

FERTILITY AND MORTALITY

Background Research Paper 2



Queensland Government

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Further Information

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Papers in this series include:

1. Background Research Paper 1: Assumptions used in the Queensland Population Projections to 2051
2. Background Research Paper 2: Fertility and Mortality
3. Background Research Paper 3: Migration

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1. EXECUTIVE SUMMARY

Fertility

Many countries, both developing and developed, have declining fertility rates.

The majority of developed nations, such as Australia and Canada, have below replacement level fertility.

Despite increases in the total number of births, fertility rates in Australia have declined, from around 6.0 children per woman between 1861 and 1865 to 1.73 in 2001.

Fertility rates in Queensland have been higher than those in Australia but the differential has narrowed. Queensland's fertility rate has declined from 1.93 in 1980 to 1.795 in 2001.

There are marked regional differences between fertility rates in Queensland. Brisbane and Moreton Statistical Divisions in South East Queensland have the lowest fertility rates, with western Queensland recording the highest rates.

In general, within Brisbane City, lower fertility rates are apparent in the inner suburbs, with higher rates further from the city centre.

A number of countries have made policy adjustments to attempt to counter declines in fertility. There is considerable debate about the success of such policies, and their appropriateness to Australia.

Most demographers expect fertility rates in Australia to continue to fall, without some significant shift in policy.

Mortality

The Queensland crude death rate fell from 11.7 deaths per 1,000 persons in 1900 to 6.4 deaths per 1,000 persons in 2001. The standardised death rate fell to 5.5 deaths per 1,000 persons in 2001.

Life expectancy increased from 52.7 years in 1900 to 79.6 years in 2001.

People living in remote areas tend to have slightly higher death rates than people living in urban areas.

Males and females not only experience mortality at different periods of their life, but also due to different causes.

2. INTRODUCTION

Assumptions regarding levels of fertility, mortality and migration are critical inputs required to project future populations. There is considerable debate about the appropriate level to set these assumptions. Thus, this paper has been prepared which summarises recent trends and current perspectives on fertility and mortality.

This is a shortened version of a more comprehensive background report on fertility and mortality. This report was prepared by the Planning Information and Forecasting Unit as part of the process leading to preparation of new Queensland population projections.

The objective of the report is to contribute relevant information to allow an informed selection of assumptions. In turn, this will lead to a more realistic set of population projections and provide more effective planning information on which to base decisions concerning Queensland's future.

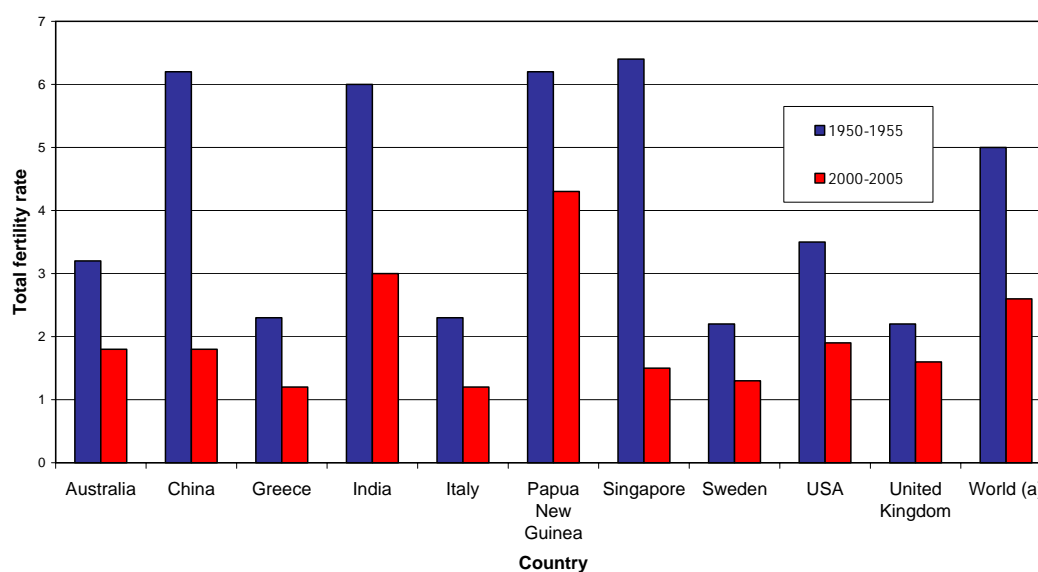
FERTILITY TRENDS

The total fertility rate (TFR) represents the number of children a woman would bear during her lifetime if she experienced the age-specific fertility rates prevailing over that period at each age of her reproductive life. The TFR is calculated by dividing the number of births in a given period by the average number of females aged 15-49 over that period. In Australia, under current rates of mortality up to age 49, a TFR of 2.1 babies per woman is regarded as the 'replacement level' of fertility, that is, the level at which the population exactly replaces itself.

3.1 Changes to total fertility rates over time

Many countries throughout the world, both developing and developed, have declining fertility rates (see Figure 3.1).

Figure 3.1: Total fertility rate, selected countries, 1950-1955 and 2000-2005



(a) The projected 2000-2005 total fertility rate for the world uses the medium series variant.

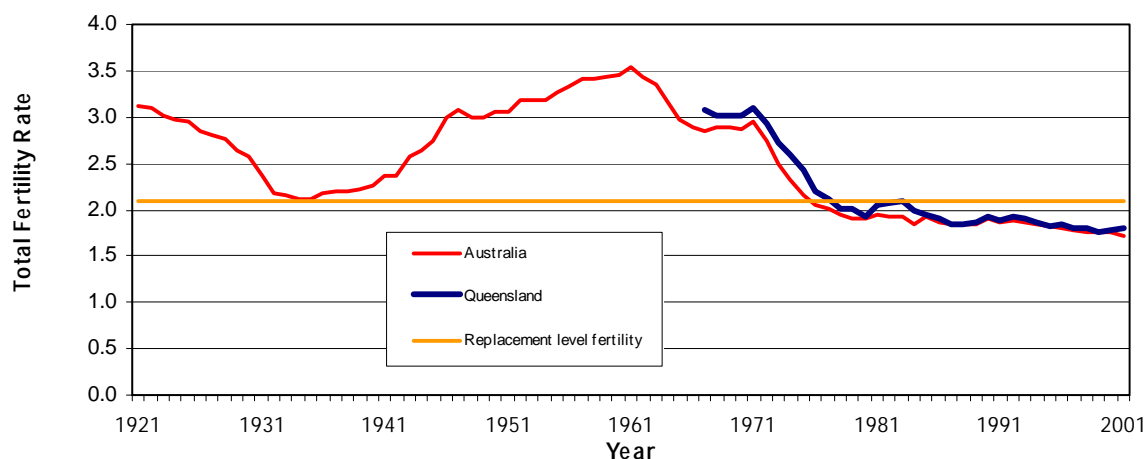
Source: Australian Bureau of Statistics, Births Australia 1998, Cat. no. 3301.0; and United Nations, 1998

The majority of developed countries have below replacement fertility. Spain and Italy have among the lowest fertility rates in the world with TFRs of 1.2 and 1.3 respectively (at 2001). Developing countries such as those in the Middle East and Africa generally have higher rates, for example Ethiopia's TFR is estimated at 5.9 (calculated by the Population Reference Bureau for late 1990s).

Australia and Queensland are undergoing fertility decline and total fertility rates are at a historic low after being below replacement level for the past 20 years (see Figure 3.2).

In the 1930s, fertility rates fell to a then historic low of 2.1 due to the effects of the Great Depression. Through the later 1930s and 1940s, fertility rates began to recover, with the post-war period bringing a large increase in marriages and the subsequent baby boom. In Australia, the baby boom is considered to have lasted until 1961 when the TFR peaked at 3.6 in Australia, followed by a smaller peak in births, the baby boom echo, in 1971.

Figure 3.2: Total fertility rate in Australia and Queensland, 1921 to 2001



Source: Australian Bureau of Statistics, Births Australia 2000 and 2001, Cat. no. 3301.0, and Demography Queensland 1975, 1976, 1992-1998, Cat. no. 3311.3 and 3102.3

Fertility rates in Queensland have generally been slightly higher than those in Australia but, as illustrated in Figure 3.2, that differential has narrowed. Queensland's TFR for 2001 was in the mid-range of the rates for all Australian states and territories and remained slightly higher than the Australian figure (see Table 3.1).

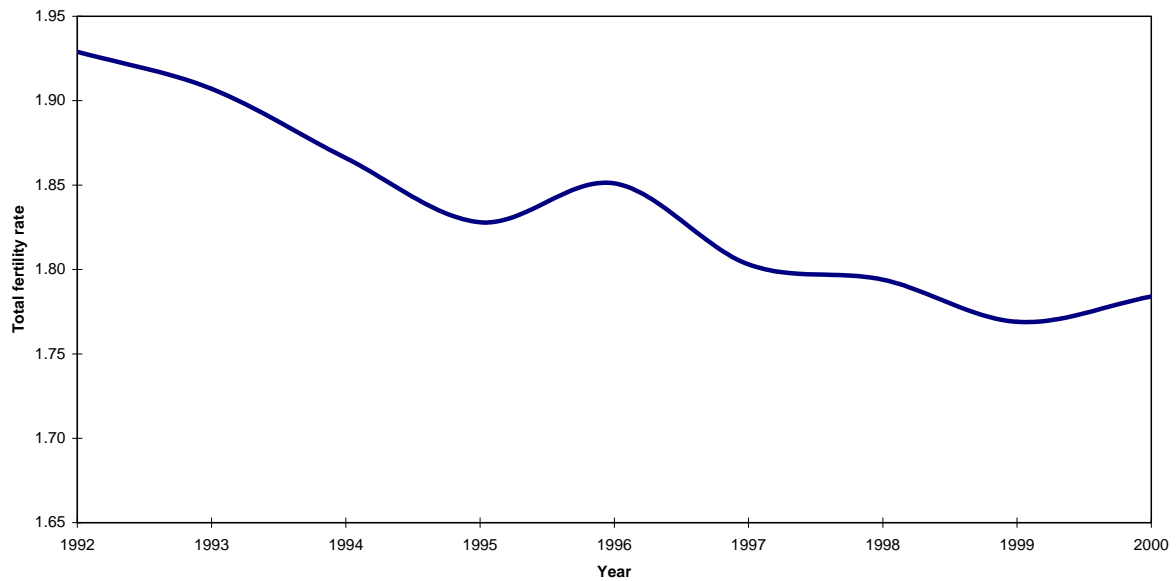
Table 3.1: TFR for Australia, States and Territories, 2001

	State / territory								
	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
TFR:	1.757	1.608	1.795	1.670	1.720	2.066	2.260	1.510	1.726

Source: Australian Bureau of Statistics, Births Australia 2001, Cat. no. 3301.0

Queensland's TFR declined from 1.93 in 1992 to 1.795 in 2001. There were a few fluctuations in the mid to late 1990s; in 2000 the TFR was 1.78, slightly higher than the 1999 TFR of 1.77, but it again dropped in 2001 to 1.795 (see Figure 3.3).

Figure 3.3: Total fertility rate, Queensland, 1992 to 2001



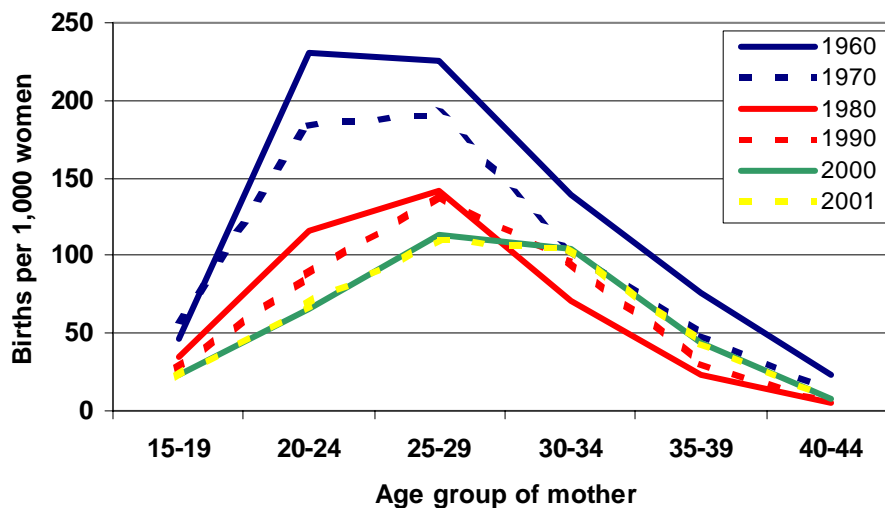
Source: Australian Bureau of Statistics, Demography Queensland 2001, 2000 and 1999, Cat. no. 3311.3

3.2 Age specific fertility rates

The age specific profile of Queensland fertility in 1960 shows that women in their 20s were the peak age group for mothers giving birth. There was then a steep decline in child-bearing after the age of 30. Twenty years later in 1980, the profile shows a shift in the peak child-bearing age from the early to late 20s, as well as a dramatic decline in the birth rate for all age groups.

Through the 1990s, the number of births among women aged less than 30 years declined but increased for those aged over 30 years, while the rates for the 25-29 year age group changed little over the decade to 1990. By 2000, the trend towards older fertility experiences continued, although the highest rates still occurred in the 25-29 year age group (see Figure 3.4).

Figure 3.4: Age-specific fertility rates for Queensland, selected years 1960 to 2001 (a)



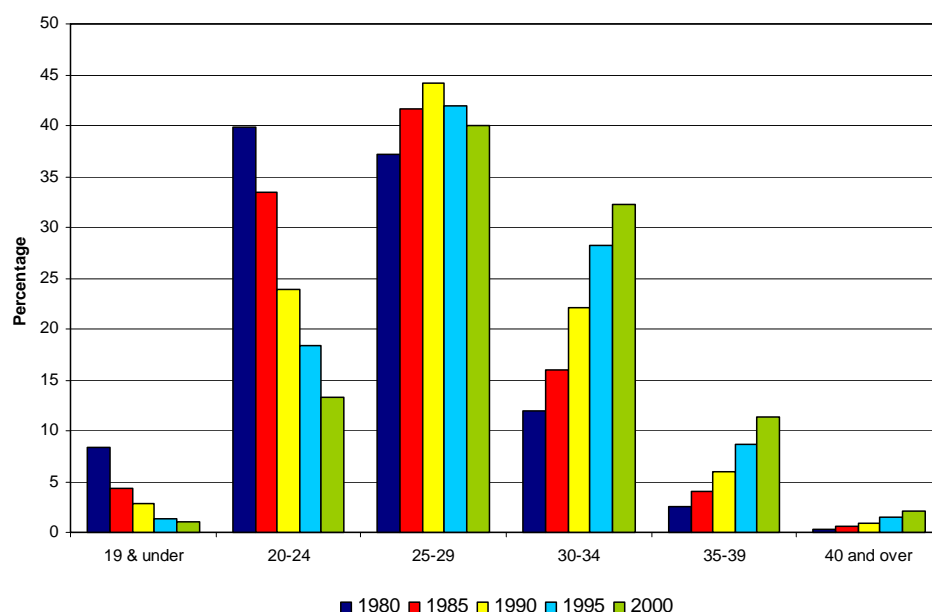
(a) The figure for 1960 is the average of annual rates for 1956 to 1960, and the data during that time excluded full blood Aborigines.

Source: Australian Bureau of Statistics, Demography Queensland 1975, Cat. no Q99/76, Demography Queensland 1980, Cat. no. 3101.3, and Demography Queensland 2000, Cat. no. 3311.3

In Queensland, the median age of mothers increased from 27.4 years in 1988 to 29.3 years in 2001, while the median age of fathers increased from 30.1 years in 1988 to 31.5 years in 2001. However, of more significance is the transition to an older pattern of initial parenthood as the postponement of child-bearing to later years leads directly to fewer children per parent.

The decline in the proportion of first-time mothers aged in their early 20s or teens since 1980 has spread to a decline in the proportion aged 25-29 since 1990 (see Figure 3.5). Increases in the incidence of first-time motherhood at older ages have not compensated for the reduction in births to younger women.

Figure 3.5: Proportion of nuptial first confinements by age of mother, Australia, selected years 1980 to 2001 (a)



(a) Excludes confinements to relationships with ex-nuptial births.

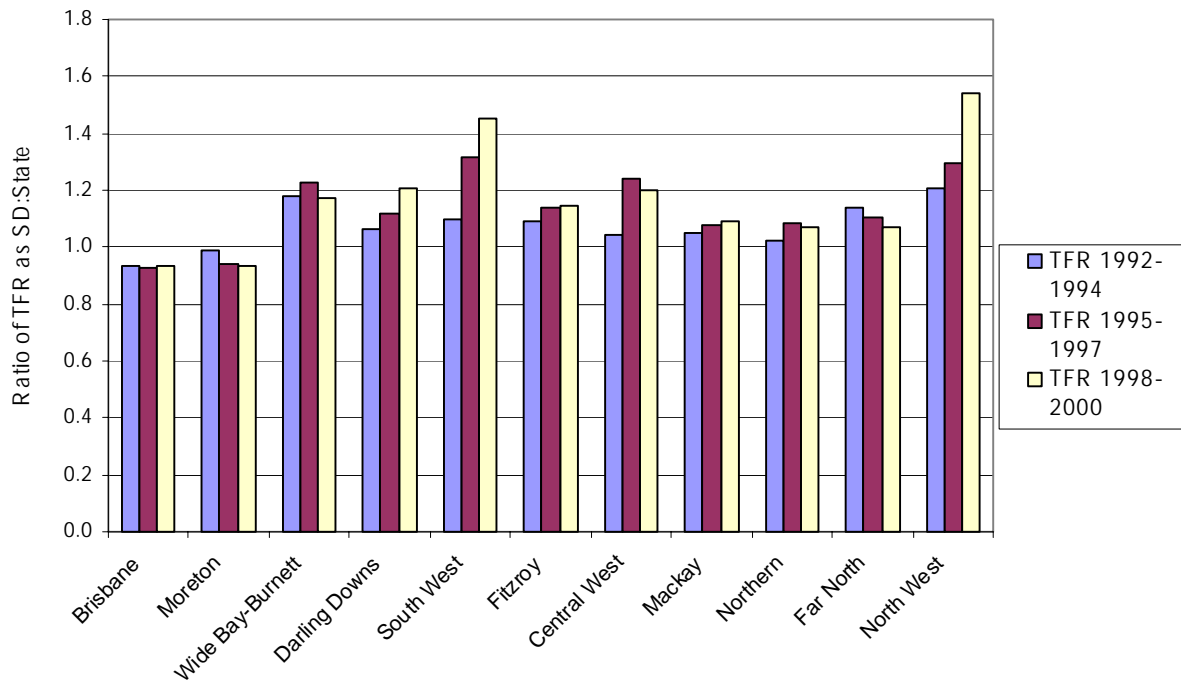
Source: Australian Bureau of Statistics, Births Australia 2000 and 2001, Cat. no. 3301.0

3.3 Regional variation in fertility rates

There are marked differences between fertility rates in Queensland's regional areas. Figure 3.6 shows TFRs calculated for Queensland statistical divisions (SDs) over three time periods compared with a whole of Queensland figure. Brisbane and Moreton SDs in South East Queensland had the lowest fertility rates in 1998-2000, followed by Far North, Northern and Mackay SDs. South West SD had the highest fertility rate of 2.55, and all the western divisions had higher fertility rates than the State average.

While there appears to be some similarity between TFRs in South East Queensland and Queensland as a whole, this is by no means the case for remaining SDs. Far North SD for example, has become more similar to the State as a whole but remaining regions have become less similar. The three western regions, for example, have increasingly diverged from the State figure and are currently most dissimilar to the State average.

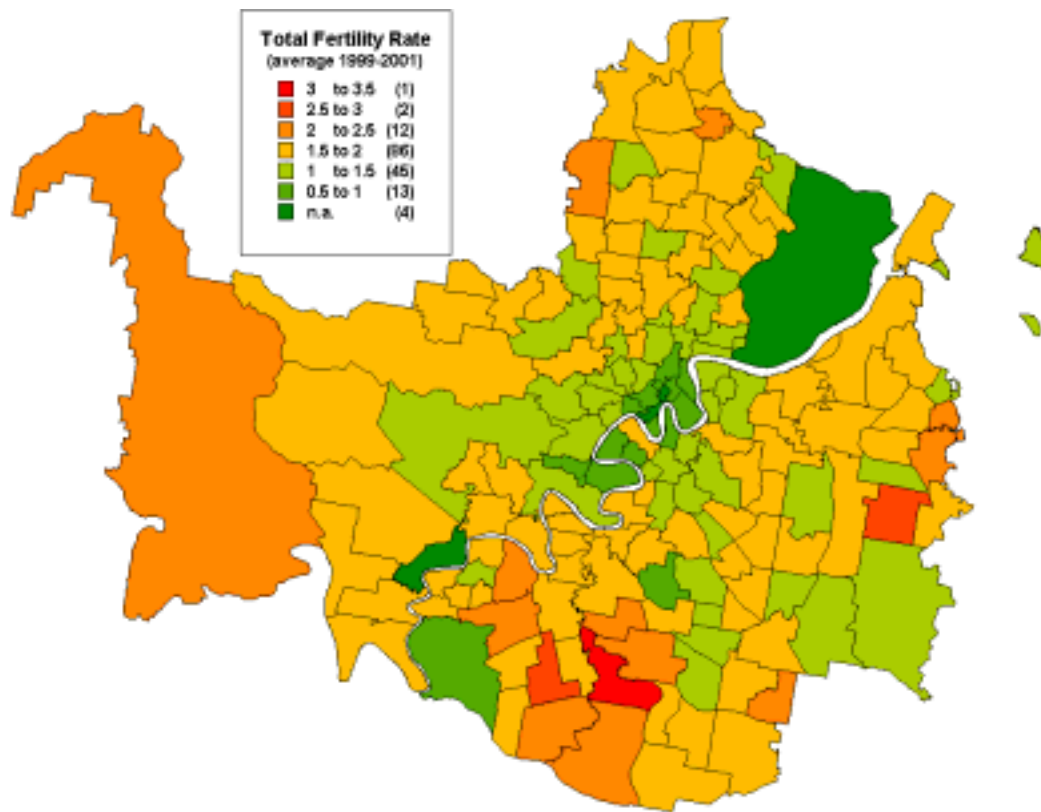
Figure 3.6: Ratio of TFR for statistical divisions: Queensland, 1992-1994, 1995-1997 and 1998-2000



Source: Australian Bureau of Statistics unpublished data

There are also significant variations within regions. Figure 3.7 shows the spatial variation in fertility within Brisbane City for 1999-2001. In general, lower fertility rates are apparent in the inner suburbs, with higher rates further from the city centre. For example, the average fertility rates from 1999 to 2001 in the Inner City areas of City-Remainder and New Farm were 0.77 and 0.67 respectively. In comparison, the fertility rate for the outer area of Chandler was 2.77 and Willawong was 3.15.

Figure 3.7: TFR map, Brisbane City, 1999-2001



Source: Australian Bureau of Statistics, Demography Queensland 2001, Cat. no. 3311.3

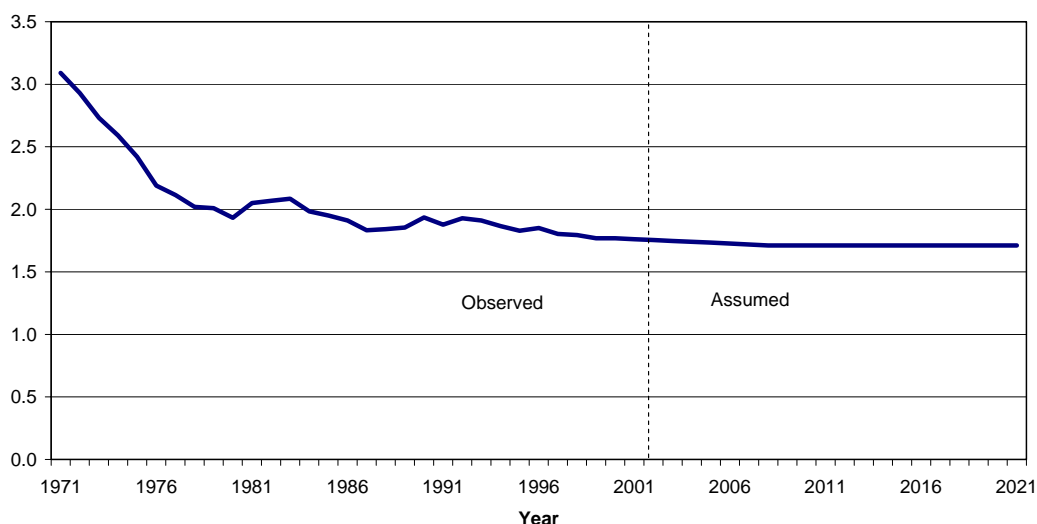
3.4 Future fertility possibilities

There is considerable uncertainty about future trends in fertility. Many other countries already have lower fertility rates than Australia, which may indicate that Australian rates still have some way to fall. Several demographers have argued that Australia's system of taxation and benefits discourages women from attempting to combine work and child-bearing, and that more and more women are choosing to postpone and then, perhaps, to forgo having children as a consequence. Postponement of the first birth to a later age by the mother leads to fewer children per mother overall. If this situation persists, fertility rates appear destined to continue their decline unless there is a radical shift in policy.

Many countries, particularly in Europe, have put into place policies to counter the decline in fertility, with varying success. There has been a growing awareness in Australia that the decline in fertility has far-reaching implications, and discussion has ensued about how to address it. Peter McDonald has suggested that the family-friendly policies adopted by Norway and France, which have both reversed a decline in fertility, provide a model that Australian policy-makers should closely examine.

Most commentators expect fertility rates in Australia to continue to fall, without some significant shift in policy. Both the current ABS and DLGP projections for Queensland assume a continued decline in fertility rates for some years to come. The 2000 release of ABS population projections assumed a TFR of 1.79 for the high series projections and a TFR of 1.64 for the low series projections for Queensland. In the DLGP 2001 edition projections, the fertility rate in Queensland is assumed to decline to 1.71 by 2008 (see Figure 3.8).

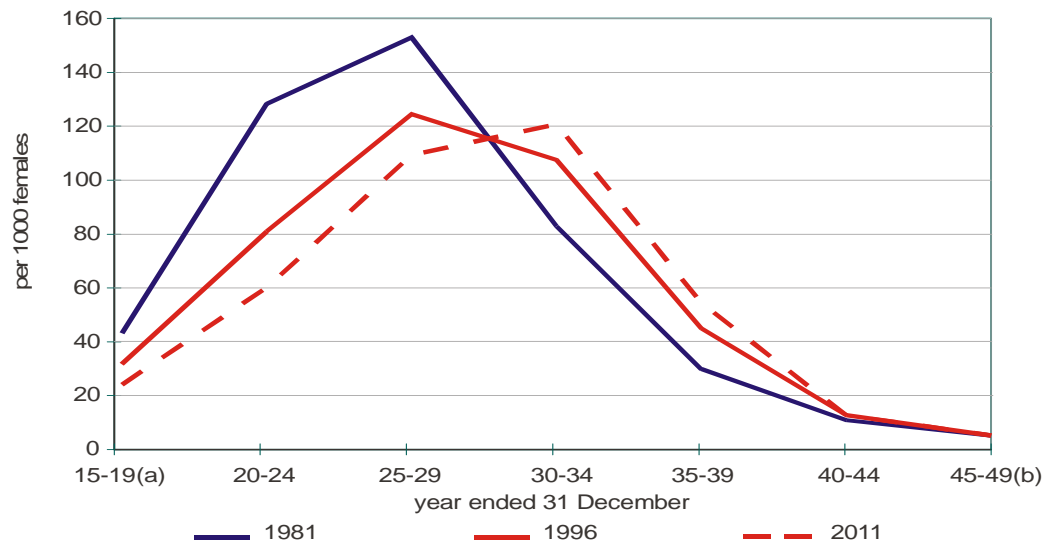
Figure 3.8: Fertility rate, Queensland, 1971 to 2021



Source: Australian Bureau of Statistics, Demography Queensland (various years), Cat. no. 3311.3; and QDLGP 2001.

Between 1981 and 1996, Queensland women increasingly gave birth when they were older and the peak age of childbirth became less pronounced. The assumed age-specific birth rates in 2011, shown in Figure 3.9, reflect these past trend considerations.

Figure 3.9: Age-specific fertility rates, Queensland, 1981, 1996 and 2011



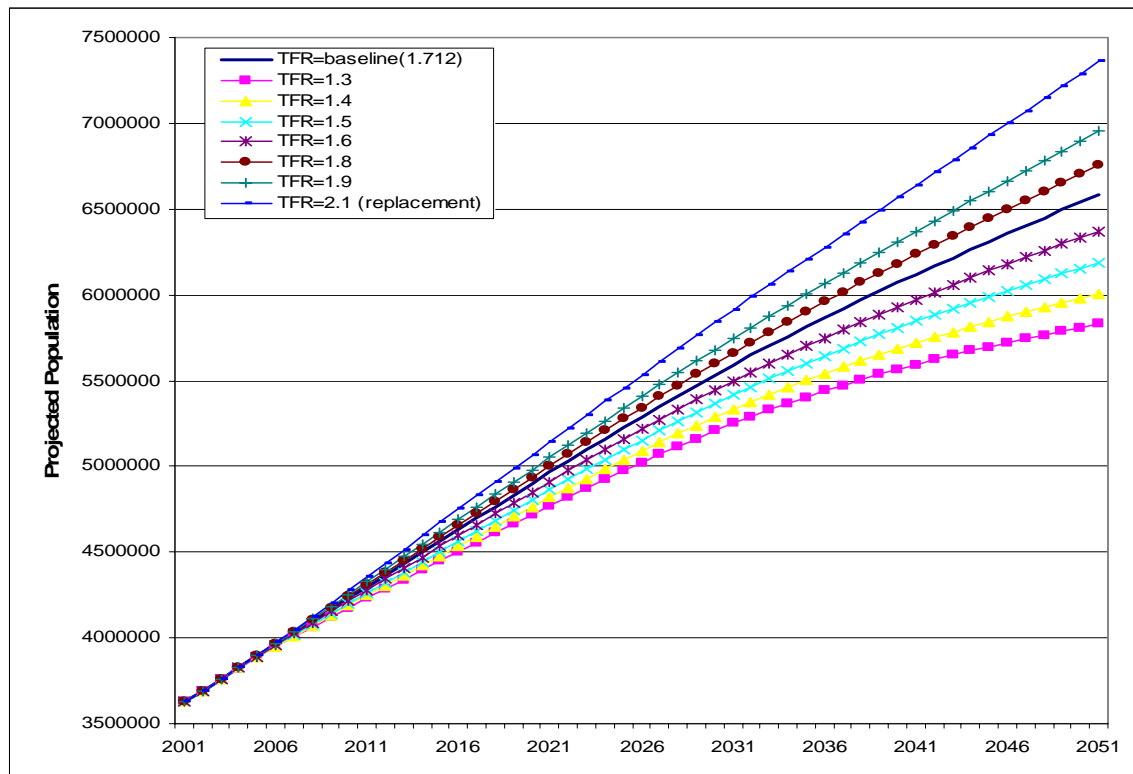
(a) Includes mothers aged less than 15 years.

(b) Includes mothers aged 50 years and over.

Source: Australian Bureau of Statistics, Demography Queensland 1996, Cat. no. 3311.3, and Births Australia 1996, Cat. no. 3301.0; and QDLGP, 2001

The Planning Information and Forecasting Unit has conducted research into the sensitivity of population projections as a result of altering fertility assumptions. This research involved holding the medium migration and mortality assumptions constant while a range of TFR assumptions from 1.3 to 2.1 (trended between 2002 and 2008 and held constant thereafter) were tested for Queensland. The results showed that by 2011 the population would be on average, 15,900 persons higher or lower for each increment or decrement of 0.1 in the assumption for TFR. By 2021 the difference would be about 82,700 persons, and each 0.1 of TFR would make a difference of almost 190,000 to the population by 2051 (see Figure 3.10).

Figure 3.10: Projected population under alternative fertility scenarios (a), Queensland, 2001 to 2051



(a) Achieved by progressive change in TFRs for 2002-2008 to rates ranging from 1.3 to 2.1, and constant thereafter.

If Queensland’s fertility rates decline to a TFR of 1.6 from 2008 onwards, the State’s projected population growth over the next 50 years (to 2051) would be 2.74 million. This compares with DLGP’s 2001 edition projections for growth of 2.96 million over the same period (using a TFR of 1.71 from 2008). An even lower TFR of 1.4 would reduce Queensland’s projected growth to 2.38 million while a higher TFR of 1.8 would increase projected growth to 3.13 million. Thus, the choice of assumed fertility rates will have a significant impact on Queensland’s projected population size.

A low assumption of a TFR of 1.4 might reduce the projected population growth by as much as 360,000 people over the next 50 years compared with a medium assumption of a TFR of 1.6. The reduction in population growth would be mostly persons of working age, and at the same time the median age of Queensland’s population would increase by about 4 years (compared with a more moderate assumption). This is a significant demographic shift with consequences for the whole society. At a TFR of 1.3, the number of children would actually decline in absolute terms after about 2031 while numbers entering the workforce would not keep pace with those leaving. The number of Queenslanders dying would exceed those being born much sooner than currently anticipated.

In summary, all indications are that fertility rates will continue to fall. Thus, a medium assumption could reasonably be considered to be that Queensland will reach a TFR of 1.6 by 2021 with this rate held constant thereafter. For initial scenario testing purposes a low assumption of 1.4 and a high assumption of 1.8 may also be considered. These rates correspond to current TFRs in Germany (a country with no policy intervention) and France (a country with a considerable range of fertility related policies) respectively.

MORTALITY TRENDS

Crude Death Rates refer to the number of deaths in a year for every 1,000 people. In contrast, *standardised rates* refer to the number of deaths in a year for every 1,000 people of a particular age. This enables comparison among populations with differing age structures.

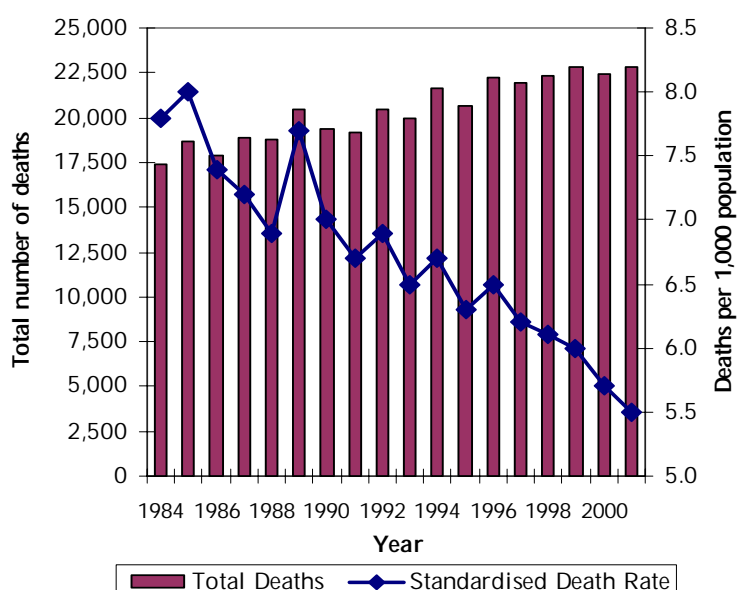
Life Expectancy is considered to be the number of years a person at a given age and sex can expect to live, in accordance with the given death rates.

4.1 Changes to death rates over time

The twentieth century saw a great decline in mortality and considerable increase in life expectancy. It is worth noting that the greatest decline of deaths during the first 40 years of the twentieth century was in infant mortality. Between 1940 and 1970 improvements were driven by improved technology, better social conditions and the availability of immunisation. The greatest decline was again in infant deaths, particularly due to increased prenatal care and infant immunisations. Other technological developments such as x-rays and nuclear imaging also made a considerable contribution to obstetrics, cancer treatment and research, therefore helping to increase the life expectancy of Queenslanders.

From 1970, continuing declines in mortality are considered to have resulted from the changing lifestyles and better health care of the general population (ABS, 1998, Cat. no. 3202.0) while in earlier years it was typically due to decreased infant mortality. As the population enjoys increased life expectancy and children have markedly higher survival rates, a greater proportion of deaths will occur in the 65 years and older age group. While infant mortality was the cause of more than 25 per cent of the total deaths in 1900, it only accounted for 1.2 per cent of the total number of deaths in 2001. The death rate in Queensland continues to fall steadily (see Figure 4.1).

Figure 4.1: Crude death rate, Queensland 1984 to 2001

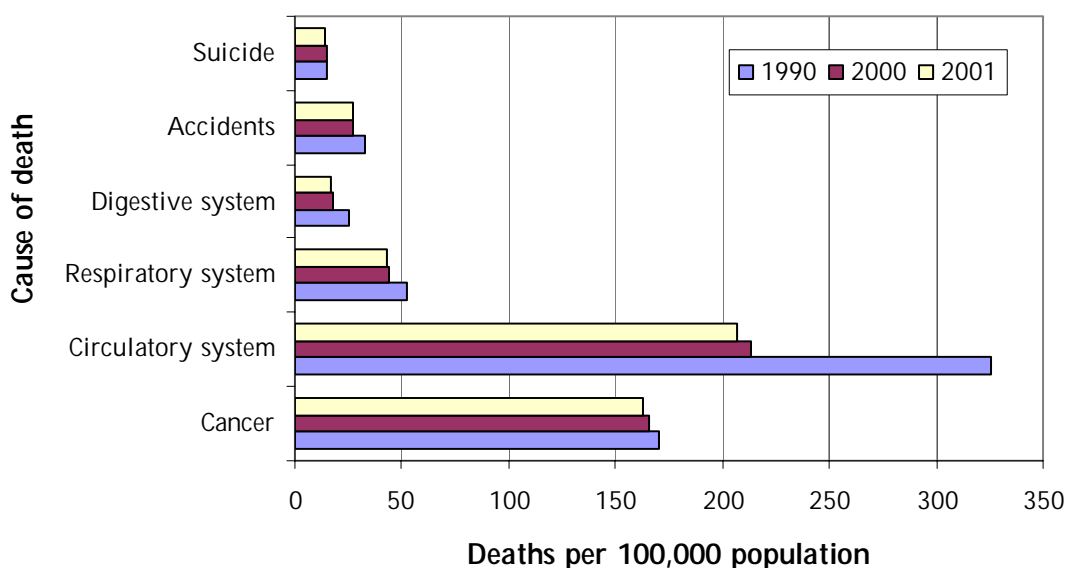


Source: Australia Bureau of Statistics, Demography Queensland (various editions), Cat. no. 3311.3

Over the past decade there has been a significant reduction in mortality rates for the major causes of death (see Figure 4.2). Proportionally, the largest decline was in deaths due to illness of the circulatory system including both heart disease and strokes. This dramatic decline is due to increased technology and access to improved health care. Accident mortality rates have also continued to decrease, most likely due to improved safety measures and enforcement of traffic laws.

Suicide was the sole exception among the major causes of death, rising from 14.8 deaths per 100,000 persons in 1990 to 15.2 deaths per 100,000 persons in 2000. In 2001, however, the rate had dropped again to 13.8 deaths per 100,000 persons.

Figure 4.2: Standardised death rates (a) by cause of death, Queensland, 1990, 2000 and 2001



(a) Standardised death rate per 100,000 of the mid-year 1991 population.

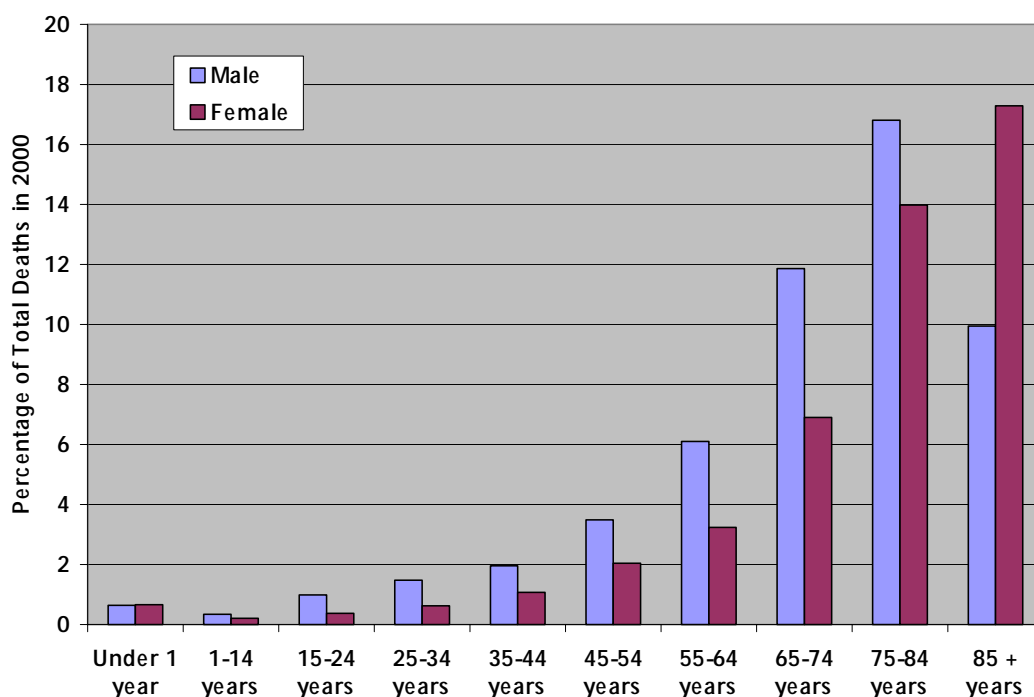
Source: Australian Bureau of Statistics, Causes of Death Australia 2000 and 2001, Cat. no. 3303.0

By 2001, the main causes of death among Queenslanders were cancer (28.3 per cent) and heart disease (26.9 per cent), which combined to account for more than 50 per cent of all recorded deaths (see Figure 6). While technological improvements will continue to decrease mortality, change of lifestyle (better nutrition, protection from the sun, cessation of smoking) is expected to play a crucial role in improving life expectancy in future years.

4.2 Age-specific death rates

Age-specific factors played a major role in explaining differential twentieth century death rates as infant mortality declined and the population steadily aged. In the twenty-first century, age-specific factors are essential to appreciate the phenomenon of external deaths in the adult and young adult population, and the different mortality experiences of males and females of all ages (see Figure 4.3).

Figure 4.3: Percentage of total deaths by age and sex, Queensland, 2001



Source: Australian Bureau of Statistics, Causes of Death 2001, Cat. no. 3303.0

Although Queensland’s infant mortality rate remained relatively low in 2001 at 5.9 deaths per 1,000 live births, it was still above the national average of 5.3 deaths per 1,000 live births. In Queensland, male and female infants had similar death rates while the Indigenous population had a markedly higher infant mortality rate.

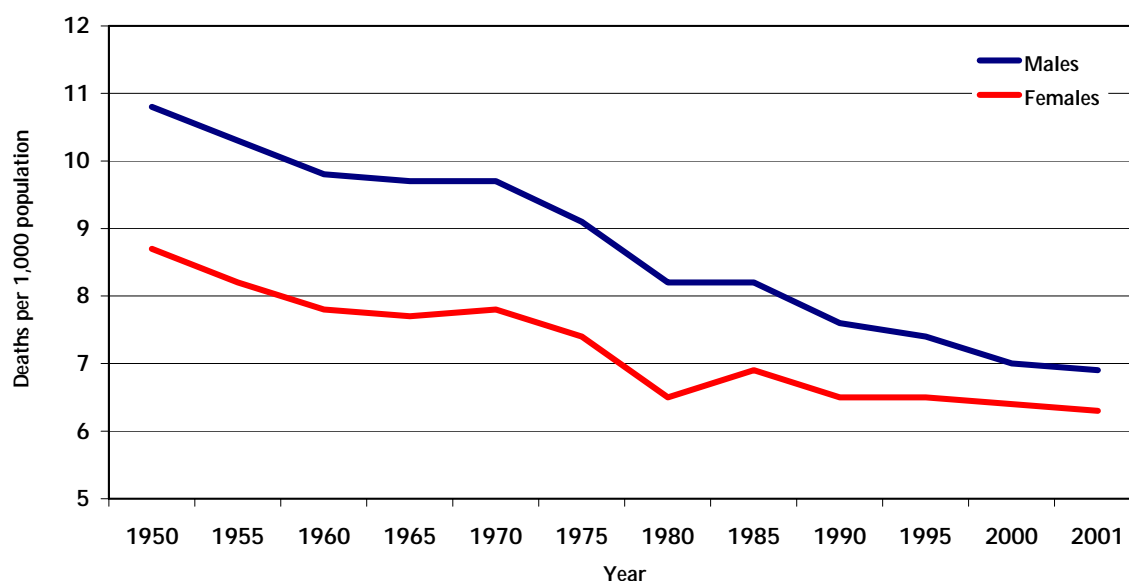
External factors such as transport accidents or suicide were the most frequent cause of death for both Queensland males and Queensland females aged between 15 and 44 years. For people aged 45 years or more, the most common causes of death were cancer and diseases of the circulatory system.

4.3 Other factors influencing death rates

Aside from age, the most immediate factor influencing death, there are a number of other factors that shape mortality rates and patterns. Among these factors, sex, geography, nationality and Indigenous heritage are the most relevant and predominant in Australia.

Australian males and females have historically had markedly different mortality experiences. Mortality rates for males have been consistently higher than for females, thus creating higher life expectancy for females than for males. Males and females experience mortality at different ages; while males have higher death rates in general, females have higher rates in the infant and very old (85+) age groups, with the latter accounting for 37 per cent of total female deaths (Figure 4.3). While the sex differential widened between 1946 and 1970, it has since begun to narrow (see Figure 4.4).

Figure 4.4: Crude death rates for males and females, Australia, 1950 to 2001



Sources: Vamplew, 1987; and Australian Bureau of Statistics, Deaths Australia (various editions), Cat. no. 3302.0

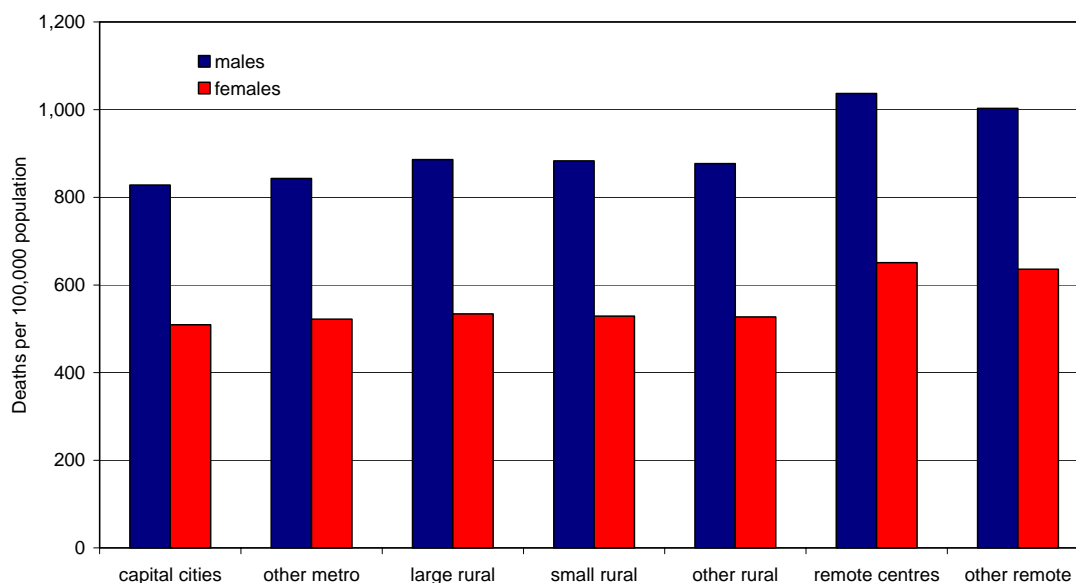
The Aboriginal and Torres Strait Islander population, in comparison to the non-Indigenous population, is marked by high death rates, low life expectancy, and distinctly different causes of death. In 2001, the Indigenous population had a death rate that was at least twice as high as the rate for the total Australian population. Based on ABS life tables for Queensland and experimental life tables for Aboriginal and Torres Strait Islander populations, the survival curves suggest that while 76.7 per cent of males and 86.5 per cent of females are expected to survive to age 70, only 23.8 per cent of Indigenous males and 38.5 per cent of Indigenous females are expected to survive to this age, largely due to high infant mortality.

In comparison to the total Queensland population, the median age at death in 2001 was 22.2 years lower for Indigenous males and 27.3 years lower for Indigenous females (ABS, 2001, Demography Queensland 2001). The median age at death for Indigenous females dropped 7.2 years between 2000 and 2001, decreasing the differential with Indigenous males and sharply increasing the differential between the Indigenous and total population.

4.4 Regional variation in mortality rates

Geographical location can have a substantial impact on likelihood of death, primarily due to access to health and basic services. People living in rural or remote areas tend to have slightly higher death rates than people living in urban areas (see Figure 4.5).

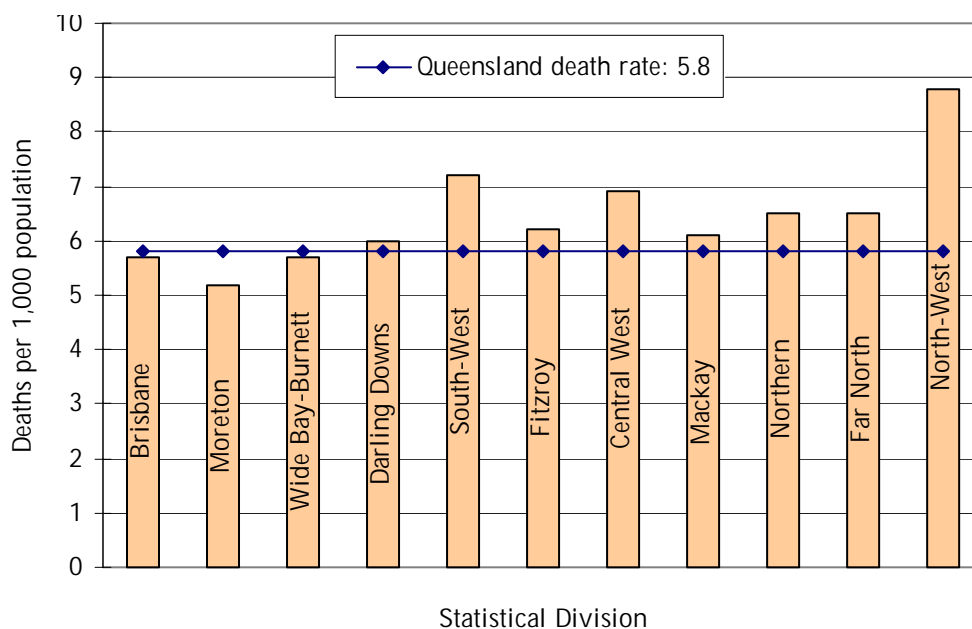
Figure 4.5: Total death rate, Australia, 1992-1996



Source: Strong et al., 1998

Brisbane, Moreton and Wide Bay-Burnett Statistical Divisions (SDs) were below the State average of 5.9 deaths per 1,000 of the population across all age groups, with all other SDs above the State average (see Figure 4.6). The highest rates were found in the North West and South West (8.2 and 7.3 deaths per 1,000 respectively) while the lowest rates were in Moreton and Brisbane (5.6 and 5.8 deaths per 1,000 respectively).

Figure 4.6: Indirect standardised death rates (a) by statistical division, Queensland, 2001

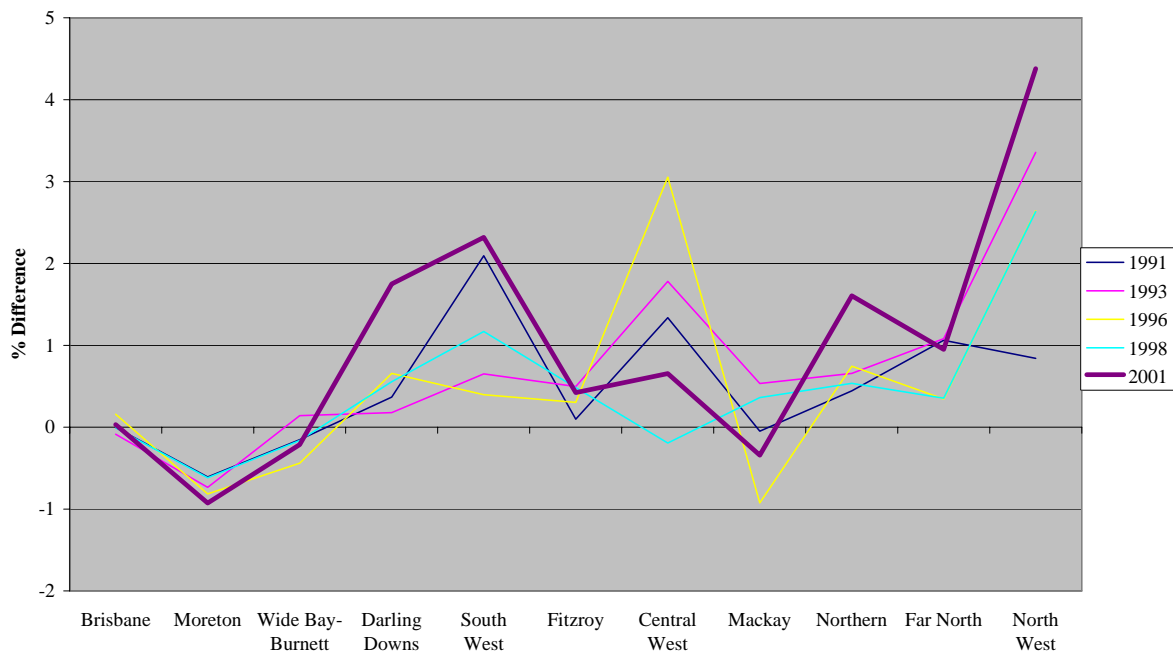


(a) Average indirect standardised death rate 1999-2001. Includes not stated, no fixed abode and overseas residents.

Source: Australian Bureau of Statistics, Deaths Australia 2001, Cat. no. 3302.0

Variations in mortality in regional areas do not seem to be either converging to or diverging from the State average in any consistent way. The following charts show the differences between standardised mortality ratios for each of the SDs compared with the Queensland figure for five different years (see Figures 4.7 and 4.8). While the largest variations are found in the three western Queensland regions, only two of these regions are diverging from the State figure with Central West recording a mortality ratio that is gradually approaching the Queensland figure.

Figure 4.7: Differences between female standardised mortality ratios and female crude death rates, by statistical division, Queensland, selected years, 1991 to 2001



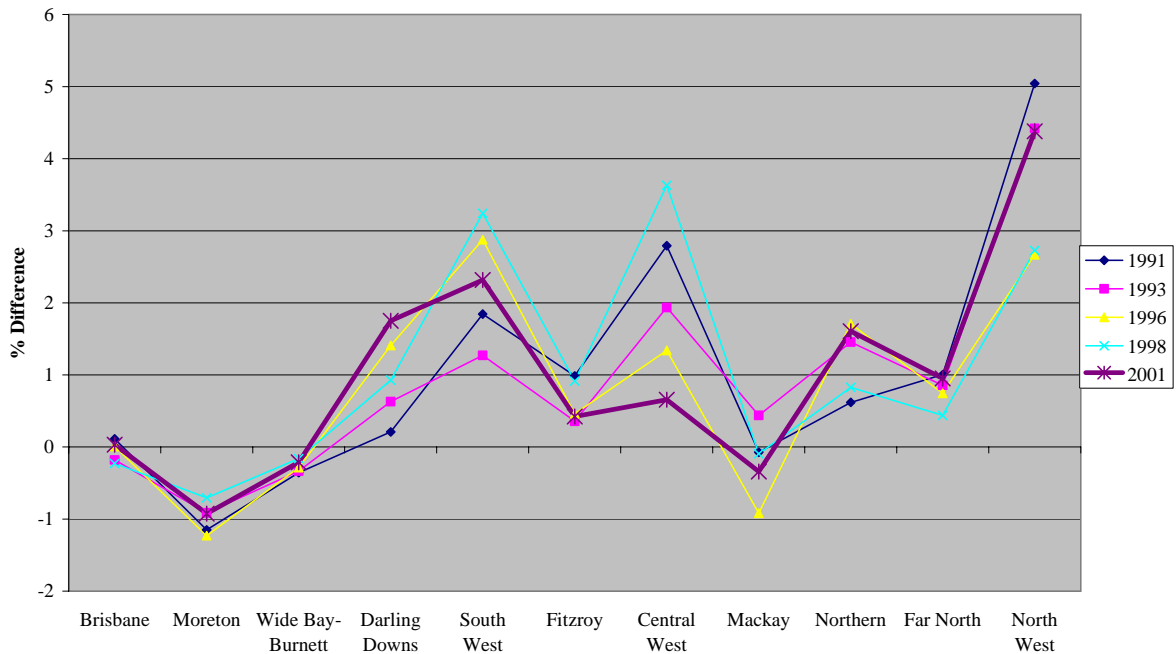
Source: OESR, unpublished deaths data

Chart produced by PIFU, 2003

Brisbane, Wide Bay-Burnett and Mackay SDs have mortality ratios most similar to the Queensland figure for both female and male deaths. Apart from the western Queensland regions, Darling Downs and Northern SDs are becoming less similar to the Queensland average while both Fitzroy and Far North SDs are also diverging from the statewide trend.

These variations make it extremely difficult to model mortality at the regional level. There does not appear to be any consistent trend of either convergence or divergence over time.

Figure 4.8: Differences between male standardised mortality ratios and male crude death rates, by statistical division, Queensland, selected years, 1991-2001



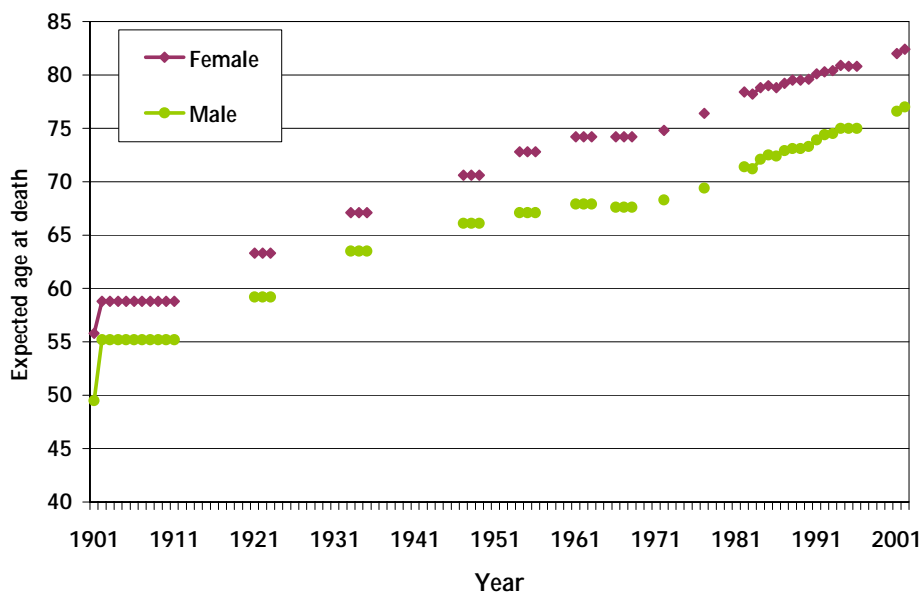
Source: OESR, unpublished deaths data

Chart produced by PIFU, 2003

4.5 Life expectancy

The life expectancy of Australians improved dramatically over the course of the twentieth century. Improvements in life expectancy were particularly rapid in the first part of the century; this gain slowed in the post-war years, but increased again from the 1970s (see Figure 4.9).

Figure 4.9: Life expectancy at birth, Australia, 1901 to 2001



Source: Australian Bureau of Statistics, Australian Demographic Trends 1997, Cat. no. 3102.0, and Deaths Australia 2001, Cat. no. 3302.0

The mortality rate declined between 1900 and 1920 while life expectancy greatly increased, jumping from an average 52.7 years in 1900 to 61.3 years in 1920. Males and females had a distinct gap in life expectancy in this time period, averaging a difference of 4.7 years with females living longer. The sex differential in life expectancy reached a peak of approximately seven years in the late 1970s and early 1980s, but it has once again begun to decline, reaching 5.4 years in 2001. Projections suggest the gap will narrow slowly further into the future (see Table 4.1).

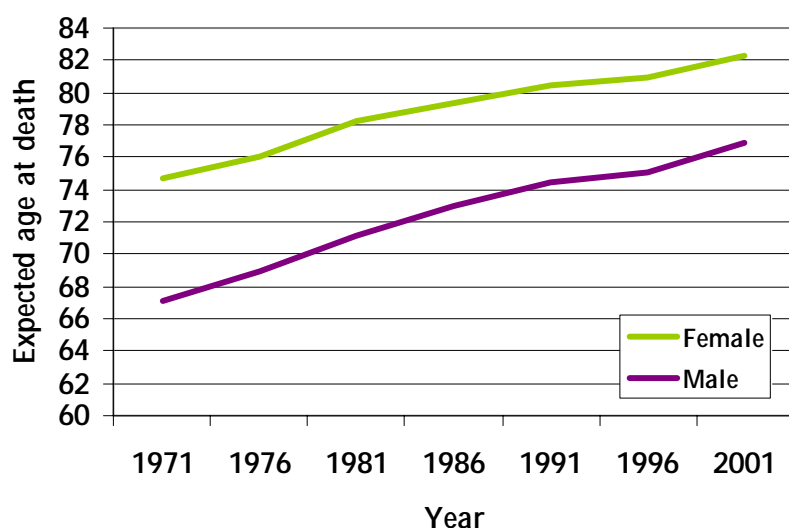
Table 4.1: Life expectancy for Queenslanders

	Males	Females	Difference
1880s	41	50	9 years
1910s	54	59	5 years
1976	69	76	7 years
2000	76	82	6 years
2001	77	82	5 years
2036	81	85	4 years
2051	83	87	4 years

Source: Australian Bureau of Statistics, Queensland Year Book, 2001, Cat. no. 1301.3, Australian Historical Population Statistics, Cat. no. 3105.0.65.001, and Population Projections for Australia, Cat. no. 3222.0

Life expectancy has continually increased in Queensland since 1971, and in 2001 life expectancy for males and females reached 76.9 and 82.3 years respectively (see Figure 4.10). In comparison, the life expectancy for all of Australia was marginally higher than for Queensland in 2001, with males at 77.0 years and females at 82.4 years.

Figure 4.10: Life expectancy at birth, Queensland, 1971 to 2001

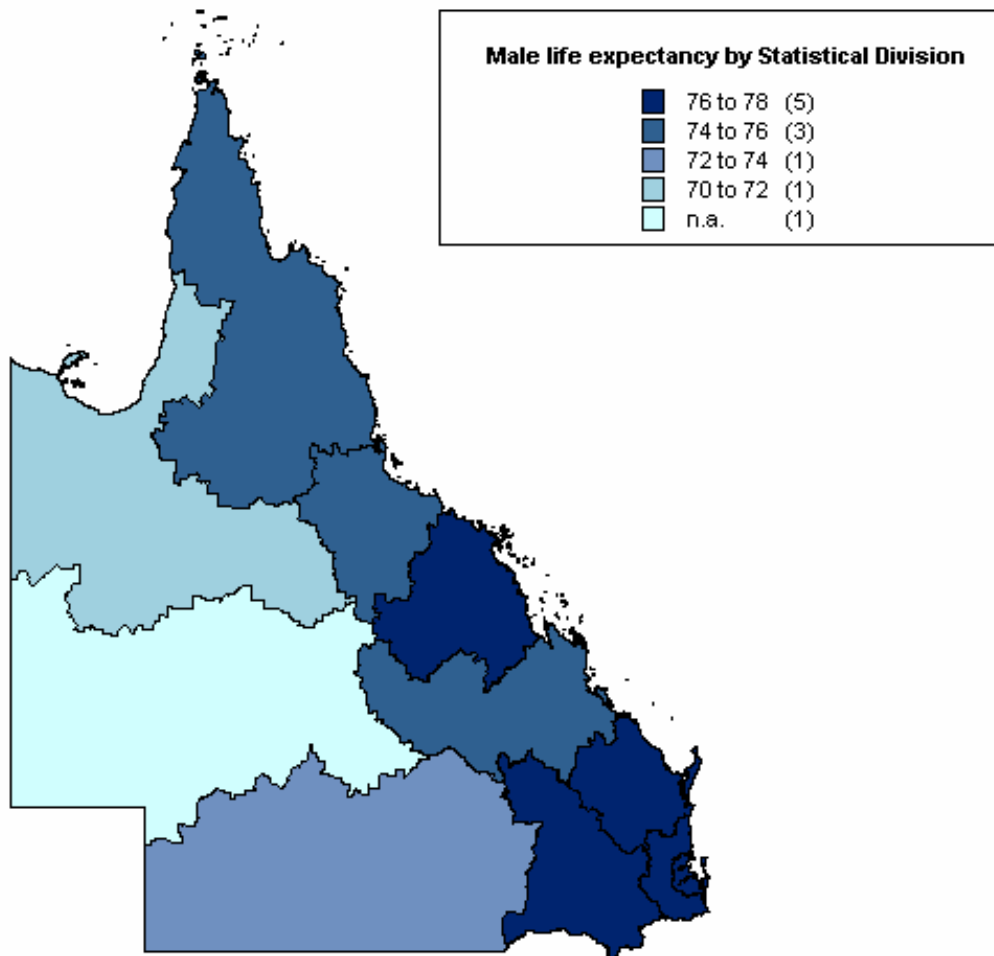


Source: Australian Bureau of Statistics, Demography Queensland (various editions), Cat. no. 3311.0

Life expectancy varies geographically in Queensland with the highest life expectancies generally experienced by people living in South East Queensland and Mackay. Conversely,

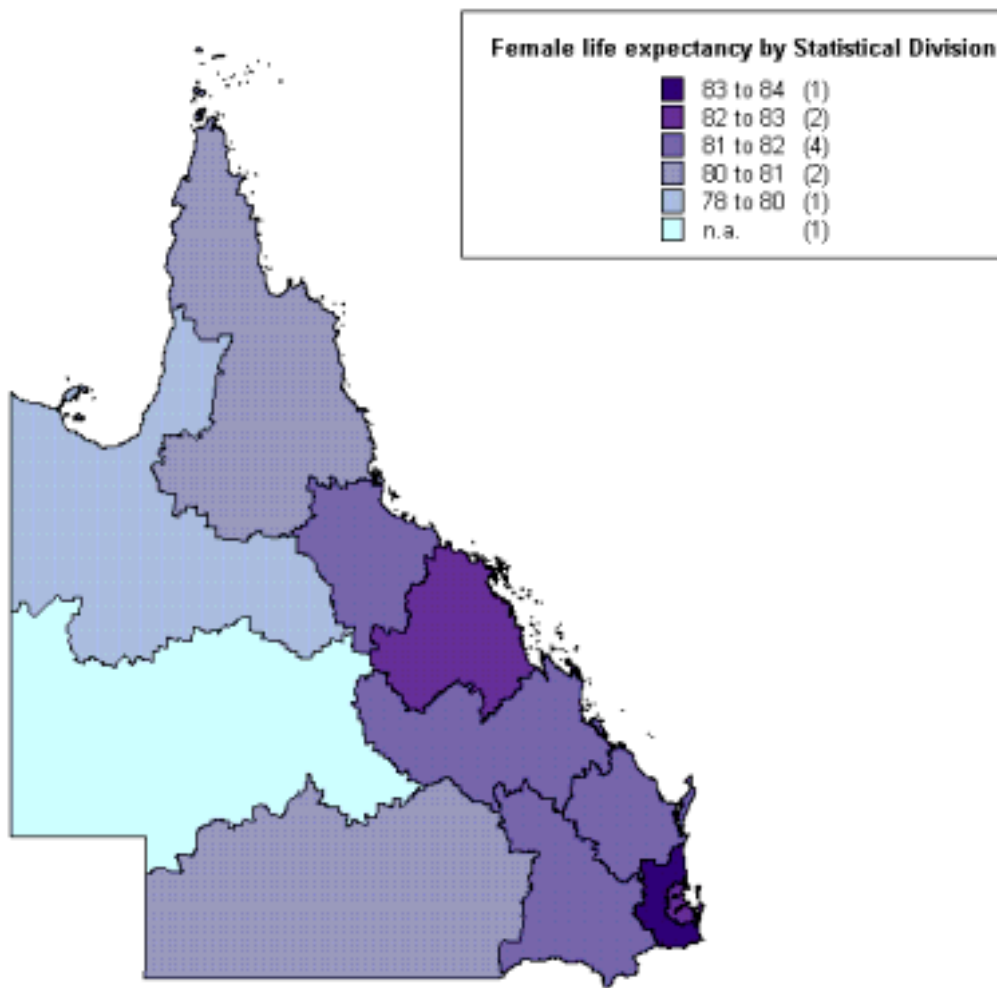
the lowest life expectancies are experienced by people living in western Queensland (see Figures 4.11 and 4.12). There is little deviation of life expectancy within statistical divisions, but there is a significant difference between male and female life expectancy.

Figure 4.11: Male life expectancy by statistical division, Queensland, 2001



Source: Australian Bureau of Statistics, Demography Queensland 2001, Cat. no. 3311.3

Figure 4.12: Female life expectancy by statistical division, Queensland, 2001

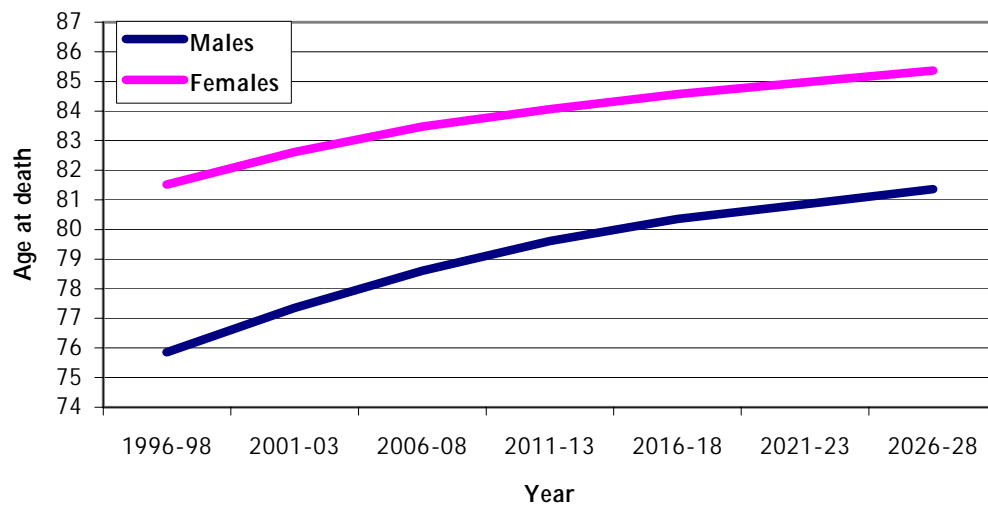


Source: Australian Bureau of Statistics, Demography Queensland 2001, Cat. no. 3311.3

4.6 Future life expectancy possibilities

Life expectancy is projected to continue to steadily and gradually increase with a narrowing sex differential (see Figure 4.13). By the year 2051, life expectancy at birth is projected to be 86.6 years for females and 83.3 years for males (ABS Deaths 1999).

Figure 4.13: Life expectancy at birth, observed and assumed, Australia, 1996-98 to 2026-28



Source: Australian Bureau of Statistics, Population Projections Australia 1999, Cat. no. 3222.0

5. APPENDIX 1: ABS assumptions (2000 edition projections)

Source: Population Projections for Australia, Cat. no. 3222.0

Table 1: Total fertility rates and fertility differentials

	1998			1996-1998			Assumed differential from 2008		
	Capital City	Balance of State	Total	Capital City	Balance of State	Total	Capital City	Balance of State	State
	rate	rate	rate	rate	rate	rate	%	%	%
NSW	1.71	2.01	1.80	1.73	2.03	1.82	97.20	114.40	102.40
Vict.	1.59	2.03	1.68	1.60	2.02	1.69	90.20	113.50	95.20
Qld	1.67	1.93	1.79	1.69	1.95	1.82	95.10	109.60	102.20
SA	1.62	2.02	1.70	1.62	2.06	1.72	91.30	114.90	96.90
WA	1.66	2.14	1.77	1.67	2.16	1.79	94.30	121.60	100.70
Tas.	1.67	1.93	1.81	1.65	1.96	1.83	92.80	110.00	102.90
NT	2.01	2.34	2.20	1.96	2.37	2.19	110.20	133.40	123.20
ACT	1.54	-	1.54	1.58	-	1.58	88.00	-	88.00
Australia			1.76			1.76			100.00

Table 2: Assumed total fertility rates from 2008, states/territories/regions

	ASSUMPTION 1: HIGH			ASSUMPTION 2: LOW		
	Balance of			Balance of		
	Capital City	State	Total	Capital City	State	Total
NSW	1.70	2.00	1.79	1.65	1.83	1.64
Vict.	1.58	1.99	1.67	1.44	1.82	1.52
Qld	1.66	1.92	1.79	1.52	1.75	1.64
SA	1.60	2.01	1.70	1.46	1.84	1.55
WA	1.65	2.13	1.76	1.51	1.95	1.61
Tas.	1.62	1.92	1.80	1.48	1.76	1.65
NT	1.93	2.33	2.16	1.76	2.13	1.97
ACT	-	-	1.54	-	-	1.41
Australia			1.75			1.60

Table 3: Life expectancy at birth, observed and assumed, Australia

Period	Life Expectancy at Birth		Increase per Year		Difference between female and male life expectancy years
	Males	Females	Males	Females	
	years	years	years	years	
1996-1998	75.86	81.52	-	-	5.70
2001-2003	77.36	82.62	0.30	0.22	5.30
2006-2008	78.61	83.47	0.25	0.17	4.90
2011-2013	79.61	84.07	0.20	0.12	4.50
2016-2018	80.36	84.57	0.15	0.10	4.20
2021-2023	80.86	84.97	0.10	0.08	4.10
2026-2028	81.36	85.37	0.10	0.08	4.00
2051-2053	83.36	86.62	0.08	0.05	3.30
ABS High: 2051	92.10	93.40			

Table 4: Net interstate migration, observed and assumed ('000)

	QLD	Capital City (Brisbane)	Balance of QLD
Observed			
1998	18.0	7.7	10.3
1999p	17.2	6.2	11.0
1999 (actual)	16.7	-	-
Assumption 1 (High)			
2000	15.7	7.6	8.1
2001	20.5	9.0	11.5
2002	25.3	10.4	14.9
2003	30.1	11.8	18.3
2004-2051	35.0	13.0	22.0
Assumption 2 (Medium)			
2000	15.7	7.0	8.7
2001	18.0	7.8	10.2
2002	20.3	8.6	11.7
2003	22.6	9.4	13.2
2004-2051	25.0	10.0	15.0
Assumption 3 (Low)			
2000	15.7	6.2	9.5
2001	15.8	6.2	9.6
2002	15.9	6.1	9.8
2003	16.0	6.1	9.9
2004-2051	16.0	6.0	10.0

Table 5: Assumed net overseas migration, capital city/balance of state or territory, 1999-2101

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
Assumption 1 (high) ('000)									
Capital City	42.1	23.3	10.7	3.6	13.5	0.1	0.4	0.4	60.0
Balance of State	4.7	1.8	7.3	0.3	1.5	0.1	0.3	-	10.0
Total	46.7	25.2	17.9	3.9	15.1	0.2	0.7	0.4	70.0
Assumption 2 (medium) ('000)									
Capital City	34.5	19.1	8.7	2.9	11.1	0.1	0.3	0.2	77.1
Balance of State	3.8	1.5	5.9	0.3	1.3	0.1	0.2	-	12.9
Total	38.3	20.6	14.7	3.2	12.3	0.1	0.6	0.2	90.0
Assumption 3 (low) ('000)									
Capital City	26.9	14.9	6.8	2.2	8.6	0.0	0.2	0.1	94.3
Balance of State	3.0	1.5	4.6	0.2	1.0	0.0	0.2	-	15.7
Total	29.9	16.1	11.4	2.4	9.6	0.1	0.4	0.1	110.0

6. APPENDIX 2: Proposed ABS assumptions (2002 edition projections)

Table 1: Total fertility rates and fertility differentials, 1999-2001

	1999-2001			Assumed differential		
	Capital City rate	Balance of State rate	Total rate	Capital City %	Balance of State %	State %
NSW	1.73	1.98	1.80	96.00	109.80	103.00
Vict.	1.56	1.88	1.63	95.90	115.30	93.10
Qld	1.69	1.89	1.79	94.40	105.90	102.20
SA	1.58	2.05	1.70	93.00	120.90	96.90
WA	1.67	2.14	1.78	94.00	120.50	101.90
Tas.	1.82	2.00	1.92	95.00	104.50	110.10
NT	1.69	2.79	2.22	76.00	125.40	127.60
ACT	-	-	1.59	-	-	91.10
Australia			1.75			100.00

Table 2: Assumed total fertility rates from 2011, states/territories/regions

	ASSUMPTION 1: HIGH			ASSUMPTION 2: LOW		
	Capital City	Balance of State	Total	Capital City	Balance of State	Total
NSW	1.88	2.15	1.96	1.39	1.58	1.44
Vict.	1.70	2.04	1.77	1.25	1.50	1.30
Qld	1.83	2.06	1.94	1.35	1.52	1.43
SA	1.71	2.23	1.84	1.26	1.64	1.36
WA	1.82	2.33	1.94	1.34	1.72	1.43
Tas.	1.99	2.19	2.09	1.46	1.61	1.54
NT	1.84	3.04	2.43	1.36	2.24	1.79
ACT	-	-	1.73	-	-	1.28
Australia			1.90			1.40

Table 3: Life expectancy at birth, observed and assumed, Australia

Period	Life Expectancy at Birth		Increase per Year		Difference between female and male life expectancy years
	Males years	Females years	Males years	Females years	
Assumption 1 - Declining improvement in life expectancy at birth					
1999-2001	77.03	82.41	-	-	5.4
2004-2006	78.50	83.65	0.30	0.25	5.2
2009-2011	79.95	84.65	0.25	0.20	4.9
2014-2016	80.75	85.40	0.20	0.15	4.7
2019-2021	81.50	85.90	0.15	0.10	4.4
2024-2026	82.00	86.30	0.10	0.08	4.3
2050-2052	84.08	87.60	0.08	0.05	3.5
Assumption 2 - Constant improvement in life expectancy at birth					
1999-2001	77.03	82.41	-	-	5.4
2004-2006	78.50	83.65	0.30	0.25	5.2
2009-2011	80.00	84.90	0.30	0.25	4.9
2014-2016	81.50	86.15	0.30	0.25	4.7
2019-2021	83.00	87.40	0.30	0.25	4.4
2024-2026	84.50	88.65	0.30	0.25	4.2
2050-2052	92.30	95.15	0.30	0.25	2.9

Table 4: Net interstate migration, observed and assumed ('000)

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
Observed								
1998	-12.2	-0.3	17.4	-2.0	3.2	-3.6	-0.5	-2.0
1999	-13.1	2.5	16.7	-1.6	0.3	-3.3	-1.0	-0.5
2000	-14.3	5.2	18.5	-3.5	-2.2	-2.6	-0.9	-0.1
2001	-16.3	5.2	20.0	-2.4	-3.1	-2.1	-1.6	0.4
2002	-23.8	6.2	29.0	-1.9	-4.2	-1.7	-2.8	-1.0
Assumption 1 (High)								
2003	-29.0	-	36.0	-2.5	-1.5	-1.5	-1.5	0.0
2004	-27.0	-6.0	36.0	-3.5	1.5	-1.0	-0.5	0.5
2005-2051	-25.0	-12.0	36.0	-4.5	4.0	-0.5	1.0	1.0
Assumption 2 (Medium)								
2003	-25.5	2.0	32.0	-2.0	-2.0	-2.0	-2.0	-0.5
2004	-20.5	-2.0	29.0	-2.5	-	-2.0	-1.5	-0.5
2005-2051	-16.0	-6.0	25.0	-2.5	2.0	-2.0	-0.5	-
Assumption 3 (Low)								
2003	-23.0	5.0	29.0	-1.5	-3.5	-2.5	-2.5	-1.0
2004	-17.0	4.0	23.0	-1.0	-2.5	-2.5	-2.5	-1.5
2005-2051	-10.0	3.0	16.0	-0.5	-2.0	-3.0	-2.0	-1.5

Table 5: Assumed net overseas migration, capital city/balance of state or territory, 2002-2101

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
				Assumption 1 (high)					
Capital City	45.0	27.2	11.6	4.6	12.5	0.4	0.8	1.8	103.3
Balance of State	6.5	2.9	8.7	0.6	1.6	0.4	0.5	-	21.7
<i>Total</i>	<i>51.4</i>	<i>30.0</i>	<i>20.3</i>	<i>5.2</i>	<i>14.1</i>	<i>0.8</i>	<i>1.3</i>	<i>1.8</i>	<i>125.0</i>
				Assumption 2 (medium)					
Capital City	36.0	21.7	9.3	3.7	10.0	0.4	0.6	1.4	82.6
Balance of State	5.2	2.3	7.0	0.5	1.3	0.3	0.4	-	17.4
<i>Total</i>	<i>41.2</i>	<i>24.0</i>	<i>16.3</i>	<i>4.1</i>	<i>11.3</i>	<i>0.7</i>	<i>1.1</i>	<i>1.4</i>	<i>100.0</i>
				Assumption 3 (low)					
Capital City	25.2	15.2	6.5	2.6	7.0	0.2	0.4	1.0	57.8
Balance of State	3.6	1.6	4.9	0.3	0.9	0.2	0.3	-	12.2
<i>Total</i>	<i>28.8</i>	<i>16.8</i>	<i>11.4</i>	<i>2.9</i>	<i>7.9</i>	<i>0.5</i>	<i>0.7</i>	<i>1.0</i>	<i>70.0</i>

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