Surveillance of people at **increased risk of colorectal cancer**

In New Zealand, colorectal cancer causes as many deaths each year as breast and prostate cancers combined. In most people, age and family history are the strongest risk factors for developing this cancer. Primary care clinicians need to be able to perform individual risk assessments for people at increased risk of colorectal cancer, and those with symptoms of colorectal cancer, and provide information on the appropriate levels of surveillance and investigation that each person requires.

Colorectal cancer in New Zealand

Each year approximately 1200 people in New Zealand die of colorectal cancer, a mortality rate similar to breast and prostate cancers combined.[1, 2] The incidence of colorectal cancer in New Zealand is high by international standards. In 2008 there were 44.1 cases reported per 100 000 males and 37.5 per 100 000 females. This compares to 36.2 cases per 100 000 males and 23.5 cases per 100 000 females in the United Kingdom.[3] Worldwide, colorectal cancer is more common in men than in women. However, the colorectal cancer rates in New Zealand women are higher than for women in any of the other 32 countries within the international cancer screening network.[3] Between 2008 and 2010 colorectal cancer was the second most common cancer in New Zealand, behind prostate cancer.[4]

Colorectal cancer in New Zealand occurs less frequently in Māori compared to non-Māori. From 2008 to 2010 there were on average 39.3 annual registrations of colorectal cancer per 100 000 Māori males and 27.8 per 100 000 Māori females.[4] However, once diagnosed, Māori are more likely to die from colorectal cancer than non-Māori. This has been largely attributed to disparities in access to, and quality of, cancer treatment and highlights the need for pro-active follow-up in Māori once a diagnosis of colorectal cancer has been made.[5]

Surveillance of asymptomatic people at increased risk

Increasing age and a family history of colorectal cancer are the two most significant risk factors for the development of colorectal cancer. A personal history of adenomatous polyps or inflammatory bowel disease also increases risk.

Screening the "average-risk" person based on age

Mortality rates for colorectal cancer increase rapidly from age

The pathology of colorectal cancer

Over 95% of cancer in the colon and rectum develops from polyps, which are protrusions in the mucosal surface of the colon, also known as adenomas.[6] This process may occur over years to decades.[7] Polyps are common and increase in frequency with age. Autopsies show that polyps are present in 30% of people aged over 60 years.[8] They are also more common in people with inherited syndromes, who are at increased risk of developing colorectal cancer. The risk of colorectal cancer increases with the size and number of polyps. In a study of 2500 tissue samples, malignant cells were found in 1% of polyps less than 1 cm in diameter, compared to 46% in polyps greater than 2 cm.[9]

The major types of polyps:

Adenomatous polyps account for 60–70% of polyps found in the colon and are the source of the vast majority of adenocarcinomas.[10] They can be further classified as tubular (accounting for 70 to 85% of adenomatous polyps), tubulovillous or villous. Villous polyps account for only 5% of adenomatous polyps but are eight to ten times more likely to become malignant than tubular adenomatous polyps.[6]

Hyperplastic polyps are usually small (less than 0.5 cm) and are frequently found in the rectum and sigmoid portion of the colon. These are usually benign.[6]

Submucosal polyps have a smooth overlying mucosa. Colour and texture are used to identify these endoscopically. Submucosal polyps are occasionally malignant.

50 years, with 94% of deaths occurring after this age.[6] There is evidence that screening asymptomatic people at increased risk of colorectal cancer, based on age, can reduce this mortality rate through early diagnosis.[11]

Faecal occult blood tests (FOBT) are widely used for the screening of colorectal cancer. FOBT can detect bleeding from colonic lesions, which may suggest the presence of high-risk colorectal adenomas or cancers. A 2007 Cochrane meta-analysis involving 320 000 patients with eight to 18 years follow-up, reported a relative-risk reduction for colorectal cancer of 25% for patients attending at least one round of FOBT screening.[11] The mortality reduction equated to 1.25, 5.5 and 17.5 less deaths over ten years per 10 000 people aged 40, 50 and 60 years respectively.[11] More recently, immunochemical FOBT (iFOBT) has improved both the sensitivity and specificity of the screening process. This test does not require dietary restrictions.

Colorectal cancer screening programmes or pilots are being run in Australia, the United Kingdom, Korea, Japan, Israel and most countries in the European Union. New Zealand does not have a national screening programme for colorectal cancer. However, a four year pilot began in the Waitemata District Health Board region in October 2011, with iFOBT screening offered to all males and females aged 50 to 74 years. People who have a positive iFOBT are referred for a diagnostic colonoscopy. The pilot will determine if the necessary secondary services in New Zealand, e.g. access to colonoscopy, are currently sufficient to support a national screening programme.

Until the results of the pilot study are known, routine FOBT in people aged over 50 years, with no other risk factors for colorectal cancer, is not necessary. However, FOBT may be considered on a case-by-case basis. FOBT is not recommended as a diagnostic test for people with symptoms of bowel cancer, or for surveillance of people with an increased risk or as part of a colorectal cancer follow-up programme.[12]

FOBT is not recommended for people aged under 50 years as the number of false-positive results is increased in younger people. Age, co-morbidity and life expectancy should also be taken into account when considering FOBT, due to the risk of complications associated with follow-up colonoscopy.

Self-testing for bowel cancer

BowelScreen Aotearoa is an organisation founded in 2010 to promote annual self-testing for colorectal cancer. FOBT kits are purchased from pharmacies and then taken home by customers to provide a sample from two different bowel movements. The customer then posts the samples to an Australian based laboratory, including the name of their general practitioner, who is contacted if a test result is positive. Bowel screen Aotearoa advises all people with a positive FOBT to visit their general practitioner.

It is recommended that general practitioners take the following steps if they receive notification that a patient under their care has a positive FOBT result:

1. Contact the patient and arrange a consultation (if the patient has not already done so)
2. Discuss the patient's clinical history, risk factors and symptoms and give healthy lifestyle advice
3. Patients with a personal or family history of colorectal cancer or other risk factors, e.g. a personal history of polyps or inflammatory bowel disease, should be referred for a colonoscopy
4. Symptomatic patients should be referred on the basis of symptoms and examination findings rather than the FOBT result alone
5. Asymptomatic patients who are not at increased risk may still benefit from colonic investigation, however, local resourcing of colonoscopy services may influence the pathway of evaluation. This should be discussed with local DHBs

Optical colonoscopy is the recommended investigation, following referral, for people who have had a positive FOBT result. Optical colonoscopy allows the clinician to visualise the entire colon mucosa, and remove small lesions and perform biopsies as required. It is also recommended for the surveillance of people at increased risk of developing colorectal cancer and as the preferred diagnostic procedure for people with symptoms of bowel cancer (Page 23).[12] There is a small risk of bleeding or colorectal perforation associated with colonoscopy, which is dependent on patient age, co-morbidities, performance of polypectomy and clinician proficiency.[6]

Computed tomography (or virtual) colonoscopy is a useful alternative to optical colonoscopy for the exclusion of malignancy in elderly people, when a less invasive investigation is preferred. It is also useful for people who experience significant pain with optical colonoscopy, e.g. diverticulitis, or present difficulties, e.g. patients taking antithrombotics. If the patient requires a biopsy or polyp removal, then an optical colonoscopy will still need to be performed.

Choosing a healthy diet and making healthy lifestyle choices are proactive steps that all people at risk of developing colorectal cancer can take. Excessive consumption of red and processed meats, high-fat dairy products and highly refined grains, starches and sugars is associated with an increased risk of colon cancer.[13] Replacing these foods with protein sources such as poultry and fish, monounsaturated and polyunsaturated fats, e.g. olives, nuts, seeds, avocados, and unrefined grains, legumes and fruits as the primary sources of carbohydrates, is likely to reduce a person's risk of developing colorectal cancer.[13]

Maintaining a healthy body weight, regular exercise, abstinence from smoking and drinking less than two standard units of alcohol per day are also healthy lifestyle choices which are likely to reduce a person's risk of developing colorectal cancer.[13]

There is currently no evidence to support the routine use of aspirin, vitamin D or calcium for the prevention of colorectal cancer.

The Cancer Society has practical dietary information available for people who want to reduce their cancer risk. Available from: **www.cancernz.org.nz/reducing-your-cancer-risk/nutrition-and-physical-activity**

Family history of colorectal cancer

Approximately 20% of people with colorectal cancer have two or more first-degree relatives (parents, siblings, children) or second-degree relatives (grandparents, aunts, uncles, nephews and nieces) with colorectal cancer.[14] People from these families are said to be at familial risk of colorectal cancer. Colorectal cancer within these families can occur either sporadically or due an inherited syndrome.

Sporadic colorectal cancer in family members influences the risk a person has of developing colorectal cancer:[6]

- One first-degree family member (parents, siblings, children) increases the risk by two to three times
- Two first-degree family members increases the risk by three to six times
- Two second-degree family members (grandparents, aunts, uncles, nephews, nieces) increases the risk by two times

Inherited colorectal cancers occur via autosomal dominant inheritance and are estimated to account for 5 – 10% of all colorectal cancers.[14]

Lynch syndrome (hereditary non-polyposis) is the most common hereditary syndrome associated with colorectal cancer. A sample of 500 patients treated consecutively for colorectal cancer found that 3.6% had Lynch syndrome, of which 44% were diagnosed before the age of 50 years.[15] Each of these patients had at least three relatives with the syndrome. Females with Lynch syndrome also have an increased risk of developing endometrial cancer.[16]

Familial adenomatous polyposis (FAP) is caused by a mutation in a tumour suppressor gene and accounts for less than 1% of colorectal cancers. One in 5000 to 7000 people have FAP.[17] FAP is characterised by multiple (> 100) adenomatous polyps which develop throughout the colon in the first decade of life.[6]

Peutz-Jeghers syndrome is characterised by gastrointestinal polyps and dark patches (1 – 5 mm in size) typically around the mouth, eyes, hands, feet and genitals. People with this condition have an increased risk of colorectal and breast cancer. The incidence of this syndrome is estimated to be between one in 50 000 to 200 000 live births.[18]

Categorising risk for an asymptomatic person (without inflammatory bowel disease) depends on their family history. Table 1 shows the recommended advice for people who know

Table 1: Risk stratification for people with a family history of colorectal cancer, adapted from NZGG, 2012[12]

Risk category	Any person with one of the following risk factors:	Advice
Slightly increased	■ Only one first-degree relative diagnosed at 55 years or older	Make healthy lifestyle choices and report any bowel symptoms to their health provider
Moderately increased	■ One first-degree relative diagnosed between age 50 to 55 years ■ Two first degree relatives on the same side of the family diagnosed at any age	Make healthy lifestyle choices and report any bowel symptoms to their health provider. Colonoscopy should be offered every five years from age 50 years, or from ten years before the earliest family diagnosis
Potentially high	■ A family history of an inherited colorectal syndrome ■ One first degree relative diagnosed before age 50 years ■ One first-degree and two or more first or second degree relatives on the same side of the family diagnosed at any age ■ One first-degree and one or more first or second-degree relative diagnosed, one of whom was diagnosed when aged under 55 years, or had multiple colorectal cancers, or had cancer in other organs ■ Any relative diagnosed who also had multiple bowel polyps	People in this category should be either referred to a genetic service or the New Zealand Familial Gastrointestinal Cancer Registry for an accurate risk assessment. A colorectal cancer specialist will then construct a surveillance plan. Self monitoring of bowel symptoms and healthy lifestyle choices should also be emphasised

The New Zealand Guidelines Group 2012 document "Bowel cancer" has further information on genetic services and the cancer registry. Available from: **www.nzgg.org.nz**

their family history of colorectal cancer. It should be noted that resourcing constraints may impact on adherence to these guidelines by DHBs around New Zealand.

Adenomatous polyps

People with a previous history of colorectal polyps have an increased risk of developing colorectal cancer and should be offered regular colonoscopy surveillance.

Surveillance frequency is determined by the risk assessment performed at the previous examination. This includes the number and size of any polyps and the histology of any polyps removed by biopsy. People with a history of adenomatous polyps should be offered colonoscopy at the following intervals:[12]

- Low risk – every five years
- Intermediate risk – every three years
- High risk – annually

Inflammatory bowel disease

People with inflammatory bowel disease have an increased risk of developing colorectal cancer. Crohn's disease and ulcerative colitis are the most common forms of inflammatory

bowel disease, with the risk being related to the duration and the anatomical extent of the disease. In a study of over 7500 patients in Sweden with inflammatory bowel disease, followed over a forty year period, 188 patients were diagnosed with colorectal cancer.[19] The risk of colorectal cancer begins to increase significantly seven to ten years after the onset of inflammatory bowel disease. The cumulative risk of colorectal cancer is 5 – 10% after 20 years and 20% at 30 years.[6]

Surveillance colonoscopy should be offered to all people with inflammatory bowel disease beginning eight to ten years following diagnosis.[12] Surveillance frequency is determined by the risk assessment based on the extent of the disease using histology and visual inspection at the last colonoscopy:[12]

- Low risk – every five years
- Intermediate risk – every three years
- High risk – annually

Investigation of people with bowel symptoms

It is common for people to be reluctant to request a consultation with their doctor for abnormal bowel symptoms. Several community-based studies in Australia found that approximately one-third of people with rectal bleeding will wait longer than three months, or never seek medical advice.[20] The symptoms of colorectal cancer should be discussed with all patients at increased risk of developing colorectal cancer.

Symptoms of colorectal cancer

Early colorectal cancer is often asymptomatic. Symptomatic presentation may indicate a relatively advanced tumour depending on the location, size and type of cancer. The symptoms of colorectal cancer are often due to the growth of the tumour into the lumen of the gut or adjacent structures. Right-sided lesions are typically larger, while left-sided lesions are more likely to cause partial or full obstruction, resulting in constipation, overflow diarrhoea, narrowed stool, bloating and cramps. Lesions of the lower colon or in the rectum often cause brighter red blood in the stool and occasionally tenesmus (a feeling of constantly needing to pass stools or that the bowel is not completely empty).

Symptoms of colorectal cancer generally include:

- Blood mixed with the stool
- Change in bowel habit (for at least six weeks)
- Abdominal pain or bloating
- Weight loss

Physical examination

An abdominal examination, including a rectal examination should be performed on all people with symptoms of colorectal cancer. A rectal examination (proctoscopic and digital) should distinguish rectal masses from haemorrhoids

and anal fissures. The presence of blood inside the rectum is suggestive of a diagnosis other than haemorrhoids or anal fissures. In contrast, rectal bleeding with anal symptoms in isolation, i.e. no anorectal mass, no anaemia and no change in bowel habit, has a high likelihood of being due to benign disease.

Diagnostic testing

A full blood count and serum ferritin to investigate iron deficiency anaemia may be useful when a diagnosis is uncertain. This may also assist the triage process if the patient is referred. FOBT and carcinogenic embryonic antigen testing are of little value in a person with symptoms suggestive of colorectal cancer and should not be performed, as a negative result does not exclude colorectal cancer.

Where the decision to refer has been made, examination and investigations should not delay this. Depending on the clinical circumstances, consider ordering a liver function test and a renal function test to assess for liver metastases and assess the patient's fitness for surgery.

Referral of symptomatic people

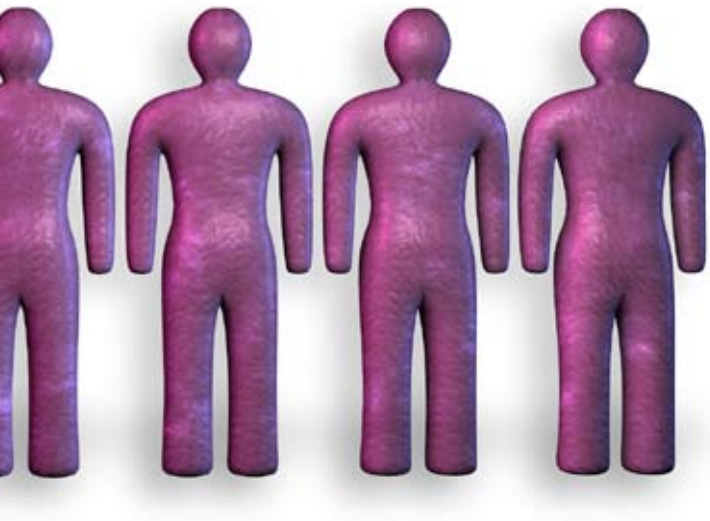
Any person with an increased risk of developing colorectal cancer and unexplained gastrointestinal symptoms should be referred to a gastroenterologist. The efficiency of triage is influenced by the level of detail provided by the referring clinician on the extent and duration of any signs or symptoms.

People with the following characteristics require urgent (within two weeks) referral to a gastroenterologist:[21]

- A palpable rectal mass
- A right-sided abdominal mass or a left-sided mass once faecal loading has been excluded
- Age ≥ 40 years with rectal bleeding and change in bowel habit lasting longer than six weeks
- Age ≥ 60 years with rectal bleeding persisting for six weeks or more without a change in bowel habit and without anal symptoms
- Age ≥ 60 years with a change in bowel habit persisting for six weeks or more without rectal bleeding
- Unexplained iron deficiency anaemia and haemoglobin ≤ 110 g/L (males) or ≤ 100g/L (females)

For further information see: "Guidance on surveillance for people at increased risk of colorectal cancer" available from: **www.nzgg.org.nz**

ACKNOWLEDGEMENT Thank you to **Dr Chris Jackson**, Consultant Medical Oncologist, Southern DHB, Chair of the South Island Bowel Cancer Working Group and Senior Lecturer, Dunedin School of Medicine, University of Otago for expert guidance in developing this article.



References

1. Cancer Society of New Zealand. Cancer statistics. Available from: www.cancernz.org.nz/divisions/auckland/about/cancer-statistics (Accessed May, 2012).
2. Ministry of Health. Cancer: New registrations and deaths 2008. Available from: www.health.govt.nz/publication/cancer-new-registrations-and-deaths-2008 (Accessed May, 2012).
3. National Cancer Institute. International cancer screening network. Available from: http://appliedresearch.cancer.gov/icsn/colorectal/mortality.html (Accessed May, 2012).
4. Ministry of Health. Cancer: Selected Sites 2008, 2009, and 2010. Available from: www.health.govt.nz/publication/cancer-selected-sites-2008-2009-and-2010 (Accessed May, 2012).

5. Hill S, Sarfati D, Blakely T, et al. Survival disparities in Indigenous and non-Indigenous New Zealanders with colon cancer: the role of patient comorbidity, treatment and health service factors. J Epidemiol Community Health 2010;64(2):117–23.

6. Julka M, Cherukuri M, Lameh R. Screening for cancerous and precancerous conditions of the colon. Prim Care 2011;38(3):449–68.

7. Cunningham D, Atkin W, Lenz H, et al. Colorectal cancer. Lancet 2010;375(9719):1030–47.

8. Bond J. Polyp guideline: diagnosis, treatment, and surveillance for patients with colorectal polyps. Practice Parameters Committee of the American College of Gastroenterology. Am J Gastroenterol 2000;95(11):3053–63.

9. Muto T, Bussey H, Morson B. The evolution of cancer of the colon and rectum. Cancer 1975;36(6):2251–70.

10. Heitman S, Ronksley P, Hilsden R, et al. Prevalence of adenomas and colorectal cancer in average risk individuals: a systematic review and meta-analysis. Clin Gastroenterol Hepatol 2009;7(12):1272–8.

11. Hewitson P, Glasziou P, Irwig L, et al. Screening for colorectal cancer using the faecal occult blood test, Hemoccult. Cochrane Database Syst Rev 2007;(1):CD001216.

12. New Zealand Guidelines Group. Guidance on surveillance for people at increased risk of colorectal cancer. Wellington: New Zealand Guidelines Group; 2012.

13. Chan A, Giovannucci E. Primary prevention of colorectal cancer. Gastroenterology 2010;138(6):2029–43.

14. Lynch H, de la Chapelle A. Hereditary colorectal cancer. N Engl J Med 2003;348(10):919–32.

15. Hampel H, Frankel W, Martin E, et al. Feasibility of screening for Lynch syndrome among patients with colorectal cancer. J Clin Oncol 2008;26(35):5783–8.

16. Leenen C, van Lier M, van Doorn H, et al. Prospective evaluation of molecular screening for Lynch syndrome in patients with endometrial cancer ≤70years. Gynecol Oncol 2012;125(2):414-20.

17. Gala M, Chung D. Hereditary colon cancer syndromes. Semin Oncol 2011;38(4):490–9.

18. Giardiello F, Trimbath J. Peutz-Jeghers syndrome and management recommendations. Clin Gastroenterol Hepatol 2006;4(4):408–15.

19. Söderlund S, Brandt L, Lapidus A, et al. Decreasing time-trends of colorectal cancer in a large cohort of patients with inflammatory bowel disease. Gastroenterology 2009;136(5):1561–7.

20. Courtney R, Paul C, Sanson-Fisher R, et al. The current state of medical advice-seeking behaviour for symptoms of colorectal cancer: determinants of failure and delay in medical consultation. Colorectal Dis 2012;14(5):e222-9.

21. New Zealand Guidelines Group. Suspected cancer guideline ebook. Available from: http://ebooks.nzgg.org.nz/suspected_cancer_guideline/ (Accessed May, 2012).

NEW
DIABETES MODULE

A new version of the *bestpractice* **Diabetes Management** module is due for release soon. This module will be available as a part of a new Chronic Care Model that allows you to:

- **Record relevant diabetes review data**
- **Undertake a cardiovascular risk review**
- **Assess renal function**

The module incorporates updated NZGG advice. Data collection and advice is supported by relevant printable resources and website links.

More information: **www.bestpractice.net.nz**

bestpractice
DECISION SUPPORT FOR HEALTH PROFESSIONALS

bestpractice Decision Support is developed by BPAC Inc, which is separate from bpac^{nz}. bpac^{nz} bears no responsibility for *bestpractice* Decision Support or any use that is made of it.