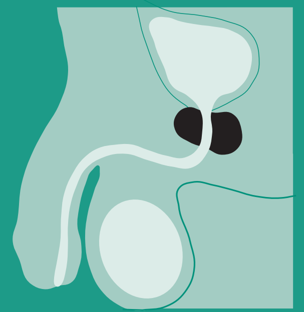
Canstat



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Canstat: A digest of facts and figures on cancer

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Prostate Cancer

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Overview

In 1997 prostate cancer was diagnosed in 2,436 men and caused 658 deaths in Victoria.

Prostate cancer is very age-dependant, with more than half of new cancers being diagnosed in men over 70.

The nature of prostate cancer

The prostate is a male sex gland located at the base of the bladder. Its function is to produce the major part of the fluid that makes up semen. At puberty, under the influence of testosterone, the prostate grows to its adult size of 20 gms and resembles a walnut in appearance. After middle age, changing hormonal levels cause the prostate to continue to grow — some prostates may reach 100 gms or more. This benign growth is contained within the prostate's tough outer membrane and as a consequence the urethra, which passes through the prostate, is compressed, causing urinary problems.

There are no symptoms that are specific to prostate cancer. Most of the urinary symptoms common in aging men are due to the normal growth described above, a condition known as BPH (benign prostatic hypertrophy).

Autopsy studies have shown that with advanced age, a majority of prostates will have microscopic evidence of cancerous cells. The nature of prostate cancer, however, is to be very slow growing. In a man's lifetime, only a small proportion of common microscopic cancers will grow sufficiently to threaten life; most men die with prostate cancer not from it.

There are two crucial questions to which we need answers:;

- what causes a small proportion of microscopic cancers to grow and spread?
- how can we distinguish between those cancers that will remain indolent and those that will grow?

Incidence and mortality

Prostate cancer is the most commonly diagnosed cancer in Australian males and has been so since 1989 when rates began to increase. **Table 1** compares numbers and rates in Victoria in 1987 with those in 1997. During this decade the numbers of prostate cancer diagnoses have more than doubled. The number of deaths has also increased (50%) but the increase in mortality is driven largely by aging of the population — the age-adjusted death rate only increasing by 7%. This is further illustrated in **Figure 1** where the age distributions of the new diagnoses and deaths in 1987 and 1997 are compared.

Histological types

Of 2,412 prostate cancers diagnosed in 1997, 94% were histologically verified. Ninety-eight per cent of these tumours were adenocarcinomas. The remaining 2% comprised mostly unspecified (and 0.5% acinar cell) carcinomas.The distribution of tumours by grade was 19%, 46%, 23%, 0.1% for grades 1–4 (well-, moderately-, poorly-, and un-differentiated). Grade was not obtained for 11% of cases.

Gleason scores were obtained for 1,985 tumours. The distribution of scores in the ranges <4, 5–7, and >7 was 19%, 62% and 19% of tumours respectively.

Pathological stage

Stage was not available from the Victorian Cancer Registry as details of lymph node and distant metastases do not form part of the dataset.

However, for 1,985 (82%) of cases the T-stage (primary tumour) was obtained. Of these 83% were T1=clinically localised tumour not palpable or visible by imaging (39% incidental findings and 44% identified by needle biopsy because of elevated PSA levels). 13% had T2 tumours (palpable but confined to the prostatic capsule) and <4% (3% T3, <1% T4) had tumour extending beyond the capsule.

Figure 1

Age distribution of new diagnoses and deaths from prostate cancer, Victoria 1987 & 1997

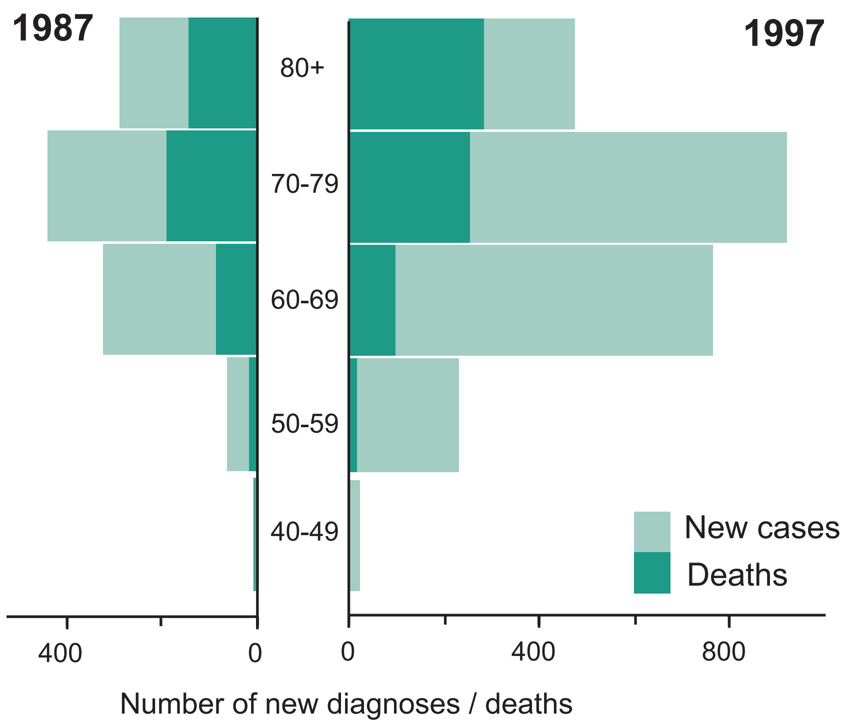


Table 1

The size of the problem: prostate cancer in Victoria 1987 & 1997

	1987	**1997**	*Increase*
INCIDENCE			
New cases	1,117	2,436	*118%*
Age-standardised rate	40.5	72.8	*80%*
Risk to age 75 (%)	4.5	8.5	*89%*
Median age (years)	74	72	*-3%*
MORTALITY			
Deaths	438	658	50%
Age-standardised rate	16.1	17.3	7%
Median age (years)	76	78	*3%*

Population variation

International comparisons

Australia has fairly moderate rates of prostate cancer. **Figure 2** shows a range of age-standardised incidence rates taken from Volume VII of Cancer Incidence in Five Continents, covering the years 1988–92. In this period, which included only the very early years of PSA testing, the highest rates in the world were observed in American blacks (137), followed by American whites (100). Australian rates (range 45 to 50) were close to those of many European countries (range 20–60).

Figure 3 shows the prostate cancer incidence rates in American whites (USA SEER registries), Victoria, Canada, Denmark and England and Wales from the same volume of Cancer Incidence in Five Continents along with mortality rates obtained from the WHO mortality data banks. Although there are marked differences in incidence between these populations (a product of different policies with respect to screening), the mortality rates are very close.

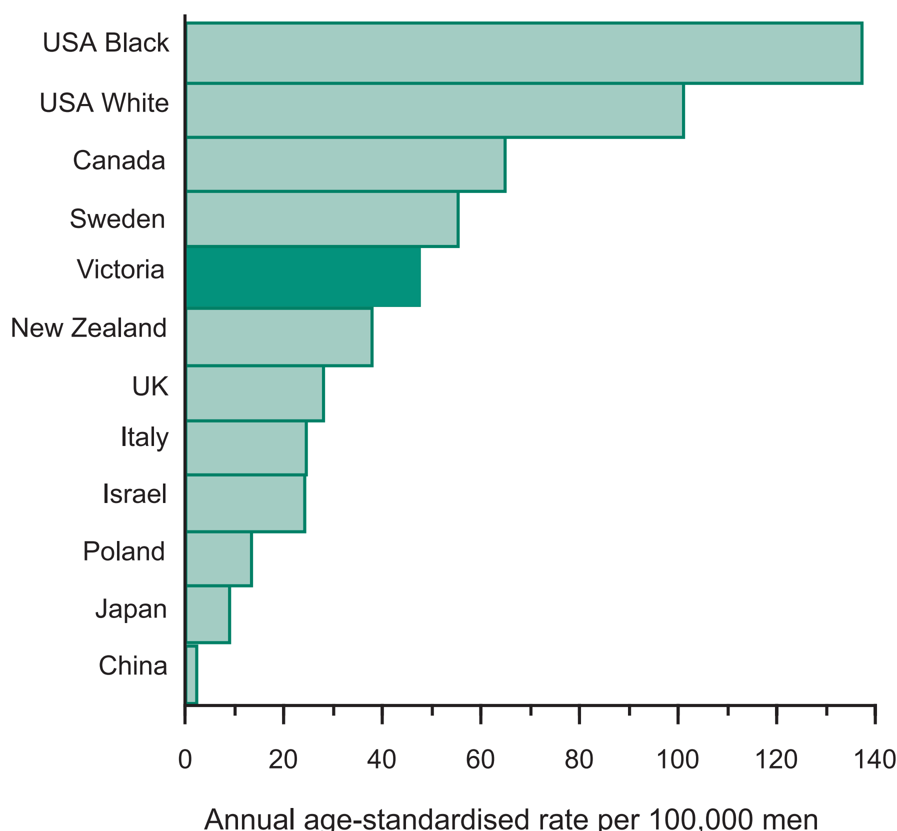
Migrants

Within Australia there exist population sub-groups that experience different risks of prostate cancer. **Figure 4** compares the age-standardised prostate cancer incidence rates for various migrant groups with men who were born in Australia. It can be seen from this graph that men who migrated from countries of southern Europe and Asia have around one third of the incidence of Australian-born men. This is taken to be evidence of the importance of environmental factors (lifestyle factors such as diet) in causing prostate cancer.

Figure 2

International incidence of prostate cancer

The countries chosen for international comparisons are from registries included in Cancer Incidence in Five Continents Vol VII [1]. They include Australia (Victoria), New Zealand (non-Maori), USA (SEER whites & SEER blacks), Italy (Parma), Israel (All Jews), England (UK, England & Wales), Japan (Miyagi), China (Shanghai) and Poland (Cracow City).



[1] Parkin DM, Whelan SL, Ferlay J, Raymond L & Young J eds (1997) Cancer Incidence in Five Continents, Vol VII (IARC Scientific Publications No. 143) Lyon, IARC

Figure 3

Prostate cancer incidence (1988–1992) and mortality (1990) in the UK (England & Wales), Denmark, Victoria, Canada and USA (SEER, whites)

Incidence data from Cancer Incidence in Five Continents Vol VII.[1] Mortality data from the WHO Cancer Mortality data bank.

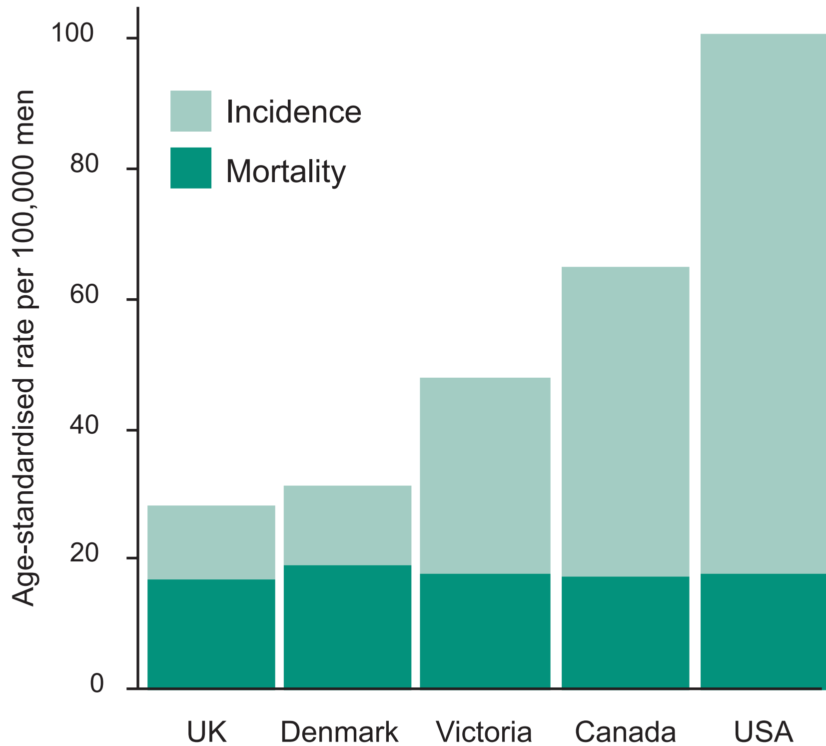
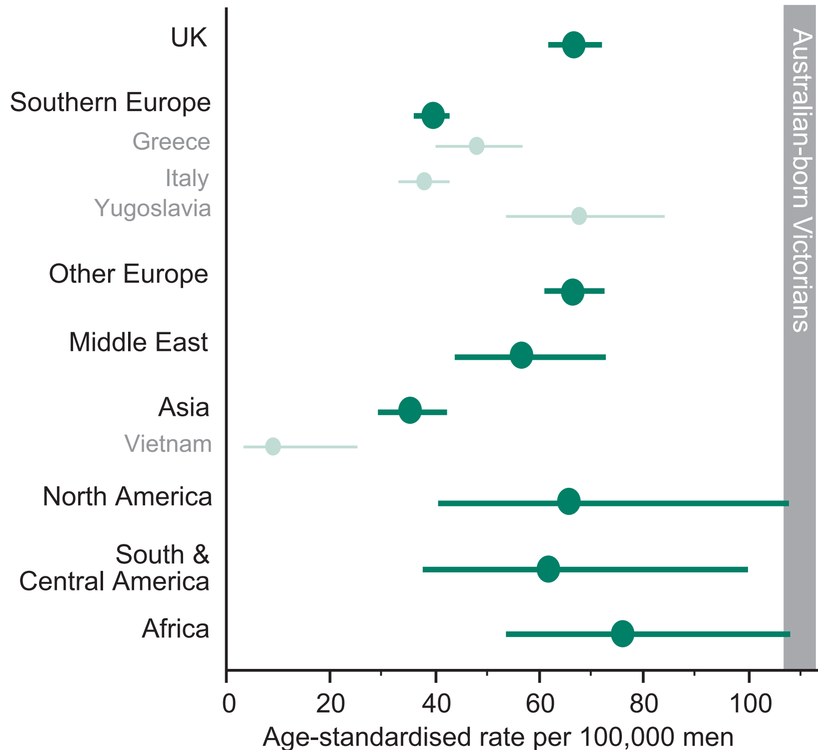


Figure 4

Prostate cancer incidence in Victoria by region of birth 1995–1997

In this graph the vertical bar represents the 95% confidence interval for the Australian-born rate (110.5 per 100,000). For the other regions of birth, age-standardised rates are shown with their 95% confidence intervals drawn as horizontal lines (the wider the confidence interval, the smaller the number of events).

Migrants from all regions except North America and Africa have significantly lower rates than Australian-born Victorian men.



Incidence rose dramatically from 1987 to 1995 with the advent of PSA testing. Between 1995 and 1997 rates fell by 33% suggesting a return towards the underlying incidence rate.

Time trends

Victorian prostate cancer incidence and mortality trends from 1982–97 are shown in **Figure 5.**

Trends in incidence

The incidence of prostate cancer shows a remarkable trend line—increasing sharply in the early 1990s, peaking and then falling. This phenomenon is closely related to the prevalence of blood testing for prostate specific antigen (PSA). Incidence rose steeply from 1987 to the peak in 1995, largely due to the detection of cancers (before the onset of clinical symptoms) by PSA testing. Between 1995 and 1997 rates fell by 33%; this would appear to indicate a return towards the underlying incidence rate.

Figure 6 illustrates the number of prostate cancer diagnoses compared with the number of other cancers diagnosed in Victorian men. Prostate cancer far exceeds bowel cancer and lung cancer but is only the third-ranking cancer cause of death after lung and bowel.

Trends in mortality

Figure 7 displays the trend in the age-standardised prostate cancer mortality rate in Australia since 1910. This shows a slow upward trend over the last fifty years with a small peak in the 1980s. **Figure 8** illustrates the same data divided into birth cohorts and age groups. The two salient features of this graph are that a) mortality from prostate cancer has been increasing in elderly cohorts but not in young men and b) there is a very recent small cross sectional fall in mortality in most cohorts. This small drop could be consistent with either a treatment-related effect or an artefact related to a change in death certification practice.

Figure 5

Trends in prostate cancer incidence and mortality, Victoria 1982–97

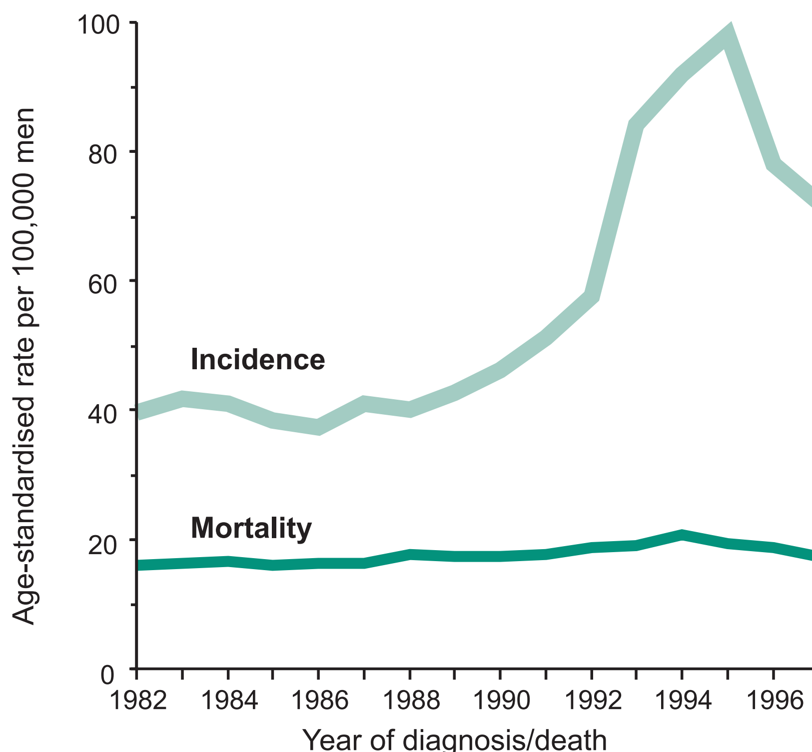


Figure 6

The leading sites of new cancer and cancer death in Victorian men 1996

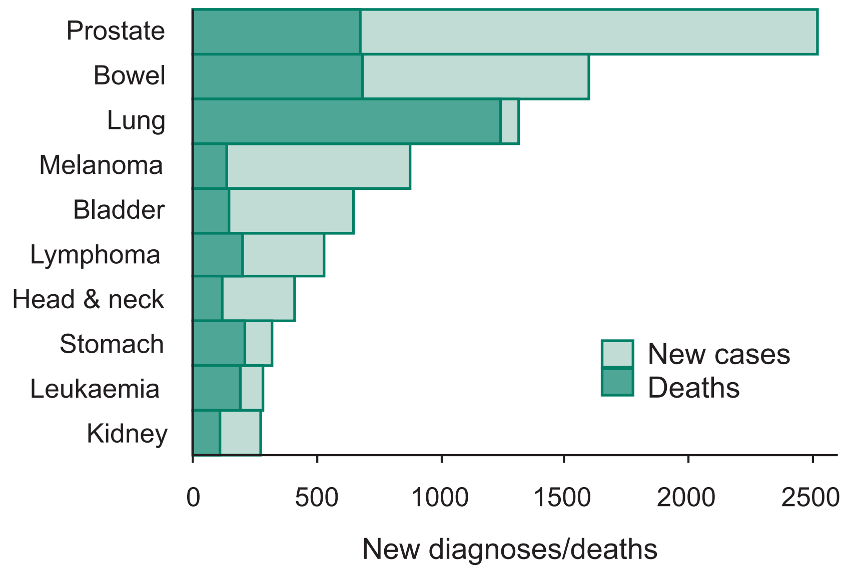


Figure 7

Australian prostate cancer mortality 1910–98

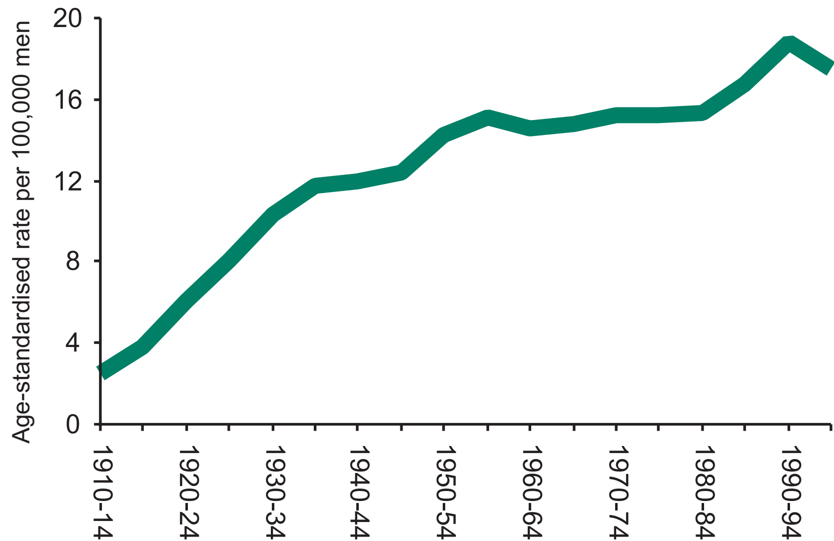
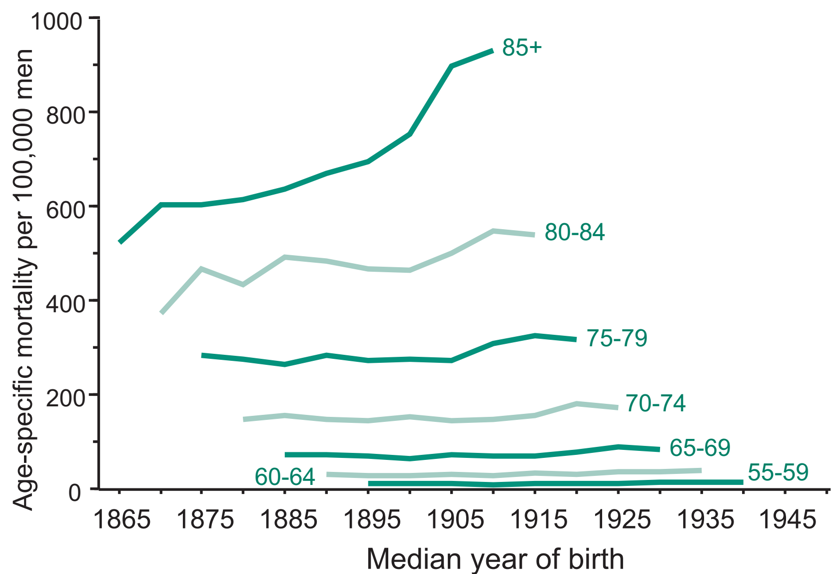


Figure 8

Age-specific prostate cancer mortality by median year of birth, Australia 1950–98



Survival

Overall survival from prostate cancer is steadily improving because of the very low mortality associated with the majority of early stage cancers detected in recent years. Survival trends by stage or extent of disease are less encouraging.

In the USA the SEER registries report a five-year relative survival proportion of 88% for white males diagnosed in 1986–92. This is significantly different from the 68% reported for men diagnosed in 1974–76. Survival from prostate cancer in SEER whites has improved by disease grade and by extent of disease with five-year relative survival being over 93% for localised and regional disease. Five-year relative survival from distant stage disease is only 34% and has not improved over time.

A survey of management of prostate cancer was conducted for all men diagnosed in Victoria in the first six months of 1993 (with a response rate of 94%). Five-year relative survival was calculated for these 1,048 men by categories of various prognostic factors. The findings are summarised in **Table 2**. A multivariate analysis comparing different treatments will be conducted when 10 years of follow-up have been accumulate —at five years, insufficient deaths had occurred to identify meaningful differences.

Table 2: Five-year relative survival for Victorian men diagnosed with prostate cancer in 1993.

	N	5YS(SE)
All men	1,048	86 (2)
Age group		
<55	23	90 (7)
55–64	159	78 (4)
65–74	447	89 (2)
75+	417	88 (4)
Clinical extent		
Clinically localised	726	98 (2)
Locally advanced	125	81 (6)
Distant spread	182	35 (4)
Tumour grade		
Well differentiated	308	97 (4)
Moderately differentiated	342	94 (3)
Poorly/undifferentiated	142	68 (4)
T-Stage		
T1	444	91 (3)
T2	370	96 (3)
T3	156	65 (5)
T4	41	42 (13)
Diagnostic PSA level (ng/ml)		
0-4	87	99 (15)
4.1–10	204	98 (5)
10.1–20	181	94 (4)
20.1–50	219	84 (4)
>50	256	57 (4)

Please pass this issue of **Canstat** to anyone who is interested.

The Anti-Cancer Council of Victoria is an independent volunteer-based charity that relies on public support to maintain vital education and patient welfare programs and to fund major scientific and behavioural research projects. This task is made possible by the generosity of Victorians, a staff of over150 and the commitment of over 20,000 supporters.

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