

# 4 Prostate cancer in profile

## Introduction

Prostate cancer is a NHPA cancer. It is the most common cancer diagnosis in males apart from NMSC, and the second most common cause of male cancer death. The number of new cases increased by 12.7% from 12,003 in 2002 to 13,526 in 2003 and by a further 16.2% in 2004 in state cancer registries. Trends to 2005–06 in the number of prostate-specific antigen (PSA) tests undertaken for screening for prostate cancer, in admissions to hospital for prostate cancer, and in prostatectomies performed suggest that an estimated 18,700 new cases of prostate cancer will have been diagnosed in 2006.

PSA tests increased by 42% from 492,147 in 2001–02 to 698,828 in 2005–06. Hospital admissions almost doubled from 13,715 in 2000–01 to 25,429 in 2005–06. Prostatectomies on males with a principal diagnosis of cancer increased by 56% in the same period, from 6,088 to 9,478.

There was a small decline in the age-standardised death rate, from 35.2 per 100,000 males in 2001 to 32.0 per 100,000 in 2004 before an increase to 32.8 per 100,000 in 2005, when there were 2,946 deaths from prostate cancer.

## Incidence and mortality

- In 2003 there were 13,526 new cases of prostate cancer and 2,837 deaths (Table 4.1). There were 2,761 deaths in 2004 (Table 4.4) and 2,946 in 2005 (ABS 2007b).
- In 2003 the age-standardised incidence rate was 144 new cases per 100,000 males and the age-standardised mortality rate was 34 cases per 100,000. The highest age-specific incidence and mortality rates occurred in men aged 85 years and over (Table 4.1).
- In 2003 84% of new cases occurred in men aged 60 and over, with 84% of deaths occurring among men aged 70 and over.
- From 1982 to 2003 the age-standardised incidence rate experienced a sharp rise in the early 1990s following the introduction of PSA testing, peaked in 1994 and then had a sharp decline until 1998. Another sharp rise occurred in 2003 (Figure 4.2, Table 4.3). These changes are analysed in more detail later in this chapter.
- From 1982 to 1998 the age-standardised mortality rate mirrored the rise and fall of the incidence rate, peaking at 44 deaths per 100,000 males in 1993 and 1994 and declining to 35 deaths per 100,000 in 1999 before levelling off at this rate until 2002 (Figure 4.2, Table 4.4). There was a decline to 32 deaths per 100,000 in 2004 followed by an increase to 32.8 per 100,000 in 2005 (ABS 2007b).
- In the long-term period from 1922 to 2003 there was a very large increase in the age-specific death rate from prostate cancer in the 85 years and over age group and, by comparison, a quite moderate increase in the rate for the 65–84 year age group. The rate for the 45–64 age group remained very low over the whole period (Figure 4.3).

**Table 4.1: Prostate cancer incidence and mortality, Australia, 2003**

Age group	Incidence			Mortality		
	Number	Per cent	Rate	Number	Per cent	Rate
Less than 40	5	0.0	0.0	2	0.1	0.3
40–44	33	0.2	4.3	2	0.1	0.3
45–49	121	0.9	17.4	9	0.3	1.3
50–54	563	4.2	86.1	24	0.8	3.7
55–59	1,492	11.0	255.5	67	2.4	11.5
60–64	1,992	14.7	453.2	117	4.1	26.6
65–69	2,495	18.4	701.4	229	8.0	64.1
70–74	2,383	17.6	787.5	398	14.0	131.5
75–79	2,131	15.8	885.5	604	21.3	251.0
80–84	1,412	10.4	968.7	653	23.0	447.3
85 and over	899	6.6	999.2	732	25.8	812.4
<b>Total</b>	<b>13,526</b>	<b>100.0</b>		<b>2,837</b>	<b>100.0</b>	
<b>Rates per 100,000 with 95% confidence intervals</b>						
Crude rate			137.0			28.7
95% CI			134.7–139.3			27.6–29.8
ASR(A)			144.2			34.1
95% CI			141.7–146.6			32.8–35.4
ASR(W)			101.2			19.6
95% CI			99.5–102.9			18.9–20.4

Sources: National Cancer Statistics Clearing House, AIHW; National Mortality Database, AIHW.

**Table 4.2: Incidence of prostate cancer and age-standardised rates, Australia, 1982 to 2003**

Year	New cases	ASR(A)	95% CI	ASR(W)	95% CI
1982	3,597	79.4	76.5–82.2	49.7	48.0–51.3
1983	3,747	80.9	78.1–83.7	50.3	48.7–52.0
1984	3,889	80.1	77.4–82.9	50.3	48.7–52.0
1985	4,158	83.2	80.5–85.9	52.1	50.4–53.7
1986	4,303	82.9	80.2–85.5	51.9	50.4–53.5
1987	4,564	85.6	82.9–88.2	53.4	51.8–54.9
1988	4,775	85.7	83.2–88.3	53.9	52.4–55.5
1989	5,298	92.8	90.1–95.4	58.2	56.6–59.8
1990	6,100	102.6	99.9–105.4	65.1	63.4–66.7
1991	6,746	110.0	107.2–112.7	69.6	67.9–71.2
1992	7,927	124.4	121.5–127.2	79.3	77.5–81.1
1993	11,154	164.7	161.6–167.9	107.8	105.8–109.8
1994	13,064	184.3	181.0–187.5	123.5	121.3–125.6
1995	12,344	168.4	165.4–171.5	114.6	112.5–116.6
1996	10,300	137.6	134.9–140.3	93.4	91.6–95.2
1997	9,966	129.7	127.1–132.3	87.8	86.1–89.6
1998	10,073	127.9	125.3–130.4	86.6	84.9–88.3
1999	10,535	129.3	126.8–131.8	87.8	86.1–89.5
2000	10,734	127.7	125.2–130.1	87.2	85.5–88.8
2001	11,285	129.7	127.2–132.1	88.9	87.2–90.5
2002	12,003	132.7	130.3–135.1	92.2	90.5–93.8
2003	13,526	144.2	141.7–146.6	101.2	99.5–102.9

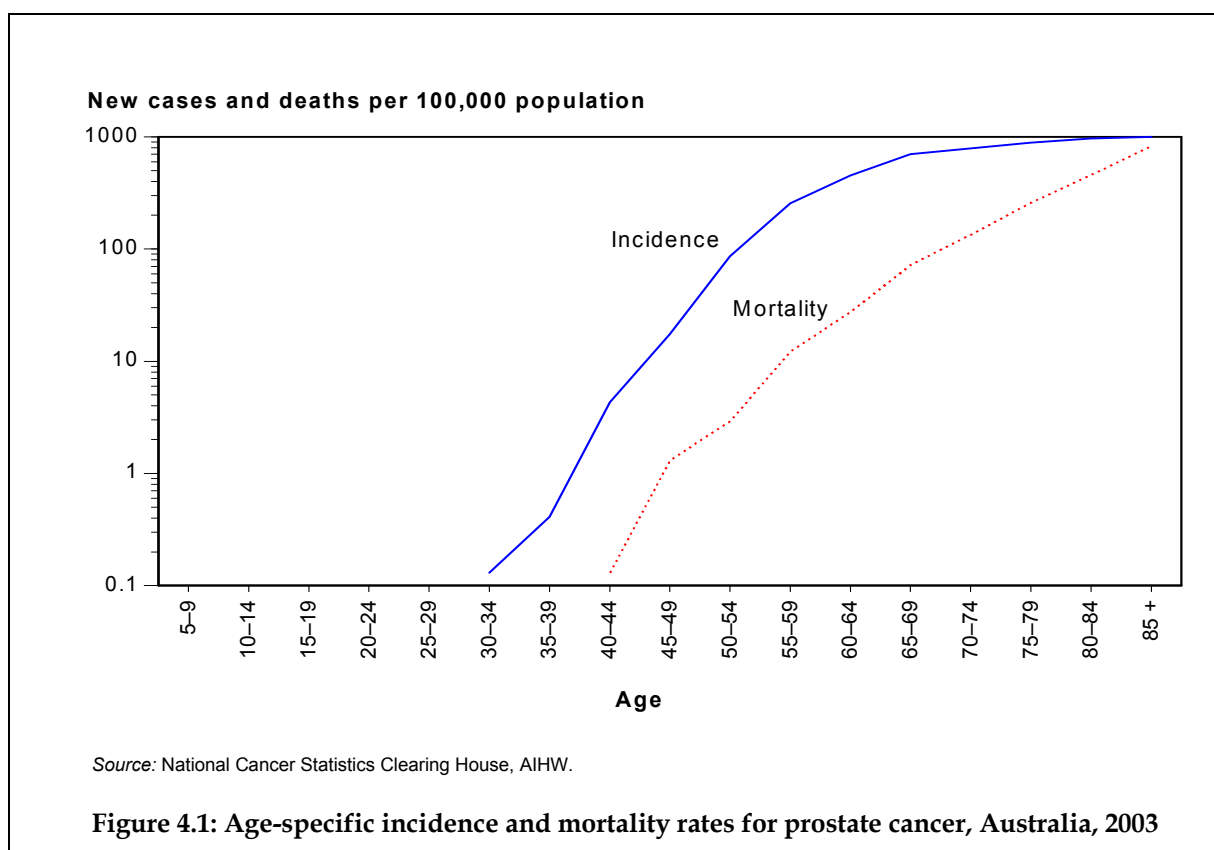
Sources: National Cancer Statistics Clearing House, AIHW; National Mortality Database, AIHW.

**Table 4.3: Trends in age-specific incidence of prostate cancer, Australia, 1982 to 2003**

Year	Age										Total rate	
	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Crude	ASR (A)
1982	0.9	3.1	11.5	44.9	118.9	258.6	445.2	667.9	938.5	976.8	47.5	79.4
1983	0.7	1.8	12.2	46.4	112.7	252.9	441.5	750.1	855.1	1,071.7	48.7	80.9
1984	0.6	3.5	15.8	44.7	121.0	277.1	448.3	677.0	850.9	1,043.2	50.0	80.1
1985	0.8	3.8	9.6	48.3	125.3	273.3	453.8	714.8	969.8	1,039.9	52.8	83.2
1986	0.8	3.0	12.7	50.2	129.4	271.8	443.8	694.6	985.8	1,034.4	53.8	82.9
1987	0.4	2.9	13.3	49.4	133.4	256.7	490.8	703.9	990.5	1,128.2	56.2	85.6
1988	1.3	2.8	10.9	53.0	132.4	284.3	496.5	739.6	922.9	1,063.8	57.9	85.8
1989	1.1	1.9	15.3	55.5	145.0	312.4	509.0	795.1	1,003.0	1,203.1	63.2	92.8
1990	1.6	3.8	16.4	69.2	168.3	374.8	565.4	850.9	1,074.6	1,289.5	71.7	102.7
1991	1.2	3.4	17.8	66.7	174.2	384.5	663.5	905.1	1,158.6	1,343.3	78.3	110.0
1992	0.6	4.1	21.1	79.7	225.0	464.7	706.4	1,035.4	1,252.8	1,491.2	91.0	124.4
1993	1.7	6.2	36.0	124.6	330.7	680.6	1,063.5	1,347.8	1,506.5	1,515.4	126.8	164.8
1994	2.1	7.8	50.8	185.8	447.9	833.8	1,163.7	1,397.0	1,547.6	1,482.7	147.0	184.3
1995	2.9	12.9	67.3	199.6	448.4	788.8	1,029.5	1,197.0	1,261.1	1,344.0	137.3	168.4
1996	1.9	13.3	60.5	181.3	358.1	614.0	816.0	934.9	1,082.6	1,172.5	113.1	137.6
1997	1.2	12.3	50.5	164.1	348.7	573.7	759.7	883.1	1,044.8	1,137.6	108.3	129.7
1998	2.5	12.4	60.5	183.3	332.5	544.3	701.3	875.3	1,060.7	1,134.6	108.4	127.9
1999	1.3	11.5	65.9	176.3	345.5	555.1	727.1	931.2	990.1	1,098.9	112.1	129.3
2000	1.7	16.9	61.8	183.2	343.6	579.2	702.6	863.9	997.7	1,068.1	112.9	127.7
2001	3.0	16.4	69.6	197.7	355.1	577.8	714.5	875.3	950.5	1,090.1	117.2	129.7
2002	2.7	20.0	84.5	215.5	392.3	614.9	743.6	810.5	917.4	1,038.7	123.1	132.7
2003	4.3	17.4	86.1	255.5	453.2	701.4	787.5	885.5	968.7	999.2	137.0	144.2

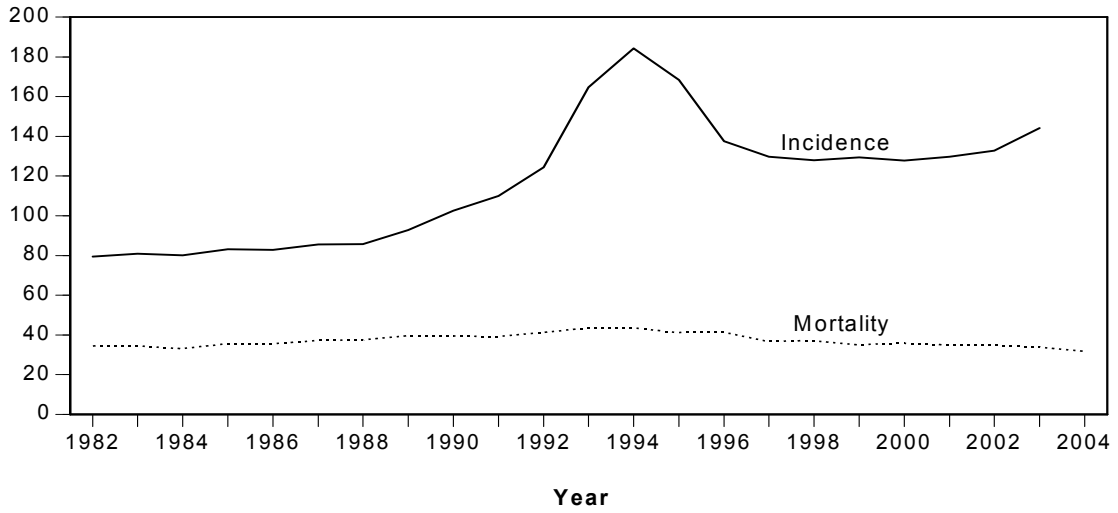
Note: Age-specific rates for age less than 40 years are close to zero and have been excluded.

Source: National Cancer Statistics Clearing House, AIHW.



**Figure 4.1: Age-specific incidence and mortality rates for prostate cancer, Australia, 2003**

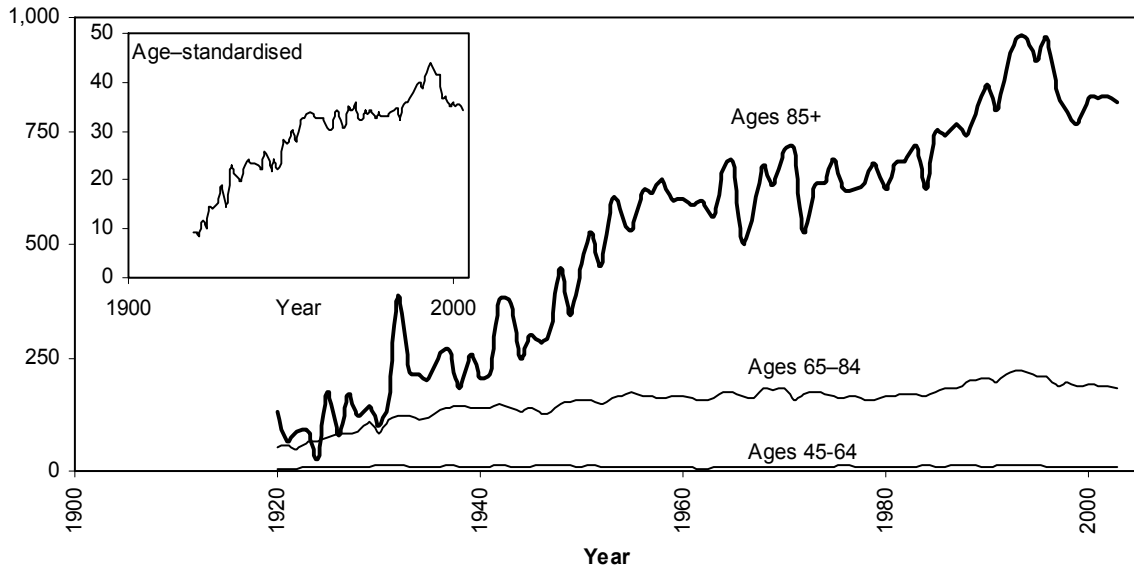
**New cases and deaths per 100,000 population**



Source: National Cancer Statistics Clearing House, AIHW.

**Figure 4.2: Trends in age-standardised incidence and mortality rates for prostate cancer, Australia, 1982–2004**

**Deaths per 100,000**



Source: AIHW 2006e.

**Figure 4.3: Age-specific and age-standardised death rates for prostate cancer, 1920–2003**

**Table 4.4: Mortality from prostate cancer and age-standardised rates, Australia, 1982 to 2004**

Year	Deaths	ASR(A)	95% CI	ASR(W)	95% CI
1982	1,343	34.5	32.5–36.5	20.1	19.0–21.2
1983	1,397	34.7	32.7–36.7	20.1	19.0–21.2
1984	1,411	33.3	31.4–35.2	19.6	18.6–20.7
1985	1,526	35.7	33.8–37.6	20.7	19.6–21.7
1986	1,612	35.7	33.9–37.6	20.9	19.8–21.9
1987	1,735	37.2	35.4–39.1	21.7	20.7–22.8
1988	1,883	37.6	35.8–39.4	22.1	21.1–23.1
1989	1,985	39.6	37.8–41.5	23.2	22.2–24.2
1990	2,036	39.7	37.9–41.5	23.1	22.1–24.1
1991	2,099	39.3	37.5–41.1	22.9	22.0–23.9
1992	2,290	41.2	39.4–42.9	24.2	23.2–25.1
1993	2,539	43.7	41.9–45.5	25.4	24.4–26.4
1994	2,561	43.6	41.9–45.4	25.3	24.3–26.3
1995	2,513	41.2	39.6–42.9	24.0	23.1–24.9
1996	2,591	41.4	39.7–43.0	23.9	22.9–24.8
1997	2,449	36.8	35.3–38.3	21.3	20.5–22.2
1998	2,570	37.2	35.8–38.7	21.6	20.7–22.4
1999	2,513	35.2	33.8–36.6	20.3	19.5–21.1
2000	2,666	35.9	34.5–37.3	20.7	19.9–21.5
2001	2,718	35.2	33.9–36.6	20.2	19.5–21.0
2002	2,820	35.1	33.8–36.4	20.3	19.5–21.0
2003	2,837	34.1	32.8–35.4	19.6	18.9–20.4
2004	2,761	32.0	30.8–33.2	18.5	17.8–19.2

Note: 1982–2003 mortality based on year of death; 2004 mortality based on year of registration.

Source: AIHW National Mortality Database.

**Table 4.5: Trends in age-specific mortality from prostate cancer, males, Australia, 1982 to 2004**

Year	Age 40 years and over										Rates	
	40–44	45–49	50–54	55–59	60–64	65–69	70–74	75–79	80–84	85+	Crude	ASR (A)
1982	0.0	0.8	3.1	11.5	29.2	66.1	150.4	307.8	446.5	678.1	17.7	34.5
1983	0.0	0.5	2.9	14.2	25.4	66.3	136.5	277.2	507.2	716.8	17.8	34.7
1984	0.2	1.0	4.2	8.6	34.9	74.6	151.3	258.8	443.4	652.4	18.1	33.3
1985	0.0	0.7	4.5	8.1	30.5	71.7	134.5	312.7	490.4	728.2	19.4	35.7
1986	0.0	0.7	1.9	12.2	30.7	74.0	160.0	284.8	465.8	746.2	20.2	35.7
1987	0.2	1.1	2.1	12.9	36.0	80.7	144.7	294.2	507.3	783.4	21.4	37.2
1988	0.2	1.3	3.0	13.3	34.6	80.4	171.2	311.5	509.6	707.4	22.4	37.6
1989	0.3	1.0	4.2	14.8	39.8	75.3	163.1	330.4	530.7	800.4	23.7	39.6
1990	0.2	0.4	2.9	9.5	31.8	85.4	179.4	315.1	510.1	849.3	23.9	39.7
1991	0.2	1.3	3.0	13.6	36.5	81.8	160.2	318.9	520.1	820.9	24.4	39.3
1992	0.2	0.9	4.0	15.2	34.5	94.5	189.4	287.5	559.1	863.9	26.3	41.2
1993	0.0	1.0	3.9	14.1	34.1	93.7	178.4	354.6	562.2	951.4	28.3	43.7
1994	0.0	1.1	3.8	13.2	38.3	81.5	184.2	351.5	572.3	947.8	28.8	43.6
1995	0.5	1.3	3.8	11.3	39.9	86.2	174.8	303.8	535.1	919.5	27.9	41.2
1996	0.1	1.4	3.3	12.9	32.5	80.6	165.5	324.1	532.8	950.2	28.4	41.4
1997	0.3	0.8	3.6	12.2	29.9	73.5	150.4	277.9	492.0	821.5	26.6	36.8
1998	0.3	1.2	4.6	11.4	31.7	67.7	156.8	266.5	537.1	810.6	27.6	37.2
1999	0.6	0.9	2.9	9.8	26.5	64.4	141.2	284.2	478.6	773.3	26.7	35.2
2000	0.0	0.9	3.9	11.6	24.2	67.2	156.5	271.0	474.9	811.4	28.0	35.9
2001	0.0	1.0	2.9	11.9	24.6	64.7	141.7	265.2	473.3	820.3	28.2	35.2
2002	0.1	1.3	2.9	12.2	27.6	72.0	134.4	258.6	458.7	828.8	28.9	35.1
2003	0.3	1.3	3.7	11.5	26.6	64.1	131.5	251.0	447.3	812.4	28.7	34.1
2004	0.0	0.7	3.3	10.9	28.9	59.4	122.4	237.1	422.6	754.5	27.6	32.0

Note: 1982–2003 mortality based on year of death; 2004 mortality based on year of registration.

Source: AIHW National Mortality Database.

## Drivers of growth in new cases diagnosed

The most significant risk factor for prostate cancer is increasing age. The two tests commonly used to detect possible signs of prostate cancer are the PSA blood test and the digital rectal examination (DRE) (The Cancer Council Australia 2005). The Cancer Council expresses caution in its 2005 *Prostate cancer screening position statement* about the use of these tests for population screening because of lack of direct evidence of benefits in terms of reduction in mortality. Nevertheless, the main drivers of the growth in incidence and treatment numbers appear to be rapid growth in the elderly male 'at risk' population and increasing use of the PSA test and DRE in health checks of older males.

### Population ageing

The male population of Australia aged 65 and over has been increasing at around 2.8% a year. However, the highest incidence rates for prostate cancer are in the 75 years and over 5-year age groups. In the year to 30 June 2001 the 75 and over population increased by 5.2%. Although the percentage increase declined in subsequent years, this population still increased by 3.7% in the year to 30 June 2006.

**Table 4.6: Male population of Australia 65 years and over and 75 years and over, 2001 to 2006**

Year	65 years and over	Per cent increase	75 years and over	Per cent increase
2001	1,076,672	2.8	437,528	5.2
2002	1,105,896	2.7	456,942	4.4
2003	1,134,702	2.6	476,387	4.3
2004	1,165,489	2.7	495,663	4.0
2005	1,198,642	2.8	514,298	3.8
2006	1,233,431	2.9	533,467	3.7

Source: ABS: *Population projections, Australia, 2004 to 2101* (cat. no. 3222.0), Series 26.

### PSA test

In the early 1990s, introduction of the PSA test resulted in a sharp rise for a few years in numbers and rates of new cases of prostate cancer diagnosed. The age-standardised rate increased from 110 per 100,000 males in 1991 to a peak of 184 per 100,000 in 1994, with the actual numbers diagnosed increasing from 6,746 to 13,064 per annum. This reflects the large pool of undiagnosed cases that were found using the PSA test (and subsequent biopsy and confirmation by a specialist) and that would otherwise have remained undiagnosed until symptoms emerged, or never diagnosed because of mortality from another condition.

After 1994 the age-standardised incidence rate declined to 128 per 100,000 males in 1998, then slowly increased to 133 per 100,000 in 2002. However, there is strong evidence that since 2002 there has been a repeat of the rapid increase of the early 1990s in new cases diagnosed. Between 2002 and 2003 the age-standardised incidence rate increased by 8.7% from 133 to 144 per 100,000 males, and the actual number of cases by 12.7% from 12,003 to 13,526. Prostate cancer incidence numbers for 2004 for the New South Wales, Victorian, Queensland, West Australian, South Australian and Tasmanian cancer registries experienced an average increase of 16.2% on those published for 2003, from 13,315 to 15,478 (Table 4.7).

**Table 4.7: Prostate cancer incidence numbers, state cancer registries, 2003 and 2004**

Year of diagnosis	NSW	Vic	Qld	WA	SA	Tas	Total
2003	4,637	3,441	2,552	1,245	1,032	408	13,315
2004	5,477	3,838	2,921	1,501	1,326	415	15,478
Per cent increase	18.1	11.5	14.5	20.6	28.5	1.7	16.2

Source: State cancer registry 2003 and 2004 incidence and mortality reports; unpublished Tasmanian data.

If the same percentage increase occurred for the two territories, the total figure for Australia for 2004 would be approximately 15,800 cases, although this might reduce to 15,500 after any interstate duplicates are identified.

Further evidence of rapid growth in incidence is that:

- Hospital admissions for a principal diagnosis of prostate cancer almost doubled from 13,715 in 2000–01 to 25,429 in 2005–06 (Table 4.11).
- Prostatectomies for males with a principal diagnosis of prostate cancer increased by 56% in the same period, from 6,088 to 9,478 (Table 4.12).

Underpinning the increase in diagnoses is increasing use of PSA tests for prostate cancer screening, up by 42% from 492,147 in 2001–02 to 698,828 in 2005–06 (Table 4.8). There are three current Medicare Benefits Schedule (MBS) item numbers for PSA tests – 66655 for one PSA test for screening in a 12-month period, and 66656 and 66659, which are tests to monitor previously diagnosed prostatic disease and to follow up a PSA result in the equivocal range. In 2005–06, there were 698,828 services for item 66655; 480,206 for item 66656; and 30,522 for item 66659. Item 66655 was introduced on 1 May 2001. On 1 November 1993 two items for PSA tests were first listed on the MBS Schedule: 66357 and 66359. These, and two replacement numbers in 1998, covered both screening and monitoring so it is not possible to extract screening only data prior to 2001. Between 1993–94 and 2005–06, a total of 9.5 million PSA tests (screening and non-screening) were undertaken (Table 4.10).

**Table 4.8: PSA tests for screening, 2000–01 to 2005–06**

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia	Per cent increase
2001–02	147,419	104,761	94,770	66,130	53,438	11,841	10,633	3,155	492,147	—
2002–03	156,894	119,205	103,166	62,443	49,078	12,868	10,356	3,336	517,346	5.1
2003–04	189,645	128,272	107,189	66,283	51,180	14,412	11,145	3,730	571,856	10.5
2004–05	210,985	140,594	110,978	71,814	56,737	15,031	11,988	3,609	621,736	8.7
2005–06	237,231	154,608	128,318	78,795	65,146	18,348	12,335	4,047	698,828	12.4
Per cent increase from 2001–02 to 2005–06	60.9	47.6	35.4	19.2	21.9	55.0	16.0	28.3	42.0	
Per cent increase from 2004–05 to 2005–06	12.4	10.0	15.6	9.7	14.8	22.1	2.9	12.1	12.4	

Source: Medicare Australia statistics: Medicare Benefits Schedule Item 66655.

On a per capita basis in 2005–06, PSA tests were provided at a rate of 20,859 tests per 100,000 males for those aged 55–64 years, at 22,667 tests per 100,000 for 65–74 year olds and at 15,796 tests per 100,000 for 75–84 year olds (Table 4.9). However, the rates for these age groups were much higher in South Australia, the ACT, Western Australia and Tasmania than in other jurisdictions. The highest rate was 28,590 tests per 100,000 males in the 65–74 year age group in South Australia in 2005–06.

Table 4.9: PSA tests for screening by age, states and territories, 2005–06

Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>Number of PSA tests</b>									
Less than 25	2,824	1,680	1,660	1,085	423	162	130	40	8,004
25–34	2,409	1,430	1,430	938	359	126	107	34	6,833
35–44	16,186	10,871	10,441	5,657	3,218	912	771	338	48,394
45–54	58,203	38,648	35,028	21,050	14,727	4,299	3,483	1,247	176,685
55–64	79,173	51,409	43,586	26,520	22,022	6,427	4,570	1,587	235,294
65–74	53,861	35,096	26,161	16,760	16,107	4,532	2,335	630	155,482
75–84	23,920	15,013	10,154	6,892	7,647	1,815	931	188	66,560
85 and over	3,064	1,891	1,288	831	1,002	201	115	17	8,409
<b>Total</b>	<b>237,231</b>	<b>154,608</b>	<b>128,318</b>	<b>78,795</b>	<b>65,146</b>	<b>18,348</b>	<b>12,335</b>	<b>4,047</b>	<b>698,828</b>
<b>Per cent</b>									
Less than 25	1.2	1.1	1.3	1.4	0.6	0.9	1.1	1.0	1.1
25–34	1.0	0.9	1.1	1.2	0.6	0.7	0.9	0.8	1.0
35–44	6.8	7.0	8.1	7.2	4.9	5.0	6.3	8.4	6.9
45–54	24.5	25.0	27.3	26.7	22.6	23.4	28.2	30.8	25.3
55–64	33.4	33.3	34.0	33.7	33.8	35.0	37.0	39.2	33.7
65–74	22.7	22.7	20.4	21.3	24.7	24.7	18.9	15.6	22.2
75–84	10.1	9.7	7.9	8.7	11.7	9.9	7.5	4.6	9.5
85 and over	1.3	1.2	1.0	1.1	1.5	1.1	0.9	0.4	1.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>
<b>Services per 100,000 population</b>									
35–44	3,180	2,794	3,535	3,633	2,795	2,661	3,045	1,980	3,140
45–54	12,406	11,085	12,730	14,479	13,333	12,124	14,846	8,798	12,426
55–64	21,237	18,840	19,407	23,776	24,660	21,847	25,394	16,734	20,859
65–74	23,080	20,339	20,199	26,449	28,590	24,590	26,472	17,829	22,667
75–84	16,244	13,774	13,675	19,199	19,931	17,293	18,928	15,607	15,796
85 and over	8,402	7,180	6,511	9,708	10,161	8,584	9,986	7,176	8,029
<b>Average, all ages</b>	<b>6,980</b>	<b>6,120</b>	<b>6,398</b>	<b>7,743</b>	<b>8,423</b>	<b>7,525</b>	<b>7,427</b>	<b>3,868</b>	<b>6,827</b>

Source: Medicare Australia statistics: Medicare Benefits Schedule Item 66655.



**Table 4.10: All PSA tests (screening and non-screening), states and territories, 1993–93 to 2005–06**

Year	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia	Per cent inc.
1993–94	84,692	47,847	40,883	29,086	16,809	4,090	3,381	711	227,499	—
1994–95	181,467	109,699	85,687	72,659	34,954	10,412	7,722	1,503	504,103	—
1995–96	190,259	134,084	89,175	70,657	38,881	11,351	8,420	1,958	544,785	8.1
1996–97	188,843	129,814	91,289	57,482	36,153	12,147	9,516	2,021	527,265	-3.2
1997–98	207,598	160,439	96,804	65,824	39,564	12,663	9,772	2,564	595,228	12.9
1998–99	227,223	182,811	114,224	72,339	43,312	13,520	10,914	3,076	667,419	12.1
1999–00	249,790	193,259	121,831	71,313	47,418	14,282	11,635	3,246	712,774	6.8
2000–01	269,343	215,735	133,294	80,482	68,610	15,572	13,959	3,795	800,790	12.3
2001–02	286,144	202,774	140,137	89,392	67,977	17,095	13,754	3,993	821,266	2.6
2002–03	285,149	217,735	139,772	89,569	68,050	18,471	13,834	4,011	836,591	1.9
2003–04	322,805	250,344	171,887	97,475	74,325	21,859	15,305	4,598	958,598	14.6
2004–05	369,387	276,493	192,902	107,430	80,996	23,057	16,950	4,599	1,071,814	11.8
2005–06	414,571	303,371	231,988	117,923	92,289	26,573	17,675	5,166	1,209,556	12.9
<b>Total</b>	<b>3,277,271</b>	<b>2,424,405</b>	<b>1,649,873</b>	<b>1,021,631</b>	<b>709,338</b>	<b>201,092</b>	<b>152,837</b>	<b>41,241</b>	<b>9,477,688</b>	

Source: Medicare Australia.

**Table 4.11: Hospital separations for admitted patients with a principal diagnosis of prostate cancer, Australia, 1993–94 to 2004–05**

Year	Separations	Per cent increase
1993–94	13,351	—
1994–95	13,257	-0.7
1995–96	12,840	-3.1
1996–97	11,210	-12.7
1997–98	11,682	4.2
1998–99	11,769	0.7
1999–00	12,886	9.5
2000–01	13,715	6.4
2001–02	15,109	10.2
2002–03	17,153	13.5
2003–04	20,547	19.8
2004–05	23,343	13.6
2005–06	25,429	8.9

Source: National Hospital Morbidity Database, AIHW.

**Table 4.12: Separations for prostatectomies performed upon patients with a principal diagnosis of prostate cancer, 2000–01 to 2005–06**

Procedure block	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06
1165 Transurethral prostatectomy	4,001	3,798	3,906	3,995	4,112	4,140
1166 Other closed prostatectomy	80	76	83	66	259	413
1167 Open prostatectomy	2,007	2,383	2,823	3,746	4,713	4,925
<b>Total</b>	<b>6,088</b>	<b>6,257</b>	<b>6,812</b>	<b>7,807</b>	<b>9,084</b>	<b>9,478</b>

Source: National Hospital Morbidity Database, AIHW.

**Table 4.13: Separations for prostatectomies performed upon patients with a principal diagnosis of prostate cancer by age, 2004–05**

Procedure block	Age group					Total
	Under 50	50–59	60–69	70–79	80+	
	<b>Number</b>					
1165 Transurethral prostatectomy	11	174	757	1,744	1,426	4,112
1166 Other closed prostatectomy	3	38	97	96	25	259
1167 Open prostatectomy	187	1,576	2,546	396	8	4,713
<b>Total</b>	<b>201</b>	<b>1,788</b>	<b>3,400</b>	<b>2,236</b>	<b>1,459</b>	<b>9,084</b>
	<b>Per cent</b>					
1165 Transurethral prostatectomy	0.3	4.2	18.4	42.4	34.7	100.0
1166 Other closed prostatectomy	1.2	14.7	37.5	37.1	9.7	100.0
1167 Open prostatectomy	4.0	33.4	54.0	8.4	0.2	100.0
<b>Total</b>	<b>2.2</b>	<b>19.7</b>	<b>37.4</b>	<b>24.6</b>	<b>16.1</b>	<b>100.0</b>

Source: National Hospital Morbidity Database, AIHW.

There are many additional prostatectomies performed in Australian hospitals other than those for a principal diagnosis of prostate cancer. Total separations for procedures on the prostate or seminal vesicle included 21,110 transurethral prostatectomies, 816 other closed prostatectomies and 5,347 open prostatectomies in 2004–05 (Table 4.14). Of the 21,110 transurethral prostatectomies, 14,109 were for a principal diagnosis of hyperplasia of the prostate, 4,112 for prostate cancer, 335 for retention of urine, 294 for bladder-neck obstruction and 209 for cancer of the bladder not otherwise specified.

**Table 4.14: All separations from Australian hospitals for procedures performed on the prostate or seminal vesicle, 1998–99 to 2004–05**

Procedure group	98–99	99–00	00–01	01–02	02–03	03–04	04–05
1160 Other application, insertion or removal procedures on prostate or seminal vesicle	107	143	159	151	218	224	n.a.
1161 Incision procedures on prostate or seminal vesicle	155	154	126	96	107	131	126
1162 Destruction of prostatic tissue	388	481	430	477	540	598	651
1163 Closed biopsy of prostate or seminal vesicle	4,637	4,928	5,477	6,976	8,495	12,389	14,856
1164 Open biopsy of prostate or seminal vesicle	102	133	180	246	450	540	n.a.
1165 Transurethral prostatectomy	20,518	20,492	20,660	20,342	20,223	20,511	21,110
1166 Other closed prostatectomy	625	582	645	591	455	501	816
1167 Open prostatectomy	2,038	2,338	2,617	3,003	3,413	4,357	5,347
1168 Other excision procedures on prostate or seminal vesicle	347	627	191	88	4	7	13
1169 Repair procedures on prostate or seminal vesicle	63	33	28	41	32	38	n.a.
1170 Other procedures on prostate or seminal vesicle	53	35	30	33	31	46	66
<b>1160–1170 Prostate and seminal vesicle</b>	<b>29,033</b>	<b>29,946</b>	<b>30,543</b>	<b>32,044</b>	<b>33,968</b>	<b>39,342</b>	<b>43,920</b>

Note: A change in coding occurred in 2004–05.

Source: National Hospital Morbidity Database, AIHW.

## Implications for projected incidence of prostate cancer

Incidence projections published by the AIHW in 2005 for prostate cancer have been found to be significantly underestimated. Based on the trends from 1998 to 2001, the projection to 2003 was for 11,797 new cases to be diagnosed, with a 95% prediction interval of 11,290–12,441. The projection to 2006 was for 12,929 cases, with a 95% prediction interval of 12,370–13,619 (AIHW, AACR & NCSG: Ian McDermid 2005). In reality, the number diagnosed in 2003 was

13,526 and the number reported by cancer registries in 2004 indicates that nationally, after removing duplicate records, there were over 15,500 new cases diagnosed in that year.

If the increase in numbers slowed to, say 10% p.a., there would be an estimated 17,000 cases diagnosed in 2005 and 18,700 in 2006. Hospital admissions for prostate cancer increased by 13.6% in 2004–05 and 8.9% in 2005–06, while PSA tests increased by 8.7% in 2004–05 and 12.4% in 2005–06. A 10% p.a. increase in new cases of prostate cancer diagnosed would be in line with these increases.

## International comparison

The International Agency for Research on Cancer (IARC) is part of the WHO. Its mission is 'to coordinate and conduct research on the causes of human cancer, the mechanisms of carcinogenesis, and to develop scientific strategies for cancer control'.

It collates cancer incidence and mortality data for 27 cancers from countries around the world and publishes estimates for all countries in its GLOBOCAN database, which is publicly available on its website at <[www.iarc.fr](http://www.iarc.fr)>.

The summary in Table 4.15 was extracted from the 2002 GLOBOCAN database and presents comparative data on crude and age-standardised rates of incidence and mortality for prostate cancer for selected countries and regions of the world. Numbers and rates are estimates for the middle of 2000, based on the most recent data available, generally 3 to 5 years earlier, so care should be taken in interpretation. In particular, the numbers and rates for Australia do not reflect the more recent increase in incidence or decline in mortality.

### Main features

- Prostate cancer is a disease with very low incidence in China, Japan, other South-East Asian countries, and less developed regions of the world. Incidence is high in the most developed countries, but the incidence rates for around the year 2000 (age-standardised to the world population) vary considerably among countries, possibly in relation to the extent to which PSA and digital rectal examination screening are used. The figures therefore should be interpreted with caution.
- In around the year 2000 the GLOBOCAN-measured age-standardised incidence was highest in the United States of America (125 cases per 100,000 males), New Zealand (101 cases per 100,000), Sweden (91 per 100,000), Finland (84 per 100,000), Norway (82 per 100,000) and Iceland (81 per 100,000). Australia, then at 76 cases per 100,000, was similar to Switzerland, Belgium and Austria, but well above countries such as France (59 per 100,000), the United Kingdom (52 cases per 100,000) and Greece (26 per 100,000). Australia's 2003 incidence, age-standardised to the world population, was 101 new cases per 100,000 population.
- The highest age-standardised mortality rates in the world for prostate cancer were experienced by Norway and Sweden, each with 28 deaths per 100,000 males. The Australian rate was 18 deaths per 100,000, similar to Western European countries but above the United States rate of 16 per 100,000.

**Table 4.15: Prostate cancer incidence and mortality in selected countries**

Country/region	Incidence			Mortality		
	Cases	Crude Rate	ASR(W)	Deaths	Crude Rate	ASR(W)
<b>World</b>	<b>679,023</b>	<b>21.7</b>	<b>25.3</b>	<b>221,002</b>	<b>7.1</b>	<b>8.2</b>
<b>More developed regions</b>	<b>513,464</b>	<b>88.4</b>	<b>56.2</b>	<b>130,382</b>	<b>22.4</b>	<b>13.5</b>
<b>Less developed regions</b>	<b>165,347</b>	<b>6.5</b>	<b>9.4</b>	<b>90,514</b>	<b>3.6</b>	<b>5.2</b>
<b>Australia</b>	<b>10,807</b>	<b>111.3</b>	<b>76.0</b>	<b>2,646</b>	<b>27.3</b>	<b>17.7</b>
New Zealand	2,678	141.9	100.9	560	29.7	20.3
Canada	17,900	115.8	78.2	3,989	25.8	16.6
United States of America	239,930	168.9	124.8	32,442	22.8	15.8
China	10,125	1.5	1.7	5,919	0.9	1.0
Japan	16,808	27.0	12.6	7,667	12.3	5.7
<i>South-Eastern Asia</i>	<i>11,834</i>	<i>4.4</i>	<i>7.0</i>	<i>7,665</i>	<i>2.9</i>	<i>4.5</i>
<i>Central and Eastern Europe</i>	<i>32,891</i>	<i>23.2</i>	<i>17.4</i>	<i>18,496</i>	<i>13.1</i>	<i>9.7</i>
<i>Northern Europe</i>	<i>46,974</i>	<i>100.4</i>	<i>57.5</i>	<i>16,771</i>	<i>35.9</i>	<i>19.7</i>
Denmark	1,842	69.8	39.3	1,075	40.7	22.6
Estonia	335	52.9	36.3	164	25.9	17.6
Finland	3,556	140.9	84.4	774	30.7	18.0
Iceland	159	112.1	81.0	47	33.1	23.0
Ireland	1,442	74.9	56.3	521	27.1	19.7
Latvia	315	28.6	19.8	213	19.4	13.4
Lithuania	791	45.7	32.3	406	23.5	16.6
Norway	3,071	137.9	81.8	1,133	50.9	28.4
Sweden	7,848	180.2	90.9	2,550	58.5	27.7
United Kingdom	27,463	93.6	52.2	9,834	33.5	17.9
<i>Southern Europe</i>	<i>47,279</i>	<i>66.9</i>	<i>35.5</i>	<i>18,417</i>	<i>26.1</i>	<i>13.2</i>
Greece	2,920	55.9	26.2	1,310	25.1	11.2
Italy	23,518	84.6	40.5	7,419	26.7	12.2
Portugal	3,995	82.8	46.8	1,784	37.0	19.9
Spain	13,253	68.1	35.9	5,857	30.1	14.9
<i>Western Europe</i>	<i>98,083</i>	<i>109.2</i>	<i>61.6</i>	<i>29,382</i>	<i>32.7</i>	<i>17.5</i>
Austria	4,701	119.6	71.4	1,282	32.6	18.4
Belgium	6,928	137.9	74.2	2,032	40.4	20.3
France	29,434	101.4	59.3	9,789	33.7	18.2
Germany	44,383	110.8	60.5	12,158	30.3	15.8
Luxembourg	200	90.9	57.2	57	25.9	15.6
The Netherlands	7,112	89.9	56.7	2,529	32.0	19.7
Switzerland	5,126	145.0	77.3	1,481	41.9	21.6

Note: Data cover the circa 2000 period. This varies among countries.

Source: GLOBOCAN 2002, IARC.

## Key statistics on prostate cancer

The following is a summary of key statistics on prostate cancer.

### Incidence

Prostate cancer is the most common cancer diagnosed in males in Australia apart from NMSC.

- In 2003 there were 13,526 new cases of prostate cancer diagnosed in Australia and it is estimated that 18,700 new cases were diagnosed in 2006.
- In 1982 there were 3,597 cases diagnosed. This had increased to 6,746 by 1991, the year before PSA testing was introduced in Australia. In 1994 the first wave of increased numbers from PSA testing peaked at 13,064. By 1997 the annual number of cases had declined to 9,966. There was a steady increase to 12,003 cases diagnosed in 2002 before a sharp increase of 12.7% in 2003 to 13,526 cases.
- The age-standardised incidence of prostate cancer in 2003 was 144 new cases per 100,000 males, an 8.7% increase from the previous year, but still well below the 1994 peak of 184 cases per 100,000.
- In 2001–2003 age-standardised incidence was 3% higher in Inner Regional areas and more than 20% lower in Very Remote areas, compared with Major Cities (Chapter 5).
- Age-specific incidence of prostate cancer increases with age. In 2003 the rate was 86 per 100,000 males for 50–54 year olds, increasing to 999 per 100,000 for males aged 85 and over.
- In 2003 the risk of a diagnosis of prostate cancer was 1 in 9 by age 75, and 1 in 5 by age 85.
- The average age of a diagnosis of prostate cancer was 69.7 years in 2003, down from 72.3 years in 1993. The median age was 70 years in 2003, compared with 72 years in 1993.

### Mortality

Prostate cancer is the second most common cause of cancer death in males, after lung cancer.

- There were 2,837 deaths in 2003 from prostate cancer, 2,761 in 2004 and 2,946 in 2005 (ABS 2007b).
- The age-standardised death rate from prostate cancer in Australia increased in the early 1990s in line with the increase in incidence following the introduction of PSA testing. It reached a peak of 44 deaths per 100,000 males in both 1993 and 1994, then declined through the late 1990s in line with the decline in incidence rates. After the age-standardised incidence rate began to increase again from 2001, there was a small decline in the age-standardised death rate from 35.2 per 100,000 population in 2001 to 32.0 per 100,000 in 2004 before an increase to 32.8 per 100,000 in 2005.
- In 2003 the risk of death from prostate cancer was 1 in 84 by age 75 and 1 in 22 by age 85.
- In 2003 the average age of death from prostate cancer was 78.3 years, up from 77.1 years in 1993. The median age was 79 years, up from 77 years in 1993.

- Compared with the Major City areas of Australia, the age-standardised death rate from prostate cancer in 2003 was around 20% higher in Inner Regional and Outer Regional areas and 10% higher in Remote areas, but about one third lower in Very Remote areas (Chapter 5).

## Survival

- Five-year relative survival for males diagnosed with prostate cancer in Australia between 1992 and 1997 was 82.7%. It was 88% for males aged 50–59 years and 60–69 years, 82% for age 70–79, 67% for age 80–89, and 39% for those aged 90 and over (AIHW 2001). For males in Victoria in 2004 with prostate cancer who have survived at least 5 years 5-year survival was 91% for age 0–54, 93% for age 55–64, 90% for age 65–74, and 69% for age 75 and over (The Cancer Council Victoria Epidemiology Centre 2007).
- 5-year relative survival was 88% for males in New South Wales diagnosed between 1999 and 2003 (NSW Central Cancer Registry 2006) and 87% for South Australian males diagnosed between 1997 and 2003 (South Australian Cancer Registry 2007). Survival was 84% for males in Victoria in 2004 with prostate cancer who have survived at least 5 years (The Cancer Council Victoria Epidemiology Centre 2007).
- In 2005 the Cancer Council Queensland analysed 5-year relative survival by remoteness and socioeconomic status for males in Queensland diagnosed between 1996 and 2002. In respect of remoteness, 5-year relative survival was 82.8% in Major City areas, 84.4% in Inner Regional, 79.6% in Outer Regional, and 67.1% in Remote areas. Males living in the most affluent 10% of the state had a 5-year relative survival of 88.6%, those in the middle 80% of socioeconomic areas 82.3% and for those in the most disadvantaged 10% of areas it was 76.7% (Viertel Centre for Research in Cancer Control 2005).
- A geographic analysis of 5-year survival has also been undertaken for Victoria for Integrated Cancer Services Regions. It ranged from a high of 89% for Loddon-Mallee to a low of 70% for Barwon South Western for males in 2004 who have survived at least 5 years. On average it was 86% for Melbourne and 80% for the rest of Victoria (The Cancer Council Victoria Epidemiology Centre 2007).
- The Cancer Institute NSW has compared New South Wales and United States of America data on extent of disease for prostate cancer patients diagnosed from 1995–2004 (Cancer Institute NSW 2007). For the cases in New South Wales where extent of disease was known, 81% of cases were localised, compared with over 90% in the United States.

	Localised	Regional	Distant	Unknown	Total
	Per cent				
NSW	42	5	5	49	100
USA	91	5	0	4	100

## Demographics of the 'at risk' population

- The male population of Australia aged 65 and over increased at around 2.8% a year from 2001 to 2006.
- The highest incidence rates for prostate cancer are in the 75 years and over age group. The 75 years and over population increased by 3.7% in the year to 30 June 2006.

## International comparisons

- In around the year 2000 the GLOBOCAN-measured age-standardised incidence was highest in the United States (125 cases per 100,000 males), New Zealand (101 cases per 100,000), Sweden (91 per 100,000), Finland (84 per 100,000), Norway (82 per 100,000) and Iceland (81 per 100,000). Australia, then at 76 cases per 100,000, was similar to Switzerland, Belgium and Austria, but well above countries such as France (59 per 100,000), the United Kingdom (52 cases per 100,000) and Greece (26 per 100,000). These figures should be interpreted with caution. For example, Australia's 2003 incidence, age-standardised to the world population, was 101 new cases per 100,000 males.
- The highest mortality rates in the world for prostate cancer were experienced by Norway and Sweden with 28 age-standardised deaths per 100,000 males. The Australian rate was 18 deaths per 100,000 males, similar to Western European countries but above the United States rate of 16 per 100,000.

## PSA tests

- PSA tests for prostate cancer screening increased by 42% from 492,147 in 2001–02 to 698,828 in 2005–06. The increase during 2005–06 of 12.4% was the highest annual increase in the 5-year period.
- In 2005–06, PSA tests were being provided at a rate of 20,859 per 100,000 males for those aged 55–64 years, at 22,667 per 100,000 for 65–74 year olds and at 15,796 per 100,000 for 75–84 year olds. The rates in these age groups were much higher in South Australia, the Australian Capital Territory, Western Australia and Tasmania than in other jurisdictions.
- In the 2004 Queensland Cancer Risk Survey 52% of men aged 50–75 years reported ever having had a PSA test (Carriere et al. 2007).

## Hospitalisation

- Hospital admissions for a principal diagnosis of prostate cancer almost doubled from 13,715 in 2000–01 to 25,429 in 2005–06.
- Prostatectomies performed on males with a principal diagnosis of prostate cancer increased by 56% in the same period, from 6,088 to 9,478.