Expert Report for the UK Covid-19 Public Inquiry

Module 3: The impact of the Covid-19 pandemic on healthcare systems in the UK

Unveiling the hidden impact: Colorectal cancer

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Author statement

"We confirm that this is our own work and that the facts stated in the report are within our own knowledge. We understand our duty to provide independent evidence and have complied with that duty. We confirm that we have made clear which facts and matters referred to in this report are within our own knowledge and which are not. Those that are within our own knowledge we confirm to be true. The opinions we have expressed represent our true and complete professional opinions on the matters to which they refer."

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30th June 2024

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Preamble

1. The authors of this report are Professor Aneel Bhangu and Dr Dmitri Nepogodiev.

    - Aneel Bhangu qualified from Birmingham Medical School in 2004, following which he completed basic and higher surgical training in general surgery. Following a Cancer Research UK funded PhD Fellowship at the Royal Marsden Hospital, he was awarded a PhD by Imperial College London in 2014 for research into colorectal cancer. He is currently Consultant Colorectal Surgeon at University Hospitals Birmingham NHS Foundation Trust and Professor of Global Surgery at the University of Birmingham.

    - Dmitri Nepogodiev qualified from Birmingham Medical School in 2012 following which he undertook basic surgical training in general surgery, before switching to the public health training programme. He was awarded a Master of Public Health degree in 2021 and a PhD in public health and epidemiology in 2023 by the University of Birmingham. He is currently a NIHR Academic Clinical Lecturer in Public Health at the University of Birmingham.

2. Most NHS statistics are reported using the NHS year which runs from April to March. Therefore, a year range such as 2018-19 implies a 12-month period from April 2018 to March 2019. Where we instead refer to the 24-month period from January 2018 to December 2019 we state this explicitly. Ethnicity categories are listed as reported in the underlying data sources.

3. Our main remit is to examine the period of March 2020 to June 2022. We also refer to how pandemic preparedness fits in with the readiness of the current NHS.

4. Our remit is also to present data for England, Scotland, Wales, and Northern Ireland separately, so all Administrations are represented. Where data for one Administration is not available, we make this clear. Sometimes it is only possible to present data that covers two or more Administrations; for example, the National Bowel Cancer Audit (NBOCAP) reports data for both England and Wales.

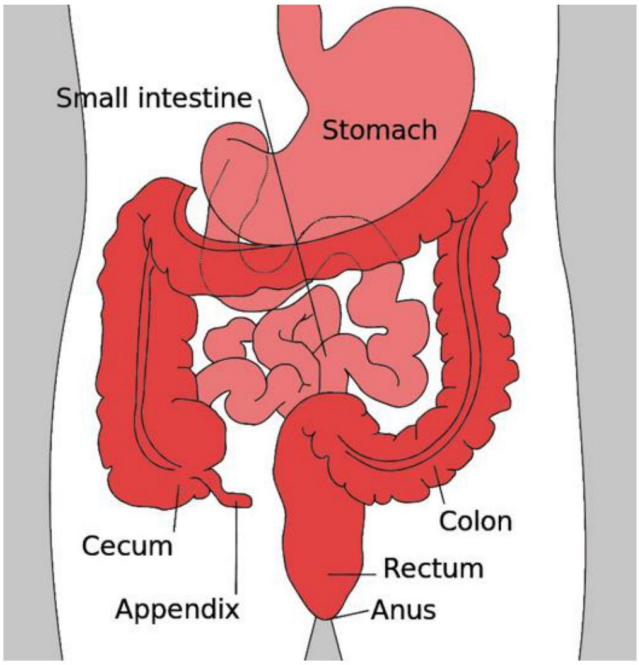
5. With thanks to Professor Eva Morris, Professor of Health Data Epidemiology at Oxford University for her review and input into this report.

Background to colorectal cancer

Introduction

6. The large bowel, also called the large intestine, is the part of the digestive system consisting of the caecum, colon, and rectum. The large intestine is shaded in the darker colour in Figure 1. Food residue enters the caecum from the small bowel and travels through the right side of the colon, the left side of the colon, and finally the rectum, which is the lowest part of the large bowel, closest to the anus. The main functions of the large bowel include absorption of water and minerals, and formation and storage of faeces

Figure 1: Schematic diagram of the large bowel

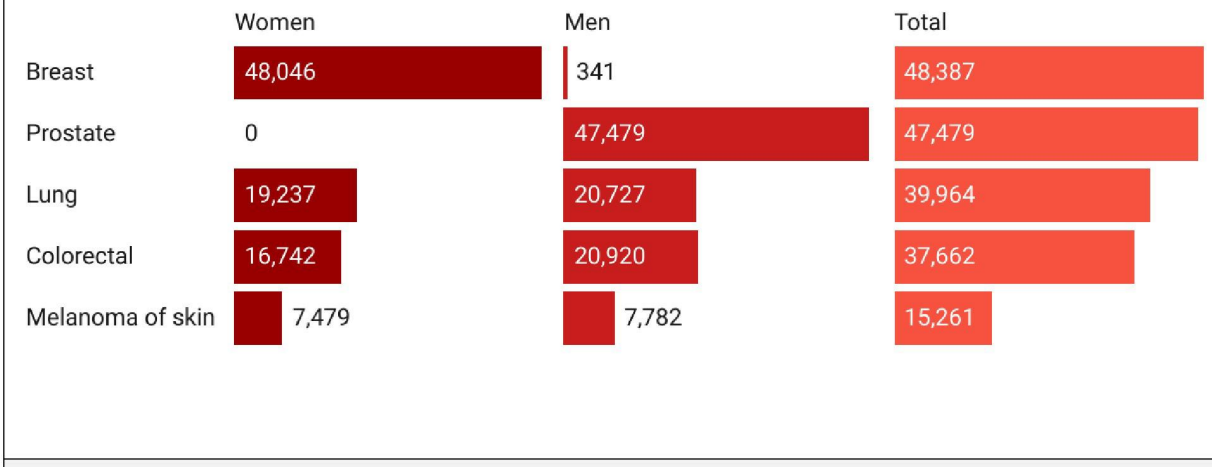


The large bowel is shaded in dark red

7. Colorectal cancer, also called bowel cancer, is extremely common. It is the forth most common cancer in the United Kingdom and the second leading cause of cancer related deaths (Cancer Research UK, 2017-2019). In England, it is the third most common cancer in both women and men. In 2019, 37,662 new cases were registered (Figure 2) (NHS England, 2021). Of these, 20,920 (55.5%) were in men and 16,742 (44.4%) were in women.

In Scotland, colorectal cancer is the third most commonly diagnosed cancer (ScotPHO, 2022), the fourth most common in Wales (Bowel Cancer UK, 2022), and the fourth most common in Northern Ireland (Nidirect, 2019). Complete comparative numbers for pre-pandemic and pandemic are given in the sections on diagnosis below at paragraphs 15-16 and 52-61.

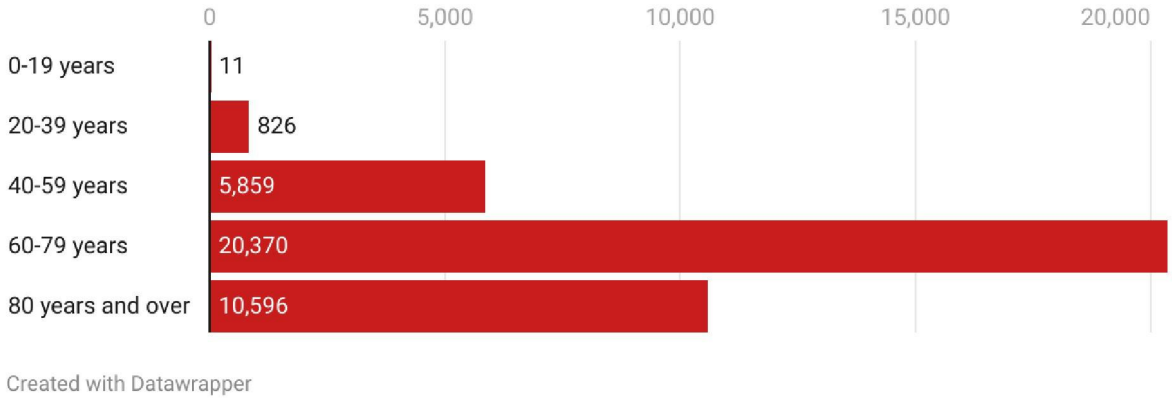
Figure 2: Registered new cases of the five most common cancers in England in 2019



Data source: NHS England

8. Colorectal cancer incidence increases with age, with 82.2% of cases diagnosed in patients aged 60 years and over (Figure 3). Overall, 27,369 (72.7%) were in the colon and 10,293 (27.3%) were in the rectum. The number of registered new colorectal cancer cases increased steadily from 26,359 in 1995 to 37,662 in 2019, a 43% increase. This increase has mainly been driven by a growing and ageing population, as the age-standardised incidence has been stable in both men (83.5 in 1995 versus 84.6 per 100,000 in 2019) and women (54.8 in 1995 versus 57.8 per 100,000 in 2019).

Figure 3: Age breakdown of registered new colorectal cancer cases in England in 2019

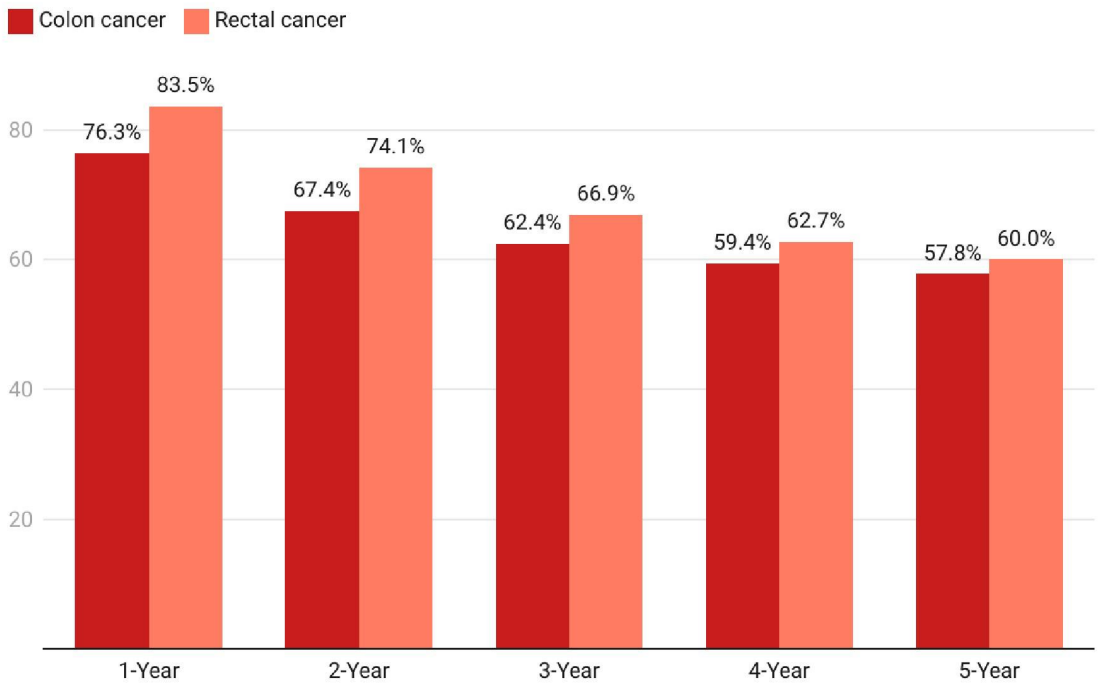


Data source: NHS England

9. The two commonest tests for colorectal cancer are endoscopy (colonoscopy [examination of the whole rectum and colon] and flexible sigmoidoscopy [examination of the rectum and left side of colon only]) and scans (CT scans). There are many different treatment options which largely depend on the cancer stage and patient fitness.

10. Overall colorectal cancer survival for patients diagnosed in England in 2015-16 to 2018-19 (followed up to 2020) at 1-year was 76.3% and at 5-years was 57.8% (NHS England Digital, 2022). Overall survival was slightly higher for rectal cancer patients than colon cancer patients (Figure 4), due to a complex combination of stage at presentation, age differences, and treatment factors. Differences in survival between men and women are small.

Figure 4: Colon and rectal cancer survival in England (patients diagnosed in 2015-19)



Data source: NHS England

Symptoms

11. Colorectal cancers can be either symptomatic or asymptomatic. Symptomatic cancers cause symptoms and patients typically go to their GP first. Asymptomatic cancers are those that have not caused any symptoms prior to the detection of the cancer, and are usually detected through screening (see paragraphs 26-33).

12. Broadly, patients present either via a GP with symptoms, as an emergency via Emergency Departments, or through national screening programmes (without symptoms). Pre-pandemic up to a fifth of colorectal cancers were diagnosed after a visit to the Emergency Department (NHS England Digital, 2022b).

13. Symptoms depend on the stage and location of the cancer, with early cancers, often, showing very few symptoms.

14. The symptoms associated with colorectal cancer are common and occur with other illnesses so distinguishing those caused by a cancer from other causes can be challenging. Furthermore, public awareness of symptoms is limited. Pre-pandemic, up to a fifth of colorectal cancers were diagnosed after a visit to the Emergency Department (NHS England Digital, 2022). The commonest 'red flag' symptoms of bowel cancer that require further investigation are:

- Bleeding from the anus or blood mixed into stool.
- Persistent, unexplained changes in bowel habit.
- A constant pain or mass in the tummy.
- Persistent feeling of fullness in the bottom.
- Weight loss or tiredness, often with an unexplained anaemia (low red blood cell count).

15. The frequency of these symptoms in people presenting to their GP means that it is not feasible to offer tests to every patient experiencing low-risk symptoms, such as a very short period of diarrhoea. The National Institute for Health and Care Excellence (NICE, 2013) makes recommendations on criteria for suspected cancer pathway referral to standardise pathways (NICE, 2015); these are summarised in Table 1. NICE clinical guidelines cover the NHS in England and Wales. Scotland is covered by the Scottish Intercollegiate Guidelines Network (SIGN, 2023) and Northen Ireland by its own Northern Ireland Cancer Network (NICaN, 2021) primary care suspected cancer guidance.

Table 1: NICE recommended criteria for urgency suspected cancer pathway referral for suspected colorectal cancer
Patients in any of the four groups below should be referred
Any one of the following: • Abdominal mass. • Change in bowel habit. • Iron-deficiency anaemia. • Age ≥40 years and unexplained weight loss and abdominal pain. • Age <50 with years and rectal bleeding and unexplained symptoms of either abdominal pain or weight loss. • Aged ≥50 years and either unexplained symptoms of either rectal bleeding or abdominal pain or weight loss. • Aged ≥60 years and any anaemia. And • Quantitative faecal immunochemical testing (FIT) result ≥10µg/g
Rectal mass
Unexplained anal mass
Unexplained anal ulceration
Source: NICE, 2015

Diagnosis

16. The 2017-19 average annual number of new colorectal cancers (ICD-10 C18-C20) provides a pre-pandemic baseline for understanding the number of new cancer cases and their spread across the four nations (Cancer Research UK, 2021):

    - England: 36,466
    - Scotland: 4,017
    - Wales: 2,388
    - Northern Ireland: 1,192

17. Of the 29,766 patients diagnosed with colorectal cancer in 2018-19 in England and Wales, 5,565 (19%) were diagnosed following an emergency admission, 16,013 (54%) were initially referred to an outpatient clinic by a GP, 2,853 (10%) were referred by the Bowel Cancer Screening Programme (discussed below), and referral source was other or not known for 5,335 (18%). Figure 5 presents a breakdown of referral source by age group. In Northern Ireland, between 2018-2020, figures were 33.6% via urgent GP referral, 27.9% by emergency presentation, and 8.8% by screening (Donnelly and Bennett, 2024).

Figure 5: Referral sources for patients diagnosed with colorectal cancer in 2018-19 in England and Wales

Data source: NBOCAP 2020

18. GP referrals are typically made on the suspected cancer pathway referral for patients with symptoms meeting the relevant referral criteria, but some patients with less typical

symptoms may be referred on a routine pathway. These patients are typically seen in consultant-led outpatient clinics for an initial consultation to discuss symptoms and to agree any tests needed. Patients who are diagnosed on an emergency admission, will have either been referred to hospital as an emergency by their GP or presented to the emergency department with severe symptoms (e.g. by calling an ambulance). These patients are likely to have a computed tomography (CT) scan as their initial test, as this is typically faster to arrange for inpatients than endoscopy.

19. The commonest tests for diagnosing colorectal cancer are endoscopies. These tests involve inserting, though the anus into the large bowel, a flexible tube that has a camera at its end. The two main types of lower gastrointestinal tract endoscopy are flexible sigmoidoscopy (which is limited to examination of the lower part of the large bowel) and colonoscopy (which can examine the whole length of the large bowel). Endoscopy can be used to take samples (biopsies) from any suspicious looking tissue as well as to snip off any small bubble-like growths (polyps) in the bowel wall. Strong bowel cleansing laxatives are needed the day before a colonoscopy to allow a good view of the bowel wall and sedation is often used on the day for patient comfort.

20. Any biopsies or polyps taken during an endoscopy are examined by a pathologist under a microscope to look for cancerous cells (histopathology). This is the gold standard test required to confirm cancer diagnosis.

21. If a possible cancer is seen at endoscopy, the next test to be performed is a CT scan to look for spread to other organs. For cancers in the rectum a magnetic resonance imaging (MRI) scan is also performed to support treatment planning.

22. Endoscopy may not be suitable for some patients, for example, more frail patients. For these patients a CT scan may be used as an initial test instead. A specific type of CT scan called a 'virtual colonoscopy' can find small polyps. However, a disadvantage is that biopsies can only be taken with an endoscopy.

Colorectal cancer staging

23. Most colorectal cancers develop through the polyp-cancer sequence (Dekker et al, 2019). This describes the development of benign polyps into invasive colorectal cancer (Muto et al, 1975). The first stage is a genetic mutation affecting the growth of cells in the lining of the colon or rectum, leading to a small benign growth (polyp). Further mutations lead to the polyp growing and transforming into an adenoma (a tumour that is not cancer). More mutations still can result in an adenoma transforming into an invasive carcinoma that starts to 'invade' through the bowel wall, becoming a colorectal cancer. The cancer may then spread (metastasise) through the lymphatic system to nearby lymph nodes, and through the bloodstream to other organs. Colorectal cancer metastases most frequently spread to

the liver and lungs. However, not all polyps develop into adenomas and not all adenomas develop into carcinomas.

24. It is difficult to precisely determine the time from initial polyp formation to the development of colorectal cancer. Firstly, polyps are thought to grow slowly and may remain asymptomatic until they reach a certain size (Morson, 1974). Secondly, when identified with an endoscopy, polyps are often removed, so it is unknown how they would grow if they were left in-situ (Winawer et al, 1993). However, it is thought that the complete polyp-cancer sequence can take up to 15 years (Dekker et al, 2019) (Morson, 1974).

25. Staging is a system for describing how advanced a cancer is. There are four stages of colorectal cancer, with stages 3 and 4 generally described as advanced colorectal cancer (Table 2). Staging is important because survival is best for earlier stage cancers (Table 2). For background, in 2016/2017, 35% of colorectal cancers diagnosed in England and Wales were stage I and II. Available data for the Devolved Administrations are shown later in this report in paragraph 66.

Table 2: Colorectal cancer staging and related pre-pandemic statistics for England. *(Technical note: Survival figures are relative survivals.)*

Stage	Definition	Proportion of new cases	1-year survival	5-year survival
1	Cancer has grown through the inner lining of the bowel, or into the muscle wall	45%	98%	93%
2	Cancer has spread into the outer wall of the bowel or into tissue next to the bowel		94%	87%
3	Cancer has spread to at least one lymph node close to the bowel	55%	87%	65%
4	Cancer has spread to another part of the body, such as the liver, lungs, or bones		41%	10%

Sources: NHS England Digital, 2021; NHS England Digital, 2022a

26. In certain genetic conditions, such as Lynch Syndrome, there can be a greatly increased number of fast-growing polyps, putting these patients at very high risk of colorectal cancer.

Bowel Cancer Screening Programme

27. Screening is a process of testing patients who do not have symptoms for a disease. The aim is to detect disease at an early (asymptomatic) stage when treatment is more likely to lead to a good patient outcome. In the UK, bowel cancer screening is performed through a stool test sent in the post to the patient's house. An abnormal test does not necessarily mean that a patient has a particular disease, only that there is a high enough probability of them having the disease to justify further (more expensive or more invasive) investigation. In other countries such as the USA, the screening test is endoscopy.

28. In the UK, further investigation is normally through colonoscopy. This can detect colorectal cancers as well as early signs of abnormal cells (polyps). Polyps can be removed during the colonoscopy (polypectomy) to prevent them transforming into colorectal cancer (Winawer et al, 1993).

29. Bowel screening programmes are proven to reduce the risk of dying from colorectal cancer by up to 40%, and also to reduce the likelihood of developing colorectal cancer in the first place (Chiu et al, 2015) (Chiu et al, 2021) (Scholefield et al, 2012) (Atkin et al, 2010). However, the impact of screening on overall (all-cause) mortality is less certain (Shaukat et al, 2013), potentially because studies would need to include very large numbers of patients to show a significant statistical reduction in overall mortality with screening (Heijnsdijk et al, 2019). There is further nuance due to regional variation in uptake of the first screening test and subsequent quality of colonoscopy, all affecting the influence of bowel cancer screening.

30. There are several different options for bowel screening, including faecal tests (i.e. tests on a stool sample that detect blood) and endoscopy. The UK National Screening Committee (NSC) makes recommendations for all four nations. In 2016, it recommended that the bowel screening programme should adopt faecal immunochemical testing (FIT) (GOV.UK, 2018).

31. FIT is based on a home test kit. This collects a small sample of stool, which the patient sends to a lab. FIT is able to detect tiny amounts of blood in the stool which would not be visible to the naked eye, this can be a sign of polyps or colorectal cancer. If the test result is normal the patient will be returned to routine follow-up (repeat test in two years). If the test result is abnormal (blood found) an urgent rapid-access referral is made to a specialist for consideration of further tests (i.e. endoscopy or CT scan).

32. Bowel screening programmes are available across the four nations, but there is variation in eligibility and specifics of FIT thresholds (Table 3). Eligibility is currently being expanded in

England to include people aged 50-59 years who were not previously included in the screening programme.

Table 3: Overview of bowel cancer screening programmes across the UK (Cancer Research UK, 2024)

Nation	Eligibility*	Frequency	FIT threshold
England	Age 54-74 years	Every 2 years (on request from 75)	120µg/g
Northern Ireland	Age 60-74 years	Every 2 years	120µg/g
Scotland	Age 50-74 years	Every 2 years (on request from 75)	80µg/g
Wales	Age 50-74 years	Every 2 years	120µg/g

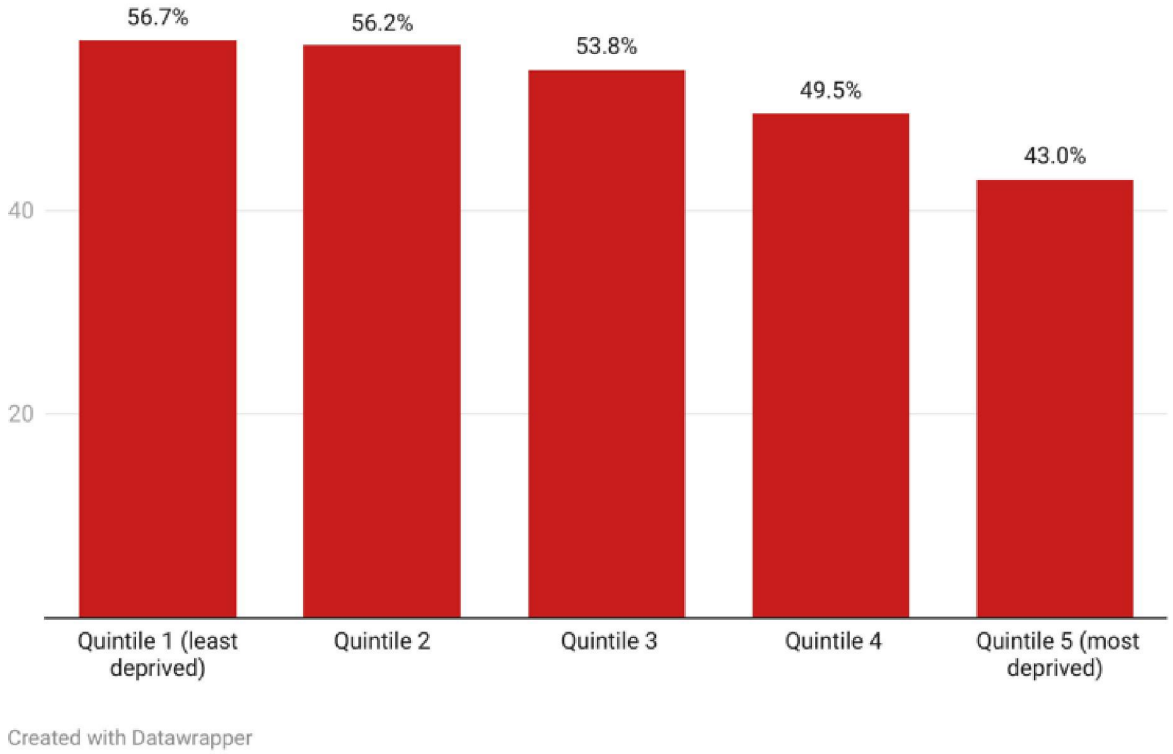
*March 2024. FIT: faecal immunochemical testing

33. Of the 4,604,510 people eligible to have bowel cancer screening in England in 2018-19, 2,741,463 participated in screening, an uptake of 59.5% (GOV.UK, 2020). Across the 64 screening centres, uptake of FIT tests ranged from 43.0% in West London to 66.4% in Dorset. Of the 7 screening centres with uptake rates below NHS England's acceptable threshold of ≥52%, six were in London and one in Birmingham and Sandwell.

34. Since the bowel cancer screening programme's inception, uptake has been lower in certain populations. A national study of 4,423,734 adults invited for bowel cancer screening uptake from 2010 to 2015 found that men (47%) had lower uptake than women (56%), and there was a socioeconomic gradient to uptake, with uptake lowest in the most deprived areas (Figure 6) (Hirst et al, 2018). A study in West London found statistically significantly lower screening 'compliance' in populations including Bangladeshi (29%), Pakistani (33%), Indian (41%), African (40%), Arab (44%), and Caribbean (49%) groups compared to the British (53%) group (Sekhon Inderjit Singh et al, 2021). A study of bowel cancer screening uptake in Scotland also found lower uptake in some ethnic minority and religious groups (Campbell

et al, 2020). Cancer symptom awareness is typically lower in all ethnic groups and targeted interventions in general for the NHS but also specifically during future pandemics would be useful to reduce disparities (Fazil, 2018). There is a wealth of data and published evidence around participation in screening, inequalities, and late diagnosis of cancer, the full remit of which is beyond the scope of this study.

Figure 6: Bowel cancer screening uptake by deprivation quintile, England (2010 to 2015)



Data source: Hirst et al, 2018

Faecal immunochemical testing (FIT) thresholds

35. Most screening tests produce a continuous result measure (e.g. concentration of blood detected by FIT). This means that a threshold must be set for what is considered a normal (good) versus an abnormal (bad) test result. When evaluating a test, important test characteristics are sensitivity (the proportion of people who have an abnormal test result among all those who actually have the disease), specificity (the proportion of people who

have a normal test result among all those who actually do not have that disease), and positive predictive value (the probability that following an abnormal test result, that individual will truly have that specific disease). In the real world there are no perfect tests. Instead, there is always a trade-off between these test characteristics.

36. Some colorectal cancer patients will have no or little blood detected by FIT. Conversely, some patients with blood detected by FIT do not have colorectal cancer. Therefore, FIT is not a perfect test and it is necessary to select a threshold for defining an abnormal versus normal result. Overall, the higher the concentration of blood detected by FIT, the more likely the patient is to have a colorectal cancer. Setting a lower threshold set for defining an abnormal test result will lead to (1) more patients with colorectal cancer having an abnormal result (higher sensitivity, meaning fewer missed cancers), and (2) a lower proportion of patients who have an abnormal result who actually have cancer. The follow-up test after an abnormal FIT test result is an endoscopy; this is uncomfortable for can result in rare but serious complications like bleeding or perforation (perforation, the most serious consequence, should happen in less than 1% of procedures) (Kim et al, 2019) (Rabeneck et al, 2008).

37. There isn't necessarily a 'correct' threshold for FIT testing in bowel screening programmes, instead there is a difficult trade-off between missing cancers versus causing harm to patients through false positive test results. This is reflected in different FIT thresholds being in use across the four nations (Table 3). Finally, the FIT threshold for triaging patients with symptoms can be very different to the threshold used in screening. This is because the prevalence of colorectal cancer is higher in patients with lower gastrointestinal symptoms than in the asymptomatic population eligible for screening.

38. Scotland has a lower FIT threshold in its bowel cancer screening programme than the other three nations (Table 2). If the other three nations were to reduce their FIT thresholds to the same level as Scotland the consequence would be that there would be a larger number of both patients would have abnormal test results. A practical consideration is whether there would be sufficient capacity for subsequent endoscopy for the additional patients being told they had abnormal test results. It is likely that it would be difficult for the NHS in England, Northern Ireland, and Wales to accommodate a significantly increased need for endoscopy, although the polyp and cancer detection rate may increase. However, that is reliant on quality of the endoscopy service, as accredited screening endoscopists tend to have better results than non-accredited endoscopists, so an overall increase in number of endoscopy tests alone is not a marker of better quality care.

39. The provision of endoscopy is a complex system. It requires an accredited expert (endoscopist); nursing, administrative, and other support staff; a specially equipped room (endoscopy suite); expensive specialist equipment (endoscope) that must undergo a sterilisation process after each use, which is sometimes performed off-site. Increasing the number of trained endoscopists will not necessarily lead to a significant increase in

endoscopy volume unless the other system constraints are also addressed. Nurse endoscopists are well established within many hospitals, but doctor endoscopists will always be needed for complex endoscopies (e.g. polypectomy). Any expansion in the numbers of nurse endoscopists must be balanced against the need to ensure that there are sufficient training opportunities for the next generation of doctor endoscopists who already find it difficult to get the training they need to become accredited endoscopists (Patel et al, 2019). Initiatives that add whole system capacity, such as weekend endoscopy lists and community diagnostic centres, are most likely to lead to an increase in endoscopy volumes.

Treatment pathways

40. The multidisciplinary team (MDT) is critical to the management of colorectal cancer. The MDT comprises many highly specialised health professionals, including:

    a. Colorectal surgeons: many of whom are sub-specialised in specific specialised areas (e.g. rectal cancer). They see often the first hospital specialist to see suspected cancer patients, break bad news, perform operations, perform endoscopy, and arrange longer-term follow-up.

    b. Medical oncologists: specialise in chemotherapy and immunotherapy.

    c. Clinical oncologists: specialise in radiotherapy.

    d. Colorectal Nurse Specialists: give information and support to patients with cancer, stomas, and other colorectal problems

    e. Radiologists: interpret x-rays and scans, including Computed Tomography (CT), Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET). They can also perform liver and lung biopsies under imaging guidance.

    f. Pathologists: analyse and provide information on both pre-operative biopsies and postoperative cancer specimens (the section of removed cancerous bowel) to determine how advanced cancers are.

    g. Gastroenterologists: perform endoscopies and remove polyps

    h. Dieticians: support patients to be as nutritionally fit as possible.

    i. Physiotherapists and occupational therapists: help patients to prepare for, and recover from, surgery.

    j. MDT co-ordinators: monitor the patient journey and coordinate the MDT, often including patient liaison.

k. Palliative care nurse specialists: support patients towards the end of life.

l. Research nurses: support patients to participate in research studies, potentially to access trial treatments.

41. The treatment combinations for patients with colorectal cancer are extremely complex and require highly specialised care with input from the whole multidisciplinary team. Shared decision making between the MDT and patient is essential. Detailed guidance on the management of colorectal cancer is available (NICE, 2020 & Cunningham et al, 2017). But this must always be interpreted in the context of an individual patients' fitness, the location of the cancer, the stage of disease, and the patient's own preferences. As a result treatment is highly individualised and it is only possible to provide a high-level summary here:

a. **Planned surgery**: Surgery to remove the whole cancer is the best chance of long-term cure for most people. Around two-thirds of operations are performed by a keyhole (or laparoscopic) method to remove the affected segment of bowel. For most patients it is possible to join the two ends of the remaining bowel back together. The most serious complication of this procedure is a breakdown in the join (anastomotic leak) resulting in sepsis. For some patients a stoma may also be used as a temporary measure whilst they recover or undergo other treatment. A stoma is when the end of the bowel that is connected to the small bowel is brought out to the skin and covered with a bag to collect stool. Temporary stomas can be 'reversed' in a follow-up procedure with the two ends of the bowel joined together again. However, for some very high-risk patients or other patients for whom it is not possible to create a join, a permanent stoma may be needed. Finally, for some very small cancers in the rectum, surgery can be performed through the anus, leading to a fast recovery and minimal effect on bowel function.

b. **Emergency surgery**: around one fifth of bowel cancer patients present as an emergency. Common reasons for emergency presentation can include the cancer causing a blockage (bowel obstruction), the cancer causing a tear in the bowel wall resulting in contamination inside the abdomen and sepsis (perforation), and bleeding (Baer et al, 2017). Patients presenting as an emergency may require emergency surgery within hours or days of admission. Compared to GP referral, emergency presentation is associated with lower likelihood of surgery to remove the cancer being (49% versus 59%) and emergency surgery compared to elective surgery is associated with higher risk of 90-day mortality (11% versus 3%) and higher likelihood of a stoma. In some cases, and when local expertise is available, a tube (called a stent) can be passed through the centre of the tumour to relieve obstructions, using endoscopies.

c. **Radiotherapy**: Radiotherapy is used in specialist centres to treat rectal cancers prior to surgery with the aim of shrinking the cancer to increase likelihood of removing all of it at surgery. In some cases, the cancer can shrink and totally disappear, and these

patients can be monitored closely (ideally within a clinical trial as there is still incomplete understanding of this treatment) and some will avoid the need for major surgery. There are different radiotherapy techniques and different dose schedules, which are refined over time according to clinical trial results. The anatomy of the colon means that there is typically no role for radiotherapy for cancers in the colon.

d. **Chemotherapy**: Chemotherapy can be given in the veins or as tablets. It is sometimes combined with radiotherapy. It also aims to shrink cancers down and may be given before surgery if the cancer is bulky or has spread to other organs. For some patients, chemotherapy after surgery is recommended if the histopathology suggests that some cancer cells may have been left behind after surgery.

42. The goals of treatment can either be curative or palliative.

a. **Curative treatment**: To achieve a cure, most patients require surgical removal of their entire cancer. The section of bowel removed must have a clear margin of normal tissue around the cancer, as leaving even few cancerous cells behind will risk the cancer recurring. Even when the cancer has spread to the liver or lungs it may still be possible to remove this surgically and achieve a cure. However, the more advanced a cancer is, the more challenging it is to completely remove the cancer. In addition to surgery the patient may need chemotherapy or radiotherapy.

b. **Palliative treatment**: For some patients it is not feasible to aim to achieve a cure. This may be because the cancer is too advanced, having grown around important blood vessels or other structures that cannot be removed or resulted in widespread growths (metastases), with the result that surgery cannot remove all the cancer. It may also be because the patient is either too frail to undergo cancer treatment or decides that they do not want to try curative treatment. Palliative treatment does not aim to cure the cancer and instead aims to slow the progression of the cancer and improve the patient's symptoms. Palliative care can include surgical procedures such as a stoma to relieve bowel obstruction (without attempting to remove the cancer itself), radiological insertion of a stent (tube) to relieve bowel obstruction, chemotherapy or radiotherapy to slow the growth of the tumour, and end-of-life care. There are some patients with metastatic disease that is terminal who survive for some months or years, partly due to extensive treatments.

c. There are other patients with palliative disease ranging from days to months depending on the circumstances.

43. How advanced the cancer is will affect MDT recommendations regarding the treatment pathway. In general, early cancers can be removed through small operations or procedures using endoscopy; middle stage cancers can be removed through keyhole operations; and advanced cancers can be treated with chemotherapy and/or radiotherapy followed by surgery. Factors that the MDT will consider will include:

- **Resectability**: Surgery is beneficial if there is a good chance that the cancer can be removed. If it can't, chemotherapy and radiotherapy first might shrink the cancer, although in up to 60% of patients, shrinkage does not occur. Even if the tumour does not shrink, in some cases, the radiotherapy can kill cells at the edge of the tumour, making surgical treatment more likely to remove all parts of the cancer.

- **Presence of metastatic cancer**: A metastasis is a cancerous growth as a result of the spread of the cancer to another organ. Colorectal cancer commonly metastasises to the liver and lung. In general, a small number (1-3) of liver or lung metastases can be removed surgically, depending on their location and whether complete removal is feasible. Multiple metastases or those that cannot be removed (e.g. involving big blood vessels) cannot be treated with surgery.

- **Patient fitness**: The patient needs to be fit enough to undergo major surgery and/or chemotherapy and radiotherapy. Fitness (e.g. cardiovascular, respiratory, survival likelihood) is assessed through a MDT approach and may involve multiple professions (surgeon, anaesthetist, oncologist, cancer specialist nurse, and others). If the patient is not fit, or they decline, then 'best supportive care' is put into place, which aims to support the patient to navigate their symptoms without trying to achieve a cure.

- **Clinical trials:** There are many trials open across a range of different types of colorectal cancer. Clinical trials may offer access to surgical or oncological treatments that are not currently routinely available as they are still under investigation. However, not all trials will be offered at all cancer centres.

- **Genetic markers:** Rapid improvement in genetic testing over the last ten years means that some patients are now offered new types of drugs, called immunotherapies, depending on the genetic profile of their cancer.

44. The impact on prognosis if treatment is delayed is likely to depend on the duration of the delay. The more advanced a cancer is at the point of treatment the worse the patient's likely prognosis (NHS England Digital, 2022a). However, most cancers are slow-growing and take around 10-15 years to develop, so a short delay is unlikely to be associated with significant progression. In the UK, it is accepted practice for scheduling of surgery to take 4-8 weeks. Research during the pandemic found that short delays to surgery following diagnosis did not worsen short-term prognosis and may therefore be justified to support planning of surgical services. However, there are some cases (e.g. young patients with large cancers) where delays may be better avoided (COVIDSurg Collaborative, 2022). Furthermore, the effects of the delays on long-term outcomes are uncertain and very hard to research, so both caution and a patient-tailored approach are needed.

Follow-up

45. Follow-up after colorectal cancer treatment is based on NICE guidance and, like treatment, is complex. It involves tailored decision making based on the patient's stage and prognosis. The aim is to identify treatable recurrence at the earliest point possible, to maximise the chance it can be treated. In general, NICE recommends (NICE, 2012):

    - CT scans of the chest, abdomen, and pelvis in the first three years.
    - A colonoscopy in the first year, if not performed before surgery.
    - Blood tests for a colorectal tumour marker (called a CEA blood test).

46. A key randomised controlled trial completed across 39 hospitals in England concluded that it was uncertain whether there might be a very small survival benefit to more intensive follow-up regimes following colorectal cancer treatment or whether this increased follow-up may in fact lead to unnecessary treatment and harm (Mant et al, 2017). Harms can include over-treatment (e.g. further surgery with no survival benefit), complications from investigations (e.g. liver biopsies), and a significant stress for the patient and family, including the inability to travel due to insurance. However, the most intensive follow-up regimes incurred very substantial additional costs, so it is unlikely that they would be cost-effective.

Performance standards

47. There are separate (though similar) performance standards across England, Northern Ireland (Department of Health, 2021), Scotland, and Wales (Table 4) (Welsh Government, 2024). The NHS currently has ten performance standards for cancer, including the Faster Diagnosis Standard introduced in April 2021.

48. Following rigorous consultation and engagement (following the 2015 Long Term Plan), NHS England consolidated its cancer waiting times targets into three key standards (outlined in Table 4 alongside those for the DAs, based on current standards and not necessarily those used in 2019/2020) (NHS England, 2023). GPs will still refer people with suspected cancer in the same way, but the focus for England is on getting people diagnosed, or cancer ruled out, within 28 days, rather than simply getting a first appointment. This also supports newer ways of testing where patients with suspected cancer do not necessarily need an appointment first, such as straight to test pathways and remote consultations.

49. There are specific Quality Indicators related to colorectal cancer treatment that are highly technical. These do not relate to referral or screening programmes, which have separate

indicators. In summary, the National Bowel Cancer Audit of England and Wales sets out 22 indicators (NBOCA, 2024), Scotland sets out 13 (NHS Scotland, 2017), and Northern Ireland sets out 22 (Northern Ireland Cancer Network, 2018).

Table 4: Current referral performance standards across the four nations

Metric	Nation	Performance target
Referral to diagnosis: time from referral for urgent cancer checks to diagnosis or having cancer ruled out	England	28 days (75%)
Referral to treatment: time from referral for urgent cancer checks to beginning definitive treatment for a confirmed cancer	England	62 days (85%)
	Scotland	62 days (95%)
	Northern Ireland	62 days (95% target)
	Wales	62 days (75% target)
Diagnosis to treatment: time from diagnosis and decision to treat to beginning definitive treatment	England	31 days (96%)
	Scotland	31 days (95%)
	Northern Ireland	31 days (98% target)

Impact of the pandemic on colorectal cancer care

50. There was an overall substantial reduction in the number of patients diagnosed with bowel cancer during the first wave of the Covid-19 pandemic (March to September 2020). The number of patients diagnosed with bowel cancer returned to normal around October 2020 and an excess in diagnoses in 2021 most likely accounts for the numerical 2020 deficit (see

Table 5). Subsequent annual data for 2022-2023 is not yet available, but will show the effects of background variation, age-standardisation, and any subsequent deficits. The following paragraphs provide further detail about these matters.

Research context

51. The UK mounted a significant research response, largely due to the existing infrastructure laid down by Higher Education Institutes, the NIHR, and other UK research organisations. There was a cross-discipline approach relevant to colorectal cancer, including primary care, diagnosis, surgery, and oncology research. There are too many examples to cover here. Specific to colorectal cancer surgery, the COVIDSurg suite of projects delivered patient level, real-time evidence that was published and supported the following strategies (led by the authors of this report). These were disseminated in rapid publications and global webinars (reaching 50,000 surgeons worldwide). The research response was possible due to the NIHR infrastructure, which led to the rapid set-up of prospective cohort studies designed to answer key questions of importance to the UK taxpayer. These were rapidly pushed across dissemination pathways (including webinars attended by thousands of surgeons) and into surgical and anaesthetic guidance. The key research projects and answers were:

- Was it safe to have unselected surgery in a hospital environment with mixed Covid-19 patients? No, unselected surgery needed to be stopped immediately, as demonstrated by the very high mortality in the COVIDSurg-1 study (Lancet, 2020).
- What was the optimal delay in time-critical surgery for a patient with Covid-19? Where possible, avoid surgery for 7 weeks, which reduces the risk of postoperative chest infections and deaths.
- What was the optimal SARS-CoV-2 testing regime for a patient being admitted for surgery? Preoperative nasopharyngeal swab before major surgery; no benefit before minor surgery.
- What is a safe delay before planned colorectal cancer surgery? Short delays of 4-8 weeks were likely to be safe and not lead to cancer progression, allowing flexibility in scheduling.
- Where was the safest place to have cancer surgery? COVID-19 free surgical pathways were the safest place for elective cancer surgery, contributing to the set-up of 'cold' Hubs.

Policy context

52. This section is mostly related to endoscopy and surgery, as the primary diagnostic and curative modality for colorectal cancer. There are other policy areas relevant to primary care, oncology, and allied specialties (e.g. physiotherapy for rehab) that are beyond the scope of this study. On March 17th 2020, NHS Trusts were instructed to pause all non-urgent elective operations. The main reason was to redeploy staff to increase capacity for emergency admissions.

    a. The surgical prioritisation process was started by publication of a Clinical guidance for the management of cancer patients during the coronavirus pandemic (published by NHS England on March 17th 2020: publication approval reference 001559).

    b. Surgical prioritisation commenced and was led by the Federation of Surgical Specialty Associations (FSSA). The request for the guidance from NHS-E was received by the FSSA on 28th March 2020 and was published on 9th April 2020. It was written by specialists in the procedures listed and was updated regularly. It set out what clinicians view as the relative priorities of conditions at the time it is posted. (FSSA, 2022).

    c. Cancer surgery was prioritised and subsequent guidance provided: A clinical guide for the management of essential cancer surgery for adults during the coronavirus pandemic (7 April 2020 Version 1, publication approval reference 001559)

    d. Endoscopy services were prioritised, through Clinical guide for the management of patients requiring endoscopy during the coronavirus pandemic, (02 April 2020 Version 1, Publications approval reference: 001559). Shortly afterwards, the British Society of Gastroenterology (BSG) issued guidance at the end of March advising hospitals to suspend all non-emergency activity (Hospital Times, 2020). This was due to safety concerns for staff over aerosol generating procedures (even if later proved to not be scientifically correct) combined with the need to re-deploy the workforce. Public Health England mandated at least three air changes between patient procedures within endoscopy procedure rooms, and this, plus additional cleaning, extra time changing in and out of enhanced PPE and social distancing greatly affected the number of patients able to be treated. On average (accepting a huge range of variation), a colonoscopy takes 45 minutes, cleaning of an endoscopy room 15 minutes, and a change of air 5-7 minutes. There is technical guidance to provide precise standards, which is beyond the scope of this report.

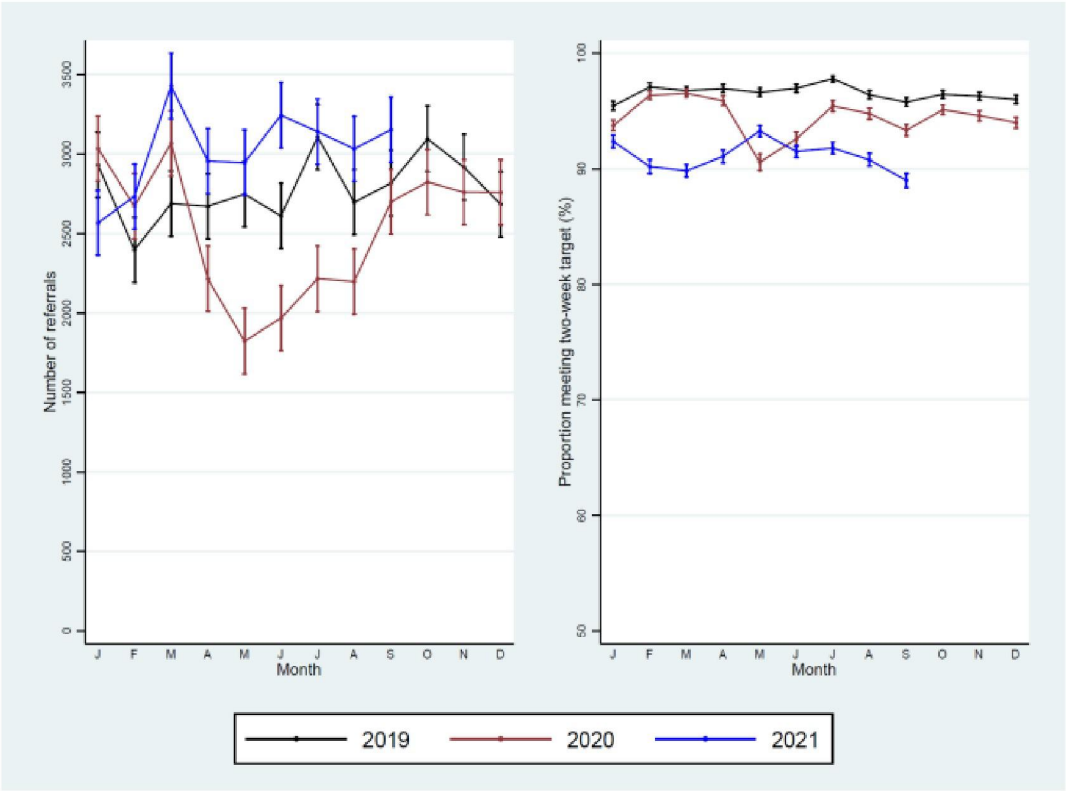
Diagnosis, including referral programmes and screening programmes

53. In the first phase of the pandemic, there was a sharp fall in referrals for suspected colorectal cancer and subsequent diagnostic tests (Morris et al 2021). This was due to a combination of factors: patients' increased anxiety about leaving home, patients' anxiety about overwhelming the NHS (e.g. the 'stay at home and protect the NHS' messaging) (Nicholson et al, 2022) , difficulties in making primary care appointments (multifactorial – working from home, reduced physical access to GP practices, demand on telephone lines), and safety concerns over colonoscopy as at the time this was thought to potentially be high-risk aerosol generating procedure (ACPGBI, 2020). However, recovery to baseline figures was complete by the end of 2020. As compared to the monthly average in 2019, in April 2020, there was a 63% (95% CI 53–71) reduction (from 36,274 to 13,440) in the monthly number of 2-week referrals for suspected cancer (figure 7A) and a 92% (95% CI 89–95) reduction in the number of colonoscopies (from 46,441 to 3,484) (figure 8). Numbers had just recovered by October 2020 (Morris et al, 2021); the potential deficit is covered in Table 5. Subsequent annual data for 2022-2023 is not yet available, but will show the effects of background variation, age-standardisation, and any subsequent deficits.

Figure 7: Monthly number of 31-day to treatment pathway referrals and the proportion of referrals meeting that target in England

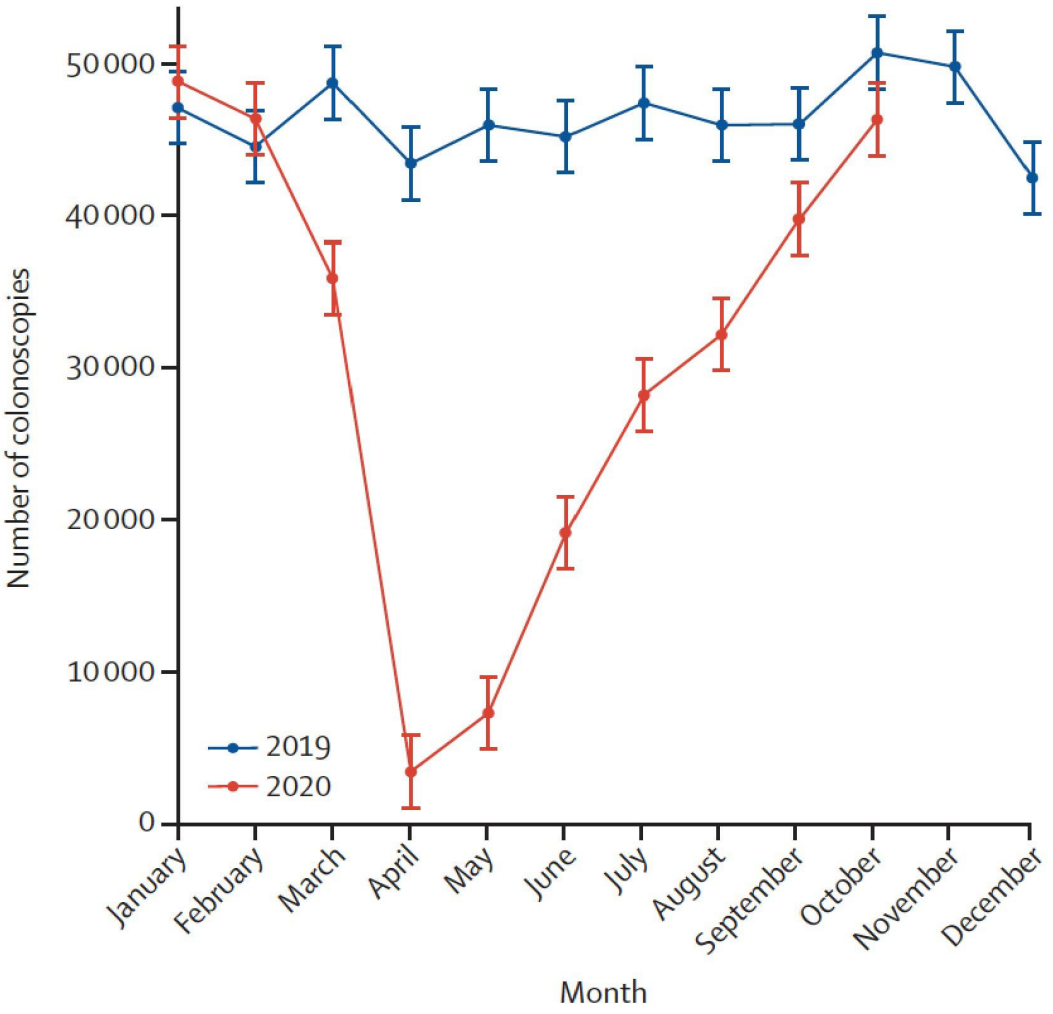
Figure 3: Monthly number of 31-day to treatment pathway referrals and the proportion of referrals meeting that target in England

Error bars represent +/– 1 SD of the (pre-COVID-19) monthly counts for 2019.



Source: Morris et al. (2021) . Error bars represent +/- 1 SD of the (pre-COVID-19) monthly counts for 2019.

Figure 8: Monthly number of colonoscopies undertaken in England from January 2019 to October 2020



Source: Morris et al. (2021) . Error bars represent +/- 1 SD of the (pre-COVID-19) monthly counts for 2019.

Performance against referral targets

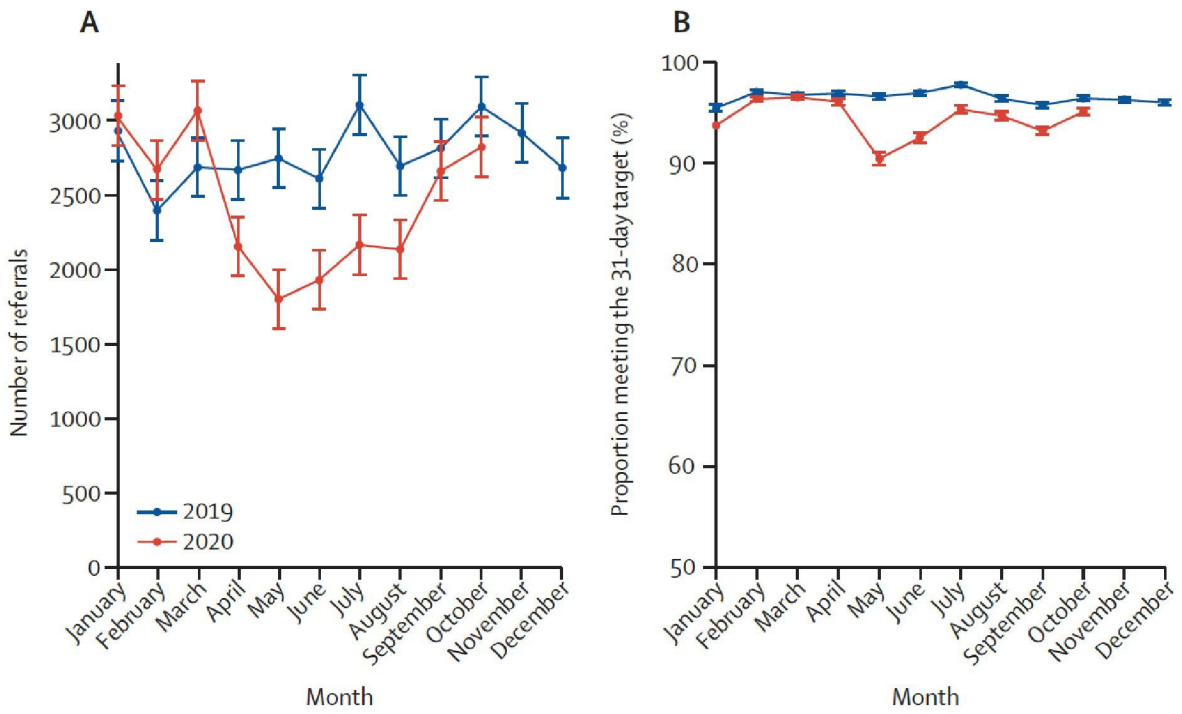
54. The following section provides detailed information for each of the Four Nations on referral standards. Where possible, colorectal cancer specific data is given. As a preamble, it should be noted that targets have limitations (e.g. they do not relate to quality) and unpicking why targets are met and are not met (e.g. a multitude of patient, community, disease, governmental, and pandemic factors) can be challenging. Overall, there has been a decline in performance against targets, especially to the 62 day target. The reasons are

multifactorial – patient fitness, provider capacity, waiting times for treatment, to name a few. These declines do not seem to have been affected by the Covid-19 phases.

England

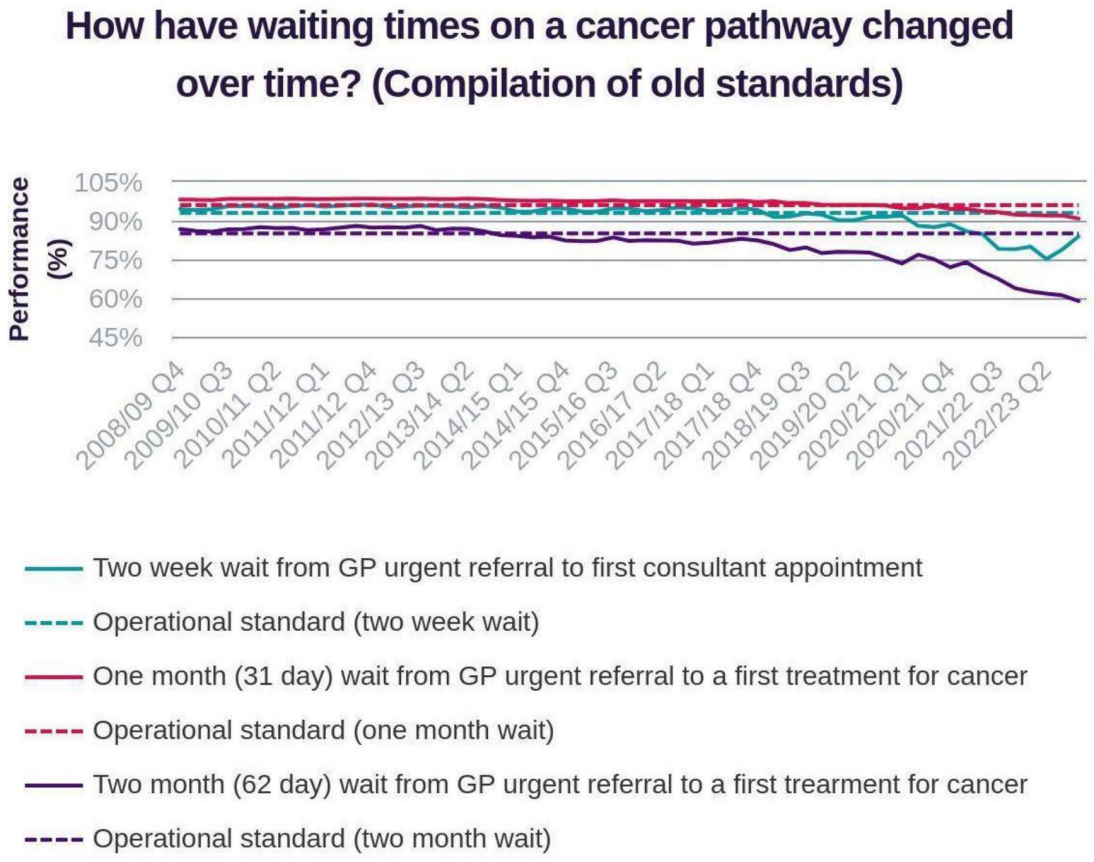
55. Data are given for the year 2020/2021, covering a wide pandemic period. For colorectal cancer, 95.3% of patients were treated within 31 days of a decision to treat (96% target). In 2019/2020, 86.9% of patients met the then two-week wait target (target 93%). The 62-day target (85%) was met by 50.6% of colorectal cancer patients. The same target was met by 66.7% of colorectal cancer patients in 2019/2020 (Nuffield Trust, 2024). In 2019, 96% of patients in England referred on the suspected colorectal cancer pathway met the 31-day target. Performance fell slightly after May 2020, but recovered to 95% by October 2020 (Figure 9). It is notable that declines in target compliance started from Q42017 (Figure 10).

Figure 9: Monthly number of 31-day to treatment pathway referrals (A) and the proportion of referrals meeting that target (B) in England from January 2019 to October 2020.



Source: Morris et al 2021. Error bars represent +/- 1 standard deviation of the pre-pandemic monthly counts for 2019

Figure 10: Waiting time compliance for cancer waiting times in England.

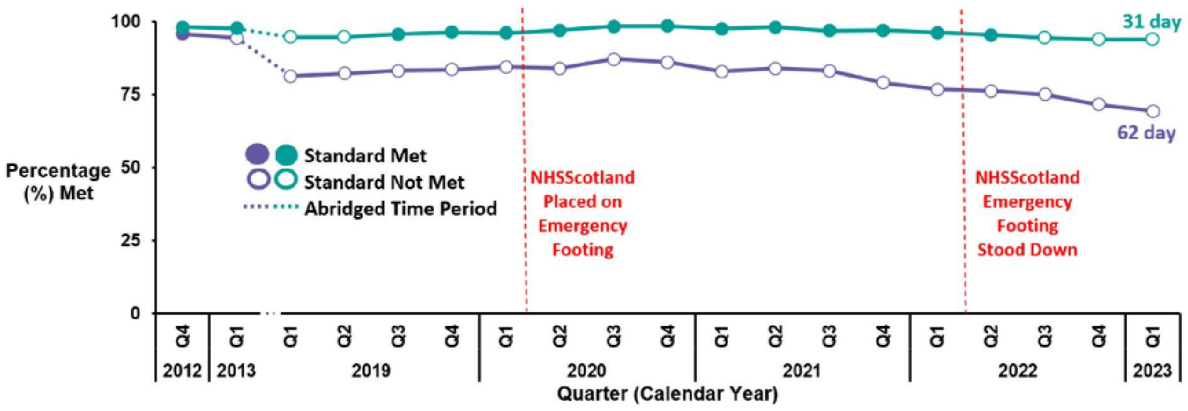


Source; Nuffield Trust (2024)

Scotland

56. The 62-day standard was not met by any NHS Board, although this was not directly affected by the Covid-19 pandemic. The 31-day standard was met by 7 of the 15 NHS Boards: NHS Ayrshire & Arran, NHS Dumfries & Galloway, NHS Forth Valley, NHS Grampian, NHS Orkney, NHS Shetland and NHS Western Isles. The main figure is for all cancers as produced by Public Health Scotland, with colorectal specific data shown afterwards.

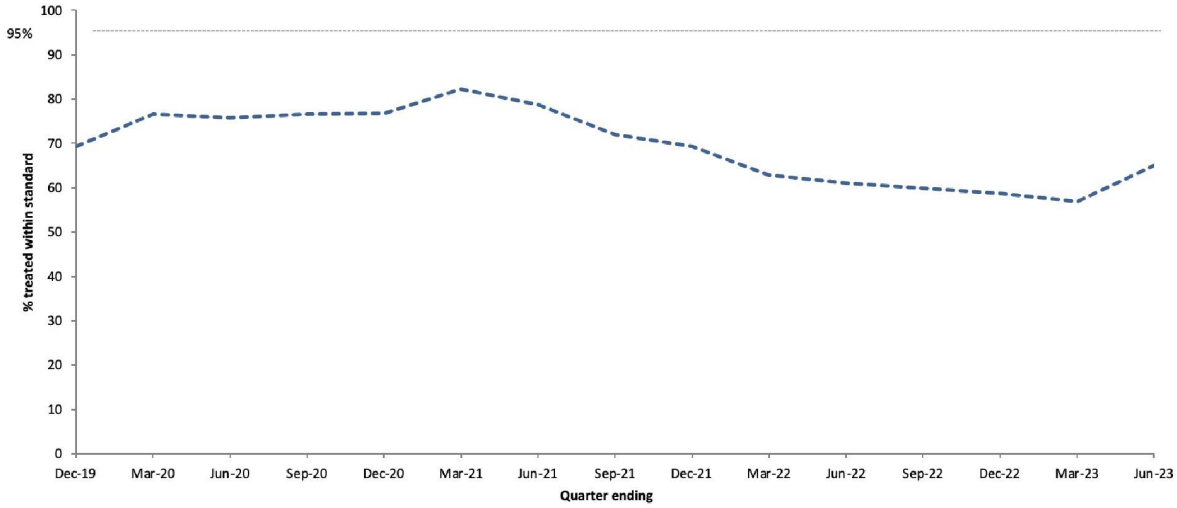
Figure 11: NHS Scotland performance against the 62 and 31 day standards



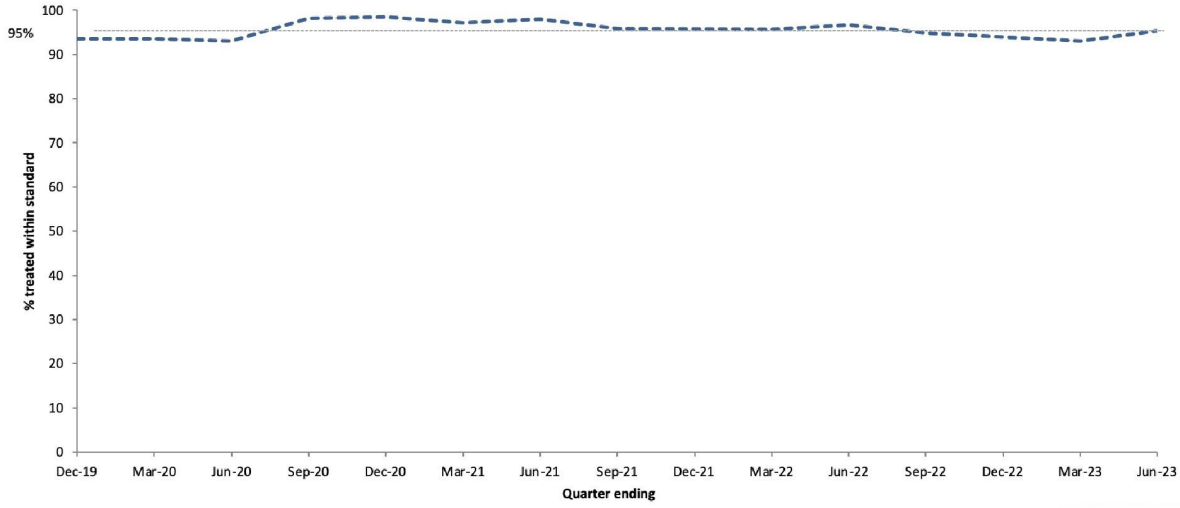
Source: Public Health Scotland, 2023

Figure 12: Scottish colorectal specific data to the 62-day and 31-day standards

62-day



31 day

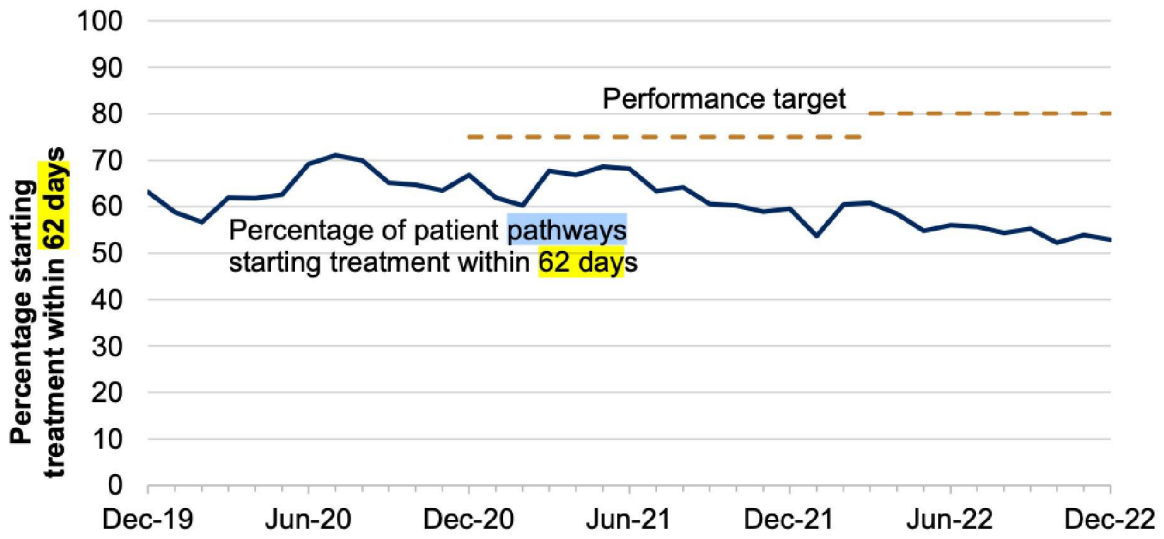


Source: Public Health Scotland, 2023a

Wales

57. Performance fluctuated, but there was a general downtrend. The figure is for all cancers as produced by the Welsh NHS, and colorectal specific data is not publicly available.

Figure 13: Percentage of pathways where the patient started their first definitive treatment within the target time



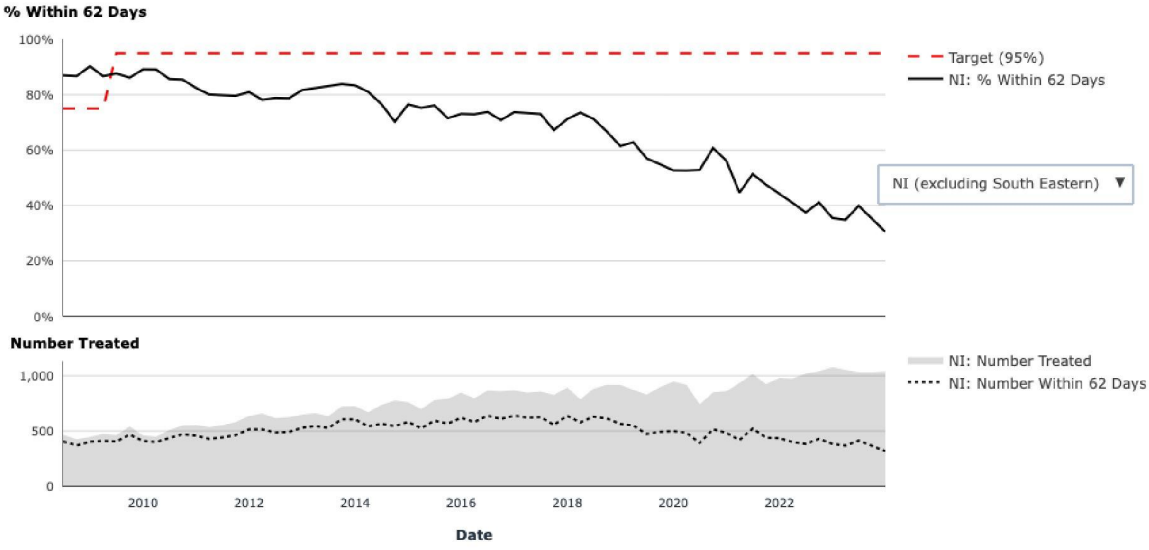
Source: Welsh Government, 2023

**new suspected cancer pathway data collection was introduced in December 2020.*

Northern Ireland

58. Similar to the other DAs, there was a downtrend in 62-day target compliance that pre-dated Covid, although the 31-day target performed well, albeit with a recent downtrend. The first set of data is for all cancers, with a subsequent colorectal cancer specific summary shown afterwards.

Figure 14: Overall 62 day target compliance in Northern Ireland



Note: In June 2009 the target was increased from 75% to 95%

Figure 2: Line charts illustrating the number of patients starting treatment following an urgent GP referral each quarter from June 2008 to December 2023 indicating the percentage and number within the 62 day target.

Source: Department of Health, 2024

Figure 15: Overall 31 day target compliance in Northern Ireland

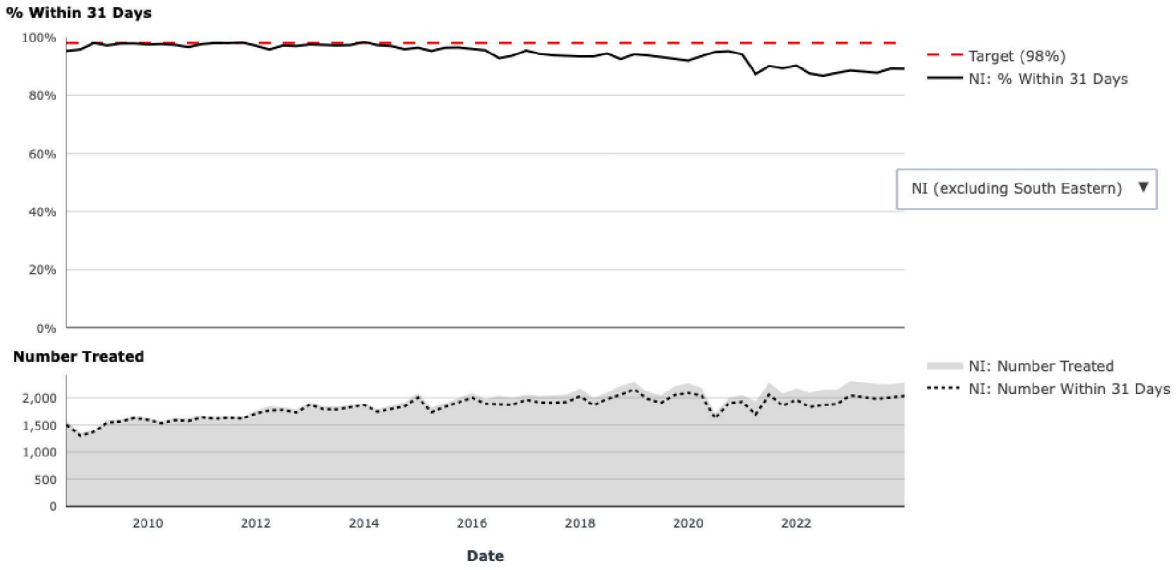
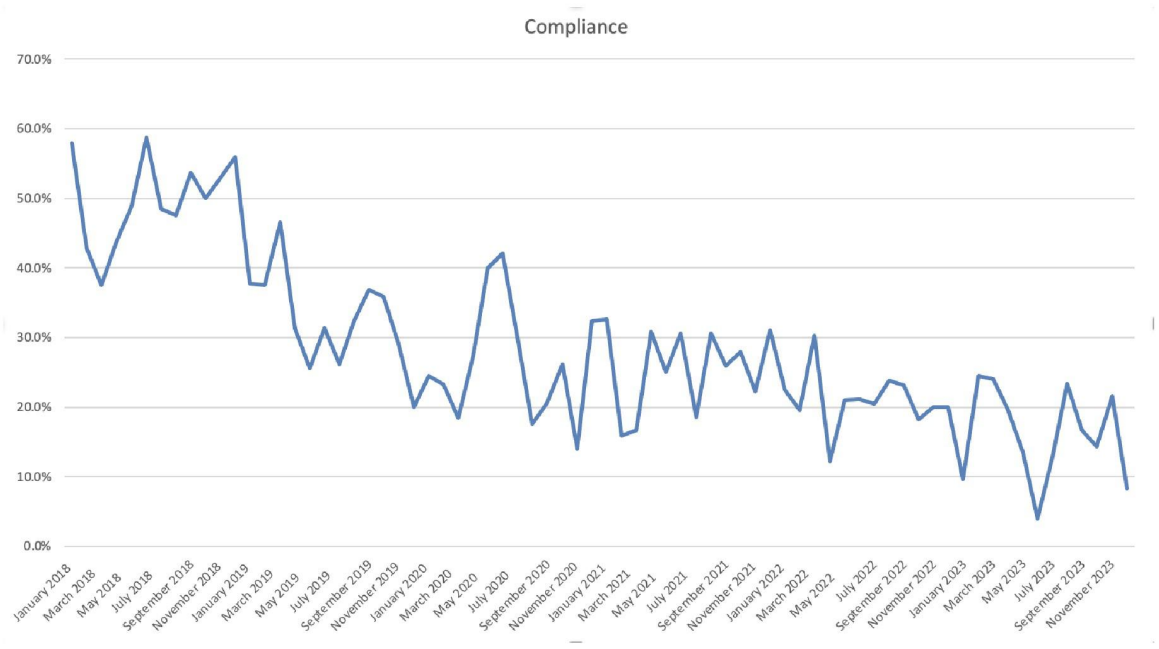


Figure 1: Line charts illustrating the number of patients starting treatment following a decision to treat each quarter from June 2008 to December 2023 indicating the percentage and number within the 31 day target.

Source: Department of Health, 2024

Figure 16: 62-day colorectal specific target compliance for Northern Ireland



Source: Department of Health, 2024

59. The most recently reported crude numbers of patients diagnosed with a colorectal cancer, to show the impact of the 2020-2021 Covid period, are shown below. There was a decrease across all UK geographies in 2020, with rapid recovery afterwards. Estimates can be made (1) from 2019, to identify a reduction in crude cases, and (2) to 2021, to show any subsequent excess of cases. Such models should be interpreted with caution: they are crude (i.e. not age standardised for population changes) and are subject to background year-on-year variation. Accepting these assumptions, there were 4,725 fewer patients diagnosed with colorectal cancer in 2020 than would be expected, and 4,332 more diagnoses in 2021 compared to 2019; the system appears to have caught up with delayed diagnoses.

Table 5: New diagnoses of colorectal cancer per year (C18-20)

	England	Scotland	Wales	Northern Ireland
2018	36,293	4,131	2,317	1,183
2019	37,843	4,099	2,531	1,239
2020	34,405	3,353	2,125	1,104
2021	41,596	4,279	Not available	1,385
Crude reduction from 2019 to 2020	3,438	746	406*	135
Crude excess from 2019 to 2021	3,753	180	253**	146

Sources: Scotland: Public Health Scotland, 2023b; England up to 2022: NHS England Digital, 2022c; England 2021:NHS England Digital, 2023, Northern Ireland: Northern Ireland Cancer Registry, 2023, Wales (geographical analysis): Public Health Wales, 2023

**based on a 10% reduction modelled from English data, as no open access data was found*

***based on a 10% increase modelled from English data, as no open access data was found*

60. Age standardised incidence rates also fell in 2020, compared to previous years.

Table 6: Age-standardised incidence rate of new colorectal cancer diagnoses

Geography	Year	European age-standardised rate	Lower 95% confidence interval	Upper 95% confidence interval
Wales	2018	71.8	68.9	74.8
England	2018	68.8	68.1	69.5
Scotland	2018	78.6	76.2	81
Northern Ireland	2018	72.3	68.2	76.4
Wales	2019	77.4	74.4	80.6
England	2019	70.5	69.8	71.2
Scotland	2019	76.8	74.4	79.2
Northern Ireland	2019	73.4	69.2	77.5
Wales	2020	64.4	61.6	67.2
England	2020	63.3	62.6	64
Scotland	2020	62.4	60.3	64.6
Northern Ireland	2020	64.7	60.8	68.6

Sources: (UK comparisons): Scotland: Public Health Scotland, 2023b; England up to 2022: NHS England Digital, 2022c; England 2021:NHS England Digital, 2023, Northern Ireland: Northern Ireland Cancer Registry, 2023, Wales (geographical analysis): Public Health Wales, 2023

61. The **reasons** for a fall in diagnostic numbers are again multifactorial: reduced presentation of patients to primary care (discussed elsewhere), disruption to colonoscopy services in part due to guidance by the British Society of Gastroenterology, other safety procedures put in place to limit the spread of COVID-19, and the secondary effects of a wider shutdown in

elective practices. likely related to the shutdown of elective services that led to the decrease in diagnosis. This reflects the lack of preparation of the wider NHS and society as a whole. It is unlikely that these changes were due to a sudden change in the biological incidence of cancer.

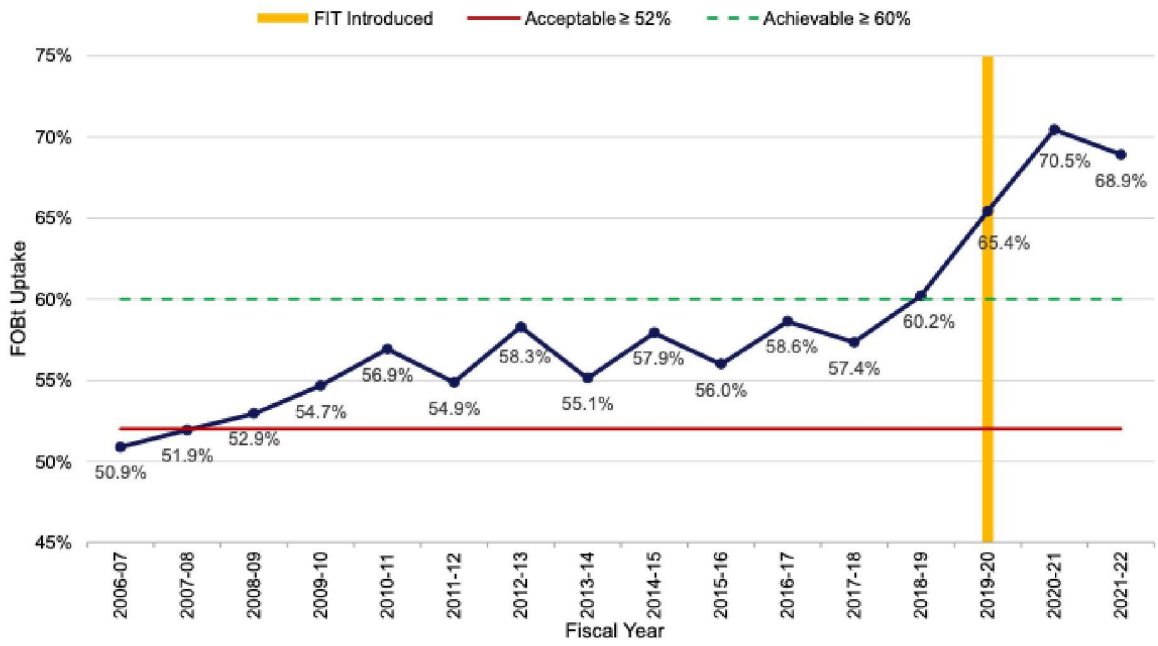
62. It is critical to consider the **counterfactual position**: without the lockdowns, it is possible that Covid-19 may have been far more widespread, hospitals further overwhelmed, and people may have been even less likely to come forth to GPs. The harms may have been even greater. Without cessation of elective care, unbridled elective surgery in Covid-19-infected environments was likely to have been extremely dangerous (24% post-operative mortality rate in un-selected patients) and led to many hundreds or thousands more deaths than would have been accepted.

Bowel cancer screening

63. At face value, uptake rate of screening of >60% was achieved during the pandemic, higher than any previous year. This surprisingly high rate may be a facet of pausing of the national programme affecting uptake rates to a highly selected population and a change in testing kits during 2019 and 2020. There are many facets to screening (including subsequent colonoscopy uptake, diagnostic yields, diagnostic completeness) that are beyond the scope of this report.

England

Figure 17: Uptake by year, England, screening year ending March 2007 to the year ending March 2022



Source: GOV.UK, 2024

Scotland

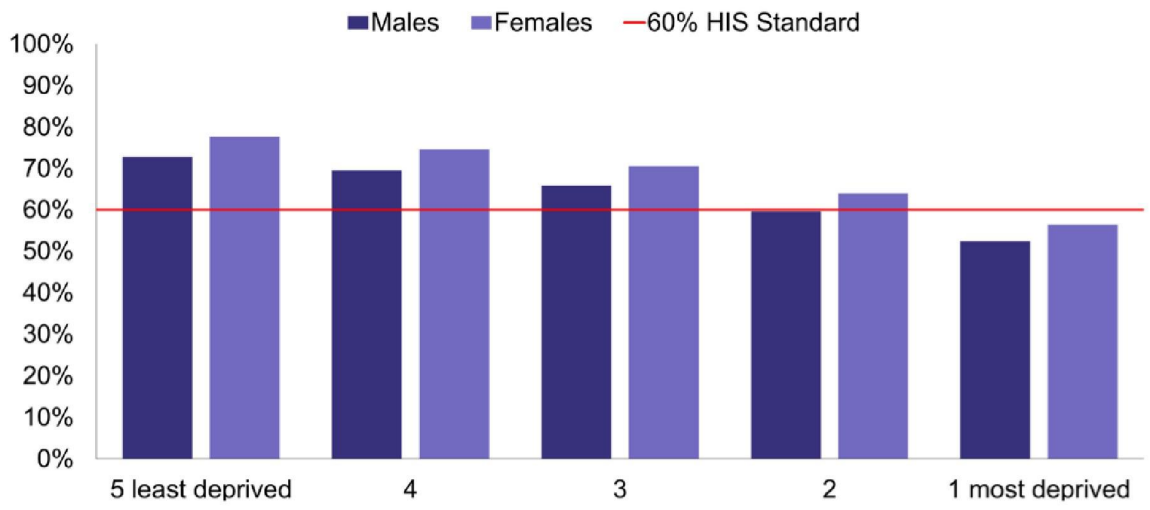
64. The screening programme was paused in March 2020 by the Scottish Government due to Covid-19 (Scottish Government, 2020). The overall uptake of screening in Scotland (out of those invited) did not fall by percentage during the pandemic, and has in fact trended upwards (Public Health Scotland, 2024). This was consistent by deprivation category and sex.

Table 7: Scottish bowel cancer screening uptake rates (from those invited, programme target 60%)

	2015/17	2016/18	2017/19	2018/20	2019/21	2020/22	2021/23
Males	53.1	54.9	59.3	61.5	63.1	64.6	63.6
Females	59.4	60.6	64.3	66.1	67.5	69.3	68.6
All persons	56.3	57.8	61.8	63.8	65.3	67.0	66.1

Source: Public Health Scotland, 2024

Figure 18: Scottish bowel cancer screening uptake by deprivation and sex



Source: Scottish Bowel Cancer Screening Database

Wales

65. The programme was paused on 23 March 2020 as part of the Public Health Wales and NHS Wales response to the coronavirus pandemic. The Bowel Screening Wales cancer

screening programme started to be re-instated with a phased approach from 01 July 2020 (Public Health Wales, 2020). Welsh uptake (from those invited) maintained standard during the COVID-19 pandemic period of 2020–21 but had declined slightly compared with the pre-pandemic period of 2019–20 (60·4% in 2019-20 *vs* 62·7% in 2020-21; p<0·001) (Bright et al, 2022).

Northern Ireland

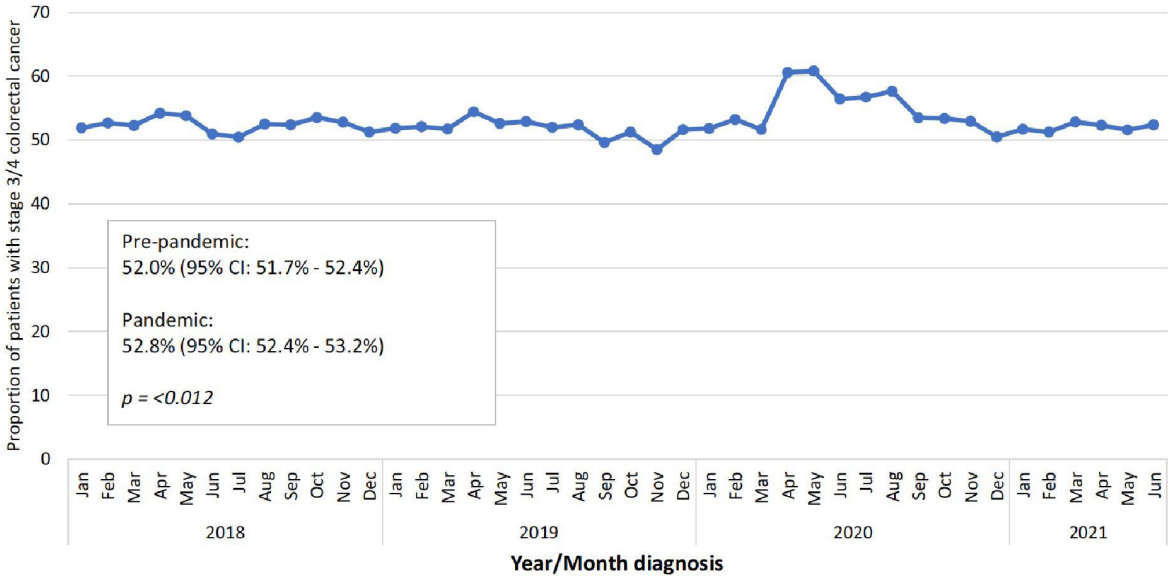
66. The bowel cancer screening programme was paused in March 2020 in response to the coronavirus pandemic. Screening colonoscopy services were reintroduced by Trusts from June 2020, for those who had a positive screening result and were on a waiting list for this investigation. Routine invitations for bowel cancer screening started again from week commencing 17 August 2020, beginning with those who were due to be sent a test in March 2020. The programme introduced the quantitative faecal immunochemical test (qFIT) as the screening test from January 2021 (Public Health Agency Cancer Screening Team, 2021). The last available annual report dates back to 2018 and we did not find any further publicly available data.

Staging

67. The 2022 National Bowel Cancer Audit report included care received by people with bowel cancer in England and Wales diagnosed between 01 April 2020 and 31 March 2021, and patients diagnosed between 01 April 2019 and 31 March 2020 who underwent a major resection after 31 March 2020 (NBOCA, 2023). It included patients from England and Wales. In this time period, the overall rate of surgery that was urgent or emergency was 20% (England and Wales). The Wales specific rate was slightly higher, at 26%. No specific information on this metric was found for Scotland or Northern Ireland. Comparatively, the NBOCA 2021 report (covering April 2019 to March 2020), the overall England/Wales rate was 21% (NBOCA, 2022). The Wales specific rate in that report was 100%, probably reflecting a coding error or discrepancy at source. There is no evidence to suggest a major shift to presentation via an emergency route, nor has that metric improved since before the pandemic.

68. During the initial pandemic period (April–June 2020) there was a small increase in the proportion of patients with advanced disease. This coincided with the period during which there were fewer diagnoses, and the proportion of patients diagnosed with Stage III and IV disease returned to baseline once diagnostic numbers returned to normal in December 2020. However, there are significant gaps in national data with up to 20% of data missing (Boyle et al, 2024).

Figure 19: Monthly proportion of patients diagnosed with Stage III or IV colorectal cancer at presentation between January 2019 and June 2021, England.



Pre-pandemic [Jan 2018 to Feb 2020] and pandemic [March 2020 to June 2021] proportions are reported with 95% confidence intervals alongside p-values for the difference (Boyle, 2024).

69. **Devolved Administrations**: For Wales only, the proportion of patients presenting elective with T2-4, M0 disease from Jan to Dec 2020 was 21.4% (411/1,921 entries to NBOCA) compared to 21.0% (469/2,234) from Jan to Dec 2019, again suggesting overall stability. In Scotland, the proportions of stage of cancers diagnosed remained largely similar from 2019-2023:

Table 8: Percentage of people with colorectal cancer by staging and two-year reporting period, Scotland

Dukes stage	**2016/18**	**2017/19**	**2018/20**	**2019/21**	**2020/22**	**2021/23**
A (stage 1)	40.3	39.1	36.9	36.5	37.3	38.1
B (stage 2)	23.8	23.2	25.2	27.1	25.2	22.8
C (stage 3)	26.8	26.8	26.1	25.6	27.3	28.6
D (stage 4)	6.0	7.4	7.3	5.7	5.5	5.3
Not known	2.4	3.6	4.5	5.1	4.7	5.2

Source: Public Health Scotland, 2024

70. Only aggregate data for 2017-2021 were found for Northern Ireland, presenting the average number per year for that time period (table 9).

Table 9: Percentage of people with colorectal cancer by stage, 2017-2021, Northern Ireland

Gender	Stage at diagnosis	Total number of cases	Average number of cases per year	Percentage of cancer cases
All persons	**All stages**	**6,081**	**1,216**	**100.0%**
	Stage I	984	197	16.2%
	Stage II	1,468	294	24.1%
	Stage III	1,641	328	27.0%
	Stage IV	1,330	266	21.9%
	Unknown	658	132	10.8%

Source: Northern Ireland Cancer Registry, 2023

Treatment

71. The changes in referral practices above led to changes in the numbers of patients in treatment, which was combined with some changes in practice. This resulted in a 22% (95% CI 8–34) relative reduction in the number of cases referred for treatment (from a monthly average of 2,781 in 2019 to 2,158 referrals in April, 2020). By October 2020, the monthly rate had returned to 2019 levels but did not exceed it, suggesting that, from April to October 2020, over 3,500 fewer people had been diagnosed and treated for colorectal cancer in England than would have been expected. Compared to the pre-pandemic phase, the expected number of major surgical resections fell in the first phase of the pandemic, matching the fall in diagnoses. There was a subsequent recovery, but it remained slightly lower than expected for the remainder of 2021. Data were only found for England and Wales (NBOCA, 2022).

April - June 2020

- 71% of the expected number of colorectal cancer operations took place in England, compared to 2019.

- 64% of the expected number of colorectal cancer operations took place in Wales, compared to 2019.

April 2020 - March 2021

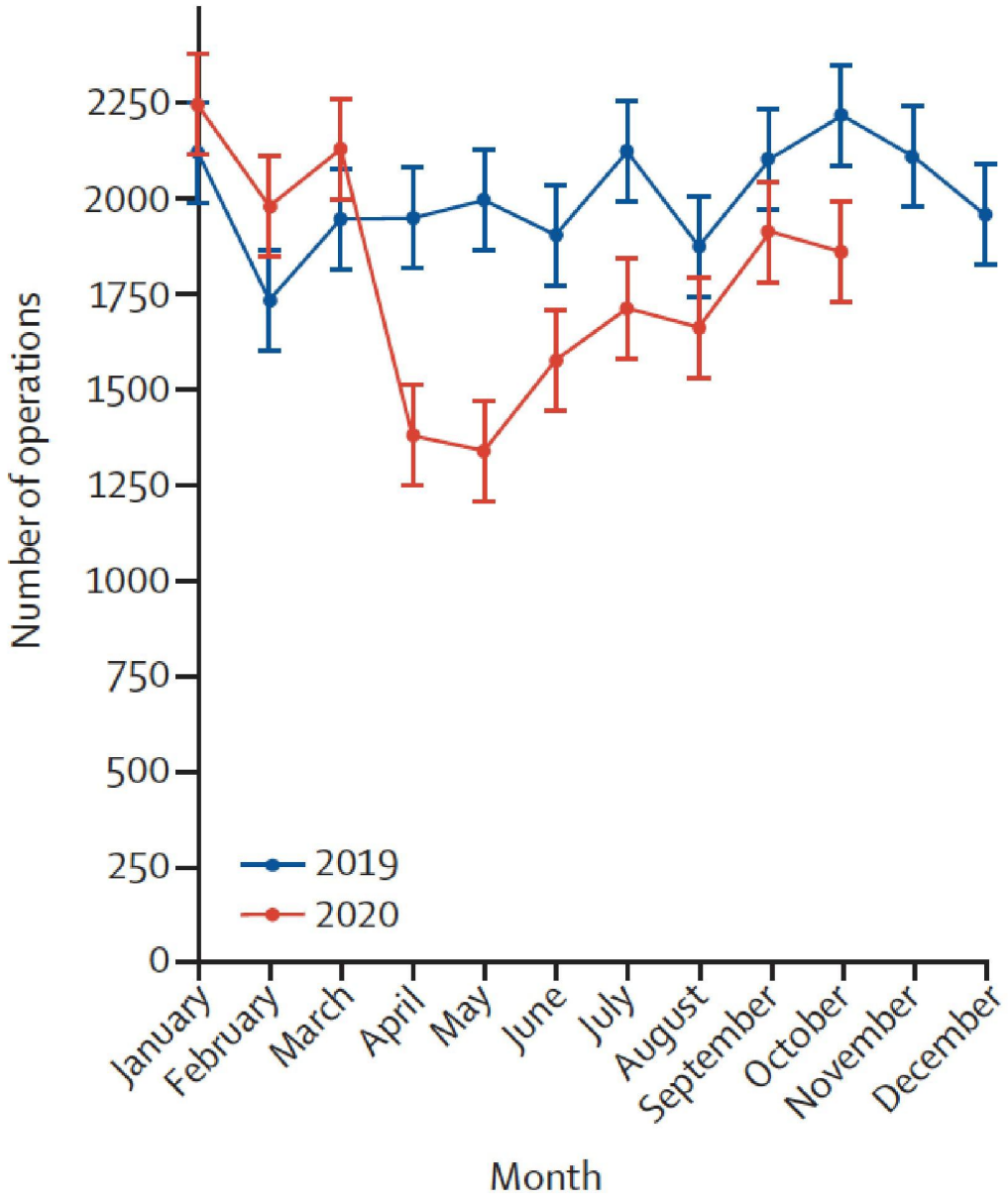
- 82% of the expected number of colorectal cancer operations took place in England, compared to 2019.

- 89% of the expected number of colorectal cancer operations took place in Wales, compared to 2019.

72. There was also a 31% (95% CI 19–42) relative reduction in the numbers receiving surgery in April 2020. This was associated with a lower proportion of procedures laparoscopically and a greater proportion of stoma-forming procedures, relative to the monthly average in 2019. If this reflected safety concerns at the time that laparoscopy might be a high-risk aerosol generating procedure, it is possible that patients were not offered a choice between open and laparoscopic surgery. The increase in stoma formation was due to the perceived need to prevent the risk of anastomotic leak (and the associated critical care resource needed for these patients) and a moderate change in case-mix, with patients in treatment having more advanced disease than typical. By October 2020, laparoscopic surgery and stoma rates were similar to 2019 levels.

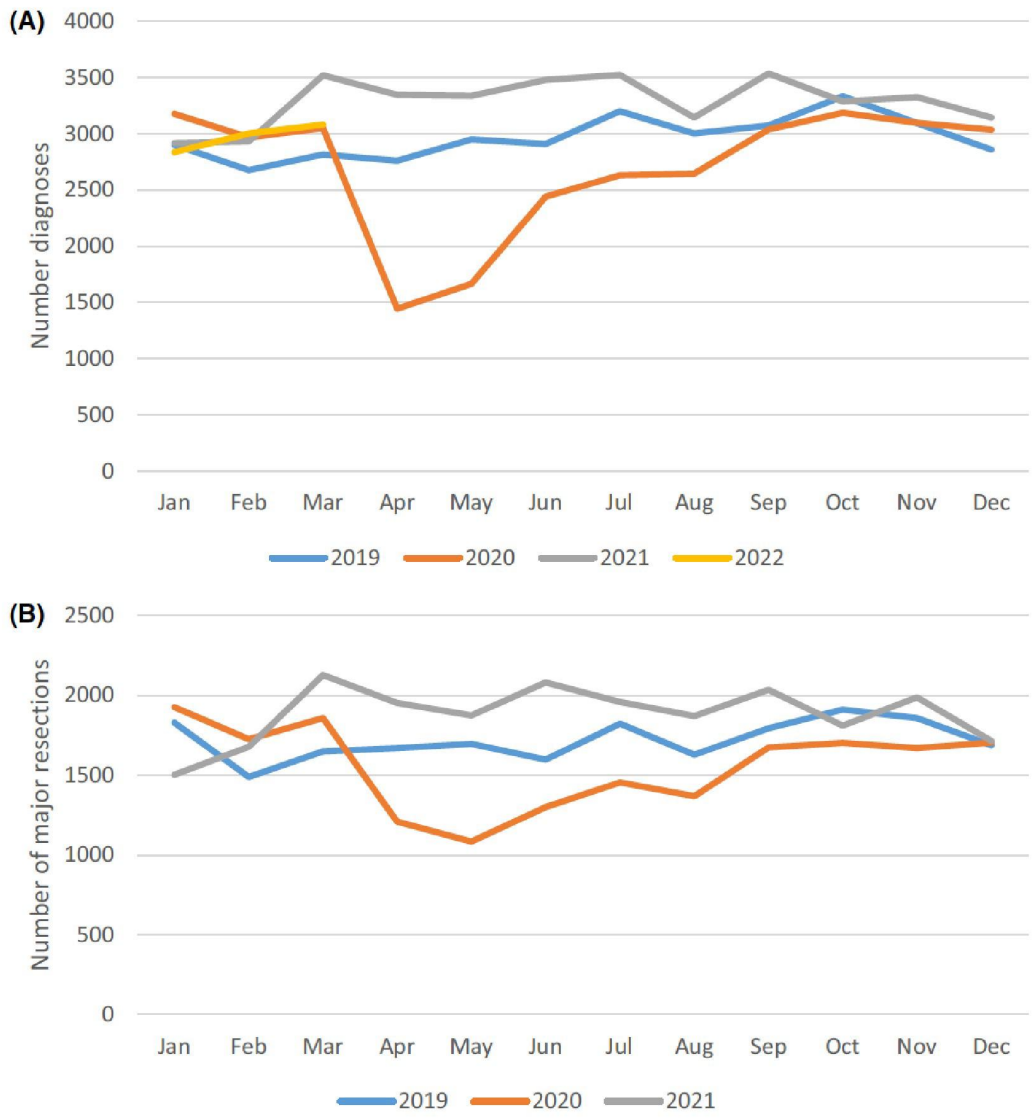
73. For rectal cancer, there was a 44% (95% CI 17–76) relative increase in the use of preoperative (neoadjuvant) radiotherapy in April 2020, relative to the monthly average in 2019, due to greater use of short-course regimens. This was due to (1) surgery avoidance (including 'bridging' delays prior to surgery) and (2) they require fewer trips to hospitals than long-course regimes, limiting exposure for cancer patients. The long-term survival impacts of this shift will become apparent in the coming 5 years. Although in June, 2020, there was a drop in the use of short-course regimens, rates remained above 2019 levels until October, 2020. We could not find any relevant data on neoadjuvant radiotherapy use for rectal cancer from Scotland and Northern Ireland, although we expect practice to be similar based on other treatment trends seen. Planned future research publications will shed light in this area (Lewis et al, 2021).

Figure 20: Monthly number of operations for colorectal cancer undertaken in England from January 2019 to October 2020



Source: Morris et al, 2021. Error bars represent +/- 1 standard deviation of the pre-pandemic monthly counts for 2019

Figure 21: Number of diagnoses and major resection rates in England from 2019 to 2022.



Source: Boyle et al, 2024.

Follow-up

74. There is quite wide variation in real-world follow-up for patients with colorectal cancer. It is heavily influenced by the patient's treatment (e.g. curative surgery or not), their adjuvant treatments, their age, their survival prospects, and their wishes. In general, most patients who have undergone curative surgery will undergo colonoscopy, CT scans, and CEA blood tests (a tumour marker for abdominal disease) in the first 5 years. After this, they are considered cured if no evidence of a recurrence is found.

75. Follow-up was frequently delayed, or missed, as a result of COVID. This affected patients who underwent treatment both before and during the pandemic. There is very little firm data to quantify this, so experience is taken from the author's personal observations. Some hospitals put into place cancer MDT follow-up audits once the pandemic ended, to identify patients who missed follow-up and were re-called. Departments continue to mitigating risk and identifying these patients, although the effects are unknown.

76. We know from a high-quality randomised trials that there is not much difference between intensive and less-intensive follow-up regimes. The FACS randomised controlled trial completed across 39 hospitals in England concluded that it was uncertain whether there might be a very small survival benefit to more intensive follow-up regimes following colorectal cancer treatment or whether this increased follow-up may in fact lead unnecessary treatment and harm (Mant et al, 2017). The impact of missed or delayed follow-up is likely to be less than the impact on patients who did not enter a diagnostic pathway in the first pandemic phase (Primrose et al, 2014). However some patients with a treatable recurrence may have been missed, contributing to future potential 5-year survival reductions.

Mortality and survival rates

77. The Office of National Statistics report "Excess deaths in England and Wales" was released on 9th March 2023, and states that from March to December 2022, there were 1,630 excess deaths from colorectal and anal cancer compared to what would be expected on a 5 year average (Office for National Statistics, 2023). They also state that there were 4,445 more deaths from the same cause at home, than would have been expected. Caution is needed; these data are not age standardised, during the pandemic discharges from hospitals were far faster than normal, admissions to hospitals were also far fewer, and death certification was a more challenging process. Putting this data together, by 2021, the health systems appeared to have caught up with the 'missed' diagnoses from 2020. These excess deaths may represent patients with disrupted treatment, those who also died from Covid-19, may have been diagnosed before the pandemic, may have been diagnosed after the first lockdown, and thus may be unrelated to the initial 2020 lockdown. Future research could

be commissioned to explore the excess deaths related to colorectal cancer and effects of the pandemic on cancer survival.

78. A delayed diagnosis to 2021 combined with a short increase in the proportion of patients presenting with advanced stage disease during the initial pandemic phase may lead to an eventual effect on 5-year survival. There may be other influences on survival too (e.g. worsening control of multimorbidity) that are harder to predict and account for.

79. Current 5-year net survival estimates spam from 2015 to 2019, and include patients followed up into 2020. Therefore, those patients potentially missed or delayed from the earlier stage of the pandemic will not achieve a median of 5 year survival for some years (it does not require the final patient to complete 5-year follow-up to achieve a median of 5 years for the whole group). If those patients begin to affect survival, then a downtrend may start to appear in 2- and 3-year survival, before dipping to 5-year survival, before improving again. As the relative number of patients involved is low, these changes may be subtle and small. As cancer registrations and survival are updated, research publications will likely be the best way to keep abreast of survival changes. Developing this data in the future will be highly complex and require expert statistical input.

How prepared were surgical services?

Surgical preparedness Index

80. Our team developed and validated the Surgical Preparedness Index (SPI) in 2022 to measure elective surgical system pandemic preparedness and support system strengthening. The SPI includes 23 globally applicable indicators across the domains of facilities and consumables, staffing, prioritisation, and systems (Table 10). Each SPI domain is scored on a 5-point scale from 1 (very weak) to 5 (very strong). The SPI has been validated and during the pandemic higher SPI score was associated with a better performance in terms of maintaining pre-pandemic surgical volume. SPI data were collected in June to August 2021 for 1,632 hospitals in 119 countries, including 170 UK hospitals (Glasbey et al, 2022).

Table 10: Components of the Surgical Preparedness Index
Facilities and consumables
• Availability of reserved planned surgery theatres (ring-fenced theatres).

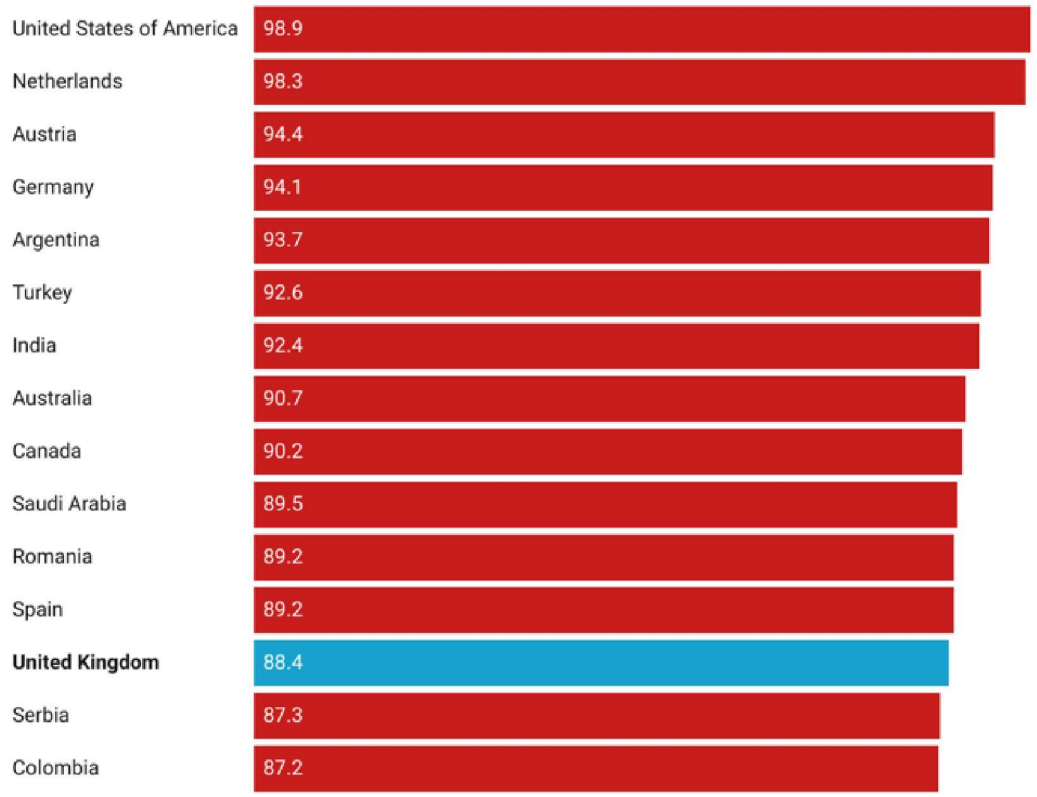
• Availability of reserved planned surgery beds (ring-fenced beds). • Availability of reserved critical care beds for planned surgery (ring-fenced critical care). • Flexibility to rearrange hospital areas to provide a segregated pathway for planned surgery (flexible areas). • Access to diagnostics and interventions to identify and treat surgical complications (managing complications). • Reliable supply of electricity (electricity supply). • Reliable supply of supplementary oxygen (oxygen supply). • Reliable supply and management of essential perioperative drugs (drug supply). • Reliable supply and management of devices and implants (device supply). • Sufficient surgical instrument and local sterilisation processes (sterilisation). • Availability of protective measures for theatre teams (protective equipment).
Staffing
• Ability to redistribute staff within and between hospitals to maintain capacity (staff redistribution). • Availability of reserved teams to provide planned surgical care (ring-fenced teams).
Prioritisation
• Cross-specialty patient prioritisation for surgery (patient prioritisation). • Ability to identify and cancel procedures of limited clinical value (procedure prioritisation).
Systems

- Formal operational plan to continue planned surgery during external system shocks (formal plan).
- Ability to do preoperative assessment in the community (preoperative assessment).
- Access to routine preoperative testing for endemic and epidemic diseases (preoperative testing).
- Ability to transfer patients to another hospital with greater capacity (hospital transfer).
- Ability to facilitate timely discharges (timely discharge).
- Social support system to facilitate safe discharge (social support).
- Capacity to use telephone or video calls for outpatient appointments (remote outpatient appointments).
- Capacity and capability to communicate with family members (family communication).

Adapted from: NIHR Global Health Unit on Global Surgery, 2022.

81. Overall, the mean SPI score was 88.5 in high-income (95% confidence interval 89.0-88.0) 81.8 in middle-income (82.5-81.1) and 66.8 in low-income countries (64.9-68.7). The average SPI score in the UK was 88.4, placing the UK 38th of 119 countries with data available. Amongst countries with data available for at least 10 hospitals, the UK ranked 13th of 39 countries (Figure 22).

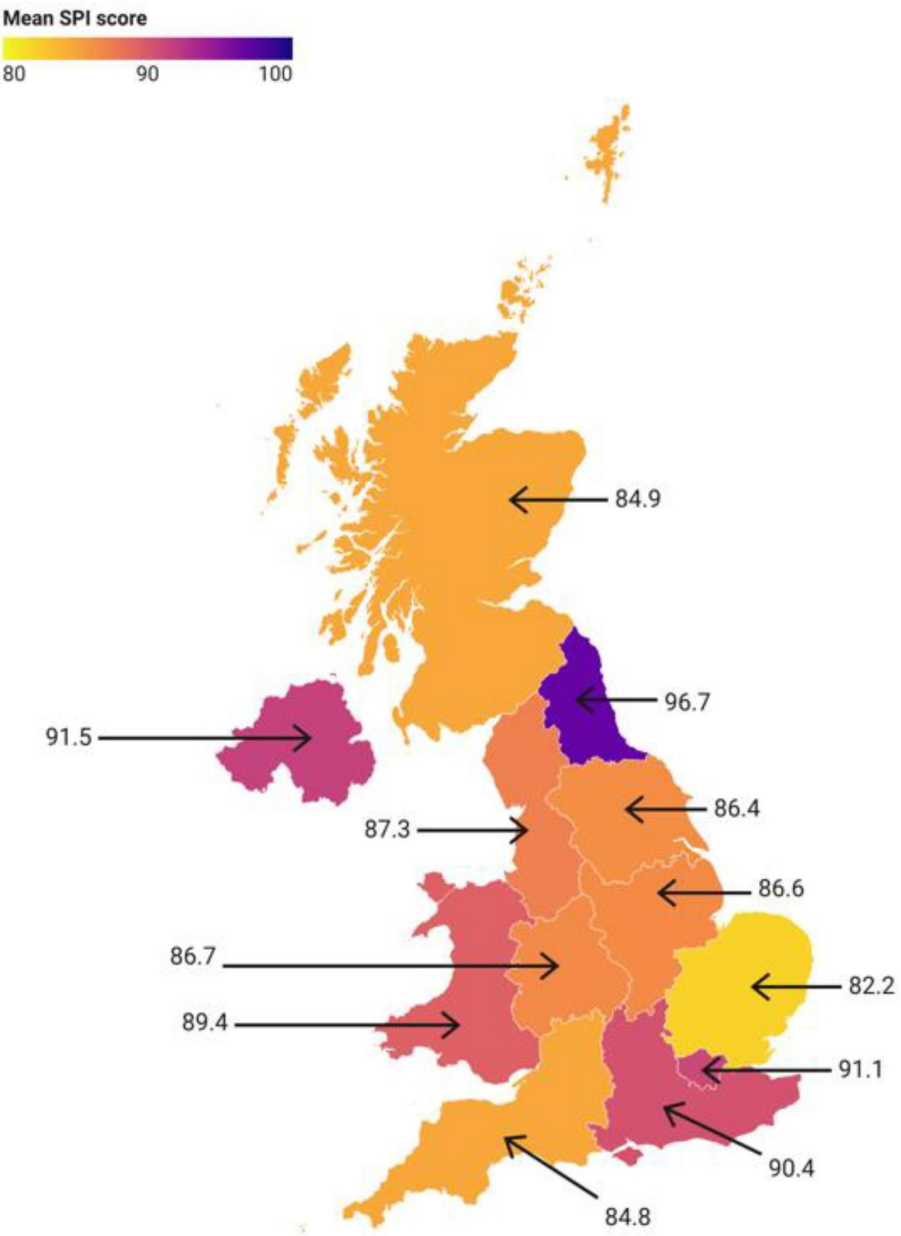
Figure 22: Mean SPI scores for countries with data for ≥10 hospitals (top 15 countries included)



Source: NIHR Global Health Unit on Global Surgery, 2022.

82. We have performed further analysis of previously collected SPI data to explore regional variation. Data from the 170 hospitals were pooled by English region and devolved administration. Specialist hospitals (e.g. children's hospitals, orthopaedic specialist hospitals) were split out as a separate group. Average SPI scores ranged from 96.7 in the North East to 82.2 in the East of England (Figure 23). Specialist hospitals had a mean SPI score of 95.2.

Figure 23: Mean SPI scores by region



Source: New analysis of NIHR Global Health Unit on Global Surgery, 2022

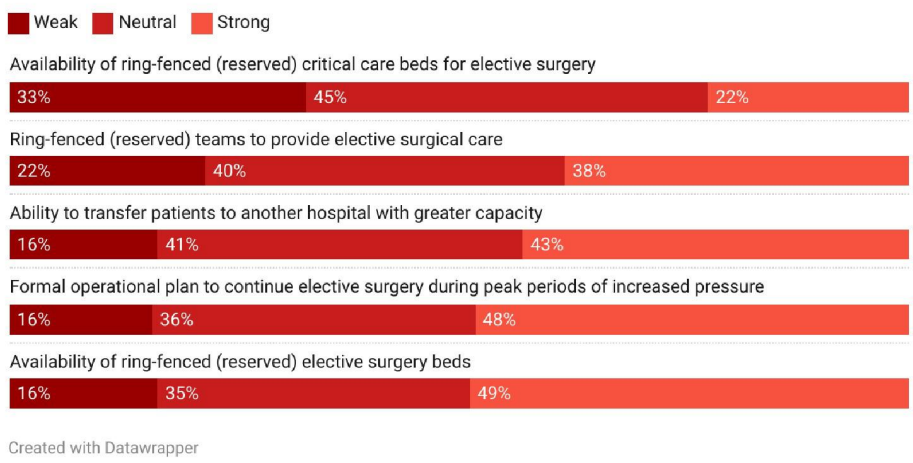
83. Across the SPI domains, average scores for the 170 UK hospitals ranged from 2.85 to 4.75 (Table 11). Of the 23 domains, rounded to the nearest integer, no domains were rated 1-2 (weak), eight domains were rated 3 (neutral), and 15 domains were rated 4-5 (strong). The five weakest domains were related to ring-fencing of critical care beds, ring-fencing of surgical teams, ability to transfer patients to another hospital, formal operational planning for periods of increased pressure, ring-fencing of elective surgery beds (Figure 24).

Table 11: UK score for the components of the Surgical Preparedness Index (max score 5)

SPI domain	UK mean score*
Availability of ring-fenced critical care beds for elective surgery	2.85
Ring-fenced teams to provide elective surgical care	3.17
Ability to transfer patients to another hospital with greater capacity	3.27
Formal operational plan to continue elective surgery during peak periods of increased pressure	3.32
Availability of ring-fenced elective surgery beds	3.35
Social support system to facilitate safe discharge	3.42
Availability of ring-fenced elective surgery theatres	3.48
Flexibility to re-arrange hospital areas to provide a segregated pathway for elective patients	3.48
Cross-specialty patient prioritisation for surgery	3.55
Ability to conduct preoperative testing in the community	3.56
Ability to redistribute staff to maintain capacity	3.62
Ability to facilitate timely discharges	3.66
Ability to identify and cancel procedures of limited clinical value	3.83
Capacity and capability to communicate with family members	4.01

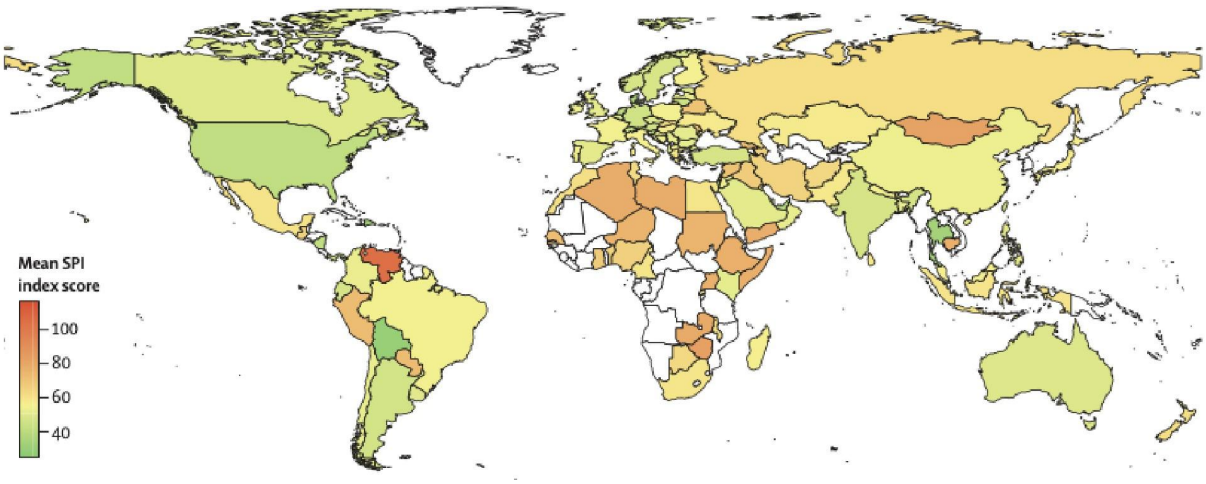
Access to diagnostics and interventions to identify and treat surgical complications	4.11
Capacity to use telephone or video calls for outpatient appointments	4.12
Access to routine preoperative testing for epidemic diseases	4.30
Availability of protective measures for theatre teams	4.35
Reliable supply and management of devices and implants	4.37
Sufficient surgical instrument and local sterilisation processes	4.51
Reliable supply and management of essential perioperative drugs	4.63
Reliable supply of supplementary oxygen	4.68
Reliable supply of electricity	4.75
Source: New analysis of NIHR Global Health Unit on Global Surgery, 2022. * Each SPI domain is scored on a 5-point scale from 1 (very weak) to 5 (very strong).	

Figure 24: Breakdown of the UK's five weakest SPI domains, as scored by 170 hospitals



Source: New analysis of NIHR Global Health Unit on Global Surgery, 2022.

Figure 25: Geographical distribution of Surgical Preparedness Index score



Source: NIHR Global Health Unit on Global Surgery, 2022.

Challenges and solutions

Reasons for the impacts seen

77. The reasons for fewer cancers being diagnosed during the early period of the pandemic are likely to be multi-factorial and cannot be definitively proven. Delays are likely to have occurred throughout the patient pathway as a result of factors summarised in Table 12.

Table 12: Factors that may have contributed to fewer cancer diagnoses and treatments
Problems with patients accessing primary care
• The clear government messaging to "protect the NHS" may have led to some patients choosing not to 'burden' their GP with their symptoms and so they did not attempt to access primary care. • In some areas, accessing GP appointments may have been harder – GP practices with reduced physical access, demand changes, working from home patterns.
Factors reducing urgent suspected cancer pathway referrals
• Social distancing measures led to many patients being offered telephone or online consultations with GPs. It is possible that important symptoms and signs may have been less likely to be picked up through remote consultations than they would have been in-person. • Some communications between hospitals and primary care were unclear (partly due to slow dissemination of guidance documents) and led to the impression amongst GPs that they should reduce or stop urgent suspected cancer pathway referrals.
Reduced diagnostic capacity
• Outpatient clinic capacity was reduced because of medical staff being redeployed to support the Covid-19 acute response. This was particularly the case for routine

outpatient pathways through which patients with more uncertain presentations are often referred.

- Staff absence due to Covid-19 sickness and the need to self-isolate further reduced staffing throughout diagnostic pathways.

- The need for social distancing restrictions increased the time taken for procedures, reducing the number of patients who could be seen in each endoscopy or radiology session.

- Concerns about the status of endoscopy as an aerosol generating procedure required additional precautions that further limited their volume.

Reduced inpatient capacity

- Severe patient bed pressures due to actual or anticipated Covid-19 admission surges meant that some planned cancer surgeries were cancelled at short notice due to not having a bed available.

- Intensive care bed shortages meant that it was not possible to provide safe surgery for patients with complex co-existing medical conditions who would normally be offered routine postoperative care in a high dependency unit.

- A lack of staff due to redeployment and sickness absence contributed to reduced operating theatre capacity. In some hospitals theatre anaesthetic rooms and/or recovery areas were used as makeshift intensive care units, meaning that they could not be used to facilitate surgical activity.

- There were additional pressures on radiotherapy and chemotherapy services, related to similar multiple factors – concerns around social distancing, cessation of elective care, staff sickness, patient concerns around attending healthcare facilities.

Alternative service models

78. A systematic review of strategies used to strengthen elective surgery during the SARS-CoV-2 pandemic authored by our team was published in February 2024 (NIHR Global Health Research Unit on Global Surgery et al 2024). The robust methodology identified a framework of six core models of provision of elective surgery. 52 out of the 53 included studies were from

high income countries, with most from the UK (22 of 53), reflecting the UK's positive attitude to responsive research and data transparency. The six key strategies are summarised in Table 13.

Table 13: Strategies to strengthen elective surgery systems

Standalone elective surgery Hub
• Ring-fenced hospital (hospital dedicated to planned surgery only) without acute admissions, which provides operating theatres, wards, +/− critical care beds. • Able to provide elective surgery to patients from a network of referring hospitals. • Staff can be recruited from the different referring hospitals with a predefined rota in place. • It should be able to transfer patients to different hospitals if emergency surgery is needed in the postoperative phase. • If cancer surgery is performed, a different MDT needs to be in place to prioritize patients and a pathology laboratory is also needed as part of the hub.
Integrated elective surgery Hub within a larger acute hospital
• Ring-fenced operating theatre (reserved planned surgery theatres) and ward beds (reserved planned surgery beds) within an acute hospital. • Ring-fenced staff (reserved teams to provide planned surgical care) that are not allocated to other tasks. • If patients with cancer have surgery, the hospital should already have its own MDT and pathology laboratory. • Internal regulation needed to maintain activity throughout the year.
Standalone day-case surgical unit

- Ambulatory surgical unit with allocated operating theatres and dedicated admission and recovery area.
- Staff allocated to this unit need to be free from other tasks.

Extension of surgical activity using extended hours

- Ring-fenced operating theatres that are used to perform surgery in extended hours, outside of usual use of theatres, such as evenings and weekends.
- Dedicated staff need to be allocated to these hours of work and contracts might need adjustment.
- To reduce the turnover time between patients, high intensity theatres might be used.

Public-private partnerships to expand capacity

- Ring-fenced operating theatre, wards, and ICU beds in a private hospital to provide elective surgery to patients from public sector.
- Staff available from private sector can provide staff capacity expansion.
- Planning includes selection of procedures tailored to capability of staff and facilities in private hospital.
- A contract between public and private hospital to define remit and responsibility is necessary.

Staff capacity expansion through expanded workforces

- Transferring surgical skills to junior doctors and/or non-surgeons and/or retired professionals to expand the workforce able to provide a surgical procedure, applied to surgical and anaesthesia teams.
- Requires planning types of surgical procedure where this can be adopted as well as a risk prediction score to adapt complexity of patients to level of operator.

Adapted from: NIHR Global Health Research Unit on Global Surgery in the British Journal of Surgery, 2024.

79. These strategies are best used flexibly, adapting the delivery of elective services as the need changes. However, without advanced planning, they are very hard to implement. In August 2022, the Royal College of Surgeons of England published the case for Surgical Hubs, reflecting the necessity of standalone elective surgical Hubs (Royal College of Surgeons of England, 2024). Although it was stated that 91 elective surgical Hubs exist with 57 new Hubs being planned, the precise nature of these and true nature of their standalone ability would benefit from on-going assessment (Holloway, 2023). NHS-England's Getting it Right First Time (GIRFT) team has a programme to support development and accreditation of elective Hubs, which should help to ensure that they are effectively delivered, safeguarding patient safety (Getting It Right First Time, 2023).

Innovations to safely restart elective colorectal cancer care

80. The cross-discipline community in the NHS responded well to data collection and research, allowing several evidence-based recommendations.

81. Covid free surgical pathways were the hallmark of best practice surgery during the Covid-19 pandemic were highly likely to have provided the safest surgical experience (Glasbey et al 2021).

82. Rapid implementation of testing into preoperative settings, especially when testing capacity may be limited (COVIDSurg Collaborative, 2021) (Glasbey et al, 2021).

83. Avoidance of unnecessary preoperative isolation (COVIDSurg Collaborative and GlobalSurg Collaborative (a), 2021) (Glasbey et al, 2021). Early in the pandemic some experts recommended that patients should self-isolate for up to 14 days before undergoing elective surgery to reduce the likelihood of coming in to hospital with SARS-CoV-2 infection. However, this could have unintended consequences; groups including the self-employed and manual and routine workers would find it more difficult to meet a requirement for preoperative self-isolation. A subsequent study found that provided that patients had a preoperative SARS-CoV-2 test, there was no additional benefit to preoperative isolation (COVIDSurg Collaborative and GlobalSurg Collaborative (a), 2021).

84. Planned delays for patients who tested Covid positive, which in the first phase were for at least 7 weeks, but in later phases (when disease severity reduced and vaccines became available), could be reduced (COVIDSurg Collaborative, 2020) (Glasbey et al, 2021).

85. Prioritisation of vaccination for pre-operative patients, as the benefits are likely to be high (COVIDSurg Collaborative and GlobalSurg Collaborative, 2021) (Glasbey et al, 2021).

86. For colorectal cancer care, there was increased use of radiotherapy and chemotherapy before surgery, either as a holding pattern during the first Covid wave or to avoid surgery altogether.

87. Short, planned delays before colorectal cancer surgery (4-8 weeks) did not affect tumour growth and aided planning.

88. The rate of reversal of temporary stomas (an upstream diversion after rectal cancer surgery) fell, probably reflecting reduced priority during Covid-19, which may have adversely affected some patient's quality of life.

89. Virtual solutions, including Zoom/Teams, for both patients (initial outpatient attendance) and MDT attendance were popular and are still in place. Face to face encounters for consent prior to admissions to surgery are likely to remain crucial.

90. Almost all independent sector hospitals in England were secured by the NHS during the pandemic, and were prioritised for time dependent cancer surgery (NHS publication reference 001559).

Prioritisation tools in use during the pandemic

91. Quantitative faecal immunochemical testing (FIT) is recommended by NICE to guide referral to colorectal services. In summary and at present, a FIT of 10 micrograms of haemoglobin per gram of faeces is taken as the threshold for a rapid referral. Patients with rectal masses do not need a FIT test. If the patient is FIT negative but the clinician has a high suspicion, a FIT negative urgent referral can be made, which leaves some room for flexibility but also potentially undermines stricter rationalisation.

92. FIT testing was introduced in regional pilots before the pandemic, accelerated during the pandemic, and has become mainstream as recommended by NICE after the pandemic. Like all tests, it is imperfect, with a false positive and false negative rate. In particular, the strain on colonoscopy services from low thresholds is probably unsustainable. NHS England is already considering changing threshold, in particular to match the lower thresholds used by Scotland.

93. There were no specific tools for prioritising endoscopy or surgery before the pandemic started that allowed for immediate action once the pandemic started. The NHS Clinical Prioritisation Programme facilitated such lists, as described below.

94. The British Society of Gastroenterology (BSG) rapidly issued clinical guidance around endoscopy, limiting immediate access to emergency endoscopy early, due to perceived aerosol risks to staff. Since these risks may emerge de novo with a new pandemic,

consideration should be given to widening access to alternatives (e.g. CT scans and CT-virtual colonoscopy), prioritised through FIT testing (see below). These prioritisation tools will be important during a future pandemic, and both the FSSA and the BSG should be ready to issue rapid guidance again. That guidance should take into account the evidence generated during COVID-19 related to aerosol generating procedures and related safety of colonoscopy to staff and other patients.

95. The Federation of Surgical Specialty Associations (FSSA) subsequently developed and launched prioritisation tools to plan emergency and elective surgery across all surgical specialities. These guidelines were used to maintain/shutdown services based on clinical priority, were updated regularly, and were useful for NHS Trusts. Some preceding urgent guidance from NHS-England was available, although dissemination of that information took time to reach the frontline due to lack of system wide preparation. In summary, these guidelines prioritised emergency surgery conditions (such as appendicitis, bleeding, fractures) as highest priority, cancer surgery as next highest priority, and non-cancer surgery as lower priority. The FSSA should be ready to reconvene and refresh the guidance as a new pandemic emerges.

Summary

- Colorectal cancer is the fourth most common cancer in the UK, with over 42,000 cases diagnosed in the UK in 2019. Pre-pandemic, around half of colorectal cancer patients were initially referred by their GP to an outpatient clinic for investigation of possible colorectal cancer symptoms, 10% of patients were asymptomatic and identified through the Bowel Cancer Screening Programme, and 20% were diagnosed following emergency hospital admission. These rates appear to have remained stable.

- Treatments are individualised and informed by a multidisciplinary team approach. They are dependent on both patient-related (fitness and personal preference) and disease-related factors (how advanced the cancer is, location of the cancer, cancer spread to other organs). Treatments can include surgery, chemotherapy, and radiotherapy. Although there is a limited evidence base on the impact of treatment delays on patient survival, short delays appear to be safe.

- Prognosis is related to disease stage, with colorectal cancer patients with stage 1 disease having over 90% 5-year survival, whereas patients with stage 4 disease only have 10% 5-year survival.

- The pandemic led to a fall in the crude number of patients being diagnosed and treated in early 2020. However, by the end of 2020 services had largely caught up to pre-pandemic levels and a slightly higher number of diagnoses in 2021 may account for the numerical

deficit. Subsequent annual data for 2022-2023 is not yet available, but will show the effects of background variation, age-standardisation, and any subsequent deficits.

- It is difficult to predict the impact of pandemic disruption on longer-term outcomes in colorectal cancer, but it is possible that there were a few thousand patients who were 'lost' during the early pandemic will be adversely impacted.

- The early response by colorectal services to the pandemic was limited by a lack of planning in advance of the pandemic. However, they rose to the challenge and many innovations were rolled out to restart colorectal cancer care, which continued throughout the rest of the pandemic.

Key messages

96. We recognise the dedication and professionalism of health service staff who continued to deliver cancer care despite many challenges and uncertainties, including fears around their personal safety relating to the possible risks of Covid-19 infection in the workplace.

97. Prior to Covid-19, it had been decades since a pandemic significantly disrupted health systems in the UK. The Department of Health prepared only limited plans for how the health system would respond to a pandemic. Whilst it was recognised that a pandemic might overwhelm health systems resulting in widespread impacts on elective care, no detailed operational plans were prepared for how such pressures could be managed. It is worth noting that there is no evidence to suggest that any elective system in the world was adequately prepared.

98. Projecting from the year before, in the order of 4,725 patients from the four nations were undiagnosed in 2020, but services seem to have caught up by the end of 2021, based on total diagnostic numbers.

99. Without lockdowns and cessation of elective activity in the first wave, missed cases could have been higher (overwhelmed health systems) and deaths higher (elective surgery in Covid-19-mixed hospitals).

100. The impact on 5-year survival is uncertain and will be shown in future national updates.

101. The early pandemic response was limited by national policy pausing elective care and lack of planning for resilient elective services. After this period, frontline and national leadership teams worked together to keep services open, successfully responding to a significant challenge.

102. The prioritisation work of the Federation of Surgical Speciality Associations aided rapid prioritisation of complex surgical disease and should be stood-ready as a mechanism for the

future. This should be updated at least every three years. This should be communicated through a single pathway from NHS England (and other relevant DA bodies), through the Royal Colleges, and to the speciality Associations, ensuring more collaborative pathways for prioritised frontline clinical care in the event of another pandemic.

103. The successful responses were also due to the UK's successful research portfolio, including the NIHR funded COVIDSurg studies and the development of FIT testing. Research capacity should be maintained, both proactively but also in response to new external crises.

104. Starting from just before the pandemic, performance against referral targets were beginning to slow, and have continued to do so. Strong public messaging and adequate resources are needed to reverse these trends.

105. The rate of emergency presentation has not worsened since the pandemic, nor has it improved. A significant research and clinical effort will be needed to be resourced to make positive changes.

Recommendations

Critical recommendation

106. During future pandemics, every effort should be made to maintain adherence to cancer performance standards.

Clinical practice recommendations

107. **An evidence based stratifier for diagnostic tests**: FIT test prioritisation of diagnostic tests. An expert team should be ready to make national recommendations for raising thresholds, with the NHS absorbing responsibility for these thresholds, as it will raise the false negative rate. This will allow high-yield diagnostics to continue. Research is needed to set agreed cut-offs for a range of scenarios.

108. Colorectal cancer services (including urgent referrals, screening, and treatment) **should be continued throughout future pandemics into dedicated units**, without a pause during first waves. If there are volume limitations, then referrals should be triaged to high-risk cases identified through an evidence based approach. Although the limits of this report are to colorectal cancer, this recommendation is likely to be influential to provision of other common cancers.

109. **Protected diagnostic and surgery hubs:** that can provide COVID-free pathways and are isolated from emergency care settings will help maintain cancer performance standards across a range of cancer types. These should be able to reduce demand on elective critical care facilities by providing enhanced post-operative monitoring beds. Hubs should have the planned ability to step-up pre-operative testing for the next pandemic strain, and staff in place to support patients around isolations and planned preoperative delays during early pandemic phases. This strategy would use existing regional infrastructures where present, whilst identifying regions in the UK which require further strengthening.

110. A toolkit around different models of elective care relevant to the UK should be made available to senior clinical leaders and hospital managers. This would provide flexibility to switch between the **six-framework** model for elective surgery, so a range of surgical services can continue if resources change unexpectedly, taking into account local resources and communication pathways.

111. If there are volume limitations on endoscopic investigation, CT scanning should be considered for some patients as a temporary first-line investigation, reserving endoscopy for confirmed abnormalities. This reflects the background pressure on endoscopy that exist now, as national capacity is inadequate to meet demand. Agreement with key stakeholders (radiology and gastroenterology) will be needed in advance.

112. Public messaging will be key to make clear that people should continue taking part in bowel cancer screening when invited and patients with symptoms should step-forward to GPs without delays, who remained open and will continue to do so. This should be developed immediately for public benefit and amplified during future pandemics. Examples include public messaging campaigns and targeting of minority groups, with research to evaluate development and outcomes.

113. Messaging across the surgical community, that includes all Royal Colleges of Surgeons and relevant clinical professional bodies, should be made consistent, non-competitive, and immediate in the case of a next pandemic.

System-level recommendations

114. **A national, NHS specific operational toolkit for surgical preparedness** during pandemics should be developed and disseminated across the four devolved Administrations. The national level of this toolkit should include a list of necessary national roles (e.g. FSSA, BSG) and provide clear instructions to harness the surgical specialities underneath this umbrella, which will provide speed and equity. Within this, a local level toolkit should allow Clinical Service Leads and Senior Managers of individual Trusts to strengthen their services now (e.g. establish and maintain elective Hubs). There is a serious risk that, as senior surgeons retire over the next 5-10 years, the experience and lessons learned from managing Covid-19 are

lost. Surgical preparedness should be mandated by NHS England to ensure planning, which need not be burdensome (e.g. annual simulated planning event) and would lead to stronger surgical services now and during a pandemic. Hospitals should use tools like SPI to perform annual self-assessment of their surgical preparedness to identify areas that can be improved, create resilience in local surgical systems, and upscale capacity to address elective surgery backlogs.

115. Mechanisms should exist to ramp-up **Public-Private partnerships** to provide additional capacity to support elective and diagnostic care away from acute sites. This support was vital during Covid-19 as it added Covid-free, non-acute surgical capacity across a range of conditions, primarily cancer in initial waves. These vary based on local set-ups and facilities available. This fits within the framework of six models for providing surgery, and is an evidence based strategy. Such partnerships should be agreed within Memorandums of Understanding agreed over the next few years, linked directly into existing NHS cancer MDTs (new ones cannot and should not be set-up), and quality assured through audit and research.

116. NHS data should be made more readily accessible to researchers. After the COVID pandemic, researchers are now faced with escalating costs to access data and laborious regulation. This limits the use of one of the world's best resources, but also limits any benefit to patients and means ongoing investment is not leading to benefits. Although confidentially and data governance considerations are crucial, there is a balance to having greater data access and wider benefits to society. This should be a priority to boost the UK's research capacity. The four devolved Administrations should consider commissioning a single colorectal cancer audit so that equivalent data is collected and readily available for all four nations, allowing easier comparison of practice and outcomes across the UK.

117. **The NIHR should fund specific research into preparedness for elective care, with a particular focus on diagnostics and safe surgery.** A research ready infrastructure is vital to rapidly deliver data around the safety of diagnosis and treatment to (1) help lift restrictions at the earliest and safest stage and (2) assess and publish the impacts of that pandemic on the impacts on patients. This should be capable of rapid publication and dissemination, as these can have a global impact beyond the NHS alone. UK Universities should be supported to deliver this in partnership with the NHS.

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