tracker for patients with stomas to assure that they do not wait long and reversal is planned within the required time. 3. All patients who had Hartman's procedures were reviewed and reversal was discussed but a good number of patients elected not to undergo reversal as they are happy this way or not very fit for the procedure.	No	Yes
Nevill Hall Hospital MDT	We have noted the potential outlier status regarding stoma rates for the Nevill Hall Hospital MDT at this year's NBOCAP report. We were found to be outliers last year as well and wrote back to NBOCAP to explain the reasons we feel were operative at the time. As a result of that audit result we also made some arrangements locally to try and improve our stoma closure rate. We have implemented these changes over the last 12 months and therefore we do not expect to see any significant changes in our numbers until next year's audit.	No	Yes
Northern Lincolnshire and Goole NHS Foundation Trust	Thank you for your letter dated 9 September 2019, where notification was provided that the Trust continued to have a higher than expected 18 month stoma rate after major resection during the time period between 1 April 2014 to 31 March 2017. This higher than expected stoma rate was also reported in the previous year's audit to which the Trust has previously responded. Following this previous outlier notification received during 2018, the Trust undertook a full review of those cases reported as having had a stoma at 18 months to examine what might have caused the higher than expected rate. The scope of this retrospective review examined the quality of care provided along with an examination of the data to identify any data quality errors. The Trust recognises that this latest audit publication covers a three year retrospective time frame and that two of these years had been included in the scope of the Trust's previous 2018 review and response. Therefore, on receipt of your outlier alert notification during September 2019, the Trust again undertook a review, but focused this on the latest one year period, not previously reviewed, this specifically being the 1 April 2016 to 31 March 2017 patient group. The scope of the review work was again to examine what might have caused the higher than expected rate. This was undertaken using two distinct methodologies. Firstly, a review of care quality was carried out, specifically ascertaining whether those stomas seen at 18 months were expected or unexpected and whether or not this delay could have been avoided due to any issues with the quality of care. Secondly, in line with your letter, an examination of the data quality was undertaken to determine if there were any relevant data errors identified. **(1) Quality of care review:** Were the 18 month stomas expected or unexpected; were there any issues in the quality of care? The Trust's review of the 29 patients identified during the 1 April 2016 to 31 March 2017 time frame, identified that the majority of patients with a stoma at 18 months were planned beforehand and therefore expected. The majority, due to their underlying diagnoses of rectal carcinoma, for which they were receiving primary surgical treatment or because of their comorbidities, were planned as permanent stomas agreed with the patient prior to surgery. The review did identify three patients where the initial surgical plan was for the stoma to be reversed but this reversal had occurred after 18 months following the index surgical procedure. The Trust considers these three patients with stomas at 18 months as being unexpected. On full review of their care, two of these three patients had relatively complex clinical pathways: one had subsequent neck and spinal surgery at a tertiary centre during the 18 months post-resection time frame, along with receiving chemotherapy which then delayed the subsequent stoma reversal; and the other patient had significant side-effects to the adjuvant chemotherapy which delayed the patient's overall pathway, including subsequent fitness to undergo significant surgery once again. Whilst recognising the complexity of the cancer pathway in some patients, the Trust considers that these three cases were unexpected and potentially avoidable with closer colorectal cancer surveillance. In response to the 2017 NBOCA national audit report, one of the local actions was to review and increase the number of colorectal Clinical Nurse Specialists (CNS) and to improve the structure of the surveillance for colorectal patients post-operatively. This local action plan led to the development and implementation of a CNS-led stratified pathway, including a formalised surveillance schedule extending to 5 years post-surgery. This stratified pathway was launched initially in the Diana Princess of Wales Hospital in April 2018, and then at Scunthorpe General Hospital from December 2018 onwards. The stratified pathway is designed to ensure that patients following colorectal surgery are monitored, supported and potentially re-escalated back for review by the appropriate surgical team should any clinical markers indicate disease recurrence. As part of this pathway, all patients with temporary stomas are reviewed and brought back in a scheduled manner for stoma reversal, taking into account their comorbidities and progress with any given chemotherapy regimen. This is a key action that was taken by the Trust to improve and standardise the surveillance arrangements for this group of patients. Whilst the impact of this action will not yet be reflected in the National Audit's current published data given the expected time-lag, the Trust is undertaking local audit work in order to provide assurance that this stratified surveillance pathway is effective. The local audit will measure compliance with the agreed surveillance schedule, in order to provide feedback to the relevant teams regarding their performance and to highlight any areas where further improvements could be potentially made. The aim is for this to provide greater assurance that this group of patients are appropriately monitored and cared for, whilst at the same time ensuring that those patients in whom stoma reversal is planned have this carried out in a more timely manner.	No	Yes

18 Month Stoma Reversal			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
Northern Lincolnshire and Goole NHS Foundation Trust **/continued**	In addition to the action already taken, as this is the second year the Trust has received an outlier notification alert, to provide further assurance, the Trust will look to commission an external review of the cases having a stoma following surgical resection. It is intended that this external review will support the Trust to determine if there are further actions necessary that should be taken to further reduce the rate and incidence of stoma formation and the rate at 18 months. The scope of this review will also include a review of the types of surgical resection used to determine if there is learning possible and any relationship between the 18month stoma rate. **(2) Data quality:** Were there any data errors identified? As previously described, the Trust's review of this area in 2018 had included an examination of both the quality of care and the data accuracy. The most recent 2019 review work has also considered data accuracy. Through this process, the Trust has identified a number of inaccuracies in the reported data which have now been retrospectively amended on the Somerset system from the 2018 review. The 2019 assessment of the data found inaccuracies, such as: • 2 patients who did not have a stoma at all • 1 patient who had their stoma reversed within the 18 month time-frame, but this follow-up surgery was performed at another healthcare provider external to the Trust. Taking into account the retrospective amendments made in response to the previous year's alert and the changes to be made to Somerset in response to the 2019 review, the Trust estimates that the validated 18-month stoma rate for the time-frame in question is 65.97%, as opposed to the 71% rate reported in the National Audit data. This amended rate had also shown a reduction compared to last year's audit data which, following validation, was 67.7% for this rate. The Trust recognises that the above validated stoma rate is still above the national 53% rate, and will thus continue to assess the quality of the action already taken to improve this area and provide local assurance that the stratified pathway is effective in standardising the post-operative surveillance schedule, in order to ensure robust monitoring and timely planning for stoma reversal. **Conclusion:** The Trust recognises there is a significant time-lag in the national audit data period reported. The Trust considers that during this time period, whilst the majority of patients had planned and expected stomas at 18 months, given their individual clinical needs and age, there were 3 cases where the stoma at 18 months was unexpected and potentially avoidable. The Trust has implemented a plan of action in the form of a stratified pathway launched during 2018, following the increased allocation of resource in colorectal CNS staffing that is designed to ensure a more robust follow-up arrangement and appropriate surveillance, taking into account the plans around stoma care amongst other clinical considerations. The Trust is currently in the process of evaluating the effectiveness of this pathway to provide local assurance that this is having the intended impact and is demonstrating improvements in patient outcomes. In order to obtain further assurance regarding the quality of care provided to our patients, the Trust will also commission an external review of those cases having a stoma to determine if there are further improvements possible by the service. In addition to the focus on quality, another action will be to continue to review the process for data submission to the NBOCA audit via the Somerset system, following the MDT review meeting. Whilst the data quality review completed to date has focused on the numerator (ie those having had surgery recorded meeting the inclusion criteria for the national audit), the previous year's review identified data errors resulting in patients who should have been included in the audit sample (rectal carcinoma cases) not being so, due to incorrect recording. This has the potential to incorrectly inflate the Trust's 18-month stoma rate. Finally, I would like to thank the national audit for the publication of this data that enables the Trust to review its outcomes and consider the reasons for differences in reported outcomes between local and national findings. I hope that this response provides you with an update on the action that the Trust has already undertaken to provide better quality outcomes for our patients.	No	Yes
The Christie NHS Foundation Trust	Thank you for your letter and the report with the Christie data benchmarked with other colorectal surgical services. You will be aware that The Christie is a tertiary centre that does not routinely undertake primary surgery for early bowel cancer nor for previously undiagnosed patients who present as emergencies. We operate on a higher proportion of advanced primary T4 and beyond TME low rectal cancers. As noted in previous correspondence, the position as an outlier for permanent stoma rates reflects the case mix here. To provide reassurance, I can confirm that the data submitted on these patients for 2017-2018 has been reviewed and again supports this explanation. The case mix of patients at the Christie is for complex pelvic surgery for advanced disease; reversal is not possible in a large percentage of our patients due to them having advanced T3/T4 tumours resulting in complete removal of their anorectum. In addition, 18 months does not always allow sufficient time for treatment to have completed. All stomas were reviewed; of 35 patients, 22 required a permanent stoma. Of the 12 that were not permanent, 9 stomas have been reversed, 2 are awaiting a date of decision and 2 were not appropriate for reversal (1 died and 1 was high risk functional problems). Data is now collected on stoma outcomes prospectively. As in previous reports, it would be helpful to include some commentary to reflect this. We do not anticipate that there would be any change in this picture in future NBOCAP audits, in which we are very pleased to participate.	Yes	Yes

18 Month Stoma Reversal			
NHS Trusts	**Comment**	**Outlier 2018 Annual Report**	**Outlier 2017 Annual Report**
West Wales General & Prince Phillip MDT	Thank you for your correspondence dated 9th September 2019 to notify that West Wales General Hospital and Prince Phillip Hospital MDT adjusted eighteen month stoma rate was 78% as compared to an eighteen month stoma rate for England of 53%. We note HES/PEDW has been used to capture the data for rectal cancer patients undergoing major surgery with a stoma. The following summary is based on the CANISC data submitted to NBOCAP and we are in the process of comparing with the PEDW data. A total of 69 patients underwent rectal cancer surgery with stoma at West Wales General Hospital and Prince Phillip Hospital general MDT from 1st April 2014 to 31st March 2017. There were 50 patients in this group who had permanent stomas for rectal cancer. The following is the breakdown: Abdomino-perineal excision of rectum 37 Hartmann's procedure 11 Panproctocolectomy and end ileostomy 2 A total of 19 patients had curative surgery in the form of an anterior resection and a temporary stoma. Out of the 19 patients 6 patients did not have their stoma reversed within the eighteen month period for the following reasons: 1. Complications resulting in non-closure of their stoma (anastomotic stricture) - 2 2. Patients choice – 1 3. Closure later than eighteen months - 2 4. Closure not done as patient developed metastatic disease – 1 The submitted CANISC data during the above period shows our eighteen-month stoma rate is comparable to the overall eighteen months stoma rate for England of 53%. It is possible that the higher stoma rate of 78% could be due to a coding issue with PEDW and the health board is looking into it.	Yes	Yes
Withybush General MDT	Thank you for your correspondence dated 9th September 2019 to notify that Withybush MDT adjusted eighteen month stoma rate was 77% as compared to an eighteen month stoma rate for England of 53%. We note HES/PEDW has been used to capture the data for rectal cancer patients undergoing major surgery with a stoma. The following summary is based on the CANISC date submitted to NBOCAP and we are in the process of comparing with the PEDW date. A total of 57 patients underwent rectal cancer surgery with stoma at Withybush general MDT from 1st April 2014 to 31st March 2017. There were 38 patients in this group who had permanent stomas for rectal cancer. The following is the breakdown: Abdominal perianal excision of rectum 26 Hartmann's procedure 8 Permanent stomas for metastatic disease 4 A total of 19 patients had curative surgery in the form of an anterior resection and a temporary stoma. Out of the 19 patients 9 patients did not have their stoma reversed within the eighteen month period for the following reasons: 1. Complications resulting in non-closure of stoma (anastomotic leak, ureteric injury) - 2 2. Closure later than eighteen months - 2 3. Closure not done as patient developed metastatic disease – 2 4. Surgery done in tertiary care – 1 5. Patients choice – 2 The submitted CANISC data during the above period shows our eighteen month stoma rate is comparable to the overall eighteen months stoma rate for England of 53%. It is possible that the higher stoma rate of 77% could be due to a coding issue with PEDW and the health board is actively looking into it. We have set up a data base to collect information prospectively of our rectal cancer resections.	No	No

Appendix 3 – Glossary

Abdomino-perineal excision of the rectum (APER) - operation to remove the entire rectum and anal canal. The patient is left with a permanent stoma.

Adenoma - a growth from the inside of the bowel which is usually non-cancerous, but over time has the potential to develop in to a cancer. For this reason, they are generally removed.

Adjusted - a way of reporting results that takes into account differences between the patients that each trust/ hospital/MDT or region is treating. This allows comparisons to be made more fairly.

Anterior resection - operation to remove part, or all, of the rectum.

Cancer Alliance - at a regional level, results in England are reported according to cancer alliance. This is a particular geographical area containing many hospitals. There are 19 cancer alliances.

Chemotherapy - drug therapy used to treat cancer. It may be used alone, or in combination with other types of treatment (for example surgery or radiotherapy).

Curative intent - the aim of the treatment is to cure the patient of the disease.

ERAS (Enhanced Recovery after Surgery) - an evidence-based approach to help people recover more quickly following major surgery. Research has shown that the sooner patients get back to normal activities such as eating, drinking and walking, the quicker their recovery is.

Hartmann's procedure - operation to remove an area of the bowel on the left hand side of the abdomen and top end of the rectum. It involves the formation of a stoma, but this is not necessarily permanent.

Health Board - in Wales, bowel cancer services are provided by Health Boards which serve distinct geographical areas. There are 7 Health Boards. The multidisciplinary teams operate within these.

Faecal Immunochemical Test - a stool sample is provided by the patient and can then be tested for the amount of blood within it. Abnormal results will require further telescopic examination of the bowel.

Laparoscopic - also known as minimally invasive surgery or keyhole surgery. This is a type of surgical procedure performed through small cuts in the skin instead of the larger cuts used in open surgery.

Local excision - procedure done with instruments inserted through the anus (often during a colonoscopy), without cutting into the skin of the abdomen to remove just a small piece of the lining of the colon or rectum wall.

Lymph nodes - small bean shaped organs, also referred to as lymph 'glands', which form part of the immune system. They are distributed throughout the body and can be one of the first places to which cancers spread.

Metastases - cancer that has spread from where it first started in the body. These can also be called secondary cancers.

Multidisciplinary Team (MDT) - at a local level, results from Wales are reported according to multidisciplinary teams. There are 13 Welsh MDTs. An MDT is a group of bowel cancer experts based within a hospital who discuss and plan the treatment of every patient with bowel cancer. The team contains surgeons, medical doctors, nurses, radiologists and pathologists. Patients from smaller hospitals will be discussed in their closest specialist bowel MDT.

Open surgery - an operation carried out by cutting an opening in the abdomen.

Palliative care - care given to patients whose disease cannot be cured. It aims to improve quality of life rather than extending life.

Radiotherapy - the treatment of disease, especially cancer, using x-rays or similar forms of radiation.

Screening - patients aged 60-74 are invited to take part in this every two years. They do this by providing a stool sample. They will be invited to have a camera test of the bowel if this is positive.

Stage - a way of describing the size of a cancer and how far it has grown. Staging is important because it helps decide which treatments are required.

Stent - a flexible, hollow tube designed to keep a section of the bowel open when it has become blocked.

Stoma - a surgical opening in the abdomen through which the bowel is brought out onto the surface of the skin. Colostomy and ileostomy are types of stoma.

Trust - an organisation within the English NHS, made up of one or more hospitals, and generally serving one geographical area.

Type 2 Objection - historically a request from a patient which is registered with their GP and means that personal identifiable information relating to them cannot be disseminated or published by NHS Digital. From May 2018, Type 2 objections were replaced by the National Data opt-out. Patients now complete this process themselves. Pre-existing Type 2 Objections were automatically converted.