

5 Risk factors

5.1 Risk factor surveys

5.1.1 Perth, Western Australia

There were three surveys of cardiovascular risk factors in Perth. They were conducted in 1983, 1988 and 1994, between May and November. In the 1983 survey, participants were selected from persons aged 25–64 years whose names were on the rolls for electoral divisions within a 16 km radius of the study centre which was located in the suburb of Nedlands (denoted the inner area). The response fraction for the first survey of risk factors was 84% (1,290 people). Subjects for the second and third surveys of risk factors in Perth were selected from residents within the Perth Metropolitan Area. There were 1,877 participants in the second survey and 1,851 participants in the third, representing responses of 74% and 73% respectively.

During the study period there were large demographic shifts in the study population in Perth. The outer area (i.e. the Perth Metropolitan Area less the inner area) comprised 25% of the study population at the beginning of the study but had increased to 45% by the end of the study. Monitoring of incidence of coronary events covered both areas throughout the study period. The 1989 and 1994 risk factor surveys also covered both areas but the 1983 survey covered the inner area only. All the available data have been included in this report. This approximation underestimated the extent of changes in levels of risk factors, as the inner area tended to have lower levels of risk factors than the outer area.

5.1.2 Newcastle, New South Wales

There were also three surveys of cardiovascular risk factors in Newcastle. The first was conducted from May to October 1983 and included residents of the study area aged 35–64 years who were selected by random sampling from the Commonwealth Electoral Roll. A stratified random sample of 300 men and 300 women was selected from each 5-year age group from 35–39 to 60–64 years. A total of 2,466 persons participated, representing response fractions of 68% for men and 69% for women.

The second survey was conducted from June to December 1988 and June to November 1989, and included people aged 25–69 years. The Commonwealth Electoral Roll was used as the sampling frame and there were different numbers of people selected in each age group to accommodate other studies being undertaken. For men and women separately, there were approximately 100 selected from the 25–29 and 30–34 year age groups, 180 selected for the 5-year age groups from 35–39 to 50–54, and 250 selected from the next two 5-year age groups. A total of 1,761 people participated in the survey, representing a response of 65%. For men and women aged 35–64 years the responses were 64% and 68% respectively.

The third survey was conducted from June to December 1994 and included people aged 35–69 years. The New South Wales Electoral Roll was used as the sampling frame. For men and women aged 35–69 years, a similar number of people were selected in each age group as the number selected for the second survey. A total of 1,670 people participated in the survey, representing a response of approximately 64%. For men and women aged 35–64 years the responses were 62% and 65% respectively.

5.2 Methods of measuring risk factors

5.2.1 Anthropometric measurements

For height and weight the participant was measured without shoes and in light clothing. Weight was measured to the nearest tenth of a kilogram and height measured to the nearest centimetre. Body mass index (BMI) was calculated as the weight in kilograms (with one kilogram subtracted to allow for clothing) divided by the square of the height in metres. People were considered overweight or obese if their BMI was greater than 25 kg/m².

5.2.2 Blood pressure

Random zero sphygmomanometers were used to measure blood pressure in Newcastle and ordinary mercury sphygmomanometers were used in Perth. Two readings were taken five minutes apart with the cuff on the right arm and the subject seated. The subject was seated quietly for five minutes before the first reading was taken. Systolic and diastolic blood pressure, phase V, were recorded to the nearest 2 mmHg. In both centres, study nurses undertook a detailed blood pressure measuring training program, and regular quality control checks were carried out.

5.2.3 Body chemistry

In all surveys in Perth and in the first survey in Newcastle participants were required to fast for 12 hours before the interview, during which time they could have water, tea or coffee (without milk or sugar). For the second and third surveys in Newcastle, however, participants were not required to fast before a blood sample was taken because non-fasting values for total cholesterol, high-density lipoprotein (HDL) cholesterol and serum lipoprotein(a) (Lp(a)) are not significantly different from fasting values. In all surveys in both centres venipuncture was performed after the participant had been seated for 10 minutes and after all other survey procedures had been completed.

For both centres, blood samples collected in 1983 were cooled, centrifuged, packed in ice and air-freighted to the central analytical laboratory at Flinders Medical Centre, Adelaide. Samples collected during the second survey in Perth were handled in the same manner, but analyses were performed at the Institute of Medical and Veterinary Science in Adelaide. For the third survey in Perth the blood samples were sent to the Department of Biochemistry at Royal Perth Hospital and analysed using a chemical method to measure total cholesterol. The samples collected during the second and third surveys in Newcastle were kept cool (5 degrees Celsius) until analysis by the Hunter Area Pathology Service. Assays were carried out within three days of collection using a Cobas BioCentrifugal Analyzer (Roche) and a standard enzyme kit. Both analytical methods employed in 1989 were standardised against samples from the Centers for Disease Control, Atlanta, USA, and appropriate corrections made to the initial laboratory values.

5.3 Trends in levels of risk factors in Newcastle and Perth

There were reductions in diastolic and systolic blood pressure for both men and women in Newcastle from 1983 to 1994 but no reduction was observed in Perth. In both centres there was a reduction in total cholesterol and there was also a slight reduction in HDL cholesterol for men in Newcastle. Associated with the reduction in cholesterol was an increase in the use of medication for the treatment of hypercholesterolaemia. The mean level of BMI increased substantially in both

centres and this resulted in an increase in the prevalence of overweight and obesity. There was also a significant reduction in the prevalence of smoking.

Table 5.1: Level of risk factors and estimated annual percentage change for men aged 35–64 years from Perth and Newcastle, 1983–94

	Centre	1983	1988–89	1994	Estimated annual percentage change (95% CI)
Systolic blood pressure mmHg (mean)	Perth	133.5	132.1	132.7	-0.09 (-0.27, 0.09)
	Newcastle	131.6	130.7	130.4	-0.19 (-0.34, -0.05)
Diastolic blood pressure mmHg (mean)	Perth	84.7	80.8	85.3	0.01(-0.10, 0.12)
	Newcastle	83.3	82.5	80.9	-0.28 (-0.37, -0.19)
Currently using medication for the treatment of high blood pressure (%)	Perth	9.4	9.9	8.0	-0.17 (-0.47, 0.13)
	Newcastle	13.1	13.6	13.3	0.08 (-0.23, 0.38)
Total cholesterol mmol/L (mean)	Perth	5.82	5.83	5.56	-0.02 (-0.03, -0.01)
	Newcastle	5.96	5.76	5.75	-0.02 (-0.03, -0.01)
High-density lipoprotein cholesterol, mmol/L (mean)	Perth	1.23	1.19	1.21	0.00 (-0.01, 0.00)
	Newcastle	1.21	1.17	1.11	-0.01 (-0.01, -0.01)
Currently using medication for the treatment of high cholesterol (%)	Perth	NR	0.4	3.1	0.60 (0.29, 0.92)
	Newcastle	NR	3.0	4.7	0.44 (0.02, 0.87)
Body mass index kg/m ² (mean)	Perth	25.3	26.2	26.4	0.09 (0.06, 0.13)
	Newcastle	26.1	26.8	27.5	0.12 (0.09, 0.16)
Current smokers (%)	Perth	32.6	24.8	25.2	-0.72 (-1.17, -0.27)
	Newcastle	35.8	27.1	23.4	-1.29 (-1.68, -0.90)
Overweight or obese (%) (BMI > 25)	Perth	51.5	61.7	63.6	1.03 (0.53, 1.53)
	Newcastle	59.3	69.6	73.9	1.39 (0.99, 1.79)
No leisure-time physical activity (%)	Newcastle	NR	5.2	6.5	0.2 (-0.1, 0.5)

NR = not recorded.

Note: Age-standardised to the 1991 Australian population.

Table 5.2: Level of risk factors and estimated annual percentage change for women aged 35–64 years from Perth and Newcastle, 1983–94

	Centre	1983	1988–89	1994	Estimated annual percentage change (95% CI)
Systolic blood pressure mmHg (mean)	Perth	126.6	125.1	126.1	-0.04 (-0.22, 0.14)
	Newcastle	128.0	126.2	126.4	-0.24 (-0.39, -0.09)
Diastolic blood pressure mmHg (mean)	Perth	79.2	74.6	78.4	-0.10 (-0.20, 0.01)
	Newcastle	78.8	77.8	75.5	-0.33 (-0.42, -0.24)
Currently using medication for the treatment of high blood pressure (%)	Perth	11.8	9.2	10.2	-0.22 (-0.53, 0.09)
	Newcastle	16.9	16.2	13.2	-0.28 (-0.59, 0.04)
Total cholesterol mmol/L (mean)	Perth	5.77	5.66	5.41	-0.03 (-0.04, -0.02)
	Newcastle	5.89	5.74	5.54	-0.03 (-0.04, -0.03)
High-density lipoprotein cholesterol, mmol/L (mean)	Perth	1.52	1.47	1.50	0.00 (-0.01, 0.00)
	Newcastle	1.49	1.51	1.45	0.00 (-0.01, 0.00)
Currently using medication for the treatment of high cholesterol (%)	Perth	NR	0.1	2.4	0.55 (0.28, 0.82)
	Newcastle	NR	2.2	3.0	0.19 (-0.18, 0.57)
Body mass index kg/m ² (mean)	Perth	24.3	25.1	25.7	0.14 (0.09, 0.18)
	Newcastle	25.0	25.9	26.8	0.16 (0.11, 0.20)
Current smokers (%)	Perth	21.6	21.0	15.0	-0.62 (-1.01, -0.24)
	Newcastle	23.8	16.3	18.8	-0.58 (-0.91, -0.25)
Overweight or obese (%) (BMI > 25)	Perth	35.1	41.8	48.9	1.24 (0.75, 1.73)
	Newcastle	43.2	49.7	53.0	0.90 (0.49, 1.31)
No leisure-time physical activity (%)	Newcastle	NR	8.9	9.4	0.1 (-0.5, 0.6)

NR = not recorded.

Note: Age-standardised to the 1991 Australian population.

5.4 Trends in use of medications in Newcastle

In Newcastle there was an increase in the use of daily aspirin by men aged 35–64 years. There was also a substantial increase in the use of calcium channel blockers and ACE inhibitors by both men and women. These newer medications appear to have replaced beta blockers, diuretics and other antihypertensive medications.

Table 5.3: Use of medications (per cent) and estimated annual percentage change in medication use for persons aged 35–64 years from Newcastle, 1983–94

	1983	1988–89	1994	Estimated annual percentage change (95% CI)
Men				
Beta blockers	8.5	8.4	5.9	–0.24 (–0.49, 0.01)
Calcium channel blockers	0.9	3.7	4.5	0.46 (0.31, 0.61)
Diuretics	7.0	5.0	4.0	–0.34 (–0.56, –0.12)
Antihypertensives	7.0	2.8	2.7	–0.51 (–0.70, –0.31)
ACE inhibitor	NA	2.0	6.0	0.64 (0.51, 0.78)
Daily aspirin	2.9	4.2	7.5	0.59 (0.39, 0.79)
Women				
Beta blockers	11.0	9.2	4.9	–0.58 (–0.83, –0.32)
Calcium channel blockers	0.9	3.1	4.9	0.43 (0.29, 0.58)
Diuretics	15.3	10.9	7.0	–0.82 (–1.10, –0.53)
Antihypertensives	7.4	4.7	2.0	–0.61 (–0.81, –0.41)
ACE inhibitors	NA	2.0	4.6	0.53 (0.41, 0.66)
Daily aspirin	3.3	3.3	2.8	0.04 (–0.12, 0.20)

NA = not available.

ACE = angiotensin-converting enzyme.