2 0 0 2 – 2 1 0 1 P O P U L A T I O N P R O J E C T I O N S — A U S T R A L I A

A S S U M P T I O N S S U M M A R Y ....

FERTILITY

For the fertility component, assumptions are made on future total fertility rate (TFR), as well as for age-specific fertility rates, and for the sex ratio at birth. Assumptions for population projections are formulated on the basis of past demographic trends, both in Australia and overseas. The three assumptions for Australia's future levels of fertility: high (1.9); medium (1.6); and low (1.4), are made in the context of recent trends in the TFR, especially those of the last decade.

The high fertility scenario assumes that the TFR will reach 1.9 in 2011 and then remain constant, reflecting the fact that fertility has fluctuated between 1.7 and 1.9 babies per woman since the late 1970s. This scenario is consistent with the United Nations' high variant projected TFR for Australia for 2010-2015 (1.9).

The medium and low fertility assumptions are based on the downward trend evident in Australia's TFR over the past ten years. These scenarios assume the persistence of factors associated with declining fertility, such as the increased participation of women in education and in the labour force. Under these scenarios it is assumed the Australia will reach the projected TFR by 2011 and then remain constant.

Once determined for Australia, assumptions for these three aspects of fertility at lower geographic levels will be derived from current relativities between Australia and each state/ territory, and between each state/territory and its capital city/balance of state.

Age-specific Fertility Rates

Over the past 10 years, age-specific fertility rates have been declining for the younger age groups (those below age 30), whilst increasing among women aged 30 years and over, representing a gradual shift in fertility towards older ages. These trends are assumed to continue under all three projection scenarios. The impact of these trends is that the mean age of women at childbirth will rise from 28.5 years in 1991 and 29.5 years in 2001 to 30.5 years by 2011.

Sex Ratio

The sex ratio (the ratio of male to female births, multiplied by 100) was 105.2 in 2001, 104.8 in 1999, and 105.3 in 1991. It is proposed to use a constant ratio of 105 male births per 100 female births for the duration of the projection period.

MORTALITY

The trend in mortality has been a steady rise in the expectation of life at birth for both males and females. For the purpose of population projections the long-term mortality assumption is that life expectancy at birth will increase from the 1999-2001 level of 77.0 years for males and 82.4 years for females to 84.1 years for males and 87.6 years for females in 2050-2052. An alternative assumption is that the 1999-2001 life expectancy at birth will increase to 92.3 years for males and 95.2 years for females in 2050-2052.

MORTALITY *continued*

The assumptions are based on the trend in life expectancy at birth during 1986-2001 for males and females. The first assumption assumes an increase in life expectancy at birth of 0.30 years for males and 0.25 years for females per year, continuing until 2006-2008 and then gradually declining over time. The alternative assumption is that the assumed rate of mortality improvement will continue through to 2051-2053.

Once determined for Australia, assumptions for mortality at lower geographic levels will be based on current relativities between Australia and each state/ territory, and between each state/territory and its capital city/balance of state.

Age-specific death rates

Under both assumptions the pattern of change in age-sex specific death rates from 1991-2001 has been assumed to continue until 2050-52. The pattern of the assumed rate of change in age-specific death rates will be scaled up or down to conform to the predetermined life expectancies at birth for future years.

OVERSEAS MIGRATION

Overseas arrivals on a yearly basis are determined by the Migration Program announced by the Government, together with the movement of New Zealand citizens and other long-term migrants who do not come under the Migration Program. Net overseas migration takes into account these overseas arrivals and those who leave the country on a permanent or long-term basis and by category jumping. For the projection series, net category jumping estimates will be set as zero.

In May 2002, the Government announced an enlarged migration program, providing for 100,000 to 110,000 migration visas as compared to 93,000 visas under the 2000-01 Program. In addition, there are places for the Humanitarian migration and special eligibility migration.

Given the high Migration Program numbers from 2002-03, it is proposed that three assumptions will have net overseas migration reaching the levels of the 70,000, 100,000, and 125,000 by 2005-06. These levels will then remain constant for future years.

Net overseas migration (permanent and long-term) will be split into arrivals and departures; and each by age and sex, and state/territories and capital city and balance of state levels. The input data for these calculations are the migration data through overseas arrivals and departure statistics over the past few years and the 2001 Census data.

INTERSTATE MIGRATION

With the availability of final interstate migration for 1996 to 2001 the proposed
assumptions for net interstate migration are shown below:

PROJECTED NET INTERSTATE MIGRATION — 2002-2101 series

Year ended 30 June	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000
Assumption 1 (High)								
2003	–29.0	—	36.0	–2.5	–1.5	–1.5	–1.5	—
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

In brief, levels for the Medium series have been roughly based on long-term averages for
the states and territories, while the High and Low series encompass a wider range of
values to allow for a wider range of possible future outcomes.

The above assumptions will need to be translated into arrivals and departures for each
state/territory and capital city and balance, and for each region an age-sex distribution
will be determined, based on internal migration data from the 2001 and perhaps earlier
censuses.

FERTILITY ASSUMPTIONS ....

SUMMARY

Future trends in fertility are an important determinant of Australia's population size and growth in years to come. In order to produce population projections, assumptions for each year in the projection period are required for the total fertility rate (TFR), as well as for age-specific fertility rates, and for the sex ratio at birth.

There are three assumptions proposed for Australia's future TFR: high (1.9); medium (1.6); and low (1.4). The trend towards older ages of mothers at birth of children is assumed to continue under all scenarios, while the sex ratio is assumed to be 105 male births per 100 female births.

Once determined for Australia, assumptions for these three aspects of fertility at lower geographic levels are derived from current relativities between Australia and each state/territory, and between each state/territory and its capital city/balance of state.

Assumptions for population projections are formulated on the basis of past demographic trends, both in Australia and overseas. This paper describes these trends and gives the rationale for the fertility assumptions made for the current set of projections.
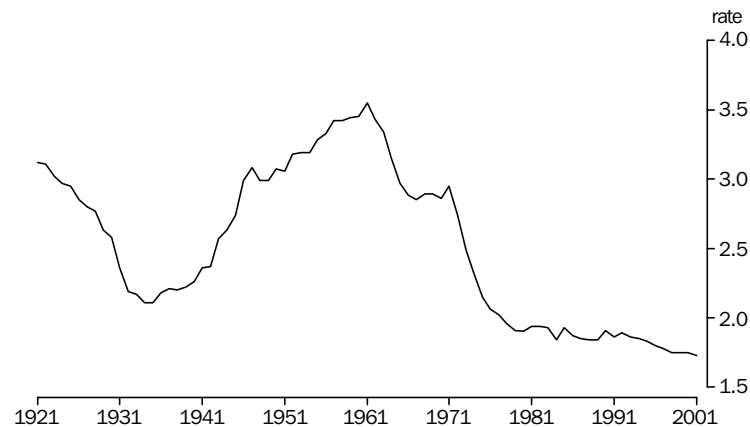
TRENDS IN THE TOTAL FERTILITY RATE

In 1961, at the height of the 'baby boom', Australia's TFR peaked at 3.5 babies per woman. Since then, fertility has declined, falling sharply during the early 1960s as the oral contraceptive pill became more widely available, before hovering at 2.9 babies per woman in the years 1966–1971. The reinterpretation of abortion law in New South Wales in 1971 in the case of R v Wall et al, had a substantial impact on women's ability to control their fertility. Subsequently a fall in births to young women contributed to a further decrease in the TFR and an increase in the median age of mothers (Carmichael, 1998). The TFR reached replacement level (2.1) in 1976, and continued to fall as increasing numbers of women chose to delay or forego having children.

Fertility stabilised somewhat during the 1980s, before resuming a more gradual decline during the 1990s. The TFR fell from 1.9 babies per woman in 1990, to 1.8 by 1995. At 1.73 babies per woman, the TFR for 2001 is the lowest on record (Births, cat. no. 3301.0).

TRENDS IN THE TOTAL FERTILITY RATE *continued*

TOTAL FERTILITY RATE, Australia

ASSUMED TOTAL FERTILITY RATES

The three assumptions for Australia's future levels of fertility are made in the context of recent trends in the TFR, especially those of the last decade.

The high fertility scenario assumes that the TFR will reach 1.9 in 2011 and then remain constant. The TFR appeared to have achieved some degree of stability at around this level during the 1980s, and this scenario acknowledges the possibility of a return to such a level.

The medium and low fertility assumptions are based on the downward trend evident in Australia's TFR over the past ten years. These scenarios assume the persistence of factors associated with declining fertility, such as the increased participation of women in education and in the labour force. Further increases in participation may result in smaller families and increasing childlessness, both of which would lower the TFR.

The medium scenario assumes a gradual continuation of the downward trend in fertility, with the TFR reaching 1.6 babies per woman by 2011, and thereafter remaining constant. This assumption reflects a fertility level already reached in some parts of Australia: Victoria, for example, recorded a total fertility rate of 1.6 in 2001.

Under the low fertility assumption, the TFR is projected to decline at a faster rate, reaching 1.4 babies per woman by 2011, then remaining constant. Fertility rates have reached such levels in many European countries, and recent projections indicate that this kind of scenario is considered a possibility in several others. Within Australia, fertility in the ACT is arguably approaching such a level, with a TFR of 1.5 in 2001.

ASSUMED TOTAL FERTILITY RATES *continued*

TOTAL FERTILITY RATE, Australia: **Observed and Assumed**
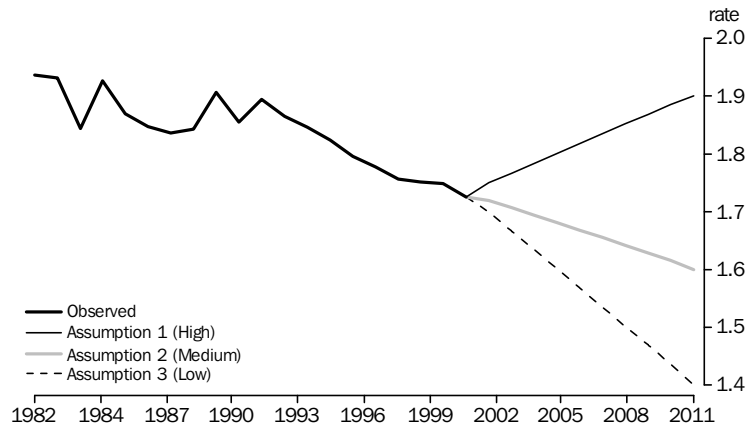
TRENDS IN AGE-SPECIFIC FERTILITY RATES

Population projections require assumptions about future age-specific fertility rates. These rates are applied to the projected female population in each year of the projection period in order to determine future numbers of births, and therefore the size of the future population.

Over the past 10 years, age-specific fertility rates have been declining for the younger age groups (those below age 30), whilst increasing among women aged 30 years and over, representing a gradual shift in fertility towards older ages. These trends are assumed to continue under all three projection scenarios.

The impact of these trends is that the mean age of women at childbirth has risen from 28.5 years in 1991 to 29.5 years in 2001. Assuming this trend continues, it is proposed to increase the mean age of the fertility schedule to 30.5 years by 2011 for all three fertility scenarios.

AGE-SPECIFIC FERTILITY RATES, Australia: **Observed and Assumed**
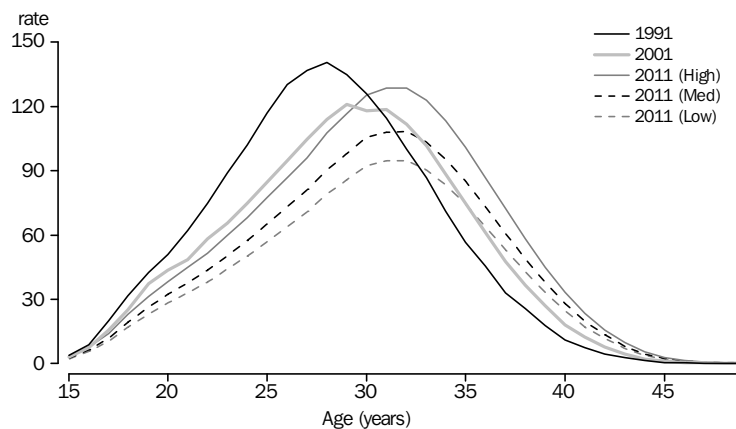
TRENDS IN THE SEX RATIO

Projections require an assumed sex ratio, in order that total projected births may be split into male and female births.

The sex ratio (the ratio of male to female births, multiplied by 100) fluctuates around 105. It was 105.2 in 2001, 104.8 in 1999, and 105.3 in 1991. It is proposed to use a constant ratio of 105 male births per 100 female births for the duration of the projection period.

AGE-SPECIFIC FERTILITY RATES(a), Australia: Assumed

AGE GROUP (YEARS)..

Year	15–19	20–24	25–29	30–34	35–39	40–44	45–49	TFR(b)	Median age(c)
ASSUMPTION 1 (High)									
2002	17.6	57.8	103.4	109.4	51.7	9.8	0.5	1.8	29.7
2003	17.4	57.3	102.8	110.9	53.9	10.6	0.6	1.8	29.8
2004	17.2	56.8	102.2	112.5	56.1	11.4	0.6	1.8	29.9
2005	17.0	56.2	101.5	114.1	58.4	12.2	0.7	1.8	30.0
2006	16.8	55.7	100.9	115.7	60.7	13.1	0.8	1.8	30.1
2007	16.6	55.1	100.2	117.3	63.1	13.9	0.9	1.8	30.2
2008	16.4	54.5	99.4	118.9	65.4	14.8	1.0	1.9	30.4
2009	16.2	53.9	98.6	120.5	67.8	15.7	1.0	1.9	30.5
2010	16.0	53.3	97.8	122.2	70.3	16.6	1.1	1.9	30.6
2011–2101	15.7	52.5	96.8	123.6	72.6	17.4	1.2	1.9	30.7
ASSUMPTION 2 (Medium)									
2002	17.3	56.8	101.6	107.5	50.8	9.6	0.5	1.7	29.7
2003	16.8	55.3	99.3	107.2	52.1	10.2	0.5	1.7	29.8
2004	16.3	53.9	97.0	106.8	53.3	10.8	0.6	1.7	29.9
2005	15.9	52.5	94.8	106.5	54.5	11.4	0.7	1.7	30.0
2006	15.4	51.1	92.5	106.1	55.7	12.0	0.7	1.7	30.1
2007	15.0	49.7	90.3	105.8	56.9	12.6	0.8	1.7	30.2
2008	14.6	48.3	88.1	105.4	58.0	13.1	0.8	1.6	30.4
2009	14.1	47.0	86.0	105.1	59.1	13.7	0.9	1.6	30.5
2010	13.7	45.6	83.8	104.7	60.2	14.2	1.0	1.6	30.6
2011–2101	13.3	44.2	81.6	104.1	61.2	14.7	1.0	1.6	30.7
ASSUMPTION 3 (Low)									
2002	17.1	56.1	100.4	106.2	50.2	9.5	0.5	1.7	29.7
2003	16.4	54.0	97.0	104.6	50.8	10.0	0.5	1.7	29.8
2004	15.8	52.0	93.6	103.0	51.4	10.4	0.6	1.6	29.9
2005	15.1	50.0	90.3	101.4	51.9	10.9	0.6	1.6	30.0
2006	14.5	48.0	87.0	99.8	52.4	11.3	0.7	1.6	30.1
2007	13.9	46.1	83.8	98.1	52.7	11.6	0.7	1.5	30.2
2008	13.3	44.2	80.6	96.4	53.1	12.0	0.8	1.5	30.4
2009	12.7	42.4	77.5	94.7	53.3	12.3	0.8	1.5	30.5
2010	12.2	40.6	74.5	93.0	53.5	12.6	0.8	1.4	30.6
2011–2101	11.6	38.7	71.4	91.1	53.5	12.9	0.9	1.4	30.7

(a) Per 1,000 women.

(b) Per woman.

(c) Years.

STATE VARIATIONS IN FERTILITY

In recent years, TFRs for Victoria, South Australia and the Australian Capital Territory have been consistently lower than the rates for Australia as a whole, while TFRs in the remaining states, and in the Northern Territory in particular, have been higher than the national average.

The fertility assumptions for the states and territories are derived from the national assumptions, by applying the average differentials between each state/territory and Australia to the national assumption. It is assumed that the average state and territory fertility differentials for the years 1999–2001 will remain constant throughout the projection period.

REGIONAL VARIATIONS IN FERTILITY

Total fertility rates in Australian capital cities are generally lower than TFRs for respective states/territories, while TFRs for state balances are higher. In 2001, the TFR for Darwin was 30% below the Territory TFR, while the TFRs for Brisbane, Adelaide and Perth were 9-10% below their respective state levels. Fertility rates in Sydney and Melbourne were 4-5% lower than fertility rates in New South Wales and Victoria respectively.

Fertility assumptions for the capital cities and state balances are derived from the assumptions for each state/territory by applying the average differentials between the region and its respective state/territory. It is assumed that the average 1999-2001 differentials between the capital city and balance within each state or territory will remain constant throughout the projection period.

TOTAL FERTILITY RATES AND FERTILITY DIFFERENTIALS(a)

	TOTAL FERTILITY RATE 1999–2001..................			ASSUMED DIFFERENTIAL ...		
	Capital city	Balance of state	Total	Capital city	Balance of state	State
	rate	rate	rate	%	%	%
New South Wales	1.73	1.98	1.80	96.00	109.80	103.00
Victoria	1.56	1.88	1.63	95.90	115.30	93.10
Queensland	1.69	1.89	1.79	94.40	105.90	102.20
South Australia	1.58	2.05	1.70	93.00	120.90	96.90
Western Australia	1.67	2.14	1.78	94.00	120.50	101.90
Tasmania	1.82	2.00	1.92	95.00	104.50	110.10
Northern Territory	1.69	2.79	2.22	76.00	125.40	127.60
Australian Capital Territory	..	..	1.59	..	..	91.10
Australia	..	..	**1.75**	..	..	**100.00**

(a) Fertility differentials show the relationship of the TFR for 1999–2001 for each state, capital city and balance of state to the Australian level.

REGIONAL VARIATIONS IN FERTILITY *continued*

ASSUMED TOTAL FERTILITY RATES FROM 2011, States/territories/regions

	ASSUMPTION 1 (HIGH)...............			ASSUMPTION 2 (MEDIUM)............			ASSUMPTION 3 (LOW)................		
	Capital city	*Balance of state*	*Total*	*Capital city*	*Balance of state*	*Total*	*Capital city*	*Balance of state*	*Total*
	rate	rate	rate	rate	rate	rate	rate	rate	rate
New South Wales	1.88	2.15	1.96	1.58	1.81	1.65	1.39	1.58	1.44
Victoria	1.70	2.04	1.77	1.43	1.72	1.49	1.25	1.50	1.30
Queensland	1.83	2.06	1.94	1.54	1.73	1.64	1.35	1.52	1.43
South Australia	1.71	2.23	1.84	1.44	1.87	1.55	1.26	1.64	1.36
Western Australia	1.82	2.33	1.94	1.53	1.97	1.63	1.34	1.72	1.43
Tasmania	1.99	2.19	2.09	1.67	1.84	1.76	1.46	1.61	1.54
Northern Territory	1.84	3.04	2.43	1.55	2.56	2.04	1.36	2.24	1.79
Australian Capital Territory	. .	. .	1.73	. .	. .	1.46	. .	. .	1.28
Australia	. .	. .	**1.90**	. .	. .	**1.60**	. .	. .	**1.40**

INTERNATIONAL CONTEXT

Fertility levels vary considerably between countries. There are many variables that can influence a country's fertility rate, such as differences in social and economic development and contraceptive prevalence. In general, developing countries have higher fertility rates while developed countries usually have lower fertility rates. According to United Nations (2001) projections for 2000-2005, more developed countries have an average TFR of 1.5, while less developed countries have an average TFR of 2.9.

PROJECTED TOTAL FERTILITY RATES, Selected Countries(a

Selected countries	*2000–2005*	*2010–2015*
Spain	1.15	1.22
Italy	1.23	1.27
Greece	1.27	1.31
Germany	1.35	1.42
Japan	1.32	1.37
United Kingdom	1.60	1.61
Australia	**1.70**	**1.67**
France	1.89	1.89
United States of America	2.11	2.08
New Zealand	2.01	2.00
Indonesia	2.35	2.10
India	3.01	2.46
Papua New Guinea	4.09	3.19
Yemen	7.01	6.35
Niger	8.00	7.30
World	**2.69**	**2.50**

(a) Projected total fertility rates use the medium variant.

Source: Population Division, United Nations Secretariat, United Nations, *World Population Prospects, 2002 Revisions.*

INTERNATIONAL CONTEXT *continued*

Australia's TFR for 2001, of 1.73 babies per woman, is one of the lowest in the world and well below the world's average, although compared to other developed countries, Australia's TFR is among the middle ranked nations. In the 1990s, fertility rates in many countries declined and converged to lower levels. According to the United Nation's projected average TFRs for 2000-05, the lowest TFR of 1.1 is shared by several countries including the Ukraine and Spain. Several other European countries have very low fertility (Italy 1.2, Greece 1.2, Germany 1.3), as do some South-East Asian countries (Hong Kong 1.2, Japan 1.3). In contrast, African countries have relatively high fertility rates, with Niger (8.0) and Yemen (7.6) the highest.

International fertility rates provide a frame of reference for the three assumptions made for Australia's TFR in the current set of population projections. A TFR of 1.9, as assumed under the high fertility scenario, approaches current fertility levels in countries such as United States of America and in New Zealand (1.9 and 2.0 respectively).   At 1.60, Australia's TFR would be comparable with current fertility levels in the United Kingdom and Canada (each 1.6). The low fertility scenario (TFR of 1.4) would bring Australian fertility in line with countries such as Singapore and Japan (1.5 and 1.3 respectively).

International projections

In most countries where fertility is low, the United Nations' medium variant shows a degree of stabilisation for the first few decades of the 21st century, followed by increases to 2050. Thus, Australia's fertility rate is assumed to increase under both the medium and high variants of the United Nations projections. Large declines in fertility are anticipated only for those countries where fertility currently remains high.

In contrast, the latest available national projections produced by individual developed countries tend to emphasise a medium variant which assumes continued decline. The exception to this is the medium variant of the projections for the United States of America, which assumes an increase in fertility for all women. Fertility has remained relatively high in the United States, compared to most other developed countries.

Generally, the low and high fertility assumptions for any nation's projections are 10-15% lower or higher respectively than the medium assumption. This change is phased in over the next 10-25 years or longer.

The current set of projections produced by the Australian Bureau of Statistics is consistent with the assumptions adopted by other countries in projecting the continuation of a downward trend under the medium fertility scenario. The low and high fertility assumptions are 9% lower and higher respectively than the medium assumption.

MORTALITY ASSUMPTIONS ....

SUMMARY

The trend in mortality has been a steady rise in the expectation of life at birth for both males and females. For the purpose of population projections the long-term mortality assumption is that life expectancy at birth will increase from the 1999-2001 level of 77.0 years for males and 82.4 years for females to 84.1 years for males and 87.6 years for females in 2050-52. An alternative assumption is that the 1999-2001 life expectancy at birth will increase to 92.3 years for males and 95.2 years for females in 2050-52.

The assumptions are based on the trend in life expectancy at birth during 1985-2001 for males and females. The first assumption assumes an increase in life expectancy at birth of 0.30 years for males and 0.25 years for females per year, continuing until 2006-08 and then gradually declining over time. The alternative assumption is that the assumed rated of mortality improvement will continue through to 2050-52.

Once determined for Australia, assumptions for mortality at lower geographic levels will be based on current relativities between Australia and each state/ territory, and between each state/territory and its capital city/balance of state.

TRENDS IN LIFE EXPECTANCY AT BIRTH

Since 1901-10 male life expectancy at birth has increased from 55.2 years to 77.0 years in 1999-01. Over the same period females life expectancy at birth increased from 58.8 years to 82.4 years. The increase in life expectancy in the early part of that century is primarily attributed to advances in living conditions, such as improved water supply, sewage systems, food quality and health education. The continuing increase in life expectancy in the latter half of the century has mainly been attributed to improving social conditions and advances in medical technology, such as mass immunisation and antibiotics.

EXPECTATION OF LIFE, Australia, 1921–2001
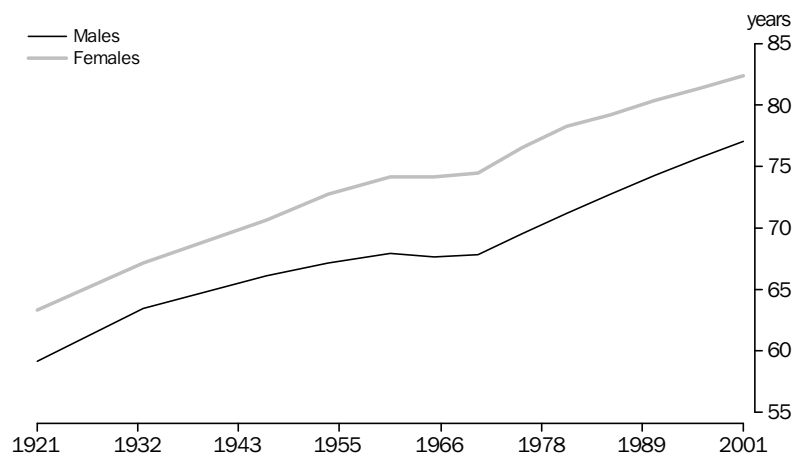
The past two decades in particular have seen further increases in life expectancy. These increases are due in part to lower infant mortality, fewer deaths among young adults from motor vehicle accidents and fewer deaths among older men from heart disease.

TRENDS IN LIFE EXPECTANCY AT BIRTH *continued*

The rate of mortality decline, as illustrated by the increase in life expectancy at birth, had slowed during the 1970-98 period. The lowest annual rate of increase, of 0.17 years for males and 0.15 years for females, was experienced between 1995-97 and 1996-98. Since this time, the annual improvement in life expectancy at birth has been faster, culminating in the 1999-2001 increases of 0.47 years for males and 0.37 years for females on the previous period of 1998-2000.

EXPECTATION OF LIFE AT BIRTH, 1970–1972 to 1999–2001

	LIFE EXPECTANCY AT BIRTH..........		INCREASE PER YEAR..............		*Difference between female and male life expectancy*
	Males	*Females*	*Males*	*Females*	
Period	years	years	years	years	years
1970–1972	67.81	74.49	. .	. .	6.68
1975–1977	69.56	76.56	0.35	0.41	7.00
1980–1982	71.23	78.27	0.33	0.34	7.04
1985–1987	72.74	79.20	0.30	0.19	6.46
1990–1992	74.32	80.39	0.32	0.24	6.07
1995–1997	75.69	81.37	0.27	0.20	5.68
1996–1998	75.86	81.52	0.17	0.15	5.66
1997–1999	76.22	81.77	0.36	0.25	5.55
1998–2000	76.56	82.04	0.34	0.27	5.48
1999–2001	77.03	82.41	0.47	0.37	5.38
Average annual increase(a)	—	—	**0.30**	**0.25**	—

(a) Based on the trend line fitted to data from 1985–1987.

The faster increase in male life expectancy in the latter period has narrowed the gap in female to male life expectancies. In 1999-2001 female life expectancy at birth exceeded that for males by 5.4 years, compared to the highest differential of 7.0 years recorded in 1980-1982.

ASSUMED LIFE EXPECTANCY AT BIRTH

The Australian Bureau of Statistics mortality assumption is for male and female life expectancy at birth in the 1999-2001 period to increase by 0.30 and 0.25 years per year respectively until 2006-08. After this, life expectancy continues to increase, but at a declining rate. Based on projections to the period 2051-2053, the life expectancy at birth in 2050-52 will be 84.1 years for males and 87.6 years for females.

A second mortality assumption has also been produced in which male and female life expectancy at birth increase constantly by 0.30 and 0.25 years per year respectively until 2050-52, producing a life expectancy at birth of 92.3 years for males and 95.2 years for females in 2050-52.

LIFE EXPECTANCY AT BIRTH: **Observed and Assumed**

Period	LIFE EXPECTANCY AT BIRTH........... Males years	Females years	INCREASE PER YEAR.............. Males years	Females years	Difference between female and male life expectancy years
1996–1998	75.86	81.52	. .	. .	5.7
1997–1999	76.22	81.77	0.36	0.25	5.6
1998–2000	76.56	82.04	0.34	0.27	5.5
1999–2001	77.03	82.41	0.47	0.37	5.4
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	79.75	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

TRENDS IN AGE-SPECIFIC DEATH RATES

The age-specific death rates are required for the calculation of the life table. A life table provides survivorship ratios, which form an essential input for population projections, and life expectancy values.

The level of the age-specific death rates has varied for different age-sex groups since the 1970s. At all ages, death rates for males remained higher than for females. The male-female mortality differential has narrowed due to faster declines in male death rates than female rates.

Between 1970 and 2001 the fastest declines in age-specific death rates were experienced in the 0-9 years age groups for both males and females. Rapid declines in age-specific death rates were also experienced in the 10-14 and 45-59 years age groups. Death rates of adult males aged between 25 and 34 years improved only slightly over the 1970-2001 period. More recent trend shows an increase in the death rates of males aged 30-34 years (from 1981 to 1996) and the 35-39 years group (from 1986 to 1996). All other age-specific death rates showed consistent decreases over the 1970-2001 period, with the percentage decreases diminishing progressively in older age groups.

Rate of change in age-specific death rates

Under both assumptions the pattern of change in age-sex specific death rates from 1991-2001 has been assumed to continue until 2050-52. Some arbitrary adjustment was performed to the rate of change at some ages to prevent the age-specific death rates from increasing and age-specific death rates for females exceeding that for males at some ages in the future. The pattern of the assumed rate of change in age-specific death rates was scaled up or down to conform to the predetermined life expectancies at birth for future years.

ASSUMED AGE-SPECIFIC DEATH RATES

The future age-specific death rates show significant declines for males and females in all age groups except at ages around 30-39 years and at the very oldest ages (95 years and over). The ratio of male to female projected death rates continue to show higher male to female mortality.

MALE DEATH RATES: **Observed and Assumed**
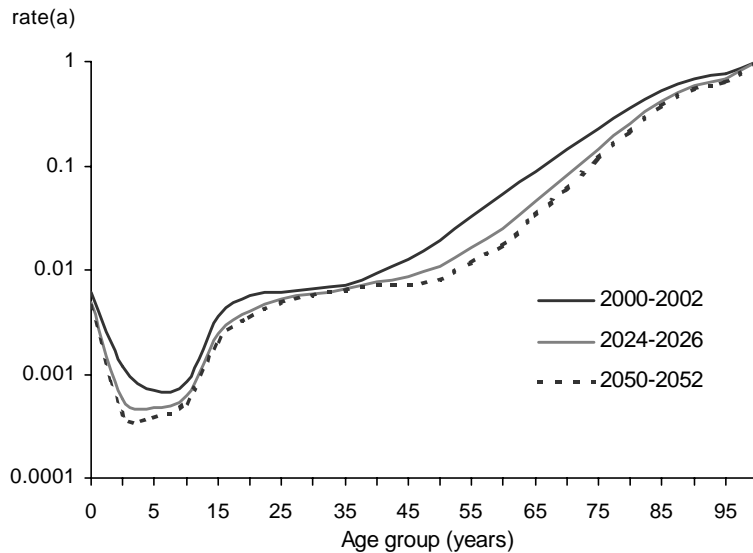
(a) y axis is on a logarithmic scale.

FEMALE DEATH RATES: **Observed and Assumed**
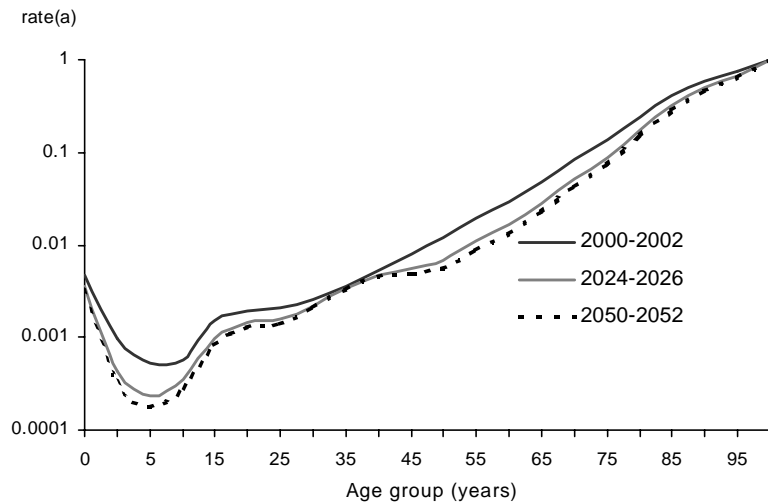
(a) y axis is on a logarithmic scale.

ASSUMED STATE AND TERRITORY AND CAPITAL CITY/BALANCE OF STATE MORTALITY DIFFERENTIALS

Mortality differentials continue to exist across states and territories, and between capital cities and their respective balance of state. It is assumed that the mortality differentials observed during 1999-2001 between states/territories and Australia, and for capital city/balance of state of the states and territories will remain throughout the projection period.

MORTALITY DIFFERENTIALS(a), States, Territories and Regions

	LIFE EXPECTANCY AT BIRTH, 1999–2001....		MALE MORTALITY DIFFERENTIALS.........			FEMALE MORTALITY DIFFERENTIALS.........		
	Males	Females	Capital city	Balance of State	State	Capital city	Balance of State	State
	years	years	%	%	%	%	%	%
New South Wales	76.94	82.41	100.98	99.02	99.89	100.49	99.53	100.00
Victoria	77.52	82.67	101.42	99.45	100.64	100.61	99.76	100.31
Queensland	76.89	82.32	100.52	99.58	99.82	100.16	99.75	99.88
South Australia	76.99	82.47	100.65	99.20	99.96	100.29	99.63	100.07
Western Australia	77.26	82.78	101.24	98.94	100.30	100.94	99.64	100.44
Tasmania	75.99	81.23	99.14	98.11	98.65	98.53	98.09	98.57
Northern Territory	70.75	76.45	96.03	88.67	91.85	96.00	88.85	92.77
Australian Capital Territory	78.46	82.91	102.47	. .	101.86	100.76	. .	100.60
Australia	**77.03**	**82.41**	. .	. .	**100.00**	. .	. .	**100.00**

(a) Differentials show the relationship of the life expectancy for 1999–2001 for each state, capital city and balance of state to the Australian level.

OBSERVED LIFE EXPECTANCY AT BIRTH, INTERNATIONAL COMPARISON

In 1999-2001 the expectation of life at birth was 77.0 years for males and 82.4 years for females. This was the highest ever recorded in Australia and compares reasonably well with life expectancy in the low mortality countries across the world.

EXPECTATION OF LIFE AT BIRTH, Selected Countries—2001

Country	Males years	Females years
Japan	78	85
Hong Kong (SAR of China)	77	82
Australia	**77**	**82**
Italy	77	83
Canada	76	81
Greece	76	81
Netherlands	76	81
New Zealand	76	81
United Kingdom	75	80
Germany	75	81
United States of America	74	80
China	69	73
Indonesia	66	70
India	62	64
Papua New Guinea	56	58

Source: Population Reference Bureau, 2002.

PROJECTED LIFE EXPECTANCY AT BIRTH, INTERNATIONAL COMPARISON

As with the mortality assumptions for this series of projections, New Zealand and the United States of America have assumed continual improvement in life expectancy at birth, coupled with a slight narrowing of the sex gap in mortality over the next fifty years.

MORTALITY ASSUMPTIONS, International comparison

	LIFE EXPECTANCY AT BIRTH, 1999–2001….		LIFE EXPECTANCY AT BIRTH, 2050–2052….		INCREASE IN LIFE EXPECTANCY AT BIRTH FROM 1999–2001 TO 2050–2052…..	
	Males years	*Females* years	*Males* years	*Females* years	*Males* years	*Females* years
Australia	**77.0**	**82.4**	**84.1**	**87.6**	**7.0**	**5.2**
New Zealand(a)	76.1	81.0	82.5	86.5	6.4	5.5
United States of America(b)	74.1	79.8	81.2	86.7	7.1	6.9

Source: Statistics New Zealand and the United States of America Census Bureau Internet sites.

(a) Medium mortality level used.

(b) Middle series used

PROJECTED LIFE EXPECTANCY AT BIRTH, INTERNATIONAL COMPARISON *continued*

The United Nations population projection series projects mortality on the basis of the models of change in life expectancy, previously produced by the United Nation.

MORTALITY ASSUMPTIONS, United Nations(a)

	LIFE EXPECTANCY AT BIRTH, 1995–2000....		LIFE EXPECTANCY AT BIRTH, 2045–2050....		INCREASE IN LIFE EXPECTANCY AT BIRTH FROM 1995–2000 TO 2045–2050.....	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
	years	years	years	years	years	years
Japan	77.0	83.8	83.5	92.4	6.5	8.6
Hong Kong (SAR of China)	76.5	82.0	82.1	87.3	5.6	5.3
Australia	**75.9**	**81.5**	**80.3**	**85.7**	**4.4**	**4.2**
Italy	75.0	81.4	79.5	85.6	4.5	4.2
Canada	75.7	81.3	80.1	85.6	4.4	4.3
Greece	75.4	80.7	79.9	85.1	4.5	4.4
Netherlands	75.1	80.5	79.6	84.9	4.5	4.4
New Zealand	74.5	79.9	79.4	84.7	4.9	4.8
United Kingdom	74.7	79.7	80.6	85.6	5.9	5.9
Germany	74.0	80.3	80.7	86.2	6.7	5.9
United States of America	73.6	79.4	80.0	85.3	6.4	5.9
China	67.9	72.0	76.7	81.3	8.8	9.3
Indonesia	63.3	67.0	75.1	79.8	11.8	12.8
India	61.9	62.6	73.5	77.4	11.6	14.8
Papua New Guinea	54.8	56.7	71.7	74.9	16.9	18.2

Source: United Nations, 2001.

(a) Medium variant used.

SUMMARY

The long range levels of net overseas migration are assumed to be 125,000 (Assumption 1), 100,000 (Assumption 2) and 70,000 (Assumption 3). These are based on the 10-year moving average series of net overseas migration over the last 50 years as well as some consideration given to the Migration program announced by the Government recently.

TRENDS

The yearly level of net overseas migration has fluctuated considerably in Australia. Over the last 10 years, this level has varied between 30,000 in 1992-93 and 135,700 in 2000-01. In 2001-02, the net overseas migration was 133,700 persons.

COMPONENTS OF NET OVERSEAS MIGRATION

Net overseas migration consists of three parts, permanent movement, long-term movement (for stays of 12 months or more) and category jumping (the change between intended and actual duration of stay of travellers to/from Australia, such that their classification as short-term or as long-term/permanent movers is different at arrival/departure from that after 12 months). Permanent arrivals (settlers) fall into two main groups. The size of one is regulated by government policy in the form of an annual migrant visa quota. The other consists mainly of New Zealand citizens who travel to Australia under the Trans-Tasman Travel Agreement and do not come under the migrant visa quota. Permanent departures are unrestricted. The level of permanent departures tend to follow the pattern of permanent arrivals, although at lower levels and with less volatility. In recent years the pattern has been masked by an increasing number of Australian-born people leaving Australia permanently. It remains to be seen whether this will become an ongoing trend.

Until 1997-98 net permanent movement was the main component of net overseas migration gain. In the last three years, from 1999-2000 the net long-term movement exceeded net permanent movement. The time lag between long-term arrivals and long-term departures could account for this, or it could be that some long-term visitors are being granted permanent residence on-shore and may not be returning to their overseas country as long-term migrants. However there is no way to accurately address this issue in the current series of the population projections.

CATEGORY JUMPING

Category jumping tends to follow net overseas migration. When migration is at a peak, category jumping tends to be high and vice versa. Over the past 20 years, the average level of category jumping has been zero.

Given the volatility of annual category jumping levels, it is difficult to predict future values of category jumping. In the last 10 years, category jumping has been affected by the 1989 Tiananmen Square incident, the recession of the early 1990s and the handover of Hong Kong to China in 1996. In the longer term, category jumping is expected to be between zero and a low positive level, depending on the size of migration flows. Category jumping is assumed to be 'zero' in this series of the population projections.

ASSUMED NET OVERSEAS MIGRATION

The Australian Bureau of Statistics has developed assumed future levels of net overseas migration by analysing net overseas migration as a 10-year moving average over the last 50 years. This average represents medium long-term levels.

NET OVERSEAS MIGRATION Observed, 10-Year Moving Average(a) and Assumed
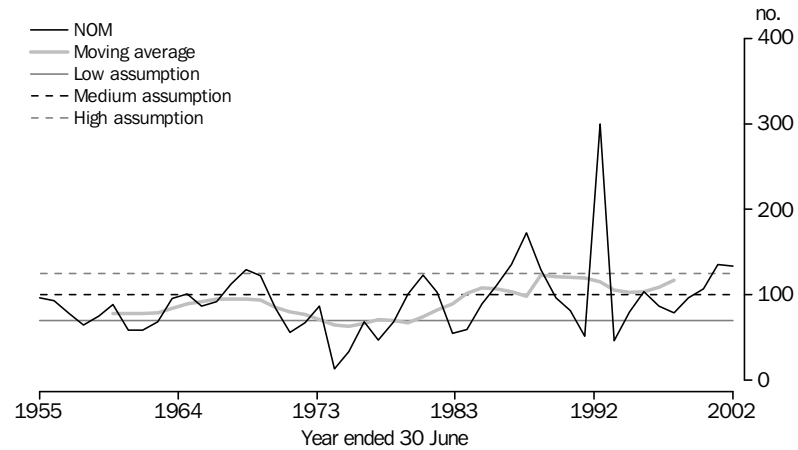
(a) The 10-year moving average represents the average net overseas migration for the previous 10 years.

Net overseas migration levels of 125,000 (Assumption 1), 100,000 (Assumption 2) and 70,000 (Assumption 3) were chosen. Only about 10% of the decades in this analysis fell below this range and the latest 3 years are seen as exceptionally high.

The assumptions made for net overseas migration will take effect from 2005-06. Assumed values of the components of overseas migration were generated by analysing the trends of each component and their interrelationship.

In addition to the projection series incorporating the three main assumptions, projections will be available in which it is assumed that there is no overseas migration. This scenario is intended to facilitate analysis of population growth and give an indication of the cumulative effect over the projection period of different levels of net overseas migration.

Under the high overseas migration assumption (Assumption 1), it is assumed that there will be 55,000 net permanent movements and 80,000 net long-term movements in 2002-03. From then on the net permanent movements will increase and net long-term movement will decrease such that in 2005-06 these numbers will be 63,000 and 62,000 per year respectively, resulting in 125,000 net overseas migration for the year.

Under the medium overseas migration assumption (Assumption 2), it is assumed that there will be 50,000 net permanent movements and 65,000 net long-term movements in 2002-03. These numbers will be equal (each 50,000) and together would contribute to 100,000 net overseas migration in 2005-06.

Under the low overseas migration assumption (Assumption 3), it is assumed that there will be 40,000 net permanent movements and 45,000 net long-term movements in 2002-03. These will change to 40,000 net permanent movements and 30,000 net long-term movements resulting in 70,000 net overseas movements in the year 2005-06.

ASSUMED NET OVERSEAS MIGRATION *continued*

Based on these three assumptions, the split of net overseas migration into arrivals and departures are given in the table below which follow a time trend in the numbers observed in the recent past.

OVERSEAS MIGRATION, By Category of Movement-Australia: Observed and Assumed

| | ARRIVALS............ | | DEPARTURES........ | | NET MOVEMENT.... | | | |
Year ended 30 June	Permanent	Long-term	Permanent	Long-term	Permanent	Long-term	Category jumping	Net overseas migration
				OBSERVED				
1983 to 1987	89 093	85 335	21 508	74 305	67 585	11 030	5 823	84 438
1988 to 1992	127 818	111 107	26 046	99 083	101 772	12 023	3 498	117 294
1993	76 330	127 436	27 905	113 190	48 425	14 246	–32 629	30 042
1994	69 768	137 600	27 280	112 707	42 488	24 893	–20 832	46 549
1995	87 428	151 095	26 948	118 533	60 480	32 562	–12 917	80 125
1996	99 139	163 578	28 670	124 386	70 469	39 192	–5 524	104 137
1997	85 752	175 249	29 857	136 748	55 895	38 501	–7 317	87 079
1998	77 327	188 114	31 985	154 294	45 342	33 820	—	79 162
1999	84 143	187 802	35 181	140 281	48 962	47 521	—	96 483
2000	92 272	212 849	41 078	156 768	51 194	56 081	—	107 275
2001	107 366	241 204	46 521	166 376	60 845	74 828	—	135 673
2002	88 900	264 471	48 241	171 446	40 659	93 025	—	133 684
				ASSUMPTION 1 (High)				
2003	93 000.0	260 000.0	38 000.0	180 000.0	55 000.0	80 000.0	—	135 000.0
2004	93 000.0	271 000.0	38 000.0	194 000.0	55 000.0	77 000.0	—	132 000.0
2005	97 000.0	278 000.0	37 000.0	211 000.0	60 000.0	67 000.0	—	127 000.0
2006	99 000.0	288 000.0	36 000.0	226 000.0	63 000.0	62 000.0	—	125 000.0
				ASSUMPTION 2 (Medium)				
2003	90 000	250 000	40 000	185 000	50 000	65 000	—	115 000
2004	90 000	260 000	40 000	200 000	50 000	60 000	—	110 000
2005	90 000	270 000	40 000	215 000	50 000	55 000	—	105 000
2006	90 000	280 000	40 000	230 000	50 000	50 000	—	100 000
				ASSUMPTION 3 (Low)				
2003	83 000	237 000	43 000	192 000	40 000	45 000	—	85 000
2004	83 000	247 000	43 000	207 000	40 000	40 000	—	80 000
2005	83 000	257 000	43 000	222 000	40 000	35 000	—	75 000
2006	83 000	267 000	43 000	237 000	40 000	30 000	—	70 000

Assumed State and Territory net overseas migration

The net overseas migration will be allocated to each state and territory as follows: New South Wales will receive 41.5% of all net overseas migrants, followed by Victoria (24.0%), Queensland (16.3%) and Western Australia (11.3%). The Australian Capital Territory (1.43%), Northern Territory (1.05%) and Tasmania (0.65%) will receive only a small proportion of net overseas migration.

The net overseas migrants going to each state or territory will be allocated to its capital city and balance of state or territory. This proportion will be based on the average distribution of migrants arriving in the year before the 1996 and 2001 censuses.

ASSUMED NET OVERSEAS MIGRATION, Capital City/Balance of State or Territory

	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aust.
ASSUMPTION 1 (high)									
Capital city	44 971	27 178	11 636	4 617	12 477	437	793	1 791	103 274
Balance of State/Territory	6 472	2 863	8 707	564	1 590	381	524	0	21 726
Total	51 443	30 041	20 343	5 181	14 067	818	1 317	1 791	125 000
ASSUMPTION 2 (medium)									
Capital city	35 977	21 743	9 309	3 693	9 981	350	634	1 433	82 619
Balance of State/Territory	5 177	2 290	6 965	452	1 272	304	419	0	17 381
Total	41 154	24 033	16 274	4 145	11 253	654	1 053	1 433	100 000
ASSUMPTION 3 (low)									
Capital city	25 184	15 220	6 516	2 585	6 987	245	444	1 003	57 834
Balance of State/Territory	3 624	1 603	4 876	316	890	213	293	0	12 166
Total	28 808	16 823	11 392	2 901	7 877	458	737	1 003	70 000

ASSUMED FUTURE AGE-SEX PROFILE OF OVERSEAS MIGRANTS

The assumed age-sex structure of each migration component for each State and Territory will be based on the average structures from 1999-00 to 2001-02.

Age-sex profiles at the part of State or Territory level will be derived from the 2001 Census question on residence one year ago. Overseas departures will have the same age-sex distribution as overseas arrivals. These distributions will be constrained to State and Territory overseas arrivals and departures data for 1999-00 to 2001-02.

SUMMARY

Net interstate migration remains the weakest component in any population estimation or projection. The movement of people between the states and territories of Australia is unrestricted and depends on many factors such as their varying economic opportunities, overseas immigration and settlement patterns, and lifestyle choices of their populations. As none of these factors can be foreseen, the trend in levels of past net interstate migration is used for future projections.

HISTORICAL DATA

Net interstate migration estimates over the past 8 years are shown below. These are calculated using Medicare change of address records and 2001 census data on usual residence one year ago and five years ago.

NET INTERSTATE MIGRATION

Year ended 30 June	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
Year ended June								
1995	–13 478	–22 020	40 224	–7 069	5 101	–2 656	384	–486
1996	–14 770	–12 800	32 614	–6 192	4 066	–2 590	328	–656
1997	–10 661	–6 195	19 605	–3 318	4 660	–3 325	1 754	–2 470
1998	–12 249	–270	17 424	–1 996	3 227	–3 633	–472	–1 982
1999	–13 050	2 527	16 682	–1 631	296	–3 317	–953	–506
2000	–14 274	5 219	18 453	–3 531	–2 187	–2 632	–907	–91
2001	–16 315	5 163	20 024	–2 418	–3 110	–2 136	–1 592	407
2002	–23 786	6 239	29 028	–1 854	–4 174	–1 691	–2 784	–978
Average year ended June								
1998-2002	–15 935	3 776	20 322	–2 286	–1 190	–2 682	–1 342	–630
2000-2002	–18 125	5 540	22 502	–2 601	–3 157	–2 153	–1 761	–221
Year ended September								
2002	–27 043	4 719	33 304	–1 239	–4 340	–1 248	–3 232	–921

Net interstate migration will not add to zero for total Australia due the inclusion of the Other Territories from 1996 to 2001.

2001 Census-based estimates of interstate migration are shown below:

2001 CENSUS MIGRATION DATA – Yearly average

Period	NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT
1996-2001	–13 229	1 344	18 508	–2 555	603	–2 975	–753	–913
2000-2001	–17 881	4 876	21 502	–2 544	–3 244	–1 045	–1 890	157

HISTORICAL DATA *continued*

Over the period 1995 to 2002 New South Wales continued to record large net interstate migration losses while Queensland recorded the largest gains. South Australia, Tasmania and the Northern Territory continued to record small to moderate losses, while net interstate migration for the Australian Capital Territory fluctuated around a level of about -500 persons per year.

Since 1999 Victoria has experienced positive net interstate migration, a departure from the long-term trend of moderate to large losses. Conversely, Western Australia has recorded a net interstate migration loss over the past three years, contrary to the long-term trend of moderate gains.

ASSUMPTIONS

With the availability of final interstate migration data for 1996 to 2001, the proposed net interstate migration assumptions are as follows:

PROJECTED NET INTERSTATE MIGRATION — 2002-2101 series

Year ended 30 June	NSW '000	Vic. '000	Qld '000	SA '000	WA '000	Tas. '000	NT '000	ACT '000
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

In brief, levels for the Medium series have been roughly based on long-term averages for the states and territories, while the High and Low series encompass a wider range of values to allow for a wider range of possible future outcomes.
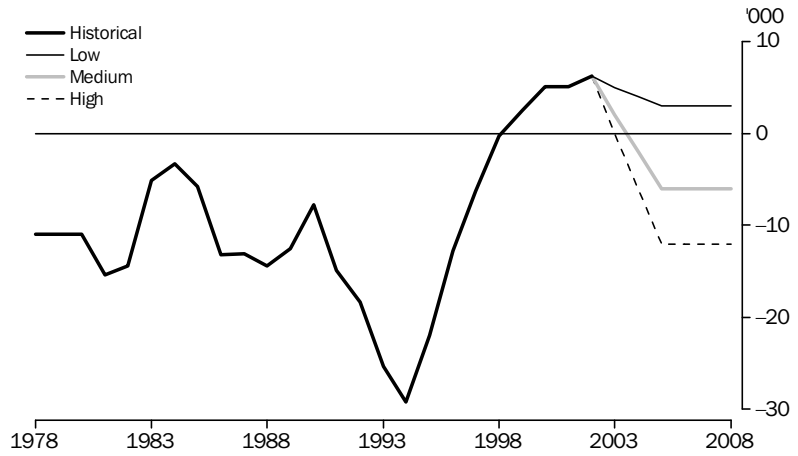
The above assumptions will need to be translated into arrivals and departures for each state/territory and capital city and balance, and for each region an age-sex distribution will be determined, based on internal migration data from the 2001 and perhaps earlier censuses.
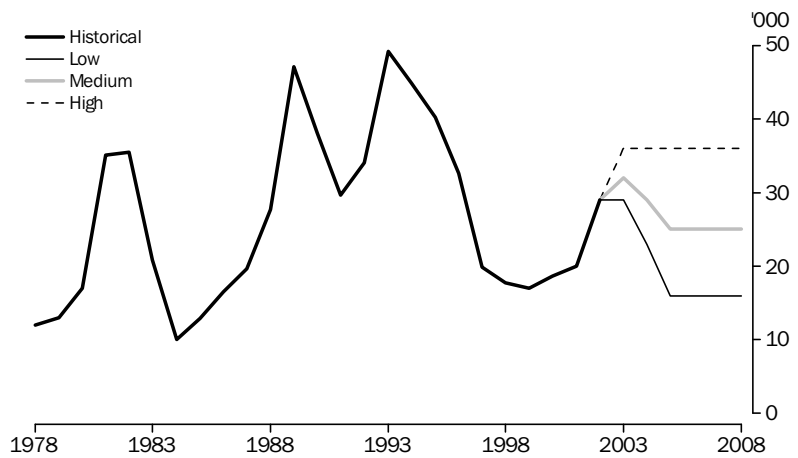
GRAPHS

NET INTERSTATE MIGRATION, New South Wales
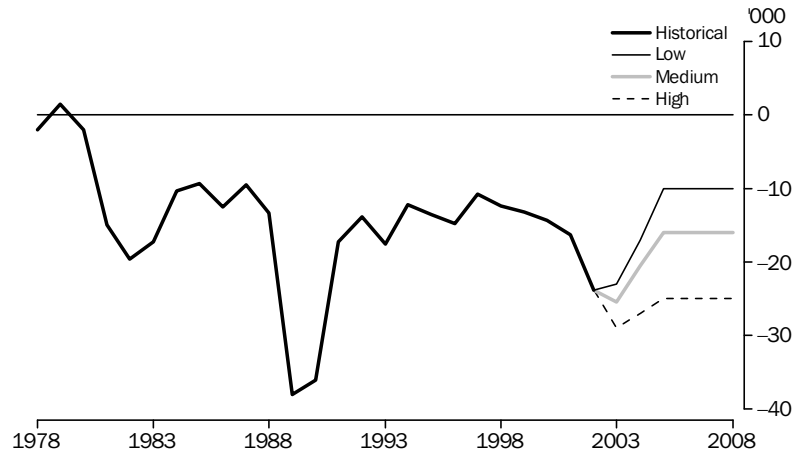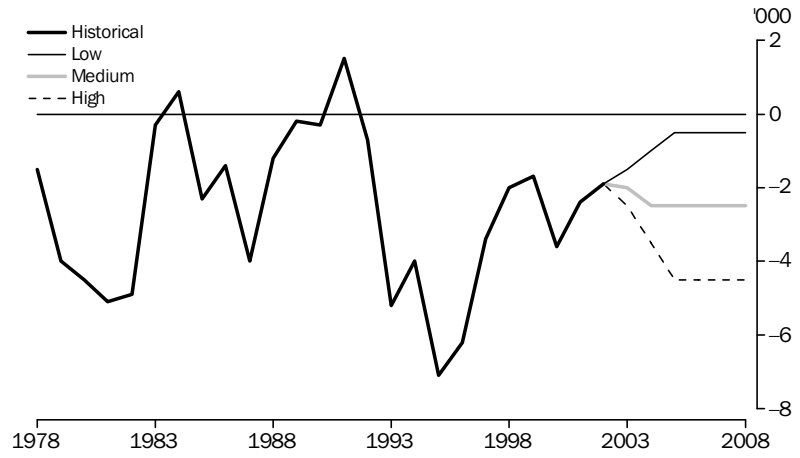

NET INTERSTATE MIGRATION, Victoria

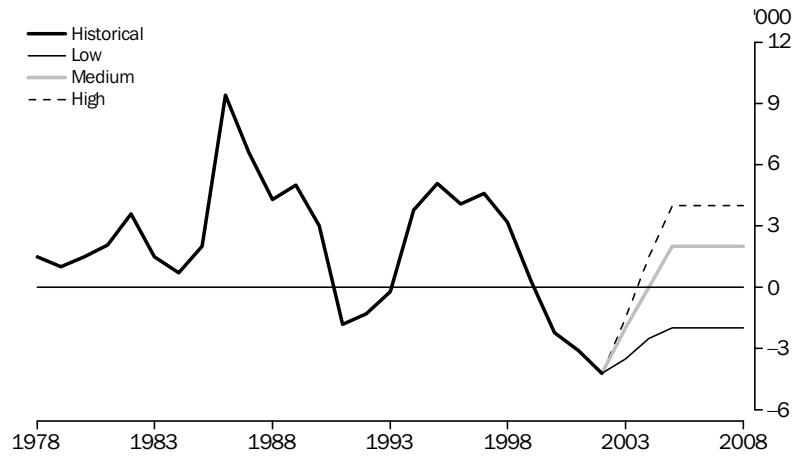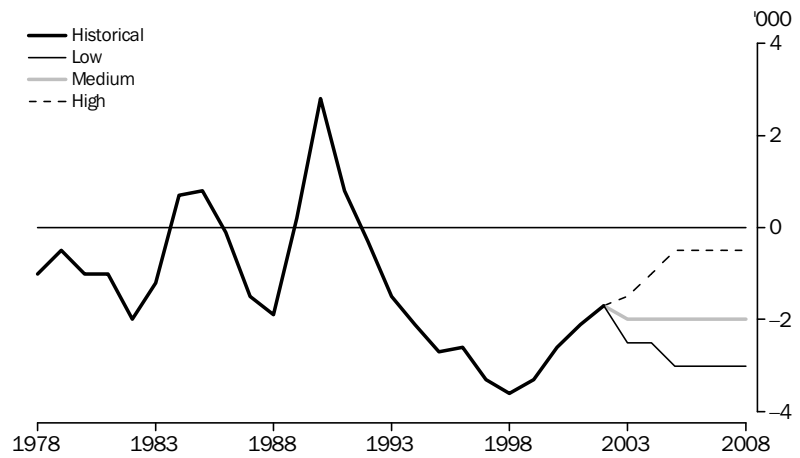### NET INTERSTATE MIGRATION, Queensland

GRAPHS *continued*

NET INTERSTATE MIGRATION, South Australia

NET INTERSTATE MIGRATION, Western Australia

NET INTERSTATE MIGRATION, Tasmania

GRAPHS *continued*

NET INTERSTATE MIGRATION, Northern Territory

NET INTERSTATE MIGRATION, Australian Capital Territory