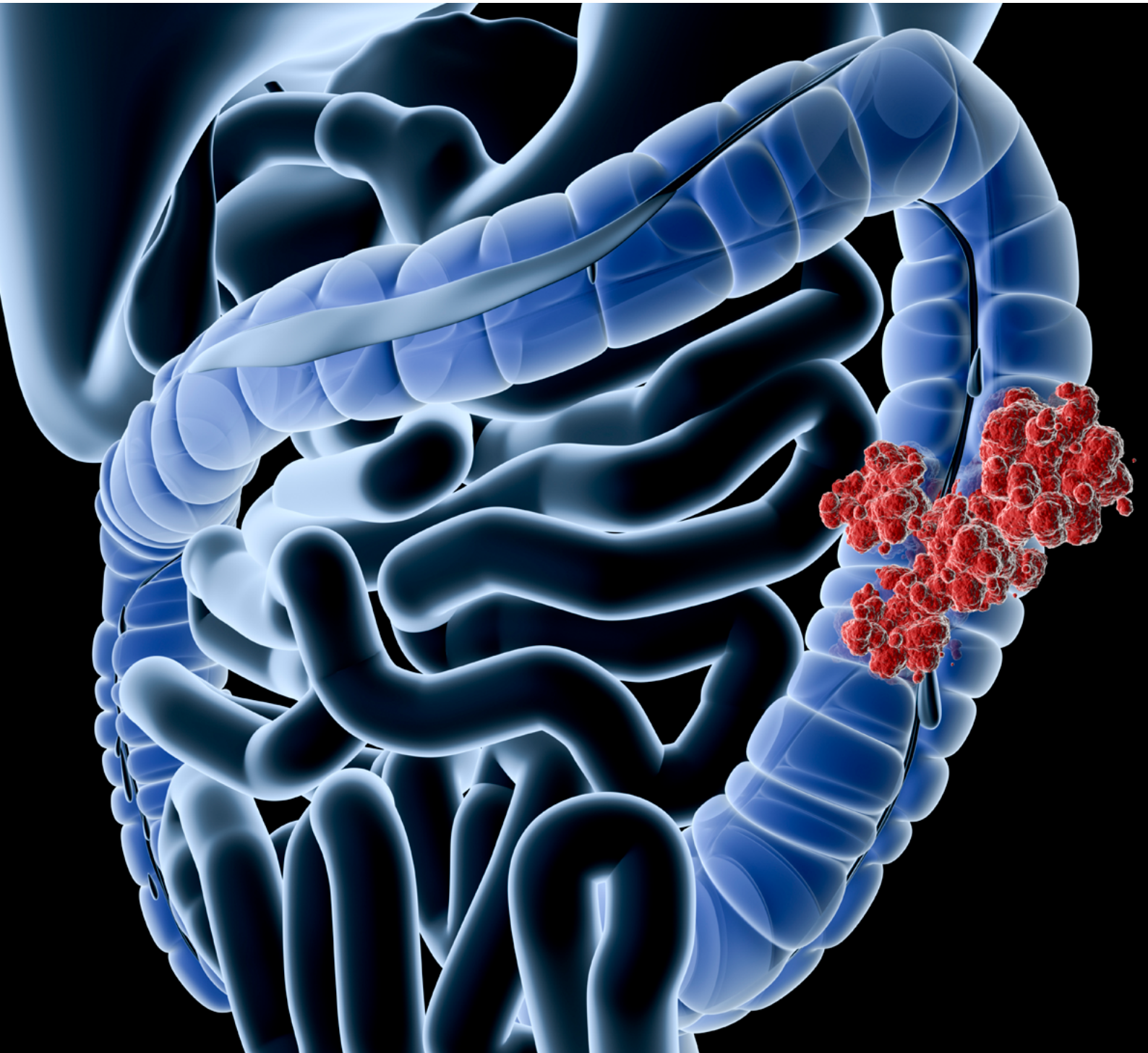
National Bowel Cancer Audit

Annual Report 2021

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 2020 Annual Report.

The Royal College of Surgeons of England 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 Royal College of Surgeons of England carried out the analysis of the data for the 2020 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

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Contents

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Acknowledgements

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

The NBOCA 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, Project Team and Patient and Carer Panel.

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 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 and bowel cancer charity representatives. Patient, carer and bowel cancer charity representatives on the NBOCA Patient and Carer Panel provide input to NBOCA and advised on the production of the Patient Report.

NBOCA uses data provided by patients and collected by the NHS as part of their care and support. 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.

The NBOCA Project Team consists of:

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The National Gastrointestinal Cancer Audit Project Board consists of:

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Members

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Chris Dew	Programme Head, NHS Digital
Martyn Evans	Clinical Advisory Group Chair and Representative for Wales
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The Project Board also includes members of the NBOCA and NOGCA Project Teams.

The 2021 NBOCA Clinical Advisory Group consists of:

Chair

Martyn Evans	Chair and Representative for Wales

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Andrew Whitehead	Audit Co-ordinator, NHS Digital
Lisa Wilde	Bowel Cancer UK Representative

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Foreword

It is my pleasure, and indeed honour, as President of ACPGBI to be invited to provide the foreword to the 2021 NBOCA annual report. Firstly, may I recognise and acknowledge the huge amount of work and the task required to produce this report and the many individuals involved, not only from the Association of Coloproctology of Great Britain and Ireland but also our partners within NHS Digital, the Clinical Effectiveness Unit at the Royal College of Surgeons of England, and the Healthcare Quality Improvement Partnership (HQIP). Secondly, we should recognise the value of the input from our Patient and Carer Panel who provide careful oversight and emphasise the focus on the patient.

The auditing of outcomes for the treatment of cancer has long been a priority for clinicians involved in the management of patients with colorectal cancer and this has been shown to improve outcomes. The process has been developed and enhanced over the last 20 years from its initial beginnings to the high quality report that is produced today by a dedicated group of enthusiasts. Concentration on several core outcomes has been maintained and, importantly, the audit has demonstrated incremental improvements year on year. For instance the fall in the 90-day mortality after both elective and emergency resections is encouraging, along with the uptake of robotic surgery. And yet, significant variation between regions remains and it is important that individual units, multidisciplinary teams, and Trusts reflect on the possible reasons behind such variation. This report, in common with reports through the years, has not only focused on the core outcomes but continues to consider and develop new outcomes.

Additional work has been carried out for this year's report including unplanned return to theatre (which allows evaluation of serious post-operative complications) and separation of data related to rates of stoma formation into permanent stoma rates versus unclosed diverting ileostomy rates. Furthermore, in response to the updated NICE recommendations, the report provides data on rectal cancer volumes by trust, hospital and MDT that may influence current discussions surrounding specialisation with regard to rectal cancer surgery. On behalf of ACPGBI may I congratulate the NBOCA Project team for their sterling work.

I also wish to highlight the fact that NBOCA has set out a quality improvement plan that is aimed at two key aspects of colorectal cancer care; specifically, improving patient experience and improving cancer outcomes and thereby addressing the whole patient pathway. This was launched in October 2021 and an overview of the NBOCA QI Plan is available here which includes key drivers and targets for the program.

This will be the last annual report to describe the management of patients that have mainly been unaffected by the COVID-19 pandemic. Part 2 of the current report highlights the recovery of bowel cancer services between 1 April 2020 and 31 March 2021. From the 2022 annual report, patients will have been diagnosed and treated during the period of the COVID-19 pandemic period. Clearly, there has been a significant impact from the COVID-19 pandemic on our management of colorectal cancer in keeping with many other aspects of hospital life and, indeed, life in general. Furthermore, the pandemic will continue to have an effect on outcomes from colorectal cancer treatments for an indefinite period as the effects of delayed presentation and the impact of hospital bed and theatre availability, staff shortages etc. lead to delayed diagnoses, stage migration, and influences the nature and radicality of operative intervention. As ever, the quality of the data is determined by the submission of data and we would encourage all units to provide accurate, up to date information for all of their patients diagnosed with colorectal cancer and receiving treatment. In the meantime, let all of us involved in the multidisciplinary management of colorectal cancer roll up our sleeves, return to what we do well, and tackle the COVID-19 cancer backlogs to achieve the best possible outcomes for our patients.

Pete Sagar
President
Association of Coloproctology
of Great Britain and Ireland

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Executive Summary

The 2021 annual report Part 1 includes patients diagnosed with bowel cancer between 01 April 2019 and 31 March 2020. In order to try to minimise any effects of COVID-19 within this audit cohort, we have included major resections carried out up to March 31st 2020 (pre-first wave of pandemic).

DIAGNOSIS AND CARE PATHWAYS

32,641

patients were diagnosed with bowel cancer in England and Wales between 1 April 2019 and 31 March 2020

61% of patients with stage III colon cancer in England and Wales received adjuvant chemotherapy

Proportion of patients that were likely to be cured, by source of referral

Screening (3,945 patients) — 9 in 10 likely to be cured

GP Referral (17,578 patients) — 7 in 10 likely to be cured

Emergency (5,821 patients) — 5 in 10 likely to be cured

SURGICAL CARE

90-day post-operative survival

98% of patients were alive 90 days after elective/scheduled surgery

94% of patients were alive 90 days after emergency/urgent surgery

Post-operative length of stay

30-day unplanned readmission

11% of patients were readmitted within 1 month of their operation

Unplanned return to theatre

8% of patients needed to go back to theatre after their primary surgery

Laparoscopic surgery

63% of patients underwent laparo-scopic surgery, with wide variation at trust/hospital/MDT level.

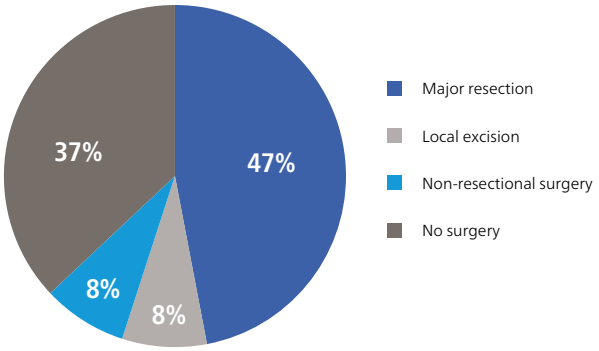
SURVIVAL

Proportion of patients who survived 2 years beyond their diagnosis of bowel cancer.

Surgery	No surgery	Overall
8 in 10 patients survived beyond 2 years if they had surgery to remove their bowel cancer	3 in 10 patients survived beyond 2 years if they did not have surgery to remove their bowel cancer	7 in 10 patients survived beyond 2 years overall; this survival rate has not improved over time

RECTAL CANCER

Proportion of rectal cancer patients that received different treatments



Stomas

37% of rectal cancer resections were abdominoperineal resections or Hartmann's procedures, which lead to a permanent stoma

30% of patients undergoing anterior resection had an unclosed diverting ileostomy at 18 months

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Part 2 of the Annual Report is on the recovery of bowel cancer services from the COVID-19 pandemic (Patients diagnosed 01 April 2020 to 31 March 2021

COVID-19 RECOVERY

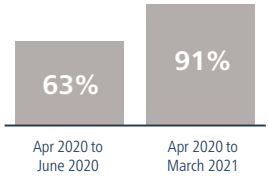
NBOCA has undertaken additional work looking at the impact of the COVID-19 pandemic on bowel cancer services in England and Wales.

Early in the COVID-19 pandemic, there was a large impact on the diagnosis and treatment of bowel cancer patients. However, bowel cancer services had largely recovered by March 2021.

Bowel cancer diagnoses

Early pandemic – April 2020 to June 2020

63% of the expected number of bowel cancer diagnoses were seen in England between **April 2020 to June 2020**, compared to 2019



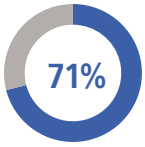
Pandemic – April 2020 to March 2021

91% of the expected number of bowel cancer diagnoses were seen in England between **April 2020 to March 2021**, compared to 2019

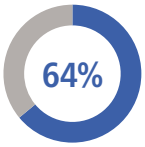
The impact on new bowel cancer diagnoses, and the extent to which the number of diagnoses had recovered, varied by region. The regions hit hardest by COVID-19 infections tended to have more "missed diagnoses" with rates between 8% and 16%. By March 2021, patients just below and patients just above screening age had the most "missed diagnoses" (85.1% and 89.4% of expected diagnoses for those aged 50-59 years and 75–84 years respectively, versus 93.0% in those of screening age). There was also a larger deficit in those from more deprived areas (89.1% of expected diagnoses for those in the most deprived group versus 92.4% in the least deprived).

Bowel cancer treatment

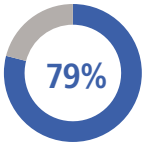
Early pandemic – April 2020 to June 2020



of the expected number of bowel cancer operations took place in England between **April 2020 to June 2020**, compared to 2019



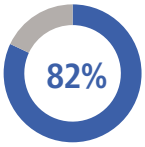
of the expected number of bowel cancer operations took place in Wales between **April 2020 to June 2020**, compared to 2019



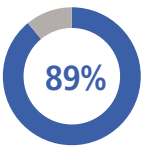
of the expected number starting adjuvant chemotherapy for colon cancer in England between **April 2020 to June 2020**, compared to 2019

of the expected number starting curative radiotherapy for rectal cancer in England between **April 2020 to June 2020**, compared to 2019

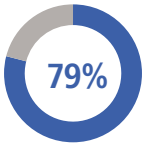
Pandemic – April 2020 to March 2021



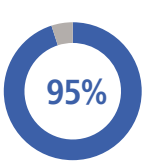
of the expected number of bowel cancer operations took place in England between **April 2020 to December 2020**, compared to 2019



of the expected number of bowel cancer operations took place in Wales between **April 2020 to December 2020**, compared to 2019



of the expected number starting adjuvant chemotherapy for colon cancer in England between **April 2020 to February 2021**, compared to 2019



of the expected number starting curative radiotherapy for rectal cancer in England between **April 2020 to March 2021**, compared to 2019

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Main recommendations

Number	Recommendation	Related National Guidance	Where in the report and rationale	Primary audience
1	Encourage participation and engagement with the NBOCA quality improvement initiative to focus on improving cancer outcomes individualised to those most relevant to the trust/hospital/MDT, and with particular focus on the performance measures with the most national variation:			NHS England Welsh health boards Commissioners Care Quality Commission Individual English trusts and Welsh MDTs
	a) Neo-adjuvant treatment in rectal cancer	NICE: Colorectal cancer. [NG151] (January 2020)	Full report, Chapter 6, page 52 To better understand variations in radiotherapy use and ensure evidence-based local radiotherapy policies are in place.	
	b) Rates of unplanned return to theatre	The Fourth Patient Report of the National Emergency Laparotomy Audit 2018 – Executive Summary	Full report, Chapter 4, page 37-39 To aid the identification of trusts/hospitals/MDTs where improvements could be made to perioperative care.	
	c) 18-month diverting ileostomy closure rate	Association of Coloproctology of Great Britain and Ireland (ACPGBI): Guidelines for the Management of Cancer of the Colon, Rectum and Anus (2017)	Full report, Chapter 6, page 55-58 To separate out the factors which might influence stoma rate at individual trust/hospital/MDT level and encourage quality improvement processes.	
	d) Adjuvant chemotherapy rates	NICE: Colorectal cancer. [NG151] (January 2020)	Full report, Chapter 3, page 24-25 To improve wide variation at provider-level in adjuvant chemotherapy rates for stage III colon cancer.	
2	All trusts/hospitals/MDTs should review the individual local outcomes provided by NBOCA and agree on three targeted quality improvement initiatives for 2022. These should focus on areas where the national metrics are not being met.	National Bowel Cancer Audit. Quality Improvement Plan (2021)	Full report, throughout To use bespoke NBOCA data for each individual provider to implement relevant and meaningful changes to clinical practice.	Commissioners Care Quality Commission Individual English trusts and Welsh MDTs
3	All trusts/hospitals/MDTs who are outliers in any of the outlier-reported metrics should develop an action plan with the aim of improving their outlier status without negatively impacting on other aspects of the patient care pathway.	Not applicable	Full report, throughout Appendix 1 – individual results To ensure that outlying trusts/hospitals/MDTs are actively engaged in processes to improve quality of care.	Care Quality Commission Individual English trusts and Welsh MDTs

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Number	Recommendation	Related National Guidance	Where in the report and rationale	Primary audience
4	Ensure timely and accurate completion of the upcoming NBOCA organisational survey to provide up to date information on colorectal cancer services, in particular:			Individual English trusts and Welsh MDTs
	a) Adoption of robotic surgery for colorectal cancer resections		Full report, Chapter 4, page 41 To allow accurate and up to date reporting of robotic surgery in England and Wales.	
	b) Access to mismatch repair (MMR) or microsatellite instability (MSI) testing and other genomics testing	NICE: Molecular testing strategies for Lynch syndrome in people with colorectal cancer. [DG27] (February 2017) NHS England: Lynch Handbook (July 2021)	Full report, Chapter 3, pages 26-28 To allow better interpretation and reporting of MMR/MSI data.	
5	Continued emphasis on campaigning to raise awareness and educating patients about bowel cancer particularly with regards to:			Patients Bowel cancer charities Bowel Cancer Screening Programme Bowel Screening Wales
	a) Signs and symptoms of bowel cancer and the importance of the national Bowel Cancer Screening Programme given its association with more favourable outcomes and better recovery of "missed" diagnoses in patients of screening age during the COVID-19 pandemic.	NHS England: Help Us, Help You campaign	Full report, Chapter 3, page 18 and Chapter 8, page 68 Patients referred via screening have less advanced disease and are more likely to undergo curative treatment.	
	b) Access to genetics testing for all patients to exclude Lynch syndrome and the implications of a positive diagnosis on patients and their families.	NICE: Molecular testing strategies for Lynch syndrome in people with colorectal cancer. [DG27] (February 2017) NHS England: Lynch Handbook (July 2021)	Full report, Chapter 3, page 26 All patients should be tested for Lynch syndrome as per NICE guidelines and counselled appropriately with the result.	
	c) Those patients who appear to have been affected the most by the COVID-19 pandemic i.e. the most deprived and those below and above the screening age.	Not applicable	Full report, Chapter 8, page 67-68 There was a larger deficit in bowel cancer diagnoses and major resections in the most deprived quintiles of the population and those just above and below the screening age.	

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Number	Recommendation	Related National Guidance	Where in the report and rationale	Primary audience
6	Individual trusts/hospitals/MDTs and surgeons should ensure that they are performing enough rectal cancer resections each year to meet at least the minimum threshold defined by NICE.	NICE: Colorectal cancer. [NG151] (January 2020)	Full report, Chapter 6, page 53 Hospitals should perform at least 10 rectal resections per year, and surgeons should perform at least 5 rectal resections per year.	Individual English trusts and Welsh MDTs Individual surgeons
7	Review and, where relevant, take action to improve participation, coding, data quality and timely reporting for the National Bowel Cancer Audit, aiming for:			Individual English & Welsh MDTs Institution-level Information Governance Commissioners
	a) >70% completeness for risk-adjustment variables (particularly TNM staging and ASA grade) for patients undergoing surgery	Not applicable	Full report, Chapter 2, page 15-16 Trusts/hospitals/MDTs excluded from outlier reporting due to insufficient data.	
	b) Improved completion and accuracy of pre-treatment TNM staging	NHS Long Term Plan for Cancer (2019), Cancer, page 57 Cancer Delivery Plan for Wales (2016), Detecting cancer earlier, page 7-9	Full report, Chapter 3, page 20 Data completion important for interpretation of pre-treatment staging and assessing appropriateness of subsequent management. This is going to be even more crucial in the pandemic era.	
	c) Improved completion and accuracy of new genomics data items for all patients	NICE: Molecular testing strategies for Lynch syndrome in people with colorectal cancer. [DG27] (February 2017) NHS England: Lynch Handbook (July 2021)	Full report, Chapter 3, page 27 Data completion is important in all patients to allow reporting of this new data item.	
	d) Improved completion of tumour height above anal verge data item with values between 0-15cm only	NICE: Colorectal cancer. [NG151] (January 2020)	Full report, Chapter 6, page 50 Improved data completion and quality for this item are important for better exploration of rectal outcome measures e.g. rectal surgery volumes, neo-adjuvant treatment.	
8	Although there has been a significant recovery of colorectal cancer services many regions of England/Wales require additional support to deal with a substantial backlog in bowel cancer diagnoses and major resections, particularly those regions worst hit by the pandemic.	NHS England: Implementing a timed colorectal cancer diagnostic pathway (2018)	Full report, Chapter 8, page 62-68	NHS England Welsh health boards Commissioners

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1. Introduction

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 2021 Annual Report is the twelfth report to date and includes data on over 32,000 patients diagnosed with bowel cancer between 01 April 2019 and 31 March 2020.

The key audience of the Annual Report and the Patient Report is those who deliver care to bowel cancer patients, those who commission bowel cancer services, and patients along with their families and carers. 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).

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 performance indicators measured in patients with bowel cancer is available via the hyperlink.

The majority of data items are collected by NHS trusts and hospitals in England as part of the Cancer Outcomes and Services Dataset (COSD). Risk-adjusted outcomes reported this year include: 90-day post-operative mortality, 30-day unplanned readmission rate, two-year mortality, 30-day unplanned return to theatre and 18-month unclosed diverting ileostomy rate for anterior resections.

1.3 Clinical Outcome Publication

NBOCA has previously published data at individual surgeon and trust level for English NHS trusts. This information has been readily accessible in the public domain on the ACPGBI website as part of the Clinical Outcomes Publication (COP) programme.

This year, NBOCA will be publishing only trust level data. This is in recognition of the impact of the COVID-19 pandemic that will make robust, valid and fair publication of surgeon level data unreliable. Surgeon level data will instead be fed back directly to individual trusts to support their local quality assurance processes.

1.4 COVID-19

This will be the last annual report to describe the initial management of patients that should largely have been unaffected by the COVID-19 pandemic. From the 2022 annual report, patients will have been diagnosed and treated within the pandemic period.

In order to try to minimise any effects of COVID-19 within this audit cohort, we have included major resections carried out up to March 31st 2020 (pre-first wave of pandemic). As a result, some of the operative denominators are a little lower than usual. These patients will be captured in the next annual report so that the cornerstone of NBOCA reporting on all patients diagnosed with bowel cancer remains.

This year's report also includes a section examining the impact of the COVID-19 pandemic on colorectal cancer services and how well these services had recovered by late 2020 and, where data were available, into early 2021. The work assesses the impact of the pandemic on treatments specific to bowel cancer, such as major resection, adjuvant chemotherapy for colon cancer and curative radiotherapy for rectal cancer. We evaluate the variation in impact of the pandemic by region and demographics, we describe changes in the patients diagnosed during the pandemic, and we synthesise and interpret the findings to identify the implications for future recovery.

1.5 Key Findings

Part 1: Pre-pandemic (Patients diagnosed 01 April 2019 to 31 March 2020)

Chapter 3 - Care pathways

- 32,641 patients were diagnosed with bowel cancer in England and Wales between 01 April 2019 and 31 March 2020.
- Most patients presented via referral from the GP (54%), with the remainder presenting by emergency presentation (18%), other referral methods (16%), and screening programmes (12%).
- Patients presenting via screening programmes were more likely to have earlier stage disease and to undergo curative treatment.
- There was marked variation by region in the proportion of patients within the eligible age range (60-74 years old) presenting via screening (20% to 38%).

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- The proportion of patients presenting with Stage 1 and 2 disease (disease that has not spread to the lymph glands or other parts of the body) varied by region from 29% to 51% although there is a significant proportion of missing data making interpretation difficult.

- 61% of patients undergoing major resection for stage III colon cancer received adjuvant chemotherapy.

- Rates of adjuvant chemotherapy varied from 55% to 67% by region with significant variation also demonstrated at trust/hospital/MDT level with 21 sites outside the inner funnel limits.

- 15.6% of patients had a MMR/MSI (genetic test looking for inherited bowel cancer) result recorded, with younger patients more likely to have a result recorded.

- Recording of MMR/MSI results varied among English cancer alliances from 0% to 58%.

Chapter 4 - Surgical care

- Overall 90-day mortality continued to improve from 3.5% in the 2015/16 audit period to 2.6%. There were no outliers for this measure at hospital/trust/MDT level.

- 90-day mortality following emergency surgery also improved from 12.9% in the 2015/16 audit period to 8.7%.

- Overall 30-day readmission rates were stable at 10.7%. However, there was reduced variation at hospital/trust/MDT level with 5 sites above the inner funnel limits compared to 9 in the last audit period.

- Overall unplanned return to theatre rates were 7.4% with 1 potential outlying hospital/trust/MDT.

- Wide variation in laparoscopic surgery rates persisted with overall rates of 49% to 76% for English cancer alliances.

- At least 35 English hospitals/trusts are now performing regular robotic surgery with an additional 565 cases recorded this audit period. The median number of robotic cases performed over the last five years at hospital/trust level is 35 (IQR 15 to 77).

Chapter 5 - Survival

- Two-year all-cause mortality for all patients remained stable at 33%.

- There was a slight improvement in two-year mortality for patients undergoing major resection (16.4% in 2015/16 compared to 15.3% this audit period).

- Two-year all-cause mortality showed significant improvement in variation with one potential outlier and seven other hospitals/trusts/MDTs outside the funnel limits, compared to four outliers and ten other hospitals/trusts/MDTs outside the funnel limits last year.

Chapter 6 - Rectal cancer

- There has been a gradual shift in the multidisciplinary management of rectal cancer, with a reduced proportion of patients undergoing major resection (53% in 2015/16 audit period to 47% this audit period) coupled with an increase in those patients not having any surgery (32% in 2015/16 audit period to 37% this audit period), although many underwent alternative treatments.

- Of those patients with rectal cancer and not undergoing surgery, 28% had a record of radiotherapy.

- Overall, 36% of patients undergoing major resection for rectal cancer received neo-adjuvant therapy with the vast majority receiving long-course radiotherapy. However, there was considerable variation between English cancer alliances (14% to 62%).

- 10.6% of hospitals/trusts/MDTs performed less than 10 rectal cancer resections during the audit year, and 35.1% performed less than 20 rectal cancer resections.

- Overall, 37% of patients underwent a procedure leading to creation of a permanent stoma, with significant variation across trusts/hospitals/MDTs (7% to 85%).

- For patients with rectal cancer undergoing an anterior resection procedure, almost two thirds of patients had a diverting ileostomy.

- Overall, almost one third of patients with diverting ileostomy had not had the stoma reversed by 18 months after their initial surgery. There was also significant variation at trust/hospital/MDT level with four potential outliers, and 17 other sites outside the inner funnel limits.

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Part 2: Recovery of bowel cancer services from the COVID-19 pandemic (Patients diagnosed 01 April 2020 to 31 March 2021)

- Early in the COVID-19 pandemic there was a very large impact on the diagnosis and treatment of bowel cancer patients, but much of the colorectal cancer service provision had recovered by late 2020 / early 2021 across England as a whole.
- In England the number of major resections gradually returned to pre-pandemic levels by the end of 2020, but did not recover sufficiently to reverse the deficit, and by the end of 2020 there was still a substantial deficit in major resections for bowel cancer. In Wales there was a smaller deficit in major resections by the end of 2020.
- By autumn 2020, the number of colon cancer patients in England receiving adjuvant chemotherapy was still lower than expected, and it is not clear whether it had fully recovered by February 2021.
- The number of rectal cancer patients in England initiating curative radiotherapy returned to pre-pandemic levels by autumn 2020 and by March 2021, numbers for this treatment type were the nearest to those expected.
- Patients in England diagnosed in the first 3 months of the pandemic were more likely to be female, have more advanced cancer, and fewer comorbidities. This change did not last into the later pandemic period (post-June 2020).
- The impact on new bowel cancer diagnoses in England, and the extent to which the number of diagnoses had recovered, has varied by region.
- There was a trend towards a larger deficit in diagnoses in the regions of England that have been the hardest hit by COVID-19 infections.
- The National Bowel Screening Programme appears to have helped to facilitate the recovery of diagnoses in those of screening age. By March 2021 those just below screening age and just above screening age in England had the largest deficits of new diagnoses.
- There was a larger deficit in diagnoses and major resections in the most deprived quintiles of the population

1.6 New to NBOCA for 2021

COVID-19

NBOCA has undertaken additional work examining the impact of the COVID-19 pandemic on colorectal cancer services and how well these services had recovered by late 2020 and, where data was available, into early 2021. The work assesses the impact of the pandemic on treatments specific to bowel cancer, such as major resection, adjuvant chemotherapy for colon cancer and curative radiotherapy for rectal cancer. We evaluate the variation in impact of the pandemic by region and demographics, we describe changes in the patients diagnosed during the pandemic, and we synthesise and interpret the findings to identify the implications for future recovery.

Unplanned return to theatre

This year for the first time, we report outliers for unplanned return to theatre rates.

18-month unclosed diverting ileostomy rate

Previously, NBOCA reported on 18-month stoma rate for all rectal cancer resections including abdominoperineal resection (APER), Hartmann's and anterior resections. This year, for the first time, two separate performance indicators are reported at hospital/trust/MDT level: (i) 18-month unclosed diverting ileostomy rate for anterior resections (outlier reported) and (ii) permanent stoma procedure rate.

Rectal surgery volume

For the first time this year, in view of the updated NICE recommendations, we report on rectal surgery volumes by trust/hospital/MDT.

Additional reports

NBOCA published one additional short report this year. This looked at patients diagnosed under 50 years old with metastatic colon cancer.

NBOCA will publish two further short reports in 2021/2022. The first covers additional methodological work for capturing rectal surgery volumes and the second will explore the feasibility of developing an acute chemotherapy toxicity indicator.

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Peer-reviewed articles

NBOCA are involved in the ongoing publication of high-quality peer-reviewed articles. Most recently, we have published a paper on survival rates by completion of adjuvant chemotherapy, and two papers looking at the initial impacts of COVID-19. This included the results of our COVID-19 survey and an initial exploration of surgical treatments and outcomes.

We have also published two methodological papers regarding the capture of adjuvant chemotherapy and linkage of national clinical datasets without personal information.

Quality Improvement Initiative

NBOCA launched its Quality Improvement Initiative in October 2021. Further information, including the Quality Improvement Plan, can be accessed here.

New Dataset Items for 2021-2022

Genomics data items

NBOCA is very excited to announce the addition of multiple new genomics data items which have been added to the Tumour record within the NBOCA dataset.

- **Mismatch repair (MMR)** – updated to align with new data items.
- **Microsatellite instability (MSI)**
- **BRAF v600 mutation**
- **KRAS mutation**
- **NRAS mutation**

The capture of these genomics items is in line with the updated recommendations from the colorectal cancer NICE guidelines. These guidelines advise that all patients with metastatic colorectal cancer suitable for systemic anti-cancer therapy should be tested for RAS and BRAF mutations to guide treatment.

In addition, we have previously highlighted the importance of capturing MMR and MSI information. Again, this is in line with NICE guidelines which recommend that all patients diagnosed with colorectal cancer should undergo genetic testing to identify those patients who have cancer due to Lynch Syndrome. More detailed information on this was reported in the NBOCA 2020 Annual Report, Chapter 4.

Multiple surgeon designation

In response to both the updated NICE guidelines and NBOCA work on rectal surgery volumes, we have updated the Consultant data item within the Surgery record to allow the entry of up to three GMC codes.

The purpose of this amendment is to allow for the recording of multiple Consultant surgeons given the shift in practice towards this, particularly during the pandemic.

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

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2. Methods

An updated Methodology Supplement for 2021 is available. This supplement includes a description of the methodology used to estimate the five measures which have undergone outlier analysis this year. Potential outliers are managed following the NBOCA Outlier Policy.

2.1 Data sources

Eligible NHS trusts/hospitals/MDTs 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 Admitted Patient Care (HES-APC), Patient Episode Database for Wales (PEDW), Office for National Statistics (ONS) mortality data, the Radiotherapy dataset (RTDS), the Systemic Anti-Cancer Therapy dataset (SACT), National Cancer Registry data (including Rapid Registration data), the National Emergency Laparotomy Audit (NELA) and Intensive Care National Audit and Research Centre (ICNARC) Case Mix Programme dataset. RTDS, SACT and National Cancer Registry data are currently only available for patients treated in England .

2.2 National data opt-out (previously Type 2 Objections)

National data opt-out allows patients in England who do not want their personal confidential information to be used for purposes other than their individual care to register this fact with NHS Digital. This scheme replaced the registration of type 2 objections via GP practices in May 2018. If there was a pre-existing type 2 objection it was automatically converted.

The proportion of audit patients who have opted out has increased over time, with variation by region, age and sex. However, since June 2021 there has been a rapid increase in the number of patients registering an opt-out. According to NHS Digital, the proportion of patients who had requested a national data opt-out in England was 2.71% in April/ May 2021, but by August 2021 this had increased to 5.25%. There is more detailed information on numbers of patients affected this audit period in the Methodology Supplement.

2.3 Exclusions

All trusts/hospitals/MDTs submitted at least one patient. Overall, case ascertainment is improved compared to last year (Methodology Supplement Table 1). Compared to NCRAS submissions for England reported in the 2020 Annual Report, 99% of colorectal cancer patients recorded in NCRAS were reported to NBOCA. In Wales, 80% of colorectal cancer patients reported to NBOCA were also identified within PEDW (i.e. there were more patients identified in NBOCA compared to PEDW).

Detailed information as to why this comparison has been used is in the Methodology Supplement. Overall, estimated case ascertainment this year is 99% although this should be interpreted with caution as the denominator is based on last year's NCRAS data.

Amongst patients recorded as having a major resection and with linked data, completeness of the 7 items used for risk-adjustment has risen slightly from 87% last year to 89% this year (Methodology Supplement Table 2).

Trusts/hospitals/MDTs with low submission for 2019-20:

The following trusts had submitted less than 10 cases overall:

- Mid and South Essex NHS Foundation Trust - Broomfield Hospital

Trusts/hospitals/MDTs with low submission for 2019-20 by linkage deadline:

The following trusts submitted low numbers of cases by the data linkage deadline, therefore had less than 10 linked surgical cases in the analysis extract:

- Northern Devon Healthcare NHS Trust
- Royal Free London NHS Foundation Trust

Trusts/hospitals/MDTs with low numbers of submitted surgical cases:

The following trusts submitted greater than 10 cases prior to linkage deadline, but had less than 10 linked surgical cases in the analysis extract:

- University Hospitals Sussex NHS Foundation Trust - Royal Sussex County Hospital
- Maidstone and Tunbridge Wells NHS Trust

Trusts/hospitals/MDTs with HES data issue:

The following trusts had more than 10 linked surgical cases in the analysis extract, but the relevant HES lacks the information needed to obtain 30-day readmission and reoperation outcomes:

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

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Trusts/hospitals/MDTs with insufficient data for risk-adjustment:

The trusts/hospitals/MDTs below 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. Data completeness is essential to allow risk-adjustment for benchmarking of patient outcomes. Two of the five trusts/hospitals/MDTs also had insufficient data for risk-adjustment last year.

These trusts/hospitals/MDTs are considered potential outliers and are asked to provide a formal response (Appendix 2). Two of the trusts/hospitals/MDTs who were notified of their potential outlier status on data completeness put in considerable work to correct their data. Their data completeness improved sufficiently that their outcomes can now be risk-adjusted and they are not included in the list of trusts/hospitals/MDTs below.

90-day mortality, 30-day emergency readmission and unplanned return to theatre:

- St George's University Hospitals NHS Foundation Trust (ASA)
- Southport and Ormskirk Hospital NHS Trust (TNM)

Two-year survival:

- Barts Health NHS Trust (TNM)
- Bradford Teaching Hospitals NHS Foundation Trust (ASA)
- Hull and East Yorkshire Hospitals NHS Trust (ASA)
- Southport and Ormskirk Hospital NHS Trust (TNM)

18-month unclosed diverting ileostomy:

- Hull and East Yorkshire Hospitals NHS Trust (<20% data completeness)

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Part 1:
Pre-pandemic (Patients diagnosed 01 April 2019 to 31 March 2020)

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3. Care pathways

Chapter 3 – Key Findings

- 32,641 patients were diagnosed with bowel cancer in England and Wales between 01 April 2019 and 31 March 2020.
- Most patients presented via referral from the GP (54%), with the remainder presenting by emergency presentation (18%), other referral methods (16%), and screening programmes (12%).
- Patients presenting via screening programmes were more likely to have earlier stage disease and to undergo curative treatment.
- There was marked variation by region in the proportion of patients within the eligible age range (60-74 years old) presenting via screening (20% to 38%).
- The proportion of patients presenting with Stage 1 and 2 disease (disease that has not spread to the lymph glands or other parts of the body) varied by region from 29% to 51% although there is a significant proportion of missing data making interpretation difficult.
- 61% of patients undergoing major resection for stage III colon cancer received adjuvant chemotherapy.
- Rates of adjuvant chemotherapy varied from 55% to 67% by region with significant variation also demonstrated at trust/hospital/MDT level with 21 sites outside the inner funnel limits.
- 15.6% of patients had a MMR/MSI (genetic test looking for inherited bowel cancer) result recorded, with younger patients more likely to have a result recorded.
- Recording of MMR/MSI results varied among English cancer alliances from 0% to 58%.

3.1 Where were patients diagnosed with bowel cancer presenting?

Referral source

Between 01 April 2019 and 31 March 2020, the majority of patients were referred via GP (54%), followed by emergency presentation (18%), and screening referral (12%) (Table 3.1). These proportions remained comparable to previous years with an increase in the number of patients referred via screening (12% versus 10% in the 2018/19 audit cohort), likely the result of a small reduction in the number of patients for whom the referral pathway was not known (16% versus 18% in the 2018/19 audit cohort).

With regards to patient characteristics, although men are generally at an increased risk of bowel cancer compared to women, in patients presenting via screening the skew towards males was much more marked (63% male via screening vs 56% male via GP referral). This might be partially explained by men being more reluctant to seek medical advice when they have symptoms and the screening kit providing them with an opportunity to do so.

As would be expected, the vast majority of patients referred via screening were aged 60-74 years; the eligible age range for screening. Patients presenting as an emergency were more likely to be at the extremes of age, with 9% under the age of 50 and 18% aged 85 and over.

There was little difference in ethnicity between groups. However, there was a considerable proportion of missing ethnicity data across the groups. Patients presenting as an emergency appeared to be less fit according to performance status. However, this information requires cautious interpretation due to a larger amount of missing data within the emergency group.

With regards to clinical characteristics, patients presenting as an emergency were much more likely to have right-sided disease, correlating clinically with its more insidious presentation (anaemia, weight loss) compared to left-sided disease. Two thirds of patients referred via screening had rectosigmoid disease compared to 41% of those presenting as an emergency.

Of those with staging information recorded, patients presenting via screening had considerably less advanced disease. Compared to 57% of emergency presentations and 54% of GP presentations, 36% of those referred via screening had nodal disease.

Of note, there was a much larger proportion of missing nodal data for emergency patients compared to GP presentations (21% versus 9%). In addition, compared to 31% of emergency presentations and 19% of GP presentations, just 7% of those referred via screening had metastatic disease. This translated into 86% of patients referred via screening undergoing curative treatment compared to 68% of GP presentations and 48% of emergency presentations.

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Table 3.1
Description of the 32,641 patients diagnosed with bowel cancer between 01 April 2019 and 31 March 2020 in England and Wales, by referral source

		Emergency Admission		GP Referral		Screening Referral		Other/ Not Known	
		N	%	N	%	N	%	N	%
Total no. patients		**5,821**		**17,578**		**3,945**		**5,297**	
Sex	Male	3,051	52.4	9,859	56.2	2,491	63.3	2,992	56.6
	Female	2,770	47.6	7,697	43.8	1,442	36.7	2,296	43.4
	Missing (% of total)	0	0.0	22	0.1	12	0.3	9	0.2
Age group	<50 yrs	545	9.4	976	5.6	<10	0.0	495	9.3
	50-59 yrs	694	11.9	2,242	12.8	184	4.7	738	13.9
	60-74 yrs	1,775	30.5	6,296	35.8	3,590	91.0	1,887	35.6
	75-84 yrs	1,744	30.0	5,838	33.2	159	4.0	1,631	30.8
	85+ yrs	1,063	18.3	2,226	12.7	10	0.3	546	10.3
Ethnicity*	White	3,992	93.8	12,772	94.8	2,776	94.6	3,496	93.4
	Mixed/Multi Ethnic	18	0.4	42	0.3	9	0.3	19	0.5
	Asian	110	2.6	296	2.2	74	2.5	121	3.2
	Black	77	1.8	208	1.5	37	1.3	60	1.6
	Other	60	1.4	159	1.2	40	1.4	49	1.3
	Missing/ Not Known (% of total)	1,564	26.9	4,101	23.3	1,009	25.6	1,552	29.3
Cancer site	Caecum/ascending colon	2,159	37.1	4,662	26.5	674	17.1	1,643	31.0
	Hepatic flexure	287	4.9	780	4.4	136	3.4	253	4.8
	Transverse colon	474	8.1	1,037	5.9	245	6.2	379	7.2
	Splenic flexure/descending colon	542	9.3	862	4.9	258	6.5	290	5.5
	Sigmoid colon	1,336	23.0	3,619	20.6	1,305	33.1	1,123	21.2
	Rectosigmoid	226	3.9	1,011	5.8	240	6.1	270	5.1
	Rectal	797	13.7	5,607	31.9	1,087	27.6	1,339	25.3
TNM version**	5	608	10.4	1,602	9.1	320	8.1	476	9.0
	8	5,213	89.6	15,976	90.9	3,625	91.9	4,821	91.0
Pre-treatment TNM T-stage**	T1	146	2.5	846	4.8	542	13.7	526	9.9
	T2	482	8.3	3,056	17.4	1,005	25.5	1,125	21.2
	T3	2,097	36.0	8,502	48.4	1,511	38.3	1,947	36.8
	T4	1,803	31.0	3,161	18.0	223	5.7	755	14.3
	Tx	928	15.9	1,458	8.3	504	12.8	676	12.8
	T9	310	5.3	421	2.4	86	2.2	201	3.8
Pre-treatment TNM N-stage**	N0	1,988	34.2	7,353	41.8	2,250	57.0	2,531	47.8
	N1	1,783	30.6	5,923	33.7	1,004	25.4	1,467	27.7
	N2	849	14.6	2,645	15.0	266	6.7	518	9.8
	Nx	893	15.3	1,231	7.0	338	8.6	573	10.8
	N9	308	5.3	426	2.4	87	2.2	208	3.9
Pre-treatment TNM M-stage**	M0	3,847	66.1	13,836	78.7	3,599	91.2	4,371	82.5
	M1	1,720	29.5	3,321	18.9	263	6.7	722	13.6
	Mx	46	0.8	92	0.5	20	0.5	36	0.7
	M9	208	3.6	329	1.9	63	1.6	168	3.2
Performance Status***	0	1,596	33.9	7,815	49.6	2,307	69.5	2,109	49.6
	1	1,304	27.7	4,961	31.5	809	24.4	1,335	31.4
	2	910	19.3	2,006	12.7	165	5.0	558	13.1
	3	708	15.0	845	5.4	37	1.1	220	5.2
	4	187	4.0	130	0.8	<10	0.0	33	0.8
	Missing (% of total)	1,116	19.2	1,821	10.4	625	15.8	1,042	19.7
Care Plan Intent	Curative	2,820	48.4	11,928	67.9	3,400	86.2	3,661	69.1
	Non Curative	1,724	29.6	3,008	17.1	148	3.8	689	13.0
	No Cancer Treatment	687	11.8	1,121	6.4	88	2.2	328	6.2
	Not Known	590	10.1	1,521	8.7	309	7.8	619	11.7
Surgical Treatment	Major Resection	2,718	46.7	10,197	58.0	2,814	71.3	2,823	53.3
	Local Excision	59	1.0	629	3.6	395	10.0	327	6.2
	Stoma	249	4.3	577	3.3	18	0.5	104	2.0
	Stent	90	1.5	114	0.6	5	0.1	22	0.4
	Other	341	5.9	445	2.5	126	3.2	242	4.6
	None Reported	2,364	40.6	5,616	31.9	587	14.9	1,779	33.6

* Ethnicity obtained from NCRAS rapid registration data for patients with a rapid registration record and PEDW for patients diagnosed in Wales

** TNM. Tumour Nodes Metastases. A system to describe the amount and spread of cancer in the body. The 'T' refers to 'Tumour' and describes the main tumour. The 'N' refers to 'Nodes' and describes how many lymph nodes or 'glands' have cancer. The 'M' refers to 'Metastases' and describes cancer that has spread to other parts of the body. Refer to NBOCA dataset for full description of each staging.

*** WHO Performance Status. 0 = Fully active, 1 = Some restriction but cares for self, 2 = Ambulatory >50% of time, occasional assistance needed, 3 = Ambulatory ≤50% of time, nursing care needed, 4 = Bedbound.

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Diagnosis from screening

For the majority of patients in this report, patients aged 60-74 years old were invited to complete a home testing kit every two years. Faecal Immunochemical Test (FIT) was introduced to the screening programme in England from June 2019, and Wales had completed a phased roll-out in September 2019. FIT testing was also being offered nationally as a diagnostic adjunct as part of NICE DG30 guidance to test patients presenting without rectal bleeding but with low-risk unexplained symptoms. Additional guidance on the use of FIT testing during the pandemic was also provided.

In August 2018 prior to the pandemic, ministers had agreed to lower the screening age to 50 within both England and Wales. Both England and Wales had committed to lowering the screening age from 2021 and so these changes do not affect this audit period. English patients could also request a home screening kit if they were aged 75 and over. Previously, NHS England had begun rolling out the Bowel Scope screening programme. This involved a one-off flexible sigmoidoscopy for patients aged 55. Although this is no longer being offered as part of the Bowel Cancer Screening Programme, some patients in this audit period may still have undergone this test. We are unable to determine from our data whether patients who were diagnosed via screening have presented via the home test kits or bowel scope.

4.5 million patients in England were invited to participate in home screening from 01 April 2019 to 31 March 2020. There continued to be an increasing trend in the uptake rate from 60% to 63% (Young person and adult screening KPI data: annual (April 2019 to March 2020). At the time of writing this report, there was no up to date information regarding bowel cancer screening in Wales for the 2019/20 audit period. In the previous audit period, 300,000 patients had been invited for screening and the uptake rate was 57%.

Geographical variation in screening diagnoses in eligible patients

This year patients with a referral source which was "not known" were separated from those with "other" referral source in order to aid interpretation. The "other" category includes, for example, referral from another medical speciality. However, there remained wide geographical variation in the referral pathway amongst patients who were within the eligible age range for bowel cancer screening (Figure 3.1).

The proportion of patients being referred via screening varied from 20% in Lancashire and South Cumbria to 38% in West Yorkshire and Harrogate. Similarly, there was wide variation in the proportion presenting as an emergency (9% to 25%), via the GP (38% to 56%), or from another source (4% to 19%).

These differences are likely to be multifactorial but may reflect differences in patient education and awareness of the Bowel Cancer Screening Programme. In addition, during this timeframe FIT testing was being rolled out meaning that there was differential access to this. It has been shown that FIT testing has higher uptake rates compared to the previous test (Faecal Occult Blood test) across both sexes and all deprivation quintiles.

Recording of pre-treatment staging

One of the key ambitions in the NHS Long Term Plan for Cancer is that, by 2028, 75% of cancer patients will be diagnosed with stage 1 or 2 disease *(before the cancer has spread to local lymph nodes or other organs).* The detection of earlier, more treatable cancers is also a key focus of the Cancer Delivery Plan for Wales.

The proportion of patients that presented with stage 1 or 2 disease varied from 29% to 51% across cancer alliances/Wales (Figure 3.2). The proportion of patients with missing pre-treatment staging also varied from 2% to 30% making the interpretation of differences in pre-treatment staging difficult.

Given the impacts of the pandemic with potential delays in presentation and diagnosis, it will be particularly important moving forwards to monitor trends in staging at diagnosis. It is therefore crucial that pre-treatment staging is accurately recorded within NBOCA.

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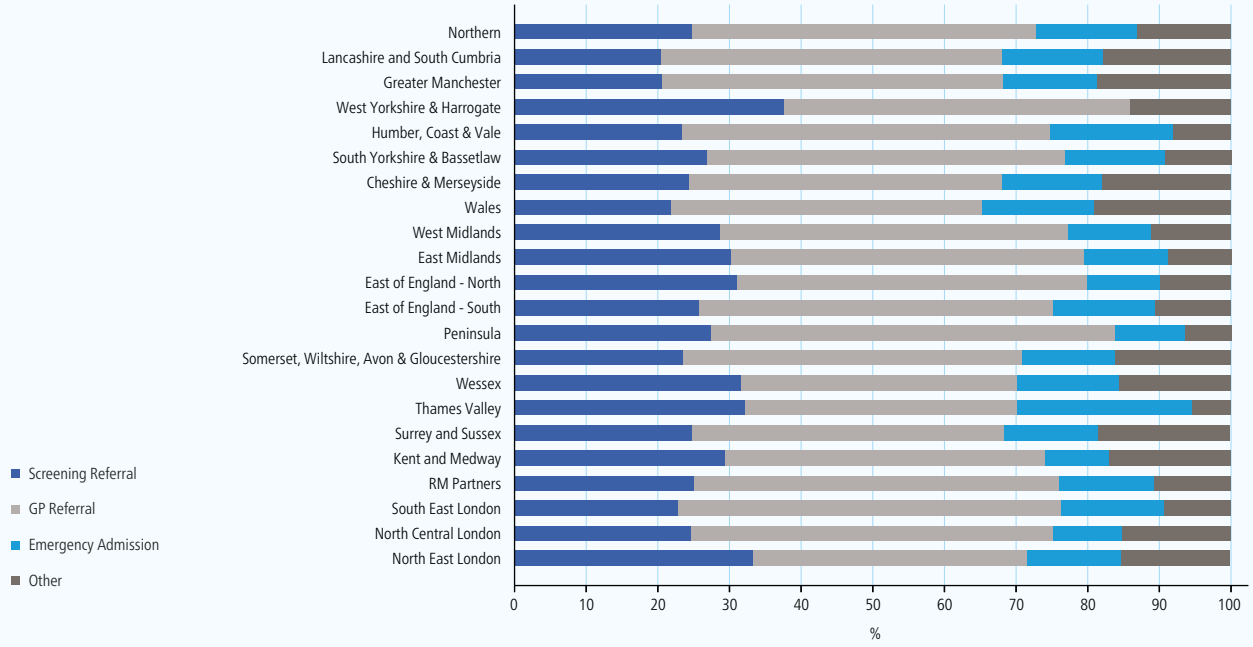
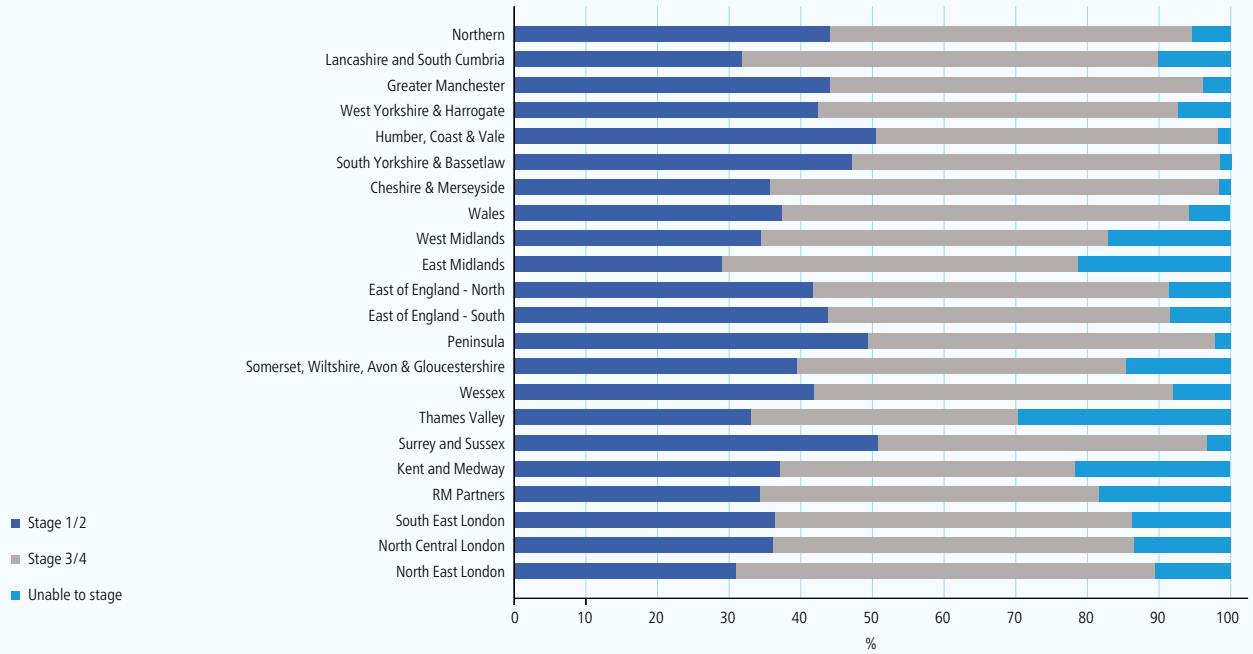
Figure 3.1
Referral source of the 13,321* patients aged 60 to 74 years diagnosed with bowel cancer between 01 April 2019 and 31 March 2020 by cancer alliance (England)/country (Wales)



*193 patients with recorded referral source "Not Known" excluded

Figure 3.2
Pre-treatment staging* of patients diagnosed with bowel cancer between 01 April 2019 and 31 March 2020 by cancer alliance (England)/country (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

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3.2 Major resection in patients who had "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, in contrast to rectal cancer patients who may undergo various neo-adjuvant treatments.

Taking this into account, the definition of patients considered to have "potentially curable" disease for this analysis was therefore patients who presented electively with stage T2 to T4 non-metastatic colon cancer. Further details are provided in the Methodology Supplement.

The proportion of these patients undergoing a major resection in the pre-screening (<60 years) and screening (60 to 74 years) age groups was 92% and 91% respectively, in comparison to 72% in those patients aged 75 and over (Table 3.2).

Across all age groups, those patients not undergoing major resection had a higher proportion of locally advanced disease (T4 stage). However, this was most marked in those patients aged under 60 years, with 43% having T4 disease compared to 24% in the other two age groups. Patients aged under 60 years also had the most marked difference in nodal staging between those who did and did not undergo major resection. For patients aged under 60 years, 67% had nodal disease compared to 51% in those aged 60 to 74 years, and 46% in those aged 75 and over. Of note, patients within the age group eligible for screening (60 to 74 years) had generally less advanced staging compared to the other age groups.

Patients in the two older age groups demonstrated more pronounced differences in performance status and comorbidities between those undergoing major resection and those not undergoing major resection, compared to those in the youngest age group. However, of note, patients who did not undergo major resection did have larger proportions of missing data.

These results suggest that for patients aged under 60, staging rather than fitness for surgery was the main determinant for major resection. In contrast, as might be expected, those in the two older age groups appear less likely to be undergo a major resection due to significant comorbidities affecting their fitness for surgery.

Across all groups, one-year survival was higher in those who underwent major resection, although this rate decreased slightly with increasing age from 97% to 93%. For those patients not undergoing a major resection, one-year survival decreased with increasing age from 80% to 76% to 56%. This is likely in part due to the increased use of other treatments in those aged under 60 years. For example, 31% have alternative surgery compared to 24% in the 60 to 74 year age group, and 11% in the 75 and over age group.
In addition, 49% have chemotherapy compared to 24% in the 60 to 74 year age group, and 4% in the 75 and over age group. These lower rates of other treatments are likely due to the higher burden of comorbidities and reduced fitness which, in turn, also further contribute to the poor 1-year survival.

There is considerable variation present between trusts/hospitals/MDTs in the proportion of patients that underwent major resection within this homogeneous group (Figure 3.3). 20 trusts/hospitals/MDTs fell outside the inner limits (95% limits), which is comparable to 19 trusts/hospitals/MDTs last year, but higher than the 7 expected by chance alone.

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Table 3.2

Description of the 8,157 patients who presented electively with stage T2 to T4 non-metastatic colon cancer in England and Wales, diagnosed between 01 January 2019 and 31 December 2019, 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		**889**		**77**		**3,224**		**302**		**2,628**		**1,037**	
Sex	**Male**	500	56.2	41	53.3	1,756	54.5	171	56.6	1,312	50.0	510	49.2
	Female	389	43.8	36	46.8	1,465	45.4	126	41.7	1,312	50.0	525	50.6
	Missing (% of total)	0	0.0	0	0.0	3	0.1	5	1.6	4	0.2	2	0.2
Cancer site	**Caecum/ascending colon**	272	30.6	23	29.9	1,250	38.8	100	33.1	1,280	48.7	454	43.8
	Hepatic flexure	53	6.0	5	6.5	239	7.4	13	4.3	204	7.8	87	8.4
	Transverse colon	70	7.9	<5	-	311	9.6	22	7.3	293	11.1	137	13.2
	Splenic flexure/descending colon	84	9.4	7	9.1	298	9.2	27	8.9	181	6.9	69	6.7
	Sigmoid colon	410	46.1	38	49.4	1,126	34.9	140	46.4	670	25.5	290	28.0
Referral Source	**GP**	843	94.8	74	96.1	2,043	63.4	226	74.8	2,563	97.5	1031	99.4
	Screening	46	5.2	<5	-	1,181	36.6	76	25.2	65	2.5	6	0.6
Pre-treatment TNM* T-stage	**T2**	191	21.5	13	16.9	909	28.2	84	27.8	642	24.4	223	21.5
	T3	536	60.3	31	40.3	1,830	56.8	146	48.3	1,555	59.2	562	54.2
	T4	162	18.2	33	42.9	485	15.0	72	23.8	431	16.4	252	24.3
Pre-treatment TNM* N-stage	**N0**	374	42.5	25	33.3	1,638	51.4	146	49.0	1,385	53.3	549	53.6
	N1	376	42.7	31	41.3	1,195	37.5	112	37.6	965	37.1	366	35.7
	N2	130	14.8	19	25.3	356	11.2	40	13.4	249	9.6	109	10.6
	Missing (% of total)	9	1.0	2	2.6	35	1.1	4	1.3	29	1.1	13	1.3
Performance Status**	**0**	656	79.3	44	71.0	1,889	64.6	105	40.2	943	39.4	129	14.5
	1	147	17.8	13	21.0	822	28.1	76	29.1	1052	44.0	266	29.8
	2	22	2.7	5	8.1	185	6.3	45	17.2	343	14.3	295	33.1
	3	<5	-	0	0.0	24	0.8	29	11.1	51	2.1	172	19.3
	4	0	0.0	0	0.0	5	0.2	6	2.3	<5	-	30	3.4
	Missing (% of total)	62	7.0	15	19.5	299	9.3	41	13.6	235	8.9	145	14.0
CPET* performed**	**Not Recorded**	830	93.4	77	100.0	2,911	90.3	287	95.0	2,400	91.3	1011	97.5
	Yes	59	6.6	0	0.0	313	9.7	15	5.0	228	8.7	26	2.5
Co-morbidities	**0**	592	69.6	41	61.2	1,585	51.5	107	43.7	962	38.9	266	33.9
	1	195	22.9	18	26.9	997	32.4	69	28.2	833	33.7	238	30.3
	2	48	5.6	7	10.4	369	12.0	35	14.3	441	17.8	151	19.2
	>=3	16	1.9	<5	-	128	4.2	34	13.9	238	9.6	130	16.6
	Missing (% of total)	38	4.3	10	1.3	145	4.5	57	18.9	154	8.9	252	24.3
Treatment received	**Other surgery**	0	0.0	24	31.2	0	0.0	72	23.8	0	0.0	117	11.3
	Chemotherapy	466	52.4	38	49.4	1,259	39.1	71	23.5	404	15.4	40	3.9
	None	0	0.0	29	37.7	0	0.0	182	60.3	0	0.0	890	85.8
Planned	**Specialist Palliative Care**	<5	-	<5	-	5	0.2	23	7.6	14	0.5	254	24.5
1 year mortality from diagnosis date	**Alive**	850	97.3	61	80.3	3066	96.4	221	75.7	2384	92.5	569	56.4
	Dead	24	2.7	15	19.7	116	3.6	71	24.3	193	7.5	439	43.6
	Missing (% of total)	15	1.7	1	1.3	42	1.3	10	3.3	51	1.9	29	2.8

* TNM. Tumour Nodes Metastases. A system to describe the amount and spread of cancer in the body. The 'T' refers to 'Tumour' and describes the main tumour. The 'N' refers to 'Nodes' and describes how many lymph nodes or 'glands' have cancer. The 'M' refers to 'Metastases' and describes cancer that has spread to other parts of the body. Refer to NBOCA dataset for full description of each staging.

** WHO Performance Status. 0 = Fully active, 1 = Some restriction but cares for self, 2 = Ambulatory >50% of time, occasional assistance needed, 3 = Ambulatory ≤50% of time, nursing care needed, 4 = Bedbound

*** Cardiopulmonary exercise testing. A way of assessing the performance of the heart and lungs at rest and during exercise to provide an indication of how someone might cope with a major operation.

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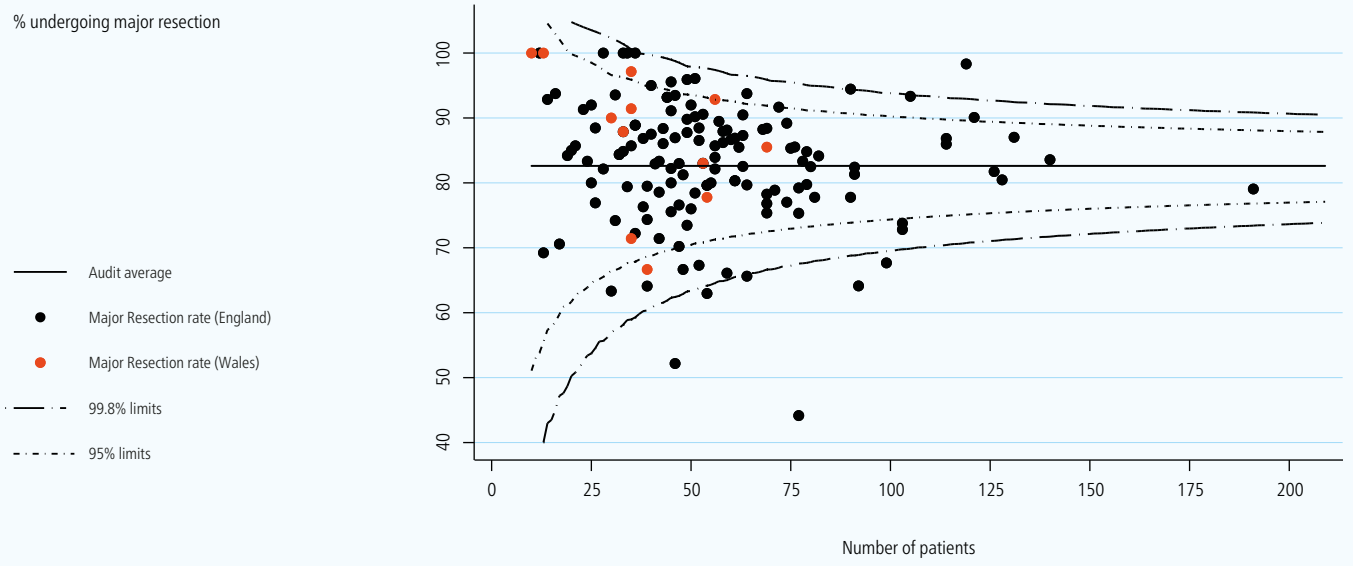
Figure 3.3
Major resection rate in colon cancer patients with an elective presentation and stage T2 to T4 non-metastatic disease, by English NHS trust/hospital/ Welsh MDT*



*Excludes 2 tertiary referral providers and 8 trusts with <10 patients fulfilling criteria

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

Updated National Institute for Health and Care Excellence (NICE) guidelines recommend the use of capecitabine and oxaliplatin (CAPOX), 5-fluorouracil (5-FU) and oxaliplatin (FOLFOX) or single agent fluoropyrimidine (capecitabine or 5-FU) as adjuvant chemotherapy for stage III colon cancer. Choice of chemotherapy should be dependent on staging, performance status, comorbidities, age and patient choice.

Updated methodology continues to be used this year to allow the reporting of adjuvant chemotherapy use for Wales who do not currently have national chemotherapy data, by instead using PEDW. Detailed methodology for this section of work can be found within the Methodology Supplement.

Geographical variation in adjuvant chemotherapy

Adjuvant chemotherapy rates remained the same as the previous audit period with an overall rate of 61% for patients with stage III colon cancer. Unadjusted adjuvant chemotherapy rates varied for English cancer alliances and Wales from 55% to 67%.

Figure 3.4 demonstrates variation in unadjusted adjuvant chemotherapy rates according to surgical trust at hospital/trust/MDT level. Five trusts and one Welsh MDT were excluded because they had fewer than 10 patients recorded undergoing major resection with stage III colon cancer. However, two of these sites were tertiary centres specialising in the management of complex or recurrent colorectal cancers who would not be expected to operate on large numbers of stage III patients.

Overall variation at the hospital/trust/MDT level has considerably reduced in this audit period with 21 sites outside the 95% funnel limits compared to 27 sites in the previous audit period. However, 7 sites were below the 99.8% funnel limits compared to 4 sites in the previous audit period. No Welsh MDTs were below the 95% funnel limits.

Of note, the results presented are unadjusted. However, previous work by the audit has demonstrated that adjustment for patient and clinical characteristics including age, comorbidity, performance status, and staging, does not reduce the variation between hospitals/trusts/MDTs (Boyle *et al.*).

The next reporting period will begin to include patients treated during the pandemic. NICE guidelines released during the pandemic initially aimed to prioritise adjuvant chemotherapy over palliative chemotherapy. It will be important to monitor any changes in patterns of chemotherapy use as a result of the pandemic.

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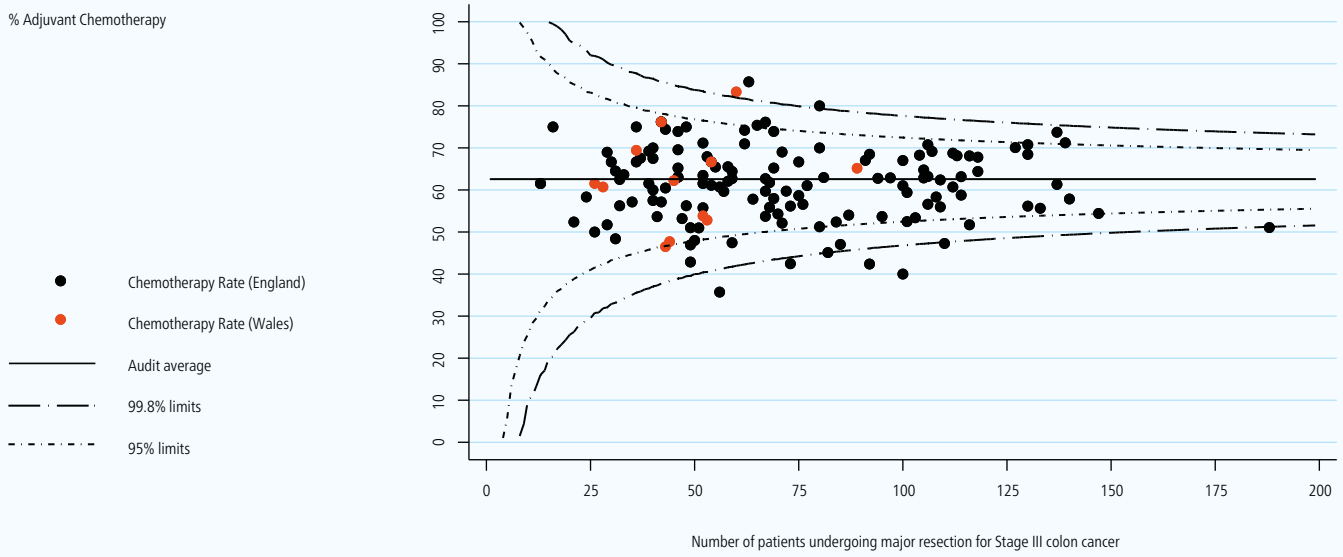
Figure 3.4
Adjuvant chemotherapy in patients with stage III colon cancer by English trust/hospital and Welsh MDT for patients undergoing major resection between 01 December 2016 and 31 August 2019



Dementia and colorectal cancer

In the 2020 annual report we undertook some preliminary work evaluating dementia in patients diagnosed with colorectal cancer. We found that 4% of patients aged 65 and over with a colorectal cancer diagnosis also had a dementia diagnosis recorded. We also found that these patients had poor prognostic factors (old age, poor fitness, and emergency presentation) and were less likely to have favourable outcomes compared to those without dementia.

Patients with dementia represent a heterogeneous group with a wide spectrum of cognitive decline and subsequent impact on daily functioning. Further work has been carried out to attempt to stratify dementia severity using a combination of dementia diagnosis and ECOG performance status. In addition, patient, tumour and hospital-level factors which might contribute to poorer survival have been explored, coupled with appropriate risk-adjustment for 2-year survival.

2-year survival was shown to decrease markedly with increasing dementia severity, and was not fully explained by patient, tumour and health service factors. This suggests that a 'one size fits all' policy for the management of these patients is not appropriate. The results will be published in a peer-reviewed paper this year.

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3.4 Mismatch Repair Testing

Background

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.

Lynch syndrome is an inherited genetic condition which accounts for approximately 3.3% of colorectal tumours in the UK. People with Lynch syndrome are also at increased risk of other cancers. Expansion of testing may increase the detection of this condition, as well as identifying families who may benefit from cascade genetic testing.

Genetic testing includes performing either immunohistochemistry for mismatch repair (MMR) proteins or microsatellite instability (MSI) testing. Tumours which are identified as having 'deficient' DNA mismatch repair require further sequential testing to confirm Lynch syndrome.

Once identified, risk-reducing strategies as per the updated British Society of Gastroenterology (BSG) guidelines, can be implemented. This includes, for example, 2-yearly colonoscopy from the age of 25 for those with MLH1 and MSH2 genes identified, and 2-yearly colonoscopy from the age of 35 for those with MSH6 and PMS2 genes identified.

Early assessment of MMR may also impact treatment strategies both in advising on the extent of surgical resection and increasing potential for immunotherapy in curative and palliative settings.

A report by Bowel Cancer UK involved a Freedom of Information (FOI) request which asked whether Clinical Commissioning Groups (CCGs) in England were funding hospitals to carry out Lynch syndrome testing. Only 6% (13 out of 204 CCGs) commissioned their local hospital(s) to test all bowel cancer patients in line with NICE guidance.

NBOCA data item

For the 2018/19 audit period, a data item collecting information about mismatch repair was added to the pathology file (meaning it could only be completed for patients undergoing major resection), and in 2019/20 this was moved to the tumour file to enable completion for all patients.

The original dataset item only allowed input of whether the MMR/MSI result was proficient or deficient. This means that currently we are unable to distinguish whether a missing response means that MMR/MSI testing has not been performed or whether the data has simply not been submitted. To address this issue, from 2020/21 diagnoses onwards an extended panel of responses will be available including options for 'failed analysis' and 'not assessed'. In addition, we are aware that there may be barriers to accessing these specialist results for members of the healthcare team entering the data. As such, permission to obtain linked data relating to histological and genomic tests performed within the NHS from the National Disease Registration Service has been obtained in the hope of improving data completeness and quality.

It is likely that the COVID-19 pandemic has affected the ability of hospitals/trusts/MDTs to report on this item, both due to service pressures and access to results. Despite this, the proportion of patients with a response to this item has increased from 13.0% in the 2018/19 audit period to 15.6% (Table 3.3). Reporting was highest in those who underwent a major resection and had a completed pathology file, but completeness was higher if either were present.

Younger patients were more likely to have a response with 25.9% of those in the youngest age group compared to 21.5% of those in the oldest age group (Table 3.4). This is likely to reflect guidance available prior to the NICE DG27 publication in 2017 which restricted MMR testing to younger patients e.g. <50 years.

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Table 3.3
Number and proportion of patients with mismatch repair/microsatellite instability result reported to the audit after CRC diagnosis between 1 April 2018 and 31st March 2020 in England and Wales

	2018/19			2019/20		
	Overall	No. with response	%	Overall	No. with response	%
All patients	29,564	3,838	13.0	31,895*	4,969	15.6
With completed pathology file	17,521	3,243	18.5	19,611	4,343	22.2
Major Resection (MR) reported	16,912	3,046	18.0	18,253	4,052	22.2
MR & complete pathology file	15,634	3,016	19.3	17,409	4,032	23.2

*Excludes patients with tumours of the appendix and those with discrepancies between the date of diagnosis and date of surgery i.e. date of surgery predates date of diagnosis by more than 6 months

Table 3.4
Number and proportion of patients with mismatch repair/microsatellite instability result reported to the audit by age, amongst patients diagnosed between 1 April 2018 and 31st March 2020 who underwent major resection in England and Wales

	2018/19			2019/20		
	Overall	No. with response	%	Overall	No. with response	%
<50 years	1,073	235	21.9	1,141	296	25.9
50-59 years	2,366	467	19.7	2,391	558	23.3
60-74 years	7,537	1,314	17.4	8,596	1,877	21.8
75-84 years	4,831	843	17.5	5,061	1,092	21.6
>=85 years	1,105	187	16.9	1,064	229	21.5

Geographical variation in MMR/MSI recording

For this audit period, at hospital/trust/MDT level, 66% of diagnosing trusts submitting at least 10 patients had a response to this question for any of their patients. Only 7% (11/149) had responses for at least 70% of their patients. However, when restricted to patients undergoing major resection, this figure improved to 17%.

There is marked variation demonstrated in the proportion of patients that have MMR/MSI results reported to the audit according to English cancer alliance over the last two audit periods (Figure 3.5) (0% to 58%). Wales has not submitted any data for this variable, the reasons for which require further exploration. Comparing this audit period to the previous one, all except two English cancer alliances had improved the proportion of patients with information submitted. We suspect these cancer alliances may have had issues with data submission due to COVID-19.

The 2019 organisational survey reported that only 58% of hospitals/trusts/MDTs were offering MMR/MSI testing to all patients. A further 36% were offering testing but only to particular age groups. The next organisational survey (likely distributed early 2022) will include questions to enable the audit to report on whether access to testing has improved.

Data reporting for MMR/MSI testing is not yet complete enough to enable comparative performance monitoring at trust/hospital/MDT level.

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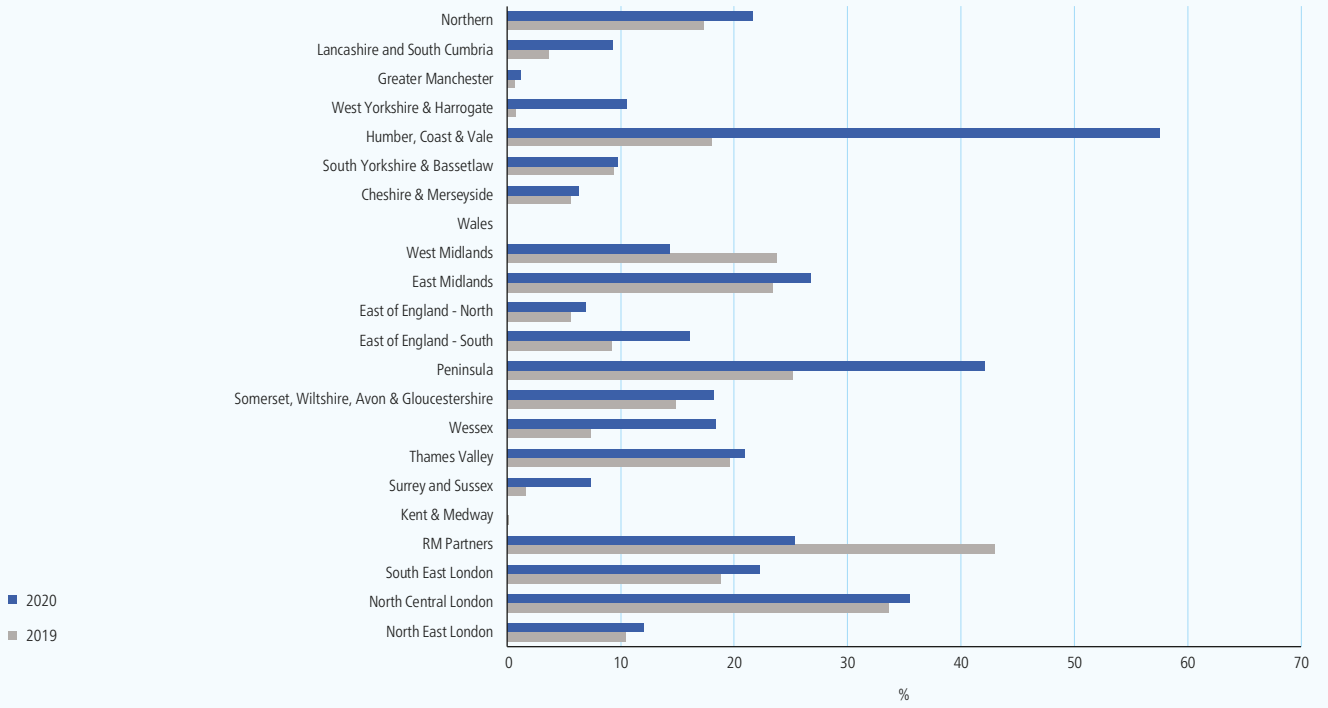
Figure 3.5
Proportion of patients with mismatch repair/microsatellite instability result reported to the audit after CRC diagnosis between 1 April 2018 and 31st March 2020, by English cancer alliance /country (Wales)



Chapter Recommendations – Care pathways

- Ongoing efforts to promote and raise awareness of bowel cancer signs and symptoms, as well as the importance of compliance with the national Bowel Cancer Screening Programme, should continue to try to mitigate some of the variation identified in both the proportion of patients referred via screening and subsequent differences in staging at diagnosis.

- Trusts/hospitals/MDTs should continue to improve data submission for pre-treatment TNM staging to help with the interpretation of variation in the proportion of patients diagnosed with stage 1 and 2 disease. There remains considerable variation in data completeness. It will be even more crucial to be able to accurately report this information for the purposes of monitoring potential impacts of the pandemic.

- Trusts/hospitals/MDTs should familiarise themselves with the new genomics data items and try to ensure that the relevant members of the healthcare team have access to these results where feasible. NBOCA are aware of potential difficulties in accessing these specialist results and are trying to overcome this through novel genomics data linkage.

- Trusts/hospitals/MDTs should complete the next NBOCA organisational survey to include updated information on their access to genomics testing.

- Patients with bowel cancer should be made aware of national guidelines regarding genetic testing and the potential implications of a diagnosis of Lynch syndrome for themselves and their family.

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4. Surgical care

Chapter 4 – Key Findings

- Overall 90-day mortality continued to improve from 3.5% in the 2015/16 audit period to 2.6%. There were no outliers for this measure at hospital/trust/MDT level.
- 90-day mortality following emergency surgery also improved from 12.9% in the 2015/16 audit period to 8.7%.
- Overall 30-day readmission rates were stable at 10.7%. However, there was reduced variation at hospital/trust/MDT level with 5 sites above the inner funnel limits compared to 9 in the last audit period.
- Overall unplanned return to theatre rates were 7.4% with 4 potential outlying hospital/trust/MDTs.
- Wide variation in laparoscopic surgery rates persisted with overall rates of 49% to 76% for English cancer alliances.
- At least 35 English hospitals/trusts are now performing regular robotic surgery with an additional 565 cases recorded this audit period. The median number of robotic cases performed over the last five years at hospital/trust level is 35 (IQR 15 to 77).

4.1 How many patients died 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 who underwent major resection in this audit period was 57% (Table 4.1). This is comparable to the 2018/19 audit period. However, it is lower than the audit periods prior to this. This reduction in numbers may be related to the reduced submission of surgical data due to the impact of the COVID-19 pandemic on resources.

A downward trend in 90-day mortality continues. This has reduced from 3.5% in the 2015/16 audit period to 2.6% in this audit period.

Table 4.1
Patients undergoing major surgery and chance of death after major surgery in England and Wales, by audit year*

	2015–16		2016–17		2017–18		2018–19		2019–20	
	N	%	N	%	N	%	N	%	N	%
Total patients**	29,512		29,621		30,390		30,129		31,827	
Undergoing major resection***	18,535	62.8	18,597	62.8	18,430	60.6	17,126	56.8	18,116	56.9
Dead at 90 days after surgery, out of those undergoing major resection	646	3.5	650	3.5	585	3.2	514	3.0	464	2.6
Missing mortality	116	0.6	66	0.4	83	0.5	54	0.3	80	0.4

*This includes patients diagnosed within the audit period regardless of major resection date to provide a more accurate estimate of the major resection rate
** Total patients entered onto CAP when patient identifiers sent for linkage to ONS/HES/PEDW: 405 patients were added to the 2019-20 cohort after linkage
*** 37 major resections occurring after 31st January 2021 excluded from 2019-20 as < 90 days follow-up in ONS available

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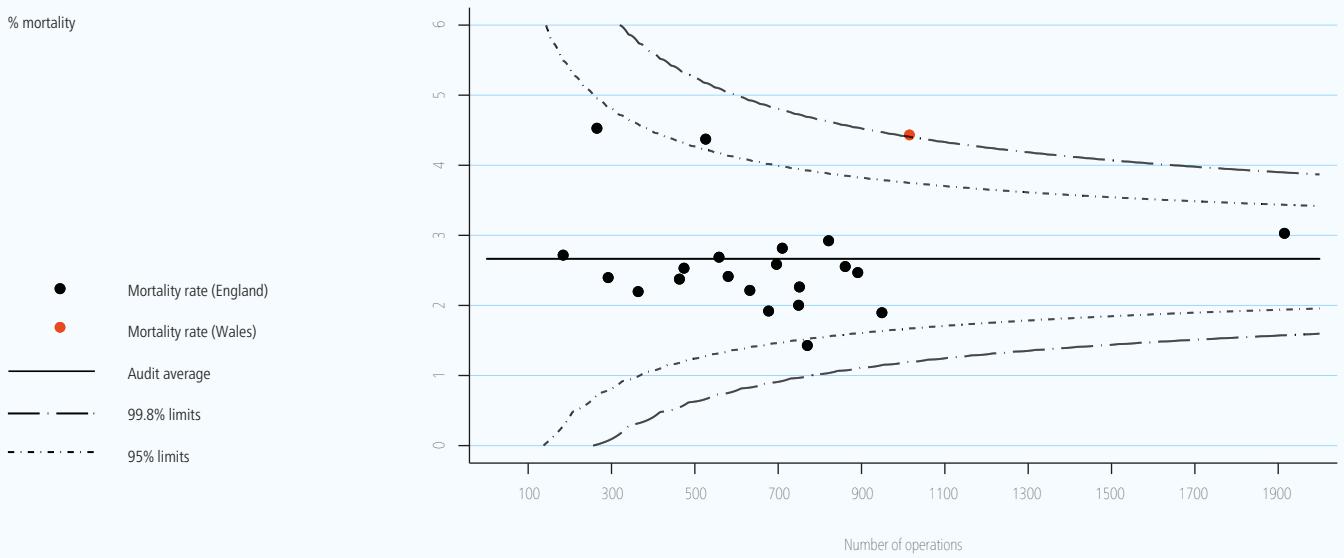
Variation in 90-day post-operative mortality between care providers

Figure 4.1 shows observed and adjusted analyses for 90-day post-operative mortality for English cancer alliances and Wales. Following risk-adjustment, there are no outliers on this performance indicator this audit period. This compares to a single potential outlier in the 2018/19 audit period.

Figure 4.1
a) observed and b) adjusted 90-day post-operative mortality (elective and emergency admissions) by cancer alliance (England)/country (Wales) for patients diagnosed between 01 April 2019 and 31 March 2020 who underwent major resection by 31st March 2020

a) Observed 90-day mortality by cancer alliance (England)/country (Wales)



b) Adjusted 90-day mortality by cancer alliance (England)/country (Wales)

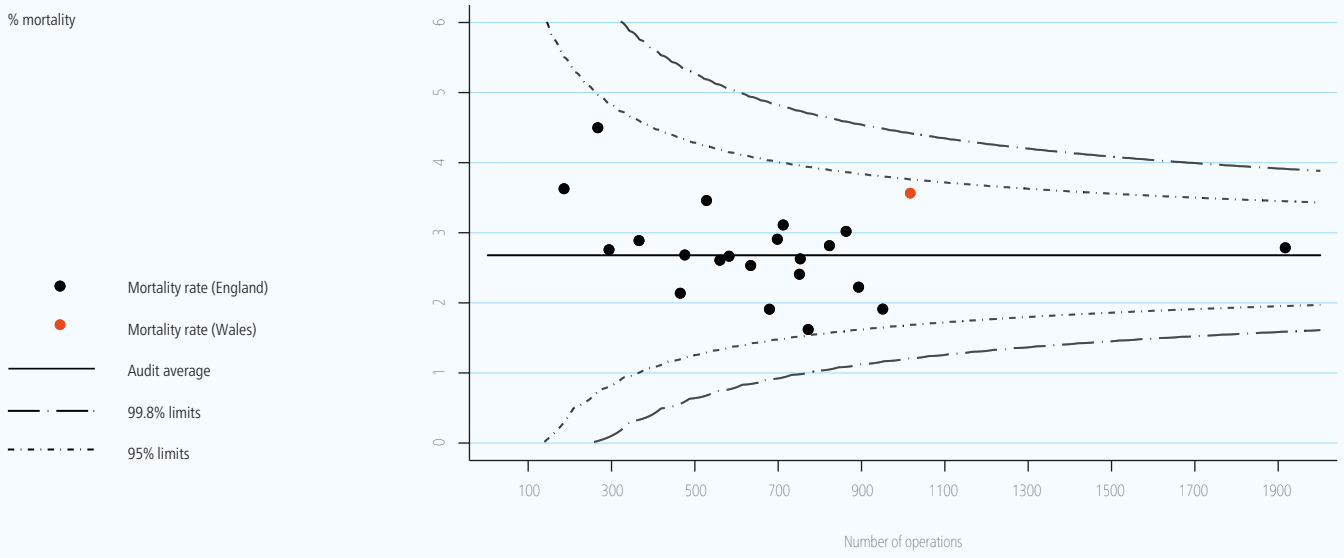


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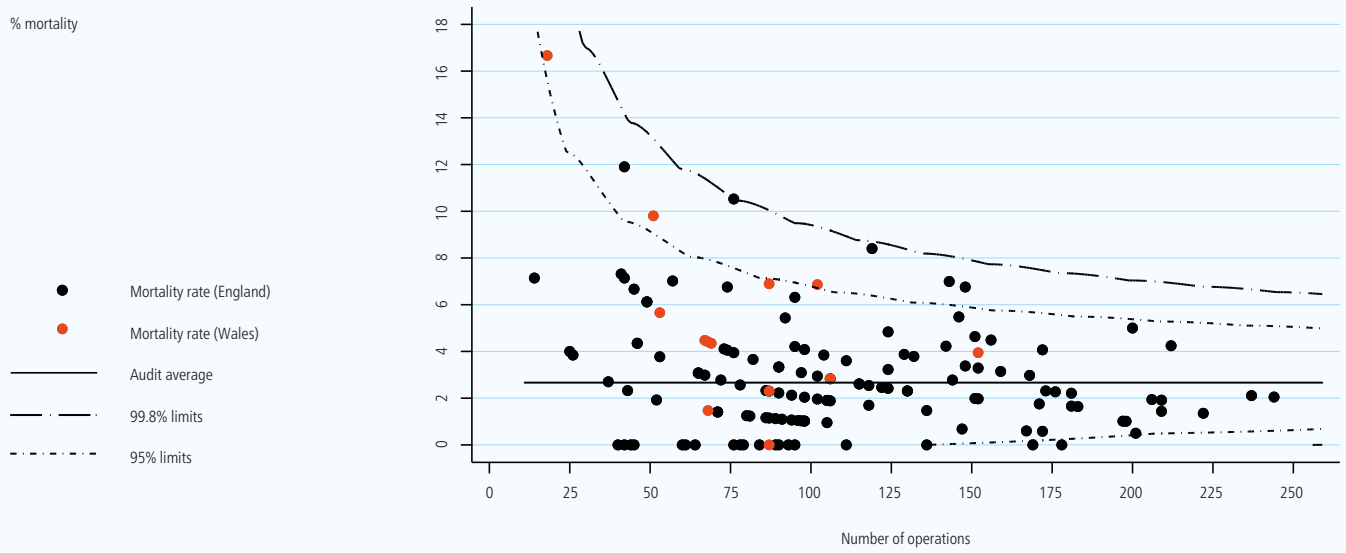
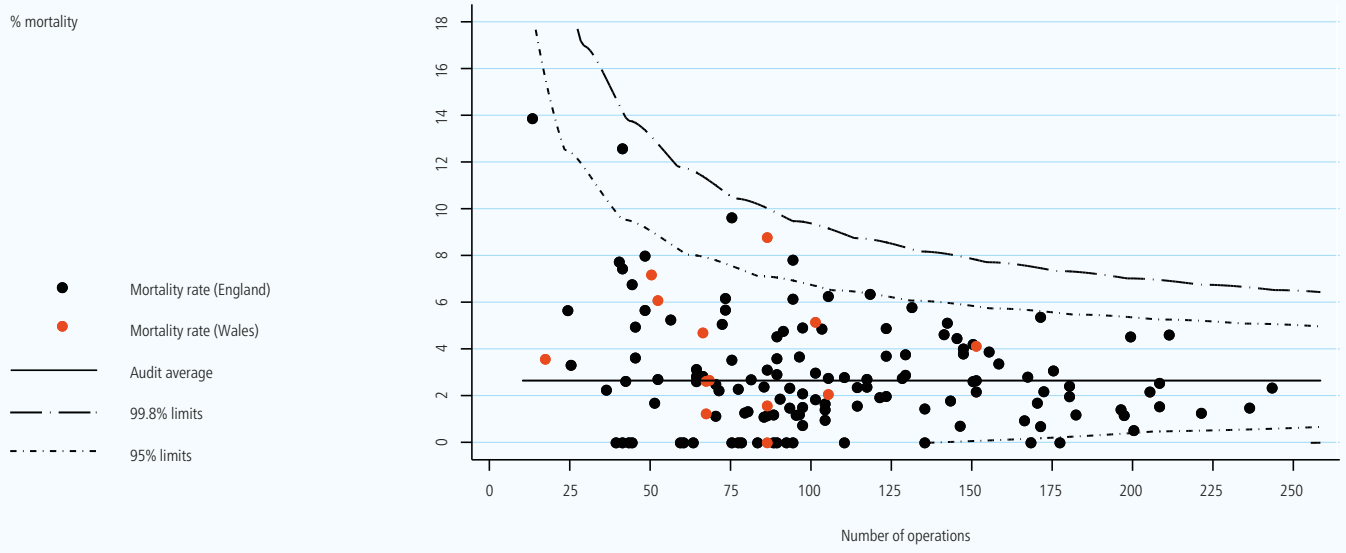
Figure 4.2 shows observed and adjusted 90-day post-operative mortality for English NHS trusts/hospitals and Welsh MDTs. Following risk-adjustment, there were no trusts/hospitals/MDTs outside the 99.8% limits. However, three trusts/hospitals and one MDT were outside the 95% limits. This compares to a single trust/hospital outside the 99.8% limit, and two trusts/hospitals outside the 95% limits in the 2018/19 audit period. None of the same trusts/hospitals/MDTs were outside the 95% limit in the previous audit period.

Figure 4.2
a) observed and b) 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 2019 and 31 March 2020 who underwent major resection by 31st March 2020

a) Observed 90-day mortality by trust/hospital/MDT with more than 10 operations



b) Adjusted 90-day mortality by trust/hospital/MDT with more than 10 operations



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90-day post-operative mortality according to operative urgency

There was a reduction in the proportion of patients presenting as an emergency admission this audit period. This has dropped from 24.1% in the 2015/16 audit period to 20.9% this audit period (Table 4.2). There has also been a slight improvement over time in the proportion of missing data.

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

	2015–16		2016–17		2017–18		2018–19		2019–20	
	N	%	N	%	N	%	N	%	N	%
Total patients*	29,512		29,621		30,390		30,129		31,827	
Emergency admission	6,354	24.1	6,356	23.7	6,328	23.2	6,107	22.9	6,015	20.9
Elective admission	20,061	75.9	20,497	76.3	20,966	76.8	20,576	77.1	22,698	79.1
Missing (% of total)	3,097	10.5	2,768	9.3	3,096	10.2	3,446	11.4	3,114	9.8

* Total patients entered onto CAP when patient identifiers sent for linkage to ONS/HES/PEDW: 671 patients were added to the 2018-19 cohort after linkage

90-day mortality rates showed improvement across all categories of urgency of surgical operations (Table 4.3). The definitions of surgical urgency are available in the Methodology Supplement, Section 7. For example, the 90-day mortality rate for patients undergoing elective surgery improved from 2.0% in the 2015/16 audit period to 1.5% this year. In addition, there were more marked improvements in the 90-day mortality rate for patients undergoing emergency surgery. This has reduced from 12.9% in the 2015/16 audit period to 8.7% this year.

These improvements are likely to be multifactorial but likely partly reflect the impacts of NBOCA reporting, the NBOCA Clinical Outcome Publication reporting, and the National Emergency Laparotomy Audit (NELA).

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

		2015–16		2016–17		2017–18		2018–19		2019–20	
		N	%	N	%	N	%	N	%	N	%
Total patients undergoing major resection eligible for linkage		18,535		18,597		18,430		17,126		18,116	
Overall 90-day mortality*		646/18,419	3.5	650/18,531	3.5	585/18,347	3.2	514/17,072	3.0	464/18,036	2.6
90-day mortality by urgency of operation	Elective	233/11,514	2.0	241/11,507	2.1	210/11,673	1.8	200/11,053	1.8	166/11,007	1.5
	Scheduled	76/3,896	2.0	92/3,881	2.4	79/3,751	2.1	66/3,272	2.0	52/3,106	1.7
	Urgent	99/1,130	8.8	98/1,228	8.0	83/1,041	8.0	63/939	6.7	104/2,187	4.8
	Emergency	238/1,848	12.9	217/1,831	11.9	208/1,747	11.9	177/1,625	10.9	139/1,600	8.7
	Missing urgency of operation	0/31	0.0	2/84	2.4	5/135	3.7	8/183	4.4	3/136	2.2

* 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. 37 major resections occurring after 31st January 2021 excluded from 2019-20 as < 90 days follow-up in ONS available.

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

Trends in length of stay over time

Overall, following major resection the median length of inpatient stay was 7 days (IQR 5-11 days). As expected, those patients undergoing emergency/urgent procedures had a longer length of stay than patients undergoing an elective/scheduled procedure with a median length of 9 (IQR 6-15) days compared to 6 (IQR 4-10) days.

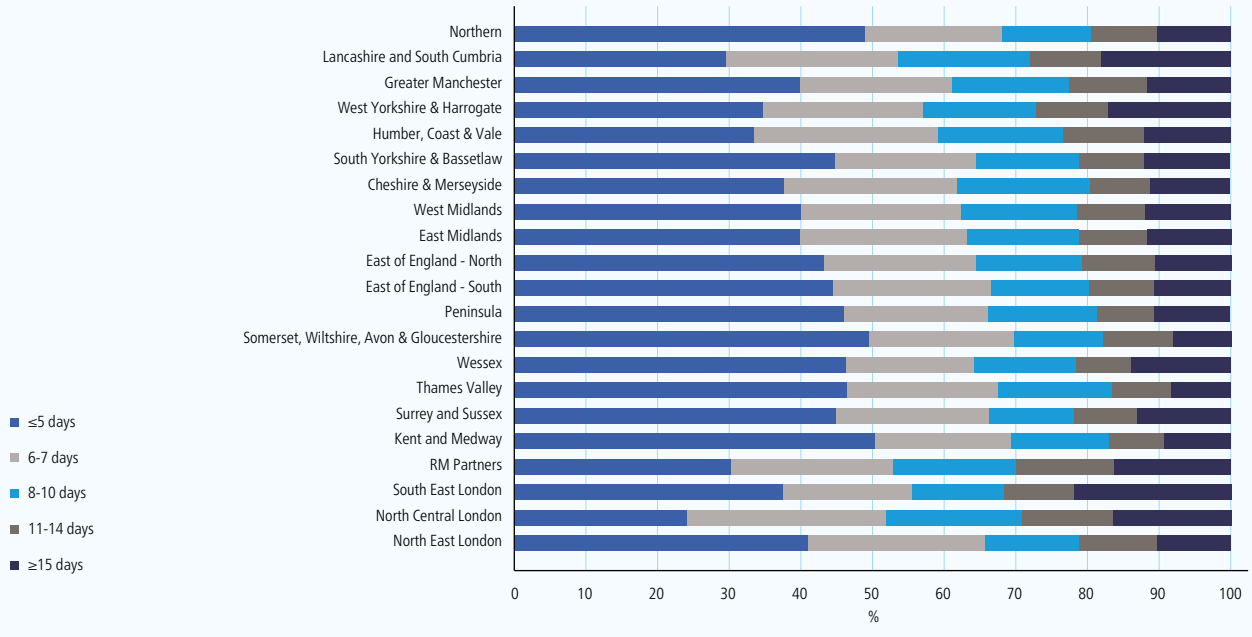
Geographical variation in length of stay

There was significant variation by region in the length of stay for patients undergoing elective major surgery (Figure 4.3a). For example, the proportion of patients staying in hospital longer than 14 days varied from 8% to 22%. Overall, at least 50% of patients were discharged across all English cancer alliances within a maximum of 6-7 days.

Similar variation was shown in the length of stay for patients undergoing emergency major surgery (Figure 4.3b). For example, the proportion of patients staying in hospital longer than 14 days varied from 23% to 44%. Overall, just under one fifth of patients were discharged across all English cancer alliances within a maximum of 6-7 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 in the accompanying Appendix spreadsheet.

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



*Welsh data excluded due to almost all patients being recorded as undergoing urgent/emergency surgery

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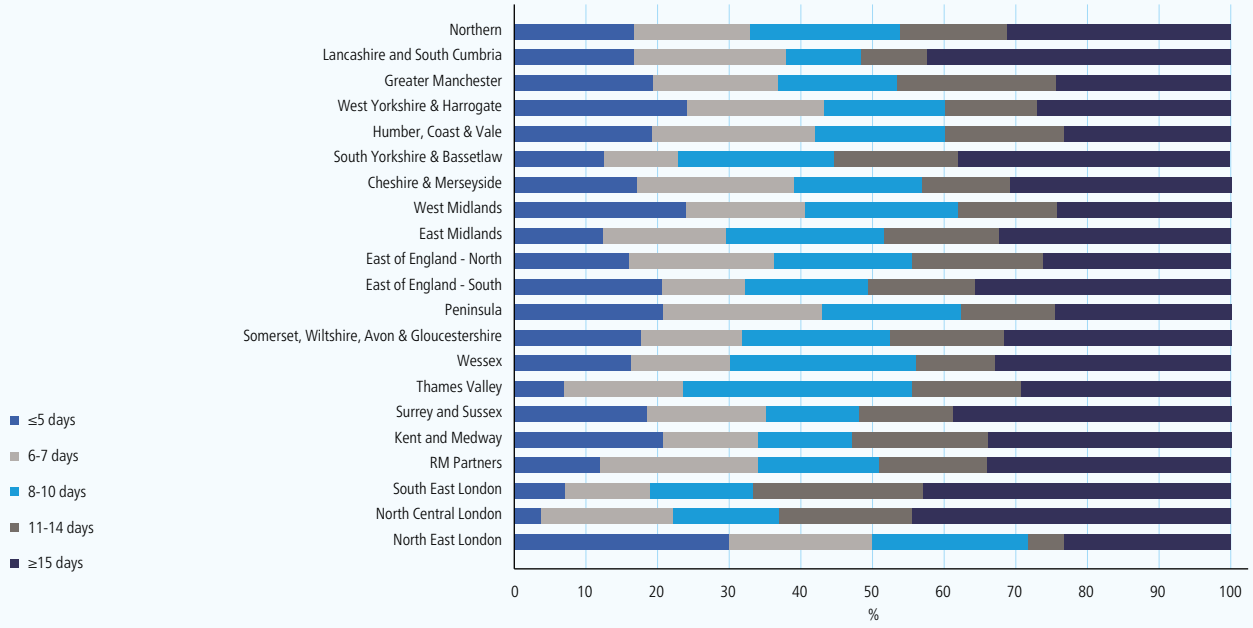
Figure 4.3b
Length of hospital stay after emergency major surgery in HES/PEDW by English cancer alliance*



***Welsh data excluded due to almost all patients being recorded as undergoing urgent/emergency surgery**

4.3 How many patients had 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

30-day unplanned readmission rates were slightly increased compared to the 2015/16 audit period with the latest rate of 10.7% compared to 9.8% (Table 4.4). However, this rate remained broadly comparable to the most recent audit years with 10.9% in 2018/19 and 10.5% in 2017/18. Of note in this audit period, there was a reduction in the proportion of missing data, although overall numbers of patients undergoing major resection were also lower. These reduced numbers are due to restricting the analyses in this audit period to patients undergoing major resection prior to the 31st March 2020 in order to avoid including patients whose care might have been affected by the pandemic.

Table 4.4
Rate of unplanned readmission within 30 days of surgery for patients linked to HES/PEDW who underwent major resection in England and Wales on or before 31st March 2020, by audit year

		2015–16		2016–17		2017–18		2018–19		2019–20	
		N	%	N	%	N	%	N	%	N	%
Total patients undergoing major resection		**18,535**		**18,597**		**18,426**		**17,106**		**15,765**	
Emergency readmission within 30 days	**Yes**	1,660	9.8	1,766	10.3	1,771	10.5	1,707	10.9	1,571	10.7
	No	15,257	90.2	15,389	89.7	15,107	89.5	13,883	89.1	13,082	89.3
	Missing (% of total)	1,618	8.7	1,442	7.8	1,548	8.4	1,516	8.9	1,112	7.1

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Geographical variation in 30-day unplanned readmission

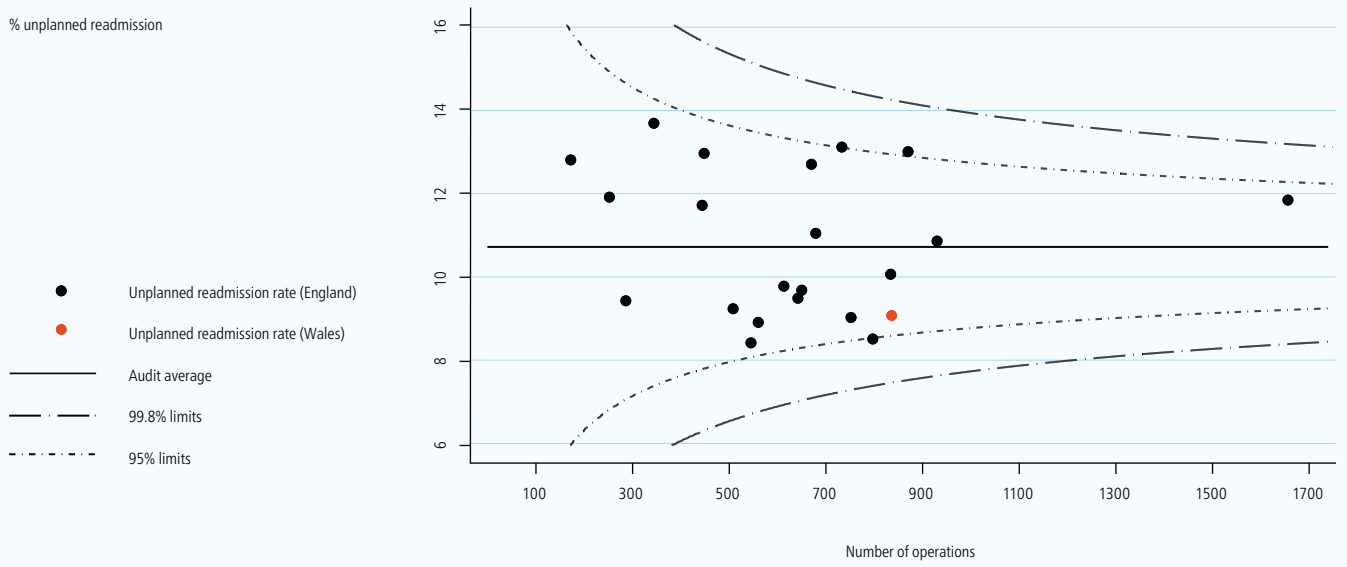
Figure 4.4 shows the observed and adjusted rates of 30-day unplanned readmission at cancer alliance (England) and country (Wales) level. Following risk adjustment, neither Wales nor any of the English cancer alliance were above the 99.8% funnel limits. However, two cancer alliances were above the 95% funnel limits. This compares to one English cancer alliance and Wales lying above the 95% funnel limits last year. Neither of the two cancer alliances above the 95% funnel limits were the same as last year.

Figure 4.5 shows the observed and adjusted rates of 30-day unplanned readmission by English trust/hospital and Welsh MDT. Following risk-adjustment, three trusts/hospitals/MDTs were above the 99.8% limits and were therefore potential outliers. All three trusts/hospitals/MDTs responded to their potential outlier notification (Appendix 2) and the Audit is working to support them in dealing with the coding of review in surgical assessment units in HES/PEDW.

In addition, two further trusts/hospitals/MDTs were above the 95% limits. This total of five trusts/hospitals/MDTs above the 95% limits demonstrated a considerable improvement compared to nine trusts/hospitals/MDTs last year.

Figure 4.4
a) Observed and b) adjusted 30-day unplanned readmission rate by cancer alliance (England)/country (Wales) for patients diagnosed between 01 April 2019 and 31 March 2020 who underwent major resection by 31st March 2020

a) Observed 30-day unplanned readmission rate by cancer alliance (England)/country (Wales)



b) Adjusted 30-day unplanned readmission rate by cancer alliance (England)/country (Wales)

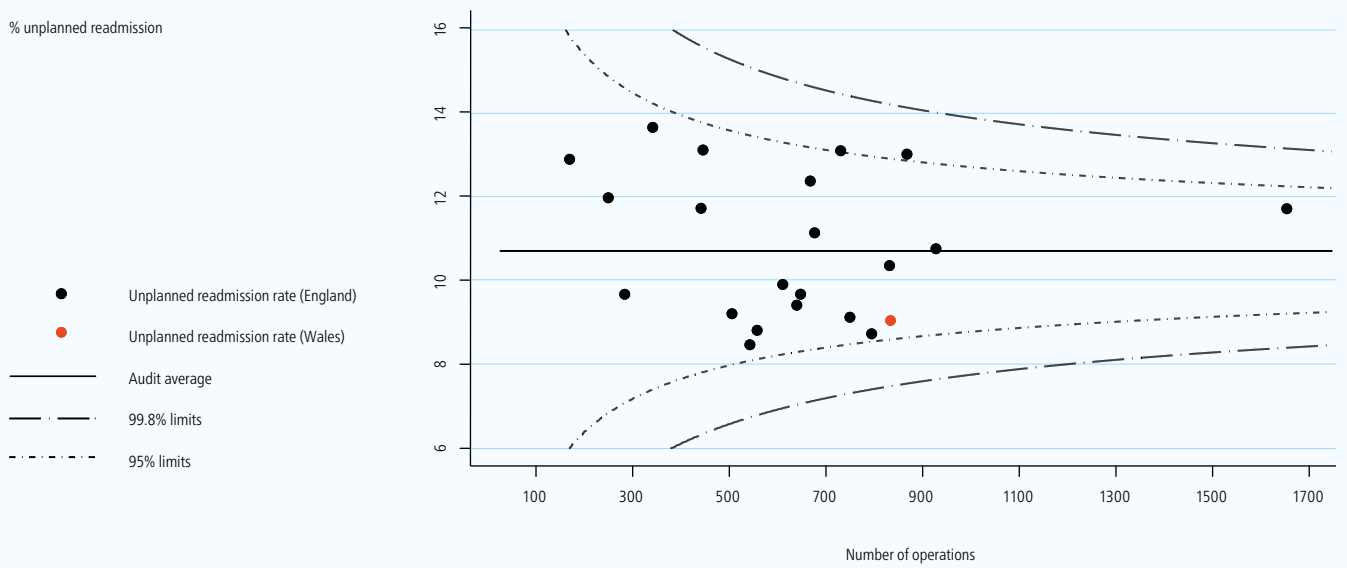


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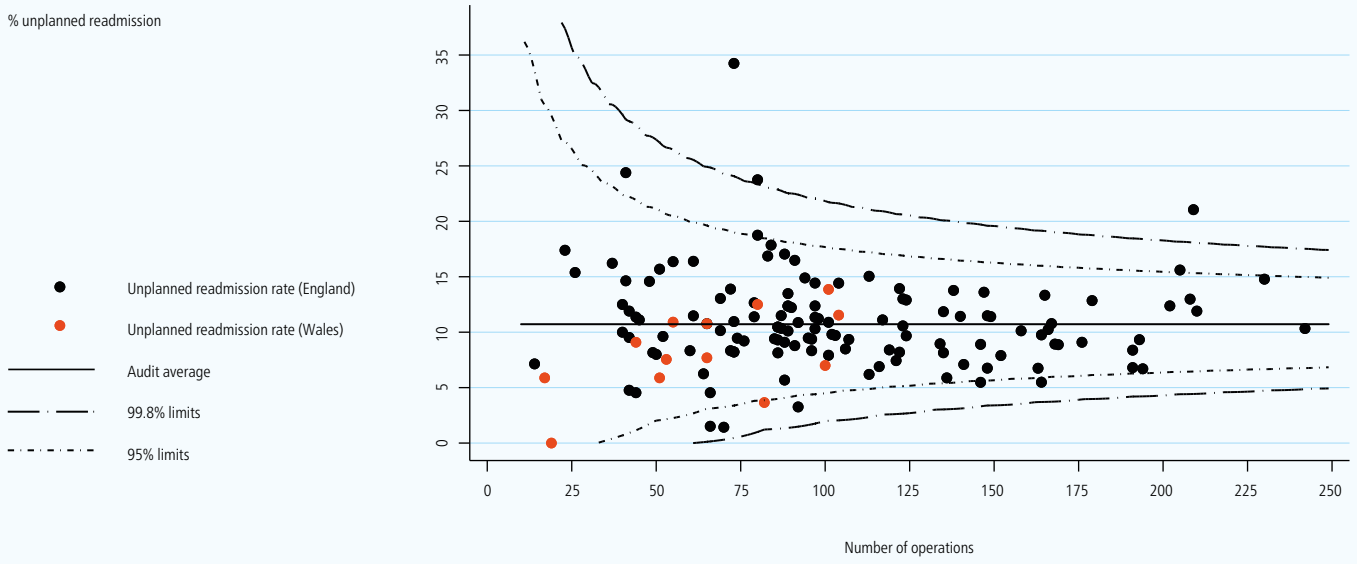
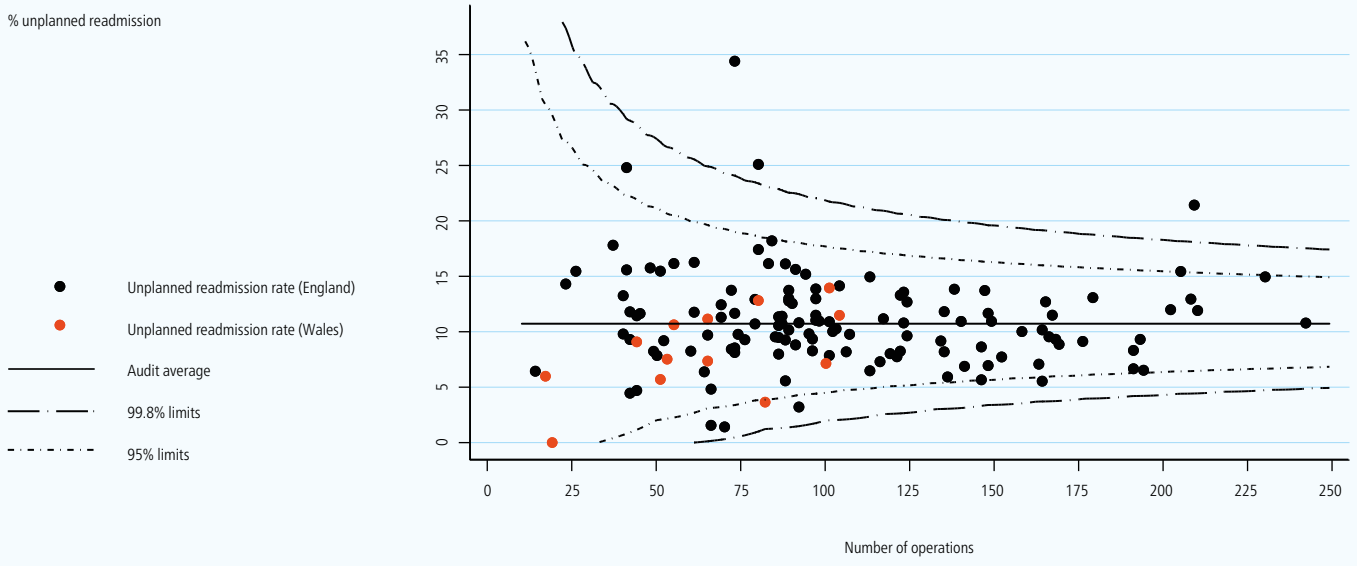
Figure 4.5
a) Observed and b) adjusted 30-day unplanned readmission rate by English NHS trust/Welsh MDT for patients diagnosed between 01 April 2019 and 31 March 2020 who underwent major resection by 31st March 2020

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



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



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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. Post-operative surgical complications have been shown to impact significantly upon morbidity, short- and long-term mortality, and oncological and functional outcomes, as well as placing a considerable burden on healthcare resources.

This new performance indicator was developed to 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. The methods used to identify patients undergoing URTT within 30 days of their original major resection in HES-APC/PEDW are described in the Methodology Supplement. After the initial analysis, the following four English NHS Trusts provided further information which has helped us to validate the methods and directly led to the removal of one OPCS code. We thank these Trusts for their support.

- King's College Hospital NHS Foundation Trust - Princess Royal University Hospital
- Wye Valley NHS Trust
- Ashford And St Peter's Hospitals NHS Foundation Trust
- Imperial College Healthcare NHS Trust

This year we are outlier reporting this performance indicator for the first time at hospital/trust/MDT level. It is an indicator still in development and we will continue to work with trusts/hospitals/MDTs to improve its captures of unplanned returns to theatres reflecting post-operative complications.

Trends in URTT within 30 days of surgery

The URTT rate this audit period was 7.4% (Table 4.5). This rate has remained relatively constant over time. This year there was a reduction in the proportion of missing data with 7.1% compared to 8.9% in the 2018/19 audit period. However, this was coupled with a reduction in the absolute numbers of reported patients undergoing major resection due to restriction of operative dates to avoid including patients who might have been affected by the pandemic.

Table 4.5
Rate of unplanned return to theatre within 30 days of surgery for patients linked to HES/PEDW who underwent major resection in England and Wales on or before 31st March 2020, by audit year

		2015–16		2016–17		2017–18		2018–19		2019–20	
		N	%	N	%	N	%	N	%	N	%
Total patients undergoing major resection		**18,535**		**18,597**		**18,426**		**17,106**		**15,765**	
Unplanned Return to Theatre within 30 days	**Yes**	1,334	7.9	1,432	8.3	1,286	7.6	1,238	7.9	1,083	7.4
	No	15,583	92.1	15,723	91.7	15,592	92.4	14,352	92.1	13,570	92.6
	Missing (% of total)	1,618	8.7	1,442	7.8	1,548	8.4	1,516	8.9	1,112	7.1

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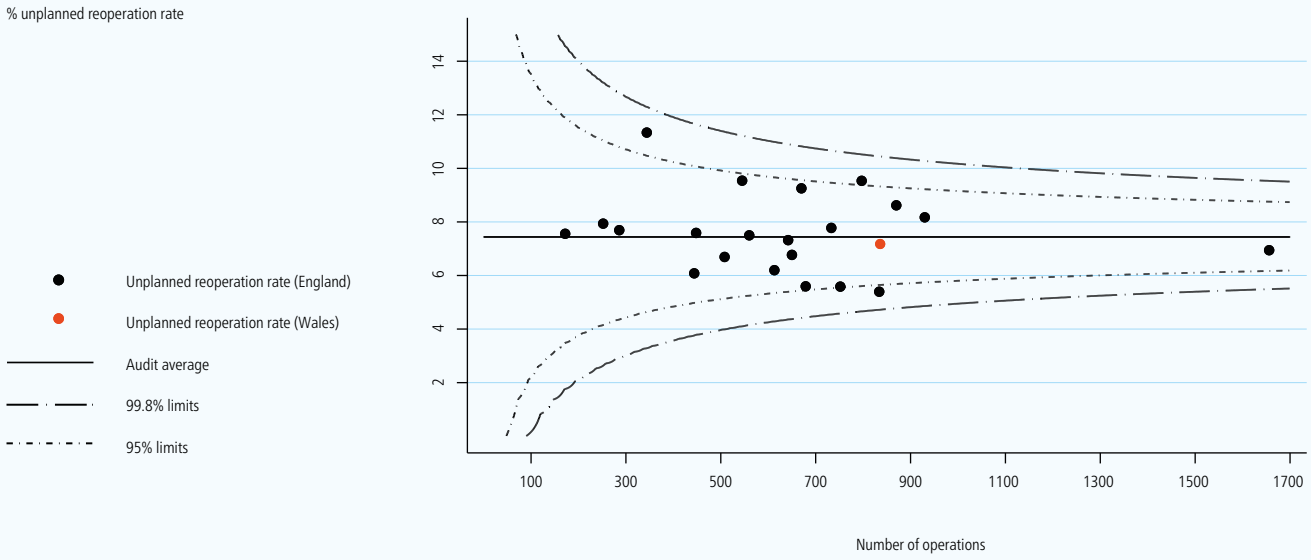
Geographical variation in URTT rates

Figure 4.6 shows the observed and adjusted URTT rates at cancer alliance (England) and country (Wales) level. Following risk adjustment, there were no cancer alliances above the 99.8% funnel limit and two above the 95% funnel limit.

Figure 4.6
a) Observed and b) adjusted 30-day unplanned return to theatre (elective and emergency admissions) by cancer alliance (England)/country (Wales) for patients diagnosed between 01 April 2019 and 31 March 2020 who underwent major resection by 31st March 2020

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



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

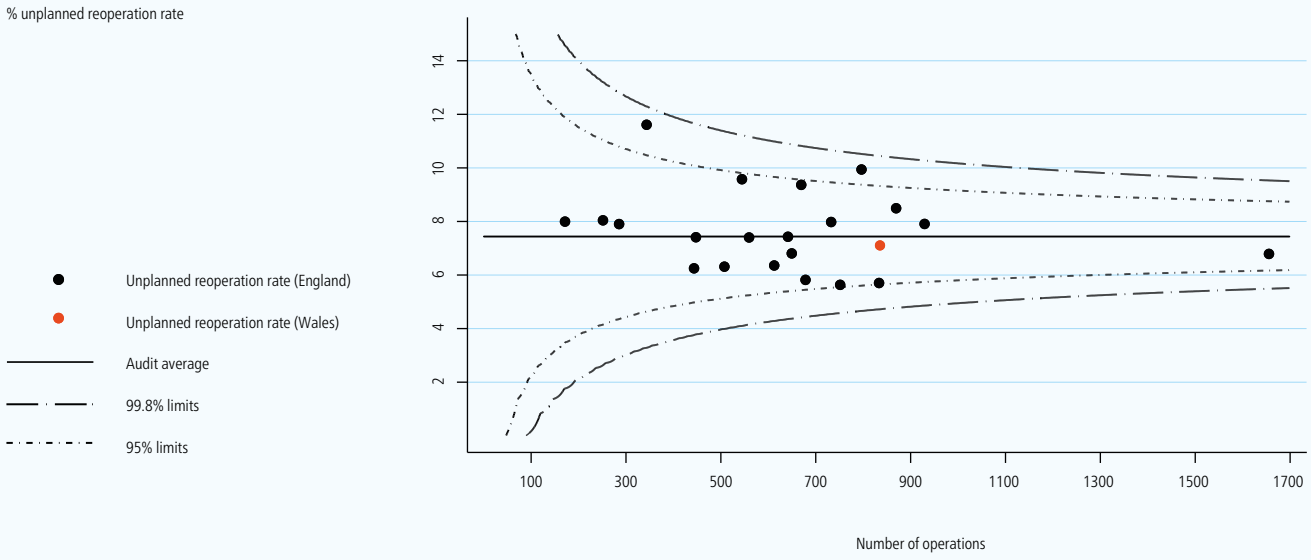


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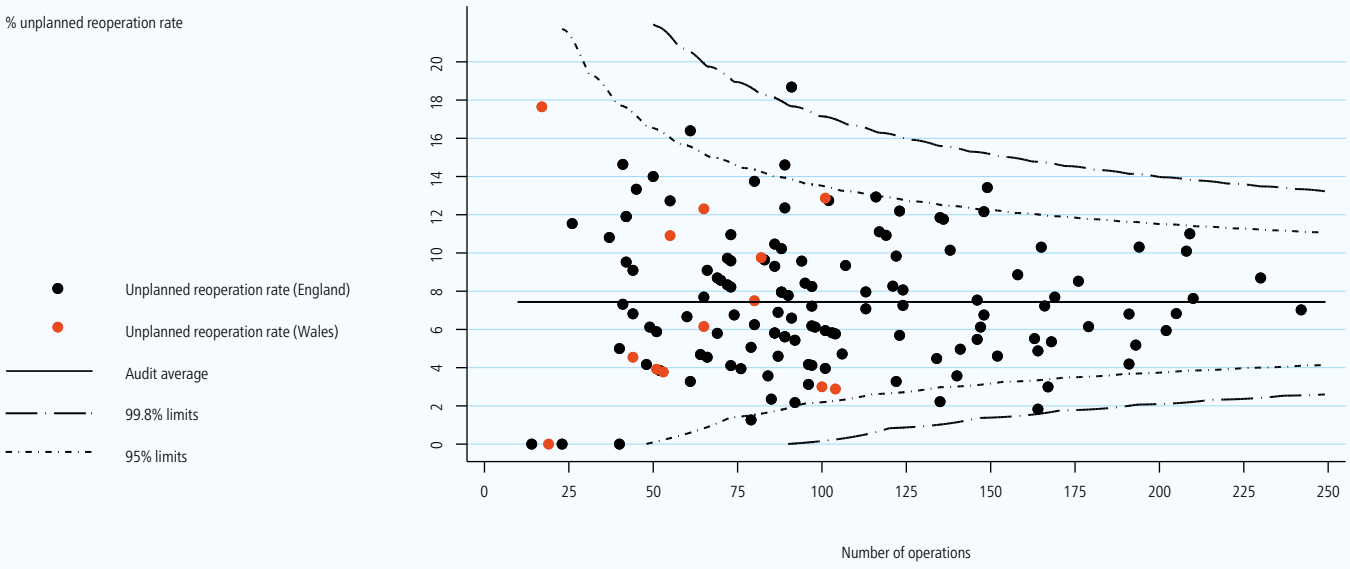
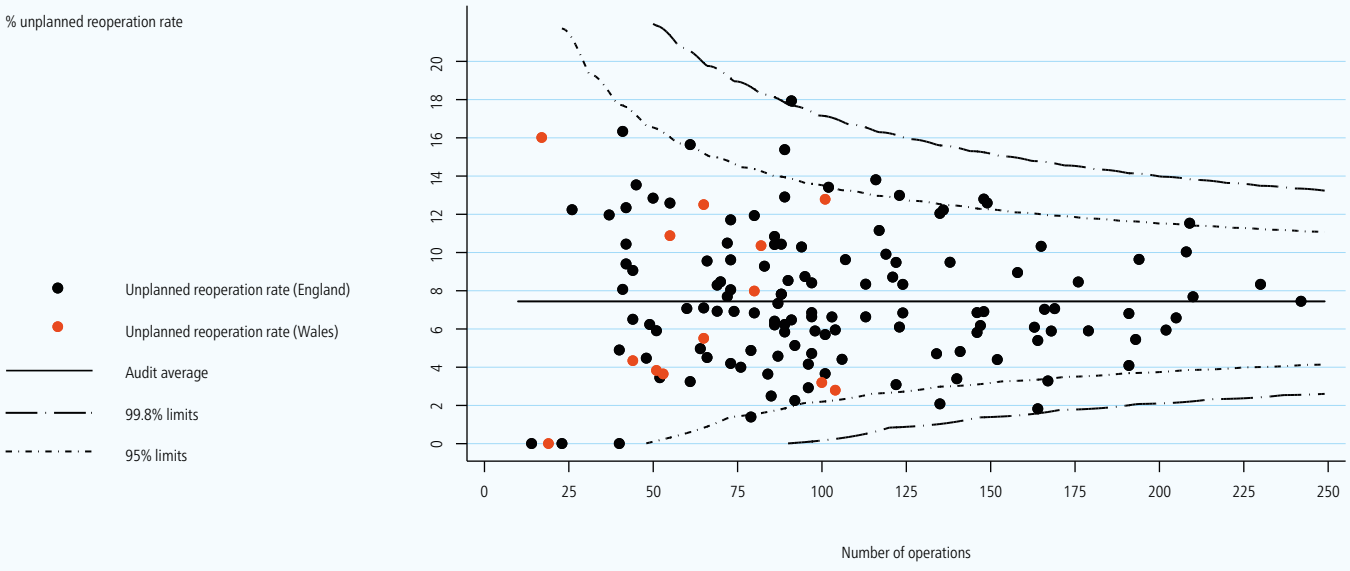
Figure 4.7 shows the observed and adjusted URTT rates at hospital/trust/MDT level. Following risk-adjustment, there was one potential English hospital/trust outliers above the 99.8% funnel limits, and a further seven English hospitals/trusts above the 95% funnel limits. Wales did not have any MDTs identified above the 95% funnel limits.

Figure 4.7
a) Observed and b) adjusted 30-day unplanned return to theatre (elective and emergency admissions) by English NHS trust/Welsh MDT with more than ten operations for patients diagnosed between 01 April 2019 and 31 March 2020 who underwent major resection by 31st March 2020

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



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



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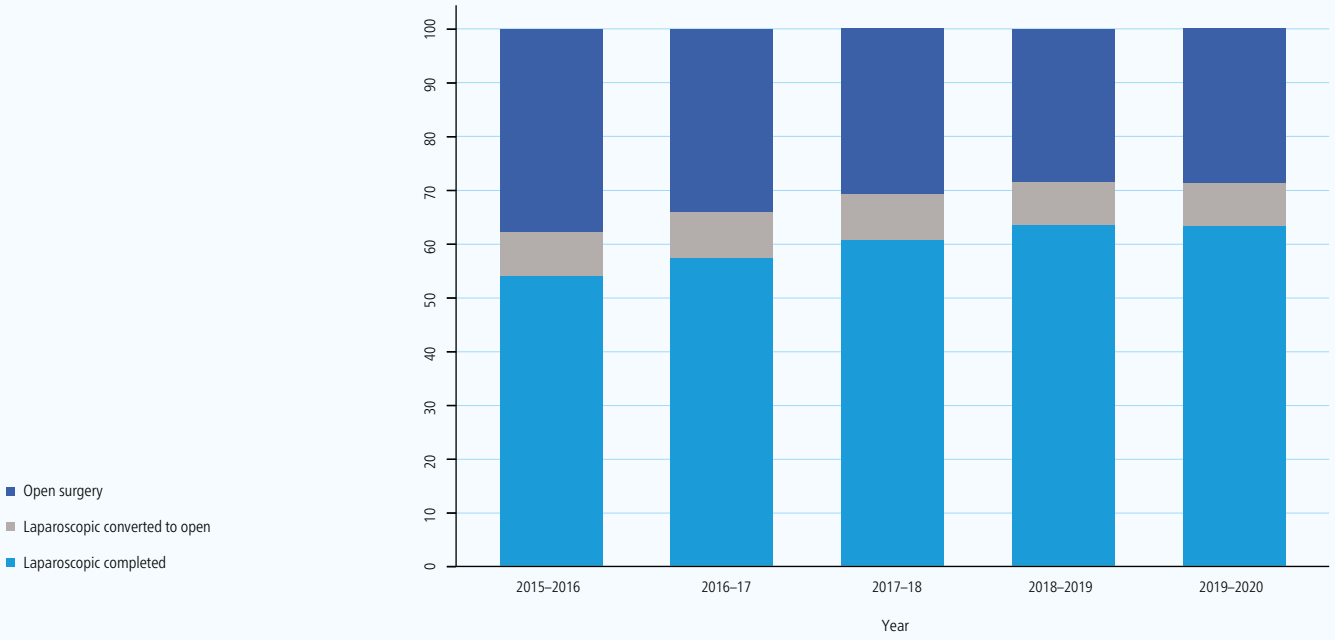
4.5 What proportion of patients have laparoscopic surgery?

Overall, the proportion of patients undergoing open or laparoscopic surgery remained stable with 29% of patients having open resection and 63% having laparoscopic resection. The proportion of patients undergoing laparoscopic converted to open procedures also remained stable at 8%.

Trends over time in the use of laparoscopic surgery

The proportion of patients undergoing laparoscopic surgery in this audit period was 63% compared to 54% in the 2015/16 audit period (Figure 4.8). This figure has plateaued in this audit period for the first time with a rate of 64% in the previous 2018/19 audit period.

Figure 4.8
Surgical access in England and Wales, by audit year



Geographical variation in laparoscopic surgery

Considerable variation in the use of laparoscopic surgery across English cancer alliances and Wales remained but had reduced compared to the last audit period (Figure 4.9). Rates of laparoscopic surgery use varied from 49% to 76% across English cancer alliances and Wales compared to variation of 45% to 80% in the last audit period.

The use of laparoscopic surgery also varies widely between trusts/hospitals/MDTs (Table A.3 in the accompanying Appendix spreadsheet). 19 trusts/hospitals/MDTs (2 of these are tertiary centres specialising in advanced or recurrent disease) had less than 50% of major resections done laparoscopically compared to 15 last audit period. 54 trusts/hospitals/MDTs had more than 80% of major resections attempted laparoscopically, which has increased from 46 last audit period.

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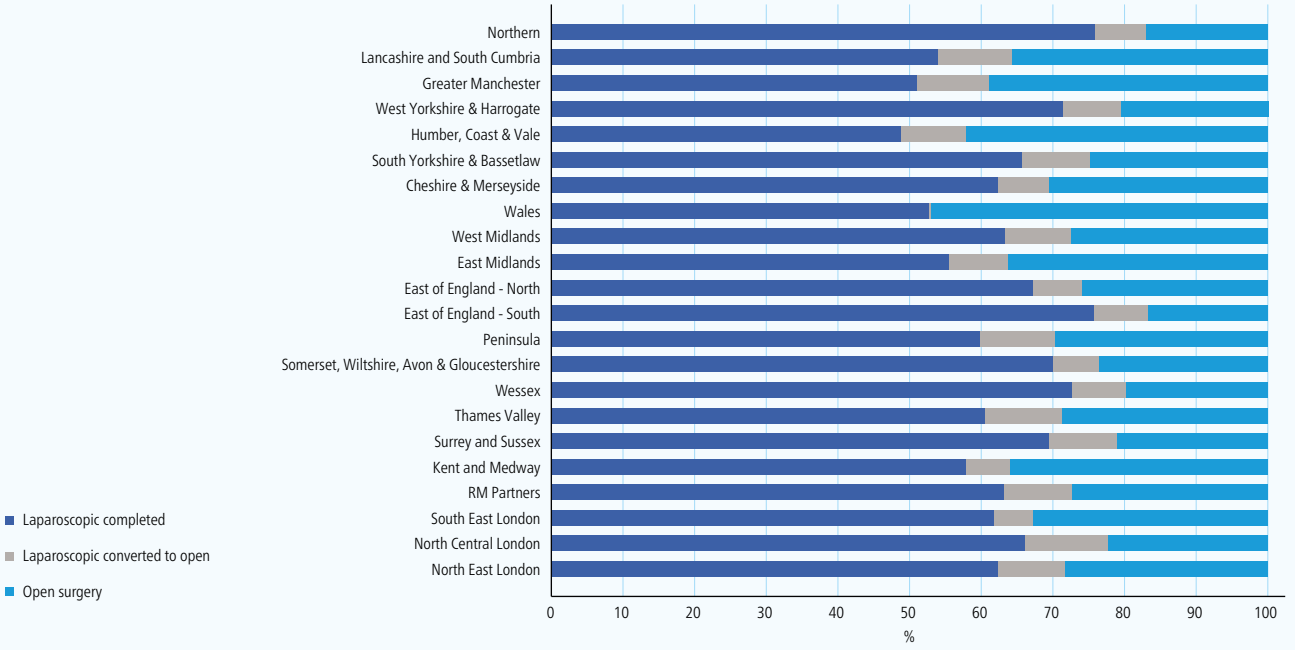
Figure 4.9
Surgical access, by cancer alliance (England)/country (Wales)



4.6 Robotic surgery

Robotic surgery for colorectal cancer is an emerging field. However, the superiority of robotic surgery over other operative techniques, particularly laparoscopic surgery, remains uncertain and there is currently no national evidence-based guidance to support its routine use.

Which NHS hospitals/trusts/MDTs were performing robotic surgery?

The 2019 NBOCA organisational audit collected information regarding the use of robotic surgery for colorectal cancer. 30 English NHS trusts/hospitals reported that they were regularly performing robotic colorectal cancer surgery (Table 4.6, 2019 Annual Report). MDTs in Wales were not performing any colorectal robotic surgery.

OPCS-4 codes for robotic surgery are also available in HES-APC/PEDW. Previously, analyses were restricted to patients with robotic surgery recorded in NBOCA and/or HES-APC for patients within the 30 trusts/hospitals who had reported regularly performing robotic colorectal surgery.

Due to the COVID-19 pandemic, the organisational survey has not been updated and is due to be repeated in early 2022. This year we therefore included the 30 trusts/hospitals previously identified in addition to five new trusts/hospitals performing more than 5 robotics cases for the first time in this audit period.

Who was performing robotic surgery?

In total, 1,839 robotics cases were recorded for patients diagnosed from 01 April 2015 to 31 March 2020. The number of robotics cases recorded each audit period continued to increase with 565 cases recorded this audit period compared to 450 cases in the 18/19 audit period.

The total caseload experience for robotic surgery for each hospital/trust varies widely from 3 to 286 (median 35, interquartile range 15 to 77).

The number of surgeons recorded as performing robotic surgery also continued to increase. In this audit period, 129 surgeons were recorded compared to 102 in the last audit period.

87 surgeons (67%) performed 10 or less robotic procedures, 16 surgeons (12%) performed 11 to 20 cases, and 27 surgeons (21%) performed 20 cases or more. There were 8 surgeons (6%) who had performed 50 or more cases, with the highest volume for an individual surgeon being 227 cases over the 5 year period.

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Which patients were having robotic surgery?

The median age of patients receiving robotic surgery was 68 years (IQR 59 to 74 years). Almost two thirds of robotic surgery was performed in males (62%).
The majority of cases were performed for rectal or rectosigmoid cancers (63%) with the most common procedure performed being anterior resection (62%), followed by APER (14%) and right hemicolectomy (14%).

Future work will include updating and verifying our understanding of which trusts/hospitals are currently performing regular robotic surgery for colorectal cancer resections.

Chapter Recommendations – Surgical care

- Trusts/hospitals/MDTs should review their results for 30-day readmission rate and unplanned return to theatre rate to identify potential areas for local quality improvement and engage with the NBOCA Quality Improvement Initiative.

- Trusts/hospitals/MDTs should complete the next organisational survey to inform us whether they have adopted robotic surgery to ensure that this information is up to date for future analyses.

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5. Survival

Chapter 5 – Key Findings

- Two-year all-cause mortality for all patients remained unchanged at 33%.
- There was a slight improvement in two-year mortality for patients undergoing major resection (16.4% in 2015/16 compared to 15.3% this audit period).
- Two-year all-cause mortality showed significant improvement in variation with one potential outlier and seven other hospitals/trusts/MDTs above the funnel limits, compared to four outliers and ten other hospitals/trusts/MDTs above the funnel limits last year.
- There was less variation at hospital/trust/MDT level for 2-year cancer-specific mortality with four hospitals/trusts/MDTs above the funnel limits compared to seven with all-cause mortality.

5.1 Two-year all-cause mortality

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 vast majority of patients who develop recurrent disease will do so within two years. For this audit period, we report on patients diagnosed between 01 April 2015 and 31 March 2018.

Two year all-cause mortality rates for all patients diagnosed with bowel cancer continued to remain stable at 33% (Table 5.1). For those undergoing major resection, two-year all-cause mortality reduced by approximately 1% (16.4% in 2015/16 compared to 15.3% this audit period). There was a similar small improvement in 2-year all-cause mortality for patients not having treatment of their primary tumour (70.1% in 2015/16 compared to 68.0% this audit period).

Table 5.1
Two-year all-cause mortality over time for all patients diagnosed between 01 April 2015 and 31 March 2018 in England and Wales

		2015–16		2016–17		2017–18	
		N	%	N	%	N	%
All patients		**29,057**		**29,155**		**29,886**	
Died within 24 months of diagnosis	**Yes**	9,669	33.6	9,571	33.1	9,907	33.4
	No	19,137	66.4	19,360	66.9	19,750	66.6
	Missing (% of total)	251	0.9	224	0.8	229	0.8
Underwent Major Resection		**18,373**	63.2	**18,440**	63.2	**18,267**	61.1
Died within 24 months of diagnosis	**Yes**	2,988	16.4	2,926	16.0	2,773	15.3
	No	15,236	83.6	15,387	84.0	15,365	84.7
	Missing (% of total)	149	0.5	127	0.4	129	0.4
Underwent Local Excision		**1,212**	4.2	**1,204**	4.1	**1,192**	4.0
Died within 24 months of diagnosis	**Yes**	101	8.4	102	8.5	102	8.6
	No	1,101	91.6	1,094	91.5	1,083	91.4
	Missing (% of total)	10	0.0	8	0.0	7	0.0
No Excision of Tumour		**9,472**	32.6	**9,511**	32.6	**10,427**	34.9
Died within 24 months of diagnosis	**Yes**	6,580	70.1	6,543	69.4	7,032	68.0
	No	2,800	29.9	2,879	30.6	3,302	32.0
	Missing (% of total)	92	0.3	89	0.3	93	0.3

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

For two-year all-cause 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.

Figure 5.1 demonstrates observed and adjusted two-year all-cause mortality rate for patients undergoing major resection for English cancer alliances and Wales. Following risk-adjustment, no regions were above the 99.8% limits and only Wales was above the 95% funnel limits. This compares to one English cancer alliance above the 99.8% limits last year.

Figure 5.2 shows observed and adjusted two-year all-cause mortality rate for patients undergoing major resection at a trust/hospital/MDT level. Following risk-adjustment, there was a significant improvement in this performance indicator this year. There was just one potential outlying hospital/trust above the 99.8% funnel limits compared to four potential outliers last year. In addition, there were seven further hospitals/trusts/MDTs above the 95% funnel limits compared to an additional ten hospitals/trusts/MDTs last year.

All hospitals/trusts/MDTs above the 95% funnel limits were different to last audit period apart from one MDT which was now above the 95% funnel limit rather than above the 99.8% funnel limit. However, this MDT will remain a potential outlier due to the 'double alert' rule within the outlier policy.

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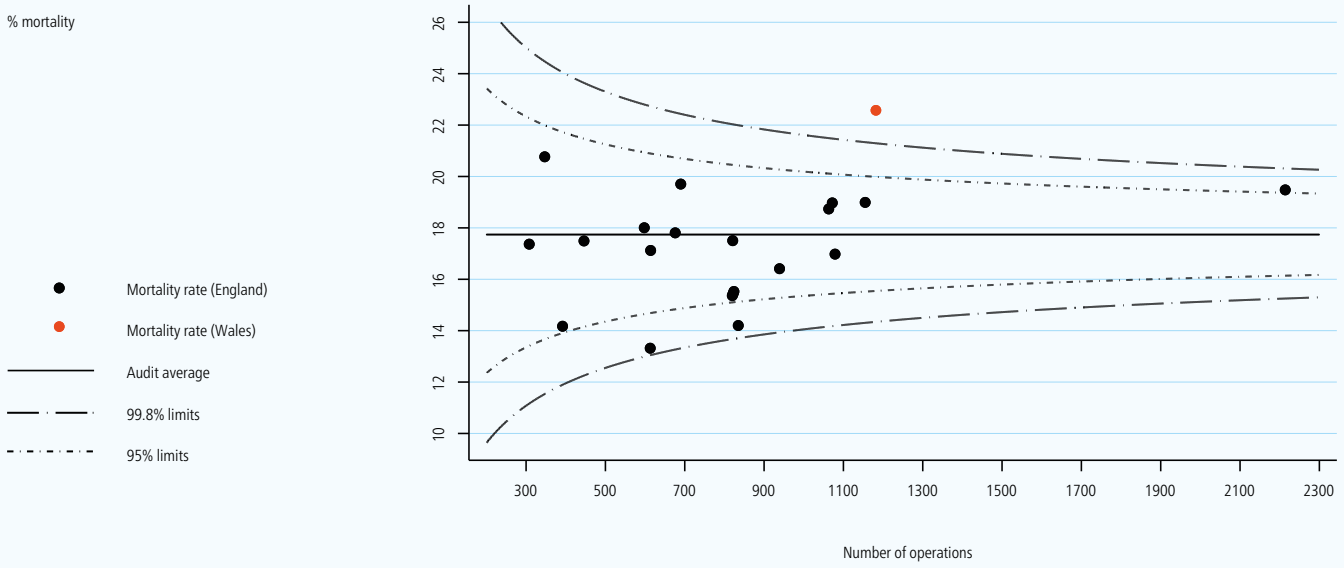
Figure 5.1
a) Observed and b) adjusted two-year all-cause mortality rate for patients who underwent a major surgical resection between 01 April 2017 and 31 March 2018, by cancer alliance (England)/country (Wales), including hospital/trust/MDTs with more than ten operations

a) Observed 2-year all-cause mortality rate by cancer alliance (England)/country (Wales)



b) Adjusted 2-year all-cause mortality rate by cancer alliance (England)/country (Wales)

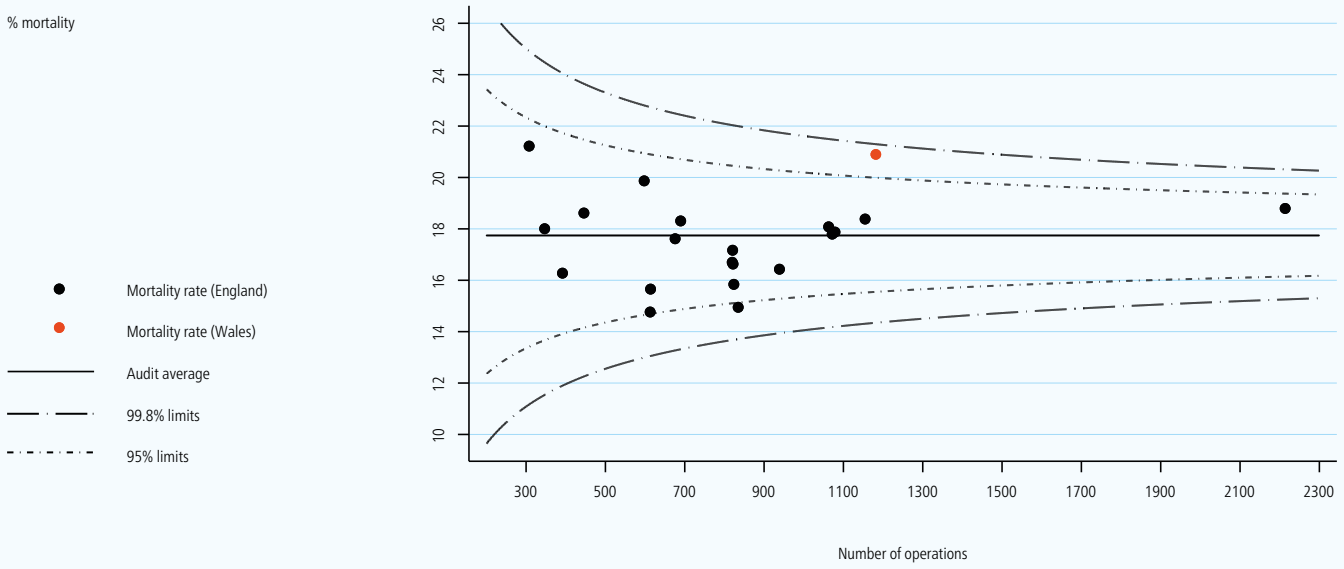


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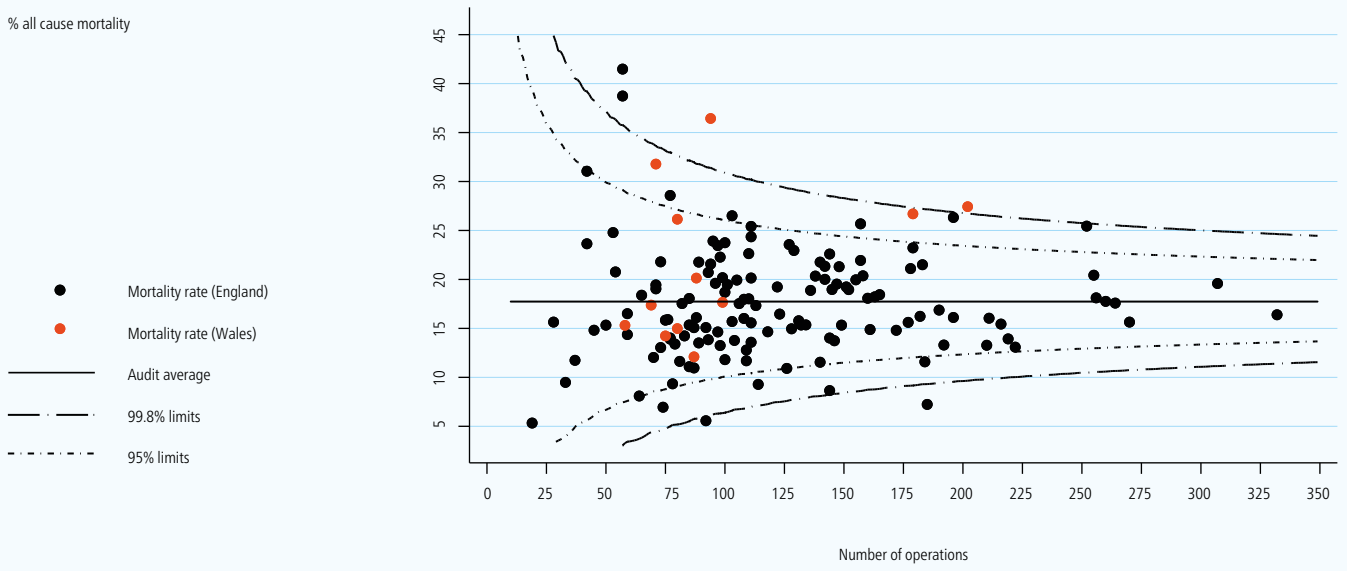
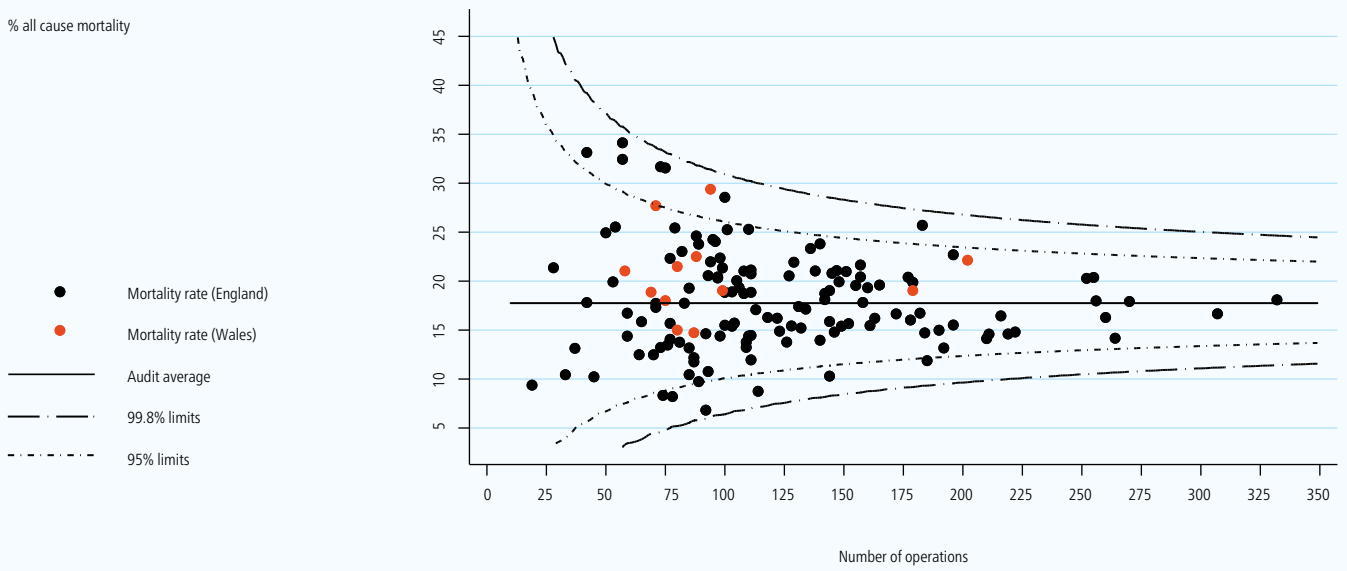
Figure 5.2
a) Observed and b) adjusted two-year all-cause mortality rate for patients who underwent a major resection between 01 April 2017 and 31 March 2018, by English NHS trusts/ Welsh MDTs with more than ten operations

a) Observed 2-year all-cause mortality rate by hospital/trust/MDT with more than ten operations



b) Adjusted 2-year all-cause mortality rate by hospital/trust/MDT with more than ten operations



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5.2 Two-year cancer-specific mortality

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.

This is the second year that we are reporting trust/hospital/MDT cancer-specific two-year mortality alongside all-cause mortality, but only all-cause two-year mortality will be outlier reported at present. Further information on this can be found in the Methodology Supplement.

Geographical variation in two-year cancer-specific mortality in patients who underwent major resection

Figure 5.3 demonstrates observed and adjusted two-year cancer-specific mortality for patients undergoing major resection by trust/hospital/MDT. One trust/hospital was above the outlier limit for this measure (compared to two in the 2020 Annual Report), and this trust/hospital is also a potential outlier for all-cause mortality There were an additional two trusts/hospitals and one Welsh MDT lying above the inner funnel limits. Two of the trusts/hospitals/MDTs that were above the inner funnel limits for cancer-specific mortality were also above the inner funnel limits for all-cause mortality.

Overall, there was less variation for cancer-specific mortality, with four trusts/hospitals/MDTs above the inner funnel limits compared to seven with all-cause mortality, with no more sites outside the inner limits than would be expected by chance.

Chapter Recommendations – Survival

- There was significant improvement in the variation in 2-year all-cause mortality this audit period. This should be monitored closely, particularly in light of COVID-19, to see whether this trend persists.
- Hospitals/trusts/MDTs are encouraged to engage with the NBCOCA Quality Improvement Initiative, aiming for >70% risk-adjusted 2-year all-cause mortality after colorectal cancer resection.

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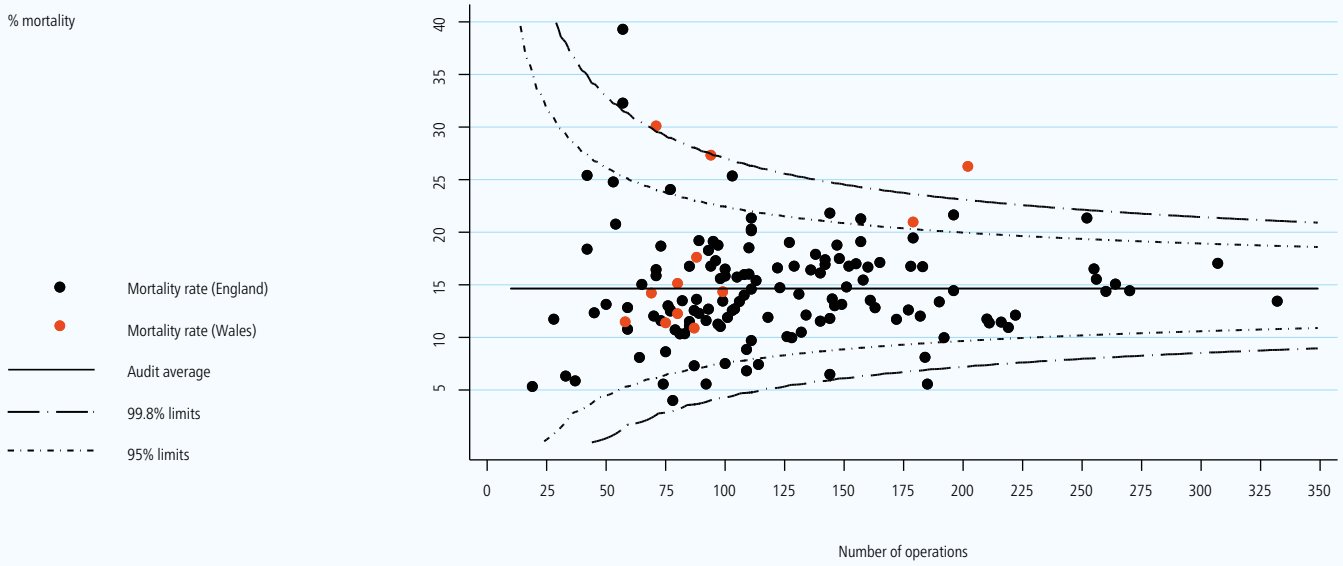
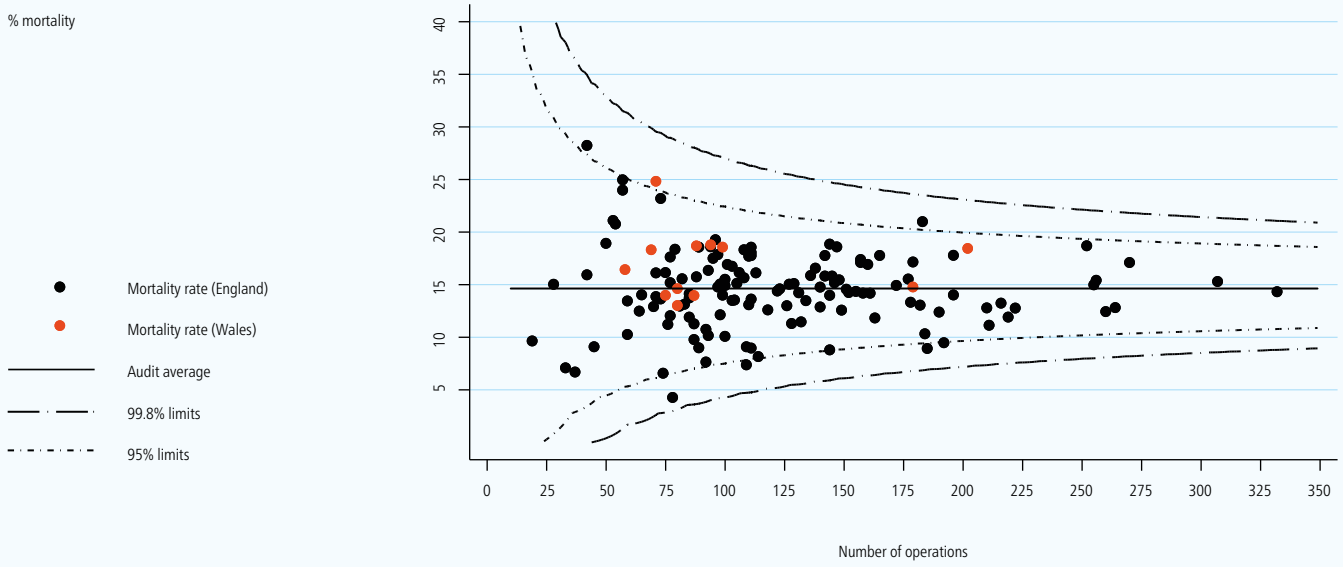
Figure 5.3
a) Observed and b) adjusted cancer-specific two-year mortality rate for patients who underwent a major resection between 01 April 2017 and 31 March 2018, by English NHS trusts/Welsh MDTs with more than ten patients

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



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



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6. Rectal cancer

Chapter 6 – Key Findings

- There has been a gradual shift in the multidisciplinary management of rectal cancer, with a reduced proportion of patients undergoing major resection (53% in 2015/16 audit period to 47% this audit period) coupled with an increase in those patients not having any surgery (32% in 2015/16 audit period to 37% this audit period), although many underwent alternative treatments.
- Of those patients with rectal cancer and not undergoing surgery, 28% had a record of radiotherapy.
- Overall, 36% of patients undergoing major resection for rectal cancer received neo-adjuvant therapy with the vast majority receiving long-course radiotherapy. However, there was considerable variation between English cancer alliances (14% to 62%).
- 10.6% of hospitals/trusts/MDTs performed less than 10 rectal cancer resections during the audit year, and 35.1% performed less than 20 rectal cancer resections.
- Overall, 37% of patients underwent a procedure leading to creation of a permanent stoma, with significant variation across trusts/hospitals/MDTs (7% to 85%).
- For patients with rectal cancer undergoing an anterior resection procedure, almost two thirds of patients had a diverting ileostomy.
- Overall, almost one third of patients with diverting ileostomy had not had the stoma reversed by 18 months after their initial surgery. There was also significant variation at trust/hospital/MDT level with four potential outliers, and 17 other sites outside the inner funnel limits.

6.1 How were patients with rectal cancer treated?

Trends over time

During this audit period, 8,830 patients were diagnosed with rectal cancer (Table 6.1). Over the past few audit periods an ongoing reduction had been noted in the proportion of patients who undergo major resection for rectal cancer (53% in the 2015/16 audit period to 48% in the 2018/19 audit period). However, it appears that this trend may have reached a plateau during this audit period when 47% patients underwent major resection. This reduction had been coupled with an associated rise in the proportion of patients not undergoing surgery at all with 32% in the 2015/16 audit period compared to 37% this audit period.

Previously, we have hypothesised that these changes in the management of rectal cancer patients might be partially attributable to an increase in 'watchful waiting' for patients with a complete clinical response to neo-adjuvant chemoradiotherapy based on clinical, endoscopic, and radiological criteria. In addition, there are ongoing trials assessing organ preservation techniques which may have also contributed to this observed trend.

Preliminary work shows that of those patients with rectal cancer and not reported to have undergone surgery, 28.0% had a record of radiotherapy. This had been slowly increasing over time from 28.7% in the 2015/16 audit period to 32.0% in the 2018/19 audit period which might support the increased use of 'watch and wait' strategies (full radiotherapy data is not available for the current audit year). Further methodological work to capture 'watch and wait' patients more accurately to better understand the changing trends in rectal cancer management will be undertaken.

Table 6.1
Management of rectal cancer patients reported to NBOCA in England and Wales, by audit year

	2015-16		2016-17		2017-18		2018-19		2019-20	
	N	%	N	%	N	%	N	%	N	%
Total rectal cancer patients	**8,270**		**8,304**		**8,473**		**8,573**		**8,830**	
Major resection	4,415	53.4	4,485	54.0	4,422	52.2	4,099	47.8	4,149	47.0
Local excision	584	7.1	596	7.2	606	7.2	623	7.3	681	7.7
Non-resectional surgery	610	7.4	598	7.2	602	7.1	655	7.6	746	8.4
No surgery	2,661	32.2	2,625	31.6	2,843	33.6	3,196	37.3	3,254	36.9

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Use of Radiotherapy in rectal cancer patients undergoing major resection

Of the 3,826 rectal cancer patients diagnosed between 01 January 2019 and 31 December 2019 who underwent a major resection, 1,387 (36%) received neo-adjuvant treatment (Table 6.2). Of those 1,387 patients, 76% received long-course chemoradiotherapy, 18% short-course radiotherapy and 6% unclassified regimens. Both the proportion of patients receiving neo-adjuvant therapy and the proportion of each type of radiotherapy received remained similar to the previous audit period.

Patients that received short-course radiotherapy tended to be older, more comorbid, and have less advanced disease than patients that received long-course radiotherapy. In addition, they were more likely to have higher tumours and to undergo sphincter-sparing procedures. Of note, although there has been some improvement in data completeness for the tumour height data item, there persists just under a third missing data. Collection of this data is crucial for further exploration of important rectal cancer measures e.g. use of neo-adjuvant therapy, rectal surgery volumes.

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Table 6.2
Patient characteristics by treatment type, for 3,826 rectal cancer patients diagnosed in England between 01 January 2019 and 31 December 2019 who underwent a major resection

		No pre-op treatment recorded		Long-course RT pre-surgery		Short-course RT pre-surgery		Other treatment pre-surgery*	
		N	%	N	%	N	%	N	%
Total rectal cancer patients		**2,439**		**1,056**		**253**		**78**	
Sex	**Male**	1,642	64.9	613	64.3	185	73.1	54	66.7
	Female	887	35.1	340	35.7	68	26.9	27	33.3
	Missing (% of total)	2	0.1	0	0.0	1	0.4	0	0.0
Age-group	**<50 yrs**	150	6.2	140	13.3	25	9.9	15	19.2
	50-59 yrs	377	15.5	242	22.9	33	13.0	16	20.5
	60-74 yrs	1,235	50.6	499	47.3	130	51.4	43	55.1
	75-84 yrs	601	24.6	167	15.8	61	24.1	<5	-
	85+ yrs	76	3.1	8	0.8	<5	-	0	0.0
Pre-treatment TNM T-stage**	**T1**	145	5.9	8	0.8	5	2.0	<5	-
	T2	902	37.0	81	7.7	51	20.2	<5	-
	T3	1,164	47.7	745	70.5	169	66.8	46	59.0
	T4	112	4.6	200	18.9	22	8.7	24	30.8
	TX/ T9	77	3.2	17	1.6	<5	-	<5	-
Pre-treatment TNM N-stage**	**N0**	1,463	60.0	192	18.2	70	27.7	15	19.2
	N1	676	27.7	460	43.6	118	46.6	36	46.2
	N2	179	7.3	378	35.8	59	23.3	25	32.1
	Nx/ N9	82	3.4	20	1.9	<5	-	<5	-
Pre-treatment TNM M-stage**	**M0**	2,311	94.8	964	91.3	219	86.6	51	65.4
	M1	83	3.4	82	7.8	30	11.9	26	33.3
	Mx/ M9	12	0.5	<5	-	<5	-	0	0.0
Surgical Procedure	**Anterior Resection**	1,647	67.5	456	43.2	127	50.2	46	59
	Abdomino-perineal excision of rectum (APER)/Pelvic Exenteration	433	17.8	505	47.8	98	38.7	23	29.5
	Hartmann's	274	11.2	80	7.6	24	9.5	<5	6.4
	Other	85	3.5	15	1.4	<5	-	<5	-
Mode of admission (from HES)	**Elective**	2,196	96.0	919	94.3	224	94.1	70	95.9
	Emergency	91	4.0	56	5.7	14	5.9	<5	-
	Missing (% of total)	152	6.2	81	7.7	15	5.9	5	6.4
Comorbidities (from HES)	**0**	1,216	53.1	561	57.4	114	47.7	43	58.9
	1	696	30.4	278	28.4	86	36.0	27	37.0
	2+	376	16.4	139	14.2	39	16.3	<5	-
	Missing (% of total)	151	6.2	78	7.4	14	55	5	6.4
Tumour height from anal verge (cm)	**0-5**	473	26.9	343	45.3	66	36.1	16	29.6
	6-10	837	47.6	313	41.3	93	50.8	22	40.7
	11-15	450	25.6	102	13.5	24	13.1	16	29.6
	Missing	679	27.8	298	28.2	70	27.7	24	30.8
Grade (differentiation)	**G1 Well**	156	7.3	60	7.1	15	6.6	8	12.7
	G2 Moderate	1,850	86.9	727	86.1	193	85.4	45	71.4
	G3/G4 Poor/Undifferentiated/anaplastic	122	5.7	57	6.8	18	8.0	10	15.9
	Missing	311	12.8	212	20.1	27	10.7	15	19.2
Vascular/ Lymphatic Invasion	**None**	1,132	56.4	557	64.8	108	51.2	30	48.4
	Vascular +/- Lymphatic	801	39.9	274	31.9	85	40.3	28	45.3
	Uncertain/Not assessed/NK	73	3.6	28	3.3	18	8.5	<5	-
	Missing	433	17.8	197	18.7	42	166	16	20.5

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

** TNM. Tumour Nodes Metastases. A system to describe the amount and spread of cancer in the body. The 'T' refers to 'Tumour' and describes the main tumour. The 'N' refers to 'Nodes' and describes how many lymph nodes or 'glands' have cancer. The 'M' refers to 'Metastases' and describes cancer that has spread to other parts of the body. Refer to NBOCA dataset for full description of each staging.

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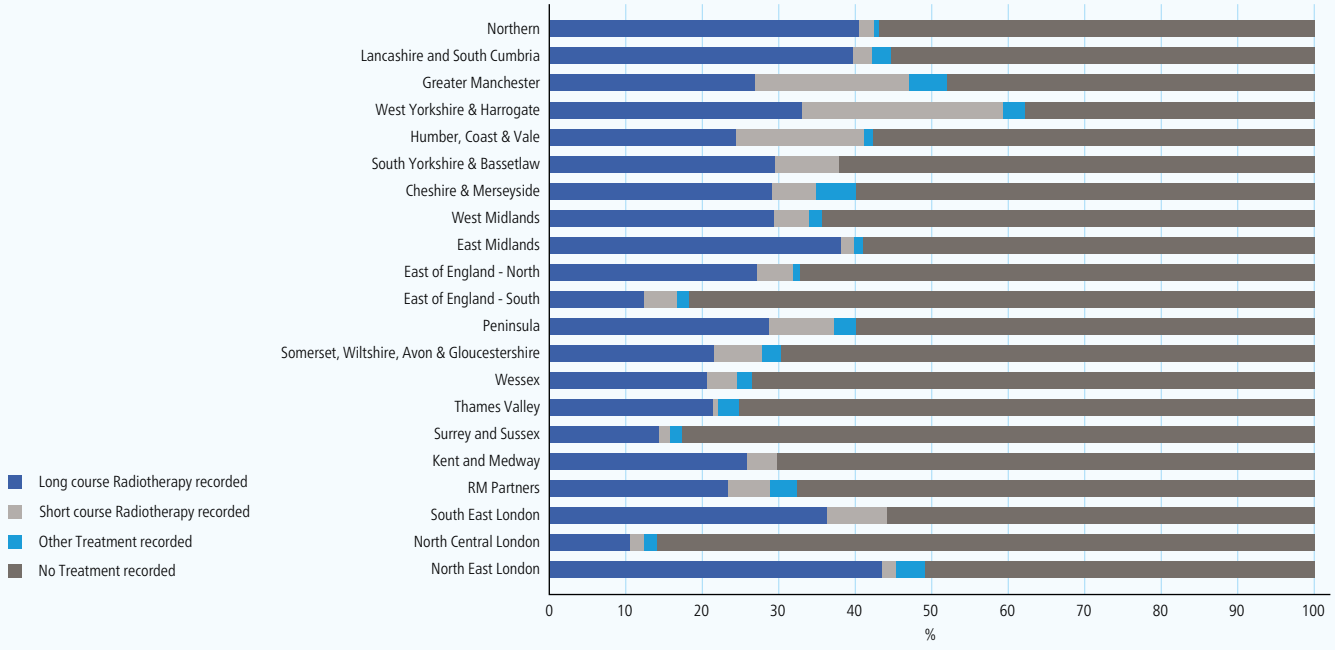
Geographical variation in the use of neo-adjuvant radiotherapy

Currently, NBOCA only has access to RTDS data for England. Radiotherapy data for Wales is usually captured via an audit dataset item, however, this was poorly completed in this audit period. NBOCA are planning to link to radiotherapy data for Wales once it becomes available.

Consistent with previous audit periods, there was significant variation in both the use of neo-adjuvant radiotherapy and the type of radiotherapy used across English cancer alliances (Figure 6.1). The use of neo-adjuvant radiotherapy varied from 14% to 62%. For those patients receiving radiotherapy, the proportion receiving long-course varied from 52% to 94%, the proportion receiving short-course varied from 3% to 42%, and the proportion receiving an unclassified radiotherapy treatment varied from 0% to 13%. No improvements in this variation have been demonstrated compared to previous audit periods.

It is anticipated that the pandemic will have had a substantial impact on both the use and choice of neo-adjuvant radiotherapy used and it will be important to monitor this through the audit. In addition, Total Neoadjuvant Treatment (TNT) is developing an increasing evidence base following recent publication of trials. TNT involves giving short course radiotherapy followed by neoadjuvant systemic chemotherapy for locally advanced rectal cancers prior to rectal cancer surgery, and eliminates the need for adjuvant chemotherapy. It is anticipated that this emerging evidence will also impact on the post-pandemic management of rectal cancer.

Figure 6.1
Treatment pathways for rectal cancer patients diagnosed between 01 January 2019 and 31 December 2019 who underwent major resection, by cancer alliance (England)* performing surgery



* Incomplete preoperative treatment in audit dataset for Wales therefore unable to include Welsh data this audit period

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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. CRM clearance is important because a positive CRM is a strong predictor of both local and distant recurrence.

There is an ongoing trend over time with improvements in both the positive CRM rate (10.1% in 2015/16 audit period versus 7.3% this audit period) and the proportion of missing data (23.3% in 2015/16 audit period versus 9.8% this audit period) (Table 6.3).

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

		2015-16		2016-17		2017-18		2018-19		2019-20	
		N	%	N	%	N	%	N	%	N	%
Total No. Patients		4,415		4,485		4,422		4,099		4,149	
Recorded Margin Status	**Negative**	3,044	89.9	3,407	91.7	3,572	89.5	3,310	92.1	3,472	92.7
	Positive	341	10.1	309	8.3	421	10.5	285	7.9	272	7.3
	Missing	1,030	23.3	769	17.1	429	9.7	504	12.3	405	9.8

6.3 Rectal Cancer Surgery Volumes

NICE commissioned and conducted a review of the limited available NBOCA evidence prior to release of the 2020 guidelines published in January. NICE guidance suggested that a minimum threshold of 10-20 rectal cancer resections per year at hospital-level may be associated with improved overall survival, local recurrence, permanent stoma rates and perioperative mortality. The latest NICE guidance suggests that providers should be performing a minimum of 10 rectal cancer resections per year and individual surgeons should be performing at least 5 rectal cancer resections per year. The recommendation reflects that management of rectal cancer is multidisciplinary.

Exploratory work evaluating trust/hospital/MDT and surgeon-level volumes for rectal cancer surgery was published in the 2020 Annual Report. Further work has been performed for the first time this year, and NBOCA will formally report on rectal cancer surgery volumes at trust/hospital/MDT level as a performance indicator in line with the NICE guidelines.

According to data submitted for major resections dated between 1st April 2019 and 31st March 2020 (with a recorded diagnosis date after 1st April 2018), 10.6% of hospitals/trusts/MDTs performed less than 10 rectal cancer resections per annum, and 35.1% performed less than 20 rectal cancer resections per annum.

Rectal volume short report

NBOCA has published a short report expanding on work already done on rectal surgery volume. It aims to improve the accuracy and robustness of the methodology used, as well as exploring patient, institution, and surgeon-level characteristics according to rectal surgery volumes.

The results of the report show that more robust reporting of volumes can be achieved using additional data sources (HES and General Medical Council data) to improve case ascertainment and accuracy. In addition, there are some clear differences in the characteristics and clinical practice within institutions according to rectal surgery volume.

This work will inform and facilitate further work exploring the relationship between rectal cancer surgery volume and outcome.

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6.4 How were stomas used in rectal cancer surgery and how often were 'temporary' stomas reversed?

Historically, we have outlier reported for the overall 18-month stoma rate. As part of the NBOCA Quality Improvement Plan and described in more detail in the 2020 annual report, we are now reporting separately the 18-month unclosed diverting ileostomy rate in patients undergoing anterior resection, and the proportion of rectal cancer resections where a permanent stoma is created at the index procedure (APER, pelvic exenterations, and Hartmann's procedures).

These outcomes will now be determined using the most recent 5 years of pooled data. However, in order to match other outcomes and to provide a baseline prior to the COVID-19 pandemic, only 4.5 years of data were used for this report. This enables the 18-month cut-off for ileostomy reversal to be 31st March 2020. Further details of how these separate outcomes are calculated can be found in the Methodology Supplement.

The historical metric of overall 18-month stoma rate reflected a combination of decisions about the surgical procedure and the proportion of temporary stomas that were reversed. As part of an APER procedure, patients receive a permanent stoma. An elective Hartmann's procedure for sigmoid or rectal cancer results in a permanent stoma in almost all cases. For the majority of patients undergoing anterior resection, patients have a temporary ileostomy to defunction the anastomosis in case of anastomotic leak, but not all of these ileostomies are reversed, with the commonest reasons for non-closure being anastomotic leak and progressive disease.

Trends over time in the proportion of patients having a rectal cancer resection where a permanent stoma is created

Between 2014 and 2018 the proportion of rectal cancer patients having a permanent stoma has remained relatively stable, with around 37% of patients undergoing an APER or Hartmann's procedure (Table 6.4). The lower number of patients undergoing a major resection in this audit period is explained by the restriction of major resections to those performed before 31st March 2020 to avoid including patients whose care may have been affected by the pandemic.

Table 6.4
Major Resection procedure performed in England and Wales, by year of surgery

	2014–5		2015–16		2016–17		2017–18		2018–19	
	N	%	N	%	N	%	N	%	N	%
Total	**4,754**		**4,524**		**4,443**		**4,457**		**4,114**	
Anterior Resection	2,796	58.8	2,724	60.2	2,658	59.8	2,639	59.2	2,468	60.0
Abdomino-perineal excision of rectum (APER)	1,338	28.1	1,207	26.7	1,219	27.4	1,229	27.6	1,095	26.6
Hartmann's	459	9.7	417	9.2	421	9.5	458	10.3	411	10.0
Other	161	3.4	176	3.9	145	3.3	131	2.9	140	3.4

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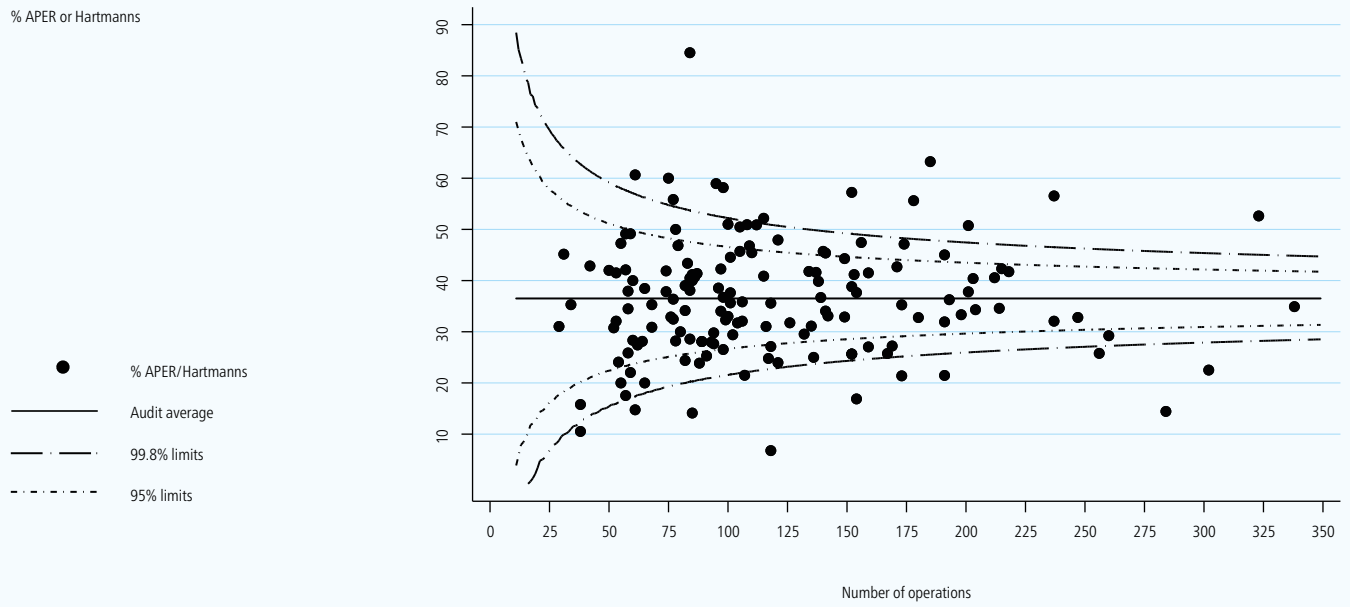
Geographical variation in the proportion of patients having a rectal cancer resection where a permanent stoma is created

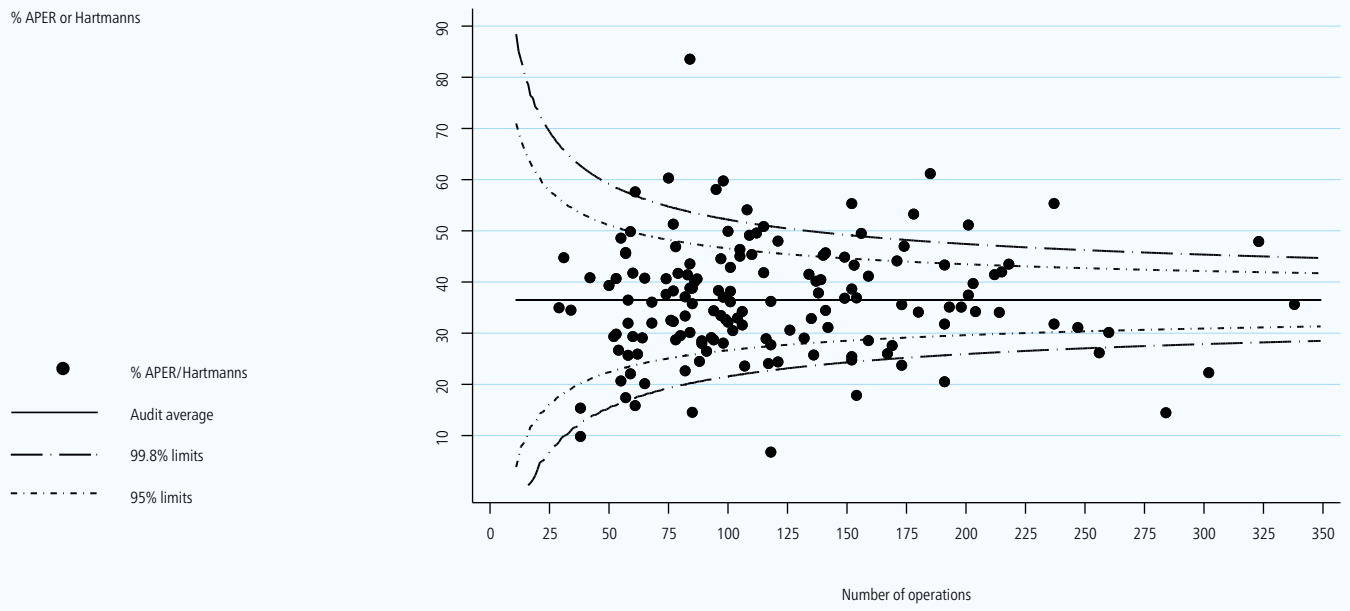
A procedure leading to a permanent stoma may be the best option for the patient due to tumour staging and location, or often due to the potential for poor functional outcome with a low anastomosis. Although across England and Wales the average proportion of patients undergoing an APER/pelvic exenteration or Hartmann's was 37%, there was wide variation in this proportion at trust/hospital/MDT level (range 7% to 85%) (Figure 6.2). Some centres are specialists in treating more advanced rectal tumours and perform complex exenterative surgery; others may treat populations who are more likely to present with later stage tumours or for whom a permanent stoma is a better option in terms of long-term quality of life or high perioperative risk. Risk-adjustment had little effect on the variation and did not change the numbers of trusts/hospitals/MDTs that were outside of the outer funnel limits.

Figure 6.2
a) observed and b) adjusted rates for the proportion of rectal cancer patients receiving an abdomino-perineal excision of rectum (APER)/pelvic exenteration/ Hartmann's by English trust/Welsh MDT between 01 April 2014 and 30 September 2018

a) Observed



b) Adjusted



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Trends over time in diverting ileostomy formation and reversal rates

Balancing the decision to divert a low anastomosis with a protective ileostomy against the potential negative consequences for the patient in terms of readmission with a high output stoma, reduced tolerance to any adjuvant chemotherapy recommended, and ultimately reduced long-term renal function and survival remains a key judgement for colorectal surgeons.

The proportion of patients receiving a diverting ileostomy at the time of their anterior resection has remained relatively constant (63.6% in the 2014/15 audit period to 62.7% this audit period (Table 6.5).
The proportion of patients whose ileostomy was unclosed at 18 months had remained at 28 to 30% over the last 3 audit periods. However, this had risen significantly from 24% in the 2014–15 audit period.

Table 6.5
Stoma status within 30 days of surgery and 18 months post-surgery in patients undergoing an anterior resection in England and Wales, by year of surgery

		2014–5		2015–16		2016–17		2017–18		2018–19*	
		N	%	N	%	N	%	N	%	N	%
Total		**2,203**		**2,621**		**2,517**		**2,478**		**1,148**	
Stoma status at surgery	**No stoma**	550	25.0	562	21.4	500	19.9	521	21.0	256	22.3
	Colostomy	1,402	63.6	1,742	66.5	1,661	66.0	1,604	64.7	720	62.7
	Ileostomy	251	11.4	317	12.1	356	14.1	353	14.2	172	15.0
	Ileostomy at 18 months in those with Ileostomy at surgery	335	23.9	520	29.9	469	28.2	446	27.8	219	30.4

* Last eligible date of surgery 30th September 2018

Figure 6.3 demonstrates observed and adjusted 18-month unclosed diverting ileostomy rates for cancer alliances and Wales. Following risk-adjustment, there was wide variation demonstrated with one cancer alliance and Wales above the 99.8% outer funnel limit and one further cancer alliance above the 95% inner funnel limit. There was one cancer alliance below the lower outer limit and two more below the lower inner limit.

Figure 6.4 shows observed and adjusted 18-month unclosed diverting ileostomy rates for trusts/hospitals/MDTs. Similarly, following risk-adjustment, there existed considerable variation with 3 trusts/hospitals/MDTs above the 99.8% outer funnel limit and therefore potential outliers, and an additional 14 trusts/hospitals/MDTs above the 95% inner funnel limit. There were 4 trusts/hospitals/MDTs below the outer limits and a further 6 trusts/hospitals/MDTs below the inner limits.

Possible explanations for this variation may include differential rates of post-operative recovery including complications such as wound infections and anastomotic leaks, complications from adjuvant chemotherapy, or progression of disease necessitating a permanent stoma. In addition, there are often no set pathways or protocols for stoma closure and the timing of this is often also variable. It is likely that considerable differences exist in administrative factors such as waiting list volumes for other urgent procedures which may affect the prioritisation of stoma reversal. It might be expected that this phenomenon will be further compounded by the pandemic and will require close observation.

It is hoped that the separate reporting of these two new performance indicators will stimulate quality improvement by separating out the factors influencing permanent and temporary stoma rates. This should provide trusts/hospitals/MDTs with a better understanding of their own target areas for quality improvement.

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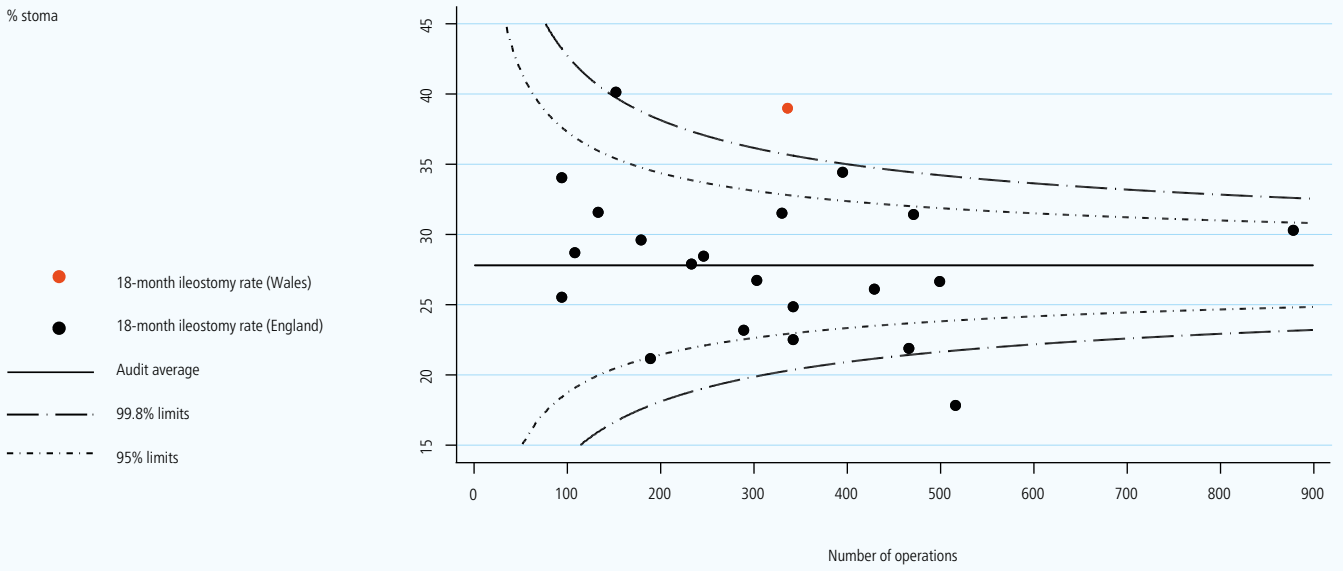
Figure 6.3
a) observed and b) adjusted unclosed diverting ileostomy rate for anterior resections performed by English cancer alliance/Wales for rectal cancer patients undergoing a major resection between 01 April 2014 and 30 September 2018

a) Observed



b) Adjusted

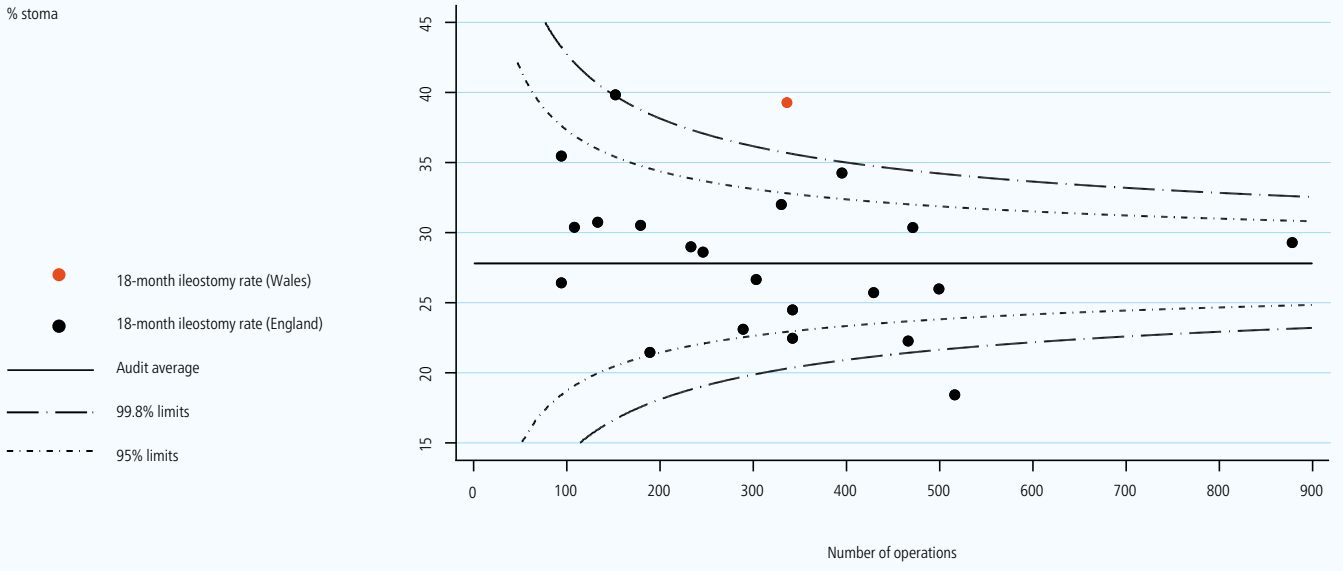


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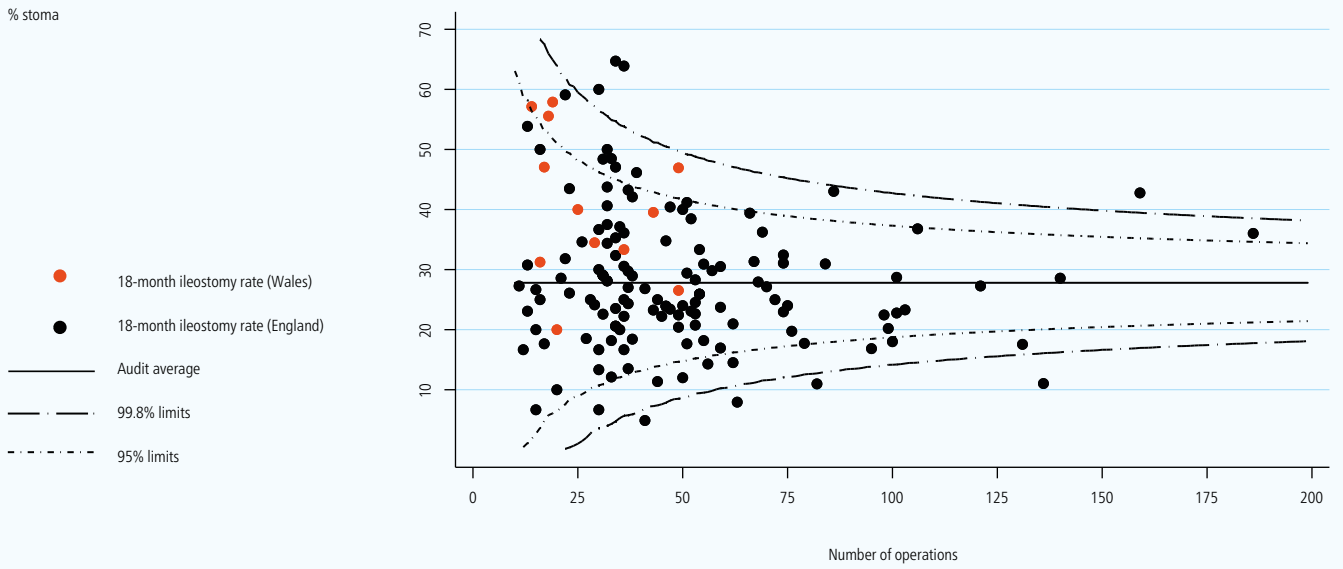
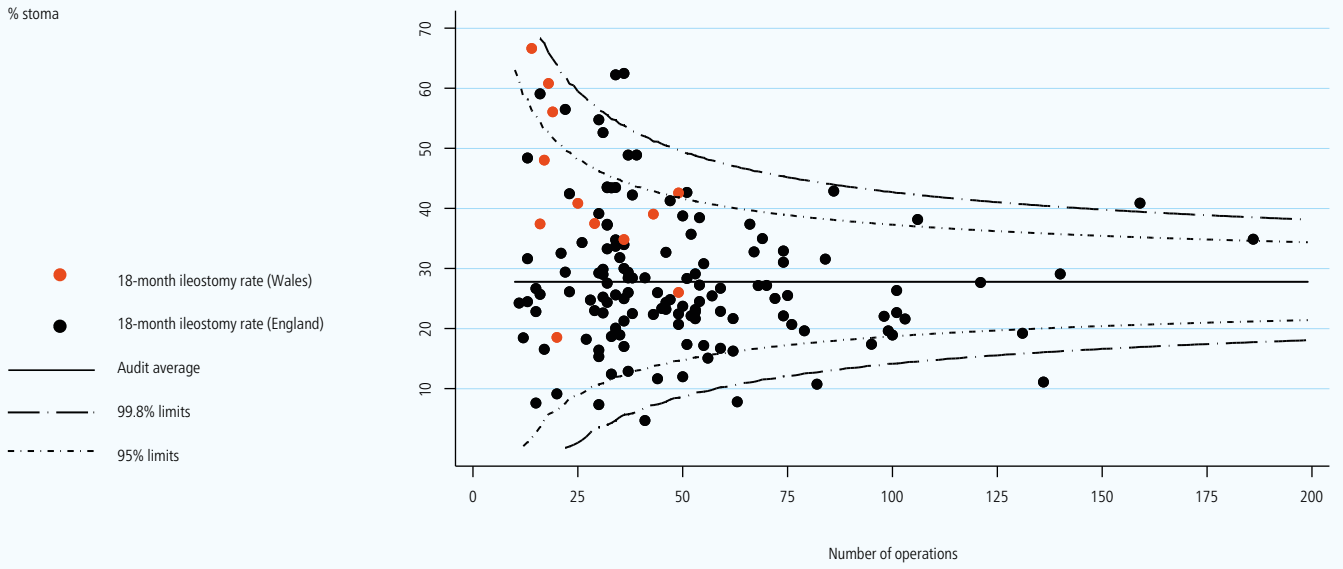
Figure 6.4
a) observed and b) adjusted unclosed diverting ileostomy rate for anterior resections performed at English trust/Welsh MDT level between 01 April 2014 and 31 September 2018

a) Observed



b) Adjusted



Chapter Recommendations – Rectal cancer

- We encourage hospitals/trusts/MDTs to participate and engage with the NBOCA Quality Improvement Initiative to better understand differences in the use of neo-adjuvant therapy for rectal cancer.
- Individual trusts/hospitals/MDTs and individual surgeons should ensure that they are meeting the minimum NICE threshold for rectal resections and, if not, consideration should be given as to how best this might be facilitated and achieved.
- Individual trusts/hospitals/MDTs should review their results for 18-month unclosed diverting ileostomy rates with a view to identifying possible barriers to stoma closure and undertaking local quality improvement processes.
- We encourage hospitals/trusts/MDTs to submit data for tumour height beyond the anal verge as this information is crucial for further exploration of important rectal cancer measures e.g. use of neo-adjuvant therapy, rectal surgery volumes.

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Part 2:
Recovery of bowel cancer services from the COVID-19 pandemic (Patients diagnosed 01 April 2020 to 31 March 2021)

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This section of the 2021 Annual Report examines the impact of the COVID-19 pandemic on colorectal cancer services and how well these services had recovered by late 2020 and, where data was available, into early 2021. Whereas the main section of the Annual Report aims to capture the care and outcomes of patients diagnosed and treated before the pandemic had impacted on hospital care, this section is on a later cohort of patients, comparing patients diagnosed and treated during the pandemic to those diagnosed and treated in 2019 as a comparison. The analysis of patients treated in England uses Rapid Cancer Registrations Data (RCRD) and the analysis of patients treated in Wales uses the Patient Episode Database for Wales (PEDW). These data sources were used because they provided more recent data than NBOCA data.

In the time available to produce the annual report it was only possible to provide a short exploration of patients treated in Wales using PEDW. The analysis of patients diagnosed and treated in Wales is from a different data source, and with a different definition of the patient cohort (see 7.1 Data sources). This makes it difficult to provide results for Wales that are comparable to those for England. Because no PEDW history was available before 2018 it is not possible to report numbers of new bowel cancer diagnoses using PEDW data. In this report the analysis for Wales is limited to numbers of major resections. This part of the report will be updated with an addendum to provide, as far as the data available allows, equivalent results for Wales to those provided for England.

There are results already published on the impact of the COVID-19 pandemic on cancer patients in England. For example, the Cancer Data dashboard provides an interactive resource including, amongst other statistics, the numbers of patients diagnosed and the proportions of patients receiving major surgery, chemotherapy and radiotherapy, according to cancer site, region, demographics and over time. The work in this report assesses the impact of the pandemic on treatments specific to bowel cancer, such as major resection, adjuvant chemotherapy for colon cancer and curative radiotherapy for rectal cancer. We evaluate the variation in impact of the pandemic by region and demographics, we describe changes in the patients diagnosed during the pandemic, and we synthesise and interpret the findings to identify the implications for future recovery.

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7. COVID-19 methods

7.1 Data sources

Rapid Cancer Registrations Data (RCRD) – which includes some data fields from Hospital Episode Statistics (HES-APC), the Systemic Anti-Cancer Therapy Dataset (SACT) and the National Radiotherapy Dataset (RTDS) – were available for patients diagnosed with bowel cancer in England from 1 January 2018. Data on diagnoses and radiotherapy (from RTDS) were available until the end of March 2021, data on procedures (from HES-APC) were available until end of December 2020, and data on chemotherapy (from SACT) were available until end February 2021. The data comes from rapid processing of cancer registration data, in particular Cancer Outcomes and Services Dataset (COSD) information submitted by hospitals. The RCRD provides a quicker, indicative source of cancer data than full, gold standard cancer registration, which relies on additional data sources, further follow-up with trusts and further processing.

PEDW data were available for patients diagnosed in Wales. The patients included in the PEDW data are those with an episode of care containing a bowel cancer diagnosis since 1 January 2019, or those with bowel cancer surgery since 1 January 2019. For these patients all PEDW episodes since 1 January 2018 were available.

7.2 Methods

Analyses are on a diagnosis-based cohort and a series of treatment-based cohorts. Treatment activity per month is reported rather than proportions of patients receiving each type of treatment. This allows more accurate reporting up to a more recent time-point because it avoids the issue of patients diagnosed more recently having insufficient follow-up data to capture their treatments.

Numbers of diagnoses and treatments are reported over time. The relative deficit is calculated both in the early pandemic period (defined as 1 April to 30 June 2020), and in the pandemic period to as recent as data allows. Numbers of diagnoses / treatments per month from January 2019 to December 2019 are used for comparison.

For patients undergoing more than one major resection, their first major resection since 1 January 2019 is included.

Curative radiotherapy is defined as radiotherapy with treatment intent recorded as anti-cancer in the RTDS dataset. Numbers reported are the number initiating curative radiotherapy each month.

Adjuvant chemotherapy is defined as chemotherapy administered within 4 months of a major resection. Cancer stage was not used to define adjuvant chemotherapy because of the large proportion of patients with missing stage data, and because this proportion increases over time. Numbers reported are the number of patients initiating adjuvant chemotherapy.

Socioeconomic deprivation was measured using the income domain of the Index of Multiple Deprivation (IMD). The IMD is an area-level measure which combines seven domains of deprivation. Results are reported according to national quintiles of the income domain of IMD rankings of 32,844 Lower Super Output Areas, containing typically 1500 people.

7.3 Limitations

There are limitations associated with the RCRD, as described in the RCRD August 2021 monthly snapshot. The main issues are an under-ascertainment of cases, which for bowel cancer is around 10%, and incomplete information on cancer stage, with 21% of patients in this analysis missing staging (Table 8.2). As the RCRD was used to compare activity before and during the pandemic, the relative differences that we report are valid. However, the absolute numbers representing the diagnostic and treatment deficits will under-report the backlog in diagnostic and therapeutic activity to the same extent.

The number of comorbidities recorded in RCRD, according to the RCS Charlson Score, appears to be an underestimate. No patients have a missing Charlson score so it seems that those without a linkage to HES are assumed to have zero comorbidities. Ethnicity is missing for a higher proportion of patients diagnosed since April 2020 (12.3%) than it was for patients diagnosed in 2019 (8.6%), preventing an analysis of the deficit according to ethnicity.

The focus of the analyses is on diagnoses and initial treatments. This is because of the way the cohort of patients in the RCRD is defined, including patients diagnosed since 1 January 2018. The number of patients in the cohort available for ongoing treatment therefore increases over calendar time, and it is not possible to reliably report numbers of patients undergoing later treatment such as palliative chemotherapy or palliative radiotherapy.

As explained above, the analysis for Wales is, for now, limited to numbers of major resections. This is because for patients in Wales there are differences in the data source and the definition of the patient cohort which prevented equivalent analyses being carried out in the time available to produce this report.

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8. COVID-19 recovery

Chapter 8 – Key Findings

- Early in the COVID-19 pandemic there was a very large impact on the diagnosis and treatment of bowel cancer patients, but much of the colorectal cancer service provision has recovered across England as a whole.
- In England the number of major resections gradually returned to pre-pandemic levels by the end of 2020, but did not recover sufficiently to reverse the deficit, and by the end of 2020 there was still a substantial deficit in major resections for bowel cancer. In Wales there was a smaller deficit in major resections by the end of 2020.
- By autumn 2020, the number of colon cancer patients in England receiving adjuvant chemotherapy was still lower than expected, and it is not clear whether it had fully recovered by February 2021.
- The number of rectal cancer patients in England initiating curative radiotherapy returned to pre-pandemic levels by autumn 2020 and by March 2021, numbers for this treatment type were the nearest to those expected.
- Patients in England diagnosed in the first 3 months of the pandemic, were more likely to be female, have more advanced cancer, and fewer comorbidities. This change did not last into the later pandemic period (post-June 2020).
- The impact on new bowel cancer diagnoses in England, and the extent to which the number of diagnoses has recovered, has varied by region.
- There was a trend towards a larger deficit in diagnoses in the regions of England that have been the hardest hit by COVID-19 infections.
- The National Bowel Screening Programme appears to have helped to facilitate the recovery of diagnoses in those of screening age. By March 2021 those just below screening age and just above screening age in England had the largest deficits of new diagnoses.
- There was a larger deficit in diagnoses and major resections in the most deprived quintiles of the population.

8.1 National recovery

Figure 8.1 shows that early in the COVID-19 pandemic there was a very large impact on the diagnosis and treatment of bowel cancer patients, but that much of the colorectal cancer service provision has recovered nationally. A series of line graphs is provided of the diagnosis and treatment activity over time in England, and of major resections in Wales. In each chart, 2019 is represented by a dotted blue line as a comparison period, whilst 2020 is represented by a solid red line and 2021 by a dashed orange line.

Diagnoses, major resections and adjuvant chemotherapy were impacted immediately (charts a, b, c and d respectively). The patterns of recovery of major resections in Wales (chart c) was similar to that in England (chart b) and data was available in Wales until March 2021, showing a continuing recovery in early 2021. The National Bowel Cancer Screening Programme in England was paused in March 2020 and had resumed by December 2020. In some areas of England the programme resumed earlier. Bowel Screening Wales was also paused in March 2020 but had resumed by August 2020.

The number of colon cancer patients receiving post-operative adjuvant chemotherapy was still reduced well into autumn 2020 (chart d) and it is not clear whether it had fully recovered by February 2021. This will be at least in part due to the reduction in patients undergoing major resection (charts b, c and d).

A drop in numbers initiating curative radiotherapy for rectal cancer was not seen until June to August 2020 (chart e). Patients planned in March 2020 to start long course radiotherapy or chemo-radiotherapy in April may have continued to start radiotherapy but had short course radiotherapy with a delay to surgery rather than start long course radiotherapy. Those planned for short course radiotherapy in April may have proceeded and had a delay to surgery or had all treatment delayed. The reduction in patients initiating curative radiotherapy in June to September 2020 likely reflects the reduction in new diagnoses.

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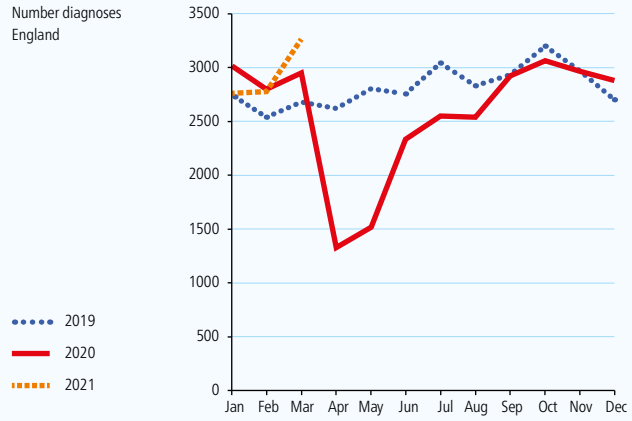
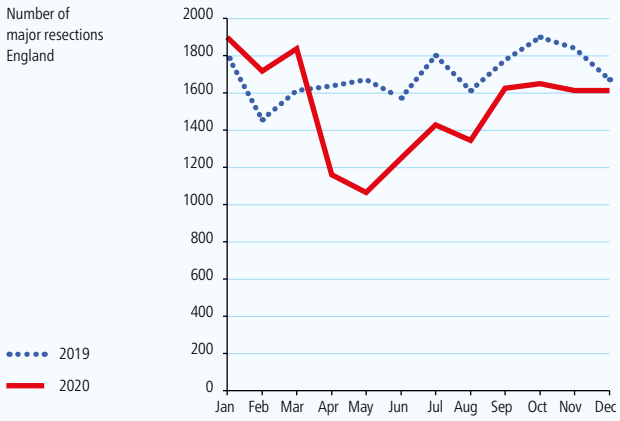
Figure 8.1

Numbers by month in 2020 and 2021 compared to 2019 of a) new bowel cancer diagnoses in England, b) major resections in England*, c) major resections in Wales, c) colon cancer patients starting adjuvant chemotherapy in England, d) rectal cancer patients starting curative radiotherapy in England.

a)

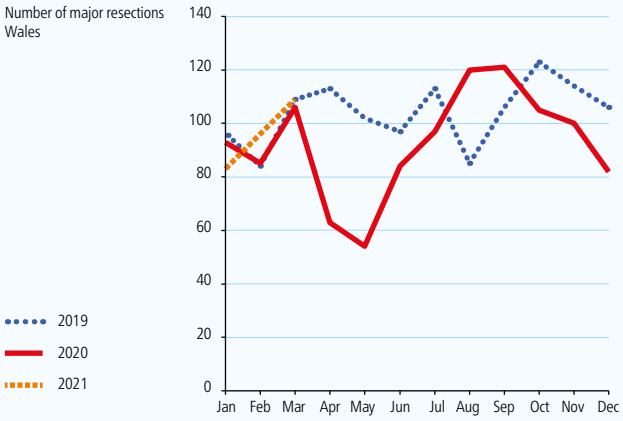


b)

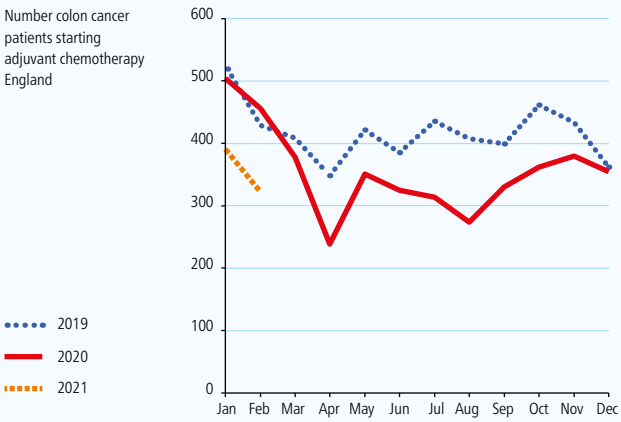


*This diagram has no dashed orange line because procedure information was only available until December 2020.

c)



d)



e)

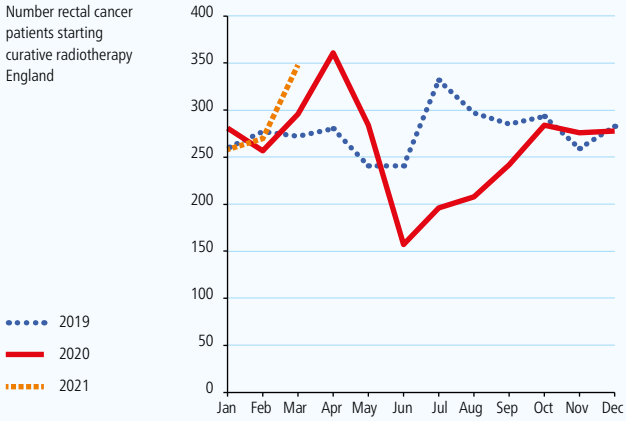


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Table 8.1 provides estimates of the overall relative deficit in diagnoses and treatment in the early pandemic period and up to the most recently available date. In England as a whole, despite the large deficit in numbers of patients diagnosed with bowel cancer in the first 3 months of the pandemic, there has been substantial recovery since then. Similarly, the number of major resections gradually returned to pre-pandemic levels by the end of 2020 (Figure 8.1 b), but did not recover sufficiently to reverse the deficit, and by the end of 2020 there was still a substantial deficit in major resections for bowel cancer (Table 8.1). A similar picture is seen for the recovery of major resection in Wales as a whole, although it seems that greater recovery has been possible in Wales. For adjuvant chemotherapy activity, the deficit was not as large in the early pandemic period, but much of the deficit in adjuvant chemotherapy across England as a whole remained into February 2021. Table 8.1 does not show a deficit in curative radiotherapy for rectal cancer in the early pandemic period. Curative radiotherapy activity returned to pre-pandemic levels by autumn 2020, and was the treatment modality with the smallest deficit by March 2021.

Table 8.1
Relative deficit in diagnoses, major resections, adjuvant chemotherapy for colon cancer and curative radiotherapy for rectal cancer in the early pandemic period and in the whole pandemic period. Expected numbers are based on 2019 data.

	April–June 2020			April 2020–March 2021*		
	Expected number (2019)	Observed number (2020-21)	% of expected	Expected number (2019)	Observed number (2020-21)	% of expected
Diagnoses	8,180	5,181	63.3	33,814	30,902	91.4
Major resections in England	4,878	3,476	71.3	15,475	12,746	82.4
Major resection in Wales†	312	201	64.4	1,248	1,114	89.3
Adjuvant chemotherapy for colon cancer	1,154	915	79.3	4,605	3,643	79.1
Curative radiotherapy for rectal cancer	762	802	105.2	3,320	3,162	95.2

* For major resections in England numbers are to end December 2020. For adjuvant chemotherapy numbers are to end Feb 2021.
† Data for patients treated in Wales from Patient Episode Database for Wales (PEDW)

8.2 Patients diagnosed in England during the pandemic

There were statistically significant differences in all characteristics except socioeconomic deprivation between the pre-pandemic (2019), early-pandemic (April to June 2020) and later-pandemic (July 2020 to March 2021) periods (Table 8.2). The largest differences were in the first 3 months of the pandemic, with more of those diagnosed being female, having more advanced cancer, and fewer comorbidities. Later in the pandemic the sex and stage distribution returned to pre-pandemic distributions.

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Table 8.2
Characteristics of patients diagnosed in early pandemic period and later pandemic period compared to 2019

	2019		April–June 2020		July 2020–March 2021	
	N	%	N	%	N	%
All patients	**33,814**		**5,181**		**25,721**	
Age group						
<50	2,306	6.8	432	8.3	1,686	6.6
50–59	4,162	12.3	638	12.3	2,902	11.3
60–74	13,784	40.8	2,045	39.5	10,781	41.9
75–84	9,657	28.6	1,427	27.5	7,206	28.0
>85	3,905	11.5	639	12.3	3,146	12.2
Sex						
Male	18,836	55.7	2,747	53.0	14,384	55.9
Female	14,978	44.3	2,433	47.0	11,325	44.1
Missing (%)	0	0.0	1	0.1	12	0.1
Stage						
1	5,813	20.7	623	15.1	3,778	19.7
2	7,735	27.6	1,105	26.7	5,054	26.3
3	9,117	32.5	1,352	32.7	6,652	34.7
4	5,374	19.2	1,055	25.5	3,705	19.3
Missing (%)	5,755	12.1	1,046	20.2	6,532	25.4
Ethnicity*						
White	29,006	93.8	4,308	93.9	21,068	93.5
Mixed	123	0.4	17	0.4	114	0.5
South Asian	819	2.6	110	2.4	590	2.6
Black	532	1.7	78	1.7	396	1.8
Other	444	1.4	74	1.6	356	1.6
Missing (%)	2,890	8.5	594	11.5	3,197	12.4
National quintiles of income deprivation**						
5 - Least deprived	7,385	21.8	1,135	21.9	5,686	22.1
4	7,842	23.2	1,184	22.9	5,989	23.3
3	7,080	20.9	1,093	21.1	5,418	21.1
2	6,202	18.3	989	19.1	4,673	18.2
1 - Most deprived	5,305	15.7	780	15.1	3,949	15.4
Missing (%)	0	0.0	0	0.0	6	0.0
Charlson comorbidity score						
0	26,065	77.1	4,086	78.9	20,760	80.7
1	3,258	9.6	482	9.3	2,262	8.8
2	2,285	6.8	295	5.7	1,284	5.0
3+	2,206	6.5	318	6.1	1,415	5.5

*Ethnicity is grouped according to Office for National Statistics recommendation.
**National quintiles of income deprivation are grouped according to Office for National Statistics English indices of deprivation 2019

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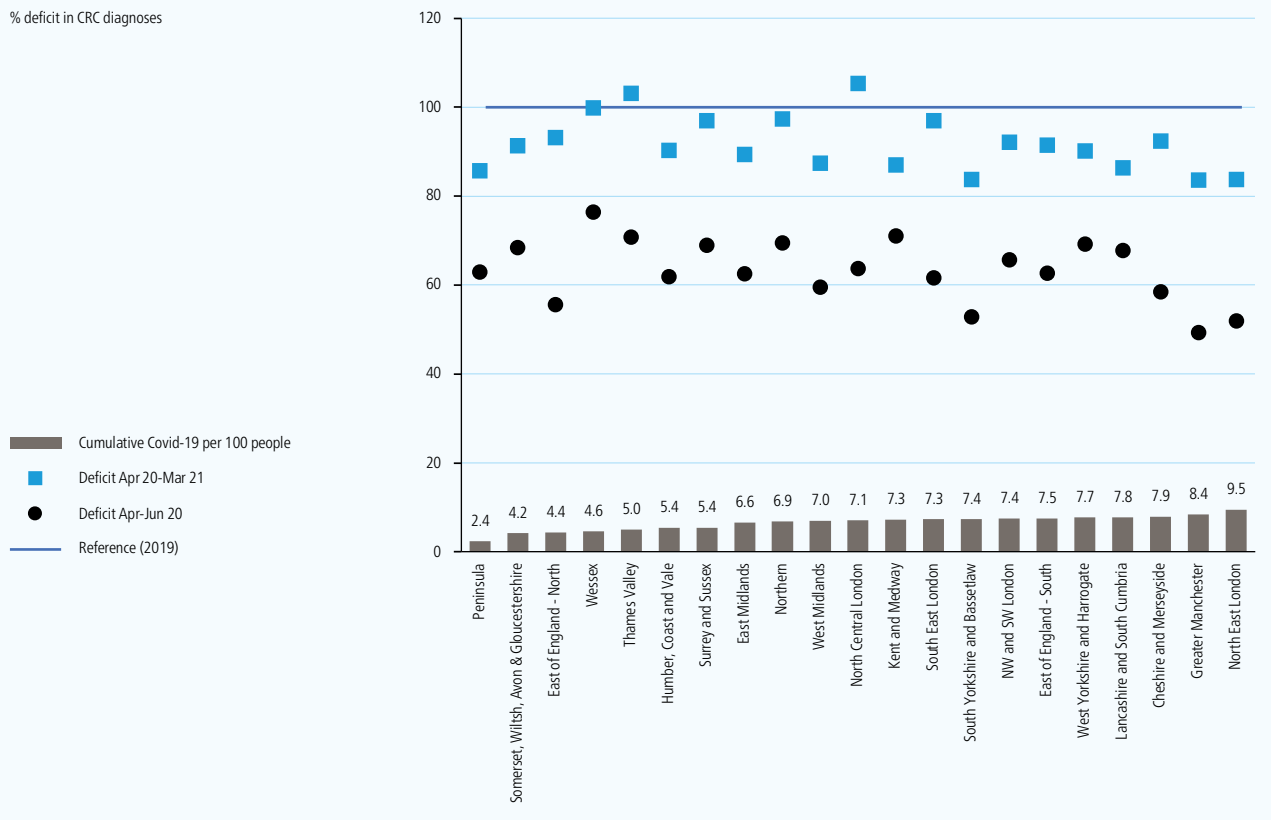
8.3 Recovery by region of England

The impact on new bowel cancer diagnoses, and the extent to which diagnoses have recovered, has varied by region. We have referred to the relative deficit in bowel cancer diagnoses (i.e. the observed number of patients diagnosed with bowel cancer during the pandemic divided by the number of patients expected to be diagnosed based on the number of patients diagnosed with bowel cancer in the same time period of the previous year) as "missed diagnoses". This is reported for the early pandemic period and for the pandemic period to March 2021, according to the 21 Cancer Alliances in England (Figure 8.2). Cancer Alliances displayed are in order of increasing cumulative rate of confirmed COVID-19 cases up to March 2021, with grey bars representing the cumulative rate of confirmed cases to that date. There is a trend towards a larger number of "missed diagnoses" in regions that have been the hardest hit by COVID-19 infections. The 8 regions with the highest cumulative rates of confirmed COVID-19 cases had between 8% and 16% "missed diagnoses" by March 2021.

By March 2021 there were less than 20% "missed diagnoses" in all regions, and in 6 regions the number of diagnoses had recovered, with less than 5% "missed diagnoses". Largely, the more a region was affected in the first wave of the pandemic, the larger the proportion of "missed diagnoses" by March 2021. There are some exceptions, however, such as North Central London and South East London. This may reflect a shift in the regions most affected by COVID-19 infection as the pandemic progressed.

Figure 8.2
Proportion of "missed diagnoses" by Cancer Alliance, in order of increasing cumulative rate of confirmed COVID-19 diagnosis per person up to 31/03/2021. The blue squares show the relative deficit between April 2020 and March 2021. The black circles show the "missed diagnoses" in the early pandemic period (April to June 2020).



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8.4 Recovery in England by age and deprivation

The relative deficit in bowel cancer diagnoses and major resections in the early pandemic period and for the whole pandemic period to March 2021 is reported according to age-group and deprivation in Tables 8.3 and 8.4. Given the differential impact of the pandemic by ethnicity, it is important to understand whether there was a difference in "missed diagnoses" by ethnic group. However, ethnicity is missing for a higher proportion of patients diagnosed since April 2020 (12.3%) than it was for patients diagnosed in 2019 (8.6%). As the ethnicity distribution of those with missing ethnicity is unlikely to be representative of those with ethnicity recorded, it is not possible to reliably report "missed diagnoses" by ethnicity.

Table 8.3
% of expected diagnoses April to June 2020 and April 2020 to March 2021, according to age and deprivation

	April–June 2020			April 2020–March 2021		
	Expected number (2019)	Observed number (2020)	% of expected	Expected number (2019)	Observed number (2020-21)	% of expected
Age group						
<50	582	432	74.2	2,306	2,118	91.8
50-59	1,049	638	60.8	4,162	3,540	85.1
60-74	3,267	2,045	62.6	13,784	12,826	93.0
75-84	2,340	1,427	61.0	9,657	8,633	89.4
>85	942	639	67.8	3,905	3,785	96.9
National quintiles of income domain of socioeconomic deprivation*						
1 - Least deprived	1,779	1,135	63.8	7,385	6,821	92.4
2	1,879	1,184	63.0	7,842	7,173	91.5
3	1,673	1,093	65.3	7,080	6,511	92.0
4	1,520	989	65.1	6,202	5,662	91.3
5 - Most deprived	1,329	780	58.7	5,305	4,729	89.1

*National quintiles of income deprivation are grouped according to Office for National Statistics English indices of deprivation 2019

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Numbers of patients diagnosed was impacted across all age-groups in the early pandemic period, with those aged under 50 less affected than the other groups. The National Bowel Cancer Screening programme appears to have helped to facilitate the recovery of diagnoses in those of screening age. By March 2021 those just below screening age and just above screening age had the largest deficits of new diagnoses.

There was a larger number of "missed diagnoses" in the most deprived quintile of the population, but no clear trend across the other quintiles. This was most stark in the early pandemic period but was still apparent by March 2021.

The number of patients undergoing major resection reflects a combination of the number of patients diagnosed and decisions on whether or not to operate. In the early pandemic period when surgical activity was markedly reduced, it appears that younger patients were more likely to be prioritised for major resection, and Table 8.4 shows an increasing deficit in major resections with age in the first 3 months of the pandemic. By December 2020 there was no clear pattern of deficit by age (Table 8.4).

The largest deficit of major resections was in the most deprived quintiles of patients, with a 20 to 21% deficit in major resections in the two most deprived quintiles compared to a 16 to 17% deficit in the other quintiles. Further work is needed to understand the reasons for the association between socioeconomic deprivation and deficit in diagnoses and major resections, especially as the association with the deficit in major resections is more marked than the association with the deficit in diagnoses.

Table 8.4
% of expected major resections April to June 2020 and April to December 2020, according to age and socioeconomic deprivation

	April-June 2020			April-December 2020		
	Expected number (2019)	Observed number (2020)	% of expected	Expected number (2019)	Observed number (2020)	% of expected
Age group						
<50	373	310	83.1	1,126	990	87.9
50-59	670	512	76.4	2,109	1,723	81.7
60-74	2,221	1,573	70.8	7,186	5,823	81.0
75-84	1,321	902	68.3	4,178	3,468	83.0
>85	293	179	61.1	876	742	84.7
National quintiles of income domain of socioeconomic deprivation*						
1 - Least deprived	1,098	719	65.5	3,406	2,861	84.0
2	1,186	884	74.5	3,638	3,023	83.1
3	1,011	753	74.5	3,255	2,740	84.2
4	858	598	69.7	2,806	2,255	80.4
5 - Most deprived	725	522	72.0	2,370	1,867	78.8

*National quintiles of income deprivation are grouped according to Office for National Statistics English indices of deprivation 2019

Recommendations

- Although there has been a significant recovery of colorectal cancer services many regions of England require additional support to deal with a substantial backlog in bowel cancer diagnoses, particularly those regions worst hit by the pandemic.
- Ongoing efforts to promote and raise awareness of bowel cancer signs and symptoms should continue to try to mitigate the delays in bowel cancer diagnoses during the pandemic, with particular focus on the most deprived and on those just below and just above screening age.
- Efforts to promote the National Bowel Cancer Screening Programme should continue as it appears to have helped facilitate recovery of diagnoses in those of screening age.
- Further work is needed to understand the reasons for the association between socioeconomic deprivation and deficit in diagnoses and major resections.
- Further work is needed to understand the impact of COVID-19 on colorectal cancer patient outcomes. Significant delays in diagnosis may result in a higher proportion of patients with stage 4 disease or locally advanced disease. As a consequence, changes may be seen in the numbers of patients having major colorectal resections; receiving pre-operative radiotherapy; having resections for metastatic disease; and receiving chemotherapy in palliative, pre-, or post-operative settings.

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

All results are published on our website. 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_2021

North East and Cumbria

South Tyneside and Sunderland NHS Foundation Trust

County Durham and Darlington NHS Foundation Trust

Gateshead Health NHS Foundation Trust

North Cumbria Integrated Care NHS Foundation Trust

North Tees and Hartlepool NHS Foundation Trust

Northumbria Healthcare NHS Foundation Trust

South Tees Hospitals NHS Foundation Trust

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 – Manchester Royal Infirmary

Manchester University NHS Foundation Trust – Wythenshawe Hospital

Pennine Acute Hospitals NHS Trust

Salford Royal NHS Foundation Trust

Stockport NHS Foundation Trust

Tameside and Glossop Integrated Care 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 and Scarborough Teaching Hospitals NHS Foundation Trust

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

Countess of Chester Hospital NHS Foundation Trust

Liverpool University Hospitals NHS Foundation Trust - University Hospital Aintree

Liverpool University Hospitals NHS Foundation Trust – Royal Liverpool University Hospital

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

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West Midlands

George Eliot Hospital NHS Trust

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

University Hospitals of Derby and Burton NHS Foundation Trust - Royal Derby 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

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

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 - North

Cambridge University Hospitals NHS Foundation Trust

East Suffolk and North Essex NHS Foundation Trust

James Paget University Hospitals NHS Foundation Trust

Norfolk and Norwich University Hospitals NHS Foundation Trust

North West Anglia NHS Foundation Trust

The Queen Elizabeth Hospital, King's Lynn, NHS Foundation Trust

West Suffolk NHS Foundation Trust

East of England - South

Mid and South Essex NHS Foundation Trust - Basildon University Hospital

Bedfordshire Hospitals NHS Trust

East and North Hertfordshire NHS Trust

Mid and South Essex NHS Foundation Trust – Broomfield Hospital

Mid and South Essex NHS Foundation Trust – Southend University Hospital

West Hertfordshire Hospitals NHS 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

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RM Partners (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 London

North Middlesex University Hospital NHS Trust

Royal Free London NHS Foundation Trust

The Whittington Hospital NHS Trust

University College London Hospitals NHS Foundation Trust

North East London

Barking, Havering and Redbridge University Hospitals NHS Trust

Barts Health NHS Trust

Homerton University Hospital 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 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 and Weston NHS Foundation Trust – University Hospital Bristol

University Hospitals Bristol and Weston NHS F oundation Trust – Weston General Hospital

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

Portsmouth Hospitals NHS Trust

University Hospitals Dorset NHS Foundation Trust - Poole Hospital

University Hospitals Dorset NHS Foundation Trust – The Royal Bournemouth Hospital

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

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Surrey & Sussex
Ashford and St Peter's Hospitals NHS Foundation 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
University Hospitals Sussex NHS Foundation Trust – Royal Sussex County Hospital
University Hospitals Sussex NHS Foundation Trust- St. Richard's Hospital
University Hospitals Sussex 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

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Appendix 2 – Outlier communications

The individual outlier responses are published here.

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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.

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.

Adjuvant therapy – these are treatments given to a patient ***after*** they have surgery and might consist of chemotherapy and/or radiotherapy.

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

American Society of Anaesthesiologists (ASA) grade – a system for assessing how fit somebody is before they have surgery, with a value of 1 representing the most fit.

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).

Circumferential resection margin – this refers to the surface of the specimen which has been removed and involves measuring how much healthy tissue surrounds the tumour. A negative circumferential resection margin (CRM) is defined as more than 1mm of healthy tissue beyond the tumour. Surgeons want to achieve a negative CRM when they remove a tumour as it reduces the risk of the tumour coming back again in the future.

Complete clinical response (cCR) – this is a term used to describe the disappearance of a rectal tumour following neo-adjuvant treatment according to clinical, radiological and endoscopic investigations. This means that the tumour is no longer visible on scans or a 'camera' test of the bowel. It might be possible for patients with complete clinical response to undergo 'watch and wait' rather than surgery. This involves intensive follow-up to monitor for tumour regrowth.

CPET – cardiopulmonary exercise testing. A way of assessing the performance of the heart and lungs at rest and during exercise to provide an indication of how someone might cope with a major operation.

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

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 (FIT) – a stool sample is provided by the patient and is then tested for the amount of blood within it. Abnormal levels of blood within the stool will lead to a recommendation for telescopic examination of the bowel.

FIT testing is used as part of national screening for asymptomatic patients, but can also be used for 'low risk' symptomatic patients. The level of blood which needs to be detected in the stool for symptomatic patients is much lower than for screening. This means that a recent negative screening test should not be relied upon if patients subsequently present with symptoms.

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.

Lynch syndrome – this is an inherited genetic defect which can be identified via blood tests (MMR/MSI testing). People with Lynch syndrome have an increased risk of a range of cancers. Bowel cancer is the most common cancer associated with Lynch syndrome.

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.

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Multidisciplinary Team (MDT) – 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 MDT includes surgeons, cancer specialists, nurses, radiologists, histopathologists and palliative care physicians. Patients from referring hospitals will be discussed in their closest specialist bowel MDT. At a local level, results from Wales are reported according to multidisciplinary teams. There are 13 Welsh MDTs.

National data opt out – this allows patients in England who do not want their personal confidential information to be used for purposes other than their individual care to register this fact with NHS Digital. This replaced the registration of type 2 objections via GP practices in May 2018 and anyone with an existing type 2 objection would have been automatically opted out of this as well.

Neo-adjuvant therapy – these are treatments given to a patient *before* they have surgery and might consist of chemotherapy and/or radiotherapy.

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

Performance status – a system for assessing how a disease is affecting the daily living abilities of a person.

A score is attributed between 0 and 4, as follows:

0 = Fully active.
1 = Some restriction but cares for self.
2 = Ambulatory >50% of time, occasional assistance needed.
3 = Ambulatory ≤50% of time, nursing care needed.
4 = Bedbound.

Permanent colostomy – this is a type of stoma. It involves bringing out a section of large bowel on to the surface of the abdomen. This type of stoma cannot be reversed. It is formed when two ends of bowel cannot be joined back together or, sometimes, if joining together the two ends of bowel would result in poor bowel function which would impair a patient's quality of life.

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.

Robotic surgery – this is a relatively new advancement in surgery and allows surgeons to control surgical instruments whilst sitting at a special console away from the patient during the operation.

Screening – patients aged 60-74 are invited to take part in this every two years. They do this by providing a poo sample that is tested for traces of blood. 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.

Temporary ileostomy – this is a type of stoma. It involves bringing out a section of small bowel on to the surface of the abdomen. A temporary ileostomy is often formed during an anterior resection procedure for rectal cancer. During an anterior resection, the section of bowel containing the tumour is removed and the ends are anastomosed (joined) back together. The ileostomy is made before the site of the join and diverts poo to allow the join time to heal and also if the join were to leak, the consequences should be less severe. This type of stoma can be reversed (small bowel put back inside abdomen) once the join has healed.

TNM Staging – a system to describe the amount and spread of cancer in the body. The 'T' refers to 'Tumour' and describes the main tumour. The 'N' refers to 'Nodes' and describes how many lymph nodes or 'glands' have cancer. The 'M' refers to 'Metastases' and describes cancer that has spread to other parts of the body.

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

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