

10 Measuring success and learning from the past

In discussing the public health successes in Australia from 1901 to 2006, this report has highlighted the development of many programs that contributed to better health of the population. However, these operated within the context of significant, non-programmatic drivers of improved health, namely, rising living standards, fertility transition, improved education, the introduction of the basic wage, and so forth. These social and economic reforms of the 20th century should not be overlooked, and they remained the most important determinants of the public's health at the start of the 21st century.

This chapter draws out a number of key factors which have underpinned successful public health programs, and they serve to reinforce the lessons of the past. Such observations may assist public health action in the future, particularly in addressing the challenge of persisting inequalities in health across the population. From 1901, public health successes featured in this report were in the areas of:

- Control of infectious diseases
 - Sanitation and hygiene:
 - Safe water, 1901-
 - Food safety, 1901-
 - Screening and disease surveillance:
 - Tuberculosis control, 1948-
 - HIV/AIDS strategy, 1989-
 - Organised mass immunisation:
 - Childhood immunisation, 1932-
 - Adult immunisation, 1991-
 - Aseptic procedures & medicines, 1901-
- Maintaining a safe environment
 - Environmental lead reduction, 1979-
 - Less exposure to asbestos, 1960s-
 - Decrease in passive smoking, 1995-
- Improved maternal, infant and child health
 - Safer birthing practices, 1930s-
 - Improved health of infants, 1920s-
 - Promotion of breastfeeding, 1964-
 - Preventing infant deaths from SIDS, 1991-
- Better food and nutrition
 - Food technology development, 1901-
 - Food regulation, 1905-
 - Improved nutrition, 1901-
- Preventing injury
 - Road traffic safety, 1970s-
 - Preventing injuries: childhood drowning, 1986-
- Preventing injury (continued)
 - Preventing suicide: restricting the availability of potentially dangerous drugs, 1960s-
 - Gun control and reduction in gun-related deaths, 1988-
- Reducing risk factors and chronic diseases
 - Reducing risk factors:
 - Tobacco smoking, 1970s-
 - Alcohol-related harm, 1970s-
 - Sun safety measures, 1981-
 - Needle and syringe exchange programs, 1990s-
 - Reducing non-communicable chronic diseases:
 - Reduction in fatal heart attacks, 1970s-
 - Stroke prevention and high blood pressure reduction, 1990s-
 - Organised screening for cancers:
 - ◇ Breast cancer, 1991-
 - ◇ Cervical cancer, 1991-
 - ◇ Bowel cancer, 2006-
- Improving health and safety at work, 1901-
- Universal access to health care, pharmaceuticals and technology, 1948-
- Improving public health practice:
 - Training the public health workforce, 1907-
 - Aboriginal Community-Controlled Health Services, 1971-
 - Research into public health, 1915-
 - Monitoring public health, 1901-

Many of these public health programs were confirmed as successful by a survey of public health experts from across Australia (Table 10.1).

Table 10.1: Important criteria cited by respondents to the Public Health Successes Survey⁷²¹

Criterion	Details
Impact	Interventions or programs that demonstrated a measurable impact on the population's health.
Importance	Interventions or programs addressing a significant public health issue.
Ambitious in scale	Interventions or programs implemented on a national or universal scale. ⁷²¹
Directly attributable to public health	Interventions or programs that had a health impact directly attributable to public health effort, rather than primarily to wider social and economic improvement.
Duration	Interventions or programs that functioned 'at scale' for at least five consecutive years. ⁷²¹
Cost-effectiveness	Interventions or programs that used a cost-effective approach.

What factors contributed to public health successes over the last century?

The public health interventions described in this report share a number of common elements:

1. A focus on a public health problem adversely affecting a significant number of Australians;
2. An effective contribution, largely attributable to the efforts of the public health sector, to ameliorating the problem;
3. Implementation at a national level, or across the whole population;
4. Leadership, stewardship and informed advocacy by public health practitioners and other champions;
5. Approaches that were complex and required action across a number of different fronts;
6. Sustained efforts to effect change, often over many years; and
7. Support of the wider community.

Each of these is discussed in further detail below.

1. A focus on a public health problem adversely affecting a significant number of Australians

All the interventions described in this report aimed to address health problems which affected particular sections of the community or the entire community, or had the potential to do so. In general, the larger the number of individuals affected by a health problem, the greater the likelihood that support would become available to address it – scientifically, financially, and politically.

Examples included actions to reduce the incidence of many infectious diseases such as poliomyelitis, tuberculosis and HIV. These were conditions that had affected or were likely to affect high numbers of people - from the polio epidemics of the late 1930s, 1940s, 1950s and early 1960s, to the risk of bloodborne and sexually transmitted HIV infections in the later years of the century. These diseases were life-threatening and had other deleterious consequences for the population's health, and effective interventions were needed to control and limit their incidence. One such example was the introduction of polio vaccines in 1956 (Salk) and 1966 (Sabin), followed by mass immunisation programs. With the ongoing immunisation of young children, poliomyelitis was finally eradicated in Australia towards the end of the century.

2. An effective contribution, largely attributable to the efforts of the public health sector, to ameliorating the problem

Amelioration of many of the public health problems identified in this report was often due to specific public health effort. Examples included the multi-pronged strategy to address HIV/AIDS transmission, the development of Medicare and the PBS, and environmental lead abatement programs. For each of these interventions, a significant problem or need was assessed, and options and solutions identified, and then implemented successfully in a sustainable manner, for the benefit of the population.

There were some notable exceptions where effective programs were not primarily led by public health. One example was the improvements in food technology, which were driven mainly by industry and by economic change (e.g., the spread of domestic refrigeration), although public health microbiologists, food chemists, and agricultural and veterinary specialists also played a role in improving the supply of safe food, processing and packaging.

For an improvement in the public's health to be attributed conclusively to a public health intervention, the evidence of effectiveness must be sufficiently comprehensive to encompass its complexity; and adequate descriptive information about the intervention, its context and its impact needs to be available.⁷²² For some interventions, such evidence was hard to find or absent, making attribution 'primarily to public health', difficult. While this was only one limitation, there remains a need for better documentation and archiving of the details of implementation processes, and greater investment in thorough program evaluation, in order to identify and cost successful interventions in the future; but this attribution will not always be possible given the complexities of what determines health.

3. Implementation at a national level, or across the whole population

In order to tackle problems that affected large segments of the population, successful interventions and programs had to be ambitious in their scale of implementation. Approaches ranged from programs that were applied across the whole population (e.g., Medicare), to those that targeted a specific population group (e.g., immunisation against pneumococcal infection for Aboriginal and Torres Strait Islander children and adults). Others focused on minority groups who had specific health needs - one example being the successful needle and syringe exchange programs that aimed to limit the interpersonal transmission of bloodborne infectious diseases, such as hepatitis, in those who injected illicit drugs intravenously.

The scale at which public health interventions were implemented was often wide-ranging and, sometimes, the scope and approach was controversial. Significant efforts were needed to ensure that there was also broad support from decision-makers, those in the population who would be affected, and the wider community. A successful example was the national HIV/AIDS program which had to be implemented rapidly, and resulted in Australia curbing its infection rate far earlier than any other country.

4. Leadership, stewardship and informed advocacy by public health practitioners and other champions

Many public health research findings with the capacity to benefit the population's health were adopted and implemented by decision-makers and the community; examples included effective preventive strategies to address SIDS, and the use of folic acid supplementation to reduce neural tube defects.⁷²³ In these areas, there were few who disagreed with the interventions and no powerful groups whose interests were likely to be challenged. Some successful public health interventions were led by small groups of committed public health practitioners and others who initiated action based on science, as there was often no existing evidence of effectiveness at the time when the programs were initiated.⁷⁶ Examples included the population screening and treatment of tuberculosis, mandatory seat belt legislation and other road safety measures, and legislated tobacco control measures.

In other areas, where public health interventions initially lacked wide community support, or were likely to diminish the profitability of certain industries and groups, progressive public health policy and strategic leadership by informed advocates and champions (exhibiting what some survey respondents explicitly identified as 'bravery' and 'courageousness'), were more

fundamental to success. For example, early measures to improve industrial and occupational safety, such as public health restrictions on the work that could be done by children and women, were not popular with many employers of the time. Other initiatives were difficult to implement because of reluctance from employees to change their work habits or practices. Strategies to control HIV/AIDS, the reform of gun control laws, and the needle syringe exchange program, were all unpopular with some segments of the community. In other areas, public health advocates had to challenge powerful vested interest groups, the *status quo*, or political inertia in the face of growing scientific evidence offering contrary advice (e.g., early evidence of the harm to health arising from tobacco use and exposure to asbestos).

Thus, leadership and champions, a skilled and committed public health workforce, and persistent advocacy in the face of opposition were all important factors that contributed to successful programs and interventions.

5. Approaches that were complex and required action across a number of different fronts

Many successful public health interventions were complex, program-based and depended upon a wide range of environmental influences. Some had to initiate action across a number of sectors in addition to health, and to utilise a plethora of strategies, from policy change and legislative amendment, to community engagement and economic reform. Although legislation and regulation were not always necessary, they were critical to the success of some of the public health achievements reported here (e.g., early quarantine law, authority to notify and act on infectious disease cases, legislative occupational health and safety requirements).

Managing such diversity of strategies in an often challenging environment required committed and far-sighted leadership. Successful public health initiatives also depended upon political support, and high-level political engagement was a vital factor in the drive to improve immunisation rates, to enact legislative bans on tobacco advertising and sponsorship, gun control reforms, and to make the decades-long journey towards national, uniform food regulation. More gradual efforts to convince decision-makers ultimately succeeded in delivering nationally agreed public health information for the community (e.g., consistent speed and blood alcohol levels for drivers; national food safety standards).

The importance of consistent public health messages, delivered nation-wide in many forms (from social marketing to regulation) over time and with the accord of governments and communities, cannot be overemphasised. The persistence of such approaches led to some of the most remarkable public health achievements in changing community-wide attitudes and behaviours (e.g., the decrease in smoking resulting in large reductions in smoking-related diseases, and the impact of seatbelts in reducing road trauma injuries and deaths).

6. Sustained efforts to effect change, often over many years

Successful public health interventions generally required detailed planning and implementation, significant levels of funding, and other mechanisms over a period of many years, to ensure their sustainability and ultimately, to reap the predicted benefits for the community. Ongoing investment was a crucial factor: the capacity and will to invest significant financial and other resources in broadly-based, multi-faceted public health ventures to address complex health issues with multiple determinants, over lengthy periods of time (i.e., for decades).⁸⁷

Even when a program targeted a specific geographic area (such as programs to reduce the blood lead levels in residents of lead-affected communities), it needed to do so for substantial periods of time (at least five years). In other areas, it was likely to take many decades of effort to achieve identifiable change, and there was seldom any prospective evaluation of the process of implementing the intervention or of its effects over the longer term. The Nobel Laureate and health economist, Robert Fogel, identified 'the long lags that frequently occur between the time that certain investments are made and the time that their benefits occur'.²³⁹ He concluded that the efficiency gains of OECD countries in the period 1910-1980 were due to investments made up to a century earlier - among which were public health investments, including the

construction of improved water supply facilities, the decontamination of the milk supply, the development of effective quarantine systems, and the sanitising of urban slums.

Sustained efforts were also important for the many public health programs that required behavioural and attitudinal change on the part of the population in order to be successful (e.g., increasing breast feeding rates, and the control of tobacco to reduce rates of smoking). Others required structural changes in the environment, such as the building of sanitation infrastructure (e.g., sewage removal, drinking water distribution systems) and the closure of asbestos mines. Behavioural, attitudinal and structural changes frequently needed lengthy and sustained periods of investment before the sought-after health benefits could be achieved.

7. Support of the wider community

Clearly, a successful outcome does not only result from the intervention itself and its method of delivery, but also arises from the interaction with the particular group for whom the intervention is designed, and the social, economic and cultural context in which that group exists. Tailoring interventions and making them socially and culturally appropriate is essential, as is the recognition that interventions may sometimes have unintended effects of making health inequalities worse, by virtue of differential outcomes among population groups (e.g., smoking cessation programs).⁷²⁴ This latter challenge still awaits an effective public health solution.

Engagement with the community and the involvement of a majority of community members were significant elements of many successful public health interventions. These ranged from obtaining community compliance with movement restrictions (e.g., for quarantine purposes and in tuberculosis sanatoria), to population health requirements (e.g., maintaining 'herd' immunity), and growing adherence to safer, health-protecting practices (e.g., wearing seatbelts, smoking cessation during pregnancy).

Difficulties in measuring the success of public health interventions

Public health interventions are multi-faceted, complex programs that must reach substantial numbers of the affected population in order to be considered effective. Therefore, the evidence to support their effectiveness must be sufficiently comprehensive to encompass their scope and complexity. In order to determine for the purposes of this report those interventions deemed to be successful, evidence of various types was sought. As indicated earlier, a detailed scan of the published and grey literature was undertaken, looking particularly for evaluations detailing program efficacy, cost-effectiveness and sustainability.

In order to provide convincing evidence, evaluations must also be able to distinguish between the success and failure of the implementation of an intervention, as well as the outcomes of the intervention itself. As Rychetnik and colleagues commented, 'if an intervention is unsuccessful, the evidence should help to determine whether the intervention was inherently faulty (that is, failure of intervention concept or theory), or badly delivered (failure of implementation). Furthermore, proper interpretation of the evidence depends upon the availability of adequate descriptive information on the intervention and its context, so that the transferability of the evidence can be determined'.⁷²²

Overall, there were relatively few comprehensive evaluations and even fewer economic evaluations; thus, only limited objective evidence about the outcomes of many of the public health interventions was available to support their inclusion in the report.

There was convincing cost-benefit information for the following public health interventions:

- water safety, food safety and food regulation;
- universal immunisation against a range of infectious diseases, and measures to contain HIV/AIDS and hepatitis C infection (e.g., needle and syringe exchange programs);
- tobacco control strategies and programs, including smoking cessation programs, advertising bans, and fiscal incentives (taxation, hypothecation) supported by legislation;

- injury prevention strategies such as road safety initiatives (e.g., RBT and police enforcement, legislation and social marketing campaigns), and the prevention of falls;
- population-wide measures to reduce cardiovascular disease and associated risk factors;
- cancer screening, detection and early intervention; and
- water fluoridation and food fortification (e.g., with iodine, thiamine).

There was limited economic evaluation of interventions such as the *Health Promoting Schools program*, and either cost or benefit information, but not both, for a number of other programs. By 2006, the routine use of economic evaluation to underpin decision-making still occurred in only a few public health areas: the listing of pharmaceuticals on the PBS, the addition of new vaccines to the universal immunisation schedule, and the introduction of new population screening programs (e.g., bowel cancer screening, newborn hearing screening).

While there were many cost-effectiveness studies on single public health issues (such as tobacco control), and others that compared packages of different measures (such as road traffic safety initiatives), there were few that costed the major public health programs, policies and strategies that were in place over a long period of time.^{482,725,87} Reasons for this included a paucity of data (e.g., on the costs of long-standing programs) and of evidence (e.g., evidence of cost-effectiveness) required to undertake such analyses. This reflected a lack of funded research for some strategies; for others, research on the comparative cost-benefits of various possible interventions was only 'at a formative stage', even in relatively well-researched areas, such as road trauma.⁴⁰¹ In still other areas, economic evaluation of this type lagged far behind, and, by 2006, the basic 'information requirements for cost-benefit and cost-effectiveness assessment [could] not be met' for most public health interventions.⁴⁰²

For public health problems that required attitudinal and behavioural change on the part of the community, evidence generated from pilot start-up and small-scale programs was often highly localised, and lacked a 'critical mass' to generate evidence of its impact, making it difficult to draw convincing conclusions or to apply it more widely.⁴⁰² Much of the historic material that was examined for the report adopted a case study approach, because of the 'difficulties involved in comprehensive evaluations of the outcomes of broad-based programs that aim[ed] to affect complex health issues with multiple determinants'.⁷²⁶

As a result of these factors, the survey of public health experts was conducted to elicit informed, but subjective, views of practitioners and researchers about public health successes. It was generally believed by survey respondents that most of the public health successes reported had been cost-effective - despite a lack of actual evidence to support this. Nevertheless, as indicated above, a small number of later studies quantified the benefits - well in excess of the costs - of implementing food safety programs in high risk sectors of the food industry, and of hepatitis C and HIV infections 'foregone' through the implementation of needle syringe exchange programs.^{49,542}

For future public health interventions to be identified as 'successes', adequately resourced and more thorough evaluations will be required, including evidence from cost-benefit or cost-effectiveness studies. There is a growing body of work that addresses 'best' or 'good enough' evidence for particular public health interventions, and in other areas, gaps between practice and evidence have been identified.^{126,377,728} Much wider use of economic evaluation in public health is needed, both routinely in risk-based assessment and in determining investment decisions and program funding priorities. In the future, directions for public health interventions should be informed by evaluations of what is known from research and from practice about the efficacy and the cost-effectiveness of particular approaches; and recommendations about whether to begin, to continue, or to cease particular activities, and the most appropriate ways to implement them.

The continuing challenge of remedying inequalities in health across the population

Despite the many achievements of public health in improving the wellbeing of Australians over the last century, the problem of inequalities, or differences in health across the population, continues to resist amelioration. The burden of premature mortality and rising levels of morbidity have remained

disproportionately concentrated among those who are the most socioeconomically disadvantaged in the nation, with none more so than the members of Australia's Indigenous populations.

In its review of the improvements in health over the 20th century, the AIHW concluded that the evident benefits had not been shared equally:

'In the year 2000, although life expectancy for most Australians has increased significantly, that of Indigenous peoples is at levels not seen in the rest of the population since 1900. Large inequalities in death rates from many causes also persist for disadvantaged populations in Australia, in spite of the long list of achievements in health during the twentieth century. Reducing the inequalities will also be a priority for the twenty-first century.' – AIHW, 2000.³

A study suggested that some early signs of 'putting the brakes on chronic disease mortality' (primarily from better access to health care) were apparent in the Indigenous populations of the Northern Territory. Such public health programs that offer improvements in the health of Aboriginal and Torres Strait Islander peoples needed to be consolidated and extended more widely.⁶⁶²

However, much more remained to be done. The assumption that health improvement in the population overall reduces health inequalities in segments of the population, had not been borne out by the available evidence.⁷²⁴ Greater efforts were required to determine the precise ways that public health interventions and policies impacted positively and negatively on the different segments within the population. Cost-effective public health programs also needed to be integrated better with the wider socioeconomic determinants of health, and with the broader canvas on which public health activities were both delivered and determined.⁷¹²

Conclusion

The public health successes of the 20th century were those that addressed problems that had a significant impact on the health of the population. The interventions employed a range of methods, and many of the most successful were complex and multi-faceted, instituting public health action across many areas - for example, legislation, fiscal incentives, social marketing and health promotion, and provision of public health services. This complexity and multi-faceted approach applied equally to early public health successes, such as tuberculosis control from the late 1940s, as well as to later examples, such as the tobacco control strategy from the 1970s.

The NHMRC Health Advancement Committee's review of infrastructure for promoting the health of Australians in 1997 suggested that the key elements of successful approaches were:

- strategic direction;
- technical expertise (including surveillance, research and evaluation);
- supportive structures for implementation; and

'The health of every individual citizen contributes to national wellbeing, thereby making health such a vital resource that its regulation must be an essential function of government. Furthermore, health consistently rates as an issue of concern for all Australians. It is intensely personal and, given the nature of health, a public good, a highly political issue. It is generally believed that governments are in the best position to encourage positive behaviour (such as immunisation, food and road safety) which will benefit the whole community, while discouraging dangerous activity such as smoking and drink driving. Moreover, given that health is regarded as a human right, public financing of essential health services is also accepted, as is the government's role in ensuring that those who are most in need receive adequate care.'

– F Beddie, *Putting life into years: the Commonwealth's role in Australia's health since 1901*, 2001.p. 3.

The preventable differences in health status across the population that developed from unequal health gains need to be remedied:

'The key to reducing societal vulnerability to the health impacts of climate change is to enhance existing public health infrastructure and intervention programs.'

– R W Sutherst, *Clinical Microbiology Reviews*, 2004, p. 167.

- sustained investment.⁷⁰³

The review identified that the greatest improvements in health were achieved in areas where there had been a sustained response that engaged many components of the health sector, such as health workers, hospitals, non-government organisations, universities and public health practitioners, and, most importantly, community members. In addition, it also recognised that the work of other non-health sectors had also been an essential factor.⁷⁰³

While there are inherent difficulties in comprehensively assessing the outcomes of broad-based public health activity from the vantage point of a one hundred-year perspective, most of the public health interventions described here achieved benefits for the community. While more remains to be done, much has been learned over the last century, which can be applied by those charged with achieving future public health successes in the hundred years to come.
