6 Reducing risk factors for chronic diseases: 1960s onwards

'As in many other developed nations, Australia has experienced a 'health transition' from infectious to chronic diseases, with influenza and tuberculosis being replaced by circulatory (cardiovascular) diseases and cancer as the major causes of death'. — Beaglehole & Bonita, 1997.[456]

Over the 20th century, the dramatic decline in infectious diseases was accompanied by a significant rise in life expectancy, and in chronic diseases. From the 1920s and 1930s onwards, there was a substantial increase in coronary artery disease and stroke, and in lung cancer (especially in males), up until the 1970s.[3] Better medical treatments were responsible for some of the rise in life expectancy of people with certain chronic diseases in the latter part of the century, although these are not attributable to public health effort.[239]

By the end of the century, chronic diseases accounted for the majority of the burden of disease in Australia, and the prevalence of these diseases as a group had risen, despite reductions in some diseases.[359] The realignment of the health system to address chronic diseases and their risk factors more effectively remained a challenge, as different models were required from those used successfully to reduce infectious diseases.   Public health approaches included both primary and secondary prevention and were aimed at:

> **Box 6.1   National Health Priority Areas**
>
> - Cancer control
> - Injury prevention and control
> - Cardiovascular health
> - Diabetes mellitus
> - Mental health
> - Asthma, and
> - Arthritis and musculoskeletal conditions.[457]

- reducing modifiable risk factors;
- screening whole and high-risk populations; and
- committing to a national approach to priority-setting and policy development.

In 1998, a number of national health priorities were identified, which included cardiovascular health, asthma, cancer control, and diabetes (Box 6.1). Mental health, arthritis and musculoskeletal conditions were subsequently added. The *National Chronic Disease Strategy* (2006) provided a coordinated national approach to the prevention and management of chronic diseases.[359]

Strategies to reduce modifiable risk factors using behavioural change at a population level were developed (e.g., addressing coronary heart disease risk through dietary changes and smoking cessation), along with methods of protection to reduce harmful sun exposure and skin cancer.

> ***Survey respondents:*** *'The health promotion and support given by NGOs led to a net increase in survival years for those with chronic conditions.'*
>
> *'The healthy eating, exercise and self-management support given by our big NGOs made a big contribution to the public health effort and continues to contribute to population wide health promotion efforts.'*
>
> *'Screening and case finding and therefore earlier treatment of certain cancers saved some lives and offered others many years of healthier living.'*

Population-based screening programs were initiated to detect early breast, cervical and bowel cancers. Prenatal and perinatal screening for a number of genetic and congenital disorders was also developed.

A range of NGOs was established, often by clinicians and/or people suffering from a disorder and their families. These community-based agencies undertook health promotion and disease prevention activities, as well as providing support to patients. Many were involved in community education campaigns to highlight the effects of particular illnesses and harmful exposures. There was significant health literacy work undertaken in schools, communities, workplaces and through the media, which all continued to improve the knowledge of the general community about health protection.

From the 1990s, a specific focus on mental health issues began to address the social stigma of mental illness and, through effective promotion and earlier detection, to develop community awareness of mental health as a driver of health and wellbeing.

Thus, examples of successful public health approaches to reduce risk factors for chronic disease at a population level included:

- decreased tobacco smoking (Sub-section 6.1.1);
- decreased alcohol-related harm (Sub-section 6.1.2);
- sun safety measures to reduce skin cancer (Sub-section 6.1.3); and
- needle and syringe exchange programs to reduce bloodborne transmission of chronic infectious diseases (Sub-section 6.1.4).

Successful public health actions to reduce the rates of some chronic diseases (Section 6.2) included:

- strategies to decrease fatal heart attacks after record numbers in the 1970s (Sub-section 6.2.1);
- stroke prevention and reduction in high blood pressure (Sub-section 6.2.2); and
- organised screening for certain cancers (Section 6.3).

Public health practices

Universal public health programs addressed preventable and modifiable risk factors for a range of chronic diseases. Successful strategies included those with a focus on diet (e.g., reducing intake of saturated fats and salt, increasing consumption of calcium, fruit and vegetables), smoking (e.g., QUIT smoking campaigns), and alcohol-related harm (e.g., codes for the responsible service of alcohol). Other strategies, aimed at increasing physical activity and fitness and better weight control, appeared to be less successful. There was, however, a considerable time-lag before behavioural changes became apparent at a population level, as shown in the gradual impact of tobacco control measures on reducing smoking rates.

The creation of partnerships between governments, health professionals, NGOs, consumers and public health researchers further strengthened many of the applied measures.

Current examples of annual prevention initiatives include the following annual designated weeks:

- April/May   National Heart Week
- July   National Diabetes Week
- September   National Stroke Week
- November   National Skin Cancer Action Week

Table 6.1: Historic highlights of successful risk factor and chronic disease control

1930s	Gastric cancer rates fell as a result of better refrigeration, reduced consumption of salted, smoked, and chemically preserved foods, more fruit and vegetable intake, and improved living standards.
1950s	The first drugs to lower blood pressure developed.
1956	Australian statistician, Oliver Lancaster, identified that skin cancer was related to exposure to sunlight.
1959	The National Heart Foundation established.
1960s	Research into the role of risk factors in chronic diseases, such as coronary heart disease and diabetes. Australian media campaigns started to highlight the dangers of smoking to health.
1961	The Cancer Council of Australia established.
1968	Commonwealth labelling regulations on cigarettes introduced (enacted 1973).
1970s	Peak in the century-long rise in cardiovascular disease. Gradual decriminalisation of public drunkenness.
1972	Cancer registration required under state and territory legislation. Mandatory warnings on cigarette packets.
1972-75	First national tobacco campaign: *National warning against smoking*. Commonwealth ban on advertising of tobacco products on radio and television.
1981	'Slip slop slap' campaign to encourage sun protection behaviours.
1982	Australasian Association of Cancer Registries (AACR) formed. WA - first attempt in the world to pass tobacco control legislation (unsuccessful). Creation of WA 'QUIT' campaign ('only dags need fags').
1983	National Stroke Foundation established. WA government increased retail tobacco licence fees and allocated $2 million per year for community anti-smoking education, including the QUIT campaign.
1985	Inception of Australia's *National Drug Strategy* and a harm minimisation framework.
1986	First government report on passive smoking (NHMRC): *Effects of passive smoking on health*. First Needle and Syringe Program (NSP) outlet opened - on a trial basis - in NSW.
1987	Victorian *Tobacco Act* passed, enacting the principle of hypothecation. Domestic airlines smoke-free.
1988	SunSmart - launched by the Cancer Council. All Australian government offices smoke-free.
1989	The National Heart Foundation's Tick Program started. Hepatitis C virus identified.
1991	Screening for breast and cervical cancers commenced. National Health Policy on Tobacco in Australia. Healthway established in WA.
1992	Federal government passed the *Tobacco Advertising Prohibition Act* (four states had already passed similar Acts). National blood alcohol limit of 0.05 for drivers of vehicles set.
1994	Australian Cancer Network established. The *National Hepatitis C Action Plan* released.
1997	Second NHMRC report on passive smoking and National Tobacco Campaign used by countries overseas.
1998	National SunSmart Schools program launched. *The Grog Book* for Aboriginal and Torres Strait Islander communities first published. First National Health Priority Areas.
1999	National Tobacco Strategy 1999 to 2002-03 endorsed. The first *National Hepatitis C Strategy 1999–2000 to 2003–2004* launched and needle exchange programs funded.
2000	Evaluation of the National Tobacco Campaign - 922 premature deaths averted and $24 million saved.
2001	NHMRC published the *Australian alcohol guidelines*.
2003	Returns on government investment in tobacco control - $2 for every $1 of expenditure on public health programs.
2004	strokesafe™ developed. Around 100 manufacturers and 1200 food products carried the Tick trademark. The *National Drug Strategy: Australia's Integrated Framework 2004–2009* and the *National Tobacco Strategy 2004–2009* endorsed. New system of graphic health warnings on tobacco products.
2005	*National Hepatitis C Strategy 2005–2008* released.
2006	National Alcohol Strategy 2006-2009 endorsed. National bowel cancer screening commenced. Graphic health warnings appeared on all Australian-manufactured and imported tobacco products. National Skin Cancer Awareness Campaign for Summer 2006-07 launched.

6.1   Influencing risk factors at a population level

1960 onwards

Certain risk factors for chronic diseases (for example, genetic susceptibility, age and sex) cannot be prevented. Others can be reduced in the population by changing human behaviours and modifying the social and environmental factors that facilitate the risky behaviour. The *National Chronic Disease Strategy* listed the known biomedical, behavioural, and social risk factors for chronic diseases (Figure 6.1).

Figure 6.1: Risk factors for chronic diseases

Behavioural and social risk factors	**Biomedical risk factors**
Poor health in early childhood	Excess weight*
Tobacco smoking*	High blood cholesterol*
Risky and high risk alcohol use*	High blood pressure*
Poor diet and nutrition*	Genetic factors
Physical inactivity*	Depression
Excessive sun exposure	
Social isolation	
	indicates factors common to several major chronic diseases

Source: NHPAC, *National Chronic Disease Strategy*, 2006, p.13.

Australian and international public health research identified the importance of the social determinants of health (e.g., education, income) in association with the traditional risk factors (e.g., smoking, diet) in the development of chronic disease (Figure 6.2). These broader determinants affect health through many pathways, including material wellbeing (e.g., access to food and shelter), environments (e.g., access to recreational facilities, exposure to dust in remote areas), access to services (e.g., health care, transport, education), and psychosocial wellbeing (e.g., early childhood experiences, social support, levels of stress). They form the backdrop for the emergence of individual risk-taking behaviours and, in this way, these risk factors can be said to be patterned by socioeconomic position.

Figure 6.2: Relationships of risk factors to chronic diseases
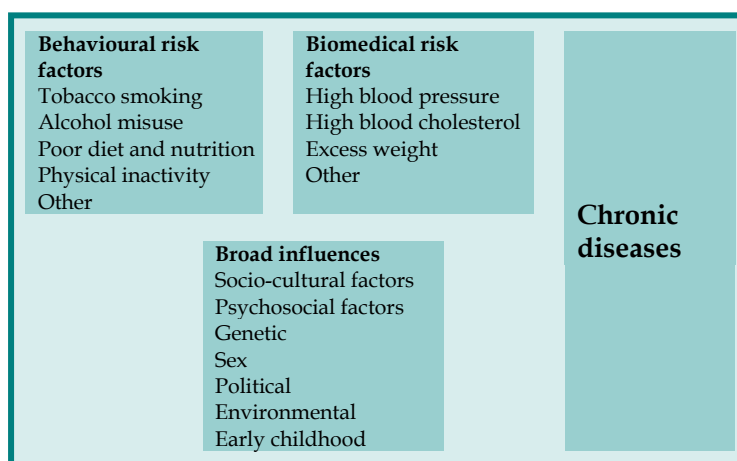
Source: AIHW, *Chronic diseases and associated risk factors in Australia, 2001*, 2002, p. 96.

Public health practices

Seven largely preventable risk factors with major impacts on the incidence and prevalence of chronic diseases were monitored by the Australian Institute of Health and Welfare (AIHW). Around one third of the burden of chronic diseases was attributed to these risk factors, and most were increasing in prevalence by the start of the 21st century.[259]

They were:

- tobacco smoking;
- risky and high-risk alcohol use;
- physical inactivity;
- poor diet and nutrition;
- excess weight;
- elevated blood pressure; and
- high blood cholesterol.

At the end of the 20th century, tobacco smoking was one risk factor for chronic disease that was decreasing in the population, with reductions evident in the rates of smoking - especially in males - and a gradual decline in the public acceptability of smoking. This was attributed to the efficacy of the tobacco control measures, which were assessed as a major public health success.

Public health practitioners who were surveyed for this report were more equivocal about the evidence for successful reductions in alcohol-related harm. However, alcohol restrictions on drivers, coupled with active enforcement of alcohol levels by police random breath-testing, averted a proportion of road accidents and subsequent injuries and deaths. Changing population behaviour to limit harmful sun exposures was also a public health success, beginning with the 'Slip! Slop! Slap!' campaign in 1981. Needle and syringe exchange programs, to minimise the potential harm of sharing infected needles, also contributed to quantifiable reductions in certain bloodborne infectious diseases (hepatitis B and C, and HIV/AIDS). Changes in diet, such as reductions in the intake of saturated fats and salt, played a role in reducing fatal heart attacks, which were the commonest cause of premature deaths around the middle of the 20th century.

Screening for risk factors proved to be a successful approach to case-finding for certain cancers, thereby offering opportunities for earlier clinical intervention and treatment. Cervical and breast cancer screening programs commenced in 1991, and screening for bowel cancer in 2006.

Factors critical to success

Multi-pronged approaches that were universal (population-wide) in their reach proved to be the most successful public health responses to the rising prevalence of preventable risk factors for chronic diseases in the latter part of the 20th century. These were flexibly tailored or targeted to certain groups in the population, and adapted over time. Tobacco control strategies, for example, were implemented across a number of fronts by a broad coalition of organisations, to address tobacco use and withdrawal, passive smoking, tobacco advertising, taxation, pricing, sales restrictions, public education, and community acceptance of changed norms such as smoke-free premises and non-smoking behaviour in enclosed and public places. Campaigns were successfully tailored to address tobacco use in priority groups, such as targeting youth smoking.

The success of these approaches highlighted the importance of a consistent public health message delivered across society in many formats, and sustained over a time span that could be decades. In the example of tobacco control, this resulted in an unarguable public health success – community-wide behavioural change to 'non-smoking' (although more achieved in higher than lower socioeconomic groups), and a corresponding reduction in smoking-related diseases and premature deaths. It was the breadth of the response, using multiple strategies across different sectors, simultaneously and over time, that was essential to modifying smoking behaviour across the population.

Future challenges

By the start of the 21st century, both universal and targeted health promotion approaches were used to reduce chronic diseases and their risk factors further, and it was anticipated that the largest population benefit would come from more effective prevention. Higher prevalence rates of smoking, obesity, and

elevated blood pressure in lower socioeconomic groups were well documented, reflecting differences in chronic disease risk factors, in exposures to the broader determinants of health, and in responses to public health campaigns. Many experts believed that traditional approaches to health promotion would no longer be as effective, because risk factors and health-damaging behaviours were strongly patterned by environmental and social factors that accompanied stressful lives, lack of education, poverty, discrimination and disadvantage.[458]

In 2005, it was estimated that the treatment of chronic diseases (and injuries) accounted for nearly 70% of health care expenditure in Australia.[459] A large proportion of the disease burden was preventable, but, as many chronic diseases had their antecedent risk factors apparent in childhood and adolescence, a long lead time was required to reduce their incidence across the population.

Despite the benefits of health promotion and disease prevention, most health expenditure was still directed at acute care in hospitals and other health care institutions, after illness was already established.[357] This resulted in treating those who had already become 'patients' with costly pharmaceuticals, diagnostic technologies, or corrective surgery, rather than initially preventing or delaying the illness from occurring.

Gross and colleagues concluded that 'early prevention and better coordinated management of chronic conditions will require changes in the methods of financing and paying for health care, inspired and supported by strong leadership from our politicians'.[460] They noted that 'economic incentives to the community to reduce their risk and look after their health have not been conspicuous', as health economists generally argued against investments in public education and information to modify demand for health care, preferring to argue for supply-side regulation. Later evidence on the impact of demand-side strategies in chronic disease management trials, however, showed that demand-side strategies worked better than supply-side strategies.[460]

Further challenges included:

- translating the *National Chronic Disease Strategy* and its associated programs into effective action to reduce the burden of chronic diseases;
- ensuring that new directions and organisational structures improved access to a fully functioning continuum of care; and
- reducing health inequalities.[461]

As knowledge gained from public health research into chronic diseases and their associated risk factors improved, there was also scope for 'best practice' to be more widely implemented. The National Institute of Clinical Studies identified the following evidence-practice gaps in the public health arena:

- ceasing 'unnecessary' screening for lung cancer with chest X-rays; and
- vaccinating against influenza to increase coverage in those aged under 65 years who were at risk due to pre-existing health conditions.[126]

6.1.1 Decreased tobacco smoking

1970s onwards

Tobacco use is the most significant preventable cause of both cancer and heart disease.[462] Over the 20th century, knowledge from public health research and a raft of tobacco control measures led to significant reductions in tobacco smoking rates and in tobacco-related diseases, contributing to increased longevity, improved quality of life, less disability and fewer deaths. Other gains accrued as smoking rates continued to fall and exposure to passive smoke reduced.[463] Tobacco-related diseases include cancer, heart disease and chronic obstructive pulmonary disease. Tobacco smoking killed more men than women - around 13,000 men compared to 6,000 women - but the number of women dying from this cause was increasing by the end of the 20th century.[464]

Cancer was the major cause of smoking-related deaths in men and women. Of five-year survival rates for cancers, those for lung cancer were among the lowest (less than 15% overall, with only a small improvement over the last two decades).[464] Lung cancer occurred most often in older people as it took decades for the cancer-causing agents to have their full effect (Figure 6.33 and Figure 6.44).[25]

Figure 6.3: Male age-specific and age-standardised death rates for lung cancer, 1945–2003
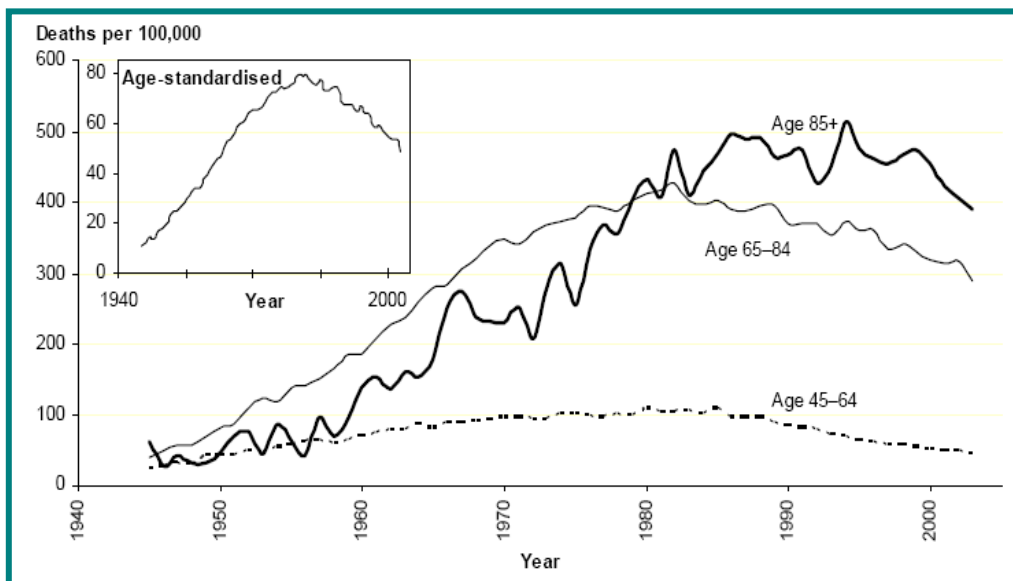
Source: AIHW, *Mortality over the twentieth century in Australia*, 2006, p. 54.

At the peak in 1982, the age-standardised male death rate from lung cancer was 80 deaths per 100,000 population; by 2000, rates had fallen to 55 deaths per 100,000 and in 2004, further still, to 50 deaths per 100,000 population.[25] For females, the death rate for lung cancer increased substantially after 1945 and showed little evidence of the reduction evident for males (Figure 6.44).[25] Smoking rates in young girls exceeded those in young boys.

Figure 6.4: Female age-specific and age-standardised death rates for lung cancer, 1945–2003
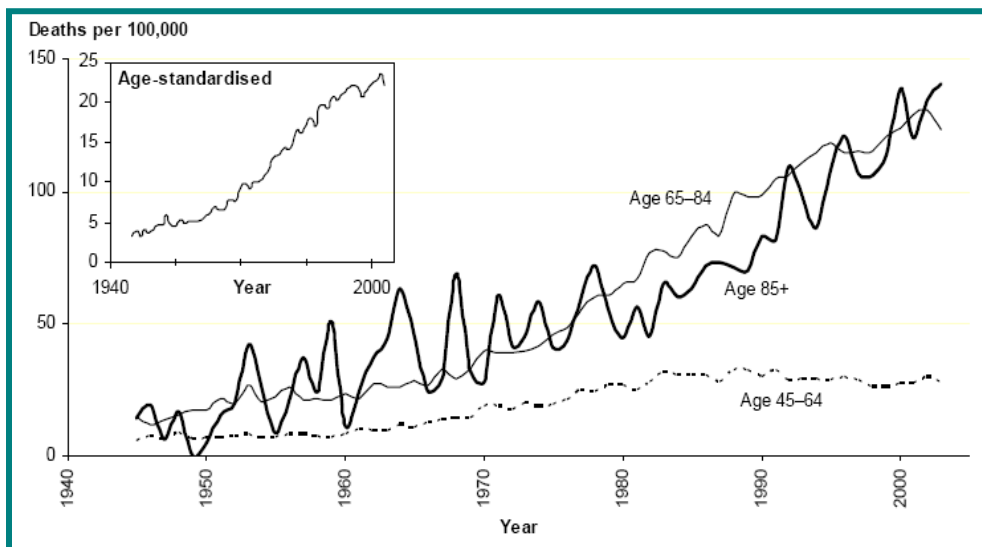
Source: AIHW, *Mortality over the twentieth century in Australia,* 2006, p. 54.

While there was a major decrease in the consumption of tobacco products from the mid-1970s, the death rates reflect the lag time evident in the relationship between tobacco consumption and the development of lung cancer (Figure 6.55).

Figure 6.5: Per person consumption of tobacco products (left hand scale) and death rates from lung cancer, 1903-1998
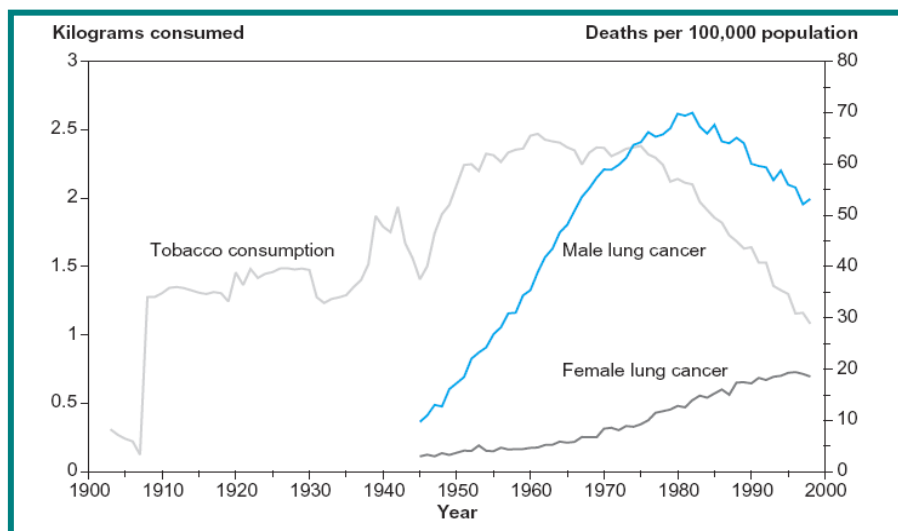
Source: AIHW, *Australia's health 2000,* 2000, p. 354.

Estimates from survey data showed that regular daily smoking rates for those aged 14 years and over fell by 40% in the twenty years to 2004: from 29% in 1985 to 17% in 2004 (Figure 6.66).[465] Rates for males declined more sharply (by 43%) than those for females (38%), resulting in daily smoking rates of 18.6% for males and 16.3% for females in 2004.

Figure 6.6: Daily smokers - population aged 14 years and over, 1985 to 2004
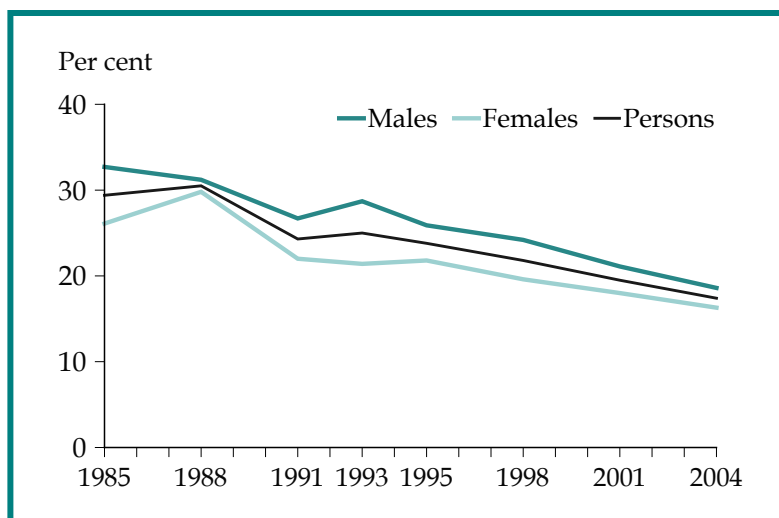
Source: AIHW, *Statistics on drug use in Australia, 2004*, 2005, p. 5.

Overall, there were more male current smokers than female. However, this pattern was reversed in the youngest ages: for those aged 14-19 years, 10% of males smoked daily compared to 12% of females (Figure 6.77).[465] The prevalence of daily smoking was also highest in the younger age groups, with 24% of men and 23% of women aged 20-29 years reporting that they were daily smokers.[465] People aged 60 years and over were the least likely to be daily smokers, with only 9% overall (11% of males and 7% of females).[465]

Figure 6.7: Daily smokers - population aged 14 years and over, by age and sex, 2004
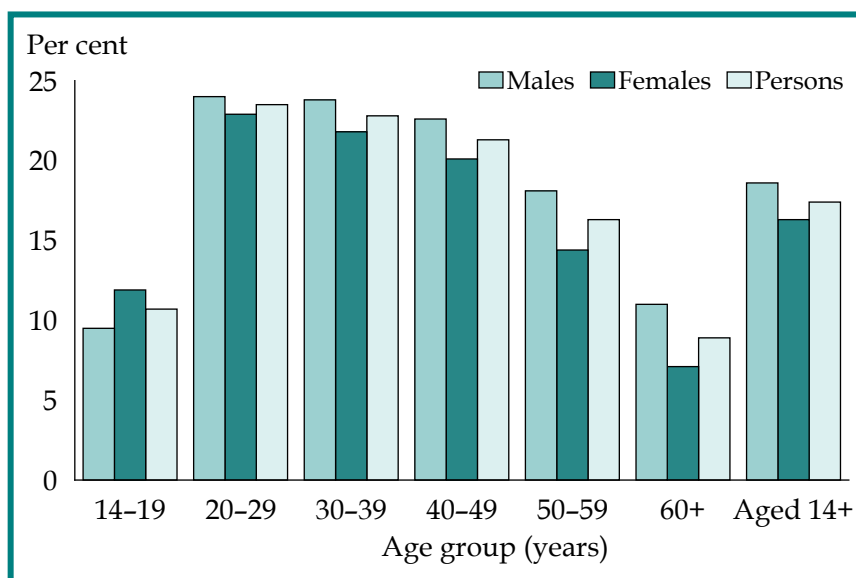
Source: Chart by PHIDU; data: AIHW, *2004 National Drug Strategy Household Survey: detailed findings*, 2005, p. 19.

For Indigenous Australians, the daily smoking rate was estimated to be 50% in 2004-05[466], with data from ABS health surveys for 1995 and later years recording little apparent change. Smoking rates for both men and women were far higher across all age groups, compared with the non-Indigenous population (Figure 6.88). These smoking rates were of particular concern, given the already poorer health of this population.

Figure 6.8: Current daily smokers aged 18 years and over, by Indigenous status, sex and age, 2004-05
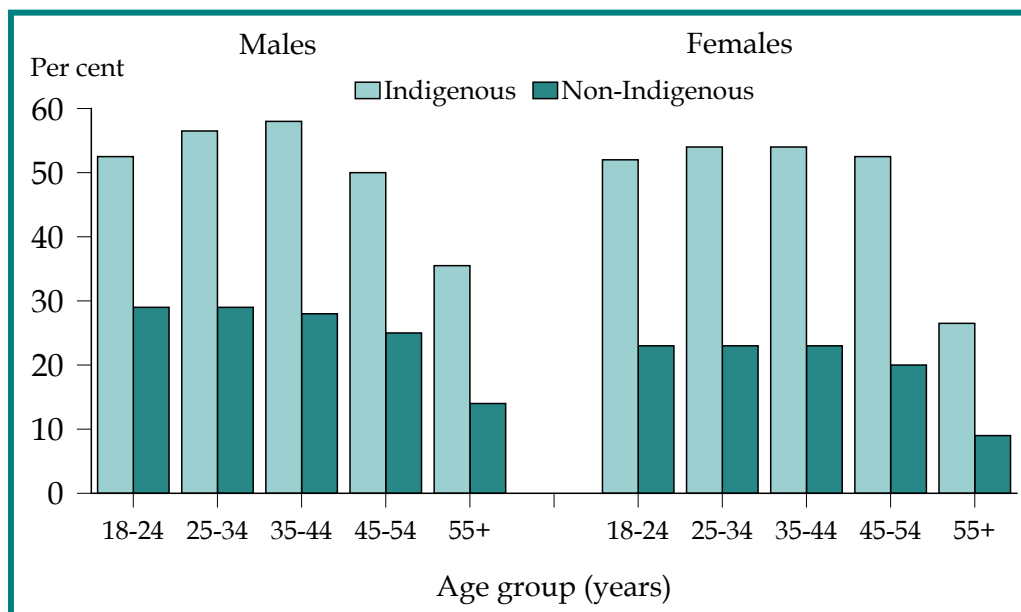
Source: ABS, *2004-05 National Aboriginal and Torres Strait Islander Health Survey*, 2006, p. 9.

Analysis of data from the *National Aboriginal and Torres Strait Islander Social Survey* in 2002 revealed that the likelihood of risky health behaviours decreased with higher levels of schooling.[467] This was particularly evident for smoking, with a rate of 39% for Aboriginal and Torres Strait Islander people aged 18 to 34 years who had completed Year 12, compared to a rate of 70% for those whose last year of schooling was Year 9 or less.[154] For those aged 35 years and more, the gradient was less marked, from 42% (completed Year 12) to 48% (Year 9 or less). These data suggested more effective ways to reduce smoking would be through improving the social determinants of health, in this case, the educational attainment levels of young Aboriginal and Torres Strait Islander peoples.

Aboriginal and Torres Strait Islander mothers also had much higher rates of smoking during pregnancy than non-Indigenous mothers. For example, in 2005, some 55% of Aboriginal and Torres Strait Islander mothers in NSW smoked at some time during their pregnancy, compared with only 13% of non-Indigenous mothers.[468] This was an improvement from 2001 when 59% of Aboriginal and Torres Strait Islander mothers reported that they had smoked while pregnant.

Public health practices

In the latter part of the 19th century, strong anti-smoking views were held by colonial politicians, and the first legislative control over tobacco was enacted in 1882 (the SA *Smoking Regulation Bill*) to prevent children from using tobacco, as tobacco smoking was seen as 'the pathway to ruin'.[30] All the states enacted legislation to ban the sale of tobacco products to children aged under 16 years and, until the 1970s, these laws were the only restriction on the sale and marketing of tobacco.

By the end of World War II, nearly three quarters of adult males and a quarter of adult females smoked, and there was a substantial tobacco-growing industry in Australia, with some regions economically dependent on the crop.[469] By the 1950s, medical evidence was accumulating that tobacco smoking was harmful and was linked to the rising incidence of lung and other cancers. Tobacco smoking was then increasingly recognised as a public health problem. Federal legislation was introduced in the late 1960s to enable a health warning to be applied to cigarette packets, although the legislation was not enacted until 1973, when the message 'Warning - Smoking is a health hazard' first appeared on packets of cigarettes.[470] Bans on 'direct' (rather than incidental) radio and television advertising commenced in 1976 under federal broadcasting legislation, and there were state bans on outdoor advertising from 1987, and nationally, on advertising from 1992 (although there were some exemptions).

In 1987, as part of a landmark strategy, the Victorian *Tobacco Act 1987* levied a wholesale tax on tobacco products sold in Victoria to fund the Victorian Health Promotion Foundation (VicHealth), with a mandate to promote health and buy out tobacco industry sponsorship of sport and the arts. VicHealth quickly increased funding for QUIT and other health promotion programs, and replaced tobacco company sponsorship of sporting and other events. VicHealth was the world's first health promotion foundation funded by a tax on tobacco, establishing the principle of 'hypothecation', in which tobacco taxes levied by the state are used to support health promoting organisations and activities to reduce smoking. The SA *Tobacco Products Control Act* was amended in 1988 and established Foundation SA[471] and Healthway, the WA health promotion foundation, commenced operation as a result of the WA *Tobacco Control Act 1990*.[472]

The *National Health Policy on Tobacco in Australia* was adopted by the Ministerial Council on Drug Strategy in 1991 as part of the National Campaign Against Drug Abuse. The policy's first premise was the acceptance of the need for a long-term and comprehensive program and it stated that there

> '…. had long been recognition... that the resolutions to this problem lie not in a piecemeal approach but in the adoption of a carefully planned, comprehensive, long-term approach encompassing education and information, legislation and restrictive measures and cessation services.'[473]

A framework for national tobacco control activities by the Australian, state and territory governments was then provided by the *National Tobacco Strategy 1999 to 2002-03*[216] and its successor, the *National Tobacco Strategy 2004-2009,* which outlined a long-term plan to improve health and reduce the social costs of tobacco in all its forms (Box 6.2).[474]

> **Box 6.2** *National Tobacco Strategy 2004–2009*: **Guiding principles**
>
> 'Our progress in reducing population exposure to tobacco in all its forms depends on how well we tackle:
>
> - the most prevalent factors still driving smoking uptake;
> - the most significant barriers to smoking cessation;
> - the factors driving continuing high levels of smoking in some workplaces and institutions particularly among disadvantaged groups; and
> - the technical, communication and regulatory difficulties posed by the development of tobacco products (and alternative nicotine delivery systems) that potentially reduce harm resulting from continuing tobacco use and nicotine dependence.
>
> To address these challenges, the *National Tobacco Strategy* seeks to adopt policies and programs where there is compelling evidence of potential effectiveness. The intent is to be as efficient as possible and address the significant inequity that is caused or exacerbated by tobacco use in this country.
>
> **1 Being as effective as possible**
> - Adopt a comprehensive approach that addresses the cultural, pharmacological and behavioural factors that affect smoking uptake, the nature of nicotine dependence, the reinforcement of continued smoking and the process of smoking cessation.
> - Build on what has been achieved so far and the lessons learned from experience and from systematic research.
> - Focus on approaches most likely to advance the objectives.
> - Take into account the global nature of the tobacco industry and the need, therefore, to learn from international experience and to contribute to international initiatives to halt the tobacco pandemic.
>
> **2 Being as efficient as possible**
> - Work in partnership to make better use of collective skills and resources.
> - Build capacity and maintain energy and enthusiasm within the workforce.
> - Assess the impact of all major new initiatives, adjusting our approach as needed.
>
> **3 Striving for greater equity**
> - Try to reach people from all sections of the community, over the course of their lives and day to day, in the settings in which they work, shop and socialise.
> - Endorse efforts to address disadvantage.
> - Put extra effort into initiatives for groups among whom the burden of disease and disadvantage is particularly high.'
>
> Source: Ministerial Council on Drug Strategy, *National Tobacco Strategy, 2004–2009: the strategy*, 2005, p. 17.

The public health activities that contributed to the long-term success in reducing tobacco smoking included:

- identification and promulgation of the risks of active tobacco smoking (which had been known from 1957), and of passive smoking (the first NHMRC report on passive smoking was published in 1986);
- tobacco control legislation and bans;
- regulation and policing of sales to minors;
- QUIT programs, health education, promotion and social marketing campaigns;
- voluntary adoption of, and legislated, smoke-free premises: offices, restaurants, clubs and hotels, other entertainment venues and enclosed spaces; and
- monitoring and publicising information on population smoking practices (e.g., tobacco smoking rates, age of uptake, numbers of children in smoke-free homes).

Factors critical to success

In its review of one hundred years of mortality, the AIHW identified the reduction of more than 30% in male death rates from lung cancer (from the peak in these rates in the 1980s) as one of the notable successes of public health over the 20th century.[25] The relationship of tobacco smoking to lung cancer had long been studied, but, as lung cancer became the leading cause of death from cancer (and remained so at the end of the century), public health practitioners worked hard to develop ways to achieve reductions.[3]

Initially, public health interventions were led by a small group of committed, visionary individuals, although Simon Chapman (one of these) disputed this, describing the 'many, often unsung, people [who] have oxygenated the huge changes achieved in smoking in Australia'.[475] Jamrozik described how the strategies used to try to control tobacco had to be based on science, rather than on evidence of their effectiveness, because no one had attempted population-wide change on such a scale

> ***Survey respondent:*** *'QUIT smoking initiatives needed a multi-pronged approach (health promotion, legislation, incorporation into acute care) and battled vested interests in the corporate sector. Yet smoking rates steadily declined, and balances were struck between individual and community rights. It was a great example of cumulative changes to community attitudes and behaviour.'*

before, and therefore, no evaluative evidence of their likely success or failure was available.[76]

Public health measures to reduce smoking threatened the industries that profited from smoking. These industries had significant resources to fund rear-guard actions to prevent, circumvent (e.g., in relation to advertising) or delay specific actions.[476] One example was the legal action brought by the Tobacco Institute of Australia Ltd. against the NHMRC in 1996, when it appeared likely that the NHMRC's second report on passive smoking would lead to more rigorous restrictions on smoking in public places such as restaurants.[477]

Public health advocates faced many challenges from the tobacco industry, and, while the metaphors of David and Goliath or 'being pecked to death by ducks' lie at two extremes, it was a battle against vested interests, political inertia (in the face of compelling medical evidence) and the

> *'Public health advocacy often requires pushing governments to act and being critical of inaction.'*
>
> —S Chapman, *Medical Journal of Australia*, 2002, p. 662.

maintenance of the status quo.[475] Public health advocacy, sustained leadership by champions, many hands and persistence in the face of adversity were significant factors behind the success.

Other elements were the use of a multifaceted strategy, and a consistent message reinforced by fiscal measures (Australia had one of the highest taxation rates on tobacco products in the world), and legislation enacted both federally and by the states and territories to control tobacco. Advertising and promotion of tobacco products by all media was banned in Australia, and campaigns marketed non-smoking behaviour and provided support for those wishing to quit.[30] The allocation of taxed funds to attempt to control the consumption of, and remedy the harm done by the taxed product was also critical to the ability of health promotion programs to reduce tobacco consumption.

Public health monitoring of smoking rates and the provision of community information about tobacco (e.g., age of initiation of smoking, smoking cessation rates, smoke-free premises, and ways to quit) were intrinsic to the success of the strategy (Box 6.3). Detailed evaluations of tobacco control campaigns were also important, as they demonstrated the enormous costs of smoking and the potential savings associated with reductions in population smoking rates.

Cost-effectiveness

Economic evaluation demonstrated that substantial gains could be made through further investment in tobacco control, and the benefits far outweighed the costs.[474] An evaluation of the first six-month phase of the National Tobacco Campaign in 1997 estimated that a total of $9 million had been spent (by Commonwealth, state and territory governments), with resultant savings of $24 million, indicating that the campaign had paid for itself 'more than twice over'.[480] It was estimated that the first six months had prevented 922 premature deaths and achieved an additional 3,338 person years of life up to the age of 75 years. This conservative estimate did not include various social costs, and a broader societal perspective was considered likely to yield a far stronger cost-effectiveness result.

Tobacco smoking was responsible, directly

Box 6.3 The WA QUIT Campaign

'The WA QUIT Campaign was the first well-funded comprehensive health promotion campaign at a state level. It had a strong outcome in terms of achieving lower smoking rates and lower lung cancer rates than other states.' — Survey respondent

From 1984 to 2004, the WA QUIT Campaign was conducted year round by QUIT WA (formerly the Smoking and Health Program), in the Population Health Division of the Department of Health, WA. The state-wide campaign encouraged and supported adult smokers to quit smoking.[478]

'Only dags need fags'
© State of Western Australia 1984, reproduced with permission.

The WA QUIT Campaign commenced in 1984, using the slogan 'only dags need fags' as part of the campaign: a slogan that was still memorable in 1998 among respondents to a survey who were asked what message came to mind after the interviewer said 'smoking'.[479]

Strategies implemented by QUIT WA (formerly the Smoking and Health Program) were evidence based and consistent with the best international practice on tobacco control, and included:

- mass media campaigns,
- legislation,
- quitting support,
- school and public education,
- promotion and sponsorship of healthy behaviours,
- support for smoke-free policies,
- collaboration across sectors, and
- research and evaluation.[479]

---

and indirectly, for a considerable number of cases of illness and deaths. Ridolfo and Stevenson estimated that there were approximately 19,000 deaths attributable to tobacco use in 1998.[481] The VicHealth Centre for Tobacco Control calculated that if smoking prevalence were reduced by five per cent to 15% over five years, at least 50,000 fewer Australians would die prematurely over the following 30 years, and reductions in health-care expenditure would total more than $1 billion. Investment in tobacco control was therefore described as 'a blue chip investment', and it was calculated that

'a $10 per capita tobacco control program modelled on international best practice would provide social rates of return higher than those of just about any other social policy'.[482]

Abelson and colleagues estimated that, over the longer term (30 years), government investment of $176 million in public health programs to reduce tobacco consumption returned an $8.4 billion net benefit, with 17,400 premature deaths averted.[87] Public health tobacco control programs that were costed included:

- national mass media campaigns to warn and educate the public of the dangers of smoking;
- health warnings on cigarette packets;

- regulations restricting the promotion of cigarettes as well as the conditions under which cigarette products might be consumed; and
- changes in taxes which contributed to a 154% price increase in tobacco products.

These programs were conservatively assessed as being responsible for a 10% decline in tobacco smoking and therefore for 10% of the benefits. Benefits attributed to public health programs totalled $12.3 billion, comprising longevity gains (estimated at $9.6 billion), improved health status gains ($2.2 billion), and lower health care costs ($0.5 billion).[87]

A study by Hurley calculated the positive impact of even short-term and modest reductions in smoking rates, on the numbers of hospitalisations of people aged 35–64 years for heart attack and stroke, and the associated costs of two different scenarios, over a seven-year period.[483] In scenario 1, smoking prevalence decreased by 1% in the first year, and in scenario 2, smoking prevalence decreased by 1% each year for five consecutive years. Under scenario 1, almost 1,300 hospitalisations would be avoided over seven years, saving about $20.4 million in health-care costs; and for scenario 2, over 4,000 hospitalisations would be avoided, saving about $61.6 million (approximately 2.75% of the costs of hospitalisations for these conditions over the period).[483] These studies showed that there were substantial gains still to be made through further investment in tobacco control.

Future challenges

At the end of the 20th century, death rates from smoking-related diseases in Aboriginal and Torres Strait Islander peoples remained a serious concern, with Indigenous Australians much more likely to die from these diseases, and at younger ages.[154]

Social gradients in smoking behaviour demonstrated that those living in lower socioeconomic status areas were more likely to be daily smokers than those from more affluent areas. Data from the ABS 2004-05 *National Health Survey* showed that 30% of people in the most socioeconomically disadvantaged fifth of the population were daily smokers, compared to only 14% of people in the least disadvantaged areas.[356]

Therefore, future action included tackling smoking rates in harder to reach sub-populations, such as:
- Indigenous Australians, especially young people and pregnant women;
- young people in general, and especially young women; and
- those who were socioeconomically disadvantaged.

6.1.2 Decreased alcohol-related harm

1970s onwards

Alcohol is a drug (a psychoactive substance) that promotes relaxation and euphoria, and has some health protective effects when used in moderation (for example, low levels of red wine consumption may have a protective effect against cardiovascular disease). Over-consumption of alcohol can, however, 'impair motor skills and judgement, produce intoxication and dependence, cause illness and death and have other harmful effects on our daily social, economic and living environments'.[484] Excessive consumption is detrimental to the liver and many other organs, and is implicated in conditions such as hypertension, some cancers and obesity.[360]

Alcohol is the most widely used and socially acceptable drug in Australia.[485] In 2004, 83% of adult Australians reported that they drank alcohol.[484] The *National Alcohol Strategy 2006-2009* asserted that 'too many Australians now partake in "drunken" cultures rather than drinking cultures'.[484] The resulting alcohol-related harms included death, injury, disease, crime, violence, unemployment and family breakdown. The ABS' long-term estimates of alcohol consumption per person aged 15 years

and over per year (in litres of beer, wine and total alcohol consumed) showed that consumption rose from 1939 to 1979, and then fell steadily in 1989 and 1999 (Figure 6.99).[360]

Figure 6.9: Apparent per person consumption of alcohol, by persons 15 years and over, 1939-1999


Note: Apparent per person consumption is total apparent consumption divided by mean resident population for the period; 'consumption' refers to estimates of supply and utilisation, rather than actual intake.

Source: ABS, *Australian social trends, 2002*, 2002, p. 84.

Shorter-term trend data from 1989, using litres of pure alcohol per person (i.e., taking into account the different alcohol percentages of beer, wine and spirits), also showed an overall fall in average alcohol consumption, despite varying estimates from different sources (Figure 6.10). However, the proportion of the population that drank alcohol steadily increased, reaching 83% in 2004, the latest year for which data were available.[484]

Figure 6.10: Estimates of per capita alcohol consumption, 1989 to 2003
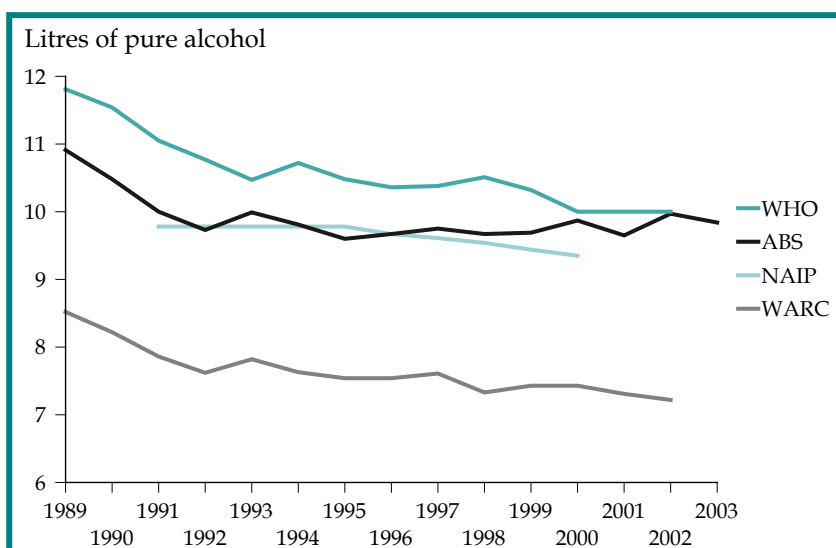
Note: WHO: World health Organization; ABS: Australian Bureau of Statistics; NAIP: National Alcohol Indicators Project; WARC: World Advertising Research Centre

Source: NAS, *National Drug Strategy 2006-2009*, 2006, p. 9.

Although the average consumption of alcohol per person in Australia declined from the 1980s, it remained high by world standards, and patterns of risky alcohol use remained a cause for concern. There was no level of alcohol intake deemed 'safe for everyone' - generally, the more alcohol consumed, the higher the risk of harm to people's health and wellbeing, and there were some groups (e.g., pregnant women, children) for whom alcohol was not recommended. The NHMRC endorsed the *Australian alcohol guidelines* in 2001 for the population and for specific groups (e.g., people taking medication or drugs, pregnant women). These set out the different levels of risk of harm (low risk, risky, and high risk) from both short-term and long-term alcohol consumption. Short-term alcohol-related harms were 'injuries from violence, accidents, falls, having unprotected sex and alcohol poisoning', while long-term harms included various diseases such as cancer, diabetes, and brain damage.[487]

NHMRC, Alcohol and your health, Australian alcohol guidelines poster.[486]

The *National Alcohol Strategy 2006-2009*, endorsed by the Ministerial Council on Drug Strategy (MCDS) in 2006, aimed to prevent and minimise alcohol-related harm and develop safer drinking cultures in Australia by:

- reducing the incidence of intoxication among drinkers;

- enhancing public safety and amenity at times and in places where alcohol was consumed;

- improving health outcomes among all individuals and communities affected by alcohol consumption; and

- facilitating safer and healthier drinking cultures through community understanding about the special properties of alcohol, and regulation of its availability.[484]

Public health practices

Liquor licensing and regulation, especially in relation to driving under the influence of alcohol, and restrictions on marketing and the advertising of alcohol; alcohol taxation, pricing and availability controls; and supply restrictions (e.g., no sales to minors, Indigenous community-determined alcohol restrictions and bans (see Box 6.6, below) all contributed to reducing the harm associated with risky alcohol use).

The gradual decriminalisation of public drunkenness from the 1970s onwards identified the need for a comprehensive public health response to risky drinking cultures and alcohol-related harm (Box 6.4). Other interventions included municipal 'dry zones' (alcohol-free public spaces in urban areas), and designated driver programs as a practical measure to reduce drink driving.

> **Box 6.4   Decriminalisation of public drunkenness, 1970s-**
>
> Drinking to intoxication or drunkenness was 'a major cause of short-term alcohol-related illness, injury and social problems.[484]   Single occasion drinking to excess ('binge drinking') had wide-reaching impacts on the health and safety of both individuals and communities because of its high incidence, the large number of people affected (both directly and indirectly, e.g., from associated risky behaviours such as unsafe sex) and because much of the injury and loss of life occurred in young adulthood.
>
> Public drunkenness was first made a criminal offence in England in 1606, and later, most colonial and then state parliaments in Australia adopted similar laws.[488] There was a subsequent shift from treating intoxication as a criminal offence requiring policing, to providing public health remedies such as sobering up centres and diversionary programs.   The NT decriminalised the offence of being intoxicated in public in 1974 and was the first Australian jurisdiction to do so.[485]   Most jurisdictions (ACT, NSW, NT, SA, Tasmania, and WA) decriminalised the offence of public drunkenness.[484]

Alcohol-related harm reduction and minimisation programs that contributed to changes in alcohol consumption at a population level included:

- risk behaviour reduction programs (e.g., 'Don't Drink & Drive' campaigns);
- training for staff dispensing alcohol (e.g., responsible service of alcohol hospitality staff training);
- education programs (e.g., drug education in schools);
- brief counselling interventions by GPs targeting risky or unsafe drinking practices; and
- treatment programs for problem drinkers.[489,490,491,492]

The legislature, licensing authorities, and police monitoring and enforcement were non-health sectors involved in successfully addressing this public health issue. For instance, in relation to alcohol and driving, the legislatures set driver alcohol limits, and police conducted random breathalyser tests on roads and were responsible for additional aspects of monitoring and enforcement (e.g., fines, loss of licence) (see Sub-section 5.1.1, *Road traffic safety*, and Box 6.5).

The NHMRC guidelines provided information on using alcohol safely and avoiding harmful consequences. They also quantified in 'standard drink' units, different levels of risk arising from consumption of alcohol in varying amounts, in the short- and long-term. Information based on the evidence-based guidelines was widely used in alcohol awareness and education campaigns to develop better community literacy in the quantities of different types of alcohol that made up a 'standard drink', and in measures to ensure low-risk drinking (e.g., 'Count your drinks for better health').

Alcohol guidelines stipulated that, to remain under a blood alcohol concentration of 0.05% (the legal limit for driving), no more than two standard drinks for males and one standard drink for females should be consumed in the first hour, with one standard drink per hour or less, subsequently.

> **Box 6.5   Alcohol and driving**
>
> Drink driving was a major cause of injury, disability and premature loss of life. Alcohol - the most important cause of road deaths - was a factor in up to a third of driver and pedestrian deaths.[493] In 2004, one in seven people (14 years and over) admitted to having driven a vehicle whilst under the influence of alcohol.[494] Of all the causes of deaths related to alcohol, road crash injury was the second commonest, causing close to 5,000 deaths in the ten years up to 2001.
>
> The burden of personal suffering and the monetary cost of road crashes were estimated at $15 billion in 1996, and substantial public benefits accrued from the implementation of road safety programs.[494]
>
> A marked reduction in alcohol-related road deaths followed the national campaign to reduce drink driving, with the proportion of alcohol-related road fatalities decreasing from 44% in 1981 to 29% in 1996.[484] This decrease was attributed to changes in legislation, increased enforcement and social marketing campaigns to deter drink driving. The net present value of the benefits of road safety programs from 1970-2010 was estimated at $13.4 billion, while road safety programs were estimated to have saved governments $750 million a year in the late 1990s.[87]

Although some population survey results (2006) indicated 'some erosion' in community understanding of these safe drinking limits, around one half of beer drinkers interviewed accurately nominated the number of standard drinks in a stubby or can of full strength beer (46%, down from 54% in 2005). Furthermore, 50% of males (57% in 2005) and 28% of females (33% in 2005) had an accurate knowledge of both parts of the guideline that would enable their blood alcohol level to remain under 0.05% (the type of alcoholic drink, and the drinks per hour).[495] A range of government-funded resources, including posters, were available to improve community awareness and understanding of safe drinking practices (e.g., *Changing the mix: a guide to low-risk drinking for the veteran community*, published by the Australian Department of Veterans' Affairs).[496]

At the start of the 21st century, publicly-funded alcohol and other drug information and treatment agencies provided services in each state and territory, and there were also specialist services (such as withdrawal and detoxification centres) to treat and manage individuals with particular alcohol dependency problems. GPs devised effective 'brief alcohol interventions' to assist risky drinkers to adopt healthier drinking behaviours.

'Brief alcohol interventions are effective in reducing alcohol consumption among non-treatment seeking patients who drink excessively. Such interventions are typically 5 to 30 minutes in duration and involve a combination of motivational interviewing and counselling techniques.' — RACP & RANZCP, Alcohol policy, 2005, p. 37.[493]

The MCDS noted that alcohol-associated fatality rates had decreased while the number of treatment services had increased over the period of the *National Drug Strategy*' (from 1985 onwards).[497] Some programs were also successfully addressing issues of alcohol and violence, but there was much more to be done in this area.

In 1989, the alcohol beverage industry introduced a self-regulatory system for regulating alcohol advertising, prior to the involvement of the MCDS in 2002.[484] A new Alcoholic Beverages Advertising Code was introduced in April 2004. Industry self-regulation was criticised as part of public health arguments for the government to regulate, monitor and report on alcohol advertising, especially in relation to young people.[498] The Australian government allocated $5 million to DrinkWise Australia, an organisation funded by the liquor industry, for alcohol education programmes in 2005-06.[499] It was hoped that DrinkWise would advocate for strategies that were supported by evidence of their effectiveness.[500]

Factors critical to success

Reducing the amount of alcohol consumed overall, and in risky and dangerous ways, required a concerted community effort and ongoing changes in culture, attitudes and behaviour. An unequivocal area of success, however, was in reducing alcohol-related deaths and injuries on our roads. Factors critical to this success were the national approach (e.g., establishing the national 0.05% blood alcohol limit in 1992), and leadership from all states and territories in the monitoring and enforcement of that limit by police, through random breathalyser testing, and in the courts through fines and licence removals. As a result of these and other measures such as social marketing (e.g., 'Don't drink and drive' media campaigns and designated driver programs), there were major shifts in community perceptions about acceptable behaviour. The later use of popular sporting figures as role models and significant penalties enforced by sporting clubs for poor behaviour (much of it alcohol-fuelled) highlighted the extent of the cultural shift that had occurred.

Financial incentives and disincentives, regulation and taxation to reduce levels of harmful alcohol use were shown to be most successful when implemented as one part among many in a comprehensive approach to prevention.[501]

Cost-effectiveness

The misuse of alcohol was responsible, directly and indirectly, for a considerable number of accidents, injuries, illnesses and deaths. The National Drug Research Institute (NDRI) estimated that in 2001, 3,000 deaths were attributable to alcohol consumption at risky and high-risk levels.[494]

In 2006, a review concluded that alcohol harm reduction interventions to reduce road trauma were well-founded in evidence, but there was limited research to support the effectiveness of other interventions.[502]

In 1992, the NT began the Living with Alcohol (LWA) program, a 'comprehensive program to reduce alcohol consumption and alcohol-related harms'.[503] It was funded by a small levy on all alcoholic beverages of three per cent or greater alcohol content by volume, which effectively raised the price of these beverages by around five cents per standard drink. The LWA Levy was removed in 1997 as a result of a High Court ruling; however, the LWA program continued until 2002, funded by redirected taxes collected by the federal government.

Evaluation of the impact of the first four years of the LWA program (1992-93 to 1995-96) showed a 22% reduction in per capita consumption of alcohol over the period, and reductions in hazardous drinking patterns, rates of road fatalities and serious road injury, as well as alcohol-related hospitalisations and deaths. Over the four years, the LWA program was estimated to have prevented 129 deaths and over 2,100 alcohol-related hospital admissions, saving the NT government more than $124 million in health care costs and lost productivity.[507] A longer term evaluation (from 1992 to 2002) confirmed that the program had resulted in significantly reduced alcohol-attributable deaths and financial savings to the NT.[507] The later study concluded that there was strong evidence of both short- and long-term benefits to be gained from combining the strategies of:

- implementing alcohol taxes related to alcohol strength and thereby increasing the real cost of alcohol (as in the LWA Levy), together with

- comprehensive programs and services to reduce alcohol-related harms (funded by the alcohol taxes above).

Furthermore, the long-term LWA program was effective in reducing acute harms in both Indigenous and non-Indigenous communities (Box 6.6).[507]

Future challenges

Despite the steady decline in overall alcohol consumption in Australia, Indigenous Australians did not benefit to the same degree from the associated health gains and, in particular, suffered a greater share of the burden of acute alcohol-related harm.[493] While there were some advances in the prevention and treatment of alcohol-related problems, risky and high-risk alcohol consumption continued at unacceptably high levels. Evidence-based interventions at both the clinical and population levels were needed.[493]

Box 6.6 Community-controlled alcohol supply restrictions

'Licensing restrictions used by Indigenous communities in Australia have taken two forms to restrict supply of alcohol… declaring areas 'dry' and… using liquor laws to control availability. These initiatives can be successful but only when initiated and supported by the communities themselves'.[493]

Liquor law controls on the availability of alcohol included licensing restrictions, conditions on trading hours and days, and limits on amounts and types of 'take-away alcohol' (e.g., limits on cask wine). Community controls required significant community support and limited alternative sources of alcohol to maximise their effectiveness. Evaluations of alcohol supply restrictions in remote Aboriginal communities and towns with substantial Aboriginal representation demonstrated reductions in alcohol consumption and alcohol-related harms (e.g., reduced injury).[504] Common factors necessary for success included that:

- restrictions were part of a whole program addressing reduced alcohol consumption and related harm;

- restrictions (and the whole program) had the active support of a representative section of the community including the Aboriginal community; and

- the community engaged and persisted in the struggle to implement restrictions.[505]

The active support of liquor licensing and enforcement authorities was fundamental to success.

The Grog Book by Maggie Brady was a resource of advice on how to manage alcohol problems at the community level for Aboriginal and Torres Strait Islander communities first published in 1998. Funded by the Australian government, a revised edition was available in 2005.

Some measures (e.g., aligning taxation with alcohol strength) were not yet implemented, despite evidence of their effectiveness. Social 'messages' about responsible alcohol use needed to be more consistent - as with tobacco control - rather than co-existing with behaviours such as drinking promotions (e.g., half-price 'happy hours') and relatively low prices for high alcohol content drinks (packaged to appeal to young people) that facilitated an acceptability of binge drinking.

Marketing of alcohol to young people remained a concern. The alcohol beverage industry was officially 'self-regulating', after introducing its own alcohol advertising system in 1989. Public health
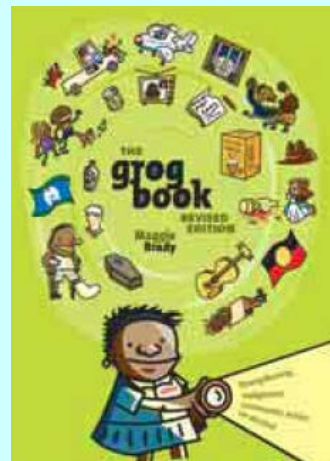
researchers argued that the self-regulating system was not working, especially in relation to alcohol advertising and promotions that were targeted at young people.[498] Increased government surveillance and regulation was needed.

The *National Alcohol Strategy* recommended monitoring and annual reporting of the advertising and promotion of alcohol.[484] A study estimated that Australian government taxation revenue from consumption of alcohol by adolescents (aged 12 to 17 years inclusive) was seven times the amount spent on interventions to educate this age group about the potential dangers of alcohol, reflecting the 'substantial disparity' between earnings and expenditure on prevention.[508]

Fiscal vertical inequity meant that, while the Commonwealth received the most revenue from alcohol taxation, the states and territories incurred most of the costs associated with alcohol-related problems (including social, hospital and treatment costs), as well as those of law enforcement activity (e.g., policing, liquor licensing procedures, responsible service of alcohol laws (NSW)), courts, jails, rehabilitation, and the social consequences of alcohol-related violence.[501]

Recommended strategies to reduce the health-related impact of high-risk alcohol consumption were:

- the systematic reform of alcohol taxation to reflect public health as well as economic considerations (to include social and community costs as well as taxation benefits to, primarily, federal government) - this meant taxing alcoholic beverages according to alcohol content rather than beverage class or cost;

- the allocation of a proportion of alcohol taxation revenue to fund alcohol prevention, treatment and research (similarly to taxes on tobacco products, and as was done in the NT's LWA program);

- addressing the proliferation of alcohol sales outlets under changes in competition policy, as there was good evidence that the density of outlets was associated with increased risky alcohol use.[500,509,510,484]

There also needed to be better prevention of specific alcohol-related harms, such as alcohol-related violence, and greater uptake of effective treatment options for alcohol dependence (e.g., early and brief interventions, pharmacotherapy).[484] The extent of alcohol-related problems among Indigenous communities remained a national concern.[484]

6.1.3 Sun safety measures

1981 onwards

Australia had the highest rate of skin cancer in the world, with two in three people likely to develop some form of skin cancer during their lifetime.[511] In 2002, the number of people treated for skin cancer was more than four times the number of people with all other types of cancer combined.[512]

Melanoma made up about two per cent of all skin cancers and was able to be treated effectively if diagnosed early, but had a poor prognosis if the tumour was diagnosed at an advanced stage, underscoring the need for early detection.[512,513] Early treatment for the more prevalent non-melanocytic skin cancers (NMSC) reduced disfigurement and deaths from this cause.[514] In 2002, it was estimated that almost two per cent of Australia's population – four per cent of those aged 40 years or over and eight per cent of those aged 70 years and over - were treated for NMSC.[513]

More than 1,600 Australians died from melanoma and NMSC in 2005.[515] The incidence of and deaths from melanoma, relative to other common cancers in 2001 are shown in Figure 6.11.

**Figure 6.11: Incidence and deaths from the most frequent cancers, 2003**
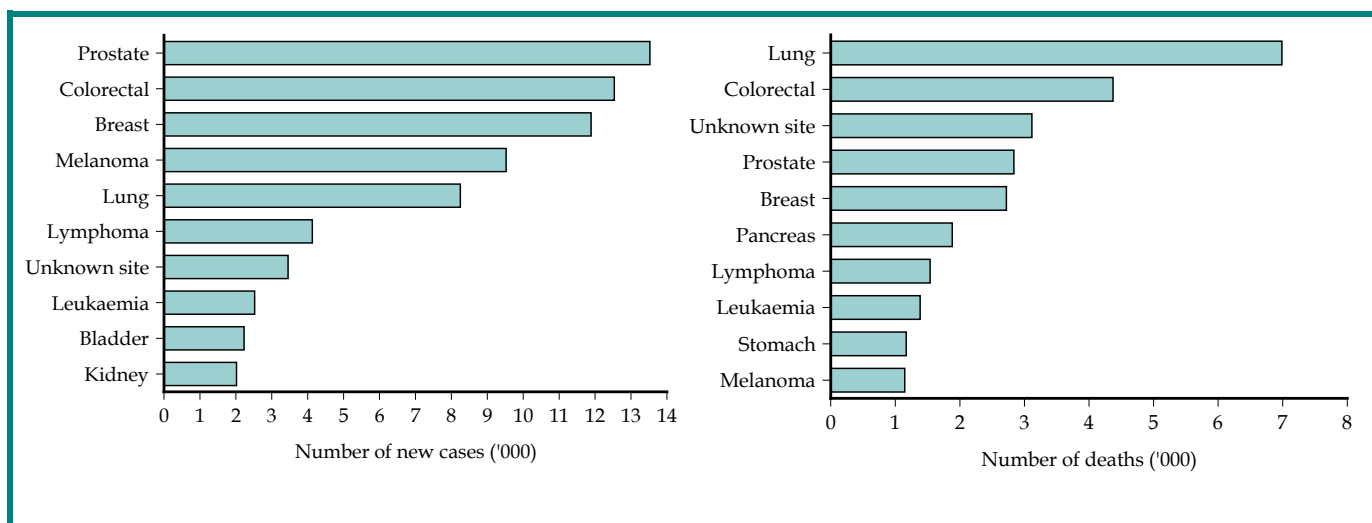
Source: Charts by PHIDU; data: AIHW & AACR, *Cancer in Australia: an overview, 2006*, 2007, pp. 8, 44; cancer incidence - National Cancer Statistics Clearing House, AIHW data compilation from state & territory cancer registries (non-melanocytic skin cancer incidence not shown as not routinely reported to cancer registries); deaths - National Mortality Database, AIHW.

Ultraviolet (UV) radiation from the sun was the main cause of skin cancer. Most ultraviolet radiation is derived from sunlight, but also from artificial sources, such as tanning booths or sunlamps. The relationship between exposure to sunlight and skin cancer was first recognised by an Australian statistician, Oliver Lancaster, in 1956.[516] His comparison of skin cancer rates among Caucasians showed a correlation with latitude and the amount of sunlight. The northern regions had far higher rates than those in the south of Australia.[517] The fourth *National Non-melanoma Skin Cancer Survey* (2002) and trend analyses, from the time of the first survey in 1985, supported this relationship.[513] The association with latitude, being Australian-born, and having fair skin (with less melanin or skin pigment) confirmed the role of UV radiation exposure in skin cancer.[513]

Over the 20th century, deaths from melanoma rose from the 1930s, when they were first recorded, to 1985, increasing at an annual rate of 6% in men and 3% in women. After peaking in the period 1985-1989, female deaths from melanoma trended down, with rates for male deaths following some five years later.[518]   Deaths from NMSC declined up to the 1950s and continued to fall in women (Figure 6.12). The later rise in young men was related to the incidence of NMSC in those with HIV/AIDS.[518]

Figure 6.12: Trends in age-standardised death rates for melanoma and non-melanocytic skin cancer (NMSC), males and females, 1950-1955 to 1995-1999
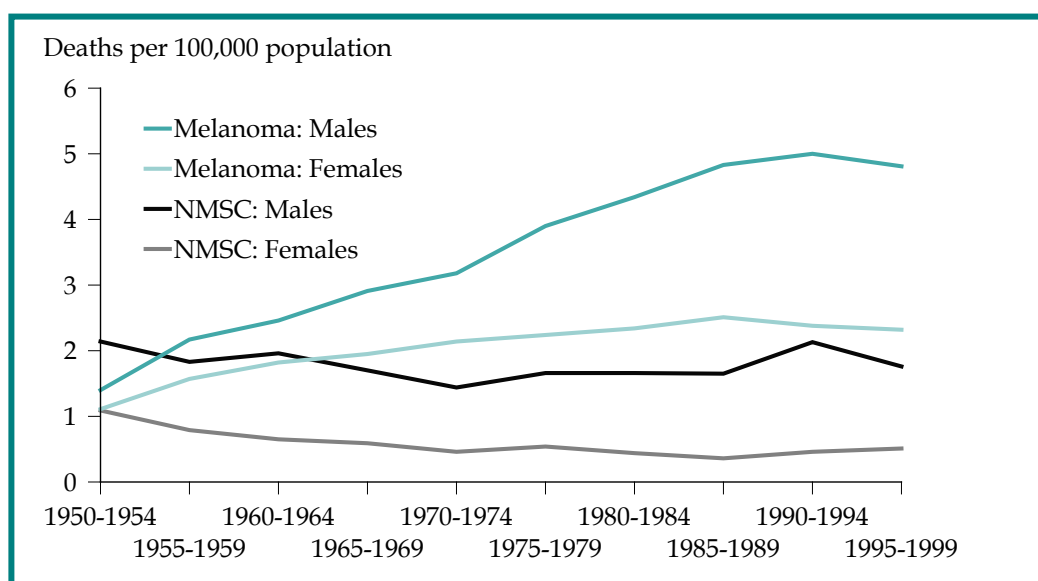
Source: Giles & Thursfield, *Canstat: Trends in cancer mortality, Australia 1910–1999,* 2001, p. 13.

135

Evidence suggested that promoting the early detection of melanoma resulted in the diagnosis and treatment of thinner tumours and an increase in survival rates.[518,519,520] Many melanomas were discovered by people themselves or by a family member.[521] Social marketing and public education campaigns aimed at primary prevention (e.g., the Cancer Council of Victoria's SunSmart program) contributed to significant changes in population behaviour.[522] The results were evident in the decline in melanoma incidence.

Although UV radiation over-exposure is harmful, some skin exposure is essential to produce vitamin D. Vitamin D is required for healthy bone development, and a relative deficiency is associated with a range of conditions, including osteoporosis, rickets and other bone diseases; autoimmune diseases (e.g., multiple sclerosis), hypertension and cardiovascular disease.[523,524, 525]

It remained a public health challenge to shape this complex message appropriately to ensure that the population, in all geographic areas and through the seasons, received adequate sun exposure for healthy vitamin D uptake, without risking the harms of over-exposure to ultraviolet radiation.[526]

Public health practices

Public health's role in promoting sun safety measures included raising community awareness about the risks of over-exposure to the sun, and researching, advocating for and educating the public on sun protective behaviours and self-screening to identify early skin cancers using social marketing, education and awareness campaigns. Many of these measures to reduce and prevent harmful over- exposure to the sun were especially important for prevention in children as NMSC and melanoma typically may take decades to develop.

Promising early results showing a decline in melanoma in younger people were proof of the value of encouraging changes in behaviour to be more sun protective (e.g., wearing hats and covering up, reducing exposures during peak UV radiation times, and applying sunscreen).

Community-wide health promotion campaigns included the memorable 'Slip, slop, slap' (from 1981, Box 6.7), 'SunSmart' (from 1988) and 'Cover up', to get people to protect their skin and to screen themselves for skin cancers. Many of these campaigns were multi-faceted in their approaches.

> ### Box 6.7   Twenty-four years of 'Slip! Slop! Slap!'
>
> One of the most successful public health campaigns in Australia's history was launched in 1981, when 'a cheerful seagull in board shorts, t-shirt and hat tap-danced his way across our TV screens singing a jingle that you just couldn't get out of your head':
>
> Slip, Slop, Slap!
> It sounds like a breeze when you say it like that
> Slip, Slop, Slap!
> In the sun we always say "Slip Slop Slap!"
>
> Slip, Slop, Slap!
> Slip on a shirt, slop on sunscreen and slap on a hat,
> Slip, Slop, Slap!
> You can stop skin cancer - say: "Slip, Slop, Slap!"[527]
>
> The 'Slip Slop Slap' slogan became institutionalised as the core message of the Cancer Council's SunSmart program for schools and local communities. The Cancer Council believed its 'Slip Slop Slap' campaign played a key role in the dramatic shift in sun protection attitudes and behaviour over the next two decades. People covered up more and made better use of shade.[511]
>
> The key sun protection messages were then expanded to ensure a focus on individual and environmental strategies including SLIP on sun-protective clothing, SLOP on SPF30+ sunscreen, SLAP on a hat, SEEK shade and SLIDE on some sunglasses.[528]
>
>
>
> Sid the Seagull puts his youthful good looks down to a healthy diet, plenty of exercise, and being SunSmart. "Avoiding overexposure from the sun doesn't just help prevent skin cancer, it helps you avoid premature ageing," he said.
>
> Source: Illustration - Paul Sloss; based on character by Alex Stitt. Provided courtesy of the Cancer Council Victoria.

For example, as well as the use of the mass media, the SunSmart program involved sponsorship of sporting associations; professional education; working with schools, early childhood services and workplaces; ongoing research; and program evaluation.[527]

Hundreds of schools were accredited as 'SunSmart schools' with comprehensive sun protection policies in place to protect students. SunSmart schools increased their shaded areas, scheduled outdoor activities when UV radiation risk was lowest, and ensured that students wore wide-brimmed hats ('no hat, no play' policies) and were taught about the need for sun protection.

Policies were adapted to allow for some sun exposure each day, especially during winter in the southern States.[527] Samanek and colleagues set out beneficial sun exposure times for major population centres and for different times of the year in Australia, to inform such changes.[529]

Cancer registries, which began in 1972, monitored melanoma incidence, survival and death rates. A national population survey monitored the incidence of melanoma and NMSCs from 1985, paying close attention to age-specific trends in order to assess the effectiveness of sun safety strategies for particular age groups.[530]

Sun safety products, such as sunscreen skin creams and UV-protective shade materials and clothing, were developed and promoted. The SunSmart UV Alert, an initiative of the Cancer Council Australia,

> *Survey respondent:* *'Sun protection is one of the very few primary prevention interventions for any cancer for which there is RCT [randomised clinical trial] in full evidence (see Green et al., Lancet, 1999)'.*[530]
>
> *'The promotion of SunSmart knowledge and behaviours though research, community education, structural changes, advocacy, and mass media [is a public health success]'.*

the Bureau of Meteorology and the Australian Radiation Protection and Nuclear Safety Agency, based on the WHO Global Solar UV Index, was launched in 2005 to highlight the harm of excess sun exposure.[531] Population surveys in Victoria demonstrated that behavioural changes had occurred from 1988 to 2001, with more people protecting themselves by wearing hats and protective clothing, using sunscreen, and avoiding sun exposure in peak UV radiation periods (Figure 6.13).[532]

Figure 6.13: Percentage of Melbourne residents taking certain sun protective measures between 11 am and 3 pm on the previous Sunday, 1988-2001

A: Wore a hat; B: Wore a long sleeve top; C: Used sunscreen
D: Wore SP 15+ sunscreen; E: Chose to minimise time outside in peak UV period
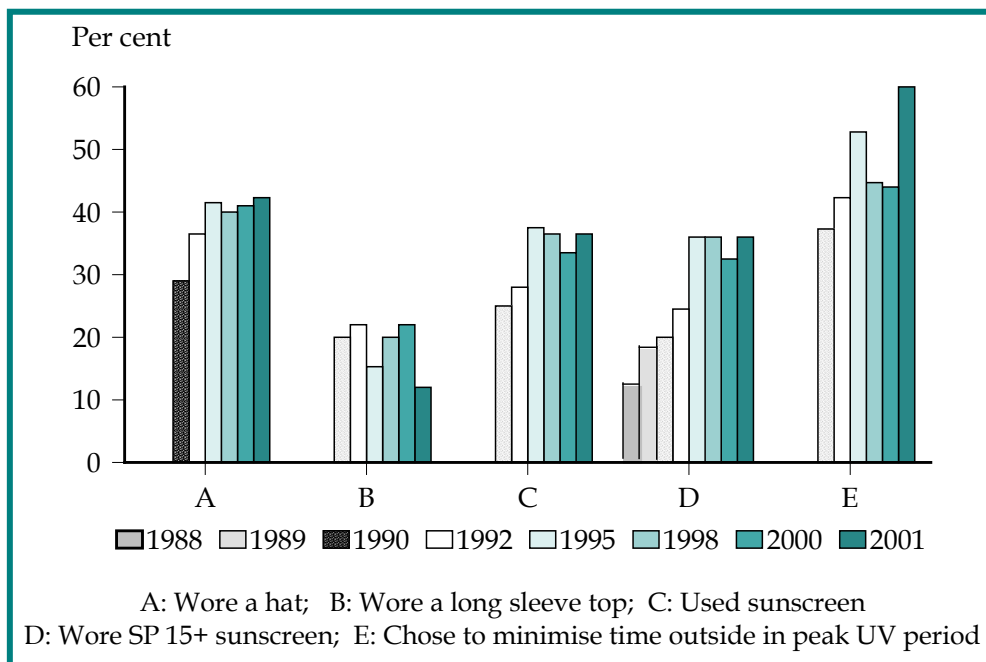
Source: SunSmart Victoria, *SunSmart Program* 2003-2006, 2002, p. 9.

Modelling the extension of the Victorian SunSmart Campaign across Australia confirmed the program's value for money.[533] Federal funding for a National Skin Cancer Awareness Campaign was allocated in 2005-2006, a move welcomed by the Cancer Council Victoria as 'an important contribution to reinforcing the behavioural changes that had taken decades to establish' in Victoria.[534]

Finally, public health research into the development and testing of vaccines against skin cancer offered possible protection for the population in the future.

Factors critical to success

These programs addressed a significant health problem, as Australia had the highest incidence of skin cancer in the world. Public education programs, focusing on reducing harmful sun exposures from childhood, had a measurable impact on the health of later generations. Cornerstones of success included:

- research quantifying the problem and its importance at a population level, and identifying effective prevention measures;

- successful behavioural change programs, run over decades, and applied with persistence and growing sophistication;

- community compliance in adopting sun protective behaviours, including early detection;

- collection of data for monitoring (incidence, deaths, treatment and survival rates); and

- adoption of successful state-based programs and other proven public health measures at a national level.

The public health aim of protecting the population from the risk of skin cancer remained ambitious in scope. Early introduction of community education and awareness campaigns over 25 years before – with the start of the 'Slip Slop Slap' campaign – undoubtedly contributed to the success of behavioural changes (Box 6.7). Campaigns that were initially led by non-government organisations such as the Cancer Council Australia and its affiliates, then by state and territory health departments, and later extended at a national level by the Australian government, demonstrated a successful 'bottom-up' approach that built on previous achievements (Box 6.8).

The multi-faceted approach included the development of protective products (e.g., sunscreens), programs for whole communities (e.g., the SunSmart Schools Program), and public information devices that improved over time. Public health research and monitoring, and program evaluation provided evidence of successful strategies, which could be scaled up and extended nationally to improve population coverage. Population surveys from 1985 monitored age-specific trends to assess the effectiveness of sun safety strategies. Lastly, public health messages were modified quickly - in response to new information on the amount of sun skin exposure needed for sufficient Vitamin D production - to present new and complex messages to the community effectively.

Cost-effectiveness

A study of the potential cost-effectiveness of a national campaign to prevent skin cancers was modelled on extending the Victorian SunSmart Campaign across the whole of Australia. It concluded that such a program would be 'excellent value for money'.[533] Assuming a national twenty-year campaign with an investment of $5 million each year (i.e., 28¢ per person, and doubling the previous expenditure by state and territory governments and Anti-Cancer NGOs), it was estimated that the program would avert 4,300 premature deaths and cost $1,360 per life-year saved (or $14,360 per death deferred). The program would be likely to generate a net saving to government of $103 million.[533]

These results were robust for a range of cost and outcome variations, and funding for a National Skin Cancer Awareness Campaign was announced in the 2005-2006 federal budget.[534]

Future challenges

At the start of the 21st century, a number of major challenges remained.

These included:

- adjusting sun protection messages to incorporate information about sun exposure requirements for adequate vitamin D production;

- further promoting sun protection behaviours, including the proper application of sunscreen and protecting the neck and head;

- public education to improve knowledge about the risks of sun exposure - including the dangers of solarium sun tanning, which also warranted national action to prevent further deaths from melanoma from this cause;

- promoting early detection (e.g., self-screening by individuals) and appropriate treatment;

- public health research into better detection and treatment; and

- monitoring the adequacy of the population's levels of vitamin D – especially those at risk of vitamin D deficiency including elderly people, those who were institutionalised or house-bound, babies of mothers who were deficient in vitamin D, and those who covered their skin for religious or cultural reasons.[526,524,536]

6.1.4 Needle and syringe exchange programs

1990s onwards

Needle and syringe exchange programs (NSPs) were implemented to limit the spread of bloodborne viral infections among injecting drug users. These infective agents included the Human Immunodeficiency Virus (HIV), hepatitis B (HBV) and hepatitis C (HCV).

Human Immunodeficiency Virus, first identified in 1981, is a bloodborne virus that greatly impairs immunity to a range of other infections and causes the Acquired Immune Deficiency Syndrome (AIDS).[80] Hepatitis B virus is a virus that is transmitted by blood and blood products (including contaminated needles), sexual contact or from mother to child (vertically). A small percentage of individuals with acute hepatitis B infection develop a chronic infection and, ultimately, cirrhosis or liver cancer. Hepatitis C is a bloodborne virus, first identified in 1989, which causes inflammatory liver disease; and was one of the most frequently notified infectious diseases in Australia in the last decade of the 20th century.[537] Bloodborne viruses can be transmitted from person to person in a variety of ways that include:

- sharing equipment used to inject drugs - it was estimated that 80% of hepatitis C infections and 90% of new infections were due to unsafe injecting practices;

- non-sterile tattooing or body-piercing techniques, or medical or dental procedures (mainly procedures performed in countries other than Australia); and

- through infected blood or blood products - about five to ten per cent of people with hepatitis C acquired the virus in this way in the 1970s and 1980s. However, as all blood and blood products were screened for hepatitis C antibodies from 1990, the risk of transmission through blood transfusions was subsequently very low.[538,539,540]

Hepatitis B and C infections were common causes of liver disease-related death, but drug-related deaths were more frequent among injecting drug users.[540] Although most of those infected with HCV did not have a shortened life expectancy, the impact on their quality of life was detrimental. While a vaccine existed for HBV, there was no vaccine for HCV, making other preventive public health measures critical. An estimate of HCV incidence by the Hepatitis C Virus Projections Working Group [HCVPWG] showed an increasing rate of HCV infections in injecting drug users to a peak of 14,000 new HCV seroconversions in 1999, and a subsequent decline (Figure 6.14).[538]

Figure 6.14: Trend in number of hepatitis C infections, by exposure category, 1960-2005
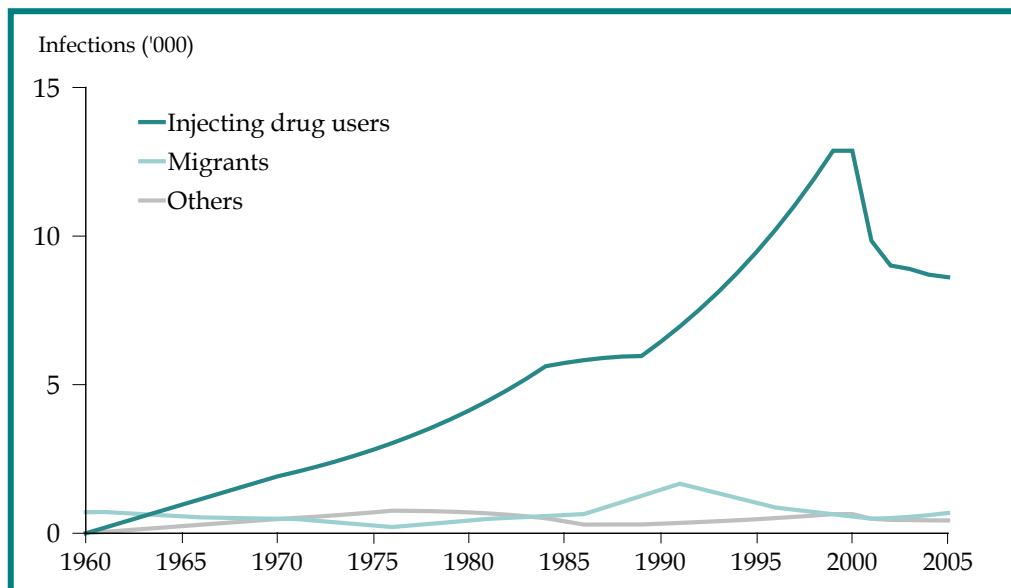
Source: HCVPWG, *Estimates and projections of the hepatitis C virus epidemic in Australia 2006*, Sydney, 2006, p. 31.

Trends in the notification rate of new diagnoses of HCV infection showed a peak in 2000 of 107 cases per 100,000 population (Figure 6.15). The notification rate fell 63.4 per 100,000 population by 2005, representing a 40% decline from the year 2000.[541,80]

Figure 6.15: Trend in notifications of hepatitis C, 1998-2003
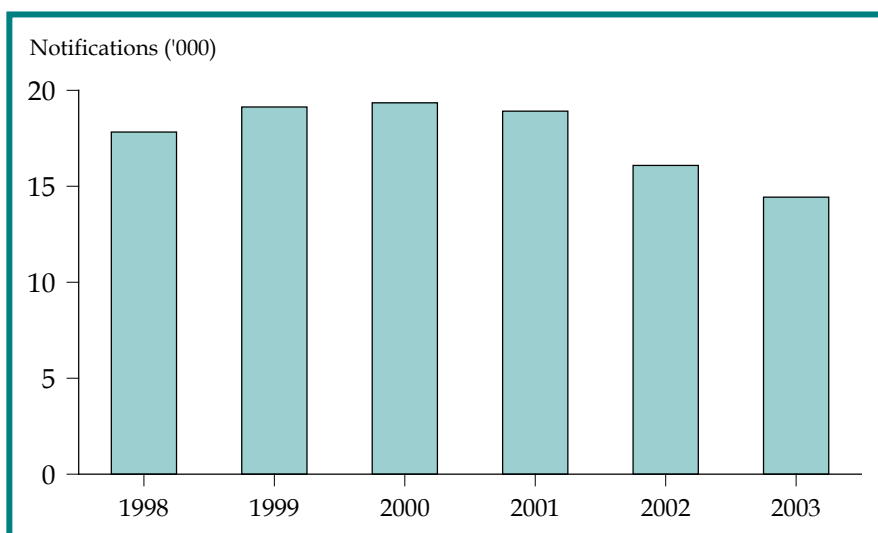

Source: DoHA, *National hepatitis C strategy 2005–2008*, 2005, p. 4.

HCV transmission occurred most often in people with a history of injecting drug use. In 2004, around 73% of people with new hepatitis C infections reported such a history.[541] The rate of diagnosis decreased in the 15–19 year age group (down by 68% between 2001 and 2005), suggesting a declining incidence among young people who used injecting drugs (Figure 6.16).[80,542]

Hepatitis C was a stigmatising condition and there was discrimination against people whose hepatitis C status became known, due to largely unfounded fears of easily acquiring the infection and the close association of hepatitis C with injecting drug use.[539] Such attitudes were a disincentive for those at risk of infection to being tested for hepatitis C and seeking treatment.

Figure 6.16: Trends in age-specific diagnoses of hepatitis C, 1996-2005
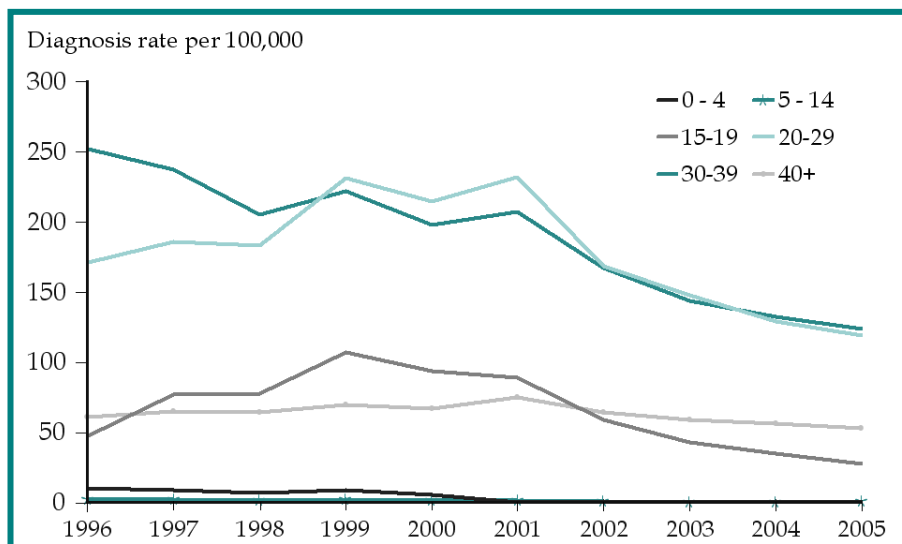
Source: NCHECR, *HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia: annual surveillance report, 2006*, 2006, p. 16.

Public health practices

Needle and syringe exchange programs (NSPs) were aimed at preventing the spread of HIV, hepatitis B and C, and other bloodborne diseases. Their operation required partnerships between public health agencies, the police, NGOs and people with or at risk of hepatitis C. There was a need to change policing policies and operating guidelines, and enact legislation to remove barriers to program implementation.[542] For example, the NSW *Drug Misuse and Trafficking Act 1985* was amended in 1988 to permit possession of needles and syringes, thereby promoting safe injecting practices by removing

legal prohibitions, and making injecting drug users less likely to share or re-use needles and syringes, and more likely to dispose of used equipment safely.[542]

In 1990, NSPs were instigated on a national basis and, a year later, were established in most states and territories, resulting in over 3,000 NSP outlets across Australia.[80,539] NSPs were supported by the harm minimisation framework that had informed the different phases of Australia's *National Drug Strategy* from its inception in 1985.[497]

The principle of harm minimisation promoted better health, social and economic outcomes for the community and individuals through a range of approaches, one of which was NSPs (Box 6.9). NSPs were described as 'the cornerstone of Australia's response to bloodborne viruses such as HIV/AIDS and hepatitis C amongst injecting drug users'.[497] Distribution of sterile injecting equipment helped to reduce the risk of transmission of bloodborne viruses.

NSPs also provided a contact point for a difficult-to-reach subpopulation to access a range of services which included:

- education and information on the reduction of drug-related harm;
- referral to drug treatment;
- primary health care;
- referral to medical, legal and social services; and
- safe disposal of injecting equipment.[501]

The programs also addressed the possibility of infection by sexual contact by providing condoms and safe sex information. NSPs thus served a broad public health function by engaging the injecting drug-using population, offering health services, reducing the likelihood of incurring further harm to themselves and society, and protecting the wider community by safely collecting used injecting equipment.

In 1994, the *National Hepatitis C Action Plan* was released, and, from 1996, hepatitis C was included as part of the *National HIV/AIDS Strategy*.[537] Achievements of the first *National Hepatitis C Strategy* for the period 1999–2000 to 2003–2004 included developing a strong partnership approach, and identifying and researching advances in the treatment of chronic hepatitis C.[537,543] The *National Hepatitis C Strategy 2005–2008* built on the achievements of the first strategy and outlined a framework for a national approach.[537]

Best estimates of the numbers of injecting drug users (total of regular and occasional injecting drug users) in Australia over the period 1970 to 2005 are shown in Figure 6.17.[544]
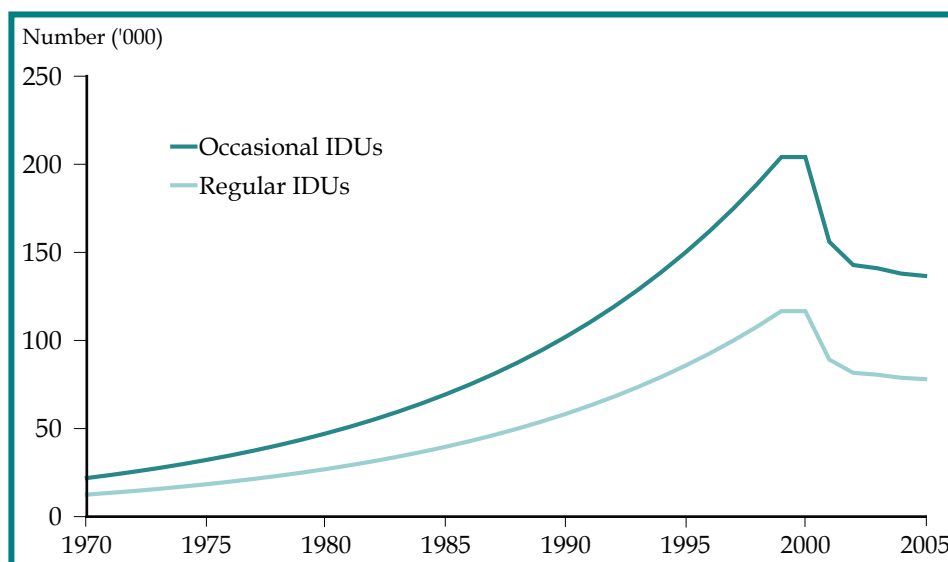
Figure 6.17: Estimated number of injecting drug users (IDUs), 1970-2005

Source: HCVPWG, *Estimates and projections of the hepatitis C virus epidemic in Australia 2006*, 2006, p 24.

Surveys suggested sero-prevalence rates (the percentage of a population testing positive for infection via a blood test) of 50-60% for hepatitis C, 23–52% for hepatitis B, and 1-3% for HIV. The low prevalence of HIV was partly attributed to the early introduction of harm reduction programs such as needle and syringe exchange, and methadone maintenance programs. However, the higher virulence of hepatitis B and hepatitis C meant a degree of continued transmission, even among injecting drug users accessing these programs, and remained a challenge for public health practitioners and others working in this difficult area.[501]

Factors critical to success

Initially, NSPs were surrounded by controversy, with claims that they 'condoned' and even 'encouraged' drug use, rather than minimised the harm arising from it; hence, determination and persistence was needed by the decision-makers who first advocated for, and later ensured, the wider implementation of NSPs.

The first NSP was started as a trial in NSW in 1986, and the concept was identified early as a cost-effective national strategy. NSPs were specifically identified in the *National HIV/AIDS Strategy* and first funded under the Public Health Outcome Funding Agreements (PHOFA) in 1999-2000, and thus, were costed as part of national public health expenditure reporting.[24] 'Unsafe sharing of needles' became one of the public health performance measures routinely reported as part of benchmarking health system performance from 2002.[24] The data in Figure 6.18 were collected in surveys carried out by the needle and syringe exchange programs in 2001 from 2,342 respondents.

Needle and syringe exchange programs (NSPs) were successful because of the advocacy and leadership of those who established them in Australia early in the HIV/AIDS epidemic.[545] Their efficacy was evident in the higher rates of HIV and HCV in countries that established programs later.[111]

Survey respondent: *'Prevention of HIV/AIDS amongst injecting drug users through needle syringe programs (NSPs) [was a public health success] — countries that implemented NSPs early in the epidemic kept their rate of HIV in injecting drug users below 2% (closer to 1% in Australia), yet countries which delayed this intervention, even just for a couple of years, had rates from 15-50%. This was a lot of cases of HIV prevented.'*

Figure 6.18: Injecting drug users reporting sharing a needle and syringe in the preceding month, 1997–2001
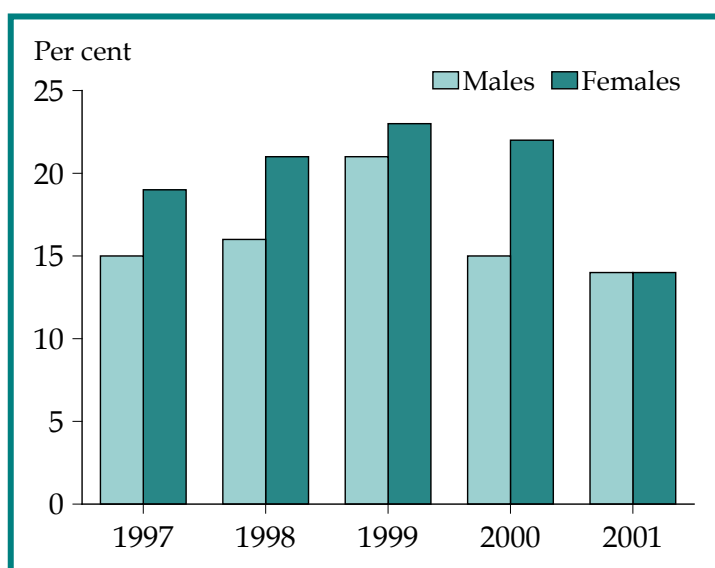
Source: NHPC, *National report on health sector performance indicators 2003*, Canberra, 2004, p. 67.

The successful adoption of effective harm reduction measures such as NSPs was a key element in reducing the transmission of bloodborne diseases among injecting drug users and the wider community, especially in the absence of effective vaccines against HCV and HIV.

Cost-effectiveness

A 2002 report confirmed the economic advantages of harm reduction strategies such as NSPs.[542] Between 1988 and 2000, as a result of NSPs, an estimated 25,000 HIV infections and 21,000 HCV infections were prevented among injecting drug users. The report estimated that, by 2010, 4,500 HIV-related deaths and 90 HCV-related deaths would have been prevented by the timely intervention of these programs. The prevention of infections and deaths represented a cost saving of up to $783 million in HCV treatment and $7,025 million in HIV treatment, for an investment of $150 million (in 2000 prices) in NSPs by Australian governments between 1991 and 2000. This was more than a fifty to one return on investment; and it was estimated that the original investment was not only fully recouped, but had been surpassed by the end of the investment period, without taking into account any future savings.

Without the introduction of NSPs from 1988, it was estimated that approximately 16,000 injecting drug users (out of an estimated 21,000) would have developed chronic hepatitis C (Figure 6.19).[542]

Figure 6.19: Projected numbers of Hepatitis C cases with, without and avoided by needle and syringe exchange programs
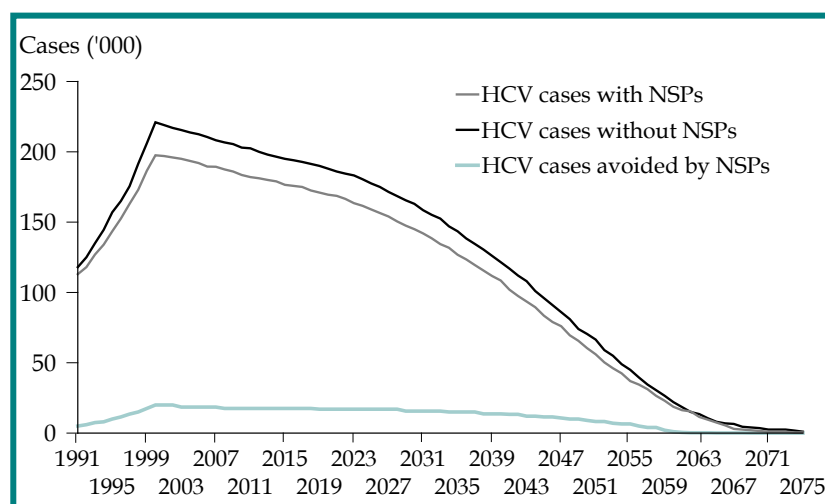
Source: Health Outcomes International et al., *Return on investment in needle and syringe programs in Australia,* 2002, p. 34.

A review of harm reduction strategies in 2006 concluded that there was 'solid efficacy, effectiveness and economic data' to support NSPs specifically and their widespread adoption as an overall policy approach to illicit drugs.[502]

Future challenges

'Maintenance and expansion of needle and syringe exchange programs will remain the single most important component of Australia's harm-minimisation efforts. Adherence to the principles of harm minimisation is the only way to control [the HCV] epidemic until a vaccine becomes available -- and this is unlikely to occur within a decade.' KJR Watson, Medical Journal of Australia, vol. 172, 2000, pp. 55-56.[546]

A survey of HIV-testing and hepatitis-testing and vaccination services in drug and alcohol agencies indicated that more than two decades after the NHMRC called for all injecting drug users to be vaccinated against hepatitis B (HBV), there was still a gap between Australian guidelines and current practice.[547]

> **Survey respondent:** *'our relative lack of success in preventing hepatitis C also needs to be reflected upon.'*

Winstock and colleagues noted that this situation might become less important as universal vaccination for infants for HBV had been introduced in 2000; however, many injecting drug users remained at risk. A sizeable proportion of drug and alcohol agencies did not provide cost-effective, evidence-based interventions against bloodborne viruses – a situation that was inconsistent with Australian policy and the 'expectation of reasonable public health care and harm reduction'. They observed that increased takeup of identified best practice and other opportunities to improve the health and reduce harm in this population represented a worthwhile future investment.[547]

The *National Hepatitis C Strategy* identified the following priorities:

- improving the capacity of NSPs to ensure that groups that previously had had poor access to the information and means of preventing HCV infection (e.g., Aboriginal and Torres Strait Islander people who engaged in risk behaviours, people in custodial settings such as prisons, and people from culturally and linguistically diverse backgrounds) were educated about HCV and measures to avoid it;
- improving access to treatment and increasing its uptake among people with HCV, as, although it had become possible to cure 50% or more of those who underwent treatment, only around 1% of people diagnosed with HCV were being treated annually; and

- improving surveillance to understand better the prevalence of HCV, and the extent of the behaviours and situations which put people at risk of contracting HCV.[537]

6.2   Reducing non-communicable chronic diseases

1901 onwards

'In the first years of the twentieth century, cardiovascular disease was already recognised as a significant contributor to the mortality of Australians. It was the fourth most common cause of death in Australia after pneumonia, tuberculosis, and diarrhoeal disease, and it was much more common than cancer'. — AIHW, 2000.[3]

During the early 20th century, as in other developed nations, Australia experienced a 'health transition' from infectious diseases to chronic, non-communicable diseases, with circulatory system diseases and cancer replacing infectious and respiratory system diseases (such as influenza and tuberculosis) as the main causes of death (Figure 6.20).[456]

**Figure 6.20: Death rates by major causes, age standardised, 1907-2004**
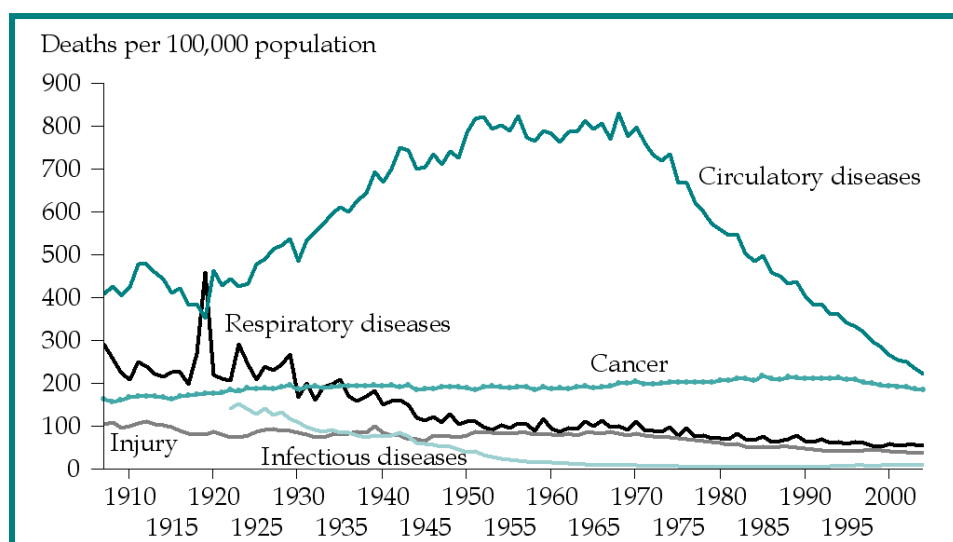
Source: Portfolio Statistics & Standards Section, Economic & Statistical Analysis Branch, Portfolio Strategies Division, DoHA; data: AIHW GRIM workbooks.

 Circulatory system diseases are diseases of the heart and blood vessels in the body. They include coronary heart disease, other forms of heart disease, stroke, and peripheral vascular disease. Most of these diseases share a number of preventable risk factors including tobacco smoking, high blood pressure, high blood cholesterol, overweight and obesity, physical inactivity, chronic high alcohol use, and diabetes.

Early in the 20th century, there was a rapid rise in circulatory system diseases, with increases tending to follow economic prosperity and urbanisation.[548] The rise in death rates was from the two major types of circulatory system diseases – coronary or ischaemic heart disease, and cerebrovascular disease (including stroke). In Australia, deaths from ischaemic heart disease rose sharply through the century for both males and females, and peaked around 1970, after which rates fell rapidly.[3] By 2004, rates were well below the levels seen in 1950 (Figure 6.21).

Figure 6.21: Death rates from the main circulatory system diseases, 1950-2004
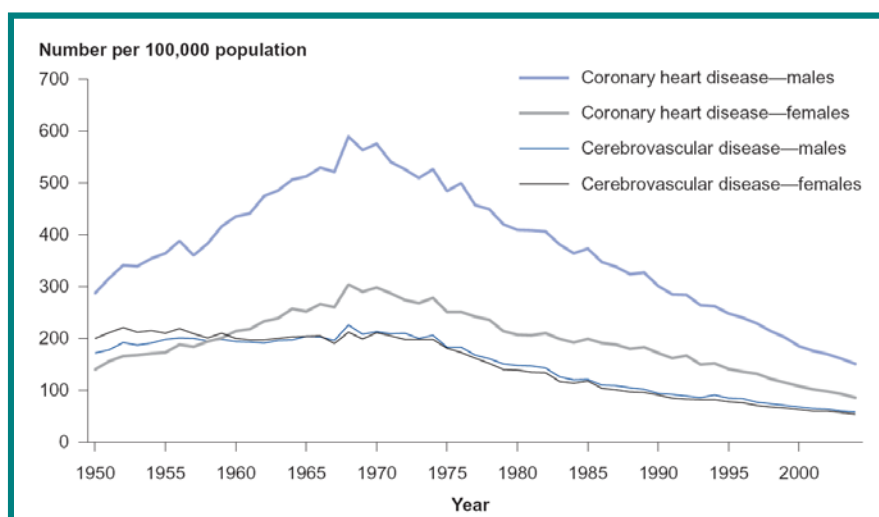
Source: AIHW, *Australia's health 2006*, 2006, p. 64.

Circulatory system diseases resulted in 47,637 deaths (36% of all deaths in Australia) in 2004. They were also a leading cause of disability, with an estimated 1.4 million Australians (6.9% of the population) having some form of associated disability. Around 18% of people surveyed in the 2004–2005 National Health Survey reported that they were affected by one or more long-term diseases of the circulatory system (equivalent to 3.5 million Australians).[356]

After adjusting for age differences between the two populations, Aboriginal and Torres Strait Islander peoples were 1.3 times more likely than non-Indigenous people to report heart disease and/or circulatory system problems.[466] The prevalence of hypertension (high blood pressure) was similar to that of non-Indigenous Australians who were ten years older, and Indigenous Australians had far higher hospitalisation rates for circulatory system diseases across all age groups (two to three times higher for those aged 45–64 years.[154]

Aboriginal and Torres Strait Islander peoples also experienced much higher death rates from circulatory system diseases across all ages, with the largest differences in the younger age groups, 25–34 and 35–44 years.[466] In these age groups, Indigenous males recorded a rate nine to ten times that of non-Indigenous males, while Indigenous females recorded a rate 12 to 13 times those of non-Indigenous females (based on age-specific death rates).[466]

Ischaemic heart disease and cerebrovascular disease (especially stroke) remained the two leading causes of deaths for both sexes in 2004.[13] Together, these two causes of death accounted for more than a quarter of all deaths, especially among older age groups.

In the following sub-sections, public health contributions to reducing some forms of circulatory system disease are described:

- the reduction in fatal heart attacks after their peak in the 1970s (Sub-section 6.2.1); and
- stroke prevention and reductions in high blood pressure (Sub-section 6.2.2).

6.2.1 Reduction in fatal heart attacks

1940s onwards

Coronary heart disease is also referred to as 'ischaemic heart disease', and deaths from this cause are sometimes called 'fatal heart attacks'. Heart attacks are life-threatening emergencies that occur when one or more of the heart's blood supply vessels (the coronary arteries) suddenly become blocked. In 2006, it was reported that four out of ten people who suffered a heart attack died within 12 months of the attack; and more than half of these people died before they reached hospital.[13]

Rapid and large increases in population death rates from ischaemic heart disease occurred in most Western countries during the 20th century, with rises following increasing prosperity, urbanisation, and modernisation, which were associated with changes in diet (greater fat and salt intake), reductions in physical activity, and more sedentary lifestyles.[548,3] Deaths from this cause rose sharply through the 20th century for both males and females, to a peak around 1970, after which rates fell rapidly - by more than 60% in the following thirty years (Figure 6.22 and Figure 6.23). In the last half of the century, ischaemic heart disease remained Australia's major cause of death, especially among older age groups.

Figure 6.22: Age-specific and age-standardised death rates for ischaemic heart disease, males, 1940-2003
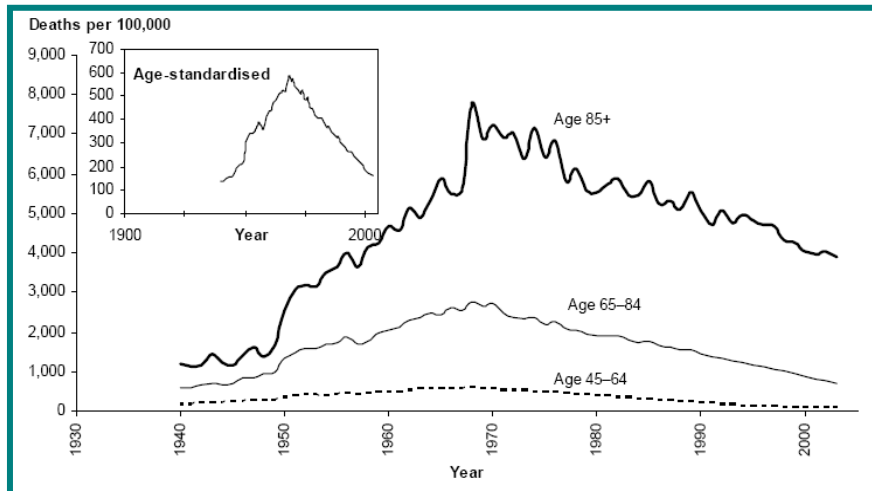
Source: AIHW, *Mortality over the twentieth century in Australia*, 2006, p. 67.

Figure 6.23: Age-specific and age-standardised death rates for ischaemic heart disease, females, 1940-2003
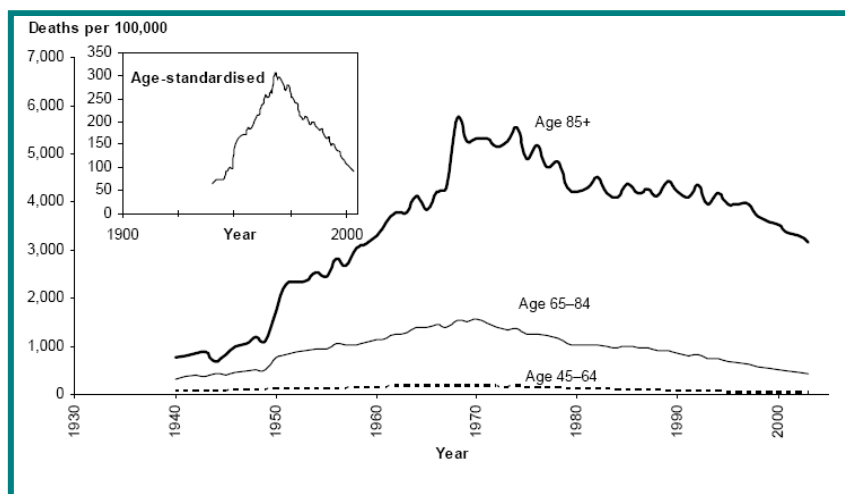
Source: AIHW, *Mortality over the twentieth century in Australia*, 2006, p. 67.

In 1950, death rates were 287 per 100,000 population for males and 140 per 100,000 population for females.[3] They rose to 575 and 298 per 100,000 population for males and females, respectively, in 1970. Thereafter, they fell to 185 deaths per 100,000 population for males and to 108 per 100,000 population for females in 2000.[3] Rates were then well below those of 1950, and there was a consequent improvement in life expectancy, especially at older ages.

Ischaemic heart disease death rates fell for both males and females, and at all adult ages (seen in the age-standardised rates in the box in Figure 6.22 for males and Figure 6.23 for females) as well as in the age-specific trends for males and females aged from 45 to 64 years, 65 to 84 years, and 85 years and over. Falling death rates had the greatest impact on older age groups.

Major improvements in coronary heart disease (CHD) within the last decade of the century (from 1993-1994 to 1999-2000) included:

- falling onset of major coronary events - with a 20% decline in incidence rates;
- better overall survival from major coronary events - a 12–16% decline in case-fatality rates;
- fewer hospital admissions for heart attack (a major component of CHD) - a 12% decline in acute myocardial infarction (AMI) admission rates;
- better within-hospital survival for AMI - a 17-19% decline in within-hospital case-fatality rates for AMI; and
- lower risk factor levels - with large declines in tobacco smoking and blood pressure levels from 1980.

Public health practices

From the 1960s, there was an increasing awareness from research of the part played by risk factors - such as high blood pressure and blood cholesterol, smoking and diet, particularly saturated fat and salt intake - in the large, relatively rapid increase in the incidence of cardiovascular disease.[549]

> *'The evolution of the epidemic of cardiovascular disease was paralleled by a rapid increase in the understanding of how the heart functions and of the contribution of risk factors to heart disease. It was also a time of significant development in methods to diagnose and treat heart and other circulatory problems. The application of this knowledge ultimately resulted in a decline in cardiovascular death rates.'* — AIHW, Australia's health 2000, *2000, p. 348.*[3]

Box 6.10 Role of NGOs in public health: The Heart Foundation, 1959-

There were many non-government agencies that played a role in prevention and health promotion, such as the Heart Foundation, which was established in 1959.[552] The Foundation's purpose was to improve the 'heart health' and reduce disability and death from heart, stroke and blood vessel disease by:

- promoting and conducting research to gain and apply knowledge about heart, stroke and blood vessel disease, its prevention and treatment; and
- promoting and influencing behaviour which improved heart and blood vessel health by conducting education and other programs directed at health professionals, those with heart disease, and the Australian community at large.

The Foundation operated a range of programs and activities, e.g., the 'heart health tick' program, and Lipid Management Guidelines, among others.

The Heart Foundation's 'heart health message' was:

- enjoy healthy eating;
- be active ;
- be smoke-free; and
- have your cardiovascular disease risk status checked regularly by your doctor.[552]

Clay and colleagues (2006) valued the benefit of the $170 million plus contribution made by the Foundation over the previous 40 years to Australian cardiovascular research funding at more than $1.36 billion in greater longevity and wellness in the population.[553]

Large overall declines in cardiovascular death rates suggested that broad population effects with a relatively short time-lag were responsible, rather than individual behavioural changes. Australian research indicated that, for the period 1969-1978, there was a decline in rates of ischaemic heart disease events as well as death rates, consistent with both reductions in risk-factor levels as well as improved acute medical treatment.[550] Later analyses, based on data after 1980, confirmed that the large decrease in the burden of ischaemic heart disease (and stroke) reflected successful primary prevention measures to reduce population risk factors (resulting in reductions in levels of tobacco smoking, dietary changes, and better controlled high blood pressure and high blood cholesterol) together with improvements in acute treatment.[357]

Although there were many contributory factors, changing population food habits played a part.[311] The earliest declines in Australia probably arose from a change in the balance and types of fats in the national diet.[3] Dietary fats associated with increased risk of coronary heart disease included trans-fats and saturated fats, while polyunsaturated fats were protective.[551] Apparent consumption of fats showed two trends in Australia in the 1960s and 70s, with consumption of butter decreasing and that of margarine and plant oils increasing (i.e., a change from saturated to unsaturated fats).[551,310] These changes predated the decline in the death rate by around seven years (see Section 4.3).[310]

The National Heart Foundation (NHF) was established in 1959, and became a lead agency in the fight against heart disease (Box 6.10). It introduced the concept of one-week public awareness campaigns when it commenced Heart Week in 1968, and promoted healthy eating through cookbooks, education programs and community forums from 1974 onwards.[553]

In the 1970s, public discussion of the role of diet increased in response to the evident rises in heart disease, stroke, hypertension and diabetes.[303] *Dietary guidelines for Australians* were first published in 1982 and were widely endorsed and used for nutrition education by NGOs with interests in health, like the NHF.[35] Consequent dietary changes such as that from butter to margarine and oils, the use of less salt in cooking and food preparation, and increases in the consumption of fresh fruits and vegetables had a positive impact on risk factors for cardiovascular disease (see Section 4.3).

In 1989, the NHF launched the 'Pick the Tick' food approval program to help consumers make 'healthier food choices, easier choices'.[552] Within five years, the program had gained the support of more than 120 companies and the NHF tick appeared on more than 600 products. Australian governments ran various media campaigns (e.g., QUIT smoking campaigns), communicating directly with the general public and indirectly via GPs.

At the start of the 21st century, there was an increased community understanding of the role of protective factors, such as polyunsaturated fat and reduced salt in the diet, in preventing heart disease. Food labelling that identified less salty foods, and reduced-fat varieties of food types (e.g., low fat dairy products) enabled consumers to choose 'heart-healthy' foods. National strategies encouraged healthy eating, physical activity and non-smoking behaviours (see Section 4.3 and sub-section 6.1.1). However, there was differential uptake of healthier options across society, and it proved difficult to promote healthy eating in the context of lifestyles and environments that frequently encouraged the opposite.

Reductions in overall cardiovascular death rates were related to successful prevention strategies, particularly those leading to changes in diet and reduced smoking rates, in addition to clinical advances in better control of risk factors and management of cardiovascular conditions.[554] Clinical treatments were supported by public health research and the monitoring of incidence and death rates from these causes nationally.

The *National strategy for heart, stroke and vascular health in Australia,* endorsed by Australian Health Ministers in 2004, provided a plan for further improving cardiovascular health and reducing the prevalence of heart, stroke and vascular disease.[555]

Box 6.11 *National service improvement frameworks:* **Guiding principles**

'In identifying the health service needs of the Australian community, the *National service improvement frameworks*:

- adopt a population health approach;
- prioritise health promotion and illness prevention;
- achieve person-centred care and optimise self-management;
- provide the most effective care;
- facilitate coordinated and integrated multidisciplinary care across services, settings and sectors;
- achieve significant and sustainable change;
- ensure that progress is monitored;
- locate people, families and communities affected by chronic disease at the centre of care;
- span both the continuum of care and the life course for the condition and embrace, where necessary, prevention, diagnosis, rehabilitation, living with the condition, and palliation;
- span different clinical and community settings;
- acknowledge that many chronic diseases share risk factors (e.g., nutrition, obesity, physical activity);
- support and encourage the application of evidence-based practice;
- focus on the need for disadvantaged, special population groups and Aboriginal and Torres Strait Islander people in particular to have access to appropriate health services– including people with mental disorders; the frail elderly; people with disabilities; people who are socioeconomically disadvantaged; people in regional, rural and remote communities; and people from culturally and linguistically diverse communities;
- acknowledge carers and families affected by chronic disease as being part of the broader experience of these conditions.'

Source: National Health Priority Action Council (NHPAC), *National service improvement framework for heart, stroke and vascular disease*, 2006, p. 13 [adapted].

In 2005, Australian Health Ministers endorsed the *National chronic disease strategy* and the *National service improvement framework for heart, stroke and vascular disease* (Box 6.11). The latter was a high-level guide to the most effective care for heart, stroke and vascular health in terms of:

- reducing risk;
- finding disease early;
- managing acute conditions;
- addressing long-term care; and
- care in the advanced stages of disease.[556]

Growing awareness of risk factors generally enabled those who were educated and more affluent to make healthier choices. There was evidence that groups of people who were less educated and with lower incomes were not able to make these choices as easily, often as a direct result of their poorer socioeconomic status and the environments in which they lived. Lower levels of risk factors were reported by higher-status occupation groups, indicating that the healthier behaviours associated with markedly lower levels of ischaemic heart disease were also more easily achieved by those groups.[550]

Factors critical to success

At the start of the 21st century, cardiovascular disease remained a national health priority. In 2006, a study determined that avoidable deaths from ischaemic heart disease in Australia and New Zealand were 'about equally split' between those deaths currently avoidable through incidence reduction and those avoidable through (improved) treatment of established disease.[557] This confirmed that the public health strategies that reduced the important cardiovascular risk factors had a measurable impact on the health of the population, in addition to improved case finding and clinical treatment.

The rapid rise in coronary heart disease up to 1970 was a significant public health problem that affected adult males and females of all ages. With a population-wide focus, strategies to reduce cardiovascular disease were ambitious in scope. They operated across Australia at all levels of government, and through partnerships with many NGOs. Public health researchers also had a successful role in examining and monitoring the efficacy and cost-effectiveness of overall preventive strategies.[557]

Cost-effectiveness

In 2003, the net benefit of public education programs to reduce coronary heart diseases was assessed at $8.5 billion for an investment of $810 million over the period 1970-2010.[87] Ten per cent of the reduction in smoking and 30% of the reduction in high blood cholesterol was attributed to public health activity. Benefits attributable to public health programs were $994 million (in 1996), composed of longevity gains ($828m), improved health status gains ($100m), and lower health care costs ($66m). The return on investment of public health programs alone was, therefore, better than one to one, and when total returns were taken into account, better than ten to one.

The Productivity Commission noted, in relation to changes in expenditure for various diseases, that direct expenditure growth of 26% for cardiovascular disease was well below the average of 37% for all diseases.[558] They attributed the reduced expenditure to the declining incidence in disease attributable to smoking and other behavioural factors, as well as improved preventive medical technologies.

Future challenges

'Although a significant proportion of cardiovascular disease is preventable, the prevalence of risk factors, such as tobacco smoking, high blood pressure, physical inactivity and poor nutrition that are amenable to change still remains high in the Australian population. It has been estimated that 80%

of all adult Australians have one modifiable cardiovascular risk factor and 10% have three or more such factors' − Tonkin et al., Asia Pacific Heart Journal, *vol. 8, 1999, p. 183.[559]*

At the end of the 20th century, four in ten Australian adults had two or more major modifiable risk factors for coronary heart disease, and, in 1999-2000, there were 48,313 major coronary events, or 132 such events per day. Fifty per cent of these coronary events were fatal; and one in eight patients who suffered a heart attack died in hospital. Future challenges included:

- greater effort on the part of the population to modify risk factors for cardiovascular diseases;

- minimising socioeconomic disadvantage especially in population groups where rates had not fallen as substantially, such as those on low incomes and Aboriginal and Torres Strait Islander peoples; and

- wider use of proven secondary prevention measures, such as cardiac rehabilitation programs.[560,561,562]

Death rates from cardiovascular disease for Aboriginal and Torres Strait Islander peoples were around twice those of the non-Indigenous population. In some instances, rates were far higher: for example, Aboriginal and Torres Strait Islander people in the NT had the highest recorded occurrence of rheumatic heart disease in the world, reflecting high levels of exposure to Group A streptococci, which, in turn, were related to overcrowding and continued poor living conditions.[563] These potentially avoidable differences needed to be addressed urgently.

## 6.2.2   Stroke prevention and high blood pressure reduction

1907 onwards

Cerebrovascular disease refers to any disorder of the blood vessels supplying the brain or its covering membranes. Stroke is its commonest manifestation, and occurs when an artery supplying blood to the brain becomes blocked or bleeds, resulting in weakness or paralysis of various areas of the body. High blood pressure, or hypertension, is a major risk factor for cerebrovascular disease.

In addition to age, sex, congenital abnormalities and genetic inheritance, risk factors for cerebrovascular disease included smoking, high blood pressure, high cholesterol, physical inactivity, excess weight (overweight or obesity), poor diet, and excessive alcohol consumption.[564, 565] Diet (particularly high salt intake), obesity, excessive alcohol consumption and insufficient physical activity also contributed to high blood pressure.[25]

During the 20th century in Australia, cerebrovascular disease was one of the ten leading causes of death in adults, both males and females (Figure 6.24 and Figure 6.25). After increasing from the 1930s, there was a reduction of more than two-thirds in the rate of deaths in males and females from this cause from 1968 to 2000 (in the box in Figures 6.24 and 6.25).[3,25] This decline in the death rate from stroke and other cerebrovascular disease was largely attributable to population-wide improvements in a number of risk factors (especially reductions in smoking), the development and application of drugs to lower blood pressure and treat and prevent blood clots, and advances in clinical treatment.[3] Yet, despite this improvement, stroke remained Australia's second highest cause of death (after ischaemic heart disease) and one of the significant causes of ongoing disability in adults.[566]

Figure 6.24: Age-specific and age-standardised death rates for cerebrovascular disease, males, 1907–2003
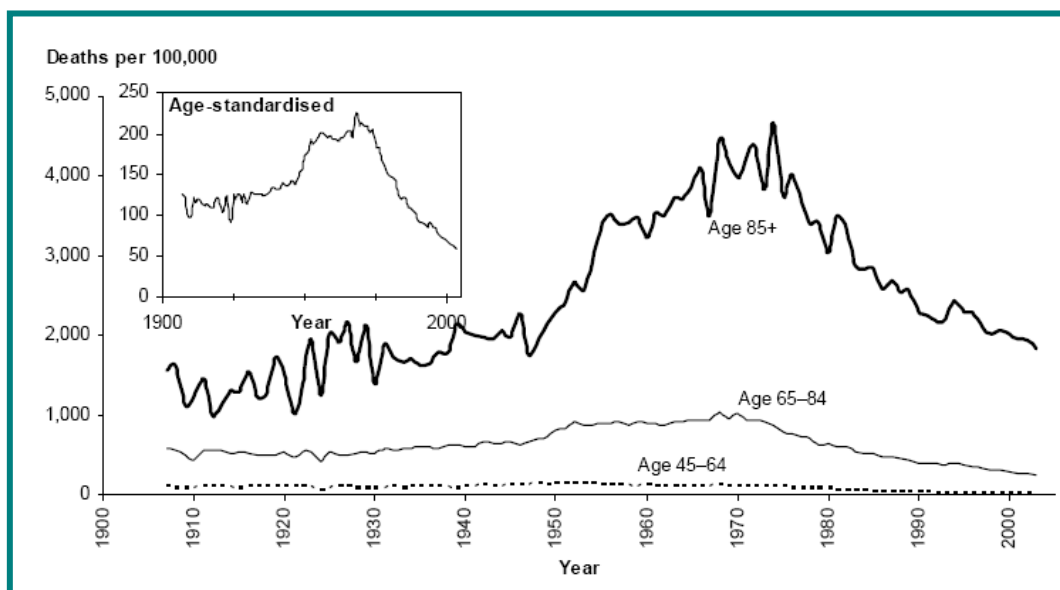
Source: AIHW, *Mortality over the twentieth century in Australia,* 2006, p. 65.

From early in the century until the late 1960s, death rates from cerebrovascular disease in people aged 45 years and over increased from just fewer than 130 deaths per 100,000 population in 1907, to more than 220 per 100,000 population, mainly due to a rise in death rates for those aged 85 years and over. From then on, death rates fell dramatically, and, by 2000, they were half the early-century levels.

Figure 6.25: Age-specific and age-standardised death rates for cerebrovascular disease, females, 1907–2003
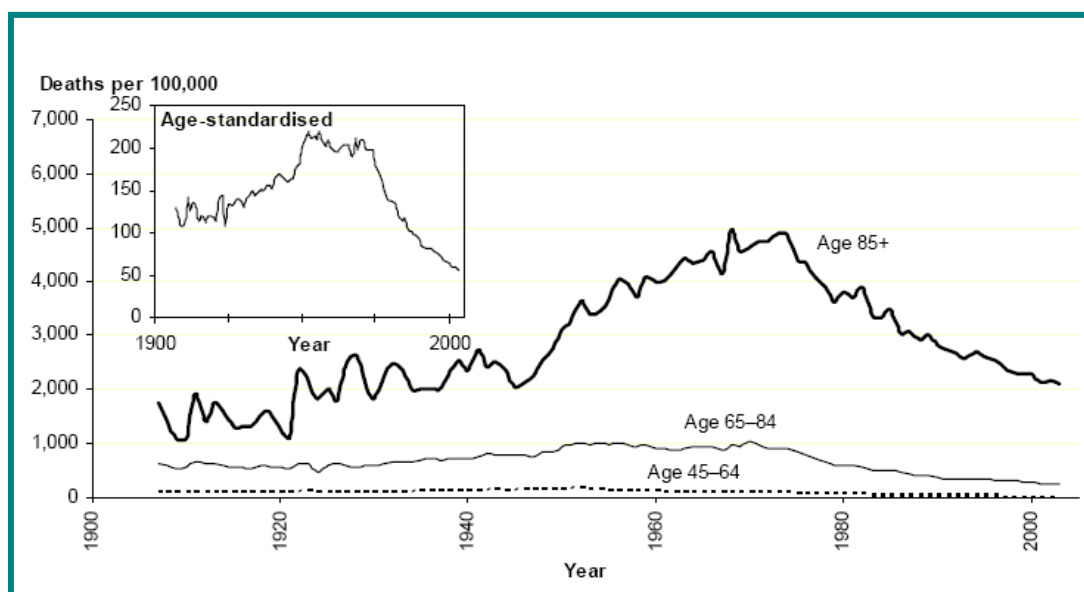
Source: AIHW, *Mortality over the twentieth century in Australia,* 2006, p. 65.

By 2003, death rates were 60 per 100,000 males and 57 per 100,000 females aged 45 years and over.[25] Death rates fell for both males and females, and for all groups aged 45 years and over. Still, an estimated 40,000 to 48,000 stroke events occurred in Australia annually. Most of these (around 70%) were 'first-ever' strokes.[13]

An AIHW analysis of the 2003 ABS *Survey of Disability, Ageing and Carers* estimated that around 346,700 Australians had suffered a stroke at some time in their lives, with four out of five of those who reported having had a stroke being 60 years of age or older.[13] More women than men had had a stroke, but when the data were age-standardised, the rate was higher in men, who tended to be younger at the time of their first stroke.[13]

Stroke caused much disability. In 2003, an estimated 282,600 people with a history of stroke also reported a disability, with about half attributed to stroke.[13] Stroke survivors with a disability were more likely to have a 'profound core activity limitation' than the average person with a disability: this meant that they needed assistance with activities of daily living such as communication, mobility and self-care.

Public health practices

At the start of the 20th century, it was not possible to treat high blood pressure, although it could be measured. Over the century, there were many developments in the understanding of the mechanisms of elevated blood pressure and cerebrovascular disease, as well as in clinical treatments. Towards the end of the century, there were substantial increases in the use of blood pressure-lowering, and blood clot-preventing prescription drugs which were subsidised and therefore universally available to those who needed them, through the Pharmaceutical Benefits Scheme.

Essential approaches to improving cerebrovascular health included public health programs to reduce risk factors for stroke such as smoking (e.g., QUIT programs), high salt intake, and untreated high blood pressure; and education campaigns to improve community understanding about preventable risk factors for stroke.

Research by the National Stroke Foundation (NSF) into community understanding of stroke and its risk factors showed that awareness generally improved over the three years to 2006, although less so in men (Box 6.12).[566]

The *National strategy for heart, stroke and vascular health in Australia* (2004) provided a plan for further reducing the prevalence of heart, stroke and vascular disease, and improving the cerebrovascular health of Australians (see sub-section 6.2.1).[555]

Factors critical to success

Public health strategies to address and reduce the impact of cerebrovascular disease were successful largely through their impact on reducing the preventable risk factors, smoking and high blood pressure. Tobacco control and smoking cessation measures, and education about behavioural change, diet and the dangers of high blood pressure had a measurable impact on the cerebrovascular health of the population. Although the disease remained a significant health problem for males and females, especially those aged 65 years and over – and more needed to be done to reduce obesity and improve fitness – there was a much better understanding of the disease, and a range of effective options available to help reduce its impact, by the end of the century.

Public health strategies were ambitious in scope, and functioned Australia-wide via a range of partnerships between government and non-government agencies (such as the National Stroke Foundation and local community groups). Public health practitioners played an active role in ensuring that effective approaches were available to the whole population, including advocating for affordable pharmaceutical treatments, effective behavioural change, and researching cost-effective population-wide approaches to further reduce risk factors and cerebrovascular disease.

Box 6.12 Role of NGOs in stroke prevention: the National Stroke Foundation

The National Stroke Foundation (NSF) was established in 1983 as a not-for-profit organisation committed to reducing the impact of stroke on Australians. The NSF aimed to save 110,000 lives from death and disability following stroke. To achieve this, the organisation had four key priorities:

1. Raising awareness and preventing stroke,
2. Improving treatment for people with stroke,
3. Improving life after stroke, and
4. Research.

strokesafe™ was a public health program developed by the NSF and launched in 2004, which aimed to teach Australians how to make themselves safe from stroke.[568]

Cost-effectiveness

In 2003, Abelson and colleagues estimated that public health programs to reduce tobacco smoking had, by 1998, averted an unstated proportion of the 2,900 premature deaths attributed to stroke and cancers other than lung cancer, in people aged between 35 to 74 years.[87]

Other public health programs that addressed factors such as improved diet (especially less salt in the diet) and more exercise were also thought to have contributed cost-effectively to the reductions in deaths and disability from stroke over the last third of the 20th century.[568]

Future challenges

As the second leading cause of death and a major cause of continuing disability, stroke remained a significant public health problem. It affected different groups in the population. An analysis of ABS *National Health Surveys* for the decade 1989 to 2001 showed that people aged 25-64 years living in socioeconomically disadvantaged areas were more likely to report raised blood pressure, smoking, overweight and obesity, alcohol consumption at harmful levels (males), and fair or poor health than their more affluent counterparts.[569] Socioeconomic differences in preventable risk factors for cerebrovascular disease needed to be better addressed.

There were significant opportunities for further risk factor reductions through stroke awareness and education campaigns, and through additional public health investment (Box 6.13). Population ageing and increased life expectancy were likely to be future challenges, as age was an unavoidable risk factor.

More progress was required in:
- reducing socioeconomic and other amenable differences in preventable risk factors for cerebrovascular disease;
- appropriately organised population screening (e.g., case finding by GPs) combined with targeting of high risk population groups;
- increasing population awareness of stroke; and
- public health research into stroke prevention strategies for ageing populations.

Box 6.13 Strokes can be prevented

'The signs of stroke could be any one, or combination of, the following:

- Weakness or numbness or paralysis in the face, arm or leg on either or both sides of the body
- Difficulty speaking or understanding
- Dizziness, loss of balance or unexplained fall
- Loss of vision, sudden blurred or decreased vision in one or both eyes
- Headache – usually severe and of abrupt onset or unexplained change in the pattern of headaches
- Difficulty swallowing.

These signs (called a Transient Ischaemic Attack – TIA) may last only a few minutes or several hours. They are often a warning of an impending stroke and must never be ignored.

FAST is an easy way to remember the key signs of stroke - **F**ace weakness, **A**rm weakness, **S**peech difficulties, **T**ime to act fast. If you experience the signs of stroke or recognise them in someone else, call 000 immediately. Prompt action can prevent further damage to the brain and assist recovery.

Strokes can be prevented. Eating healthily, participating in exercise, not smoking and ensuring a normal blood pressure level can all help to reduce the risk of stroke.'

Source: National Stroke Foundation (NSF), 'Stroke fact sheet', NSF, Melbourne, 2007.

6.3   Organised screening for certain cancers

1960 onwards

'Because of the success of the national cervical cancer screening program in detecting and following up pre-cancerous abnormalities, Australia's cervical cancer incidence and mortality rates have been declining steadily for many years. They are both well below the averages for the more developed countries of the world, and also below those of the UK, Canada, the US and New Zealand.'
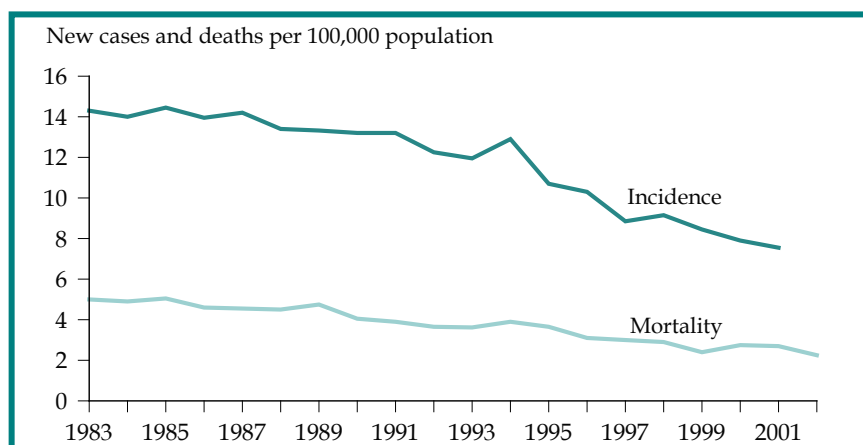*- AIHW & AACR,* Cancer in Australia 2001, 2004, p. xvi.[464]

Organised screening for cancers in Australia began with cervical cancer and breast cancer screening programs in 1991. A program for bowel cancer screening started in 2006 following a successful two-year pilot. Screening of targeted high-risk groups (e.g., identified by age and/or sex) was accompanied by early intervention and treatment, supported by disease registers and population monitoring. Organised screening, concurrent with advances in clinical diagnosis and treatment, contributed to successful reductions in incidence and deaths, and improvements in survival rates for these cancers.

Cervical cancer

Causes of cervical cancer include sexually transmitted human papilloma virus (HPV) and associated risk factors including smoking, diet and oral contraception.[327] The death rate from cervical cancer fell from the early 1960s when Papanicolau (Pap) smears were first advocated for early detection. Evidence suggested that screening every two years could prevent up to 90% of the commonest form of cervical cancer (squamous cell type).[570]

The National Cervical Screening Program commenced in 1991. From 1990, the incidence of all types of cervical cancer almost halved and death rates also declined (Figure 6.26).[571] These steadily decreasing rates were attributed in part to the success of the National Cervical Screening Program, which screened women in targeted age groups (20 to 69 years), and detected and monitored pre-cancerous abnormalities and early stage cervical cancer.[464] Towards the latter part of the century, Australia's rates of incidence and death were well below those in other developed countries, including the UK, the USA, Canada and New Zealand.[464]

Figure 6.26: Trends in age-standardised incidence and death rates for cancer of the cervix, 1983–2002

Source: AIHW & AACR, *Cancer in Australia 2001*, 2004, p. 36.

Figure 6.27 indicates the decreasing age-standardised incidence rates of various types of cervical cancer per 100,000 women aged 20–69 years, with the difference being statistically significant for almost all types of this cancer over the period shown.[571]

Figure 6.27: Age-standardised incidence rates of cervical cancer by histological type, women aged 20–69 years, 1990–2001
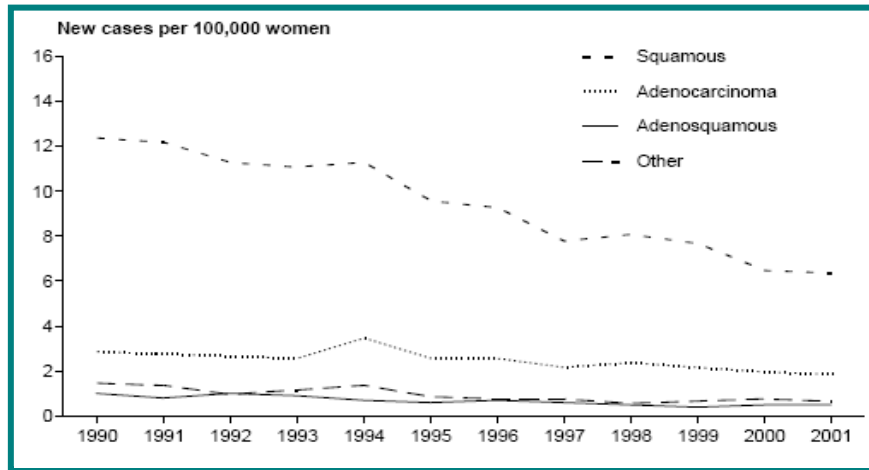
Source: AIHW, *Cervical screening in Australia 2002-2003*, 2005, p. 25.

There were fewer deaths from cervical cancer in 2000-2003 than in 1990-1993, and in almost all age groups, except for 20-24 year old women for whom there was no change (Figure 6.28). The decline in mortality rates, particularly for the oldest age groups in 2000-2003, is evident when compared with the earlier period. Although rates fell dramatically, age-specific death rates for cervical cancer remained higher in older women.

Figure 6.28: Age-specific cervical cancer death rates by age group, 1990–1993 and 2000-2003
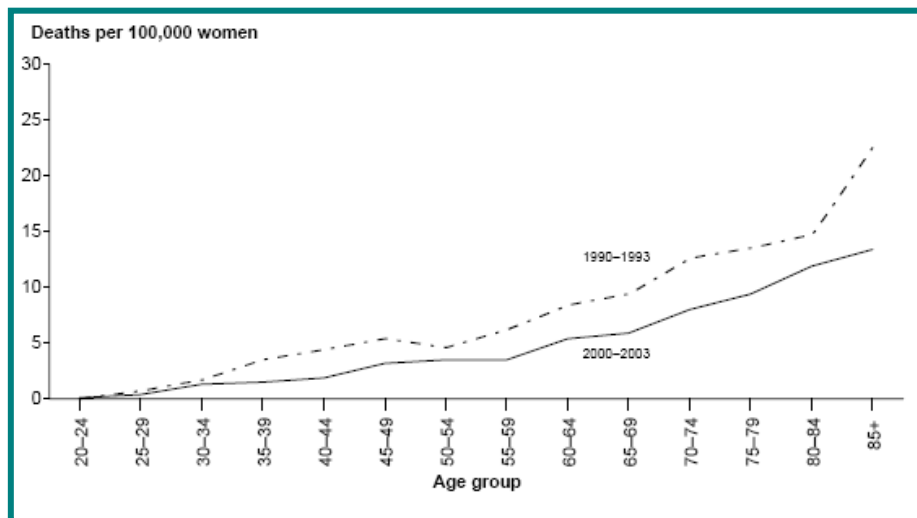

Source: AIHW, *Cervical screening in Australia 2002-2003*, 2005, p. 29.

Breast cancer

Breast cancer was the most frequently diagnosed cancer and the commonest cause of cancer-related death in females. Despite a rise in reported new cases, deaths of women from breast cancer declined (with a decrease of around 2.2% per year for each year from 1991 to 2001) (Figure 6.29).[464] Causes of breast cancer were only partially understood, and there were no proven means of primary prevention. Screening aimed to reduce deaths by up to 30%, although, in the short term, it could raise apparent incidence rates through increases from reporting.[572]

Figure 6.29: Trends in incidence and mortality rates for breast cancer, 1983–2002
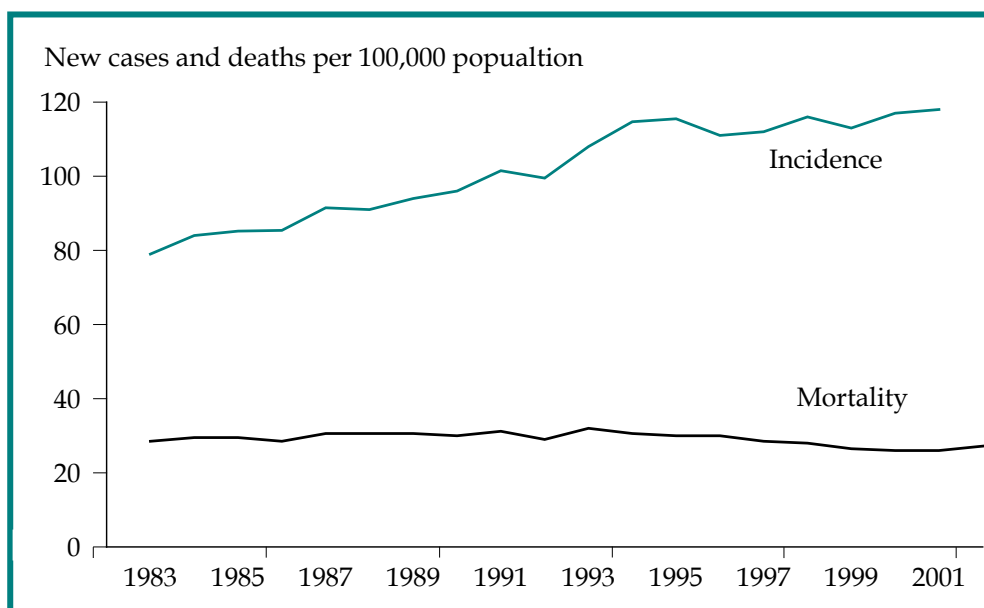
Source: AIHW & AACR, *Cancer in Australia 2001*, 2004, p. 32

Over the 20th century, the age-standardised rate of female deaths from breast cancer trended upwards from 1907 (21.8 deaths per 100,000 females) when data were first collected, to an apparent decrease in the early 1940s, followed by a plateau until the 1990s, when a fairly sharp decline was evident relatively soon after the implementation of the national breast screening program, with a rate of 23.4 deaths per 100,000 females in 2004 (Figure 6.30).[572]

Figure 6.30: Age-standardised mortality rates for breast cancer, females, 1907-2004
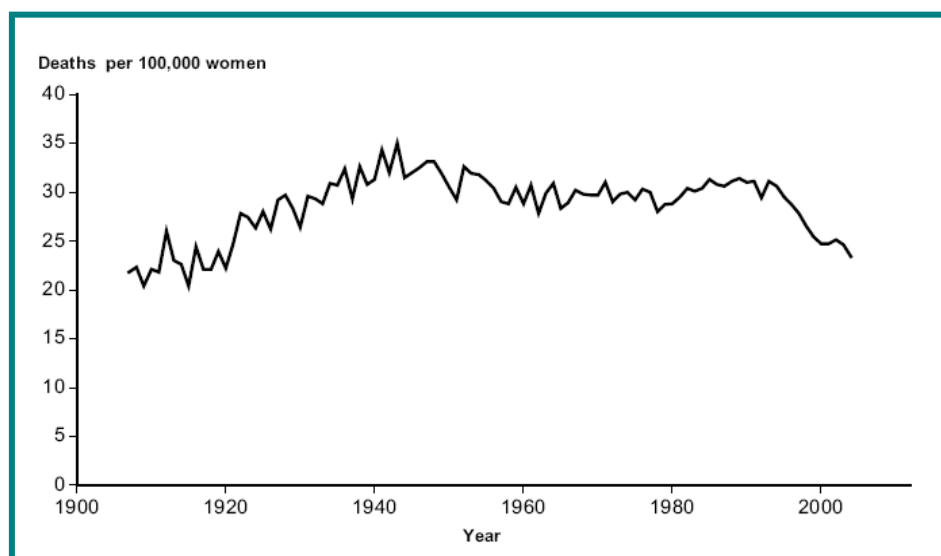
Source: AIHW & NBCC, *Breast cancer in Australia: an overview, 2006*, 2006, p. 22.

From 1991, screening for breast cancer in women in the high-risk group (50-69 years) was undertaken by BreastScreen Australia. Women diagnosed with breast cancer also benefited from clinical advances in treatment. Five-year relative survival (the length of time lived after the initial diagnosis of cancer) increased considerably, from 70.9% in 1982-1986, to 86.6% in 1998-2002 (Figure 6.31), and further improvement was expected.[572]

Figure 6.31: Breast cancer in females - relative survival proportions by years after diagnosis for periods of diagnosis, 1982-1986 to 1998-2002
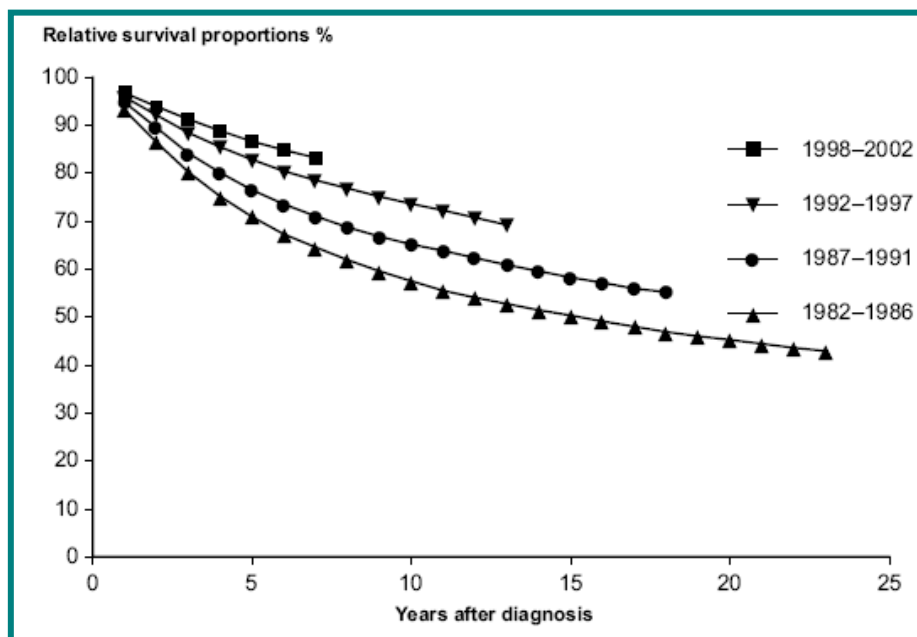
Source: AIHW & NBCC, *Breast cancer in Australia: an overview, 2006*, 2006, p. 32.

Screening and early detection programs were supported by population-based cancer registers and coverage estimates from population health surveys. The estimated national participation rate in BreastScreen Australia, for the two-year period of 2003-2004, showed that the age-standardised participation rate of women in the target age group (50 to 69 years) was 55.7%, but a statistically significant decrease from the rate of 57.1% recorded for 2001-2002 (Figure 6.32).[573] These results underestimated total national screening, as a small proportion was performed outside the Program (i.e., in private clinics).

Figure 6.32: Trends in participation of women aged 50–69 years in BreastScreen Australia by region, 1998–1999, 2001–2002 and 2003–2004
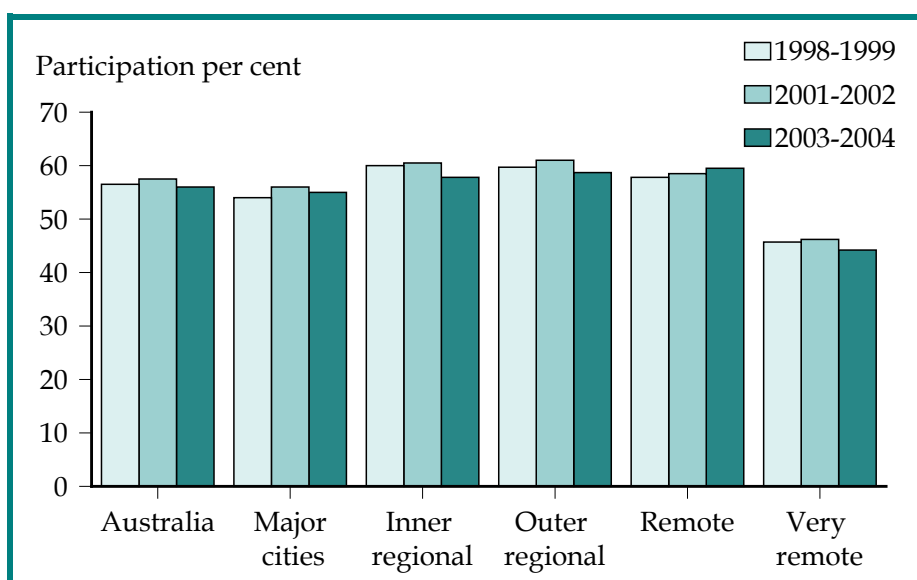
Source: AIHW & DoHA, *BreastScreen Australia monitoring report 2003-2004*, 2007, p. 6.

Age-standardised participation rates for 2003-2004 varied by state and territory, ranging from a high of 63.1% in SA to a low of 43.1% in the NT.[574] The rate of 35.3% for Aboriginal and Torres Strait Islander women in the target age group was substantially lower than that for non-Indigenous women (55.4%); however, it had increased from 30.3% in 1998-1999. Rates for women who reported not speaking

English as their main language at home were also lower (at 42.8%) than those for English-speaking women (58.0%). Age-standardised participation rates varied markedly between areas, with lower participation in 'Major cities', probably indicating greater use of private radiology services (but data were not available); and lower participation in 'Very remote' areas, reflecting a lack of services and greater proportions of Indigenous women not being screened in these areas (Figure 6.32).

Bowel cancer

Bowel cancer (colorectal cancer, or cancers of the colon and rectum) had the second highest incidence for both men and women, and was the most common registrable cancer overall in 2003, with 12,536 new cases.[464] In 2003, about 84 Australians died each week from bowel cancer, a cancer that could be treated successfully if detected in the early stages; however, fewer than 40% of bowel cancers were detected early.

The evaluation of the *Bowel Cancer Screening Pilot Program 2002-2004* showed that an organised bowel cancer screening program was feasible, acceptable and cost-effective for Australia. Funding of $43.4 million was allocated over three years for a National Bowel Cancer Screening Program, to be phased in from 2006.

Program participants completed a simple test at home and mailed it to a diagnostic centre for analysis. Such screening tests were shown to be effective, and participants with a positive result were then referred by their general practitioner for further investigation (e.g., a colonoscopy).

Public health practices

The direction of public health practice was the organised screening of average risk population groups in high incidence and mortality age groups, in order to provide early detection and referral for appropriate treatment, for those cancers that were amenable to population-wide approaches. Screening was targeted to whole population groups, and aimed for universal coverage within those groups (although there were shortfalls).

Population screening programs that were introduced in the early 1990s became highly organised and used increasingly sophisticated methods, such as recall and reminder systems to maximise their coverage and retain the involvement of their target populations. They routinely monitored and assessed the 'participation' or coverage of targeted groups, allowing particular populations to be identified and addressed (e.g., differences between rural/remote and urban populations that might be remedied by using mobile screening units).[572,573]

Corresponding population health monitoring and epidemiology were used to ascertain the reach of organised programs in the community, to identify harder-to-reach sub-populations, and to examine factors that might increase the efficacy of programs for these groups.[575] Cancer registries provided complementary data on treatment and survival rates, while clinical groups prepared guidelines and assessed the evidence to identify best practice and any changes necessary to achieve it.

Factors critical to success

National publicly-funded screening programs were one of the successful factors behind reductions in preventable cancers, increasing their early detection. Success was also achieved because intervention included a range of appropriate treatments, based on regularly updated clinical guidelines, and supported by cancer registries and active case surveillance and research.[576] Data from cancer registries were collated and published, thus enabling incidence, mortality and survival rates to be calculated, resulting in evidence-based identification of 'best practice' treatment and management. Screening programs were quality controlled and evaluated for effectiveness. Treatment modalities were also audited for compliance with clinical guidelines and best practice recommendations (e.g., the National Breast Cancer Audit).[577]

These programs were increasingly 'vertically integrated' and evidence-based, with collaboration between the different levels of government, screening agencies, health care providers, cancer-related NGOs and public health practitioners; and with strong links between screening, case-finding, cancer registry information collection and analyses of cases, and primary research all contributing to practice improvements in the detection and treatment of these cancers.

Lastly, public health researchers and scientists continued to contribute to improvements in the understanding of the natural history of specific cancers and their causes.

Future challenges

At the start of the century, in 2003-2004, the national cervical screening coverage rate for the target population (age range 20 to 69 years) was 60.7% and the breast screening coverage rate for the target population (age range 50 to 69 years) was 55.6% - both should have been higher.[574,573] For example, it was estimated that if 70% of Australian women aged between 50 and 69 years participated in mammography breast screening, breast cancer death rates would fall by up to 30%.[578]

Future challenges included extending the coverage of cancer screening and related services, especially for women in rural and remote areas who had lower cervical and breast screening participation rates, and higher cervical cancer death rates, than those living in urban areas; and for Aboriginal and Torres Strait Islander women who had higher cervical cancer rates than their non-Indigenous counterparts.[579, 580, 464] There was a need to improve Indigenous identification within the cervical screening dataset to enable national monitoring of the participation of Indigenous women in cervical screening and improve strategies to encourage greater use of screening services by these women.

In relation to breast cancer screening, the risks of over-detection and/or over-treatment also warranted attention. While screening for breast cancer meant better case ascertainment, it also led to more aggressive (and sometimes overly aggressive) clinical treatment.[581] Anxiety in participants arising from being falsely diagnosed as having breast cancer (false positives), and lack of, or delays in, treatments were undesirable.[581] Furthermore, there was a need for the risks of routine mammographic breast-screening to be more clearly outlined to women prior to screening, and for the benefits and risks to continue to be monitored.[582]

This page intentionally left blank