

# information

## CIRCULAR



Health Information Centre

### CANCER IN QUEENSLAND

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## INSIDE

### Contents

<b>Introduction</b>	<b>1</b>
<b>Incidence</b>	<b>1</b>
<i>Interstate and overseas comparisons</i>	2
<i>Age and sex distribution</i>	2
<b>Mortality</b>	<b>3</b>
<i>Interstate and overseas comparisons</i>	3
<i>Age and sex distribution</i>	3
<b>Potential years life lost</b>	<b>4</b>
<b>Cost to the Queensland Public Hospital system</b>	<b>4</b>
<b>Cancer among Indigenous people</b>	<b>4</b>
<b>Geographic and socio-economic differences</b>	<b>4</b>
<b>Cancer among children</b>	<b>4</b>
<b>National Health Priority Area cancers</b>	<b>5</b>
<i>Melanoma</i>	5
<i>Lung</i>	5
<i>Breast (female)</i>	6
<i>Cervix</i>	6
<i>Colorectal</i>	6
<i>Prostate</i>	7
<b>References</b>	<b>7</b>
<b>Appendix</b>	<b>8</b>

### Introduction

In Queensland during 1996, cancer was the second most common cause of potential years life lost (before age 75) behind injury, the second most common cause of death behind cardiovascular disease, and the eighth most common reason for hospitalisation.

This circular will describe the current burden of cancer in Queensland. The burden has been measured in terms of incidence (new cases), mortality (deaths), potential years life lost and public hospital costs (full details of each of these measures are contained in the Appendix). Those cancer sites that have contributed a high burden to the Queensland community will be described in more detail. Unless otherwise stated, all data was obtained from the Queensland Cancer Registry, Queensland Health, with rates standardised by age to the 1991 Australian population.

Non-melanocytic skin cancers are the most common cancers in Queensland. However, due to difficulties in defining cases, the expected large volume of notifications and difficulties in collecting data from general practitioners (who treat most cases), data on non-melanocytic skin cancers are not routinely collected. Therefore with the exception of the hospital costs, non-melanocytic skin cancers are excluded from this circular (see Appendix).

The majority of data presented is by primary cancer site. These sites are classified according to ICD-9-CM classifications (National Coding Centre, 1996). Childhood cancer classifications are based on morphology codes (National Coding Centre, 1996), while hospital costs are based on combinations of primary cancer sites and Diagnostic Related Groups.

### Summary

- Cancer was the second most common cause of death in Queensland during 1996.
- Between 1982 and 1996, cancer incidence increased by about 1% per year for females and 2% per year for males, while mortality remained relatively stable.
- Breast cancers and prostate cancers were the most common new cancers among females and males respectively.
- Breast cancers and lung cancers were the most common cause of cancer death among females and males respectively. Leukaemia was the most common cancer and the most common cause of cancer death among children aged under 15 years of age.

### Incidence

During 1996, there were 14,662 new cancer registrations in Queensland. The age standardised incidence rate for males in 1996 was 528.9 cases per 100,000 population, while for females it was 366.4 cases per 100,000 population. Based on 1996 data, the lifetime risk (between the ages of 0 and 74 inclusive) of developing some kind of malignant cancer (excluding non-melanocytic skin cancer) was approximately 1 in 3 for males and 1 in 4 for females living in Queensland.

Since 1982, the age standardised incidence rate has increased by approximately 2% per year for males, and 1% for females (Figure 1). The majority of this increase was observed among people aged 65 years and over, while cancer incidence rates for people less than 65 years of age appear to have remained relatively stable between 1982 and 1996. Increases in recorded incidence can reflect either a real increase in incidence or an increase in the rate of detection or notification of cancers. Short term rises may result from detection of some cancers at an earlier stage.

**Interstate and overseas comparisons**

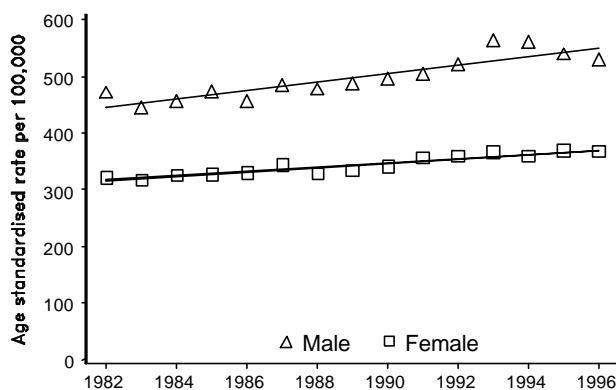
The age-standardised cancer incidence rate in Queensland between 1992 and 1996 was slightly higher than the other states and territories in Australia. (AIHW & AACR, 1999). The higher incidence was mostly accounted for by higher incidence rates of melanoma in Queensland.

Internationally, compared to nineteen other OECD (Organisation for Economic Co-operation and Development) countries, the cancer incidence rate in Australia in 1990 was 3<sup>d</sup> highest among males, behind Canada and United States and 4<sup>th</sup> highest among females behind Canada, United States and New Zealand (Parkin et al., 1999).

**Age and sex distribution**

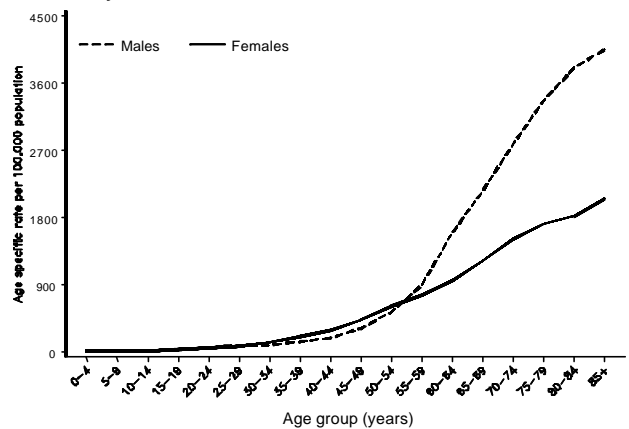
Age-specific cancer incidence rates generally increased as age increased (Figure 2). Over half of the new cancers diagnosed in Queensland in 1996 were diagnosed in persons aged 65 years and over. Before the age of 60 years, there was little sex differential in cancer incidence rates. However, after age 60, the increase in male cancer incidence was substantially greater than the increase in female cancer incidence. By 80 years of age, males were more than twice as likely to develop cancer than females.

**Figure 1 Trends in age-standardised incidence rates for cancer in Queensland between 1982 and 1996**



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

**Figure 2 Average age-specific incidence rates for cancer by sex in Queensland in 1996**

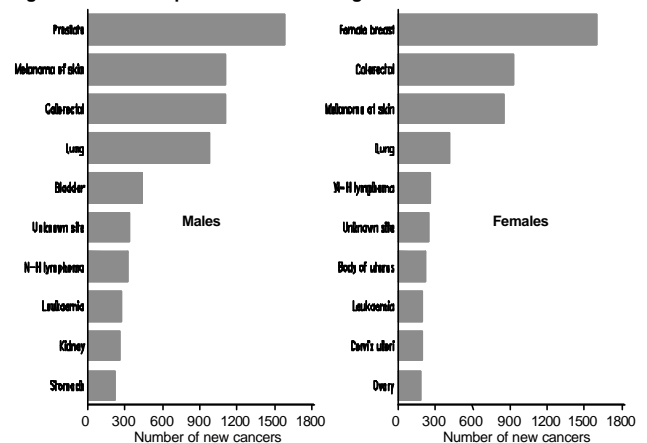


Data source: Queensland Cancer Registry

Breast cancer was the most common incident cancer for females, comprising a quarter (25%) of all female cancers diagnosed in Queensland during 1996 (Figure 3). This was followed by colorectal cancer (14% of all female cancers) and melanoma of the skin (13%). Combined, these three cancers accounted for more than half of all female cancers during 1996.

Cancer of the prostate was the most common incident cancer for males, comprising nearly 20% of all male cancers diagnosed in Queensland during 1996. This was followed by melanoma of the skin (14%), colorectal cancer (14%), and lung cancer (12%). Combined, these four cancers accounted for almost 60% of male cancers that were diagnosed in Queensland during 1996.

**Figure 3 Most frequent cancer sites diagnosed in Queensland in 1996**



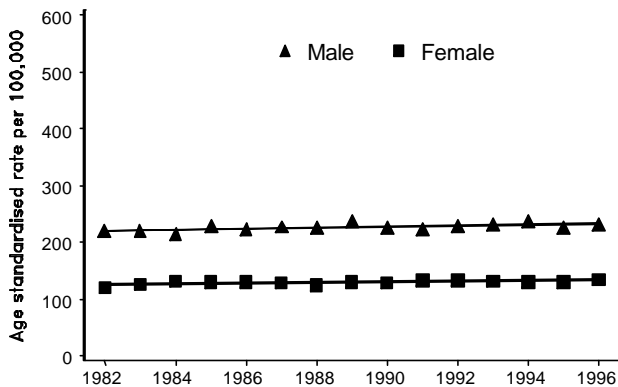
Data source: Queensland Cancer Registry

## Mortality

During 1996, there were 5,938 deaths due to cancer in Queensland. The age standardised mortality rate for males in 1996 was 231.1 deaths per 100,000 population and 135.0 deaths per 100,000 population for females. Based on 1996 data, the lifetime risk of dying from some form of malignant cancer between the ages of 0-74 years was approximately 1 in 6 for males and 1 in 10 for females.

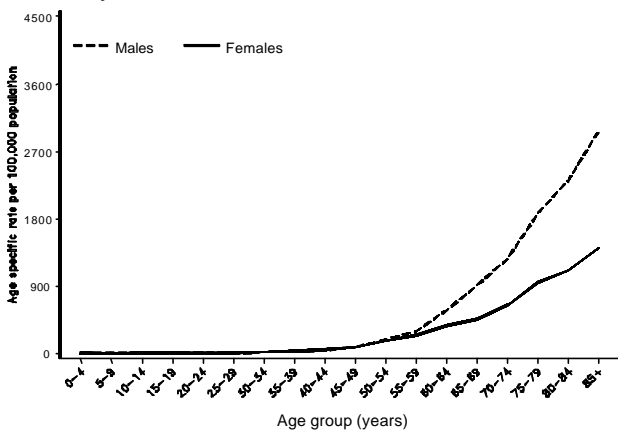
Since 1982, the age standardised mortality rate has remained relatively stable, with only a very slight increase among females (Figure 4).

**Figure 4 Trends in age-standardised mortality rates for cancer in Queensland between 1982 and 1996**



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

**Figure 5 Average age-specific mortality rates for cancer by sex in Queensland in 1996**



Data source: Queensland Cancer Registry

## Interstate and overseas comparisons

The age-standardised cancer mortality rate in Queensland between 1992 and 1996 was similar to the other states in Australia, but lower than the two territories. (AIHW & AACR, 1999). Compared to nineteen other OECD countries, the cancer mortality rate in Queensland during

1995 was 7<sup>th</sup> lowest (for example lower than United States, United Kingdom, New Zealand and Italy). However, mortality attributed to melanoma in Queensland during 1995 among males was the highest among all OECD countries, and second to New Zealand among females (World Health Organisation, 1999).

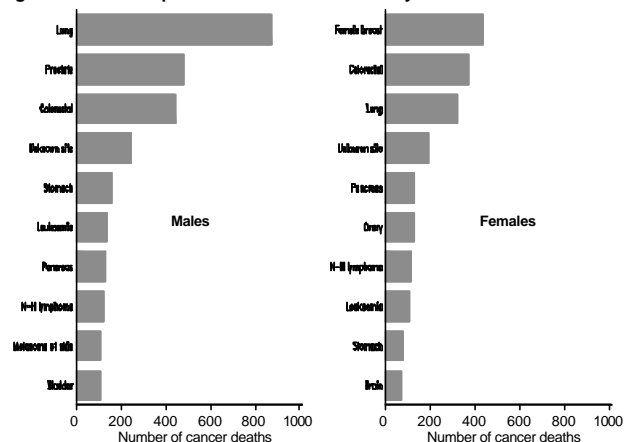
## Age and sex distribution

As was observed with cancer incidence, cancer mortality rates generally increased as age increased (Figure 5). Over two-thirds (69%) of cancer-related deaths occurred in persons aged 65 years and over. Before the age of 60 years, there was little sex differential in cancer mortality rates. However, after age 60, the increase in male cancer mortality was substantially greater than the increase in female cancer mortality. By 80 years of age, males were more than twice as likely to die from cancer than females.

The most common sites in terms of cancer mortality for Queenslanders by sex in 1996 are shown in Figure 6. Breast cancer was the most common cancer mortality site for females, comprising nearly one-fifth (18%) of all female cancer deaths in 1996. This was followed by colorectal cancer (15% of all female cancer deaths), lung cancer (13%) and cancer of the pancreas (5%). Combined, these four cancers accounted for half of all female cancer deaths in Queensland during 1996

Lung cancer was the most common type of cancer death in males in 1996, comprising over a quarter (25%) all male cancer deaths (Figure 6). This was followed by prostate cancer (14%) and colorectal cancer (13%). Combined, these three cancers accounted for more than half of male cancer deaths in Queensland during 1996.

**Figure 6 Most frequent cancer sites for mortality in Queensland in 1996**



Data source: Queensland Cancer Registry

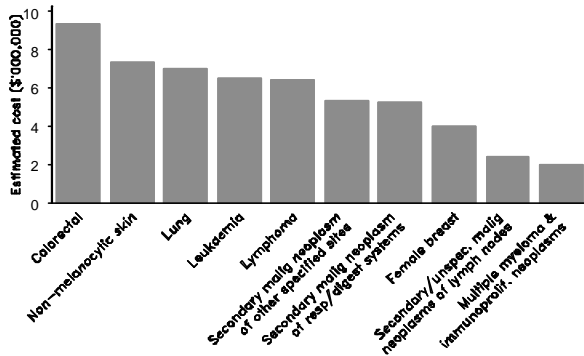
## Potential years life lost

In 1996, there were 48,562 potential years of life lost (PYLL) due to cancer (based on expected lifetime of 75 years). The number of PYLL is a function of the number of deaths and the age at which each person died. Breast cancer claimed the most potential number of years life lost for females (5,273 PYLL) in Queensland in 1996, followed by lung (2,660), colorectal (2,290), ovarian (1,308) and leukaemia (1,258). Lung cancer claimed the most number of potential years life lost for males (6,245 PYLL), followed by colorectal (3,273), leukaemia (1,933), brain (1,850) and melanoma (1,403).

## Cost to the Queensland Public Hospital system

The cost of cancers to the public hospital system in Queensland was estimated by applying Diagnostic Related Groups cost weights to episodes of care during 1996/97 in Queensland public hospitals. Based on these calculations (see Appendix for further details), the cancer-related episodes of care cost about \$80 million in 1996/97. Colorectal cancer was the biggest contributor to this amount (Figure 7), followed by non-melanocytic skin cancer and lung cancer.

Figure 7 Estimated costs of cancer-related conditions in Queensland Public Hospitals in 1996/97 (Top 10 DRGs or sites)



Data source: Queensland Hospital Admitted Patient Data Collection  
Hospital funding model for Queensland Public Hospitals (DRG-related cost weights)  
Includes episodes of care for which the principal condition was cancer,  
or the DRG was cancer-related and cancer was a secondary condition

## Cancer among Indigenous people

The identification of Indigenous people in the Queensland Cancer Registry is improving each year. At present, identification is not considered good enough to publish data for all of Queensland. However, we do have reliable data from the discrete Aboriginal communities in rural and remote Queensland. They show that for the period 1982 to 1996, the incidence of all cancers combined was similar to that for all of Queensland, but the mortality rate for all cancers combined was 50% higher. A similar pattern has been observed in South Australia, Western Australia and the Northern Territory, the three other

jurisdictions that have reasonably reliable data on cancer among Indigenous people (Threlfall & Thompson, 1997; d'Espaignet et al., 1996; SACR, 1997). This pattern suggests that Indigenous people with cancer have poorer survival than non-Indigenous people. The reasons for this are unclear, but could include diagnosis at a more advanced stage and higher rates of typically fatal cancers such as cancer of the lung.

A concurrent Queensland Health Information Circular (Coory et al., 2000) examines in more detail specific cancers among Indigenous people who live in the discrete Aboriginal communities in rural and remote Queensland. Briefly, the Queensland data show that the rates of cancer of the cervix in women and cancer of the lung in both men and women are extremely high among Indigenous people.

## Geographic and socio-economic differences

Cancer mortality rates are up to 93% higher among socio-economically disadvantaged groups in Australia compared to those in less disadvantaged groups (Mathers 1994). The principal contributor to this is lung cancer, with higher rates also observed for cancers of the mouth, pharynx, oesophagus, stomach, rectum, liver, larynx and cervix (Smith et al., 1996). Most of these cancers are related to the prevalence of smoking, which is significantly greater among socio-economically disadvantaged individuals (HIC, 1999).

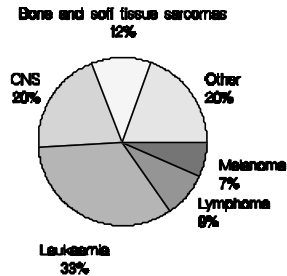
No large mortality differentials exist between Australians who live in rural and remote areas and those living in metropolitan areas (AIHW & CDHFS, 1997), except where indigenous people make up the majority of the population in remote areas. A subsequent information circular will look at geographic and socio-demographic differences in Queensland in further detail.

## Cancer among children

There were 576 new cancer cases registered for children aged 0-14 years old in Queensland between 1992 and 1996 (Figure 8). The most common incident cancers for this age group were leukaemia (all types), cancers of the central nervous system (CNS), bone and soft tissue sarcomas and lymphoma.

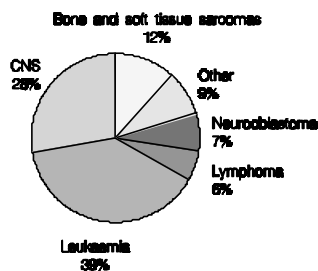
In the same period, there were 152 childhood cancer deaths (Figure 9). The most common cancers causing mortality among children were leukaemia (all types), cancers of the central nervous system (CNS) and bone and soft tissue sarcomas.

**Figure 8** Most common sites for new cases of cancer among children aged 0-14 years in Queensland between 1992 and 1996 (n=576)



Data source: Queensland Cancer Registry  
Excludes non-melanocytic skin cancer  
Cancers based on morphology coding

**Figure 9** Most common cancers causing death among children aged 0-14 years in Queensland between 1992 and 1996 (n=152)



Data source: Queensland Cancer Registry  
Excludes non-melanocytic skin cancer  
Cancers based on morphology coding

## National Health Priority Area cancers

### Melanoma of the skin (ICD-9 code: 172)

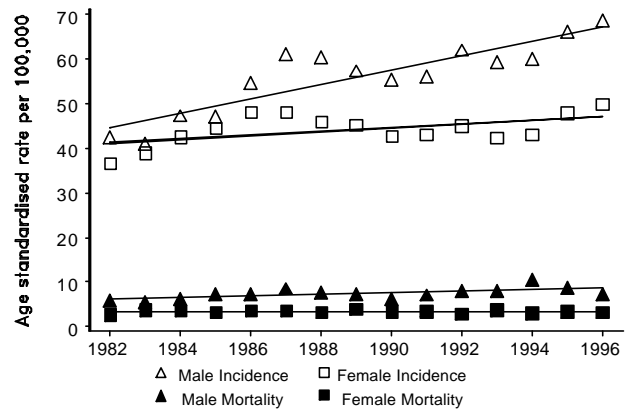
Melanoma of the skin was the second most commonly diagnosed cancer among males and the third most common cancer among females in Queensland during 1996, and ranked eighth among males and twelfth among females for cancer deaths.

During 1996, there were 1,961 cases of melanoma diagnosed in Queensland. The age standardised incidence rate for males was 68.7 cases per 100,000 persons and 49.7 per 100,000 persons for females. Mortality rates for melanoma are much lower than incidence rates, reflecting the good survival rates if melanoma is detected early. During 1996, there were 169 deaths due to melanoma in Queensland. The age standardised mortality rate for males was 7.1 deaths per 100,000 and 3.2 deaths per 100,000 for females.

Between 1982 and 1996, the incidence rate for melanoma

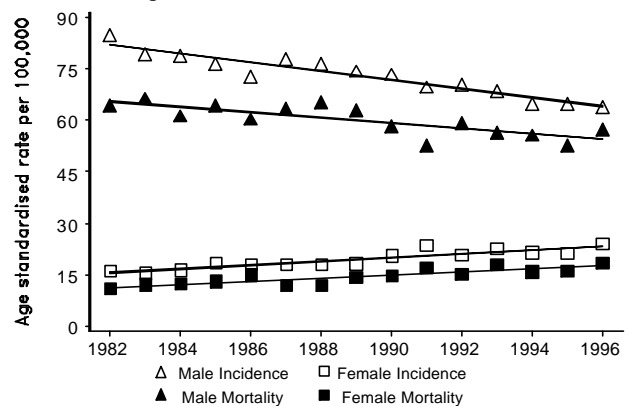
among males has increased by almost 3% per year, while the female rates have increased by about 1% per year (Figure 10). During the same period, mortality increased by almost 2% per year for males, but remained stable for females.

**Figure 10** Trends in age-standardised mortality and incidence rates for melanoma in Queensland between 1982 and 1996



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

**Figure 11** Trends in age-standardised mortality and incidence rates for lung cancer in Queensland between 1982 and 1996



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

### Lung cancer (ICD-9 code: 162)

In terms of cancer deaths, lung cancer was the most common cancer site for Queensland males and ranked third for females during 1996. Lung cancer was the fourth most common site for new cancers for both males and females during 1996.

During 1996, there were 1,397 new cases of lung cancer diagnosed in Queensland. The age standardised incidence rate for males was 63.7 cases per 100,000 and 24.1 per 100,000 for females. In the same period there were 1,195 deaths due to lung cancer in Queensland. The age standardised mortality rate for males was 57.4 deaths per 100,000 and 18.4 deaths per 100,000 for females.

Lung cancer incidence and mortality rates decreased for males between 1982 and 1996 by approximately 1% per year (Figure 11). Conversely, the incidence and mortality rates for females increased by 3% per year. Trends in lung cancer largely reflect the change in smoking habits or occupational exposure that took place more than 20 years ago. A comprehensive approach is required to reduce incidence and mortality rates, including strategies which prevent the uptake of smoking, promote smoking cessation and reduce exposure to tobacco.

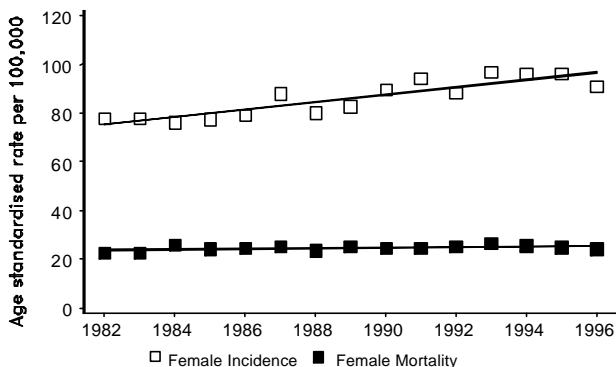
**Female Breast Cancer (ICD-9 code: 174)**

Female breast cancer was the most common cancer site for new cancers and deaths from cancer among females in Queensland during 1996.

During 1996, there were 1,594 cases of breast cancer diagnosed among females in Queensland, with an age standardised incidence rate of 90.6 per 100,000. During the same period, there were 435 deaths due breast cancer among females in Queensland. The age standardised mortality rate for females was 24.1 deaths per 100,000.

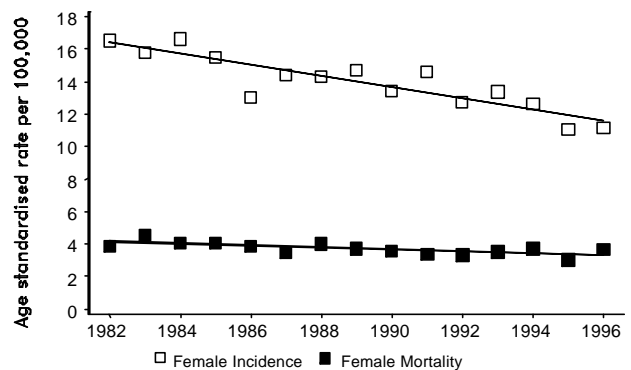
Between 1982 and 1996, the age-standardised incidence of breast cancer among females in Queensland rose by approximately 2% per year (Figure 12). Mortality rates were stable between 1982 and 1993, and decreased slightly thereafter. While it is too early for this decrease to be declared a real trend, this pattern is encouraging and is likely to be a result of increased screening activity and early detection of breast cancer.

**Figure 12 Trends in age-standardised mortality and incidence rates for breast cancer among females in Queensland between 1982 and 1996**



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

**Figure 13 Trends in age-standardised mortality and incidence rates for cervical cancer among females in Queensland between 1982 and 1996**



Rates standardised using Australian 1991 population  
Data source: Queensland Cancer Registry

**Cancer of the cervix (ICD-9 code: 180)**

Cervical cancer accounted for almost 3% of all female cancer deaths (tenth most common) and almost 3% of all new cancer registrations (eighth most common) in Queensland during 1996. A very strong association between the human papillomaviruses (HPV) infection and cervical cancer has been demonstrated in epidemiological studies (Schiffman et al., 1996).

During 1996, there were 190 cases of cervical cancer diagnosed among females in Queensland, with an age standardised incidence rate of 11.1 per 100,000. During the same period, there were 64 deaths due to cervical cancer among females in Queensland. The age standardised mortality rate for females was 3.6 deaths per 100,000.

Between 1982 and 1996, the age-standardised incidence of cervical cancer among females decreased by approximately 2% per year, with a similar decrease in mortality (Figure 13). This decrease can be largely attributed to the increased cervical screening coverage in the at-risk population.

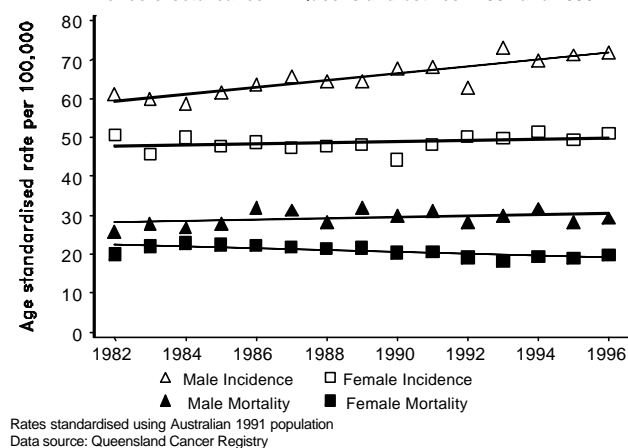
**Colorectal cancer (ICD-9 code: 153 and 154)**

Colorectal cancer was the second most common cancer for females and the third most common for males in terms of incidence and mortality among Queenslanders in 1996.

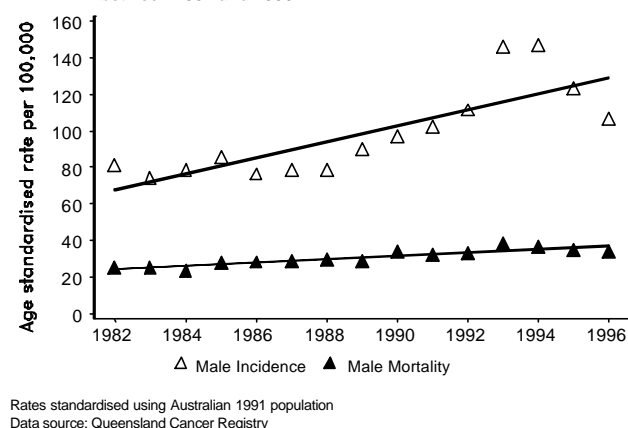
During 1996, there were 2,031 new cases of colorectal cancer diagnosed in Queensland. The age standardised incidence rate for males was 71.7 cases per 100,000 and 51.2 per 100,000 for females. In the same period there were 813 deaths due to colorectal cancer in Queensland. The age standardised mortality rate for males was 29.3 deaths per 100,000 and 19.8 deaths per 100,000 for females.

From 1982 to 1996 mortality from colorectal cancer in Queensland has decreased for females by about 1% per year, while the male rate has remained stable (Figure 14). During the same period incidence increased by 1% per year for males, and remained stable for females.

**Figure 14** Trends in age-standardised mortality and incidence rates for colorectal cancer in Queensland between 1982 and 1996



**Figure 15** Trends in age-standardised mortality and incidence rates for prostate cancer among males in Queensland between 1982 and 1996



### Prostate Cancer (ICD-9 code: 185)

In 1996, prostate cancer was the most common malignant cancer among Queensland males and the second most common cause of cancer death. Prostate cancer rates increase with age, being rare in men under 50 years of age.

During 1996, there were 1,579 cases of prostate cancer diagnosed among males in Queensland, with an age standardised incidence rate of 106.6 per 100,000. During the same period, there were 480 deaths due to prostate cancer among males in Queensland. The age standardised mortality rate for males was 34.1 deaths per 100,000.

Incidence rates for prostate cancer have increased in

Queensland by an average of 5% per year between 1982 and 1996 (Figure 15). Much of the increase is due to increased use of the prostate-specific antigen (PSA) test. This first became available in 1987 and appeared in the Medicare Benefits Schedule in 1989. Sharp increases in PSA testing and new cases of prostate cancer occurred in 1993. Incidence rates decreased somewhat after 1994, but are still much higher than pre-PSA testing levels. The post-1994 decrease is not surprising and is probably because an increased proportion of men are now receiving repeat as opposed to initial tests.

Mortality rates from prostate cancer have increased steadily by 3% per year between 1982 and 1996 (Figure 15). This is higher than the trends reported for the other states in Australia. The incidence of prostate cancer is particularly high among older men and it is possible that an important proportion of older men who die have both prostate cancer and other conditions that could cause their death. Consequently, both the certification of the cause-of-death by medical practitioners and the subsequent coding of the cause-of-death by clerical staff are open to interpretation. Because the numbers of diagnosed cases of prostate cancer have increased markedly in recent years, it is likely that the level of interpretation used when certifying or coding the cause-of-death has increased. The increasing trend in mortality using data from the Queensland Cancer Registry was also observed for the Australian Bureau of Statistics data for Queensland. Consequently, the increase is unlikely to be due to coding practices at the Queensland Cancer Registry.

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## Appendix

*Cancer incidence* is defined as the number of new cancers first registered for a given population during a specified period. The data presented in this report only includes invasive cancers at the primary sites, and exclude non-melanocytic skin cancers.

*Cancer mortality* is defined as the number of deaths notified to the cancer registry for persons who died during a specified time period and who usually resided in Queensland at the time of diagnosis of cancer. Therefore mortality rates in this report may differ from those derived from Australian Bureau of Statistics (ABS) Causes of Death which is based on usual residence in Queensland at the time of death. In addition the cancer registry has more information for coding the cause of death than the ABS, which may result in slight differences in coding between the two data sources. However, these differences are marginal.

*Expected lifetime* is the number of years taken to be a person's expected lifetime, and for this report is equal to 75 years (ie lifetime is taken to be between 0 and 74 years). Although current data suggests that the average life expectancy for males in Australia is 75 years and for females 81 years, 75 years is still regarded as the standard cut-off for lifetime in cancer publications worldwide. In addition, it was considered confusing to use 75 years for males and 80 years for females.

*Lifetime risk* is the estimated risk that a person will develop cancer or die from cancer during their expected lifetime (before 75 years of age). In this report, the lifetime risk is based on 1996 data, and is the risk that would occur if people passed through the age-specific incidence (or mortality) rates in 1996. In practice this is impossible since the age-specific rates will change over a person's lifetime. However the lifetime risk is a method of summarising current data.

*Potential-years life lost (PYLL)* is an estimate of the number of years of life that are lost during their expected lifetime (before 75 years of age) when a person dies from a specified condition. For conditions with equal incidence, a higher PYLL value indicates that people tend to die at an earlier age for that condition than for one with a lower PYLL.

*Direct age-standardised rates* are used to enable comparison between populations where the age profile changes over time. In this report, all rates are standardised to the Australian age-specific population distribution in 1991.



*Non-melanocytic skin cancers* are the most common cancers in Queensland. However, due to difficulties in defining cases, the expected large volume of notifications and difficulties in collecting data from general practitioners (who treat most cases), data on non-melanocytic skin cancers are not routinely collected by cancer registries. Estimates of the incidence of non-melanocytic skin cancer in Queensland (based on survey data in 1984) indicate that Queensland has the highest recorded incidence rates in the world, with rates in men almost double the rates in women, and age-specific incidence rates increased curvilinearly with age (Stenbeck et al., 1990).

*Hospital costs* were calculated based on the Phase 3 Hospital Funding Model for Queensland public hospitals (Queensland Health, 1997). In this report, all hospital separations for which the principal condition was cancer, or the Diagnostic Related Group (DRG) was cancer-related and cancer was a secondary condition. The Hospital Funding Model is DRG based, and costs are assigned according to, among other things, the type of DRG, the length of stay, and the category of the hospital. The calculations only include the variable payments (including acute inpatient, medical, high cost, outlier, sub and non-acute, and designated psychiatric unit). They do not include fixed payments such as infrastructure, teaching and special grants.