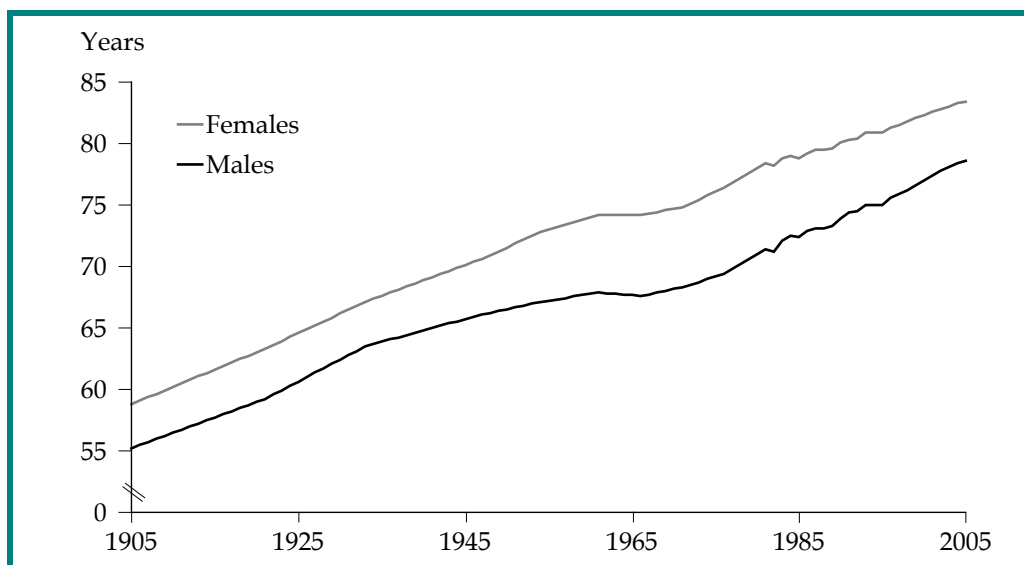


3 Improved maternal, infant and child health: 1901 onwards

The spectacular improvement in the life expectancy and health of Australian mothers, infants and children over the 20th century was one of the most successful areas of public health effort. Advances in sanitation and hygiene, living and birthing conditions, antenatal and postnatal care, parental education (especially of mothers) and better nutrition, contributed to the substantial reductions in the mortality and morbidity of mothers, infants and children.²²³ Early in the century, the large declines in infant and child death rates resulted in increasing life expectancies, while reductions in deaths at older ages contributed later in the century (Figure 3.1).¹³

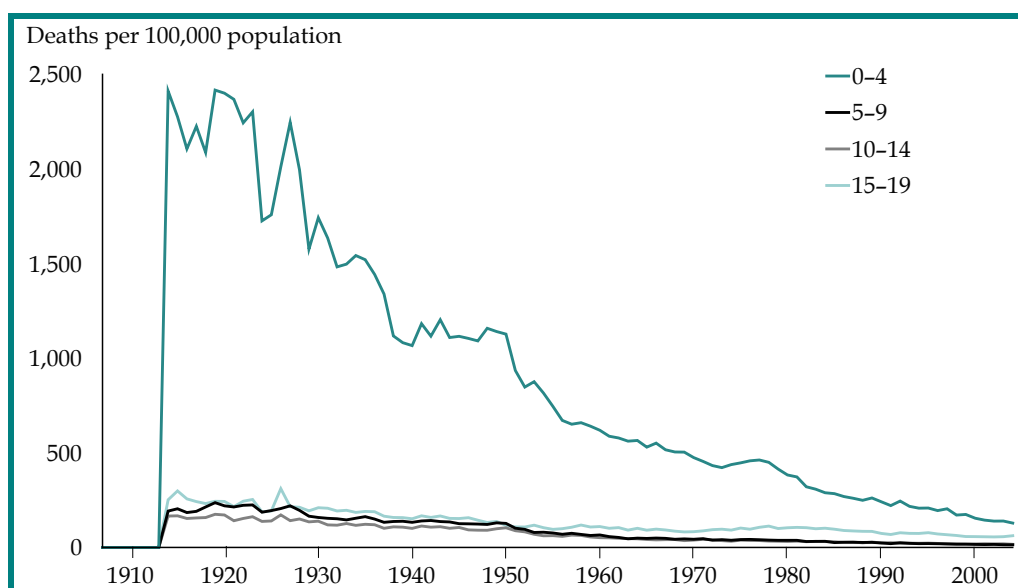
Figure 3.1: Trends in life expectancy at birth, 1905-2005



Source: ABS Australian Historical Population Statistics, 2006.

Over the century, the decline in all-cause death rates of children aged under 5 years was dramatic (Figure 3.2). By 2004, the age-standardised death rate was just under 5% of the 1907 rate.

Figure 3.2: Deaths of children and young people (0 to 19 years), by age group, 1907-2004



Source: AIHW GRIM Books, 2005.

Rates for other young age groups were also significantly lower in 2004, at 5.5% of the 1907 rate for those aged 5 to 9 years, 7.4% for those aged 10 to 14 years and 15.5% for those aged 14 to 19 years. At the end of the 20th century, however, Indigenous infants still had far lower life expectancies than non-Indigenous infants.³ While a non-Indigenous baby had an average life expectancy of around 80 years (78.5 years for males and 83.3 years for females), an Aboriginal or Torres Strait Islander infant could expect to live only 59.4 years for a male and 64.8 years for a female.^{25,224}

A wide range of measures was responsible for the reductions in infant, child and maternal death rates. These included:

- better health and nutritional status, and economic and living conditions;
- rising levels of education generally, and of parents, particularly mothers;
- improvements in medical knowledge, treatment and procedures, health care delivery systems including emergency care, the availability of antibiotics and vaccines, and the continued development of safe contraceptives; and
- shifts in social and legislative attitudes that broadened women's roles, skills and responsibilities beyond their reproductive lives.^{225,226,227,266}

By the end of the 20th century, infants and children had become a recognised focus of public health effort, deserving special attention from health policymakers and practitioners alike. There was also acknowledgment of the importance of the period of early childhood for human development and health. Evidence from public health research, as well as from many other disciplines, emphasised the significance of early brain development and the critical influences of a nurturing environment and secure relationships in infancy and early childhood, which set a base for health, learning and behaviour throughout life.²²⁸ Other perinatal and early childhood factors, especially nutrition and growth, were shown to have lifelong impacts on adult health, in areas such as the cardiovascular and endocrine systems.

The cost-effectiveness of public health intervention during the first years of life was demonstrated by evaluating programs such as intensive, targeted home visiting and early childhood education. Some of these initiatives in other countries returned benefits that exceeded program costs in the areas of higher employment and skill levels in mothers, reduced welfare expenditure, improved school performance, and reduced criminal activity of parents and children, and led to fewer health care costs.²²⁹

To this end, a draft framework for a *National Agenda for Early Childhood* (2004) proposed specific areas to which the Australian, state and territory governments might commit in order to improve outcomes for young children and their families.²³⁰ The *Stronger Families and Communities Strategy*, initiated in 2000, was later guided by the *National Agenda* in order to provide a greater focus on early childhood initiatives.²³¹

'Early childhood is widely acknowledged as a crucial period of physical, emotional, intellectual and social growth. How we as a society respond to the needs of young children can have a profound impact on their development and life pathways. This, in turn, has consequences for the economic and social growth of Australia as a whole.'

– The National Agenda for Early Childhood: a draft framework, 2004.

In July 2006, the Council of Australian Governments (COAG) agreed to a suite of indicative high-level outcomes as a framework for the *Human Capital Agenda* (to improve participation and productivity), which included an outcome to 'significantly improve the proportion of children that are born healthy', and a subsidiary one, 'that the gap between Indigenous and non-Indigenous children is closed'.²³²

By the start of the 21st century, there was a greater recognition of the importance of early public health programs for infants and children. However, more effort was needed to ensure that every child in Australia had 'a best start in life', especially those who were of Aboriginal and Torres Strait Islander origin.

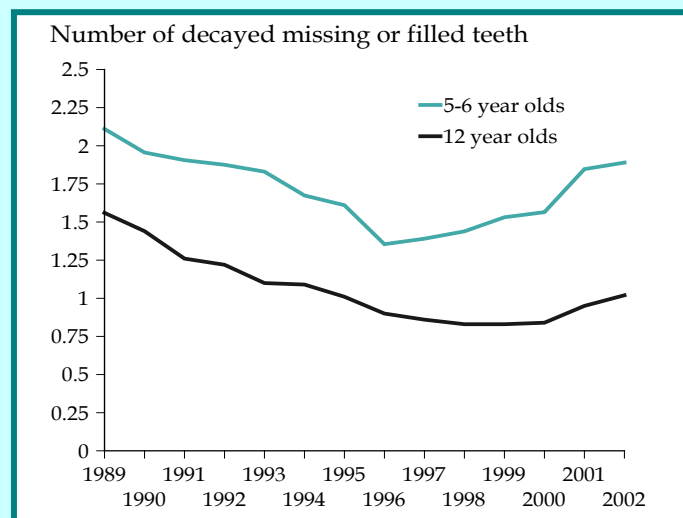
Box 3.1 Water fluoridation, 1960s-

Fluoride in drinking water protects against dental disease, especially in children, and may also have an indirect effect on reducing coronary heart disease risk by reducing the incidence of periodontal disease.²³³

The addition of fluoride to drinking water to prevent dental caries ensured that this public health measure was available to all in the fluoridated areas. In Australia, drinking water was first fluoridated in Beaconsfield, Tasmania in 1953, and then in six capital cities between 1964 and 1971, with Melbourne fluoridated in 1977.²³⁴ Brisbane remained the only non-fluoridating capital city. In 2001-02, just over 69% of Australians (67.5% of 0-14 year-olds) had access to optimal levels of fluoridated water supply.²³⁴ Although many regional and rural communities did not have access, some commenced water fluoridation, or planned to do so.²³⁴ The cost of adding fluoride to drinking water supplies was modest and it was estimated that each dollar invested in water fluoridation returned savings ranging from \$12.60 to \$80 in dental treatment costs alone, with those who were most disadvantaged gaining the greatest benefit. The goal of the *National Oral Health Plan 2004-2013* was to extend water fluoridation to all Australian communities with populations greater than 1,000 people.²³⁵

The Australian beverage industry applied to FSANZ to add fluoride voluntarily to bottled water to address concerns about increased consumption of bottled water and sub-optimal fluoride levels for the prevention of dental caries, but, by the end of 2006, this had not been agreed.²³⁶

Figure 3.3: Dental caries experience of children aged 5-6 years and 12 years, 1989-2002



Source: Australian Research Centre for Population Oral Health (ARCPOH), *Child Dental Health Surveys* (various years), University of Adelaide.

Tooth decay in the deciduous teeth of 5-6 year old children was lower at the end of the 1990s than in 1990 (Figure 3.3). However, and contrary to over two decades of recorded declines in decay experience, the end of the 1990s saw a period of increasing decay scores - most evident for 5-year-olds who, between 1996 and 1999, experienced a 21.7% increase in recorded decay. Tooth decay in the permanent teeth of 12-year-old children (recorded as the mean number of decayed, missing and filled teeth - DMFT) had reduced by 83%, from 4.79 in 1977 to 0.9 in 1996 (Figure 3.3). From then, the trend was stable, with a mean DMFT score of 0.83 in 1999, 0.84 in 2000, and a rise to 1.02 in 2002.^{13, 237, 238}

In 2002, across the age range 5-15 years, children from areas with higher concentrations of fluoride in drinking water had fewer decayed, missing and filled teeth, on average, than children from areas with relatively low concentrations of fluoride in drinking water. Relative differences ranged from 6.9% to 65.3% in the deciduous teeth and from 12.7% to 50.6% in the permanent teeth.²³⁴

Public health practices

Mothers and their infants were an early focus for public health activity. The 20th century witnessed large improvements in the safety of birthing and aftercare (e.g., the prevention of sepsis), and the gradual development of primary health services for infants and children, which offered care and support to parents.

Public health measures included:

- improved sanitation, clean and fluoridated drinking water (Box 3.1), and generally better standards of hygiene;
- changes in traditional and cultural practices through health promotion and community education campaigns;
- universal maternal, infant and child health services providing a high standard of health care and information to parents and their children, including antenatal and postnatal screening;
- organised family planning services that offered effective contraception, and later expanded their focus to sexual health more broadly;
- breastfeeding support, education and promotion that encouraged women to breastfeed and resulted in high breastfeeding initiation rates;
- targeted services and programs to improve outcomes for Indigenous mothers and infants; and
- monitoring and research into preventing health problems, such as neural tube defects and SIDS, that identified a number of effective strategies to reduce these major causes of infant disability and death.

The establishment of universal health services for mothers and babies contributed to the success of the public health measures described above. Universal services aimed to provide access for all mothers and babies, improve their health, and that of the population overall. However, services were less accessible for those in remote areas, and under-utilised by some families who were socially marginalised or living in very stressful circumstances. Targeted services and programs to improve the birthweight and health of Indigenous infants and mothers had some success from the 1980s onwards, but more still needed to be achieved.

The education of parents, and particularly of mothers, was also crucial, and was often delivered in the home by infant health nurses, community midwives and other public health practitioners.²³⁹ Advice about breastfeeding, infant sleeping position and behaviour, and home safety aimed to address risky practices. Some commentators accredited the larger share of the gains in population health to improved economic conditions which led to better nutrition.²⁴⁰

The principle of intervening early to prevent disease by attempting to remedy the environmental conditions that bred disease was another public health contribution in this area. The public health practices of sanitation and hygiene generally, as well as specifically in birthing and in the home, introduced a set of basic measures that became universally effective.

Future challenges

Further challenges in improving maternal, infant and child health remained - the mental health of mothers and children, childhood overweight and obesity, tobacco smoking rates in pregnancy, and the need to increase iodine in maternal and children's diets.

However, the greatest challenge was to ensure that the dramatic population health gains made during the century were fully extended to all Australians, especially Aboriginal and Torres Strait Islander mothers and babies.

Professor Fiona Stanley concluded her Centenary article, *Child health since Federation*, thus:

'Issues in relation to poverty and child health have not left Australia's shores in the century either, in spite of us being one of the most developed countries in the world. Many Indigenous families with children are living in conditions of real deprivation, not unlike those in the 19th and beginning of the 20th century. Their rates of death and illness are higher than those of non-Indigenous children, although there have been improvements recently... And we are faced with more children of all kinds living in relative poverty, with observable disparities in health status between the 'haves' and the 'have-nots'. This is a common problem in wealthier countries all over the world... Today's social and environmental influences, as with those 100 years ago, are far more powerful in child health and disease than are the drugs or medical care facilities we have at our disposal to treat them. Are we going to respond to change our social, emotional and economic environments to improve child health as effectively as did our forebears in the years after Federation?'

Source: F Stanley, 'Centenary article - Child health since Federation' in ABS (eds.), *Year book Australia 2001*, ABS, Canberra, 2001, pp. 368-400.

Table 3.1: Historic highlights of improved maternal, infant and child health

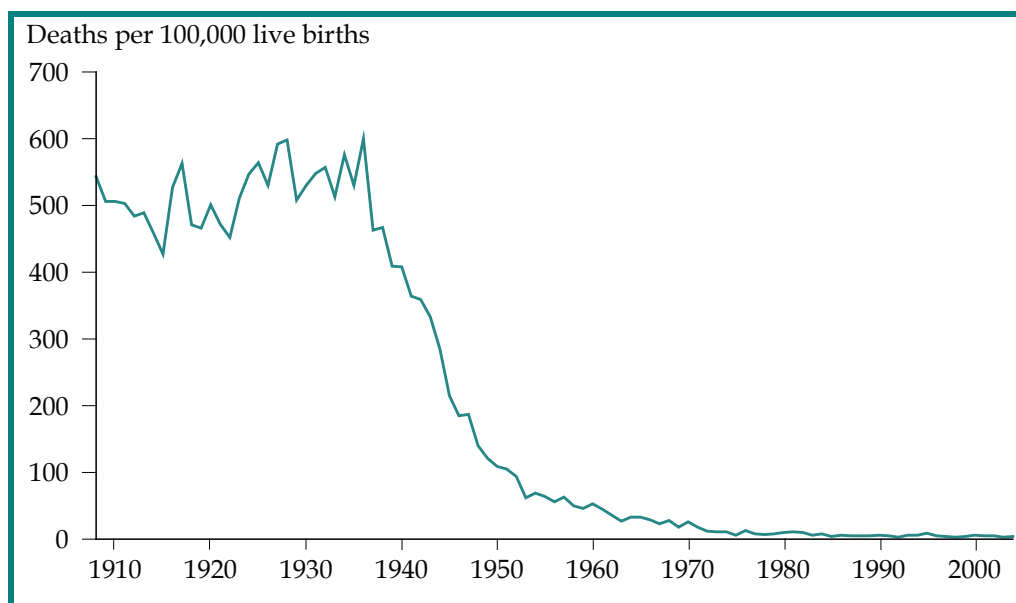
1907	Basic wage determined.
1909	Mothers' and infants' welfare centres (medical in nature but promoting general health) first established in Adelaide.
1912	Maternity benefit introduced. Statutory regulation of midwives in Queensland.
1920s-30s	Growth of maternal and infant health programs.
1926	The (then) Racial Hygiene Association (RHA) of NSW founded to promote sex education, prevention and eradication of venereal disease and education of the public in eugenics.
1933	The first birth-control clinic, although only for married women, established by the RHA.
1937	Dramatic decline in maternal mortality following the use of antibacterial drugs.
1960s	Universal screening of newborns to detect rare congenital metabolic conditions.
1964	The Nursing Mothers' Association (now the Australian Breastfeeding Association) founded. Information on maternal deaths reported nationally from 1964.
1970s	Family planning programs established, including for single women. Only an estimated 40-45% of women breastfeeding their infants on discharge from hospital.
1973	Opening of many women's and community health centres under the Community Health Program.
1981	Australia signed the WHO <i>International code of marketing of breast-milk substitutes</i> .
1982	Breastfeeding first included in <i>Dietary Guidelines for Australians</i> .
1987	Better Health Commission set targets to increase the proportion of women breastfeeding on hospital discharge to 95% and still breastfeeding at three months to 80%, to increase rates in at-risk groups, and lengthen the average period of breastfeeding by the year 2000.
1988	Tasmanian Infant Health Survey began collecting data for a prospective study on Sudden Infant Death Syndrome (SIDS).
1991	'Reducing the Risk' campaign by SIDS organisations and Red Nose Day funds, launched nationally.
1992	The SIDS death rate fell after the national campaign on infant sleeping position.
1995	The first comprehensive national health policy framework for Australian children and young people aged 0-24 years.
1996-2001	National Breastfeeding Strategy (nine projects over four years).
2003	NHMRC <i>Dietary Guidelines for Children and Adolescents in Australia</i> incorporated <i>Infant Feeding Guidelines for Health Workers</i> . Treasury became the first federal agency accredited as a 'Breastfeeding-Friendly Workplace'.
2004	<i>National agenda for early childhood</i> draft framework - areas in which the Australian, state and territory governments could achieve better outcomes for children, their families and communities. Renewal of the national <i>Stronger Families and Communities Strategy</i> (2004-2009).
2006	Council of Australian Governments (COAG) agreed to a framework for the <i>Human Capital Agenda</i> , including 'significantly improving the proportion of children that are born healthy, with the subsidiary outcome that the gap between Indigenous and non-Indigenous children is closed'.

3.1 Safer birthing practices

1901 onwards

There was an impressive reduction in the rates of women dying from childbirth over the 20th century. In the early 1900s, childbirth was responsible for the deaths of around 600 women during pregnancy, childbirth and the puerperium (the period after childbirth) in every 100,000 live births.⁵ The rate declined rapidly from the mid-1930s, to levels of around 11 deaths per 100,000 live births in the early years of the 21st century (Figure 3.4).

Figure 3.4: Maternal deaths in pregnancy, childbirth and the puerperium, Australia, 1908-2004



Source: ABS, *Causes of death*, and historical *Demography bulletins*.

By this time, maternal deaths were very uncommon, and over the three years from 2003 to 2005, 65 deaths were classified as directly or indirectly relating to the pregnancy or its management, with all deaths occurring while the women were pregnant, or within 42 days of termination of pregnancy.²⁴¹ During this triennium, one woman died for every 11,896 women giving birth, giving a maternal death ratio of 8.4 per 100,000 of women giving birth. This compared favourably with the reported Maternal Mortality Rates (MMR) in other developed countries.²⁴²

The AIHW National Perinatal Statistics Unit and other commentators attributed the sustained progressive overall decrease in the rate of maternal deaths in Australia to:

- improved general health status including much better nutrition,
- improved reproductive patterns, including a decrease in the number, and better spacing of pregnancies;
- effective contraception and family planning;
- access to appropriate general and specialised health care;
- the introduction of medical interventions (e.g., aseptic procedures, use of antibacterial drugs and antibiotics, blood transfusions); and
- professional training of birth attendants.^{243,244,245}

By the late 1990s, maternal death rates had fallen substantially in Australia and remained among the world's best.²⁴² The Organisation for Economic Co-operation and Development (OECD) reported that, in 2003, Australia had the sixth lowest maternal mortality ratio of the 29 OECD countries for which data were available.²⁴⁶

In 2000, the WHO calculated that a woman's estimated lifetime risk of maternal death in Australia was 1 in 5,800.²⁴² Lifetime risk in the UK was calculated at 1 in 3,800, in the US one in 2,500; and in New Zealand, 1 in 6,000. By contrast, for the whole of the WHO Western Pacific region in which Australia is located, the lifetime risk of maternal death was dramatically higher at 1 in 540.

Maternal mortality rates for Aboriginal or Torres Strait Islander women, however, were more than two and a half times as high as for other Australian women. In 2003-2005, there were 21.5 deaths per 100,000 women giving birth, compared with 7.9 per 100,000 for non-Indigenous women.²⁴¹ This high rate and a lack of improvement indicated that further measures were needed to improve pregnancy outcomes for Aboriginal and Torres Strait Islander women.

Public health practices

Early in the 20th century, the Federal Health Council (an early cooperative arrangement for public health between federal and state governments) drew up a national scheme to coordinate maternal welfare activities, including a model maternity centre in each capital city, a consultant service, public antenatal clinics, rural maternity facilities, and a system to collect vital statistics. The federal government was also to subsidise university research, fund chairs of obstetrics and model maternity units, and convene an annual conference on maternal health.⁵ As Lewis noted, 'the reality never approached the blueprint', but this was the beginning of the development of a professional public health approach to maternal health, which included a population focus on prevention and early intervention, as well as partnership approaches to providing services.⁵

Social and cultural changes over the 20th century led to a reduction in overall family size, meaning fewer pregnancies per mother, and greater spacing between pregnancies.²⁴⁷ A number of safe and reliable contraceptive methods and advice on fertility control and family planning became available to prospective parents. Access to safe, legal abortion also greatly reduced related illness, injury and death.²⁴⁸ The availability and accessibility of professional pregnancy counselling for women, especially those living in rural and remote areas was improved with the introduction of a new Medicare payment in 2006 for non-directive pregnancy support counselling (provided by eligible GPs, and psychologists, social workers and mental health nurses on referral from a GP).

By the start of the 21st century, a high standard of antenatal and obstetric care was available for pregnant women. One principle of antenatal care was the screening and early detection of problems, so that potentially adverse consequences to the mother and fetus could be minimised or avoided. Pregnant women were screened for a range of conditions including hepatitis B and C, rubella, gestational diabetes mellitus, and Rhesus incompatibility (providing antiD for the active immunisation of Rhesus-negative women was one of the many contributions of the Commonwealth Serum Laboratories), and other conditions that might affect their health in pregnancy or that of their unborn child.^{249,250} The baby was usually examined *in utero* by ultrasound to ensure position and appropriate development, and might be genetically screened for Down syndrome and other chromosomal abnormalities.

Survey respondents: *'Deaths of women in childbirth or due to induced abortion were not uncommon in the first part of the century. Improvements in later years were due to better antenatal and obstetric care, ready access to reliable contraception for fertility control (child spacing and reduction of overall family size), and access to safe legal abortion in the last 30 years... the availability of contraception and legal abortion were important public health measures.'*

'Birth control, including availability of contraceptives and contraceptive advice, wider availability of legal abortion, [and] the contraceptive pill had profound effects on the health and well-being of women and their children.'

'Poor maternal and child health early in the century had its origins in too many unwanted pregnancies in deprived conditions. For example, postpartum haemorrhage and maternal death in childbirth, and other debilitating obstetric problems were related to excessive numbers of pregnancies, exhaustion and inadequate maternal nourishment. This also impacted in a pervasive way on the health and well-being of Australian women, whose life destiny was dictated by pregnancy, not by ability.'

Giving birth became safer as the result of a range of clinical improvements including highly skilled birth attendants. While puerperal fever (or postpartum infection) was the cause of around one third of early maternal deaths at the beginning of the century, these deaths were extraordinarily rare a century later.²⁴⁵ Doctors in the 1920s attributed the high maternal death rate largely to poor standards of obstetric care, especially unnecessary and poorly performed Caesarean sections.²⁵¹ High levels of interference in labour and delivery (e.g., forceps deliveries), lacerations, blood loss and exhaustion from prolonged labour all increased the possibility of postpartum infection.²⁴⁵ 'Untrained' midwives were also identified by the medical profession, leading to their formal training and registration, which was largely achieved by the 1930s. Maternal death rates, however, remained high until after 1937, when there was a sudden decline following the introduction of antibacterial drugs (Figure 3.4).²⁵ Many mothers and their infants were also saved by the early recognition of risk during pregnancy and appropriate emergency care in the case of complications.

The 'medicalisation' of birth, however, tended to diminish women's satisfaction with the experience of childbirth (Box 3.2).²⁵² Planned homebirth was a preferred option for a few women who were at low risk of complications, were tended by qualified midwives and had appropriate access to a hospital for transferral if the need arose.²⁵³ Most (67.6%) of the relatively small number (589) of planned homebirths that were reported nationally in 2004 (0.2% of all births; 0.8% of all births to Aboriginal and Torres Strait Islander mothers) occurred in major cities, with all infants being live born and few low birthweight or preterm babies (1.5% were of low birthweight, and 0.3% were preterm).²⁴³ The introduction of hospital-based birthing centres and culturally appropriate Indigenous birthing centres also partly addressed women's desire for less medical intervention in childbirth.

Mothers were generally better educated than they were at the beginning of the 20th century when literacy rates and educational levels were far lower. There was greater public child health support for both parents in their role; and public health research continued to identify ways to improve the experience of pregnancy, childbirth and parenthood.

Public health also played an important role in gathering and analysing data related to pregnancy and birth. The maternal death rate is regarded as a leading or headline indicator of a nation's overall population health and development status. Maternal deaths were reported nationally from 1964. Information was collated and published by the AIHW's National Perinatal Statistics Unit with the objective of monitoring and interpreting national data on reproductive and perinatal illness and deaths.²⁵⁴ Maternal deaths in hospital were key sentinel events, regularly scrutinised by the Australian Commission on Safety and Quality in Health Care as part of the national commitment to improve the quality and safety of maternal care in Australia.²⁴¹

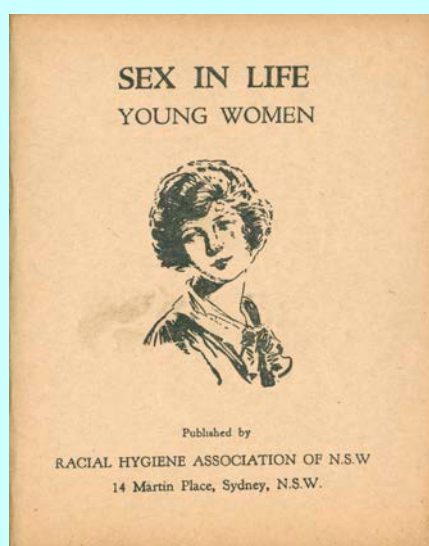
Box 3.2 Changes in social and medical attitudes towards child-bearing

'The late nineteenth and early twentieth centuries saw profound changes in social and medical attitudes towards maternity. Nowhere is this more apparent than in the rise of antenatal care, a system of monitoring the health and wellbeing of the unborn child through the surveillance of the pregnant woman. The emergence of such a system of surveillance in Australia occurred around the time of the First World War. In essence, the development of an antenatal regime was stimulated by fears over the declining population, and concerns over the high rate of maternal mortality during reproduction. The rise of antenatal care, however, is notable for more than being an extension of medical services to mothers. The interest in the fetus marks a significant shift in understandings about mothers and children. Based on the perceived need for population, the fetus was considered less a part of the mother, and more an independent potential person. At the same time, the development of an antenatal regime justified enormous intervention into the lives of women and mothers, extending medicalisation throughout the pregnancy and beyond.'

Source: L Featherstone, 'Surveying the mother: the rise of antenatal care in early twentieth-century Australia', *Limina*, vol. 10, 2004, pp. 16-31.

Box 3.3 Family planning, 1926-

Family planning services provided reproductive and sexual health services, contributing to the reduction of high parity and high risk for mothers and associated infant morbidity and mortality.



Collection: Powerhouse Museum, Sydney.²⁵⁵

Dr Marie Stopes was a family planning pioneer in Europe at the turn of the 20th century. She fought enormous prejudice to establish the first family planning clinic in London in 1915, believing strongly that, until women could determine the numbers of children they had, they would never be able to escape poverty and ill health.

Founded in 1926 by feminists Ruby Rich and Lillie Goodisson, the Racial Hygiene Association of NSW (its name was changed to the Family Planning Association (FPA) of NSW in 1960) had as its objectives 'the teaching of sex education; the eradication and prevention of venereal diseases; and the education of the community along eugenic lines'.²⁵⁶ In Australia, as in other countries at this time, a 'loosely-defined collection of eugenics-related goals for increasing the nation's fitness' was the norm, and its aims - considered 'scientific, worthwhile and achievable' - left a legacy in various disciplines, such as family planning and public health.²⁵⁷ It was supported by many leading feminists of the day, including Jessie Street who was the inaugural vice president.²⁵⁸

In 1933, the Association established the first birth-control clinic in Sydney, although this was for married women only (those with 'hereditary, economic or health problems').²⁵⁹ Judicious birth control was to 'eradicate inheritable disease, diminish maternal mortality (by discouraging abortion) and result in an increased and healthier population'. At that time, when Australia's population was seven million and there was a 'populate or perish' mentality, the concept of women having control over their reproduction was 'akin to treason'.²⁵⁹

In 1971, the FPA officially resolved to provide birth control to single people as well as to married people. National family planning programs were established in the 1970s across Australia. Family planning clinics offered a wide range of services, and the FPA's focus was on training GPs, nurses and other health workers in education, advocacy and research (e.g., testing of new contraceptives), and young people as peer educators.

Factors critical to success

Chief among the contributors to the success of public health measures to ensure safe motherhood and reduce deaths related to pregnancy and childbirth, was the universal availability of maternal health care of a high quality. These services extended from antenatal care through to safe birthing conditions provided by well-trained staff with the availability of emergency medical responses when required, and postnatal care. The provision and professionalisation of maternal care services had a measurable impact on the health of pregnant women and their survival during and after childbirth.

Another contributor was the range of public health initiatives, frequently led by NGOs and other agencies that brought sexuality and fertility 'into the light' (Box 3.3). These movements started early in the century and expanded to the provision of sexual health education, family planning, safe contraception and pregnancy alternatives, and pregnancy counselling and support. The social and cultural shifts that accompanied these changes meant, for example, that 'backyard abortions', which had killed many women, ceased and a range of safe, reliable fertility-control methods was available to women.

Through their universal reach, strategies to improve maternal care were ambitious in scope and operated Australia-wide. The reduction in maternal deaths by the end of the century addressed what had been a significant public health problem at its start.

Future challenges

By the end of the century, however, the need to improve outcomes for Indigenous mothers and their babies was still critical. Mortality rates of Aboriginal and Torres Strait Islander women remained unacceptably high, at more than five times that of non-Indigenous women (45.9 per 100,000 women who gave birth compared to 8.7 per 100,000 in 2000–2002).²⁴¹ Age-specific death rates for Aboriginal and Torres Strait Islander women of reproductive age were also on average three to five times as high as those for non-Indigenous women.²⁴¹

Although some targeted services and programs had been developed from the 1980s to improve birth weight and health in Indigenous mothers and babies (Box 3.6), more work was needed to ensure the sustainability of successful programs, with priority given to appropriate primary health care initiatives.^{260,261} The socioeconomic determinants of health which so adversely affected this population group also needed to be urgently addressed if health benefits were to be realised.

Socioeconomic disparities also existed for other disadvantaged groups - in infant mortality, low birthweight, perinatal risk, and in smoking and drinking alcohol during pregnancy. These required a more targeted approach to improve the health of those most disadvantaged in Australian society.

In keeping with the guidelines of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists, the *2006 National HIV testing policy* (a revision of the *1998 HIV Testing Policy*), universalised HIV testing as part of antenatal care for pregnant women, recommending that HIV testing be routinely offered to all women.^{250,262} Testing was only to be performed with the informed consent of the woman. This approach of assessing HIV status during pregnancy allowed appropriate interventions to be targeted early to improve the health of pregnant women and to decrease the incidence of mother-to-child HIV transmission.

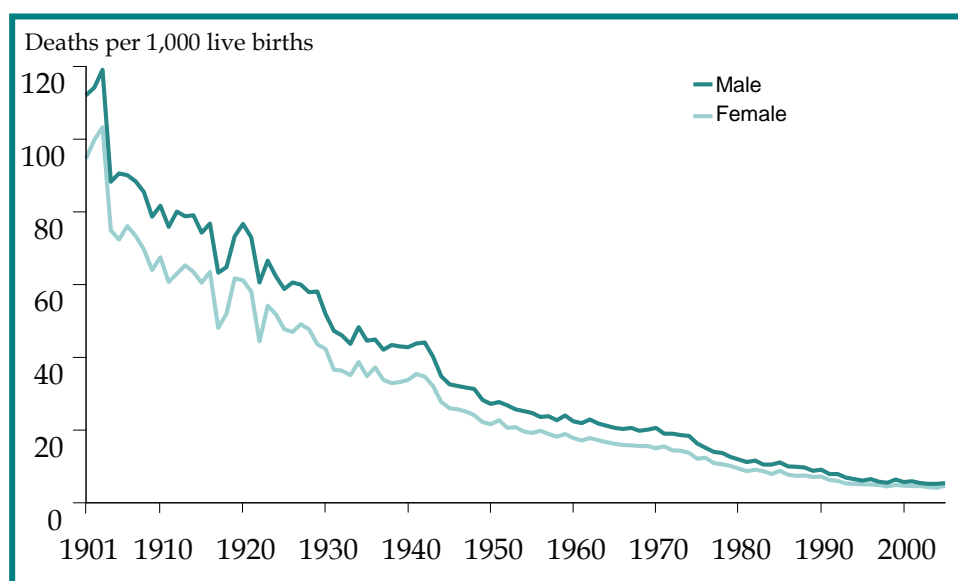
Although delivery at home was a preferred birthing option for a very small number of women, it was viewed with considerable caution by many medical specialists, even where transport and hospital facilities were available nearby. This delivery option, however, remained a challenge for those in remote areas. The 'tyranny of distance' was also problematic for very small, premature or unwell newborn infants.

3.2 Improved survival and health of infants

1901 onwards

Rates of infant deaths – the deaths of children aged less than one year - fell substantially over the 20th century.²⁵ The decline in the infant mortality rate (IMR: infant deaths per 1,000 live births) from 1901 to 2005 is shown in Figure 3.5. For reasons that are not well understood, female infant death rates were consistently lower than male rates. The IMR fell from 112 (males) and 95 (females) per 1,000 live births in 1901, to below 70 in the mid-1920s. Both male and female rates remained below ten deaths per 1,000 live births from 1986, and the overall rate remained at or under five deaths per 1,000 live births from 2002.²⁶³ In 2005, the infant mortality rate was 5.0 infant deaths per 1,000 live births, slightly above the rate of 4.7 in 2004, but 50% lower than the 1985 rate of 9.9 per 1,000 live births.²²⁴

Figure 3.5: Infant mortality rate, 1901 to 2005



Source: Portfolio Statistics & Standards Section, Economic & Statistical Analysis Branch, Portfolio Strategies Division, DoHA; data: ABS, *Deaths, Australia*, and historical *Demography* bulletins from 1908 to 2006.

Best estimates of Indigenous infant mortality rates (which were only available from the 1970s) were of the order of around 70 to 80 deaths per 1,000 live births in the 1970s, falling to around 25 deaths per 1,000 live births in the 1980s.²⁶⁴ In 1994-96, the rate of 18.6 deaths per 1,000 live births was still decreasing, but remained far higher than the rate for non-Indigenous infants.

'Towards the end of the twentieth century, the Indigenous infant mortality rates were about three times as high as those of other Australian infants' – AIHW, 2006.¹⁵⁴

In 2005, ABS data for Queensland, South Australia, Western Australia and the Northern Territory combined (likely to be an under-estimate, although these areas were considered to have the best ascertainment of Indigenous status) estimated the infant mortality rate for Aboriginal and Torres Strait Islander infants at 15.0 for males (more than three times the rate for non-Indigenous males) and 10.4 for females (more than two and a half times the rate for non-Indigenous females).²²⁴

Overall, the large falls in infant and child death rates over the century (from 1907 to 2000) were attributed to fewer deaths from:

- diarrhoea – decreased from 700 (male) and 579 (female) deaths to less than one death, per 100,000 population;
- other infectious diseases – decreased from around 315 (male) and 494 (female) deaths to less than three deaths, per 100,000 population; and
- conditions originating in the perinatal period – decreased from 700 (male) and 596 (female) deaths to 55 and 45 deaths, per 100,000 population respectively.^{25,13}

'The fascinating question is that the real gains in child health were made before antibiotics and widespread immunisation against the classic infectious diseases of childhood. The bio-social change that closely correlated with the sharp fall in infant mortality between the late 1880s and the 1920s was the fertility rate: as families shrank in overall size, and spaced their children more strategically, new babies, infants and young children all improved their survival chances. Therefore, if women's health benefited from a release from the relentless cycle of pregnancy and birth, children's wellbeing benefited immensely also.'

JS McCalman, 'The past that haunts us: the historical basis of well-being in Australian children', in S Richardson & MR Prior (eds), *No time to lose: the well-being of Australia's children*, Melbourne University Press, 2005, p. 43.²⁴⁷

There was compelling evidence that adverse experiences during infancy (such as being of low birthweight, chronically ill, or having been abused and/or neglected) could have a negative impact upon later physical and mental health and social disadvantage in adulthood.²⁶⁵

Public health practices

Early in the 20th century, the emphasis in public health was on the provision of safe, aseptic birthing conditions with well-trained birth attendants. Registration and training of midwives and better training of doctors focused attention upon the need for sterile techniques and more hygienic birthing practices.

For babies, infant health services developed with the first service established in 1909 in Adelaide by Dr Helen Mayo. At the end of 1915 in NSW, for instance, there were nine baby health clinics (mainly in areas of high infant mortality) and by 1919, there were fifteen.²⁶⁶ In Queensland, where the State (rather than NGOs and benevolent associations) took the initiative, there were four clinics in Brisbane in 1918.

The spread and universal reach of mothercraft and infant health services meant that, by the end of the 20th century, they were available to all but the most remote mothers and babies. Infant health nurses provided essential services, from monitoring the health and growth of infants and assisting mothers, to encouraging breastfeeding, and providing information and education on safety in the home, safe sleeping position, and other matters pertaining to the development of infants.

The introduction and growth of universal screening of newborns in order to detect a range of rare congenital metabolic conditions also contributed to improvements in the health of infants (Box 3.4).

The public health practices of screening and early detection were extended to the state-based screening of newborns for hearing deficits (Box 3.5) and these programs were to be made available Australia-wide.

Box 3.4 Screening of newborns, 1960s-

Universal screening of newborns to detect rare congenital metabolic conditions was established in the late 1960s. Early detection allowed early treatment of conditions that caused severe disability or death. Testing expanded from the first programs for phenylketonuria, to include programs to detect hypothyroidism, cystic fibrosis, and a number of other conditions.²⁶⁷ Equally as important, a mechanism was in place to expand routine screening to further conditions as they too became preventable.

Box 3.5 Extending newborn hearing screening, 2000-

Much of the disability associated with hearing loss could be averted through the early screening of hearing in newborns, and this was becoming universal in Australia.²⁶⁸ One example was the NSW Statewide Infant Screening Hearing Program (SWISH), which included screening, diagnostic assessment, early intervention and parent support. After three years, the program found that:

- 3.8% of infants screened did not pass the hearing test bilaterally (with both ears); almost all of these (97.2%) attended diagnostic audiology;
- about 45% of those with bilateral hearing impairment had *no risk factors*; and
- about 20% of those with unilateral hearing loss had developed bilateral hearing loss by the time they were assessed.

Overall, 1.2 in 1,000 babies had a degree of permanent bilateral hearing impairment. The average age for fitting hearing aids was two months. Parental satisfaction with the program was very high: 99% of parents reported that they would recommend screening to other parents. SWISH Coordinators were proactive with follow-up, and the NSW Blue Book provided a safety net, as baby health nurses checked that the SWISH page had been completed.²⁶⁹

The main factor attributed to the success of the program was the tenaciousness and persistence of the SWISH Coordinators in getting babies to diagnostic testing and follow-up if needed; and, as a result of their efforts, coverage in 2005 was estimated at 98%. The program drove demand in other programs, as hearing aids fitted on much younger children had to be replaced more often to keep up with their rate of growth and development.²⁷⁰

The general rise in the level of education, and specifically the education of mothers in mothercraft, also contributed to improving the health of infants (Box 3.6). By the start of the 21st century, universally available services delivered a high standard of postnatal and early childhood care. Breastfeeding improved infant immunity and health. Childhood immunisation, which commenced in infancy, contributed to the decline in infant deaths. Finally, a range of common - but preventable - causes of infant injury in the home and elsewhere (e.g., swimming pools, cars) were identified, and measures to prevent or minimise their impact implemented. The success of public health measures to ensure safer infancy and fewer infant deaths rested on the increased availability of standard care of a high quality, from aseptic birthing conditions provided by well-trained staff through to infant health services delivered in clinics and in homes by infant health nurses and other community-based practitioners. Services also included screening for preventable or treatable conditions, in order to reduce avoidable death and disability.

Factors critical to success

The success of public health measures to ensure safer infancy and fewer infant deaths rested on the increased availability of standard care of a high quality, from aseptic birthing conditions provided by well-trained staff through to infant health services delivered in clinics and in homes by infant health nurses and other community-based practitioners. Services also included screening for preventable or treatable conditions, in order to reduce avoidable death and disability.

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Future challenges

At the start of the 21st century, the public health challenges included improving outcomes for

Survey respondents nominated as public health successes: 'Well baby clinics, parent education' and 'universal maternal and child health services'.

Indigenous babies, and those of mothers in other socioeconomically disadvantaged groups, whose babies were more at risk of low birthweight or of dying before the age of 12 months, and of other adverse health outcomes.²⁶¹ Child death reviews were being undertaken in most States and Territories to examine preventable causes of death in infants and children, although there was no national data collection and no consistent approach taken to reviewing.

Targeted services and programs that had had some success in improving birth weight and health gain in Aboriginal and Torres Strait Islander babies (from the 1980s) needed to be consolidated to ensure their longer term success, and priority given to primary health care initiatives to reduce the prevalence of low birthweight and preterm birth (Box 3.6).²⁶⁰

Similarly, there were some successful early intervention programs to improve the health of babies in lower socioeconomic situations, but more needed to be done to broaden the reach of the best programs, and to apply the universal principle of early intervention to those most in need.

Other challenges were:

- encouraging periconceptional use of folic acid supplements (including consideration of the mandatory fortification of a staple food, such as flour) to prevent neural tube defects;
- reducing exposure to environmental tobacco smoke - a cause of SIDS and of significant developmental delay in children;
- ensuring that iodine deficiency in pregnant women and infants was identified and remedied to prevent iodine deficiency disorders; and
- addressing childhood overweight and obesity.^{271,126,272}

Box 3.6 'Lifting the weight' and programs for health gain for Aboriginal and Torres Strait Islander babies, 1984-

The Australian Medical Association's 2005 Indigenous Report Card, *Lifting the weight - low birth weight babies*, detailed some targeted programs that demonstrated improvements in birthweight and health in Aboriginal babies:

- Nganampa Health, Antenatal Care Program, Anangu Pitjantjatjara Lands, SA (1984-);
- Congress Alukura Women's Health Program, NT (1986-);
- Mums and Babies Program, Townsville Aboriginal and Islander Health Service, Qld (2000-);
- *Strong Women Strong Babies Strong Culture* Program, NT (1993-), WA (2003-).²⁶⁰

The limited evidence available suggested, however, that a main driver behind the improvement in infant mortality was semi-coercive programs to have women from remote areas deliver their babies in large centres, a long way from their homes. There was insufficient attention paid to programs to improve birthweight, and the birthweight distribution for Aboriginal and Torres Strait Islander children in Queensland, for example, hardly shifted over the previous 16 years.²⁶¹ Coory and Johnston (2005) reported that

'the main reason Indigenous babies have a high risk of death is because they are born too early and too small'.²⁶¹

To reduce the relative excess of deaths among Indigenous babies, priority needed to be given to primary health care initiatives aimed at reducing the prevalence of low birthweight and preterm birth.²⁶¹

3.3 Promotion of breastfeeding

1964 onwards

'Breastfeeding is the normal and most appropriate method for feeding infants and is closely related to immediate and long-term health outcomes.' - National Health & Medical Research Council 2003.²⁷³

There were many benefits to be gained from breastfeeding - for infants, mothers and the community. For infants, breastfeeding protected against respiratory, ear and gastrointestinal infections; and exclusive breastfeeding for at least four months reduced the prevalence of asthma and cows' milk allergy.²⁷³ Breastfeeding was associated with good developmental outcomes in children such as

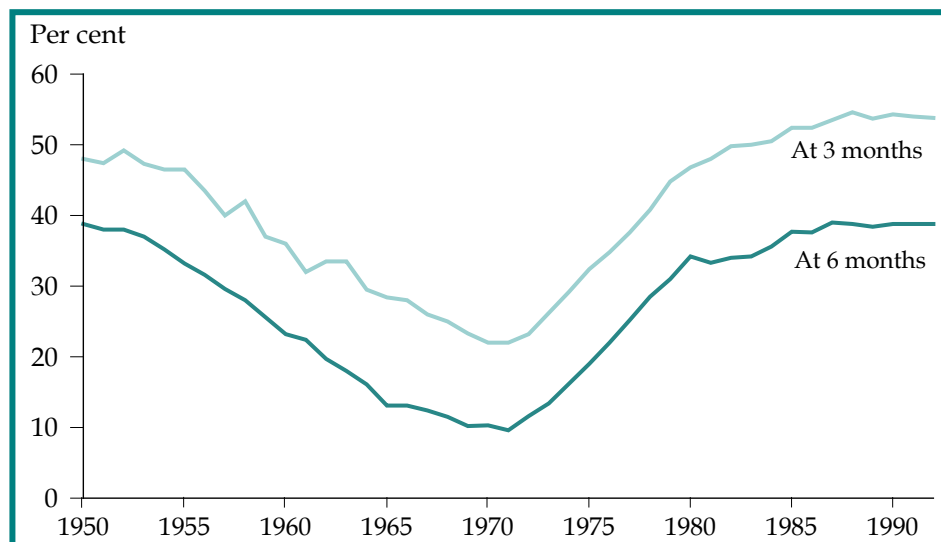
improved visual acuity, psychomotor development, and jaw formation, and higher IQ scores. For mothers, breastfeeding promoted recovery after childbirth and reduced the risk of post-delivery haemorrhage; and it also enhanced infant-mother attachment and protected against negative moods and stress, and reduced the risk of pre-menopausal breast cancer.^{274,275} For the community, there were significant social and economic benefits that resulted from breastfeeding.

Breastfeeding rates in Australia waxed and waned quite substantially. At the beginning of the 20th century, Australia had relatively high breastfeeding rates, and public health campaigns such as ‘Don’t kill your baby, never wean in summer’ directly communicated the risks of not continuing to breastfeed.²⁷⁶ A link between bottle feeding and gastrointestinal illness in infants was identified.²⁷³ This feeding method increased the risk of infection through contamination of the feeding equipment, and bottle-fed infants missed out on the protection against infection afforded by breastfeeding.²⁷⁷

In the following decades, the influence of scientific mothercraft and the Truby King-associated infant health clinic movement had differing effects on breastfeeding.²⁷⁸ Some of the recommended breastfeeding practices (e.g., scheduled feeding where ‘timetabling took on a clocklike regularity with a moral significance’, test weighing, and a general ‘preoccupation with graphs, charts, and standardised measurement’ which ignored babies’ individual requirements) resulted in a decline in breastfeeding rates.²⁷⁸

By the 1950s and 1960s, the promotion of artificial infant formulas had a devastating effect on breastfeeding rates of infants at three and six months (Figure 3.6).^{279,280} By the early 1970s, it was estimated that only 40-45% of women were breastfeeding their infants on discharge from hospital.²⁸¹ This trend was eventually reversed through the sustained efforts of community-based breastfeeding support groups, which began in the early 1960s with the establishment of the Nursing Mothers’ Association (NMA, now the Australian Breastfeeding Association [ABA]). At the time that the NMA was founded (1964), the use of artificial formulas was favoured and little breastfeeding support was available to mothers or to health professionals.

Figure 3.6: Mothers exclusively breastfeeding infants at three and six months, Victoria, 1950-1992

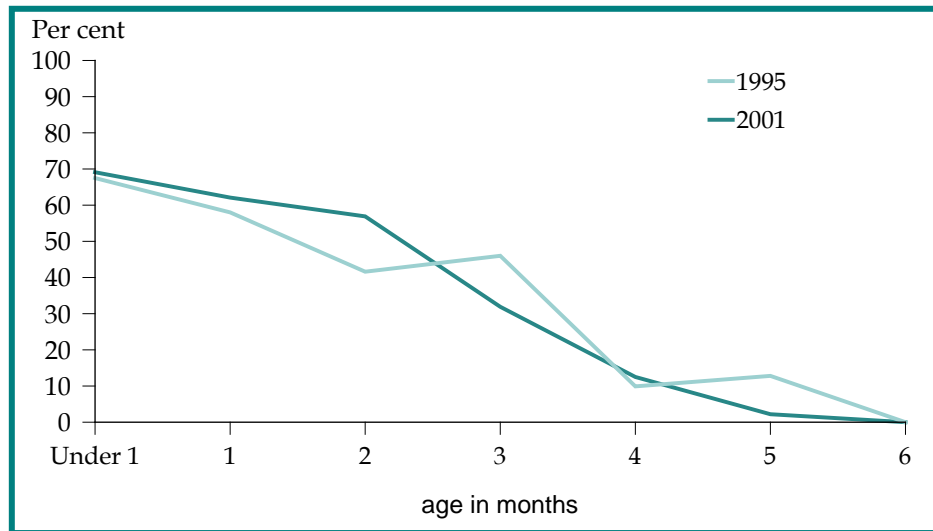


Source: IH Lester, *Australia’s food and nutrition*, 1994, p. 194; indicator compiled by the Nursing Mothers Association of Australia, 1993.

In 1974, the 27th World Health Assembly noted an overall decrease in breastfeeding rates in many parts of the world, and attributed some of the decline to ‘the promotion of manufactured breast-milk substitutes’.²⁸² Australia supported the World Health Assembly’s adoption of the *WHO International code of marketing of breast-milk substitutes* in 1981, agreeing to protect and promote breastfeeding and to ensure appropriate marketing of substitutes. In response, the requirement for a breastfeeding statement on infant formula labels was incorporated in the *Australia New Zealand Food Standards Code* and an industry self-regulatory arrangement was established in 1992. However, no such requirement was applied to the labelling of feeding bottles and teats.

By 1987, the Nutrition Taskforce of the Better Health Commission had established targets aimed at increasing the proportion of mothers who were breastfeeding on discharge from hospital to 95%, and the proportion still breastfeeding at three months to 80%, by the year 2000.²⁷³ By 1995, it was estimated that 82% of all children up to the age of three were breastfed on leaving hospital (83% in 2001), but this proportion decreased substantially in the two months following discharge.²⁸³ The decline in the proportion of infants who were exclusively breastfed at various ages up to six months, in 1995 and 2001, is shown in Figure 3.7.

Figure 3.7: Proportion of fully breastfed infants, newborn to 6 months of age, 1995 and 2001



Source: ABS, *Breastfeeding in Australia, 2001, 2003*.

In 1982, Australia was one of the first countries to adopt dietary guidelines which encouraged breastfeeding.²⁷³ The NHMRC produced *Infant feeding guidelines for health workers* in 1996, to support health workers to promote breastfeeding as ‘a primary aim of nutrition and better health programs’.²⁸⁴ Revised guidelines were incorporated into the *Dietary guidelines for children and adolescents in Australia* in 2003.²⁷³ The 2003 NHMRC dietary guidelines recommended that infants up to the age of six months only consume breast milk. Therefore, remedying this downward trend in rates of exclusive breastfeeding of young infants still remained a substantial challenge by the start of the 21st century.¹²⁶

Breastfeeding support groups were partially successful in advocating for the implementation of the WHO *International code of marketing of breast-milk substitutes*.²⁸² Furthermore, the possible long-term adverse effects of breast milk substitutes (e.g., on the development of metabolic-related diseases such as diabetes and cardiovascular disease) were becoming evident from public health research and clinical trials.²⁸⁵

Accreditation of ‘baby-friendly’ places (e.g., health services, workplaces, cafes and restaurants) encouraged the promotion of breastfeeding by providing supportive environments for mothers. The *Baby Friendly Health Initiative* (BFHI), a program developed by WHO and UNICEF, was facilitated in Australia by the Australian College of Midwives Inc. from 1995. ‘Baby friendly’ maternity sites had to demonstrate their compliance with the ‘Ten steps to successful breastfeeding’ - a series of best practice standards for a pattern of care in which practices ‘harmful to breastfeeding’ were replaced by ones proven to promote breastfeeding.^{286,287} By late 2006, the BFHI had accredited over 50 Baby Friendly hospitals and health services across Australia (more than double the 24 that were accredited in mid-2001).²⁸⁸

The Australian Government established the *National Breastfeeding Strategy 1996-2001* with the aim of encouraging breastfeeding awareness and raising Australian mothers’ breastfeeding rates.²⁸⁹ As women’s participation in the labour force increased, many women returned to work relatively soon after their babies were born. For instance, information from the first wave of the *Longitudinal Survey of Australia’s Children* indicated that one in five mothers was in the paid workforce by the time their child was six months old, with a significant proportion returning to or commencing work before their child

was three months old.²⁹⁰ Among other approaches, the National Breastfeeding Strategy included the development of workplace resource materials to support breastfeeding mothers returning to work and to educate both employers and employees.

In 2003, the Treasury was the first federal agency to be accredited as a 'Breastfeeding Friendly Workplace', providing breastfeeding breaks and flexible work options. Other Australian government agencies in Canberra and elsewhere became accredited, with the Australian government Departments of Health and Ageing (DoHA) and Family and Community Services (DFaCS) achieving national accreditation for all their offices across Australia.

Other workplaces became 'baby friendly' premises as a result and this move was enhanced by the ABA's production of a 'Breastfeeding Welcome Here' kit, to accredit and promote breastfeeding-friendly businesses.²⁹¹ While breastfeeding in public was once unthinkable, modern attitudes became

more accepting, and a mother's right to breastfeed was protected under the Commonwealth *Sex Discrimination Act 1984*.²⁹² The Australian government continued to provide funding in support of breastfeeding and for research into breastfeeding and other infant feeding practices.

'Employers who are "breastfeeding-friendly" save on recruitment costs as valuable skilled employees are more likely to return after having their baby if the workplace supports their plans to breastfeed. Parents are also less likely to need time off to care for a sick baby, keeping employers' costs down'.

Dr Julie Smith, Australian Breastfeeding Association.

Public health practices

Breastfeeding support, education and promotion were undertaken by non-government and community organisations, supported by health departments in the states and territories, and the Australian government. This demonstrated the public health principles of promoting and protecting the health of the community, by focusing on its youngest members and their mothers, in partnership with a wide range of agencies. As a result, there was a range of promotional and educational materials available to assist mothers to choose to breastfeed and a variety of services to help them maintain breastfeeding.

Factors critical to success

From the 1970s, the activities and community advocacy of NGOs contributed to the resurgence of breastfeeding as a public health measure. Government support for these activities was also important. The 1995 *National Health Survey* had a special focus on breastfeeding and subsequent surveys monitored breastfeeding rates at a population level and provided information on critical issues (such as reasons for discontinuing breastfeeding), to direct public health research towards addressing barriers to breastfeeding.

Public health research also continued to quantify the societal value of breastfeeding, and to generate evidence about the benefits in terms of improved health, reduced illness, and consequent decreased demand for hospital and health services.

Successful public health measures to promote breastfeeding initially used universal approaches to focus on all mothers, and increasingly tailored their interventions to reach particular groups (e.g., partners of breastfeeding mothers, and Aboriginal and Torres Strait Islander mothers).

***Survey respondent:** 'The public health success [in increasing breastfeeding], as in tobacco, originated in women/community based action and advocacy, which prevented the near "extinction" of breastfeeding in Australia, unlike in the UK or US.'*

**Breastfeeding
welcome here**



Australian Breastfeeding Association

Source: Australian
Breastfeeding
Association

Cost-effectiveness

A study quantified some of the benefits of extending exclusive breastfeeding in Australia to six months, by estimating that the hospitalisation costs for the treatment of five infant and childhood illnesses attributable to early weaning from breast milk (including gastrointestinal illness, respiratory illness and otitis media) were around \$1-2 million a year in the ACT alone.²⁹³ Extrapolated nationally, hospitalisation costs associated with premature weaning were of the order of \$60-100 million per year, and excluded costs associated with other illnesses and out-of-hospital health care costs related to early weaning.²⁹⁴ Although breastfeeding initiation rates were relatively high at 92%, fewer than one in ten ACT infants were exclusively breastfed for the recommended six months (ABS data suggested that a similar situation existed nationally).²⁸³ The study concluded that 'interventions to protect and support breastfeeding were likely to be cost-effective for the public health system'.²⁹³ While further gains were required, increasing the proportion of breastfed Australian infants was economically advantageous, in addition to being a public health goal.

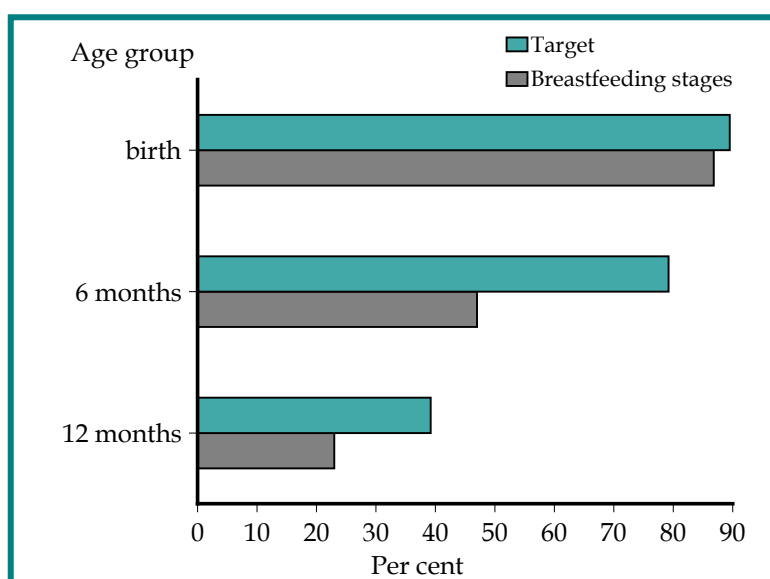
Future challenges

From a public health perspective, at the start of the 21st century, there was 'room for improvement in both the rates and the duration of breastfeeding in Australia'.²⁷³ As achievable objectives for Australia, the NHMRC recommended:

- a breastfeeding initiation rate in excess of 90%;
- 80% of infants still breastfed at the age of six months;
- mothers continuing exclusive breastfeeding for about six months; and
- 40% of mothers still breastfeeding their infants at 12 months.

The latest estimates showed that, while breastfeeding was initiated for 87% of newborns, less than half of Australian infants at six months of age (48%) were still receiving some breast milk, and less than 1% of those were fully breastfed (Figure 3.8).²⁹⁵ In addition, a far higher proportion of infants aged three months or less was regularly given solids and breast milk substitutes in 2001 than in 1995. These data appeared to indicate that breastfeeding rates were still declining, with decreasing rates of exclusive breastfeeding, and more infants being given breast milk substitutes before six months of age.

Figure 3.8: Prevalence of breastfeeding, infant age 0-12 months, 2001



Source: National Institute of Clinical Studies, *Evidence-practice gaps report*, vol. 2, 2005, p. 7.

The proportion of infants being breastfed in 2001 was higher among older mothers and those with a tertiary education.²⁸³ Women from the more advantaged socioeconomic groups also tended to breastfeed their infants for longer periods.²⁷³

The National Institute of Clinical Studies (NICS) indicated that future effort should focus on increasing the duration of exclusive breastfeeding. To this end, NICS suggested better management of the difficulties and barriers that breastfeeding mothers faced.¹²⁶ Although these directly affected mothers, health savings from breastfeeding and the possible health risks of breast milk substitutes impacted directly on government budgets, and therefore also had implications for the wider community.²⁹⁴

The best available evidence suggested that long-term intensive promotion of breastfeeding was most successful when it spanned the pre- and postnatal periods, and involved multiple contacts with a peer counsellor or professional breastfeeding promoter.¹²⁶ Improved contact with postnatal services was needed, especially for high-need women (such as those who were Indigenous and those who were socioeconomically disadvantaged). Information offered to women about breastfeeding had to be consistent, easy to access and reflect the standard in the NHMRC guidelines.¹²⁶

Finally, other interventions that were likely to improve breastfeeding duration (drawn from the *Australian Breastfeeding Leadership Plan*) included:

- improving workplace conditions for breastfeeding;
- piloting a human milk bank in a maternity hospital, and evidence-based guidelines for its use;
- promoting the acceptability of breastfeeding in public;
- educating women's partners and enlisting their support for breastfeeding; and
- improving the knowledge of peers and health professionals (e.g., general practitioners and pharmacists) who were likely to provide informal and formal breastfeeding support to mothers once they had left hospital.²⁹⁶

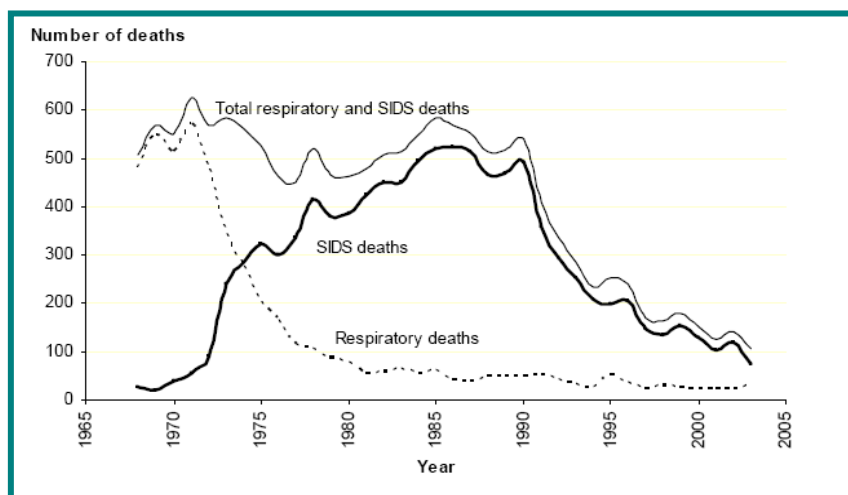
3.4 Preventing infant deaths from Sudden Infant Death Syndrome

1991 onwards

From the first registration of 26 infant deaths from Sudden Infant Death Syndrome (SIDS) in 1968, the number rose to a peak of 525 SIDS deaths in 1986 (Figure 3.9). The number then fell sharply from 1986 onwards, and by 2003, the number of SIDS deaths was 73.²⁵ There was a corresponding decrease in deaths attributed to a range of respiratory diseases among those aged less than 1 year, notably the 'unspecified' types of pneumonias.²⁵ It is therefore possible that the apparent emergence of SIDS could be due to a change or a refinement of deaths classification. Whatever the explanation for SIDS' apparent emergence, the resulting public health intervention and research in Australia are credited with major falls in the rates.

Although SIDS was the leading cause of death in 1997-2001 for both Indigenous and non-Indigenous infants, a higher proportion of Indigenous infants died from this cause (16.6% compared to 9.3% for non-Indigenous infants).²⁹⁷

Figure 3.9: Deaths from SIDS and respiratory causes, infants under one year of age, 1968–2003



Source: AIHW, *Mortality over the twentieth century in Australia*, 2006, p. 76.

In 2005, Gilbert and colleagues reported that the advice given to mothers for nearly a half century (to put infants to sleep face downwards) was contrary to the evidence available from 1970 onwards, that this was likely to be harmful.²⁹⁸ They suggested that a systematic review of preventable risk factors for SIDS from 1970 and earlier recognition of the risks of infants sleeping face downwards could have prevented 60,000 deaths in the UK, Europe, the US, and Australasia from this cause.

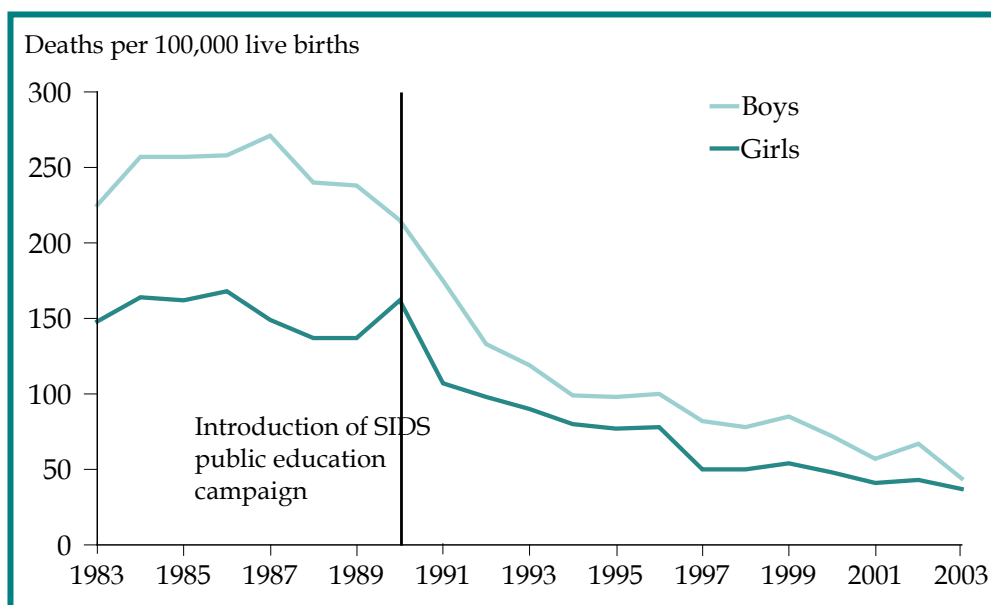
The eventual fall in SIDS deaths in Australia was credited to public health research which identified that the sleeping position of infants was a preventable risk factor for this type of death. This finding enabled public awareness and education campaigns to be mounted.²⁰⁴ The large reduction in the death rate from SIDS was attributed almost entirely to the change in the prevalence of placing infants in the prone position to sleep.²⁹⁹ By 2001, SIDS was no longer the overall leading cause of death for infants (deaths from SIDS decreased from 11.4% in 1997 to 7.5% in 2001), but it remained the leading cause of post-neonatal deaths (infants aged 28 days to 1 year).²⁰⁴

It was likely that the change in sleeping position reflected a 'healthy adopter' phenomenon, in that families at lower risk of SIDS were more likely to adhere to the prevailing health advice.²⁰⁴ Despite research, the causes of SIDS were still largely unknown; however, maternal smoking and infant exposure to environmental tobacco smoke (Section 2.3) were known preventable risk factors for SIDS that needed further intervention.²⁰⁴

Public health practices

Australian public health researchers first identified infant sleeping position as a preventable risk factor for SIDS, and suggested strategies to reduce it. The pioneers were Terry Dwyer and Anne-Louise Ponsonby at the Menzies Centre for Population Health Research in Tasmania, who conducted a Rotary funded, world-first study that collected and analysed details about the health and environmental circumstances of more than 10,000 apparently well babies.³⁰⁰ The *Tasmanian Infant Health Survey* began collecting data for this prospective study on SIDS in 1988.³⁰¹ Findings from the study contributed to the public education campaign targeted at parents of newborn infants which encouraged them to adopt a number of changes, including the sleeping position of infants. The first 'Reduce the Risks' campaign began in July 1990 in Victoria. A national campaign, driven by SIDS organisations and supported by Red Nose Day funds, was launched in 1991 and their impact was evident in the declining SIDS death rate (Figure 3.10).

Figure 3.10: Infant deaths from SIDS, 1983-2003



Source: AIHW, *A picture of Australia's children*, AIHW, Canberra, 2005, p. 18.

The campaigns promoted infants sleeping on their backs from birth with their heads and faces uncovered and free from exposure to environmental tobacco smoke.³⁰² Population-wide behavioural changes arising from public awareness and education campaigns resulted in fewer infant deaths. However, more needed to be done for Indigenous babies, whose death rates from SIDS remained higher. Over the period 1991 - 2000 for South Australia, Western Australia and the Northern Territory combined, the ABS estimated that the Indigenous SIDS death rate was 4.49 per 1,000 live births compared to the non-Indigenous rate of 0.73 per 1,000.

The prevention of as many premature deaths as possible remained a major public health objective. By the start of the 21st century, public health researchers continued to monitor and research SIDS deaths to identify other preventable risk factors and strategies that could be promulgated to the community, through health promotion activities, in order to lessen the number of infants still dying from this cause.

Factors critical to success

The prospective study which identified the major risk factors shared by babies who suffered SIDS deaths was frequently cited as a classic example of public health research and was often listed by respondents to the Public Health Successes Survey.³⁰³ The identification of the problem, the well-designed research of its causes and the adoption of preventable measures demonstrated the contribution that public health research could make in the field of preventable deaths.

The ability of public health practitioners to roll out community education campaigns to inform parents of the changes that were necessary to reduce the risks of a SIDS death was a critical element in the success of these measures. An estimated 4,084 babies' lives were saved in Australia after the SIDS risk reduction campaigns began.³⁰³ These approaches, however, failed to reach all segments of Australian society.

Future challenges

The National Institute of Clinical Studies identified placing infants to sleep on their backs to reduce the risk of SIDS as an evidence-practice gap, which formed part of the challenge of improving infant health at a population level.¹²⁶

While the SIDS death rate decreased overall in Australia, it remained significantly higher in the Northern Territory and amongst Indigenous communities elsewhere, where similar reductions were

not evident.³⁰⁴ There was also an increased risk in families that were socioeconomically disadvantaged. A systematic review reported a significant association of socioeconomic status with SIDS, with the risk of infant death increasing markedly with greater exposure to adverse social circumstances.^{305,306} Other studies supported these findings and affirmed that adverse social circumstances played a significant role in pathways to sudden unexpected deaths in infancy. A detailed study of infants born in Western Australia during the period from 1980 to 2001 found that, not only did Indigenous infants have more potentially preventable deaths than non-Indigenous infants, but disparities between Indigenous and non-Indigenous infants for all major causes of deaths including SIDS had also increased.³⁰⁷

Families at low risk of SIDS were more likely to adhere to prevailing health advice and, while significant improvements had been made, families most at risk of SIDS had not benefited to the same extent.³⁰⁷ Further public health research was needed to target SIDS risk reduction activity more appropriately. Programs aimed at reducing SIDS, decreasing serious infections, and improving antenatal care to reduce low birthweight and preterm births were likely to be more cost-effective than further improvements to neonatal intensive-care facilities, perinatal transport and increased hospital births for Indigenous mothers.³⁰⁷
