Past, Present and Future of Cardiovascular Disease in Australia

Annette J. Dobson

This paper used official mortality data for Australia; data on incidence of coronary events and levels of risk factors from the World Health Organization's MONICA Project (to MONitor trends and determinants of CARdiovascular disease) in Newcastle, New South Wales, Australia; and national data on coronary procedures and medications to show the past trends and present situation of cardiovascular disease (CVD) in Australia. There are well-established trends of declining rates of deaths from all causes, CVD, coronary heart disease and stroke and of non-fatal coronary events (which are also becoming less severe). The three major risk factors of cigarette smoking, high blood pressure and high blood cholesterol have also been declining for some time. Despite this picture, which is encouraging from a population perspective, the medical costs of CVD are rising. This is due to increases in medical and surgical procedures and the use of increasingly expensive drugs. The challenge for public health is to keep the focus on prevention, including attention to the increasing prevalence of overweight and obesity. *J Epidemiol*, 1996 ; 6 : S209-S213.

WHO MONICA Project, trends, cardiovascular disease, Australia

The purpose of this paper is to review past trends and the present situation of cardiovascular disease (CVD) in Australia and to predict future patterns of disease, risk factor levels and costs.

MATERIALS AND METHODS

Data on mortality are produced annually by the Australian Bureau of Statistics based on death certificates. They include demographic information and the primary cause of death, coded according to the 9th revision of the International Classification of Diseases (ICD-9) or earlier revisions. Numbers of deaths from specific causes are tabulated by sex and 5-year age group by the National Heart Foundation of Australia and these, together with the corresponding population estimates for each year, were used to calculate mortality rates. The causes of death considered here are: all causes; all CVD (ICD-9 codes 390-459) ; ischaemic or coronary heart disease (CHD) (ICD-9 codes 410-414) ; and cerebrovascular

disease or stroke (ICD-9 codes 430-438). For this paper directly age-standardized rates were calculated using the World Standard Population weights for 5-year age groups for 35-69 years¹⁾.

To illustrate trends in fatal and non-fatal coronary events, data from the World Health Organization's MONICA Project (to MONitor trends and determinants of CARdiovascular disease) were used. These data were collected in the Newcastle area (Hunter Region) of New South Wales, Australia during 1985-1993 for all people aged under 70 years in a geographically defined population. Event registration was conducted by continuous monitoring of all suspected heart attacks or coronary deaths through hospital admissions and death registrations. This paper includes all events classified as

- i) fatal cases meeting the criteria for definite acute myocardial infarction (MI), possible MI or unclassifiable coronary deaths - whether hospitalised or not ²⁾;
- ii) non-fatal definite MI ²⁾;
- iii) non-fatal probable MI - cases with typical symptoms and

Department of Statistics, University of Newcastle, NS, Australia.

Address for correspondence : Annette J. Dobson, Department of Statistics, University of Newcastle, Callaghan, New South Wales 2308, Australia.

electrocardiogram or enzyme changes suggesting cardiac ischaemic but not severe enough to fulfil the criteria for non-fatal definite MI³;

iv) prolonged chest pain - cases meeting the MONICA criteria for non-fatal possible MI but not the criteria for non-fatal probable MI; these are mainly cases of stable or unstable angina^{2,3}.

Details of the study methods have been published previously⁴. For non-fatal events, almost all patients were hospitalized. Annual event rates were calculated using direct standardization with the World Standard Population weights for 5-year age groups for 35 - 69 years¹¹ and are presented on a logarithmic scale.

Trends in risk factors are also illustrated by data from the Newcastle collaborating centre of the WHO MONICA Project. Risk factor surveys were conducted in the study population in 1983, 1988-9 and 1994. The standardized protocol for the Project was used⁵ and the survey methods have been described previously⁶. For this paper data are shown on prevalence of regular cigarette smoking (%) and mean levels of diastolic blood pressure (mmHg), total cholesterol (mmol/L) and body mass index (kg/m²). The risk factor data refer to the age group 35-64 years and are directly age-standardized using the World Standard Population weights for 5 year age groups¹¹.

Data on numbers of coronary procedures in Australia are collected by the National Heart Foundation from all the specialist units providing the services. As the data are not disaggregated by age or sex they are presented here as crude rates calculated by dividing the numbers of procedures by the national population aged 35 - 74 years for the same calendar year. For coronary artery bypass graft (CABG) operations data are presented for 1970-1994 and for coronary angioplasty for 1980 - 1993; before these times very few of these procedures were performed.

Recent changes in the use of pharmaceuticals are illustrated by data for 1990/1-1994. These were obtained through the Australian Institute of Health and Welfare from the Drug Utilization Sub-Committee data base of the Commonwealth Department of Health and Family Services. They are estimates obtained by combining data on prescription counts from the Pharmacy Guild survey and prescriptions submitted for payment of a subsidy through the Health Insurance Commission⁷. The data are presented in terms of defined daily dose per 1,000 population per day.

RESULTS

Death rates from stroke in Australia have been falling for over 30 years (Figure 1). Death rates from CHD increased during the 1950's and early 1960's, peaked around 1966 and since then have declined. As a result the fall in death rates for men aged 35 - 69 years between 1966 and 1994 was 49% for all causes and 71% for CHD. The corresponding falls in death

rates for women were 48% for all causes and 74% for CHD. A consequence of these changes in mortality from the major categories of cardiovascular diseases is that in the last 25 years life expectancy has increased by 7 years for both men and women.

Data on rates of CHD in the Newcastle area show a pattern of decreasing severity (Figure 2). During 1985-1993 death rates fell for men and women, in line with the national trends. Rates of non-fatal definite MI also fell but more slowly than death rates, especially for women. In contrast for milder disease, rates of non-fatal probable MI initially increased and then slightly declined while rates of hospitalization for episodes of prolonged chest pain increased.

The long-term declines in death rates and severity of CHD are consistent with changes in the major risk factors. Data from the Newcastle area illustrate the main trends (Figure 3). Prevalence of cigarette smoking declined from 36% to 23% among men between 1983 and 1994. For women the decline was smaller, from 24% to 21%. Blood pressure levels and prevalence of hypertension also declined; over the study period mean diastolic blood pressure fell by 2.5mmHg for men and 3mmHg for women. These data from the WHO MONICA Project also show reductions in mean levels of total cholesterol of 0.2 - 0.3mmol/L. Despite these improvements, a potential future problem is the increase in mean body mass index (BMI) and prevalence of overweight and obesity.

Medical treatment of coronary disease is increasing substantially in Australia. Figure 4 shows the national rates for coronary artery bypass grafts and angioplasty. Pharmaceutical treatment has also increased, especially the use of more expensive drugs. Figure 5 gives national data showing marked increases in angiotensin converting enzyme (ACE) inhibitors and differing trends for other antihypertensives. Figure 6 shows the corresponding trends for lipid lowering drugs. Drugs for CVD, including antihypertensives, calcium channel blockers, beta blockers, diuretics and lipid lowering drugs, now make up 27% of the total costs of government subsidized drugs used in the community. In particular, the anti-hyperlipidaemic agent Simvastatin was the drug which cost the government the most in 1994 - \$95 million.

DISCUSSION

In summary, there are two important aspects of the CVD epidemic in Australia at present.

On one hand the disease has been diminishing for more than 25 years. Over a long period cigarette smoking has been declining⁸. There have also been substantial dietary changes, with lower consumption of meat and dairy products and increases in fruit and vegetables^{9,10}. Biological risk factors such as blood pressure and cholesterol levels have declined^{11,12}. In line with these improvements in risk levels, first death rates and then rates of major, non-fatal coronary events declined.

Figure 1. Death rates from all causes, all cardiovascular diseases (CVD), coronary heart disease (CHD) and stroke for men and women in Australia from 1950 to 1994 (age standardized rates per 100,000 for ages 35 - 69 years).

Figure 2. Rates of coronary events among men and women from the WHO MONICA Project collaborating centre in Newcastle, Australia from 1985 to 1993 : fatal coronary events non-fatal definite myocardial, infarction non-fatal probable myocardial infarction and hospitalisation for non-fatal prolonged chest pain (age standardized rates per 100,000 for ages 35-69 years).

Figure 3. Risk factor levels from the WHO MONICA Project collaborating centre in Newcastle, Australia from random population surveys in 1983, 1988/89 and 1994: prevalence of cigarette smoking (%), mean diastolic blood pressure (mmHg), mean blood cholesterol (mmol/L) and mean body mass index (kg/m²) (age standardized for ages 35 - 64 years, and shown with 95% confidence limits).

Figure 4. Rates of coronary artery bypass grafts and angioplasty in Australia (crude rates per 100,000 based on population data for ages 35 - 74 years).

Figure 5. Drugs used in the management of hypertension in Australia, 1991 - 1994 (defined daily dose per 1,000 population per day).

Figure 6. Drugs used to lower serum lipids in Australia, 1990 - 1994 (defined daily dose per 1,000 population per day).

The increase in less severe events is also consistent with the risk factor changes being important determinants of the decrease in disease. As the favourable trends in risk factors are well-established and show no signs of slowing down, it seems reasonable to expect that disease rates and severity will decline for some years, at least. The only worrying factor is the increase in body weight.

On the other hand, against this background of declining disease, there are substantial increases in medical and surgical investigations and procedures related to CVD and increasing use of pharmaceuticals, especially newer, much more expensive drugs. These changes in medical care have occurred after the reductions in CVD were already underway. They are directed at the minority of the population with identifiable disease. While part of the more recent improvement in mortality and morbidity rates probably is attributable to medical interventions, the costs are great. Cardiovascular medicine accounts a growing proportion of the health care budget. This epitomises the high risk strategy which Rose described as "no more than an expensive rescue operation, offering disappointingly little towards solving the overall problem" ¹³.

The population approach to prevention offers greater potential benefits at less cost. The continuing targets are reductions in cigarette smoking, improvements in diet and increases in physical activity. To these is now added a new target - to combat overweight and obesity. An additional challenge for public health is to maintain the focus on primary prevention for everyone, against a background of a rising wave of medical interventions and costs for those people with established disease.

ACKNOWLEDGEMENTS

National data used in this paper were provided by the Australian Institute of Health and Welfare and the National

Heart Foundation of Australia. Data from the Newcastle collaborating centre of the WHO MONICA Project were collected mainly using grants from the National Health and Medical Research Council and the National Heart Foundation. All of this support is gratefully acknowledged. This paper was prepared by the Newcastle MONICA research team.

REFERENCES

1. Breslow NE, Day NE. Statistical methods in cancer research vol II - design and analysis of cohort studies. International Agency for Research on Cancer, Lyon, 1987.
2. WHO MONICA Project (prepared by Tunstall-Pedoe H, Kuulasmaa K, Amouyel P, Arveiler D, Rajakangas AM, Pajak A). Myocardial infarction and coronary death in the World Health Organization MONICA Project: registration procedures, event rates, and case-fatality rates in 38 populations from 21 countries in four continents. *Circulation* 1994; 90: 583-612.
3. WHO MONICA Project (prepared by Salomaa V, Dobson A, Miettinen H, Rajakangas A-M, Kuulasmaa K) Mild myocardial infarction - a classification problem in epidemiologic studies. *J Clin Epidemiology* 1997; 50: 3-13.
4. Dobson AJ, Alexander HM, Heller RF, Malcolm JA, Steele PL. Trends in ischaemic heart disease in the Hunter Region of New South Wales 1985 - 1989. *Med J Aust* 1991; 155: 599-608.
5. WHO MONICA Project (prepared by Keil U, Kuulasmaa K) WHO MONICA Project: risk factors. *Int J Epidemiol* 1989; 18(suppl 1): 546-555.
6. Auckland, Newcastle and Perth MONICA Centres. Risk-factor levels and mortality from ischaemic heart disease in three Australasian centres. *Med J Aust* 1988; 148: 61-65.
7. Commonwealth Department of Human Services and Health. Australian statistics on medicines 1994. Australian Government Publishing Service, Canberra, 1996.
8. Hill DJ, White VM. Australian adult smoking prevalence in 1992. *Aust J Public Health* 1995; 19: 305-8.
9. Dwyer T, Hetzel BS. A comparison of trends in coronary heart disease in Australia, USA and England and Wales with reference to three major risk factors - hypertension, cigarette smoking and diet. *Int J Epidemiol* 1980; 9: 65-71.
10. Dobson A, Porteous J, McElduff P, Alexander H. Who has changed their diet? *Aust NZ J Public Health* (in press).