6 Cerebrovascular disease

Disease characteristics

Cerebrovascular disease (commonly known as stroke) occurs when an artery supplying blood to a part of the brain suddenly becomes blocked (85% of cases) or bleeds (15% of cases). The part of the brain where the blockage or bleed occurs can then become damaged, which in turn can impair the functions relying on that part. For instance, this can result in paralysis to one side of the body or an inability to communicate with speech. Death due to stroke occurs mainly in the elderly (aged 75 years and over). It is also a major cause of disability in those aged between 25 and 64 (Mathers et al. 1999).

About one-third of those who have had a stroke will die within 12 months. A further one-third become permanently disabled, with some degree of paralysis of one side of the body, difficulty in communicating, or a range of other problems that may affect their quality of life and their ability to function in society. It is estimated that stroke is the cause of 25% of all chronic disability in Australia (AIHW 1999b).

The most important risk factor for cerebrovascular disease is high blood pressure. Other risk factors include tobacco smoking, heavy alcohol consumption, being overweight and having insufficient physical activity. Transient ischaemic attack, atrial fibrillation, diabetes and history of heart attacks are also associated with an increased risk of stroke (AIHW 2002; AIHW 1999b).

It is estimated that stroke results in about 16,000 PYLL before the age of 75 for males each year, and about 13,000 for females, making cerebrovascular disease (ranked ninth on this measure) a major cause of premature death.

Historic view

Cerebrovascular disease is the second most common cause of death, claiming 10% of all deaths in 1998, with 593 and 535 deaths per million population for males and females respectively in 1998. This corresponds to 5,065 deaths in males and 7,547 deaths in females.

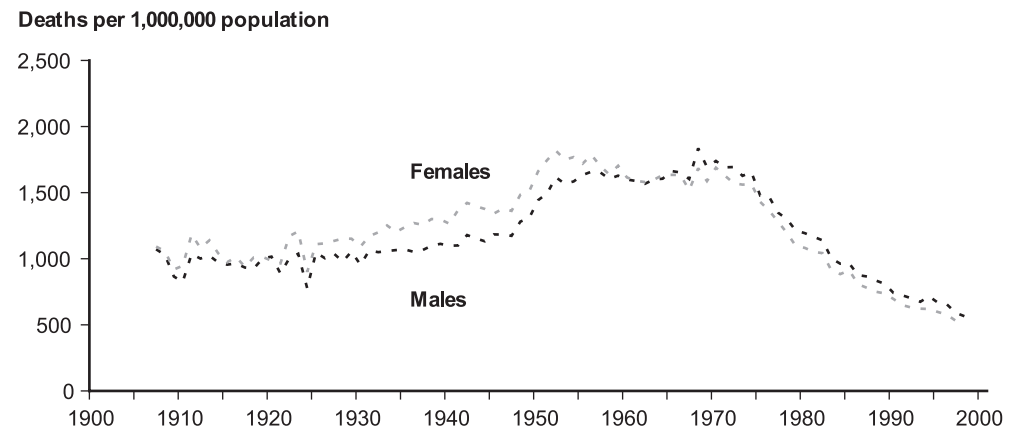

Figure 6.1: Age-standardised mortality rates for cerebrovascular disease, Australia, 1907–1998

In 1907 the rate for cerebrovascular disease was about 1,000 deaths per million population for both males and females. The number of deaths was 1,038 males and 863 females. While mortality rates for cerebrovascular disease climbed steeply over the first half of the century, they began to slow down between 1950 and 1970. Mortality rates peaked at 1,830 deaths per million population for males in the late 1960s and 1,820 for females in the early 1950s. Since 1970, mortality rates for stroke have declined annually by over 4.4% per year in males and 3.6% in females (Figure 6.1).

As with ischaemic heart disease, changes in lifestyle and improvements in the management of the disease are considered to have contributed to the decline in these mortality rates.

Age–sex distribution

The age distribution for mortality rates was consistent over the 1987–1998 period, with most deaths occurring after the age of 75.

- In 1998, the mortality rate for males (593 deaths per million population) was significantly higher than the rate for females (535).
- For males, 93% of deaths occurred from age 60 and 69% occurred from age 75.
- For females, 96% of deaths occurred from age 60 and 84% occurred from age 75 (Table 6.1; Figure 6.3).

Twelve-year trends 1987–1998

There has been a significant downward trend in cerebrovascular disease mortality rates over the 1987–1998 period, 0.9% annually for males and 1.0% for females. For males, there were significant decreases in age-specific rates over the 1987–1998 period for age groups 50–54 years and above, while for females there were significant decreases for age groups 45–49 years and above (Table 6.1; Figure 6.2).

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 mortality rates from cerebrovascular disease decreased between the two periods (1987–1991 and 1994–1998) for males and females in all States and Territories, except in the Northern Territory where the rates increased for both males and females and the Australian Capital Territory where the rate increased for females (Table 6.2). The mortality rates for cerebrovascular disease also showed some variation among the States and Territories. During the 1987–1991 period, compared with the national cerebrovascular disease mortality rate:

- Mortality rates for males in New South Wales and South Australia were significantly higher.
- Mortality rates for males in Victoria and Western Australia were significantly lower.
- Mortality rates for females in New South Wales and South Australia were significantly higher.
- Mortality rates for females in Victoria, Western Australia and the Australian Capital Territory were significantly lower.

During the 1994–98 period:

- Mortality rates for males in New South Wales, South Australia Tasmania, and the Northern Territory were significantly higher.
- The mortality rates for males in Western Australia was significantly lower.
- Mortality rates for females in New South Wales and South Australia were significantly higher.
- Mortality rates for females in Victoria and Western Australia were significantly lower.

Geographic category (by metropolitan, rural and remote area)

For the period 1995–1997, mortality rates did not vary significantly by geographic area (Table 6.3).

Country of birth

For the period 1992–1994, the world-standardised mortality rate for cerebrovascular disease for Australian males and females born in Australia was 411 deaths per million population for males and 356 deaths per million for females (Table 6.5).

- Of the 25 countries of birth analysed for Australian males and females, none had significantly higher mortality rates for cerebrovascular disease than Australian males and females born in Australia.
- Mortality rates for Australian males born in Greece, Italy and the United Kingdom and Ireland were significantly lower than for Australian males born in Australia.
- Mortality rates for Australian females born in Japan, Chile, Hong Kong and Macau, Greece, Italy, Hungary and the United Kingdom and Ireland were significantly lower than for Australian females born in Australia.

It is interesting to note that Australian males born in China, Hungary, Italy and the United Kingdom and Ireland, and Australian females born in China, and the United Kingdom and Ireland had rates about half the rate of their country of origin.

International comparisons

The world-standardised Australian mortality rates were in the lower range for males and females, and similar to the rates for USA, Canada, Switzerland and France. Mortality rates in China and Hungary were about three times as high as Australian rates for males and females (see Tables C.2 & C.3 in Appendix C).

Socioeconomic status

There was a general inverse relationship between socioeconomic status and risk of death from cerebrovascular disease for the 1995–1997 period, using the SEIFA Index of Relative Socioeconomic Disadvantage (see Appendix D).

- The male mortality rate for the highest SEIFA group (599 deaths per million population) was significantly lower than the rates for males in the lower three of the five SEIFA groups (ranging between 653 and 680 deaths per million population).
- For females there were no significant differences (Table 6.4).

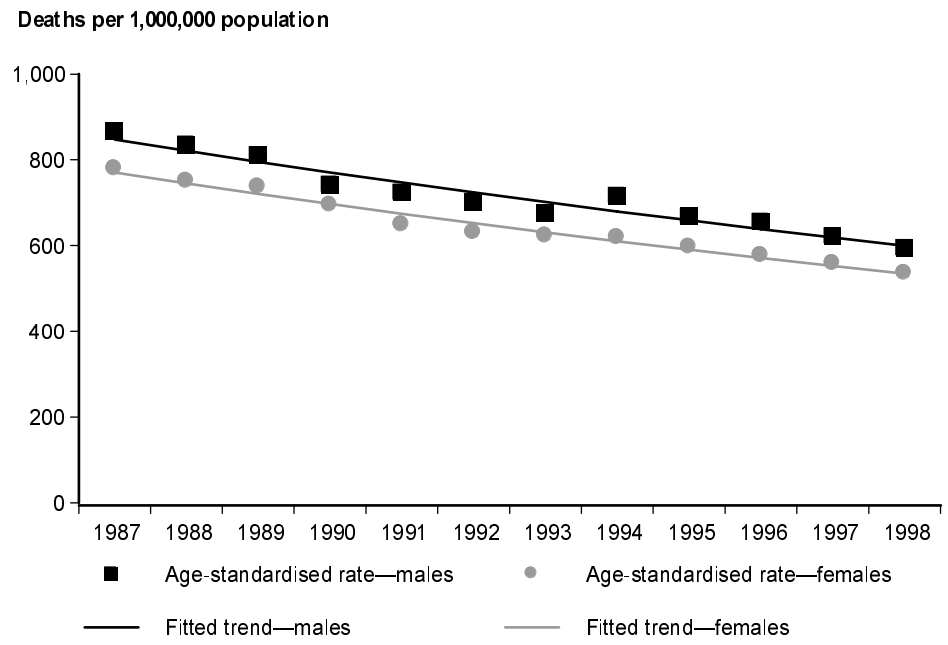

Figure 6.2: Age-standardised mortality rates and fitted trends for cerebrovascular disease, Australia, 1987–1998

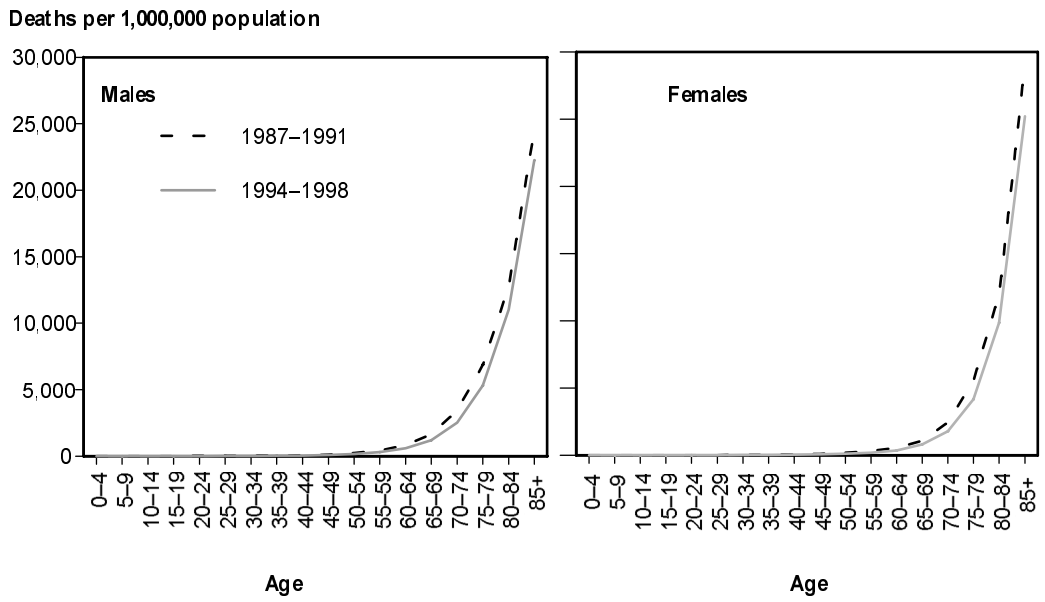

Figure 6.3: Age-specific mortality rates for cerebrovascular disease, by sex, Australia, 1987–1991 and 1994–1998

Table 6.1: Age-specific and age-standardised mortality rates for cerebrovascular disease per million population, Australia, 1987–1998

	Age																		ASMR
Year	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	Aust 1991
Males																				
1987	2	0	0	4	6	13	12	31	82	157	276	523	940	1,753	3,903	7,394	13,685	26,838	625	866
1988	2	0	3	6	18	20	18	36	77	95	208	370	872	1,755	3,686	7,396	13,837	25,419	610	835
1989	2	3	2	10	7	15	38	37	68	93	214	434	795	1,831	3,591	6,869	12,651	25,688	603	810
1990	2	0	3	6	17	20	17	29	72	131	252	390	837	1,450	3,194	6,574	11,637	22,903	563	741
1991	2	0	0	4	3	17	29	33	70	114	201	400	758	1,477	2,849	6,233	12,297	22,546	561	723
1992	6	5	3	1	7	7	21	36	66	107	166	355	651	1,465	2,847	6,442	11,634	21,670	558	701
1993	2	2	0	2	3	13	16	39	41	92	178	297	656	1,279	2,897	5,830	11,234	21,987	548	674
1994	2	5	6	9	4	10	23	35	49	97	143	345	698	1,245	2,763	6,320	11,954	24,361	592	715
1995	0	0	0	2	7	10	14	42	57	91	177	305	617	1,253	2,703	5,487	11,188	22,917	568	667
1996	2	0	3	5	7	8	18	36	55	110	164	293	562	1,248	2,503	5,279	11,270	22,885	571	655
1997	3	0	3	3	11	22	19	21	67	126	174	275	593	1,204	2,423	4,984	10,498	21,057	557	621
1998	3	0	2	5	3	7	22	25	65	101	114	286	548	1,105	2,311	4,662	10,280	20,669	543	593
Females																				
1987	0	0	2	0	6	18	20	29	50	147	174	349	616	1,136	2,766	5,954	13,419	30,804	920	779
1988	0	2	3	3	9	16	30	30	56	106	180	327	632	1,148	2,628	5,926	12,684	29,145	894	750
1989	0	0	3	1	5	13	15	23	77	105	188	352	550	1,167	2,539	5,513	12,144	30,036	893	737
1990	0	0	3	6	6	8	17	32	39	88	182	267	499	984	2,332	5,582	11,706	28,284	853	695
1991	2	2	0	0	12	10	15	35	52	74	208	268	473	985	2,048	5,122	10,274	27,293	814	649
1992	2	5	2	0	10	9	19	28	48	104	177	243	487	926	1,873	4,719	10,552	26,739	812	631
1993	0	0	0	2	10	6	18	32	37	94	145	210	392	819	1,993	4,786	11,118	25,885	825	622
1994	0	2	0	5	8	9	10	26	44	97	102	189	392	860	1,847	4,702	10,570	27,152	845	619
1995	2	2	3	2	1	10	16	28	45	78	116	185	359	841	1,957	4,409	10,132	25,958	834	597
1996	0	3	2	3	4	10	10	21	40	78	139	194	381	823	1,743	4,364	9,530	25,382	826	577
1997	3	2	2	7	3	12	28	31	43	81	122	206	310	787	1,712	3,845	9,658	24,665	820	558
1998	2	2	3	7	8	9	15	38	51	75	109	171	324	691	1,742	3,662	9,450	23,400	802	535

Note: ASMR = age-standardised mortality rate.

Table 6.2: Number of deaths and age-standardised mortality rates for cerebrovascular disease per million population, States and Territories, 1987–1991 and 1994–1998

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males									
				Deaths					
1987–1991	9,555	5,900	4,069	1,910	2,364	732	177	80	24,786
1994–1998	9,477	6,183	4,408	2,113	2,432	793	229	137	25,774
				Deaths per million population					
1987–1991	873	743	777	651	888	808	688	662	792
1994–1998	686	626	633	575	710	725	616	840	648
				Confidence intervals (95%)					
1987–1991	855–891	724–762	753–802	621–681	852–925	748–868	579–798	481–843	782–802
1994–1998	672–700	610–641	614–651	550–600	682–739	674–776	533–699	671–1,009	640–656
Females									
				Deaths					
1987–1991	14,747	9,123	5,717	2,558	3,299	1,054	209	62	36,769
1994–1998	14,341	9,207	6,249	3,000	3,570	1,100	360	107	37,934
				Deaths per million population					
1987–1991	808	676	713	522	799	749	518	571	720
1994–1998	614	545	578	477	646	617	592	717	576
				Confidence intervals (95%)					
1987–1991	794–821	662–690	694–731	502–543	771–826	703–794	447–589	415–728	713–728
1994–1998	604–624	534–557	564–593	459–494	625–668	580–654	530–653	569–864	570–582

Table 6.3: Age-standardised mortality rates for cerebrovascular disease per million population, by geographic area, 1995–1997

Geographic area	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
Metropolitan	641	629–654	576	567–585
Rural	659	640–678	576	562–591
Remote	606	535–678	563	499–627

Note: ASMR = age-standardised mortality rate.
Source: AIHW Mortality Database, based on *Statistical Local Area* resident population estimates compiled by the ABS.

Table 6.4: Age-standardised mortality rates for cerebrovascular disease per million population, by socioeconomic status, 1995–1997

SEIFA quintile	Males		Females	
	ASMR	95% confidence interval	ASMR	95% confidence interval
1 High SES	599	577–621	564	548–579
2	621	598–645	567	550–585
3	653	630–676	578	560–595
4	658	635–681	568	550–585
5 Low SES	680	657–703	588	571–605

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 6.5: Age-standardised mortality rates per million population for cerebrovascular disease, Australians by birthplace, 1992–1994

Males			Females		
Country of birth	**ASMR (world)**	**95% CI**	**Country of birth**	**ASMR (world)**	**95% CI**
Portugal	615	194–1,036	Israel	734	318–1,149
Finland	594	265–922	Switzerland	443	210–676
USA	494	320–669	Portugal	435	169–700
Hungary	461	352–570	Mauritius	400	213–587
Poland	438	302–573	Finland	397	122–672
Australia	**411**	**403–419**	Poland	370	307–433
Germany	402	327–477	**Australia**	**356**	**350–362**
China	381	302–460	China	350	286–415
Malta	378	276–481	Singapore	349	107–591
Canada	378	177–578	USA	341	216–466
New Zealand	374	310–437	Korea	334	113–554
Switzerland	370	128–612	Canada	327	166–487
Netherlands	353	266–440	New Zealand	310	261–358
United Kingdom and Ireland	341	325–357	Germany	306	258–355
Singapore	327	93–561	Netherlands	301	248–355
Israel	325	0–692	United Kingdom and Ireland	296	283–309
Mauritius	322	97–547	Austria	286	198–373
Austria	313	199–427	Malta	283	200–366
Italy	311	281–341	France	273	115–430
Greece	290	238–342	Hungary	264	187–341
Hong Kong and Macau	285	105–464	Italy	251	225–277
Korea	254	34–474	Greece	218	177–258
Chile	248	0–525	Hong Kong and Macau	190	62–318
France	241	56–425	Chile	128	0–259
Japan	186	0–478	Japan	74	0–177

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