TE AHO O TE KAHU CANCER CONTROL AGENCY

New Zealand Government

BOWEL CANCER QUALITY PERFORMANCE INDICATORS

Updated descriptions

Released 2022

Citation: Te Aho o Te Kahu. 2022. *Bowel Cancer Quality Performance Indicators: Updated descriptions*. Wellington: Te Aho o Te Kahu.

Published in April 2022 by Te Aho o Te Kahu, the Cancer Control Agency
PO Box 5013, Wellington 6140, New Zealand

ISBN 978-1-99-110024-5 (online)
HP 8058

TE AHO O TE KAHU CANCER CONTROL AGENCY

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CONTENTS

VERSION RECORD

2022 Update

This document was updated to coincide with the release of the second Bowel Cancer Quality Performance Indicator (QPI) report which calculated the QPIs using data from 2017 to 2019.

The following QPIs have been updated:

- BCQPI 7 – Post-operative mortality
- BCQI 16 – Rectal cancer treatment (name change only)

The following QPI has been discontinued:

- BCQPI 21 – Stoma free survival

The following QPI has been added:

- BCQPI 21_a – Abdominoperineal resection

The following QPIs have been calculated and reported in the latest Bowel Cancer QPI Monitoring Report using data from 2017 to 2019:

Indicator	Measure
BCQI 1. Route to diagnosis	Proportion of people with cancer who are diagnosed following a referral to a clinic, screening or, presentation to an emergency department (with or without surgery)
BCQI 5. Length of stay after surgery	Median length of stay following surgery for bowel cancer
BCQI 7. Post-operative mortality	Proportion of people with colorectal cancer who died within 90 days of surgery
BCQI 10. Lymph-node yield	Proportion of people with colon cancer who undergo surgical resection where 12 or more lymph nodes are pathologically examined
BCQI 16. Rectal cancer treatment	Proportion of people with rectal cancer with: a) no radiotherapy (surgery alone) b) short course radiotherapy (SCRT) pre-operative c) long course radiotherapy (LCRT) pre-operative.
BCQI 19. Emergency surgery	Proportion of people with bowel cancer who undergo major surgical resection performed as an emergency.
BCQI 21_a. Abdominoperineal resection	Proportion of people with rectal cancer who had major surgery and an abdominoperineal resection.

1 INTRODUCTION

Background

Te Aho o Te Kahu, Cancer Control Agency (Te Aho o Te Kahu) has continued the Ministry of Health's cancer quality performance indicator (QPI) programme, which aims to drive quality improvement for cancer detection, diagnosis, and treatment across Aotearoa New Zealand. The Cancer Services team within the Ministry of Health and the National Bowel Cancer Working Group (NBCWG) worked together to identify a set of QPIs for bowel cancer and we continue to work with the NBCWG.

The indicators were selected to measure performance and drive quality improvement in bowel cancer diagnosis and treatment services across district health boards (DHBs) in Aotearoa New Zealand.

The QPIs that appear in this document are part of a project to establish ongoing quality improvement for cancer care in Aotearoa New Zealand. Addressing variation in the quality of cancer services is essential to delivering improvements in quality of care. This is best achieved if there is consensus, and a set of clear indicators for what good cancer care looks like.

Purpose

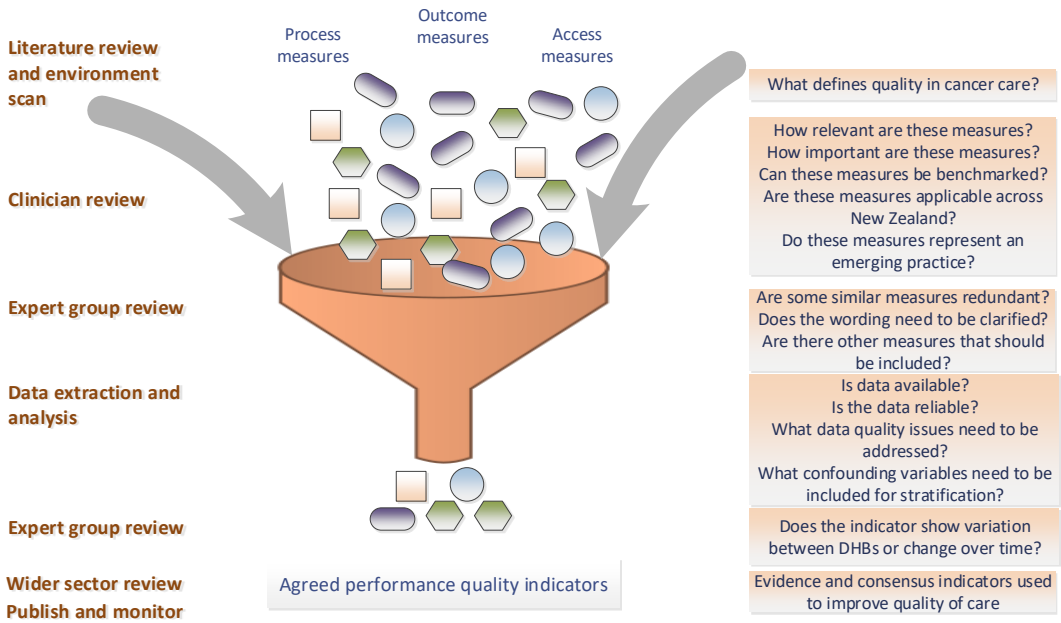
The ultimate aim of the project was to develop a framework for quality improvement whereby DHBs regularly review recent data, and act upon their findings accordingly.

The QPIs that appear in this document will ensure that activity is focused on the areas that are most important in terms of improving survival and individual care experience, while reducing variation and supporting the most effective and efficient delivery of care.

Development process

The Ministry of Health and the NBCWG were committed to ensuring that they developed these indicators in an open, transparent and timely way. The diagram below outlines the development process (Figure 1).

Figure 1: Overview of the process to select clinical quality performance indicators for bowel cancer care



The bowel cancer QPI group was first convened in September 2017. Membership of this group included clinical representatives from the NBCWG, consumers and other clinicians with expertise in developing QPIs. **Appendix 1** lists members of the various groups.

Selecting the indicators

We selected an initial long list of indicators following a literature review and environment scan. We considered this long list during a workshop with clinicians, consumers and other cancer care professionals, with a view to selecting a final set of indicators.

We selected final QPIs based on the following criteria:

- **Overall importance** – does the indicator address an area of clinical importance that would significantly impact on the quality and outcome of care delivered?
- **Evidence basis** – is the indicator based on high-quality clinical evidence? Is there evidence of known equity gaps (eg, age or presence of co-morbidities) and opportunities for Māori health gain?
- **Measurability** – is the indicator measurable (ie, are there explicit requirements for data measurement, and are the required data items accessible and available for collection)?

Following the initial workshop, members of the bowel cancer quality indicator group developed descriptions for the indicators.

We provided clinicians and other cancer experts in Aotearoa New Zealand an opportunity to review the bowel tumour-specific QPIs in November 2017.

We incorporated their feedback into the final set of indicators.

Format of the quality performance indicators

The QPIs are designed to be clear and measurable, based on sound clinical evidence while also taking into account other recognised standards and guidelines.

Each QPI has a **title** that can be used in reports, as well as a more detailed **description** that explains exactly what the indicator is measuring.

This is followed by a brief overview of the **rationale and evidence**, which explains why we considered this indicator to be important.

The measurability **specifications** are then set out; these highlight how we will measure the indicator in practice, to allow for comparison across New Zealand.

We have tried to minimise exclusions, to simplify measurement and reporting.

It is very difficult to accurately measure patient choice, co-morbidities and patient fitness; we note that this should be considered in interpreting variability between DHBs. Where there are other factors that might influence variability between DHBs, we have noted this.

Measuring and reporting on the indicators

Appendix 2 contains a summary of the initial assessment of data available in existing national data collections to measure each proposed indicator.

Where national data was available for a specific indicator, we used this to develop and report on the indicator.

Despite the initial assessment, we found that the specific data needed for indicators was not always available in the Ministry of Health's national collections. To address this, in some instances, we made changes to the indicator specifications to fit with the available data (eg, we did not limit radiotherapy indicators to non-metastatic disease). In other cases, we decided the data and/or methods were not of sufficient quality to proceed with publishing the indicator (eg, in the case of unplanned return to theatre). We have added a statement in the notes section for each indicator to indicate where data could be reported in 2019.

As part of the project, we identified areas where data improvement is required (cancer group stage and grade of cancer are two examples). Our clinical advisory groups and other data experts within the Ministry of Health are already working to implement the identified improvements.

Participants at the initial workshop requested that the published indicators be stratified by the variables shown in **Appendix 3**.

The first report on bowel cancer QPIs, *Bowel Cancer Quality Improvement Report 2019*, can be found on the Ministry of Health's website: **www.health.govt.nz**.

Bowel cancer definitions

For the purposes of the QPIs, we considered a person to be diagnosed with primary bowel cancer when that person was first entered on the New Zealand Cancer Registry with a diagnosis of cancer of the colon, rectosigmoid junction or rectum. The term 'bowel' is interchangeable with the term 'colorectal'.

Rectal cancer is defined as a cancer with its lower margin less than 15 cm above the anal verge as measured on sagittal *magnetic resonance imaging* (MRI).

We exclude people diagnosed with appendiceal cancer, neuroendocrine tumours, gastrointestinal stromal tumours, lymphomas, squamous cell carcinomas and melanomas from all QPIs, as the presentation and management of these rare cancers is different from other colorectal tumours.

Sources of national data for indicators

This document refers to the following national data sources.

- **Mortality Collection** – classifies the underlying cause of death for all deaths registered in New Zealand
- **New Zealand Cancer Registry (NZCR)** – a population-based register of all primary malignant diseases diagnosed in New Zealand, excluding squamous and basal cell skin cancers
- **National Minimum Dataset (NMDS)** – a collection of public and private hospital discharge information, including coded clinical data for inpatients and day patients
- **National Non-Admitted Patients Collection (NNPAC)** – includes event-based purchase units that relate to medical and surgical outpatient events and emergency department events
- **National Screening Database** – national repository for information relating to bowel and other publicly funded screening
- **Pharmaceutical Collection (PHARMS)** – a data warehouse that supports the management of pharmaceutical subsidies, and contains claim and payment information from pharmacists for subsidised dispensings
- **Radiation Oncology Collection (ROC)** – a collection of radiation oncology treatment data, including both public and private providers.

More information on these data sources can be found on the Ministry of Health's website: **www.health.govt.nz**.

Glossary of terms

Term	Description
Common indicator	Indicator of quality of diagnosis and treatment (ie, service provision) applied to more than one tumour group. Common indicators will be used for comparability and consistency across all tumour groups (eg, proportion of people who participate in a clinical trial). They will be considered for each tumour group but can be defined differently for each group.
Descriptive measure	A measure that organises, summarises and describes data (eg, the number of people with bowel cancer who have surgery).
Major resection	Surgery can be a simple, safe method to cure people with solid tumours when the tumour is confined to the anatomic site of origin. Resection of the primary cancer involves definitive surgical treatment, encompassing a sufficient margin of normal tissue with the goal of curing the disease with surgery alone. When selecting a definitive surgical treatment careful consideration of the likelihood of local cure needs to be balanced against the impact of surgical morbidity on the person's quality of life.
Structured reports	Structured reports are reports (eg, pathology) that contain structured data. Structured data are a collection of discrete values within a report, each with its own specification. A report containing structured data can be easily mined by computers for storing, sorting, and analysing the individual data elements.
Synoptic reports	Synoptic reports are summary reports that are standardised in their format, content, and terminology and appear structured to the human eye. They may or may not contain structured data, and many combine structured inputs and narrative text.
TNM group stage	For many purposes it is useful to combine TNM system categories into groups. Tumours localised to the organ of origin are generally staged as I or II depending on the extent, locally extensive spread, to regional nodes are staged as III, and those with distant metastasis staged as stage IV. The Union for International Cancer Control (UICC) uses the term Stage to define the anatomical extent of disease. The American Joint Committee on Cancer (AJCC) uses the term Prognostic Stage Group which may also include additional prognostic factors in addition to anatomical extent of disease.
TNM system	The TNM system is a global standard used to record the anatomical extent of disease. TNM was developed and is maintained by the UICC. It is also used by the AJCC and the International Federation of Gynecology and Obstetrics (FIGO). In the TNM system, each cancer is assigned a letter or number to describe the tumour, node, and metastases. T stands for the original (primary) tumour. N stands for nodes (indicates whether the cancer has spread to the nearby lymph nodes). M stands for metastasis. It is very important to note that the criteria used in the TNM system have varied over time, sometimes fairly substantially, according to the different editions that AJCC and UICC have released. For this reason, the name and edition of the staging system must be recorded alongside TNM values.
Tumour-specific indicator	An indicator of quality of diagnosis and treatment (ie, service provision) unique to a tumour group because of the treatment regimen.

2 BOWEL CANCER QUALITY PERFORMANCE INDICATORS

The table below lists each indicator, with a hyperlink to the detailed descriptions for each indicator on the following pages.

ID	Indicator title	Indicator description	Indicator type
1	**Route to diagnosis**	Proportion of people with colorectal cancer who are diagnosed following a referral to a clinic, screening or presentation to an emergency department (with or without surgery)	Common
2	**Timeliness of treatment**	Time from first histological diagnosis to first definitive treatment	Common
3	**Stage at diagnosis**	Proportion of people with colorectal cancer by stage of diagnosis	Common
4	**Multidisciplinary discussion**	Proportion of people with colorectal cancer discussed at a multidisciplinary meeting (MDM)	Common
5	**Length of stay after surgery**	Median length of stay following surgery for colorectal cancer	Descriptive
6	**Clinical trial participation**	Proportion of people with colorectal cancer in a clinical trial	Common
7	**Treatment survival**	Proportion of people with colorectal cancer who died within 30 or 90 days of treatment (surgery, chemotherapy, radiotherapy)	Common
8	**Overall survival**	Overall survival for people with colorectal cancer at 1, 3, 5 and 10 years from diagnosis by stage	Common
9	**Structured pathology reporting**	Proportion of people with colorectal cancer who undergo surgical resection whose histology is reported in a structured format	Common
10	**Lymph-node yield**	Proportion of people with colorectal cancer who undergo surgical resection where ≥12 lymph nodes are pathologically examined	Bowel-specific

ID	Indicator title	Indicator description	Indicator type
11	**Mismatch repair (MMR)/microsatellite instability (MSI) testing**	Proportion of people with colorectal cancer who have been tested for MMR status on initial diagnosis	Bowel-specific
12	**Circumferential resection margin (CRM)**	a) Proportion of people with rectal cancer undergoing surgery with reported CRM b) Proportion of reported CRMs with a positive margin (less than or equal to 1 mm – R1)	Bowel-specific
13	**Integrity of mesorectum**	a) Proportion of people with rectal cancer where mesorectal intactness/grade is documented b) Proportion of each mesorectal grade/degree of intactness for rectal cancers	Bowel-specific
14	**Rectal magnetic resonance imaging (MRI) reporting**	Proportion of people with rectal cancer who receive an MRI that is synoptically reported	Bowel-specific
15	**Tumour localisation**	Proportion of people with rectal cancer for whom distal tumour margin (tumour height) to anal verge distance is specified on the MRI report	Bowel-specific
16	**Radiotherapy**	Proportion of people with non-metastatic rectal cancer who receive: a) no radiotherapy (ie, surgery alone) b) pre-operative short-course radiotherapy (SCRT) c) pre-operative long-course radiotherapy (LCRT)	Bowel-specific
17	**Adjuvant chemotherapy**	a) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy b) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy within eight weeks	Bowel-specific
18	**Metastatic colorectal cancer chemotherapy**	Proportion of people with metastatic colorectal cancer receiving chemotherapy	Bowel-specific
19	**Emergency surgery**	Proportion of people with colorectal cancer undergoing major resection who have emergency surgery	Bowel-specific
20	**Unplanned return to theatre**	Proportion of people with an unplanned return to theatre within 30 days of surgery for colorectal cancer	Bowel-specific
21	**Stoma-free survival**	Proportion of people with rectal cancer with stoma-free survival at 18 months after major resection	Bowel-specific
21_a	**Abdominoperineal resection**	Proportion of people with rectal cancer who had major surgery and an abdominoperineal resection.	Bowel-specific

1 Route to diagnosis

Indicator description	Proportion of people with bowel cancer who are diagnosed following a referral to a clinic, screening or presentation to an emergency department (with or without surgery).	
Rationale and evidence	People who are diagnosed with early-stage bowel cancer and receive treatment early have a 90 percent chance of long-term survival. For this reason, bowel screening every two years can help save lives. Bowel screening can also detect polyps. Most polyps can be easily removed, reducing the risk that bowel cancer will develop. People referred from screening services tend to have earlier-stage cancers and are more likely to be treated with curative intent than people diagnosed via other referral means.	
Equity/Māori health gain	The PIPER study found that Māori people were more likely to be diagnosed following presentation to an emergency department (45%) than Pacific peoples (35%) and non-Māori/non-Pacific peoples (30%). (Grothey et al 2004; Sharples et al 2018). These differences were reduced after controlling for demographic characteristics and disease variables such as stage and grade at diagnosis, but Māori people (particularly rural Māori) and those living in areas with the highest socioeconomic deprivation were still more likely to be diagnosed following an emergency department presentation.	
Specifications	**Numerator a)**	Number of people with colorectal cancer whose diagnosis followed an elective presentation.
	Numerator b)	Number of people with colorectal cancer whose diagnosis is based on screening, defined as regular examination, such as faecal occult blood test or colonoscopy in asymptomatic people.
	Numerator c)	Number of people with colorectal cancer whose diagnosis followed an emergency presentation.
	Denominator	Number of people diagnosed with colorectal cancer.
	Exclusions	People diagnosed with colorectal cancer at death.
Data sources	NZCR, national screening database, NMDS.	
Notes	This indicator can be reported in 2019.	

2 Timeliness of treatment

Indicator description	Time from first histological diagnosis to first definitive treatment.	
Rationale and evidence	Timely high-quality care delivers the best outcomes for people diagnosed with bowel cancer. Timely treatment following diagnosis of cancer contributes to a better patient experience by reducing anxiety and uncertainty and minimising the risk of deterioration prior to treatment. Previous studies have identified ethnic inequalities in timely access to treatment; ensuring timely treatment for all will likely reduce equity gaps.	
Equity/Māori health gain	A previous study found that Māori were more likely to experience treatment delays (Hill et al 2010b).	
Specifications	**Numerator**	Time from first histological diagnosis to date of first treatment.
	Denominator	People having treatment for colorectal cancer.
	Exclusions	None.
Data sources	NZCR, NMDS, ROC, PHARMS.	
Notes	This indicator was investigated in 2018. The histology date currently available on the NZCR is most often the date of definitive histology following surgery, rather than the earlier biopsy date (eg, when diagnosis was first made). This indicator cannot be reported in 2019.	

3 Stage at diagnosis

Indicator description	Proportion of people with colorectal cancer by stage at diagnosis.	
Rationale and evidence	Stage at diagnosis is the most important determinant of prognosis. People who are diagnosed when their cancer is at an early stage have significantly improved survival outcomes (McPhail et al 2015). Stage is also a critical element in determining appropriate treatment.	
Equity/Māori health gain	The PIPER study found that Māori and Pacific people had higher proportions of metastatic (late-stage) colorectal disease at diagnosis than non-Māori, non-Pacific people (Sharples et al 2018). For example, for colon cancer, 24 percent of people nationwide had stage IV disease at diagnosis: for Māori this figure was 32 percent, and for Pacific people it was 35 percent. The PIPER study did not find a pattern in stage at diagnosis by socioeconomic deprivation. For many people, data on pathological stage was not available because key diagnostic procedures had not been undertaken.	
Specifications	**Numerator**	Number of people diagnosed with colorectal cancer by TNM group stage.[1]
	Denominator	Number of people diagnosed with colorectal cancer.
	Exclusions	People who were registered on the basis of a death certificate only. People aged under 18 years at diagnosis. People diagnosed with cancer of the appendix.
Data sources	NZCR.	
Notes	The NZCR records extent of disease for colorectal cancer cases. Data on TNM group stage is not consistently reported to the NZCR; only individual T, N and M values can be recorded at present. This indicator cannot be reported in 2019.	

[1] See explanation of TNM system and TNM group stage in glossary of terms.

4 Multidisciplinary discussion

Indicator description	Proportion of people with colorectal cancer discussed at a multidisciplinary meeting (MDM).	
Rationale and evidence	International evidence shows that multidisciplinary care is a key aspect to providing best-practice treatment and care for people with cancer. Multidisciplinary care involves a team approach to treatment planning and provision along the complete patient cancer pathway. Cancer MDMs are part of the philosophy of multidisciplinary care. Effective MDMs result in positive outcomes for people receiving the care, for health professionals involved in providing the care and for health services overall. Benefits include improved treatment planning, improved equity of patient outcomes, more people being offered the opportunity to enter into relevant clinical trials, improved continuity of care and less service duplication, improved coordination of services, improved communication between care providers and more efficient use of time and resources.	
Equity/Māori health gain	Earlier evidence showed that Māori with stage III colorectal cancer and comorbidities were at high risk of receiving inequitable cancer care (Hill et al 2010a). The PIPER study did not identify significant differences in people reviewed at a colorectal multidisciplinary meetings by ethnic group or socioeconomic deprivation (Jackson et al 2015).	
Specifications	**Numerator**	Number of people with colorectal cancer discussed at an MDM.
	Denominator	Number of people with colorectal cancer.
	Exclusions	None.
Data sources	NZCR, MDM databases, NMDS.	
Notes	This indicator will initially measure the number of people who were discussed at an MDM. Over time, more criteria will be added (eg, people discussed at an MDM prior to treatment). No national data collection records whether a person's treatment has been discussed at a colorectal cancer MDM. This indicator cannot be reported in 2019.	

5 Length of stay after surgery

Indicator description	Median length of stay following surgery for colorectal cancer.	
Rationale and evidence	Surgery is the cornerstone of treatment for many cancers. There have been major developments in surgery for colorectal cancer over the past decade, which have included greater surgical specialisation and wider use of laparoscopic procedures. Hospital length of stay following surgery is an indicator of health service efficiency. In some health care settings, there have been initiatives aimed at reducing length of stay after cancer surgery; for example, through enhanced recovery programmes. These types of initiatives may confer advantages for patients, including faster recovery and fewer complications. One of the key concerns of attempts to reduce length of stay, however, is that it may compromise patient safety and lead to increased readmissions.	
Equity/Māori health gain	The PIPER study did not identify significant differences in length of stay by ethnic group or socioeconomic deprivation (Jackson et al 2015).	
Specifications	**Numerator**	Median length of stay following surgery.
	Denominator	People undergoing definitive surgery for colorectal cancer.
	Exclusions	None.
Data sources	NZCR, NMDS.	
Notes	This is a descriptive indicator; it can be reported alongside other surgical indicators for information and context in 2019.	

6 Clinical trial participation

Indicator description	Proportion of people with colorectal cancer in a clinical trial.	
Rationale and evidence	Progress in preventing, diagnosing and treating cancer predominantly comes from scientific research, including the testing of new, potentially more effective medications and procedures through clinical trials. People who participate in these trials gain access to the very latest advances in cancer care developed by cancer specialists.	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with colorectal cancer treated on a clinical trial at any time after diagnosis.
	Denominator	Number of people diagnosed with colorectal cancer.
	Exclusions	None.
Data sources	Clinical notes.	
Notes	There is no national data collection on people enrolled in clinical trials for colorectal cancer. This indicator cannot be reported in 2019.	

7 Treatment survival

Indicator description	Proportion of people with colorectal cancer who died within 30 or 90 days of treatment (surgery, chemotherapy, radiotherapy).	
Rationale and evidence	Treatment-related mortality is a marker of the quality and safety of the whole service provided by the multidisciplinary team (MDT).[2] Service providers (DHBs, clinicians, MDTs) should regularly assess outcomes of treatment, including treatment-related morbidity and mortality. Patients with poor performance status, who are therefore at a greater risk of treatment-related morbidity and mortality, are increasingly being considered for radical interventions. These interventions may be curative, but their impact needs to be balanced against people's overall prognosis.	
Equity/Māori health gain	The PIPER study found that people who resided in more socially deprived areas had a higher 90-day mortality after surgery (Jackson et al 2015). There was not a statistically significant difference in 90-day mortality after surgery between Māori and non-Māori/non-Pacific people.	
Specifications	**Numerator a)**	Number of people with colorectal cancer who undergo emergency or elective surgical resection who die within 30 or 90 days of surgery.
	Denominator a)	Number of people with colorectal cancer who undergo emergency or elective surgical resection.
	Numerator b)	Number of people with colorectal cancer who undergo neo-adjuvant chemoradiotherapy, radiotherapy or adjuvant chemotherapy with curative intent who die within 30 or 90 days of treatment.
	Denominator b)	Number of people with colorectal cancer who undergo neo-adjuvant chemoradiotherapy, radiotherapy or adjuvant chemotherapy with curative intent.
	Exclusions	None.
Data sources	NZCR, NMDS, Mortality Collection, PHARMS, ROC.	
Notes	This indicator will be reported by treatment modality (ie, chemotherapy, radiotherapy and surgery). Both 30-day and 90-day mortality after surgery (elective and emergency) were reported in 2019.	

[2] A multidisciplinary team (MDT) comprises a range of health professionals from one or more organisations, working together to deliver comprehensive patient care.

8 Overall survival

Indicator description	Overall survival for people with colorectal cancer at 1, 3, 5 and 10 years from diagnosis by stage.	
Rationale and evidence	Overall survival is universally recognised as being unambiguous and unbiased, with a defined end point of paramount clinical relevance. Survival provides evidence that the treatment provided has extended the life of people diagnosed with cancer.	
Equity/Māori health gain	The PIPER study found that five-year overall survival for people diagnosed with colorectal cancer was lower for Māori (42%) than it was for non-Māori/non-Pacific people (51%) (Sharples et al 2018).	
Specifications	**Numerator**	Number of people with colorectal cancer who survive at 1, 3, 5 and 10 years from diagnosis.
	Denominator	Number of people diagnosed with colorectal cancer.
	Exclusions	None.
Data sources	NZCR, Mortality Collection.	
Notes	This indicator is dependent on data on TNM group stage, which is not consistently available from the NZCR. This indicator cannot be reported in 2019.	

9 Structured pathology reporting

Indicator description	Proportion of people with colorectal cancer who undergo surgical resection whose histology is reported in a structured format.	
Rationale and evidence	Pathology reports of colorectal cancer resection specimens provide important information, which guides post-operative management and informs prognosis. Structured reporting improves the completeness of pathology reports (Sluijter et al 2016).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with colorectal cancer who undergo curative surgical resection whose histology is reported in a structured format.
	Denominator	Number of people with colorectal cancer who undergo curative surgical resection (with or without neo-adjuvant therapy).
	Exclusions	• People with rectal cancer who undergo neoadjuvant therapy. • People who undergo transanal endoscopic microsurgery or transanal resection of tumour.
Data sources	NZCR, pathology reports, NMDS.	
Notes	Varying evidence exists regarding the most appropriate target level; this may need redefining in the future, to take account of new evidence or as further data becomes available. The data required for this indicator is not recorded in the NZCR; therefore, this indicator cannot be reported in 2019.	

10 Lymph-node yield

Indicator description	Proportion of people with colorectal cancer who undergo surgical resection where ≥12 lymph nodes are pathologically examined.	
Rationale and evidence	Maximising the number of lymph nodes resected and analysed enables reliable staging, which influences treatment decision-making (RCPA 2016).	
Equity/Māori health gain	A previous study showed that, in general, Māori had less lymph nodes removed than non-Māori (Hill et al 2010b).	
Specifications	**Numerator**	Number of people with colorectal cancer who undergo surgical resection where ≥12 lymph nodes are pathologically examined.
	Denominator	Number of people with colorectal cancer who undergo surgical resection (with or without neo-adjuvant short course radiotherapy).
	Exclusions	People with rectal cancer who undergo long-course neo-adjuvant chemo radiotherapy or radiotherapy.
Data sources	NZCR, pathology reports, NMDS.	
Notes	Better documentation of neoadjuvant therapy is needed on the clinical request form. Without this information it is not possible to exclude people undergoing long-course radiotherapy from the data. Pathology reports do not always record whether a person had a curative resection. Indicator results should be presented for rectal and colon cancer separately. Varying evidence exists regarding the most appropriate target level for this indicator; this may need redefining in the future, to take account of new evidence or as further data becomes available. The data required for this indicator is recorded on the NZCR for colon cancer but not for rectal cancer. Due to pre-operative radiotherapy treatment, rectal cancer surgery often occurs more than four months after diagnosis (the period for which the NZCR records these details). This indicator can only be reported for people with colon cancer in 2019.	

11 Mismatch repair (MMR)/ microsatellite instability (MSI) testing

Indicator description	Proportion of people with colorectal cancer who have been tested for MMR status on initial diagnosis.	
Rationale and evidence	Testing for DNA MMR status by immunohistochemistry (IHC) or by MSI can be performed on tumours to determine if the cancer occurred because of Lynch syndrome.[3] This is important, as it has implications not only for the management of the initial tumour but also subsequent screening of the individual affected and their family members. In addition, there is increasing evidence that MMR status may predict response to chemotherapy in all people with colorectal cancer, not just those with Lynch syndrome (Ministry of Health 2018; RCPA 2016).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with colorectal cancer who were tested for MMR status on initial diagnosis.
	Denominator	Number of people with colorectal cancer who have a tissue diagnosis.
	Exclusions	None.
Data sources	NZCR, pathology reports, NMDS.	
Notes	The current standard refers to IHC for MMR testing but not MSI (National Bowel Cancer Tumour Standards Working Group 2013). The target level for testing will be determined after initial analysis of data. The data required for this indicator was not recorded on the NZCR therefor this indicator cannot be reported in 2019.	

[3] Lynch syndrome (previously known as hereditary non-polyposis colorectal cancer (HNPCC)) is an inherited genetic mutation that gives people an increased chance of developing certain cancers across their lifetime, often at a younger age than the general population (ie, before 50 years of age).

12 Circumferential resection margin (CRM)

Indicator description	a) Proportion of people with rectal cancer undergoing surgery with reported CRM. b) Proportion of reported CRMs with a positive margin (less than or equal to 1 mm – R1).	
Rationale and evidence	Involvement of the CRM is associated with increased local recurrence, metastatic disease and reduced overall survival (Bernstein et al 2009).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with rectal cancer who undergo surgical resection where the CRM is reported. Number of people with rectal cancer who undergo surgical resection where the CRM is reported as positive.
	Denominator	Number of people with rectal cancer who undergo surgical resection (with or without neo-adjuvant therapy). Number of people with rectal cancer who undergo surgical resection where the CRM was reported.
	Exclusions	People who undergo transanal endoscopic microsurgery or transanal resection of tumour.
Data sources	NZCR, pathology reports, NMDS.	
Notes	A positive CRM is defined as ≤ 1 mm, but the current New Zealand standard states < 2 mm (Amin et al 2017, p 264; National Bowel Cancer Tumour Standards Working Group 2013). Varying evidence exists regarding the most appropriate target level for this indicator; this may need redefining in the future, to take account of new evidence or as further data becomes available. This indicator is a measure of the completeness rather than the quality of the resection. The data required for this indicator was not recorded in the NZCR; therefore, this indicator cannot be reported in 2019.	

13 Integrity of mesorectum

Indicator description	a) Proportion of people with rectal cancer where mesorectal intactness/grade is documented. b) Proportion of each mesorectal grade/degree of intactness for rectal cancers.	
Rationale and evidence	The quality of mesorectal excision predicts local and overall recurrence of rectal cancer (MacFarlane et al 1993; Maslekar et al 2007).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	a) Number of people with rectal cancer who undergo surgical resection where mesorectal intactness is documented. b) Number of people with rectal cancer recorded as complete, nearly complete and incomplete.
	Denominator	a) Number of people with rectal cancer who undergo surgical resection. b) Number of people with rectal cancer who undergo surgical resection.
	Exclusions	People who undergo transanal endoscopic microsurgery or transanal resection of tumour.
Data sources	NZCR, pathology reports, NMDS.	
Notes	The data required for this indicator was not recorded in the NZCR; therefore, this indicator cannot be reported in 2019.	

14 Rectal magnetic resonance imaging (MRI) reporting

Indicator description	Proportion of people with rectal cancer who receive an MRI that is synoptically reported.	
Rationale and evidence	A staging rectal MRI reported in a synoptic format enables MDT discussion of the treatment options most appropriate for a person's care. Pelvic MRI is the most accurate test to define locoregional clinical staging. By detecting extra-mural vascular invasion and determining the T substage and distance to the CRM, MRI can also predict the risks of local recurrence and synchronous/metachronous distant metastases and should be carried out to determine the appropriate pre-operative management and to define the extent of required surgery' (Glynne-Jones et al 2017). Tumour localisation is vital for operative planning and should be detailed in all synoptic reports. A standard synoptic template ensures a comprehensive report, including all relevant data items (RANZCR nd).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with rectal cancer who receive an MRI that is synoptically reported.
	Denominator	Number of people with rectal cancer.
	Exclusions	None.
Data sources	NZCR, DHB RIS/PACS[4] databases, radiology reports, NMDS.	
Notes	For some people, a curative/radical treatment approach is clearly not appropriate (eg, extreme age, severe co-morbidities or widespread metastatic disease may prohibit it). There is no national collection for radiology data; therefore, this indicator was not reported in 2019.	

[4] Radiology information system (RIS)/ picture archiving and communications systems (PACS).

15 Tumour localisation

Indicator description	Proportion of people with rectal cancer for whom distal tumour margin (tumour height) to anal verge distance is specified on the MRI report.	
Rationale and evidence	Localisation of rectal tumours is important for planning surgery, adjuvant therapy and audit. There is no consensus on the best way to localise rectal tumours; several methods are used. It is likely that MRI is the most pragmatic and reproducible method of tumour localisation. Tumour localisation is included as a core data item for synoptic reporting of rectal MRI (Keller et al 2014).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people with rectal cancer for whom distal tumour margin (tumour height) to anal verge distance is specified on the rectal MRI report.
	Denominator	Number of people with rectal cancer.
	Exclusions	None.
Data sources	NZCR, DHB RIS/PACS databases, radiology reports.	
Notes	This indicator could be based on endoscopy or rigid sigmoidoscopy, but it is generally agreed that MRI is best practice, especially with low rectal cancer. A paper from 2016 presents a series of MRI-defined low rectal cancers from Oxford. Grading is from the LOREC group in the United Kingdom (Kusters et al 2016). There is no national collection of radiology data; therefore, this indicator was not reported in 2019.	

16 Radiotherapy

Indicator description	Proportion of people with non-metastatic rectal cancer who receive: a) no radiotherapy (ie, surgery alone) b) pre-operative short-course radiotherapy (SCRT) c) pre-operative long-course radiotherapy (LCRT).	
Rationale and evidence	Adjuvant (pre- or post-operative) radiotherapy reduces the risk of pelvic recurrence of rectal cancer, but results in morbidity, so appropriate patient selection for this treatment is important (NICE 2011). Pre-operative radiotherapy results in fewer long-term side effects than post-operative radiotherapy (Sauer et al 2012). The current New Zealand guidelines for the management of early colorectal cancer recommend either pre-operative SCRT or pre-operative long-course chemoradiation for people with rectal cancer who are at risk of local recurrence (NZGG 2011). Pre-operative long-course chemoradiation is recommended for people who have a low rectal cancer or a threatened CRM (NICE 2011). Short-course radiotherapy is more convenient for patients, has fewer short-term side effects and uses fewer health resources (Bujko et al 2004).	
Equity/Māori health gain	No data was available.	
Specifications a)	**Numerator**	Number of people with non-metastatic rectal cancer who have not received pre-operative radiotherapy.
	Denominator	Number of people with non-metastatic rectal cancer who have received definitive surgery.
	Exclusions	None.
Specifications b)	**Numerator**	Number of people with non-metastatic rectal cancer who have received short-course pre-operative radiotherapy.
	Denominator	Number of people with non-metastatic rectal cancer who have received definitive surgery.
	Exclusions	None.
Specifications c)	**Numerator**	Number of people with non-metastatic rectal cancer who have received long-course pre-operative radiotherapy.
	Denominator	Number of people with non-metastatic rectal cancer who have received definitive surgery.
	Exclusions	None.
Data sources	NZCR, ROC, NMDS.	
Notes	Ideally indicator 16c results will be presented by R0 and R1 rates,[5] as all people with anticipated positive (R1) resection margins should receive long-course pre-operative radiotherapy. This indicator can only be reported in 2019 for all (non-metastatic and metastatic) rectal cancer patients, as TNM group stage is not available to identify people with metastatic disease on the NZCR.	

[5] Margins are classified by the pathologist as R0 (no cancer cells seen microscopically at the resection margin) and R1 (cancer cells present microscopically at the resection margin (microscopic positive margin)).

17 Adjuvant chemotherapy

Indicator description	a) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy. b) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy within eight weeks.	
Rationale and evidence	Adjuvant chemotherapy in stage III colon cancer has been shown to significantly improve overall survival (Andre et al 2015). The PIPER study found that 59 percent of people with stage III colon cancer received adjuvant chemotherapy. The evidence for adjuvant chemotherapy in rectal cancer is more contentious. People with high-risk stage II colon cancer derive benefit from adjuvant chemotherapy, although the risk–benefit ratio varies considerably between patients. Subgroups of people with stage III colon cancer benefit from the addition of oxaliplatin to fluoropyrimidine chemotherapy, although not all people derive benefit (Andre et al 2015). The recommended duration of adjuvant chemotherapy is currently under review. Time to commencement of chemotherapy has been shown to correlate with benefit; statistical modelling suggests that starting chemotherapy within four weeks of surgery is associated with greater predicted benefit (Biagi et al 2011). This modelling has not been verified in a randomised study.	
Equity/Māori health gain	The PIPER study found that utilisation of chemotherapy diminished with people's age and increasing comorbidities (Jackson et al 2015). A previous study found that Māori were slightly less likely to receive adjuvant therapy compared to non-Māori and were more likely to have a prolonged delay prior to commencement of chemotherapy (Hill et al 2010b).	
Specifications	**Numerator**	Number of people with stage III colon cancer with resection of primary tumour who receive a single dose of chemotherapy (count prescription of oral chemotherapy as 'received').
	Denominator	Number of people with stage III colon cancer (not rectal) who have undergone resection of the primary tumour and are alive at 12 weeks post-operatively.
	Exclusions	• People with rectal cancer. • People who die within 90 days of surgery.
Data sources	NZCR, pathology reports, NMDS, PHARMS, local chemotherapy databases.	
Notes	This is an important indicator in terms of equity. Limited chemotherapy prescribing data is available in the PHARMS dataset. This indicator is also dependent on TNM group stage. Data on TNM group stage to identify people with stage III colon cancer is not consistently available from the NZCR. This indicator cannot be reported in 2019.	

18 Metastatic colorectal cancer chemotherapy

Indicator description	Proportion of people with metastatic colorectal cancer receiving chemotherapy.	
Rationale and evidence	People with stage IV colorectal cancer who have adequate ECOG performance status[6] (ECOG grade 0–2) who are treated with fluoropyrimidine chemotherapy have improved duration of survival and improved quality of life, compared to those who receive supportive care alone (Cunningham et al 1998). The addition of oxaliplatin and irinotecan to fluoropyrimidine chemotherapy improves overall survival in those with stage IV colorectal cancer (Grothey et al 2004). Length of overall survival in clinical studies is correlated with the proportion of people receiving all three chemotherapy agents (Grothey et al 2004). Clinically meaningful and statistically significant improvements in overall survival have been seen in people with metastatic colorectal cancer, left-sided primary tumour and all people with RAS wild-type status[7] who receive cetuximab or panitumumab (Benson et al 2017). These agents are not presently funded in New Zealand. Modest improvements in overall survival have been seen with the use of bevacizumab, regorafinib, aflibercept and TAS 102. These agents are not presently funded in New Zealand.	
Equity/Māori health gain	Chemotherapy may be underutilised for people with bowel cancer who have comorbidities (Sarfati et al 2009). The PIPER study found that there were no clear trends in the proportion of people receiving chemotherapy by ethnicity, although these analyses were unadjusted, and further potentially important information may be yet be discovered (Jackson et al 2015).	
Specifications	**Numerator**	Number of people with stage IV colorectal cancer who receive at least a single dose of chemotherapy (count prescription of oral chemotherapy as ‘received’).
	Denominator	Number of people with stage IV colorectal cancer.
	Exclusions	(Potentially) people who die within 30 days of diagnosis.
Data sources	NZCR, pathology reports, NMDS, PHARMS, local chemotherapy databases.	
Notes	Limited chemotherapy prescribing data is available in the PHARMS dataset. This indicator is also dependent on the availability of data on TNM group stage to identify people with stage IV cancer. Data on TNM group stage is not available from the NZCR therefore this indicator cannot be reported in 2019.	

[6] The ECOG Scale of Performance Status is a standard for measuring how cancer impacts a person’s daily living abilities. It describes a person’s level of functioning in terms of their ability to care for themselves, daily activity, and physical ability (walking, working, etc). The ECOG scale ranges from 0 (fully active) to 5 (dead) and was developed by the Eastern Cooperative Oncology Group (ECOG).

[7] RAS proteins play an important role in the regulation of cell growth, cell division and cell death. Everyone has RAS genes because we need them for normal cell growth. Normal RAS genes are also called ‘wild-type’ RAS genes.

19 Emergency surgery

Indicator description	Proportion of people with colorectal cancer undergoing major resection who have emergency surgery.	
Rationale and evidence	People having emergency major resection for colorectal cancer have increased mortality, morbidity and stoma formation. These people are also less likely to be treated with curative intent (HQIP 2016).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people undergoing major resection for colorectal cancer following an emergency admission.
	Denominator	Number of people having major colonic resection for colorectal cancer.
	Exclusions	People who undergo transanal endoscopic microsurgery, transanal resection of tumour or endoscopic resection.
Data sources	NZCR, NMDS.	
Notes	This indicator can be reported in 2019.	

20 Unplanned return to theatre

Indicator description	Proportion of people with an unplanned return to theatre within 30 days of surgery for colorectal cancer.	
Rationale and evidence	Previous studies have reported large variation in unplanned return to theatre rates (Burns et al 2011). Unplanned return to theatre and other unplanned procedures are markers of serious post-operative complications (AM Morris et al 2007). There is evidence that unplanned return to theatre is an independent predictor of mortality at one year (van Westreenen et al 2011).	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people undergoing major resection for colorectal cancer with an unplanned return to theatre for an intra-abdominal procedure or wound complication within 30 days.
	Denominator	Number of people undergoing major resection for colorectal cancer.
	Exclusions	People undergoing surgery for central line placement and closure of ileostomy.
Data sources	NZCR, NMDS.	
Notes	This indicator was developed in 2018, but local DHB auditing revealed inconsistencies between national and local results. This indicator cannot be reported in 2019.	

21 Stoma-free survival

Indicator description	Proportion of people with rectal cancer with stoma-free survival at 18 months after major resection.	
Rationale and evidence	Effective MDT planning and surgical technique may lower the rate of permanent colostomy and ileostomy. There is variation in the rate of abdominoperineal resection (APER) for low rectal cancer, and an approximate 25 percent rate of permanent ileostomy following low anterior resection. The APER rate is simple to measure, but evidence supporting the APER rate as a quality marker is weak (Jorgensen et al 2013). Stoma-free survival is an important outcome and quality-of-life measure.	
Equity/Māori health gain	No data was available.	
Specifications	**Numerator**	Number of people who are alive and stoma-free at 18 months after major resection.
	Denominator	Number of people who undergo major resection for rectal cancer.
	Exclusions	People who undergo transanal endoscopic microsurgery, transanal resection of tumour or endoscopic resection of tumour. People who die within 18 months of surgery.
Data sources	NZCR, NMDS.	
Notes	This is a complex quality marker, due to confounding variables (it requires definition and accurate recording of low rectal cancer). This indicator has been selected instead of the APER rate, to avoid inadvertently promoting an increase in ultra-low anterior resection rates to meet a weak marker of quality. This indicator can be reported in 2019.	

21_a Abdominoperineal resection

Indicator description	Proportion of people with rectal cancer who had major surgery and an abdominoperineal resection (APR)	
Rationale and evidence	APR is the removal of the sigmoid colon, the rectum and the anus, leaving a permanent stoma. For patients undergoing resection for rectal cancer, sphincter preserving surgery should be considered if appropriate, with reversal of defunctioning stoma within 18 months. APR may have poorer outcomes compared with low anterior resection (Ptok et al 2007), and APR may decrease quality of life due to the formation of a permanent stoma. However, sphincter-preserving surgery for low rectal cancer can have complications and require a permanent stoma (Campos-Lobato et al 2011; Holmgren et al 2017) Therefore this quality performance indicator (QPI) should be considered in conjunction with other markers of quality. While there is some evidence that this QPI may not be a useful marker of overall hospital performance (Jorgensen et al 2013), it highlights variation between services (E Morris et al 2008) and, as this is a common indicator used internationally, it will allow for comparison. Effective multidisciplinary team (MDT) planning and surgical techniques may lower the rate of permanent colostomy and ileostomy.	
Equity/Māori health gain	There is international evidence of inequities in the provision of sphincter sparing surgery for disadvantaged population groups, for example, African American patients in the United States (Arsoniadis et al 2018; AM Morris et al 2004).	
Specifications	**Numerator**	Number of people with rectal cancer who had an abdominoperineal resection.
	Denominator	All patients who undergo major resection for rectal cancer.
	Exclusions	
Data sources	New Zealand Cancer Registry, National Minimum Dataset.	
Notes		

APPENDICES

Appendix 1: Working group members

2018

In 2018 the Bowel Cancer Quality Performance Indicator Group members were:

- Christopher Jackson (chair), medical oncologist, Southern District Health Board
- Ian Bissett (deputy chair), colorectal surgeon, Auckland District Health Board/ University of Auckland
- Christopher Harmston, general and colorectal surgeon, Northland District Health Board
- Sarah Derrett, consumer, Bowel Cancer New Zealand
- Joe Feltham, radiologist, Capital and Coast District Health Board
- Nicole Kramer, pathologist, Auckland District Health Board
- Iain Ward, radiation oncologist, Canterbury District Health Board
- Janet Hayward, general practitioner, Nelson.

The National Bowel Cancer Working Group members in 2018 were:

- Ian Bissett (chair), colorectal surgeon, Auckland District Health Board/University of Auckland
- Christopher Jackson (deputy chair), medical oncologist, Southern District Health Board
- Adrian Secker, general surgeon, Nelson Marlborough District Health Board
- Anne Cleland, gastroenterology nurse, MidCentral District Health Board
- David Vernon, general surgeon, Lakes District Health Board
- Denise Robbins, consumer representative
- Helen Moore, radiologist, Auckland District Health Board
- Iain Ward, radiation oncologist, Canterbury District Health Board
- Janet Hayward, general practitioner, Nelson
- Joe Feltham, radiologist, Capital and Coast District Health Board
- John McMenamin, general practitioner, Whanganui
- Judith Warren, cancer nurse, Waikato District Health Board
- Marianne Lill, general surgeon, Whanganui District Health Board
- Nicole Kramer, pathologist, Auckland District Health Board
- Nina Scott (Ngāti Whatua), public health physician, Waikato

- Ralph Van Dalen, colorectal surgeon, Waikato District Health Board
- Siraj Rajaratnam, general and colorectal surgeon and endoscopist, Waitemata District Health Board
- Susan Parry, gastroenterologist, Auckland District Health Board
- Teresa Chalmers-Watson, gastroenterologist and hepatologist, Canterbury District Health Board.

2022

The current National Bowel Cancer Working Group members are:

- Ian Bissett (chair), colorectal surgeon, Auckland District Health Board/The University of Auckland
- Anne Cleland, clinical nurse specialist, MidCentral District Health Board
- Ben Lawrence, medical oncologist, Auckland District Health Board
- David Vernon, general and colorectal surgeon, Lakes District Health Board
- Denise Robbins, consumer representative
- Iain Ward, radiation oncologist, Canterbury District Health Board
- Janet Hayward, general practitioner, Nelson
- John McMenamin, general practitioner, Whanganui
- Justin Hegarty, radiologist, Pacific Radiology
- Marianne Lill, general surgeon, Whanganui DHB
- Masato Yozu, pathologist, Counties Manukau District Health Board
- Nina Scott (Ngāti Whatua), public health physician, Waikato District Health Board
- Ralph Van Dalen, general surgeon, Waikato District Health Board
- Siraj Rajaratnam, general and colorectal surgeon and endoscopist, Waitematā District Health Board
- Susan Parry, gastroenterologist, Auckland District Health Board and clinical lead, National Bowel Screening Programme, Ministry of Health
- Teresa Chalmers-Watson, gastroenterologist, Canterbury District Health Board.

Others that contributed to this updated report are:

- Chris Harmston, general and colorectal surgeon, Northland District Health Board
- Sarah Derrett, consumer, Bowel Cancer New Zealand
- James Stanley, Biostatistician, Research Associate Professor, University of Otago, Wellington.

Appendix 2: Initial assessment of availability of national data for calculating indicators

QI no	Indicator title	Indicator description	National data available?	Data required		Data source												
				Site[1]		TNM group stage	Surgery	Chemotherapy	Radiotherapy	Death	Other	NZCR	Pathology report	Radiology report	NMDS	NNPAC/ ROC	PHARMS	MDM	Mortality
				C	R														
1	Route to diagnosis	Proportion of people with cancer who are diagnosed following a referral to a clinic, screening or presentation to an emergency department (with or without surgery)	Yes	✓	✓							✓			✓				
2	Timeliness of treatment following diagnosis	Time from first histological diagnosis to first definitive treatment	Yes	✓	✓		✓	✓	✓			✓	✓		✓	✓	✓		
3	Stage at diagnosis	Proportion of people with colorectal cancer by stage of diagnosis	No	✓	✓	X						✓							
4	Multidisciplinary discussion	Proportion of people with colorectal cancer discussed at a multidisciplinary meeting (MDM)	No	✓	✓						X	✓						X	
6	Clinical trial participation	Proportion of people with colorectal cancer in a clinical trial	No	✓	✓						X	✓						X	
7	Treatment survival	Proportion of people with colorectal cancer who died within 30 or 90 days of treatment (surgery, chemotherapy, radiotherapy)	Yes	✓	✓		✓	✓	✓	✓		✓			✓	✓	✓		✓
8	Overall survival	Overall survival for people with colorectal cancer at 1, 3, 5 and 10 years from diagnosis by stage	No	✓	✓	X				✓		✓							✓
9	Structured pathology reporting	Proportion of people with colorectal cancer who undergo surgical resection whose histology is reported in a structured format	No	✓	✓		✓						X						
10	Lymph-node yield	Proportion of people with colorectal cancer who undergo surgical resection where ≥12 lymph nodes are pathologically examined	Yes	✓	✓		✓	✓	✓			✓	✓						

QI no	Indicator title	Indicator description	National data available?	Data required		Data source													
				Site[1]		TNM group stage	Surgery	Chemotherapy	Radiotherapy	Death	Other	NZCR	Pathology report	Radiology report	NMDS	NNPAC/ ROC	PHARMS	MDM	Mortality
				C	R														
11	Mismatch repair (MMR)/ microsatellite instability (MSI) testing	Proportion of people with colorectal cancer who have been tested for MMR status on initial diagnosis	No	✓	✓								x						
12a	Circumferential margin (CRM)	a) Proportion of people with rectal cancer undergoing surgery with reported CRM	No		✓		✓						x						
12b	Circumferential margin (CRM)	b) Proportion of reported CRMs with a positive margin (less than or equal to 1mm – R1)	No		✓		✓						x						
13a	Integrity of mesorectum	a) Proportion of people with rectal cancer where mesorectal intactness/grade is documented	No		✓		✓					✓	x						
13b	Integrity of mesorectum	b) Proportion of each mesorectal grade/ degree of intactness for rectal cancers	No		✓		✓						x						
14	Rectal MRI reporting	Proportion of people with rectal cancer who receive an MRI that is synoptically reported	No		✓						x			x					
15	Tumour localisation	Proportion of people with rectal cancer for whom distal tumour margin (tumour height) to anal verge distance is specified on the MRI report	No		✓						x			x					
16	Radiotherapy	Proportion of people with non-metastatic rectal cancer who receive: a) no radiotherapy (ie, surgery alone) b) pre-operative short-course radiotherapy (SCRT) c) pre-operative long-course radiotherapy (LCRT)	No		✓	x	✓		✓			✓			✓	✓			
17	Adjuvant chemotherapy	a) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy b) Proportion of people with stage III colon cancer who receive adjuvant chemotherapy within eight weeks	No	✓		x	✓	✓		✓		✓			✓		✓		

QI no	Indicator title	Indicator description	National data available?	Data required		Data source													
				Site[1]		TNM group stage	Surgery	Chemotherapy	Radiotherapy	Death	Other	NZCR	Pathology report	Radiology report	NMDS	NNPAC/ ROC	PHARMS	MDM	Mortality
				C	R														
18	Metastatic colorectal cancer chemotherapy	Proportion of people with metastatic colorectal cancer receiving chemotherapy	No	✓	✓	X				✓		✓					✓		
19	Emergency surgery	Proportion of people with colorectal cancer undergoing major resection who have emergency surgery	Yes	✓	✓		✓					✓							
20	Unplanned return to theatre	Proportion of people with an unplanned return to theatre within 30 days of surgery for colorectal cancer	Yes	✓	✓		✓					✓							
21	Stoma-free survival	Proportion of people with rectal cancer with stoma-free survival at 18 months after major resection	Yes		✓					✓		✓			✓				
21_a	Abdominoperineal resection	Proportion of people with rectal cancer who had major surgery and an abdominoperineal resection	Yes									✓			✓				
	Descriptive measures																		
5	Length of stay after surgery	Median length of stay following surgery for colorectal cancer	Yes	✓	✓		✓								✓				

1 C – colon, R – rectum

Appendix 3: Stratifying variables

In addition to DHB and regional cancer network, the indicators will be stratified by the following variables where possible:

- age
- sex
- ethnicity (Māori, Pacific, Asian, European/Other)
- socioeconomic deprivation
- rurality.

Other potential stratifying variables for reporting include:

- treatment facility
- DHB of service
- DHB of domicile
- screen-detected vs symptomatic cancer
- grade and stage of tumour
- comorbidities*
- smoking status.

* This could be based on a comorbidity index; for example, a C3 comorbidity index (cancer-specific compilation of comorbid conditions, weighted according to their association with non-cancer death) or a pharmacy-based comorbidity index (Sarfati et al 2014a, 2014b).

ABBREVIATIONS

APER	abdominoperineal resection
AJCC	American Joint Committee on Cancer
CRM	circumferential resection margin
DHB	district health board
IHC	immunohistochemistry
LCRT	long-course pre-operative radiotherapy
MDM	multidisciplinary meeting
MDT	multidisciplinary team
MMR	mismatch repair
MRI	magnetic resonance imaging
MSI	microsatellite instability
NBCWG	National Bowel Cancer Working Group
NMDS	National Minimum Dataset
NNPAC	National Non-Admitted Patients Collection
NZCR	New Zealand Cancer Registry
PACS	picture archiving and communications systems
PHARMS	Pharmaceutical Collection
QPI	quality performance indicator
RIS	radiology information system
ROC	Radiation Oncology Collection
SCRT	pre-operative short-course radiotherapy
TNM	tumour, node, metastases
UICC	Union for International Cancer Control

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