

7 Lung cancer

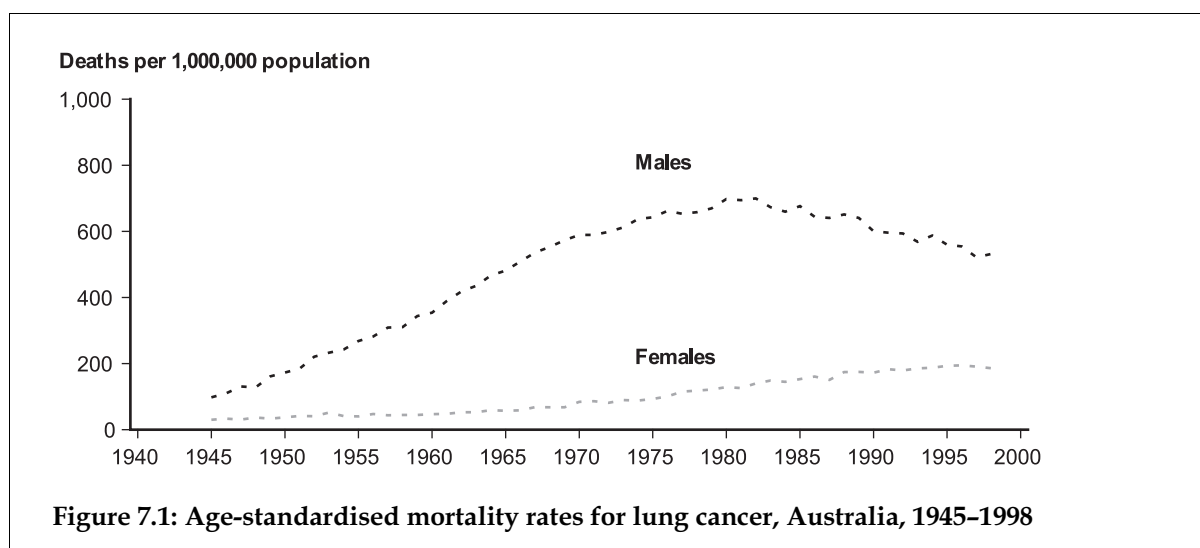
Disease characteristics

Lung cancer is the most commonly diagnosed form of cancer in Australia and occurs in parts of the lung or the windpipe. Smoking is responsible for over 85% of lung cancer cases and for the high incidence of lung cancer from the 1940s onwards (Fauci et al. (eds) 1999). Some forms of lung cancer are also caused by exposure to air-borne particles (e.g. asbestos fibres). Lung cancer is usually detected as a result of a persistent cough, coughing up blood, breathlessness, or through spread to other parts of the body (e.g. bones, liver). A chest X-ray and tissue sample usually confirms the cancer. Survival after diagnosis from lung cancer is poor, with only about 10% of males and 12% of females diagnosed surviving 5 years or longer (AIHW & AACR 2001; Coates & Tracey 2000).

An estimated 1 in 22 males and 1 in 60 females will die from lung cancer before the age of 75. It is estimated that there are about 45,000 PYLL each year because of death from lung cancer before age 75, making it a major cause of premature death in Australia (ranked fifth on this measure).

Historic view

Lung cancer is the leading cause of cancer death for males and the third most common cause for females in Australia, with 532 male deaths and 186 female deaths per million population in 1998. This corresponded to 4,821 male deaths and 2,053 female deaths.



The collection of data specific to lung cancer began in 1945 during the 5th revision of the ICD. In 1945 the lung cancer mortality rates for males and females were relatively low at 97 and 30 deaths per million population. The number of deaths was 316 males and 99 females. Since then the rate has grown rapidly for males, peaking at 700 deaths per million population in 1982. During the 1982 to 1998 period the rate decreased at about 2% each year and the rate of decline has continued to increase over the last 5 years to 3.5% (Figure 7.1). In

contrast, the rate for females has been increasing by more than 4% each year during the 1987–1996 period. The rate appears to have slowed during 1997–1998.

Lung cancer can take up to 20 years to develop, and, given this timelag, the overall trend in lung cancer mortality rates in Australia follows the trend in tobacco smoking 20 years earlier. There has been a definite decline in the prevalence of tobacco smoking since the mid-1970s (Waters & Bennett 1995). This decline in smoking has been more substantial in males than females (Hill et al. 1998) and it is expected to continue to lower lung cancer mortality rates for males. For females, the mortality rate is expected to increase as the smoking rates are increasing in younger females and are steady in older females.

Age–sex distribution

In 1998, the mortality rate from lung cancer for males (517 deaths per million population) was significantly greater than that for females (218) (Figure 7.1).

- In 1998, 86% of male lung cancer deaths occurred from the age of 60 onwards and 35% occurred from age 75.
- For females, 82% of deaths occurred from age 60 and over and 38% occurred from age 75.
- The risk of death from lung cancer flattens out for females from age 70, at about 1,300 deaths per million population, while for males it continues to climb because the prevalence of smoking for males rose before it did for females (a cohort effect) (Table 7.1).

Twelve-year trends 1987–1998

There has been a significant and consistent downward trend in lung cancer mortality rates in males since 1987 of about 1.9% each year, but a significant increase in females of 1.4% each year (Figure 7.2). A comparison of mortality rates (per million) between 1987–1991 and 1994–1998 shows a reduction from 625 to 550 in males and an increase from 171 to 190 in females. While there has been a general decline in mortality rates for males after the age of 35, the greatest fall in lung cancer mortality rates has been in males aged under 65 years. In contrast, the greatest increases of rates in females have been in those aged between 65 and 84 (Table 7.1).

Geographic differences in mortality

As discussed in Chapter 4, geographic differences are a complex interplay of many factors including socioeconomic status, occupational and environmental risk, migrant population, Aboriginal and Torres Strait Islander population, and proportion of the population living in rural and remote areas. Areas with a higher proportion of Aboriginal and Torres Strait Islander people will have higher mortality rates because of the higher mortality rates experienced by the Aboriginal and Torres Strait Islander population. Some of these factors are discussed separately below.

State and Territory comparison

The rates of lung cancer decreased between the periods 1987–1991 and 1994–1998 for males in all States and Territories except the Northern Territory (Table 7.2). The rates for females all increased except in South Australia, Tasmania and the Australian Capital Territory. The

mortality rate for lung cancer also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national lung cancer mortality rate:

- The mortality rate for males in Victoria was significantly higher.
- The mortality rate for males in Western Australia was significantly lower.
- Mortality rates for females in Tasmania and the Northern Territory were significantly higher.
- The mortality rate for females in Queensland was significantly lower.

During the 1992–98 period:

- Mortality rates for males in Victoria, Tasmania and the Northern Territory were significantly higher.
- The mortality rate for males in the Australian Capital Territory was significantly lower.
- Mortality rates for females in Victoria and the Northern Territory were significantly higher.
- The mortality rate for females in Queensland was significantly lower.

Geographic category (by metropolitan, rural and remote area)

Mortality rates were highest in remote areas although there were no significant differences by area for males. The mortality rate for females in remote areas (245 deaths per million population) was 26% higher than in metropolitan areas (194) and 32% higher than in rural areas (185) (Table 7.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for lung cancer for Australian males born in Australia was 396 deaths per million population (Table 7.5).

- Mortality rates for Australian males born in Korea, Hong Kong and Macau, Japan, Chile, Singapore, Mauritius, Greece, China and New Zealand were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian males born in Malta, the Netherlands and the United Kingdom and Ireland were significantly higher than for Australian males born in Australia.

For the period 1992–1994, the world-standardised mortality rate for lung cancer for Australian females born in Australia was 134 deaths per million population (Table 7.5).

- Mortality rates for Australian females born in Greece, Portugal, Korea, Malta and Italy were significantly lower than for Australian females born in Australia.
- The mortality rate for Australian females born in the United Kingdom and Ireland was significantly higher than for Australian females born in Australia.

The mortality rates for Australian males born in Hungary and Poland were about half the rate of their Hungarian and Polish counterparts living in Hungary and Poland, and Australian females born in Germany had rates about 1.5 times the mortality rate of their German counterparts in Germany.

International comparisons

Compared internationally, lung cancer mortality rates for Australian males and females were mid-range.

- Australian males had a rate similar to Finnish and Austrian males, and Australian females had a rate similar to Austrian Polish and Dutch females.
- Mortality rates were higher for males in Hungary, Poland and the Netherlands (1.5 to 2.0 times the rate for Australian males).
- Mortality rates for females were higher in the USA and Canada (about 1.5 to 2.0 times the Australian rate) (see Tables C.2 & C.3 in Appendix C).

Socioeconomic status

Socioeconomic status is an important factor in the prevalence of smoking in males and females. This factor is demonstrated in lung cancer mortality rates where there is a clear inverse relationship with socioeconomic status, using the SEIFA Index of Relative Socioeconomic Disadvantage (Table 7.4; Figure 7.3) (see Appendix D).

- The mortality rate was almost 55% higher for males in the lowest of the five SEIFA groups (about 619 deaths per million population) than for males in the highest SEIFA group (399).
- In females the relationship was not quite so strong, but the difference between the highest SEIFA and lowest SEIFA groups (about 25%) was nevertheless significant.

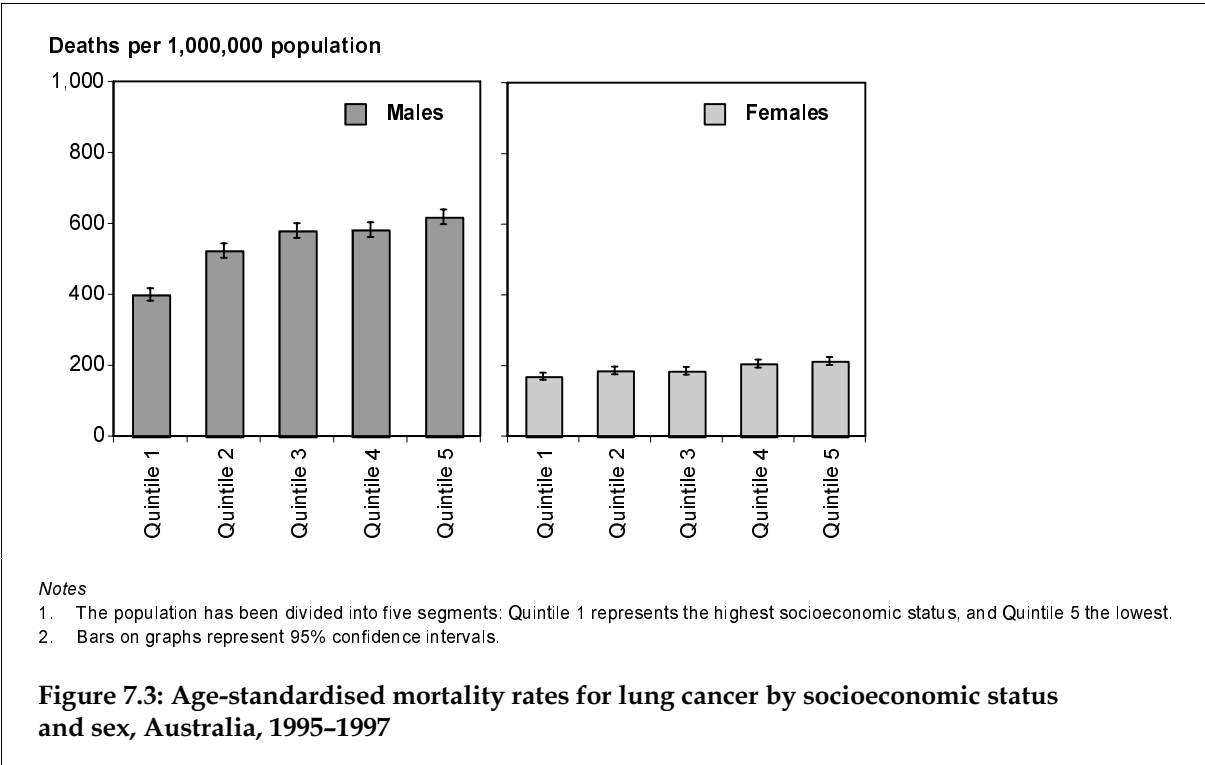
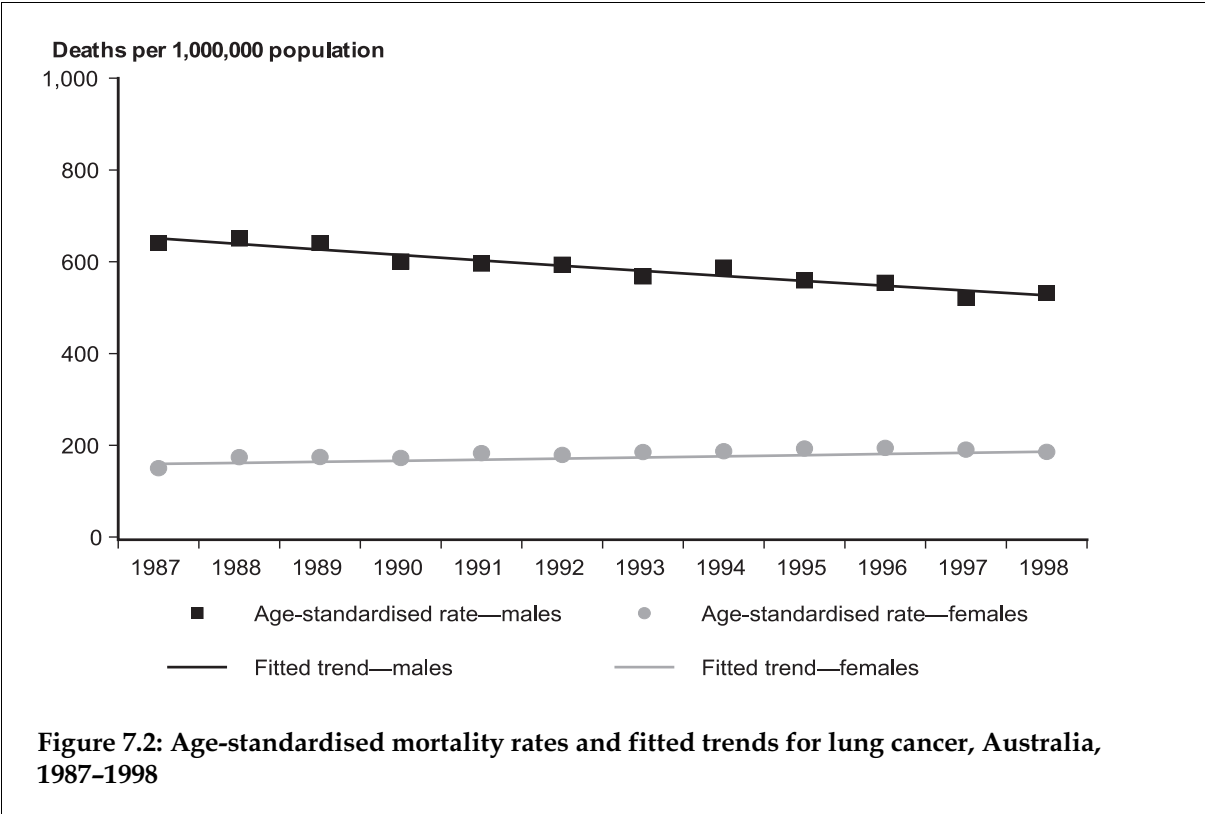


Table 7.1: Age-specific and age-standardised mortality rates for lung cancer per million population, Australia, 1987-1998

Year	Age																	ASMR		
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	Crude rate	Augst 1991
Males																				
1987	0	0	0	0	0	0	8	25	71	257	549	1,230	2,003	3,058	3,964	4,823	4,988	4,882	549	640
1988	0	0	0	0	0	1	3	30	75	254	536	1,175	2,102	2,888	4,100	5,301	5,069	4,910	561	651
1989	0	0	0	0	0	1	12	20	87	259	525	1,080	1,955	3,134	3,921	4,880	5,541	4,652	556	640
1990	0	0	0	0	1	1	3	12	70	216	454	1,066	1,879	2,852	3,598	4,698	5,299	4,667	525	600
1991	0	0	0	0	0	1	4	18	64	220	484	1,043	1,794	3,008	3,646	4,478	4,940	4,749	529	596
1992	0	0	0	0	1	4	7	19	64	182	491	1,042	1,844	2,954	3,804	4,375	4,991	4,266	535	594
1993	0	0	0	0	1	1	7	19	73	181	412	907	1,841	2,571	3,707	4,391	4,936	4,509	517	568
1994	0	0	0	2	0	0	4	23	68	154	434	909	1,700	2,794	4,018	4,661	4,658	5,124	541	587
1995	0	0	0	0	1	3	8	21	42	172	395	814	1,612	2,703	3,777	4,177	5,195	4,774	522	559
1996	0	0	0	0	0	0	3	18	49	148	444	762	1,600	2,640	3,618	4,527	5,016	4,610	524	554
1997	0	1	0	0	0	0	6	12	45	146	343	755	1,551	2,350	3,522	4,193	4,738	4,641	500	521
1998	0	0	0	1	3	1	3	17	54	147	347	744	1,488	2,492	3,706	4,224	4,715	4,729	517	532
Females																				
1987	0	0	0	0	0	3	3	27	47	102	234	270	529	683	883	960	913	730	159	150
1988	0	0	0	0	0	0	5	19	60	119	178	380	646	820	1,062	1,127	1,054	711	186	174
1989	0	0	0	0	0	3	6	12	65	116	200	410	621	779	1,185	968	1,091	698	186	175
1990	0	2	0	0	0	1	4	24	52	100	192	362	612	843	1,035	1,119	1,026	833	186	172
1991	0	0	0	0	1	3	6	14	45	119	232	374	657	837	1,137	1,255	1,073	818	199	183
1992	0	0	0	0	1	0	6	9	39	91	210	344	600	870	1,053	1,362	1,070	1,090	198	179
1993	0	0	2	0	0	1	3	16	42	112	235	357	576	903	1,150	1,317	1,181	977	206	185
1994	0	0	0	0	0	1	1	20	29	106	249	384	546	875	1,217	1,383	1,268	863	210	187
1995	0	0	0	0	1	0	4	10	48	102	252	306	611	909	1,220	1,431	1,351	1,079	220	193
1996	0	0	0	0	0	0	7	21	38	103	251	398	611	908	1,098	1,436	1,331	1,208	223	194
1997	0	0	0	0	1	0	3	11	46	111	218	381	568	927	1,179	1,369	1,341	1,060	221	191
1998	0	0	0	0	0	1	6	12	40	85	196	373	546	869	1,228	1,325	1,400	1,064	218	186

Note: ASMR = age-standardised mortality rate.

Table 7.2: Number of deaths and age-standardised mortality rates for lung cancer per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
	Deaths								
1987–1991	8,095	6,016	3,768	1,914	2,009	672	188	117	22,778
1994–1998	8,150	6,138	4,252	2,038	2,063	721	179	164	23,705
	Deaths per million population								
1987–1991	624	655	620	564	660	647	543	740	625
1994–1998	540	573	560	523	560	611	376	903	550
	Confidence intervals (95%)								
1987–1991	611–638	638–672	600–640	538–590	631–690	597–696	457–629	581–898	617–633
1994–1998	529–552	559–587	544–577	500–546	536–585	566–656	318–434	742–1,063	543–557
Females									
	Deaths								
1987–1991	2,755	2,119	1,011	736	690	264	96	42	7,713
1994–1998	3,540	2,758	1,559	890	823	296	114	64	10,045
	Deaths per million population								
1987–1991	169	182	141	174	186	215	214	301	171
1994–1998	190	203	177	184	184	209	185	334	190
	Confidence intervals (95%)								
1987–1991	163–176	174–189	132–150	161–186	172–200	189–241	170–257	197–404	167–175
1994–1998	183–196	196–211	168–185	172–196	172–197	185–234	150–219	243–425	186–194

Table 7.3: Age-standardised mortality rates for lung cancer per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	544	533–555	194	188–200
Rural	542	525–558	185	176–194
Remote	601	534–667	245	201–289

Note: ASMR = age-standardised mortality rate.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 7.4: Age-standardised mortality rates for lung cancer per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	399	382–417	170	160–180
2	523	503–544	186	175–197
3	580	559–601	185	174–196
4	583	562–604	206	195–217
5 Low SES	619	598–640	213	202–224

Notes

1. ASMR = age-standardised mortality rate; SES = socioeconomic status.

2. A description of the SEIFA Index of Relative Socioeconomic Disadvantage may be found in Appendix D.

Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 7.5: Age-standardised mortality rates per million population for lung cancer, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	ASMR (world)	95% CI	Country of birth	ASMR (world)	95% CI
Israel	738	184–1,293	Japan	233	25–440
Malta	663	538–789	Canada	203	49–358
Netherlands	570	496–645	United Kingdom and Ireland	193	179–206
France	551	290–813	Hungary	185	113–257
United Kingdom and Ireland	458	438–478	USA	183	66–299
USA	437	290–584	Switzerland	157	0–316
Hungary	431	324–539	Austria	151	65–238
Finland	423	169–676	New Zealand	149	106–191
Canada	419	216–621	Germany	148	113–183
Poland	413	334–492	Finland	136	2–270
Australia	396	388–404	Australia	134	129–139
Italy	396	363–430	China	129	86–172
Germany	391	326–456	Netherlands	128	91–165
New Zealand	322	260–384	France	126	14–238
Austria	321	205–437	Hong Kong and Macau	107	12–201
China	293	224–363	Singapore	102	0–209
Greece	288	239–337	Mauritius	100	2–198
Portugal	244	45–443	Poland	94	56–131
Switzerland	241	27–455	Chile	62	0–150
Mauritius	224	67–381	Israel	47	0–140
Singapore	138	0–294	Italy	45	32–58
Chile	130	0–296	Malta	37	7–67
Japan	106	0–314	Korea	31	0–92
Hong Kong and Macau	92	3–181	Portugal	20	0–60
Korea	61	0–179	Greece	20	7–32

Notes

1. ASMR = age-standardised mortality rate; CI = confidence interval.
2. Age-standardised mortality rates have been standardised to the World Standard Population.