3 Costs of cardiovascular diseases in 1993–94

Comparison with other major disease groups

The total health system costs of disease and injury in Australia in 1993–94, summarised at the broad disease group level according to ICD-9 chapters, are shown in Figure 1, ranked in descending order of total costs. Cardiovascular disease, with an estimated total expenditure of $3,719 million in 1993–94, ranks with digestive system diseases at $3,715 million, as the most expensive group. The digestive system expenditure includes $1,830 million for dental services. These are followed by musculoskeletal disorders, injury and mental disorders. The cardiovascular disease group also has the largest institutional costs (hospital and nursing home) of all disease groups. Disease costs at chapter level of ICD-9 have been examined in detail in a previous report (Mathers et al. 1998a).

Costs for the diagnosis and treatment of high blood cholesterol are classified in the 'endocrine, metabolic, nutritional and immunity disorders' chapter of ICD-9. As high blood cholesterol is of concern primarily as a risk factor for cardiovascular disease, its

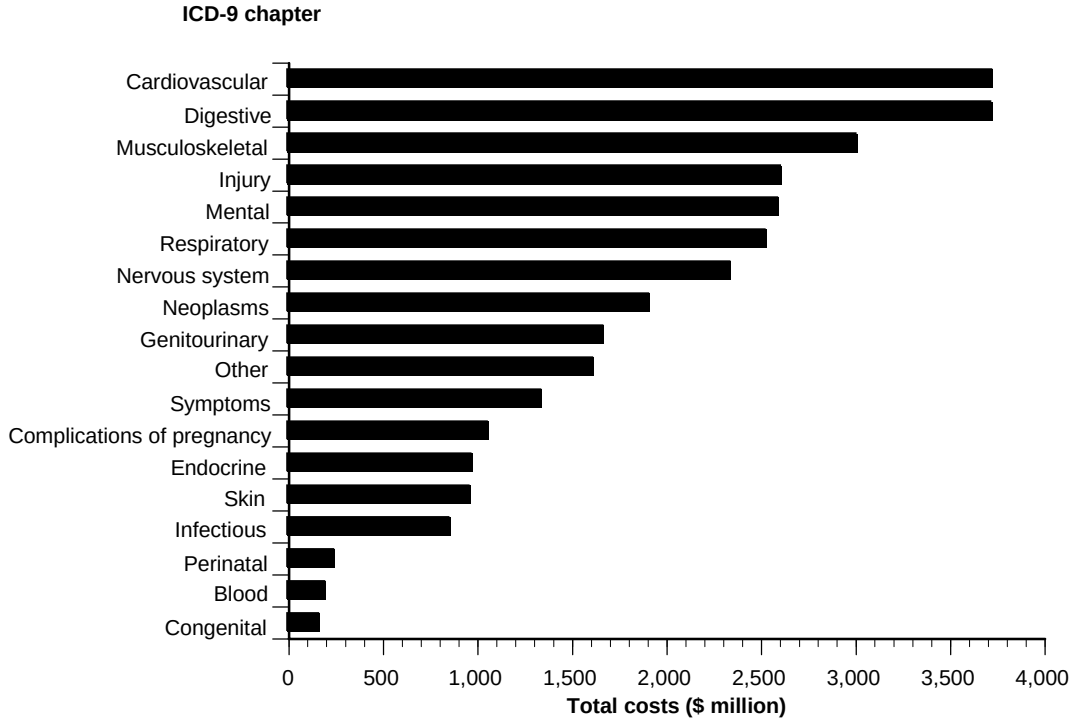


Figure 1: Health system costs by ICD-9 chapter, Australia, 1993–94

estimated $199 million expenditure is included in the following tables in this section, and total cardivascular disease expenditure including high blood cholesterol expenditure, is estimated to be $3,919 million.

Costs of specific cardiovascular diseases

Figure 2 shows the estimated health system costs associated with specific cardiovascular diseases and risk factors in 1993–94. Ischaemic heart disease accounts for an estimated $894 million (or 23% of total cardiovascular disease costs), followed by hypertension ($831 million) and cerebrovascular disease ($630 million). Costs for the diagnosis and treatment of high blood cholesterol ($199 million) are also shown in Figure 2, although these costs fall within the 'endocrine, metabolic, nutritional and immunity disorders' chapter. Costs for hypertension ($831 million) include the costs of detecting and treating high blood pressure (essential hypertension) as well as the costs of treating hypertensive heart and renal disease (which account for $15.9 million of the total $831 million).

Table 1 summarises estimated costs of specific cardiovascular conditions by health sector. More detailed estimates of expenditure for the major disease groups shown in Table 1 are given in Appendix C, disaggregated by health sector, age and sex.

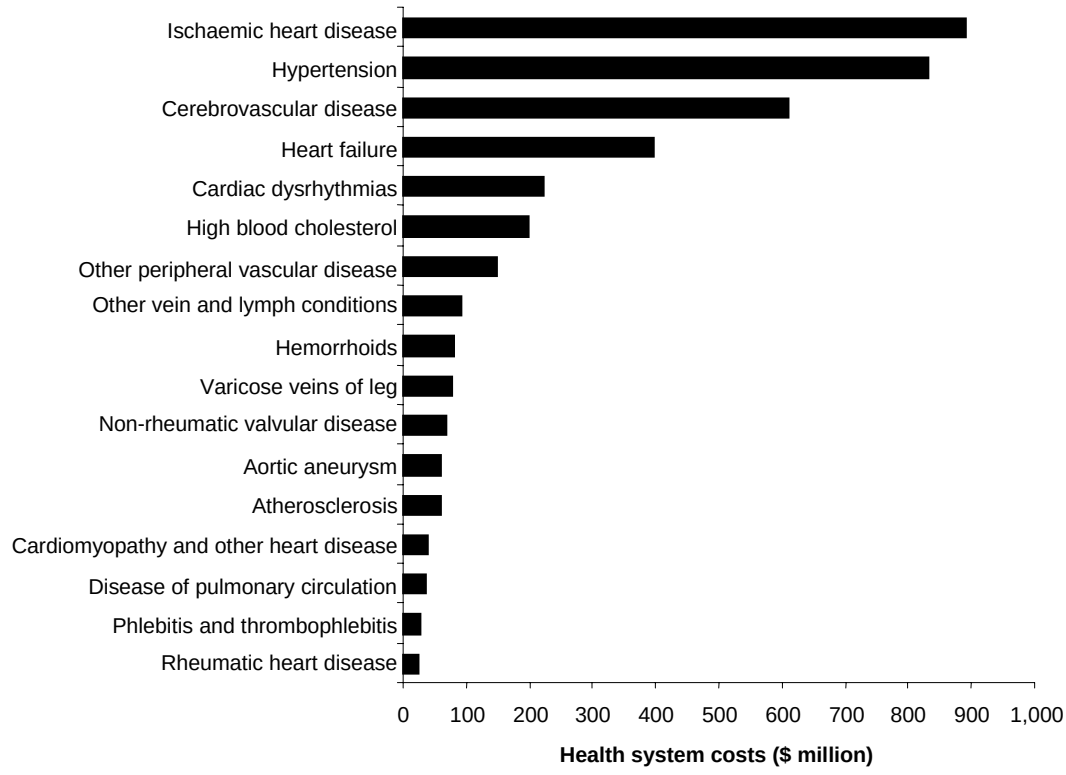


Figure 2: Health system costs of specific cardiovascular diseases, ranked in descending order, Australia, 1993–94

Table 1: Cardiovascular disease and risk factors: health system costs by health sector, 1993–94 ($ million)

ICD-9 chapter	Total costs	Hospital[a]	Medical[b]	Pharma-ceuticals	Allied health services	Research[c]	Other[d]
High blood cholesterol[e]	199	6	42	135	4	4	8
Hypertension[f]	831	55	217	476	20	22	42
Rheumatic heart disease	24	19	2	1	0	0	2
Ischaemic heart disease[g]	894	574	88	105	5	11	111
Acute myocardial infarction[h]	164	125	3	1	0	2	32
Other	730	449	85	104	5	9	78
Diseases of pulmonary circulation	35	22	3	2	0	1	7
Other forms of heart disease	741	353	93	81	5	11	199
Cardiac dysrhythmias	224	114	36	31	1	4	38
Heart failure	411	157	47	45	4	5	152
Non-rheumatic valvular disease	67	52	7	3	0	1	4
Cardiomyopathy and other[i]	40	29	4	2	0	1	4
Cerebrovascular disease[j]	630	283	31	13	5	6	292
Diseases of arteries, arterioles, capillaries	269	180	22	11	2	7	48
Atherosclerosis	60	43	2	2	0	3	11
Aortic aneurysm	60	46	5	2	0	1	5
Other peripheral vascular disease	149	91	15	7	2	3	32
Diseases of veins, lymphatics, other	275	157	46	23	2	3	44
Phlebitis and thrombophlebitis	26	7	10	6	1	0	3
Varicose veins of leg	76	59	7	2	1	1	7
Hemorrhoids	79	42	17	11	1	1	8
Other	93	49	12	5	0	1	26
Unspecified treatment and aftercare	9	6	1	1	0	0	1
Prevention and screening	12	9	1	1	0	0	0
Total cardiovascular disease[e]	**3,919**	**1,663**	**546**	**849**	**44**	**64**	**753**

(a) Public and private acute hospitals, repatriation hospitals and psychiatric hospitals. Includes public hospital non-inpatient services.

(b) Medical services for private patients in hospitals are included under Hospitals.

(c) Estimated as described in Appendix B.

(d) Includes nursing home expenditure and other institutional, non-institutional and administration expenditure. Does not include public health services, community health services, ambulances, or medical aids and appliances.

(e) Costs for high blood cholesterol are classified to the Endocrine, nutritional, metabolic and immunity disorders chapter, but are included in the last row total of this table for cardiovascular diseases.

(f) This category includes essential hypertension (high blood pressure) as well as hypertensive heart and renal disease. The latter account for only $15.9 million of the total $831 million health expenditure for this category.

(g) Also known as 'coronary heart disease'.

(h) Known in lay terms as 'heart attack'.

(i) Cardiomyopathy, myocarditis, endocarditis, pericarditis and other diseases of pericardium and endocardium.

(j) Known in lay terms as 'stroke'.

Table 2: Cardiovascular diseases: estimated health services utilisation by sector, 1993–94

	Hospitals			Medical services ('000)			Drugs
	Admissions ('000)	ALOS (days)	Non-inp. services ('000)	GP	Specialist[a]	Total	Prescriptions ('000)
High blood cholesterol[b]	0	2.2	91	639	1,366	2,004	2,354
Hypertension[c]	9	6.3	481	5,265	2,933	8,199	17,493
Rheumatic heart disease	2	7.9	17	27	43	70	60
Ischaemic heart disease	138	5.8	268	1,195	1,262	2,457	4,228
Disease of pulmonary circulation	5	9.9	10	36	61	97	108
Other forms of heart disease	84	7.7	628	1,448	1,401	2,849	3,615
Cerebrovascular disease	47	4.2	207	469	461	930	569
Arteries, arterioles, capillaries	25	10.5	235	260	359	619	411
Veins, lymphatics, other	62	9.0	177	730	718	1,448	910
Other	2	14.8	146	44	47	92	41
Total	**374**	**7.4**	**2,187**	**10,115**	**8,652**	**18,766**	**29,788**

(a) Includes diagnostic imaging and pathology services.

(b) High blood cholesterol is classified to the Endocrine, nutritional, metabolic and immunity disorders chapter and service utilisation numbers are included in the last row total of this table.

(c) Includes hypertensive disease with organ involvement.

Hospital and nursing home costs account for 60% of all cardiovascular disease treatment costs (Table C.2); the proportion is higher at 87% for cerebrovascular disease and much lower at 7% for hypertension.

Table 2 summarises estimated utilisation of hospitals, doctors and drugs for cardiovascular diseases and high blood cholesterol. In total they accounted for an estimated 374,000 hospital admissions, 18.8 million medical services and 29.8 million prescriptions in 1993–94. More detailed utilisation estimates are also given in Appendix C.

Table 3 shows the estimated health care costs of cardiovascular disease for males and females by health sector in 1993–94. Total hospital inpatient costs for males are 40% higher than those for females, whereas total nursing home costs and pharmaceutical costs are substantially lower for males than females.

Table 3: Health care costs of all cardiovascular disease[a] by sex and sector of expenditure, Australia, 1993–94 ($ million)

Sector of expenditure	Males	Females	Male/female ratio
Hospital inpatient	876	637	1.4
Hospital outpatient	73	70	1.0
Nursing home	217	370	0.6
Medical	244	259	0.9
Allied health professional	21	19	1.1
Pharmaceutical	303	412	0.7
Other	108	110	1.0
Total	**1,842**	**1,877**	**1.0**

(a) Not including high blood cholesterol.

Costs and impact of cardiovascular diseases

Table 4 shows estimated health system costs of cardiovascular diseases, for all ages and for people aged less than 75 years, together with numbers of deaths and years of life lost to age 75 in 1994. High blood cholesterol and hypertension are not included in this table, as they are risk factors for cardiovascular diseases and not in themselves direct causes of many deaths. Also included are total costs and mortality impact of diabetes, discussed in more detail in Section 4.

Ischaemic heart disease stands out from all other cardiovascular diseases in terms of both costs and premature mortality impact (Figure 3). Diseases of the veins and lymphatic system, which include varicose veins and hemorrhoids, stand out as having high health expenditure relative to mortality impact.

Table 4: Cardiovascular diseases[(a)] and diabetes: total health system costs ($ million) 1993–94, and total deaths and potential years of life lost to age 75 (PYLL 75), 1994

	Total costs ($ million)	Costs 0–74 years ($ million)	Deaths 1994	PYLL 75 1994
Diabetes mellitus[(b)]	387	287	2,751	13,172
Cardiovascular disease				
Rheumatic heart disease	24	22	340	2,316
Ischaemic heart disease	894	699	30,575	112,339
Disease of pulmonary circulation	35	24	217	1,853
Other forms of heart disease	741	361	6,474	24,719
Cerebrovascular disease	630	237	12,838	30,571
Diseases of arteries, arterioles, and capillaries	269	163	3,070	8,277
Diseases of veins, lymphatics, and other circulatory disorders	275	221	256	1,362
Total cardiovascular disease	**3,255**	**2,014**	**53,770**	**181,437**

(a) Excluding hypertension and high blood cholesterol, which are risk factors for other cardiovascular diseases.

(b) Including costs of $15.8 million for hypoglycemia and hyperinsulinism. See Table 6 for details.

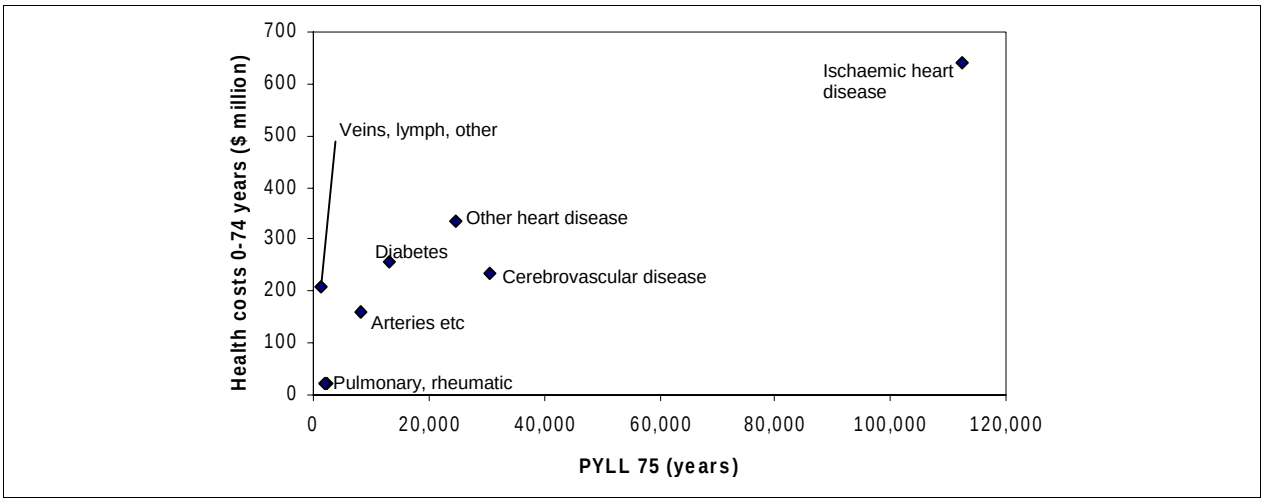
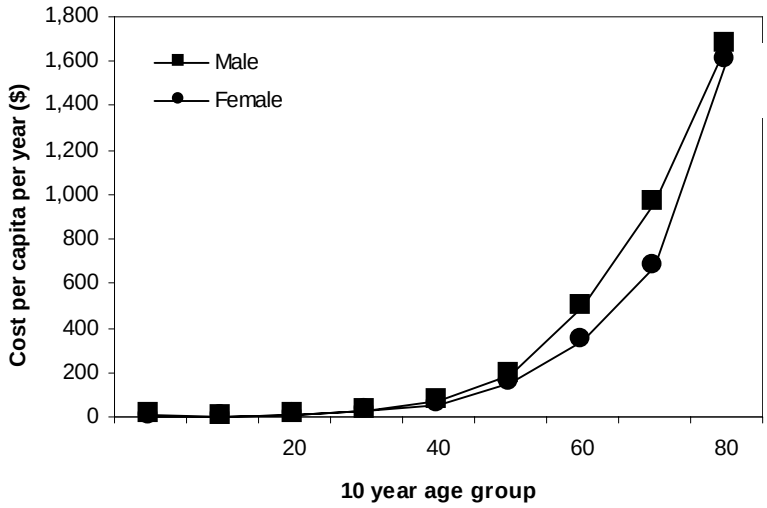


Figure 3: Cardiovascular diseases and diabetes: health system costs for people aged 0–74 years compared with potential years of life lost to age 75 in 1994

Cardiovascular disease costs by age and sex

Figure 4 illustrates the age–sex distribution of total expenditure on cardiovascular disease and per capita annual expenditure. These rise steeply with age from 40 years onwards. Per capita expenditure for cardiovascular disease reaches around $1,700 per annum for men and women aged 75 years and over.

Figure 5 shows the age–sex distributions of health system costs per capita for selected cardiovascular disease groups and high blood cholesterol. Detailed information on total costs and health services utilisation by health sector, age, sex and ICD-9 chapter are provided in Appendix Tables C.6 to C.31.



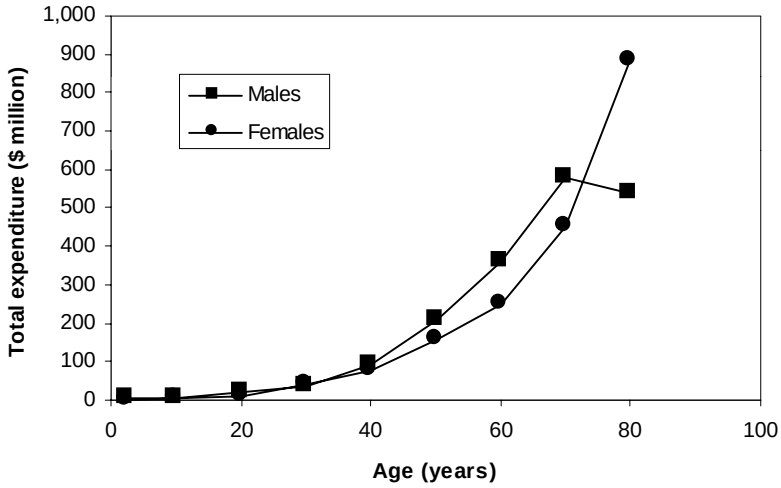


Figure 4: Cardiovascular disease: total health system costs ($ million) and average annual costs per capita, by age group and sex, 1993–94

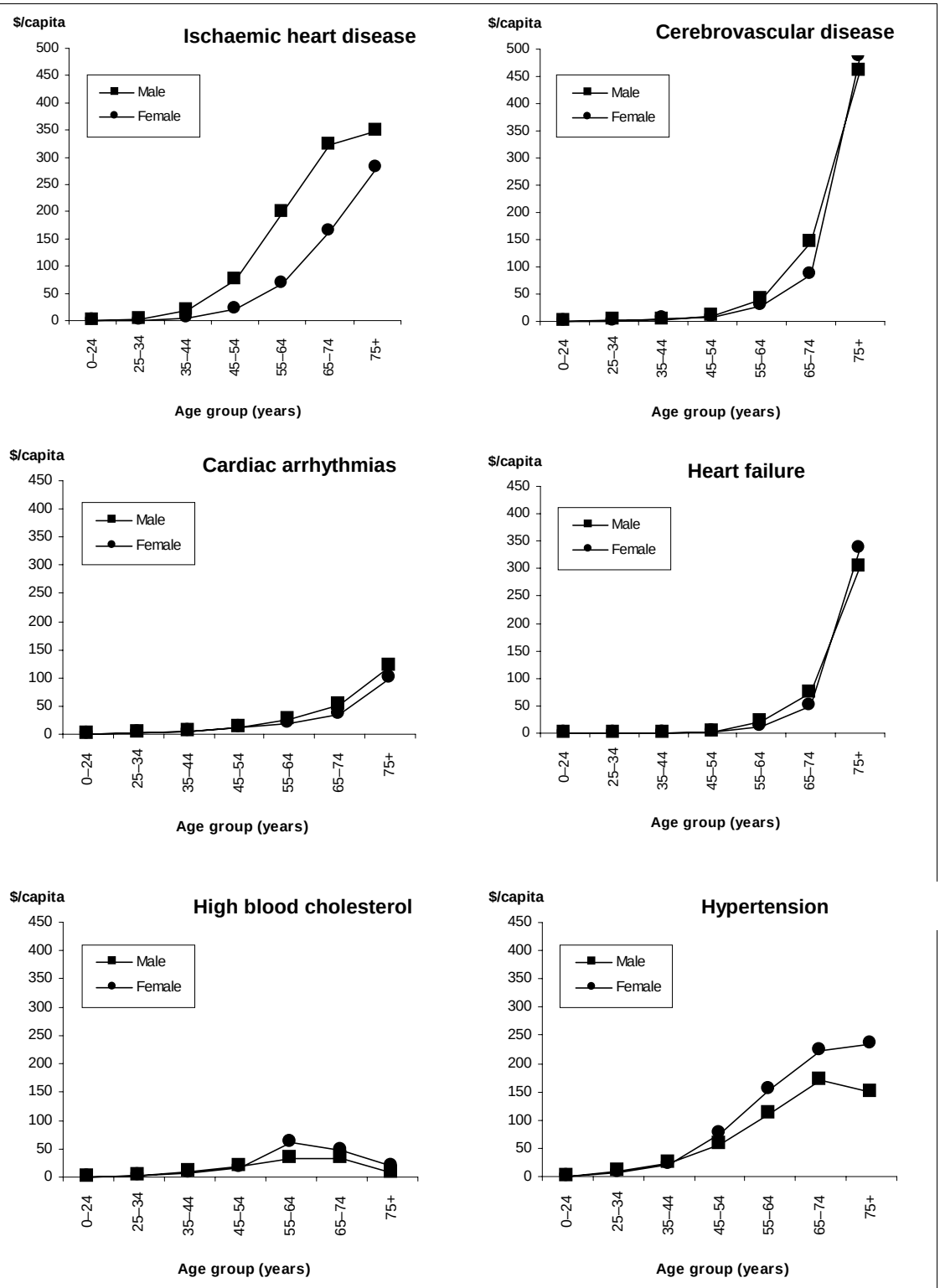


Figure 5: Selected cardiovascular conditions: total health system costs by age group and sex, 1993–94

Estimated annual costs per case of hypertension and high blood cholesterol

The first two columns of Table 5 show the estimated prevalence of diagnosed high blood cholesterol and hypertension by age group in 1994. These were estimated using data from the 1995 ABS National Health Survey on numbers of persons reporting high cholesterol and from the 1995 ABS National Nutrition Survey on the numbers of persons with controlled hypertension or treated, uncontrolled hypertension. For the purpose of this analysis, it is assumed that persons reporting that they had high cholesterol would have based this on a doctor's diagnosis.

Total health system costs of hypertension and high blood cholesterol for each age group (given in Tables C.8 and C.26) were divided by the estimated prevalent cases for that age group to obtain estimates of the average annual costs per prevalent diagnosed case in 1993–94. These are shown in the final two columns of Table 5.

The estimated average annual cost per diagnosed case of hypertension is $572 compared with $214 for high blood cholesterol. Hypertension costs per case are higher at younger ages, although it should be noted that the estimate for 0–24 year olds is a ratio of two very small estimates and so is not shown. High blood cholesterol costs per case rise with age to around $240 per year for those aged 45 years and over.

In interpreting these estimates, it should be noted that the health system costs include all costs associated with screening for hypertension and high blood cholesterol, so that the estimated costs per diagnosed case will include a component associated with screening of other people without hypertension or high blood cholesterol as well as the average treatment costs associated with diagnosing and managing the diagnosed case.

Table 5: Hypertension and high blood cholesterol: estimated average annual health system costs ($) per prevalent diagnosed case, 1993–94

	Estimated prevalence (%)		Estimated annual cost ($) per prevalent case	
Age group	Treated hypertension[a]	High blood cholesterol[b]	Treated hypertension	High blood cholesterol
0–24	0.0	0.3	—	46
25–44	2.2	3.5	665	128
45–64	16.0	12.0	552	245
65 and over	33.9	12.5	567	237
All ages	**8.0**	**5.1**	**572**	**214**

(a) Based on reported current treatment for hypertension in the 1995 National Nutrition Survey (unpublished data provided by ABS).

(b) Based on reported high blood cholesterol in the 1995 National Health Survey (unpublished data provided by ABS).

Estimated costs per case of AMI and stroke

Acute myocardial infarction

Boyle and Dobson (1995) estimated total numbers of acute myocardial infarctions (AMI or heart attacks) in 1991–92 using two different methods. Averaging these two estimates results in an estimated 15,634 and 5,314 heart attacks for males and females aged 25–69 years respectively. If we also assume that the incidence of heart attacks has declined at the same rate as ischaemic heart disease mortality for males and females respectively between 1991–92 and 1993–94, then the estimated number of heart attacks in 1993–94 for males and females aged 25–69 years are 14,220 and 4,970 respectively.

Total estimated health system costs of AMI were $57.5 million and $18.9 million for males and females aged 25–69 years in 1993–94. If we assume that around 20% of heart attacks cause death before contact with medical services (Magnus 1998), then the average treatment cost of an acute myocardial infarction episode in 1993–94 was approximately $5,060 for males and $4,760 for females.

These estimates include only the health system costs associated with the AMI episode. Many people who experience AMI will have treatment for ischaemic heart disease before or after the period associated with the heart attack. Estimates are not available for the incidence of ischaemic heart disease as such, so it is not yet possible to estimate lifetime health system costs for a person with ischaemic heart disease.

Stroke

Anderson et al. (1993) carried out a study of the incidence of stroke in Western Australia in 1989–90. Applying their estimates of the age-specific incidence rates of first strokes to the total Australian male and female population, and assuming that the incidence of first stroke has declined 17% between 1989–90 and 1993–94 in line with mortality, we estimate that there were 13,140 and 10,630 first strokes among males and females respectively in 1993–94. Dividing the total health system costs of cerebrovascular disease (Table C.20) by the estimated incident cases gives an average lifetime cost of $21,420 for males and $31,160 for females. For both sexes combined, the overall average lifetime health system costs per first stroke were $25,780. The estimated lifetime cost per first stroke is thus around 60% higher than the average lifetime cost of per incident cancer, excluding non-melanocytic skin cancers, of $16,135 (Mathers et al. 1998c). Although the incidence of stroke is lower in females than males, the estimated lifetime cost is higher. This reflects the longer average survival of females with stroke, in part because their risks of death from other causes are generally lower.

These lifetime cost estimates are approximate because they are based on the assumption that incidence and mortality rates have been steady over time. As both incidence and mortality for stroke have been declining for several decades in Australia, the estimate of $25,780 per first stroke will overestimate the actual lifetime costs for current new stroke cases (assuming that the real cost of treating cerebrovascular disease at various ages and stages through the course of the disease remain constant at their 1993–94 values).