# A profile of colorectal cancer

## Introduction

Colorectal cancer is the current focus of considerable national policy interest. Encouraged by success of randomised controlled trials of bowel screening in other countries, a national bowel cancer pilot screening program is under way to trial screening for colorectal cancer in Australia.

As a cancer, colorectal cancer is particularly important because colorectal cancer (ICD-10 codes C18–C21) is the second most frequently occurring cancer in Australian men (behind prostate cancer) and women (behind breast cancer) if skin cancers other than melanoma are excluded. If the data for men and women are combined, it is the most frequently occurring cancer in Australia for new cases of malignant cancer. There is currently a 1 in 17 lifetime risk for males of being diagnosed with colorectal cancer by the age of 75 years and a 1 in 26 risk for females. It is also second only to lung cancer as the most common cause of cancer death in Australia. Further, there is considerable potential for both prevention and early detection of this cancer to greatly reduce its overall burden in both mortality and morbidity. This section presents an overview of the current state of colorectal cancer in Australia.

## What is colorectal cancer?

Colorectal cancer is a tumour that starts in the bowel wall and is confined locally for a relatively long time before spreading through the bowel wall and metastasising to lymph nodes and other parts of the body. Most colorectal cancers are believed to develop from benign precursor lesions, or adenomas. These adenomas develop on the lining of the bowel. Most are of no direct clinical significance, but a proportion become malignant over time and progress to colorectal cancer. The development of colorectal cancer from a small adenoma usually takes many years (NHMRC 1999).

## Potentially modifiable risk factors

The major potentially modifiable risk factors for colorectal cancer relate to diet and physical activity. The proportion of colorectal cancer attributed to dietary factors has been estimated to be about 50% (Kune et al. 1992). Further, around 66–77% of colorectal cancer could be prevented by appropriate combination of diet and physical activity (AICR & WCRF 1997). There is convincing evidence that a diet high in calories and rich in animal fats, most often as red meat, and poor in vegetables and fibre is associated with an increased risk of colorectal cancer. Conversely, a low fat, high vegetable and possibly high fibre diet has a protective effect (Stewart & Kleihues 2003).

In summary, appropriate dietary changes, together with regular physical activity and maintenance of healthy weight, could, in time, substantially reduce the incidence of colorectal cancer in Australia (NHMRC 1999).

The current Australian trends in these dietary and lifestyle risk factors present a mixed picture. The rate of regular physical activity among Australians has decreased significantly in recent years. Average dietary fibre intake among Australian adults has increased significantly, though it remains below the recommended level. However, the average total

calorie intake has increased, along with the rates of overweight and obesity (AIHW: Mathur 2002; AIHW 2002b).

## Other predisposing factors

Apart from the dietary and lifestyle risk factors discussed above, there are a number of other predisposing factors for colorectal cancer. These comprise a family history of the cancer, some specific genetic syndromes and some conditions such as inflammatory bowel disease. Around 75% of all new cases of colorectal cancer occur in people with no known predisposing factor (Burt et al. 1990). These people may be considered as at average risk for the disease. People with a family history of colorectal cancer but without any apparent defined genetic syndrome account for most of those at above average risk—about 15% to 20% of all cancer cases. Hereditary nonpolyposis colon cancer accounts for 4%–7% of all cases and familial adenomatous polyposis about 1%. The remainder of cases, about 1%, are attributable to a variety of uncommon conditions such as inflammatory bowel disease, Peutz-Jeghers syndrome and familial juvenile polyposis (Winawer et al. 1997).

## Incidence by site

For colorectal cancer, both the male and female incidence rates have increased since 1990 by an average of 0.4% and 0.1% respectively per year. Mortality rates have fallen steadily—the male rate decreased 0.9% per annum between 1990 and 2000 and the female rate decreased 1.4%.

Colorectal cancer can be classified according to its primary site as being in the proximal colon (the part of the colon from the caecum to the splenic flexure), distal colon (the descending and sigmoid colon) or rectum (the rectosigmoid junction, rectum and anus). Figure 9 shows the distribution of cases between these sites. Tables 4 and 5 show the numbers and proportion of cases by age, sex and site. These show that colon cancer is not evenly distributed along the bowel. Around 60% of cases occur in the rectum and distal colon, while only 35% occur in the proximal colon. However, the proportion of cases in the proximal colon increases after the age of 40 years—rising to around 41% by the age of 85 years. This result is consistent with international studies (Cooper et al. 1995). One implication of this is that screening and diagnostic modalities such as sigmoidoscopy, which cannot reach the proximal colon, may potentially detect around 60% of cancers overall but become less effective at older ages.

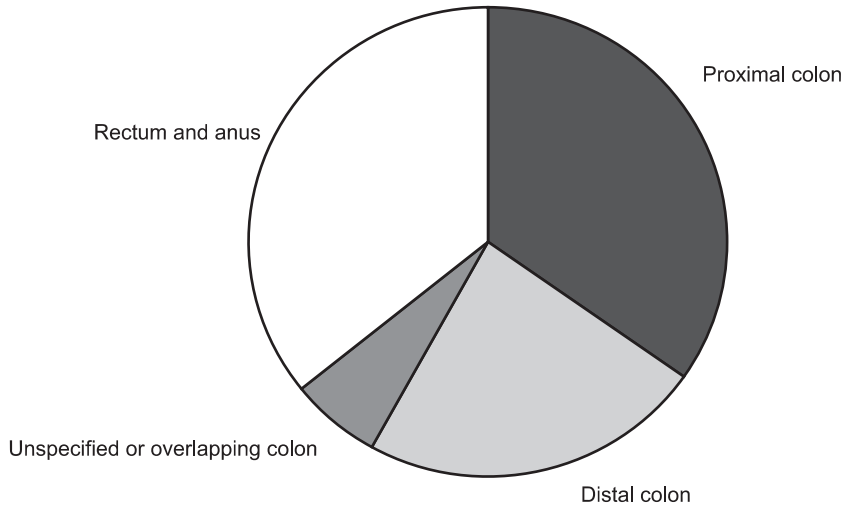



**Figure 9: Distribution of new cases of colorectal cancer by site, Australia, 2000**

**Table 4: New cases of colorectal cancer by age, sex and site, Australia, 2000**

| | Age (years) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0–44 | 45–54 | 55–64 | 65–74 | 75–84 | 85+ | All ages |
| **Males** | | | | | | | |
| Proximal colon (C180–C185) | 78 | 160 | 403 | 708 | 565 | 171 | 2,085 |
| Distal colon (C186–C187) | 53 | 138 | 394 | 556 | 419 | 102 | 1,662 |
| Unspecified or overlapping colon (C188–C189) | 7 | 28 | 82 | 121 | 109 | 47 | 394 |
| Rectum and anus (C19–C21) | 110 | 343 | 647 | 880 | 624 | 118 | 2,722 |
| *All colorectal (C18–C21)* | *248* | *669* | *1,526* | *2,265* | *1,717* | *438* | *6,863* |
| **Females** | | | | | | | |
| Proximal colon (C180–C185) | 74 | 163 | 362 | 635 | 703 | 285 | 2,222 |
| Distal colon (C186–C187) | 56 | 146 | 272 | 334 | 297 | 130 | 1,235 |
| Unspecified or overlapping colon (C188–C189) | 9 | 20 | 39 | 85 | 120 | 100 | 373 |
| Rectum and anus (C19–C21) | 83 | 236 | 320 | 451 | 454 | 168 | 1,712 |
| *All colorectal (C18–C21)* | *222* | *565* | *993* | *1,505* | *1,574* | *683* | *5,542* |
| **Persons** | | | | | | | |
| Proximal colon (C180–C185) | 152 | 323 | 765 | 1,343 | 1,268 | 456 | 4,307 |
| Distal colon (C186–C187) | 109 | 284 | 666 | 890 | 716 | 232 | 2,897 |
| Unspecified or overlapping colon (C188–C189) | 16 | 48 | 121 | 206 | 229 | 147 | 767 |
| Rectum and anus (C19–C21) | 193 | 579 | 967 | 1,331 | 1,078 | 286 | 4,434 |
| *All colorectal (C18–C21)* | *470* | *1,234* | *2,519* | *3,770* | *3,291* | *1,121* | *12,405* |

**Table 5: Distribution of new cases of colorectal cancer by age, sex and site, Australia, 2000**

| | Age (years) | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0–44 | 45–54 | 55–64 | 65–74 | 75–84 | 85+ | All ages |
| **Males** | | | | (per cent) | | | |
| Proximal colon (C180–C185) | 31.5 | 23.9 | 26.4 | 31.3 | 32.9 | 39.0 | 30.4 |
| Distal colon (C186–C187) | 21.4 | 20.6 | 25.8 | 24.5 | 24.4 | 23.3 | 24.2 |
| Unspecified or overlapping colon (C188–C189) | 2.8 | 4.2 | 5.4 | 5.3 | 6.3 | 10.7 | 5.7 |
| Rectum and anus (C19–C21) | 44.4 | 51.3 | 42.4 | 38.9 | 36.3 | 26.9 | 39.7 |
| *All colorectal (C18–C21)* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* |
| **Females** | | | | (per cent) | | | |
| Proximal colon (C180–C185) | 33.3 | 28.8 | 36.5 | 42.2 | 44.7 | 41.7 | 40.1 |
| Distal colon (C186–C187) | 25.2 | 25.8 | 27.4 | 22.2 | 18.9 | 19.0 | 22.3 |
| Unspecified or overlapping colon (C188–C189) | 4.1 | 3.5 | 3.9 | 5.6 | 7.6 | 14.6 | 6.7 |
| Rectum and anus (C19–C21) | 37.4 | 41.8 | 32.2 | 30.0 | 28.8 | 24.6 | 30.9 |
| *All colorectal (C18–C21)* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* |
| **Persons** | | | | (per cent) | | | |
| Proximal colon (C180–C185) | 32.3 | 26.2 | 30.4 | 35.6 | 38.5 | 40.7 | 34.7 |
| Distal colon (C186–C187) | 23.2 | 23.0 | 26.4 | 23.6 | 21.8 | 20.7 | 23.4 |
| Unspecified or overlapping colon (C188–C189) | 3.4 | 3.9 | 4.8 | 5.5 | 7.0 | 13.1 | 6.2 |
| Rectum and anus (C19–C21) | 41.1 | 46.9 | 38.4 | 35.3 | 32.8 | 25.5 | 35.7 |
| *All colorectal (C18–C21)* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* | *100.0* |

## Screening and early detection

The existence of a pre-cancerous lesion (the adenoma) and the long period the cancer spends in a highly curable localised state mean that this cancer is an ideal candidate for screening and early detection. Randomised controlled trials of population screening for colorectal cancer using a Faecal Occult Blood Test (FOBT) with colonoscopy follow-up of positive results have been carried out in the USA (Mandel et al. 1993), the UK (Hardcastle et al. 1996), Denmark (Kronborg et al. 1996) and Sweden (Kewenter et al. 1991). These have shown that such screening has the potential to reduce mortality from colorectal cancer by 15–30%. A national pilot study of FOBT screening in Australia is currently being conducted by the Australian Governement Department of Health and Ageing. A more detailed discussion of this pilot is presented in Chapter 5.

## Treatment

The usual treatment options for colorectal cancer consist of surgical resection of the colon or rectum (or both), with or without adjuvant chemotherapy or radiotherapy (NHMRC 1999). In 2000–01, there were 25,238 separations from hospitals in Australia of persons with a principal diagnosis of colorectal cancer, with an average stay of 8.6 days. There were 2,000 deaths in hospital. Treatment was mainly acute care (23,401 separations) and palliative care (1,389 separations). The most common procedures (excluding anaesthesia and allied health interventions) were:

- Fibreoptic colonoscopy with excision (6,946)
- Colectomy (5,824)
- Transfusion of blood and gamma globulin (4,328)
- Anterior resection of rectum (3,363)
- Fibreoptic colonoscopy (1,840)
- Division of abdominal adhesions (1,387)
- Computerised tomography of abdomen and pelvis (1,339).

The most common additional diagnoses were:

- Secondary malignant neoplasm of respiratory and digestive organs (4,972)
- Secondary and unspecified malignant neoplasm of lymph nodes (4,533)
- Personal history of certain other diseases (2,996)
- Other medical care (2,745)
- Benign neoplasm of colon, rectum, anus and anal canal (2,658)
- Essential (primary) hypertension (2,597)
- Diverticular disease of intestine (2,079)
- Type 2 diabetes mellitus (1,985)
- Other diseases of intestine (1,700).

## Survival and cure

Survival after a diagnosis of colorectal cancer in Australia has improved steadily since 1982. Table 6 presents relative survival proportions for colorectal cancer by sex and diagnosis period. These show that survival improved for both men and women since 1982, though survival for women was consistently higher than for men.

Statistical modelling techniques can be applied to estimates of cumulative relative survival to provide estimates of the average proportion of people cured of colorectal cancer and the average time to death for those people who ultimately die from the disease. In this case, a cure is defined as having, on average, the same overall risk of death as the general population who do not have a diagnosis of colorectal cancer. These statistical methods are explained in detail in Appendix B.

Table 7 presents the modelled estimates of the proportion of people cured of colorectal cancer, based on the survival experience of people living with a diagnosis of colorectal cancer in 1997. Table 8 presents the modelled estimates of average time to death in years for people who ultimately die from the disease.

**Table 6: Five-year relative survival proportions for colorectal cancer by sex and diagnosis period, Australia, 1982–1997**

| Diagnosis period | Crude proportion | 95% confidence | Age standardised | 95% confidence interval |
|---|---|---|---|---|
| **Males** | | | | |
| 1982–1986 | 49.9 | 49.0–50.8 | 49.9 | 48.8–50.9 |
| 1987–1991 | 53.6 | 52.8–54.4 | 53.4 | 52.4–54.3 |
| 1992–1997 | 57.8 | 57.0–58.5 | 57.6 | 56.8–58.5 |
| **Females** | | | | |
| 1982–1986 | 51.9 | 51.0–52.8 | 52.0 | 51.0–52.9 |
| 1987–1991 | 55.3 | 54.5–56.2 | 55.6 | 54.7–56.5 |
| 1992–1997 | 59.4 | 58.6–60.1 | 59.9 | 59.1–60.7 |

*Note:* Age adjustment uses as a standard population the total number of cancer cases of all types diagnosed from 1992–1997.

**Table 7: Average cure rates for index year 1997, by sex, Australia**

| Sex | Average cure rate (%) | Approximate 95% confidence interval |
|---|---|---|
| Males | 50.7 | 50.4–51.0 |
| Females | 56.7 | 56.4–57.0 |
| Persons | 53.7 | 53.4–54.0 |

**Table 8: Average time to death for those who ultimately die from colorectal cancer for index year 1997, by sex, Australia**

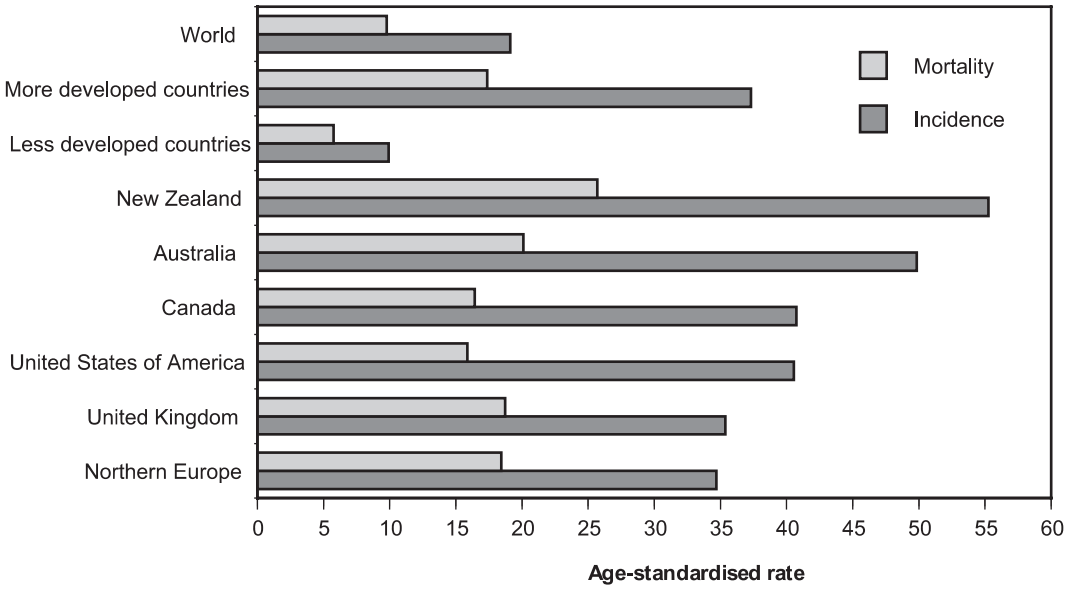
| Sex | Average time in years | Approximate 95% confidence interval |
|---|---|---|
| Males | 1.92 | 1.80–2.02 |
| Females | 2.64 | 2.56–2.71 |
| Persons | 2.27 | 2.19–2.35 |

## International comparisons

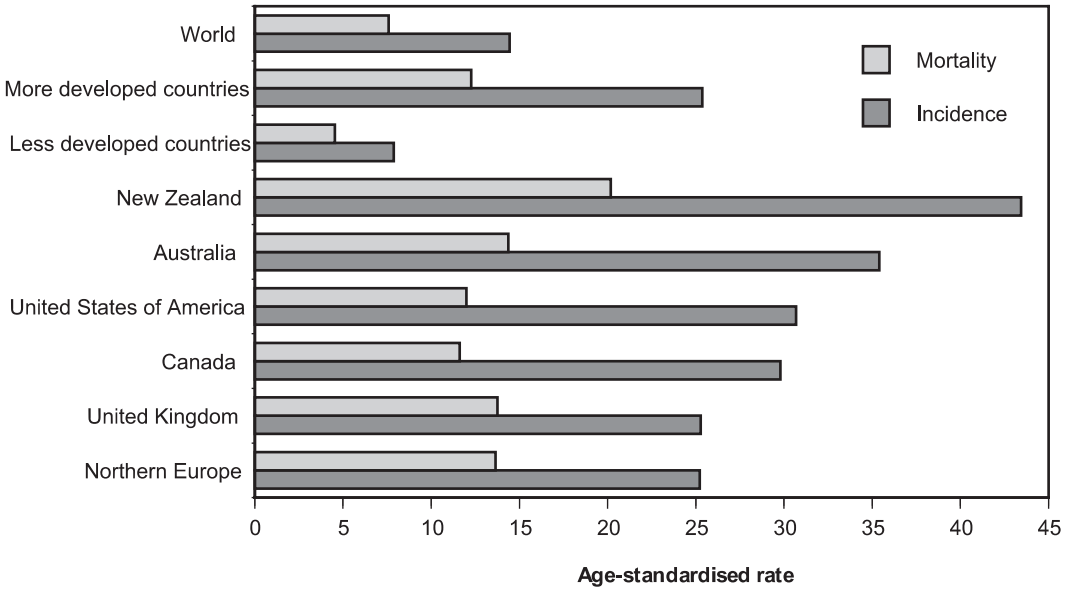
Australia has a high incidence rate of bowel cancer by world standards. The International Agency for Research on Cancer (IARC) has compiled comparative incidence data for colorectal cancer for 173 countries. Out of these countries, Australia has the fifth highest colorectal cancer incidence for men (behind the Czech Republic, New Zealand, Hungary and Slovakia) and the second highest for women (behind New Zealand). However, Australia's colorectal cancer death rates are comparatively lower. Australia is fifteenth out of the 173 for male death rates and seventeenth for female death rates (IARC 2001).

Figure 10 presents a comparison of the age-standardised incidence and mortality rates for Australia, selected regions and selected countries from the IARC study. This shows that colorectal cancer incidence rates in Australia are lower than those in New Zealand but higher than those in the USA, Canada, UK and, on average, Northern Europe. However, while the corresponding Australian mortality rates are higher than those in the USA and Canada, they are comparable to those in the UK and Northern Europe.

**Males**




**Females**




*Notes*
1. Rates are all age standardised to the World Standard Population.
2. Australian rates apply to 1997. Rates for other countries apply to different years in the range 1995 to 1997.

*Source: IARC* (2001).

**Figure 10: Age-standardised incidence and mortality rates for colorectal cancer of Australia, selected world regions and selected countries**