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# Cancer incidence and mortality in Indigenous Australians in Queensland, 1997–2006

Suzanne P Moore, Peter K O'Rourke, Kylie-Ann Mallitt, Gail Garvey, Adèle C Green, Michael D Coory and Patricia C Valery

Cancer is now the second leading cause of death, after heart disease, in Indigenous Australians.<sup>1</sup> Although the age-standardised incidence of all cancers in Indigenous Australians is similar to that for the rest of the Australian population, death rates are up to 45% higher.<sup>2</sup> Reasons for the higher mortality are multifaceted; they may include diagnosis at a later stage of cancer, as well as elevated incidence of cancer types with higher case-fatality rates (ie, lung, liver and gallbladder, pancreas, and stomach cancers).<sup>2,3</sup> Cancer registries in the Northern Territory, Western Australia and South Australia have published population-based cancer incidence and mortality rates for Indigenous people,<sup>4</sup> but to date Queensland data are available only for selected rural and remote Indigenous communities.<sup>5</sup> Our aim was to assess incidence and mortality rates for cancers diagnosed among Indigenous people in all of Queensland.

## METHODS

Incidence and mortality data for the Indigenous and total Queensland populations for 1997–2006 were obtained from the Queensland Cancer Registry. Averaged estimates of the Indigenous and total resident populations of Queensland were obtained from censuses conducted in 1996, 2001 and 2006.<sup>6</sup> Indirectly age-standardised incidence and mortality ratios for Indigenous Australians in Queensland (compared with the total Queensland population) were calculated using the total Indigenous resident population in Queensland and cancer incidence and mortality data for the Indigenous and total Queensland populations. Comparisons were made with cancer rates for the total Queensland population because only 1% of cancers in Queensland are diagnosed in people known to be Indigenous.

## RESULTS

From 1997 to 2006, 1936 cancer diagnoses were identified among the Indigenous Queensland population, representing an annual incidence rate of 172 per 100 000 people. Overall, Indigenous people were 21% less likely to be diagnosed with cancer than the total Queensland population (standardised incidence ratio, 0.79; 95% CI, 0.75–0.82).

## ABSTRACT

**Objective:** To examine cancer incidence and mortality in Indigenous Queenslanders.

**Design, setting and patients:** Assessment of indirectly standardised incidence and mortality ratios for Indigenous Australians in Queensland diagnosed with cancer from 1997 to 2006, compared with the total Queensland population.

**Main outcome measures:** Standardised incidence and mortality ratios.

**Results:** Compared with the total Queensland population, Indigenous Queenslanders had a lower overall incidence of cancer (standardised incidence ratio, 0.79; 95% CI, 0.75–0.82), but a higher incidence of some of the more fatal cancer types. Overall cancer mortality was higher (standardised mortality ratio, 1.36; 95% CI, 1.28–1.45) and similar to rates for Indigenous people in other Australian states.

**Conclusion:** Cancer rates for Indigenous Queenslanders, a mostly urbanised population, are similar to rates for Indigenous Australians mostly living in remote areas.

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Standardised incidence ratios by cancer type and sex are shown in Box 1. Compared with the total Queensland population, Indigenous people had markedly lower rates of cancers of the skin, breast, prostate, colon and rectum, bladder, and brain and central nervous system. Indigenous females experienced an 18% lower incidence of breast cancer, and Indigenous males were 45% less likely to develop prostate cancer. Rates of cancer of the trachea, bronchus and lung, liver and biliary tract, and oesophagus were higher for Indigenous people compared with the state population and, among Indigenous females, cervical cancer and uterine cancer were 3.45 and 2.41 times more common, respectively.

There were 955 cancer-related deaths in the Indigenous Queensland population during the period 1997–2006; 495 males (mortality rate, 89 deaths per 100 000 people per year) and 460 females (mortality rate, 80 deaths per 100 000 people per year). Overall, Indigenous people were 36% more likely to die from cancer than the total Queensland population (standardised mortality ratio, 1.36; 95% CI, 1.28–1.45).

Standardised mortality ratios by cancer type and sex are shown in Box 2. Cancer-related death among Indigenous males was 1.28 times more common (95% CI, 1.17–1.40) and among females was 1.47 times more common (95% CI, 1.33–1.61) when compared with all Queensland males and females, respectively. There were no marked differences in breast cancer mortality in females and prostate cancer

in males compared with the total Queensland population.

Cancer incidence and mortality rates for Indigenous people in Queensland were fairly constant over the 10-year study period (Box 3).

## DISCUSSION

The overall incidence of cancer among Indigenous people in Queensland for the period 1997–2006 was 21% lower than in the total Queensland population but, in contrast, the mortality rate for all cancers was 36% higher.

The lower overall incidence of cancer in Indigenous Queenslanders was mostly due to lower incidence of colorectal, prostate, breast and skin cancers, similar to findings reported for other states and territories.<sup>8,9</sup> Age-adjusted incidence rates of trachea, bronchus and lung cancers were nearly double those of other Queenslanders. Cervical cancer was the third most common cancer in Indigenous females, in contrast to being the 14th most common cancer for all females in Queensland.<sup>10</sup> Rates of trachea, bronchus and lung and cervical cancers were comparable to rates reported for Indigenous people in other Australian jurisdictions.<sup>8,11,12</sup> In addition, incidence of uterine cancer was more than twice as high for Indigenous females.

Lifestyle factors may have contributed to increased rates of some cancers. Higher rates of smoking<sup>13,14</sup> may have increased the risk of lung cancer, and higher rates of hepatitis

### 1 Incidence of cancer in Indigenous Australians in Queensland compared with the total Queensland population, 1997–2006

Cancer type (ICD-O-3 codes)	Male		Female	
	n	SIR (95% CI)	n	SIR (95% CI)
All cancers (C0–C96)	905	0.72 (0.68–0.77)	1031	0.85 (0.80–0.91)
Head and neck (C0–C14)	72	1.29 (1.01–1.62)	35	0.99 (0.69–1.37)
Digestive cancer (C15–C25)	249	1.16 (1.02–1.31)	172	0.89 (0.76–1.03)
Oesophageal (C15)	44	3.32 (2.42–4.46)	11	1.22 (0.61–2.19)
Stomach (C16)	37	1.80 (1.27–2.48)	10	0.68 (0.32–1.24)
Colorectal (C18–C20)	83	0.60 (0.48–0.74)	88	0.67 (0.54–0.83)
Liver and biliary tract (C22–C24)	44	2.89 (2.10–3.88)	34	2.48 (1.72–3.47)
Pancreas (C25)	32	1.70 (1.16–2.39)	18	0.98 (0.58–1.54)
Respiratory (C30–C38)	218	1.82 (1.59–2.08)	127	1.49 (1.24–1.77)
Trachea, bronchus, lung (C33, C34)	194	1.85 (1.59–2.12)	119	1.51 (1.25–1.80)
Bone and cartilage (C40, C41)	4	0.75 (0.20–1.91)	5	0.97 (0.31–2.25)
Melanoma (C44)	13	0.06 (0.03–0.11)	15	0.07 (0.04–0.12)
Mesothelial and soft tissue (C45–C49)	12	0.42 (0.22–0.74)	15	0.93 (0.52–1.53)
Breast (C50)*	—	—	226	0.82 (0.72–0.94)
Female genital organs (C51–C58)	—	—	245	2.63 (2.31–2.98)
Cervix (C53)	—	—	94	3.45 (2.78–4.22)
Corpus uteri (C54)	—	—	81	2.41 (1.92–3.00)
Ovary (C56)	—	—	47	1.89 (1.39–2.51)
Male genital organs (C60–C63)	115	0.59 (0.49–0.71)	—	—
Prostate (C61)	94	0.55 (0.45–0.68)	—	—
Urinary tract (C64–C68)	56	0.72 (0.54–0.93)	35	0.64 (0.45–0.89)
Bladder (C67)	26	0.59 (0.38–0.86)	19	0.73 (0.44–1.14)
Eye, brain and other CNS (C69–C72)	15	0.49 (0.27–0.80)	10	0.35 (0.17–0.65)
Brain and CNS (C70–C72)	14	0.55 (0.30–0.93)	9	0.39 (0.18–0.74)
Thyroid and other endocrine (C73–C75)	10	0.43 (0.21–0.79)	33	0.87 (0.60–1.22)
Thyroid (C73)	8	0.38 (0.17–0.75)	31	0.87 (0.59–1.23)
Unspecified site (C26, C39, C76–C80)	41	1.40 (1.00–1.90)	36	1.29 (0.90–1.78)
Lymphomas and leukaemias (C42, C81–C85, C91–C96)	74	0.73 (0.57–0.92)	49	0.55 (0.41–0.73)
All other neoplasms (C88, C90)	24	0.76 (0.48–1.13)	28	1.02 (0.67–1.47)

ICD-O-3 = *International classification of diseases for oncology*, 3rd edition.<sup>7</sup> SIR = standardised incidence ratio. CNS = central nervous system. \* SIR not calculated for two Indigenous males. ◆

B infection and excessive alcohol consumption (among those Indigenous people who drink)<sup>8,15</sup> may have increased the risk of liver cancer. Also, lower participation in cervical cancer screening programs<sup>16,17</sup> and increased rates of obesity, the latter a risk factor for uterine cancer,<sup>18,19</sup> may be associated with higher rates of cervical and uterine cancer in Indigenous women.

The higher cancer mortality rate in Indigenous Queenslanders was mostly because of higher mortality due to cancers of the trachea, bronchus and lung, digestive tract, head and neck, cervix, and uterus. Diagnosis at a later stage of cancer, less uptake of cancer treatment, and a greater number of

comorbidities may have also contributed to the higher mortality.<sup>3,20</sup>

Some evidence suggests that Indigenous patients are occasionally reluctant to identify as Indigenous and that hospital staff might not ask, or might make an educated guess, about Indigenous status.<sup>21</sup> As hospital records are the primary source of Indigenous status data for the Queensland Cancer Registry, underreporting of Indigenous status may have resulted in underestimation of cancer incidence in our study. However, this is unlikely to be substantial as our results concur with a 2005 Queensland Health study of cancer in discrete Indigenous communities (where Indigenous status is

assured), which found standardised incidence ratios of 0.70 (95% CI, 0.59–0.83) for males and 0.79 (95% CI, 0.66–0.94) for females.<sup>22</sup> Also, results of a data quality audit estimated high rates of correct identification of Indigenous status (88% of Indigenous patients and 98% of non-Indigenous patients) in Queensland hospitals.<sup>23</sup>

From 1997 to 2006, cancer incidence and mortality in Indigenous people in Queensland, a predominantly urbanised population, were similar to the cancer rates for Indigenous people mostly living in remote areas of Australia.<sup>5</sup> A number of the cancers which contributed to the high mortality rate are preventable through screening, lifestyle changes, and implementation of specific public health initiatives — for example, culturally appropriate strategies aimed at reducing tobacco use and obesity could reduce cancer incidence and mortality. Advanced cancer at diagnosis, low uptake of cancer treatment, and high rates of comorbidities in Indigenous people appear to be some of the factors leading to the poorer outcomes,<sup>3,8</sup> hence improved access to and delivery of culturally appropriate health care services<sup>4</sup> could reduce the disparity in cancer outcomes in Australia.

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### COMPETING INTERESTS

None identified.

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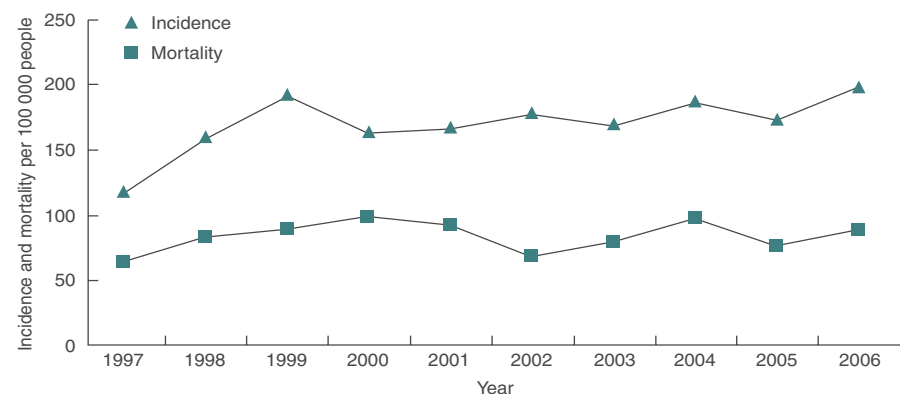
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## 2 Cancer-related mortality in Indigenous Australians in Queensland compared with the total Queensland population, 1997–2006

Cancer type (ICD-O-3 codes)	Male		Female	
	n	SMR (95% CI)	n	SMR (95% CI)
All cancers (C0–C96)	495	1.28 (1.17–1.40)	460	1.47 (1.33–1.61)
Head and neck (C0–C14)	40	3.27 (2.33–4.45)	24	3.10 (1.99–4.61)
Digestive cancer (C15–C25)	146	1.48 (1.25–1.74)	90	1.06 (0.85–1.30)
Oesophageal (C15)	33	3.53 (2.43–4.95)	8	1.33 (0.57–2.62)
Stomach (C16)	22	1.57 (0.98–2.37)	10	1.11 (0.53–2.04)
Colorectal (C18–C20)	30	0.65 (0.44–0.93)	29	0.67 (0.45–0.96)
Liver and biliary tract (C22–C24)	35	3.28 (2.29–4.56)	26	2.78 (1.81–4.07)
Pancreas (C25)	23	1.39 (0.88–2.09)	15	0.99 (0.55–1.63)
Respiratory (C30–C38)	169	1.94 (1.65–2.26)	103	1.69 (1.38–2.05)
Trachea, bronchus, lung (C33, C34)	154	1.86 (1.58–2.18)	97	1.64 (1.33–2.00)
Bone and cartilage (C40, C41)	0	0.00 (0.00–1.93)	1	0.72 (0.02–4.00)
Melanoma (C44)	3	0.17 (0.03–0.49)	1	0.08 (0.00–0.44)
Mesothelial and soft tissue (C45–C49)	7	0.44 (0.18–0.92)	4	0.52 (0.14–1.33)
Breast (C50)*	—	—	60	1.25 (0.95–1.61)
Female genital organs (C51–C58)	—	—	95	4.00 (3.23–4.89)
Cervix (C53)	—	—	44	7.51 (5.45–10.08)
Corpus uteri (C54)	—	—	21	4.61 (2.86–7.05)
Ovary (C56)	—	—	25	2.15 (1.39–3.18)
Male genital organs (C60–C63)	36	1.25 (0.87–1.73)	—	—
Prostate (C61)	34	1.22 (0.84–1.71)	—	—
Urinary tract (C64–C68)	14	0.80 (0.44–1.35)	15	1.17 (0.66–1.93)
Bladder (C67)	3	0.38 (0.08–1.11)	11	2.10 (1.05–3.75)
Eye, brain and other CNS (C69–C72)	13	0.73 (0.39–1.24)	5	0.30 (0.10–0.71)
Brain and CNS (C70–C72)	13	0.76 (0.40–1.30)	5	0.32 (0.10–0.74)
Thyroid and other endocrine (C73–C75)	2	0.99 (0.12–3.59)	2	1.03 (0.13–3.73)
Thyroid (C73)	1	1.42 (0.04–7.90)	2	2.16 (0.26–7.79)
Unspecified site (C26, C39, C76–C80)	27	1.42 (0.94–2.07)	30	1.53 (1.03–2.18)
Lymphomas and leukaemias (C42, C81–C85, C91–C96)	31	1.05 (0.71–1.48)	23	0.90 (0.57–1.35)
All other neoplasms (C88, C90)	7	0.22 (0.089–0.45)	7	0.92 (0.37–1.89)

ICD-O-3 = International classification of diseases for oncology, 3rd edition.<sup>7</sup> SMR = standardised mortality ratio. CNS = central nervous system. \* SMR not calculated for one Indigenous male. ◆

## 3 Incidence and mortality rates for Indigenous Australians diagnosed with cancer, Queensland, 1997–2006



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