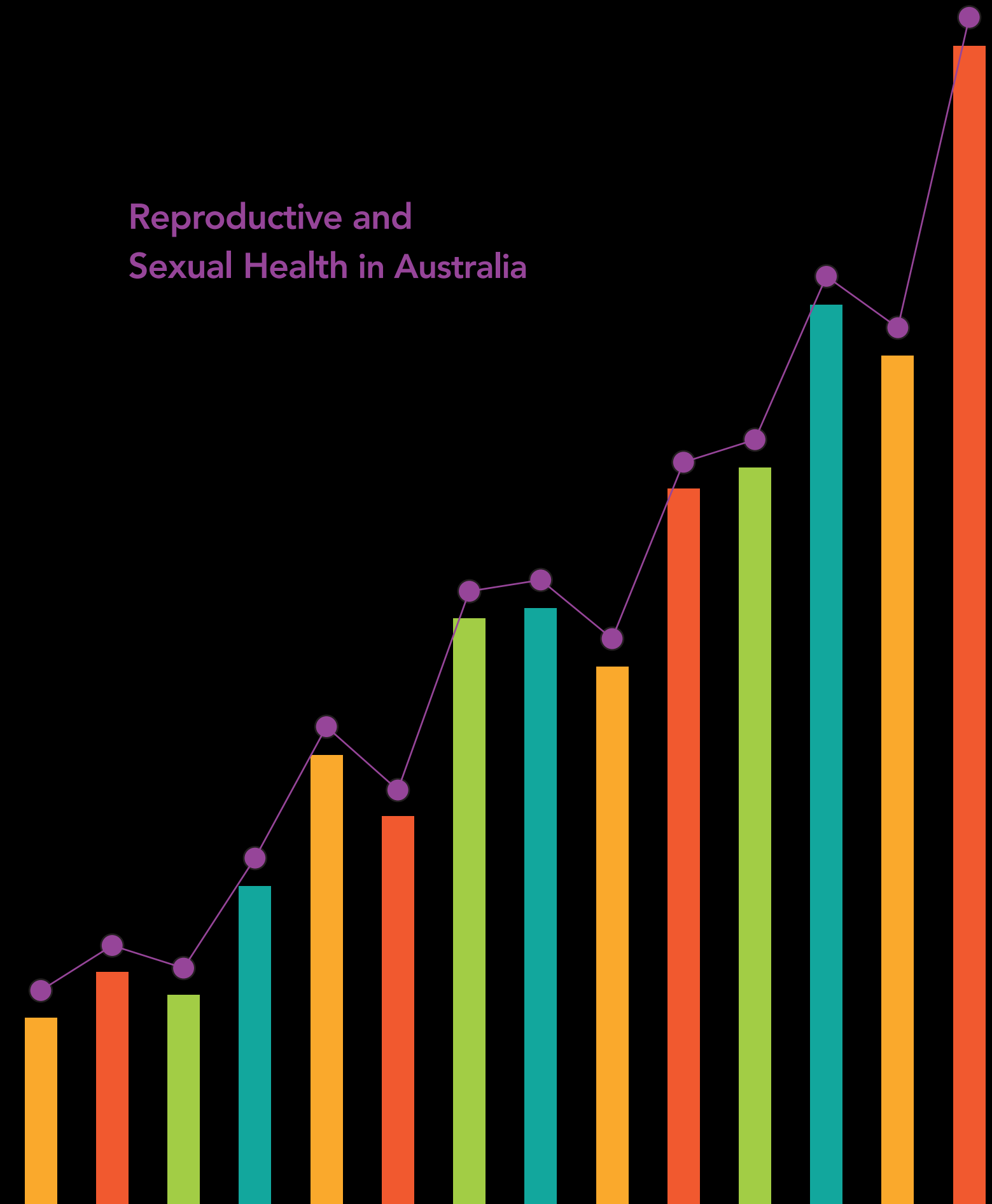
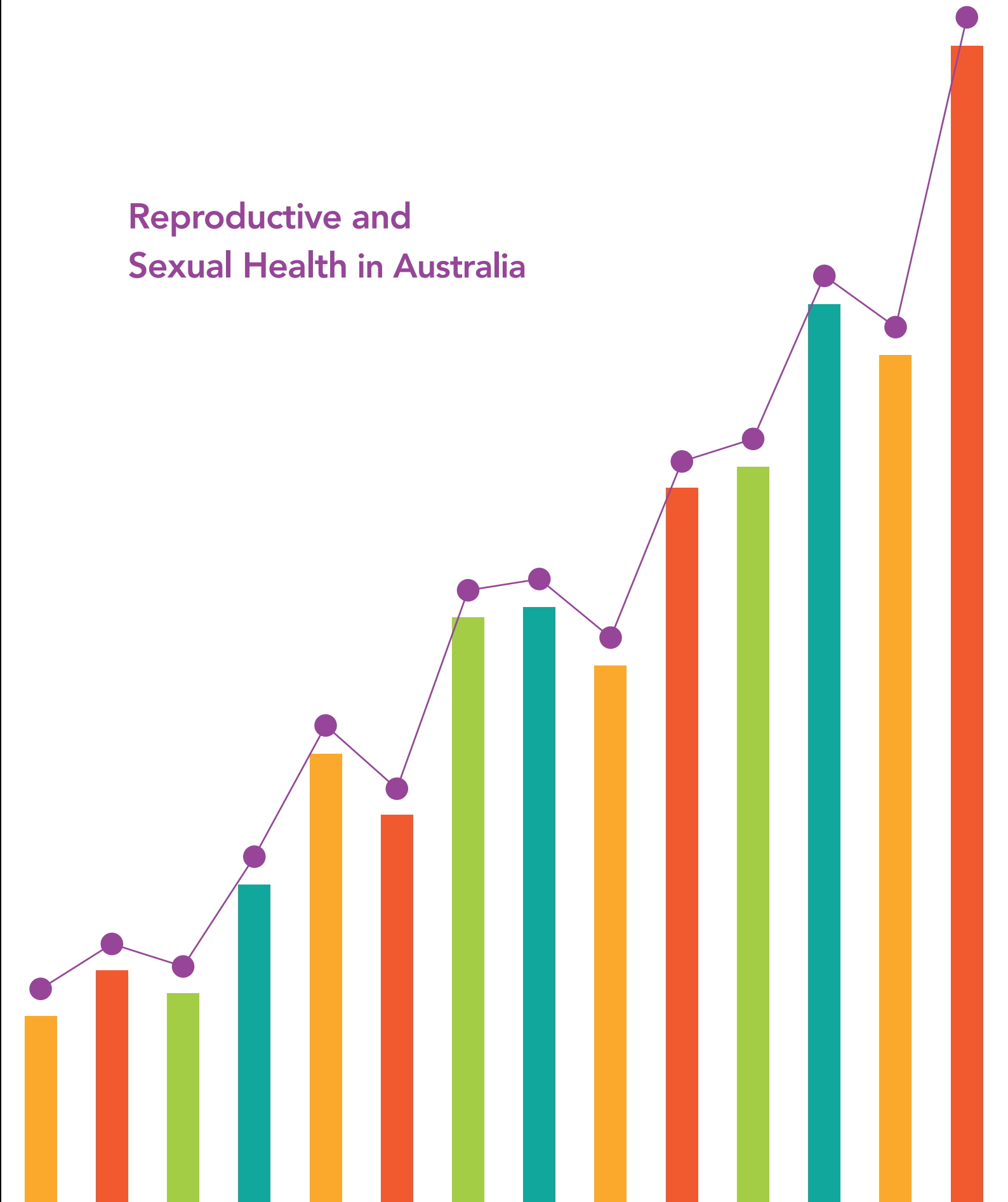
family planning nsw
Reproductive & Sexual Health

# Reproductive and Sexual Health in Australia



# Reproductive and Sexual Health in Australia



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## A message from the CEO

Family Planning New South Wales (NSW) is pleased to present this report of Reproductive and Sexual Health in Australia.

Reproductive and sexual health is a fundamental human right. Poor reproductive and sexual health is linked to poverty and a plethora of poor health outcomes. Within Australia there are a range of current and emerging reproductive and sexual health issues that require assessment and analysis. The findings presented in this report provide a comprehensive review of these issues in relation to seven domains of reproductive and sexual health; fertility; infertility and assisted reproductive technology; infant mortality; contraception; induced abortion; sexually transmitted infections; and cancer of the reproductive tract. The report also reviews pregnancy counselling in Australia and outlines services delivered by Australian Family Planning Organisations.

The data sources identified in this report are utilised by Family Planning NSW and Family Planning Organisations across Australia to drive planning, service delivery and other activities. The intention of this report is to bring these data sources to the attention of other key stakeholders, including clinicians, educators, researchers and policy-makers. The report will provide a reference point for the enhancement of the reproductive and sexual health and wellbeing of the Australian population, particularly the needs of population sub-groups such as:

Aboriginal and Torres Strait Islanders

Young people (i.e. aged less than 25 years)

People living in rural and remote settings

People from culturally and linguistically diverse backgrounds

These groups are already known to benefit from targeted education, health promotion and clinical services but further research is required. Other important sub-groups are people with disability and same-sex attracted people, however, very little data are available in respect to the reproductive and sexual health of these groups.

Family Planning NSW is committed to the provision of evidence-based best practice for training and clinical services. Our work is shaped by our research through the Family Planning NSW Sydney Centre for Reproductive Health Research, our publications, our nationally recognised data and evaluation unit and validated through our own extensive clinical practice. This report is an example of our commitment to evidence-based practice and service delivery. I commend the staff of Family Planning NSW for producing this important contribution.

Should you require any further information, this can be obtained by contacting Ms Jane Estoesta, Director, Monitoring Evaluation and Research Operations on 8752 4318.

Ann Brassil
Chief Executive Officer
Family Planning NSW

# Contents

## Summary

The purpose of this report is to provide a comprehensive review of the reproductive and sexual health data available in Australia in order to describe the health of the Australian community, determine areas where improved data collection would refine our understanding and assist in the identification of areas of research, policy review, health care, health promotion and education to address unmet needs. Reproductive and sexual health is a broad state of physical, mental and social wellbeing. Indicators relevant to the assessment and monitoring of reproductive and sexual health include: fertility; infertility; perinatal, infant and maternal mortality; contraception; induced abortion; sexually transmissible infections (STIs); and cancers of the reproductive tract and cervical cancer screening. Each chapter of the report analyses available data relevant to a specific domain of reproductive and sexual health. The report also reviews pregnancy counselling in Australia and outlines services delivered by Australian Family Planning Organisations.

While the focus of this report is on Australia, comparative international data are reported as a benchmark. Where there are no routinely collected data, information from surveys and publications in peer reviewed journals is reported. The process of assessment of indicators for Australian reproductive and sexual health reveals important data gaps and highlights the overlapping social and policy areas which impact upon the health of the community.

### Fertility

The Australian Bureau of Statistics (ABS) collects data from State and Territory Registrations of Births, Deaths and Marriages. The ABS data includes all important fertility indicators including number of live births, total fertility rate, crude fertility rate, maternal age, age-specific fertility rate, and net reproduction rate. The data are available by state and territory of residence, remoteness status, Indigenous status and maternal country of birth. While efforts have been made to address some limitations of this data including improvements in under and delayed registration of births, especially in Queensland, more efforts are needed to improve the ascertainment of Indigenous status.

The total fertility rate of 1.9 children per woman in Australia is below the replacement rate of 2.1 children per woman. Internationally, countries with policies that provide parents with the means to balance family life and career, and where the financial costs of having children are lower, tend to have higher fertility rates. Women's education and employment levels do not appear to account for the difference in fertility rates between countries.

The number of births in Australia had already started to increase prior to the introduction of the Baby Bonus in 2004 and especially after the Baby Bonus was increased in 2006, the number of births increased sharply to reach its peak in 2008. However, the second increase to the Baby Bonus in 2008 did not produce the same effect; the number of births remained the same in 2009 and 2010. This aligns with the experience in Europe where monetary incentives only had a short term effect on fertility rates.

Anecdotal evidence suggests that the Baby Bonus has increased the fertility rate among teenagers. However, from 2001 to 2010 the fertility rate in Australia increased in all age groups, except in teenage women. In fact, the Baby Bonus had the greatest impact on women residing in the highest socioeconomic areas in WA and among women having third or subsequent births in NSW.

### Infertility and Assisted Reproductive Technology (ART)

ART is indicated for the clinical management of infertility following the inability of a couple to conceive after 12 months or more of regular unprotected sex. Published population surveys have found that 16 to 25% of women had, at some time in their lives, experienced a period of infertility (i.e. inability to become pregnant despite trying to) that lasted 12 months or more, and that between 3.4 and 14% were currently infertile (i.e. in the preceding 12 months). The longer the timeframe for trying to achieve pregnancy, the lower is the apparent prevalence of infertility. This chapter reports on ART trends in Australia drawing on data from the Australian and New Zealand Assisted Reproduction Database (ANZARD) and Medicare. There are several Medicare Benefits Schedule (MBS) items for ART procedures addressing the range of techniques involved.

In 2010, almost 95% of the ART cycles undertaken by 30,588 Australian and New Zealand women were autologous, that is, where the woman used her own oocytes or embryos. Live delivery rates achieved in autologous ART cycles increased slightly from 16.6% in 2002 to 18.4% in 2010. Live delivery rates for women aged under 35 years who undertook autologous fresh cycles (i.e. where the embryos had not been cryopreserved (frozen)) also increased slightly over time, from 25% in 2002 to 28% in 2010. The live delivery rate achieved in oocyte and embryo recipient cycles increased from 12% in 2002 to 19% in 2006 and thereafter remained around 17 to 18%.

Australia has one of the highest ART treatment activity levels in the western world. Public awareness of the increasing success of ART in treating infertility may have resulted in an incorrect perception of the general effectiveness of ART and lack of knowledge regarding the effects of age on fertility. Given a lack of relevant randomised controlled trials in this health service area, it is unclear what proportion of the births that occur during ART treatment could have occurred "naturally" without ART treatment.

Research is required to assess the wider population's knowledge about ART, and to identify gaps or misconceptions that may need to be addressed to ensure that women are fully aware of the strengths and weaknesses of infertility treatment when they choose to delay childbirth.

## Infant Mortality, Infant Morbidity and Maternal Mortality

Australia has lower levels of infant mortality, infant morbidity and maternal mortality than other developed countries. Infant mortality in Australia reduced dramatically during the last century, from 100 infant deaths per 1,000 live births in the early 1900s to 50 deaths per 1,000 live births in the 1920s, to less than 10 deaths per 1,000 live births in the 1980s. In 2009, the infant mortality rate in Australia was 4 deaths per 1,000 live births, lower than the average of 6 deaths per 1,000 live births for high income countries and considerably lower than the world average of 42 deaths per 1,000 live births. Maternal mortality in Australia also reduced from around one death per 1,000 live births in the 1970s to around 0.5 deaths per 1,000 live births in the early 2000s.

Identifying sub population groups with relatively higher levels of infant mortality and morbidity, and maternal mortality is important to enable policy makers to allocate appropriate resources to improve pregnancy outcomes in these groups. Data on infant and maternal mortality are managed by the ABS and the Australian Institute of Health and Welfare (AIHW). Data from the ABS provides the most complete ascertainment of deaths by place of usual residence but does not include data on antenatal care, smoking during pregnancy, gestational age, birth weight and maternal mortality. Data from the AIHW include a large range of indicators that are often reported by state or territory of occurrence of births rather than by mothers' usual place of residence, reflecting reporting based on accessing services.

The proportion of women who smoked during pregnancy reduced from 19% in 2001 to 15% in 2009. National, state and territory legislations to reduce tobacco smoking in the general population since 2001 may have contributed to the reduction. A cross-sectional survey found 46% of Indigenous women smoked at the beginning of pregnancy. Factors associated with smoking during pregnancy were low education, high parity, poor knowledge of risks associated with smoking, and negative attitudes toward quitting. Maternal deaths in Indigenous women are two and a half times greater than the national average.

Babies of mothers born outside Australia had higher mortality rates than babies of mothers born in Australia. In the three year period 2006-2009, the fetal mortality rate among babies of mothers born outside Australia was 8.4 deaths per 1,000 births compared to 7.2 deaths per 1,000 births among babies of mothers born in Australia. Contributing factors could be related to accessing antenatal care later in the pregnancy, lack of information and support, cultural perception and poor English skills.

## Contraception

Effective, safe and affordable contraception provides fertility control, the choice of when or if to have children and to manage the number and spacing of children.

No routinely collected data on contraceptive use that is both reliable and complete are available in Australia. Information presented in this chapter is collated from Medicare data and the published literature from which estimates were extracted of current and ever contraceptive use, types of contraceptive methods and other factors. The total number of Medicare claims, cost and rate per 100 women or men of reproductive age were analysed for Australia, each state and territory and age group.

Both data sources have limitations. Comparisons between surveys and over time are limited by differences in the classification of contraceptive methods, the sampling frames and populations from which the samples were drawn. Medicare data are limited to products listed on the Pharmaceutical Benefits Scheme (PBS) or Medicare Benefits Schedule (MBS) for contraceptive methods requiring a reimbursable procedure. Neither MBS nor PBS data provide information about how long a woman has used a particular contraceptive method. PBS data excludes the newer

oral contraceptive pills containing drospirenone and oestrogens, the vaginal ring and copper intrauterine device. Counts from the PBS reflect prescriptions filled and not the numbers of users. Similar to other developed countries, the majority of Australian women use or have used contraception. Oral contraception use was most common (27 to 34%), followed by condom use (20 to 23%), vasectomy (8.6 to 12%) and tubal ligation (4.8 to 8.6%). Very few women used long acting reversible contraception (LARCs) with injectable contraception accounting for 0.9 to 2.1% of contraceptive use with similar proportions of use for the implant (1.1 to 3.6%) and intrauterine contraceptive methods (IUDs) (1.2 to 3.2%). Conversely, use of oral contraception and sterilisation was more common in Australia than in other developed countries, but use of IUDs was much less common. Half of all pregnancies in Australia are unintended and about one in four pregnancies are terminated. The majority of unintended pregnancies result from either not using contraception or using contraception incorrectly while having sex, and only a small proportion of unintended pregnancies are due to contraceptive failure. To improve the uptake of highly effective contraceptive methods, especially LARCs, essential in reducing unintended pregnancies, health care providers must have a thorough understanding of the prevalence of and trends in contraceptive use, choices of contraceptive methods and factors associated with their use, especially for population sub-groups.

### Induced abortion

Induced abortion is an important health indicator for women of reproductive age. There is no national data collection on the incidence of induced abortion in Australia and the available data on the number of and indications for induced abortions are limited. Data on socioeconomic characteristics, sexual and reproductive health of women who present for abortion are also very limited.

Notification of abortions is mandatory in SA, WA and NT. Hence, data from these states provide a fairly accurate picture of the number of abortions performed. Data for other states and territories are derived from indirect estimates using different data sources and may be less reliable. The different service provision and reporting systems between states and territories makes it difficult to carry out useful comparisons between states and territories. Lack of data limits the capacity of reproductive and sexual health services to target reductions of unwanted pregnancies and to provide services for the management of these pregnancies.

There is a difference between an unplanned and an unwanted pregnancy. An unplanned pregnancy may not be unwanted and not result in an abortion. In a survey of 2,000 Australian women, approximately half (51%) experienced an unplanned pregnancy. Of those, about half (49%) continued the pregnancy, 31% had an abortion, 18% miscarried and 2% adopted out. Induced abortion can also occur when there is a fetal abnormality.

### Sexually Transmissible Infections (STIs)

This chapter reviews the incidence of chlamydia, gonorrhoea, syphilis, hepatitis B, HIV/AIDS, genital warts and genital herpes within the Australian population and also reports the prevalence of the human papilloma virus (HPV) vaccine uptake.

The asymptomatic silent nature of STIs means that individuals are less likely to seek testing and treatment, and as a result, the true prevalence of STIs is not accurately reflected in notification data. STI prevalence among Indigenous communities may be further underestimated because Indigenous communities have less access to health services, and Indigenous status is often under reported.

Interventions to encourage testing in vulnerable, remote or disadvantaged populations, such as a program to increase chlamydia testing in sexually active people under 25 years old, may bring estimates of prevalence in the target population closer to the true value. Conversely they could also artificially inflate differences between before and after the intervention, and between the target population and other populations. Interpretation of apparently inflated rates of STIs must therefore be made within the context of health interventions and changes in other relevant factors.

### Cancers of the reproductive tract and cervical cancer screening

Cancers of the reproductive tract accounted for large proportions of all cancer morbidity (22%) and mortality (10%) in Australia. Among the cancers of the female reproductive tract, uterine cancer was most common (about 2,000 new cases in 2008); however, uterine cancer causes less mortality as it is easier to detect at early stages and easier to treat than ovarian cancer.

Data regarding cancer in Australia are easily accessible online. However, data on subpopulation groups are insufficient. Data on Culturally and Linguistically Diverse (CALD) populations is not available for all types of cancers. Data on Indigenous status, socioeconomic status and remoteness are only available for cervical cancer and prostate cancer. For the cervical cancer screening program, the NSW Pap Test Register collects information on Indigenous status but this information is currently not available at a national level. It is therefore not possible to monitor either the rate of cervical cancer screening or the impact of any initiatives to increase screening among Indigenous women.

## Pregnancy Counselling

Non-directive pregnancy counselling is available from a variety of sources in Australia, including generalist counselling services, medical practitioners, family planning services, psychologists, social workers and clinics that provide abortion services. The Australian Government has implemented two initiatives to support non-directive pregnancy counselling services; Medicare rebates for services provided and the Pregnancy, Birth and Baby Helpline.

In November 2006, Medicare rebates became available for up to three non-directive pregnancy counselling services for each pregnancy. From January 2007 to December 2011, a total of 20,610 Medicare claims (i.e. approximately 4,000 per year, and approximately 18 per 100,000 population per year) were processed, 96% of which related to counselling provided by medical practitioners. Since July 2010, the Pregnancy, Birth and Baby Helpline has provided free advice, counselling and referral services and is contactable 24 hours per day. Between November 2010 and August 2012 the helpline received a total of 1,147 calls, an average of 52 per month, requesting non-directive advice and counselling.

No evaluations of the non-directive pregnancy counselling services that are funded by Medicare or provided by the Pregnancy, Birth and Baby Helpline have been published. It is therefore also difficult to assess the outcomes that may be resulting from these services and the benefits that they may be providing. There are no recently published, reliable estimates of the number of unintended pregnancies that occur in Australia. This makes it difficult to assess whether current service provision is meeting the community's need for this type of counselling.

## Family Planning Organisations (FPOs) in Australia

FPOs provide reproductive and sexual health services to people across Australia through the provision of integrated clinical services, health promotion programs, workforce development programs and information services. Programs and services aim to improve the reproductive and sexual health outcomes of all people, particularly groups who have been identified as facing greater health challenges. This includes people from culturally and linguistically diverse and Aboriginal and Torres Strait Islander backgrounds, people with disability, young people and people living in rural and remote areas. The challenges in meeting the reproductive and sexual health care needs of all Australians are in delivering appropriate and accessible services and in meeting the often higher costs involved in the provision of specialised services to targeted communities.

Through FPO clinics, health professionals can participate in practical clinical training. Additionally, FPOs advocate and provide evidence based advice to guide government and other decision making bodies in the development of policies and practices to support the reproductive and sexual health of the community.

The data items collected and published in this report were last reviewed collectively by FPOs in 2004 and reflect the funding requirements and areas of need that were identified at that time. Since then the role of FPOs has expanded. Many states and territories collect additional data as part of their funding agreement that is not reported nationally. The challenge in developing and reviewing the national data set is that each FPO is driven by unique population demographics, operational needs and funding obligations. A review of FPO national data definitions would allow FPO data collection to align with ABS and other nationally recognised definitions and enable more accurate comparisons with other relevant data.

# Introduction

## Family Planning NSW and Family Planning Organisations in Australia

Family Planning NSW is the leading provider of reproductive and sexual health services in the state, and is committed to the provision of evidence-based best practice for training and clinical services. Our work is shaped by our research through the Family Planning NSW Sydney Centre for Reproductive Health Research, our publications, our nationally recognised data and evaluation unit and validated through our own extensive clinical practice. Family Planning NSW is also working to assist poor and disadvantaged communities in the Asia Pacific region to access comprehensive reproductive and sexual health services. We collaborate with organisations at national and international levels to strengthen the ability of local health providers to deliver high quality family planning services.

Each Australian state and territory is serviced by their constituent Family Planning Organisation (FPO). All Family Planning Organisations respect the rights of individuals to make choices about their reproductive and sexual health and be treated with respect, dignity and understanding. Services are targeted to marginalised communities including people from culturally and linguistically diverse and Aboriginal and Torres Strait Islander backgrounds, people with disability, young people, people from rural and remote communities.

## Reproductive and Sexual Health

Reproductive and sexual health encompasses the health and wellbeing of individuals and populations in terms of three broad areas; fertility and births, family planning and contraception, and reproductive and sexual health and related disease (Figure i). It includes a broad suite of physical and psychological health disciplines.

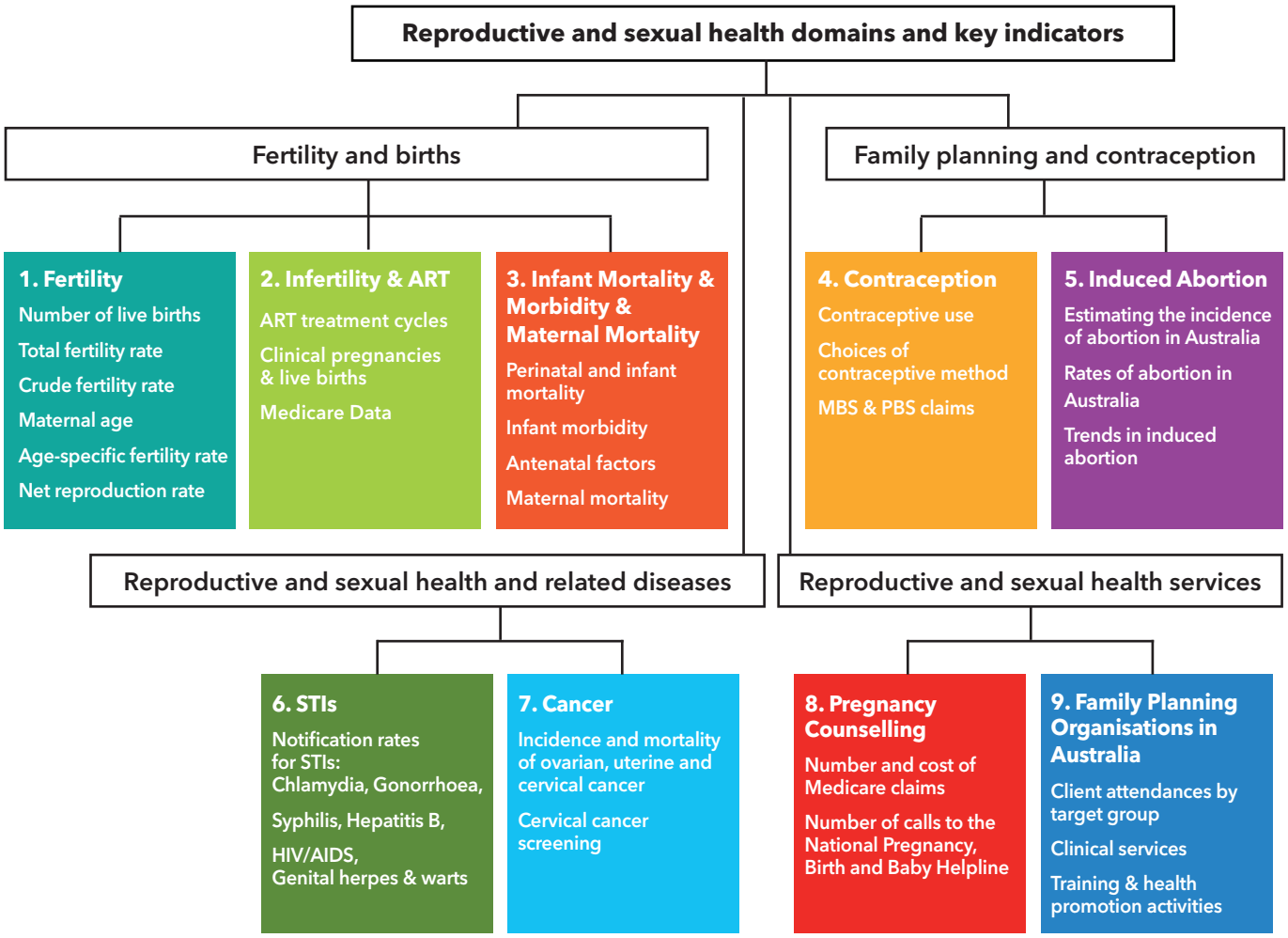
Reproductive and sexual health services and outcomes are directly and indirectly affected by several social, political and policy areas. The 1994 Cairo International Conference on Population and Development[1,2] provided a global reference point for reproductive and sexual health, outlining aims for all people to have the freedom to decide if and when to reproduce in the context of:

> Safe, affordable and effective family planning methods, such as contraception, and lawful access to safe and affordable alternatives such as abortion
>
> Safe and affordable health services for pregnancy and childbirth
>
> A sex life that is satisfying and safe grounded in elements of respect and choice

The combination of these freedoms, services and protections aims to provide, at an individual and population level, optimal reproductive and sexual health: an overarching state of physical and mental health, social wellbeing, and safety and fulfilment in the areas of life related to reproduction, sexuality and the biology of the reproductive system.[3,4] These goals are the foundations for policy, services and research in reproductive and sexual health and have been incorporated into the United Nations Millennium Development Goals (MDGs). Initially reproductive and sexual health was addressed in the MDGs in the narrower sense of infant mortality, maternal health and control of HIV/AIDS, but this was subsequently broadened under MDG 5b with "universal access to reproductive health" including elements on contraception, teenage births and family planning.[4-6]

The Cairo approach and subsequent developments are limited in that they focus on the reproductive and sexual health of women and their children largely to the exclusion of men. This is intrinsically valid, as women bear the primary responsibility and outcomes of fertility and are most vulnerable to the effects of poor services and safety related to reproductive and sexual health. Nevertheless, there is a growing recognition that to achieve the wider social and human rights goals of the Cairo Conference and the MDGs the inclusion of men and the development of policy that encompasses and addresses reproductive and sexual health more widely is required. Moreover, this is a necessity if only because, in many societies, the balance of social and political power remains with men, and therefore positive change demands the inclusion of women, men and their children.

Figure i: Reproductive and sexual health domains and key indicators




## Report Content and Format

The report contains nine chapters (Figure i). The three broad areas of reproductive and sexual health are examined in terms of seven domains; fertility; infertility and Assisted Reproductive Technology (ART); infant mortality, infant morbidity and maternal mortality; contraception; induced abortion; sexually transmissible infections (STIs); and cancers of the reproductive tract and cervical cancer screening. Each domain is the subject of one of the chapters of the report. In addition, the report addresses the provision of key reproductive and sexual health services in the form of pregnancy counselling and services delivered by Family Planning Organisations within Australia.

### Fertility and births

Fertility represents the capacity and freedom to reproduce and the choice to do so if, when and how often. Assessment of fertility as a reproductive and sexual health indicator, includes the population measurement and monitoring of fertility or birth rates, changes in these rates over time and heterogeneity in these rates within a population. It further extends to the measurement of factors such as the age at which women have their first child and the number of children born to each woman.

Infertility refers to the inability to become pregnant in spite of a period of regular, unprotected sexual intercourse. Current infertility usually refers to the most recent 12-month period, lifetime infertility refers to any (usually 12-month) period during a lifetime. As a reproductive and sexual health indicator, infertility is comparatively difficult to measure, however, treatment for infertility can be assessed in Australia through the rates of use and success of assisted reproductive technologies.

The deaths of infants or their mothers represent fundamental indicators of the health and development of a population and society. Measurement of the rates of stillbirths and infant deaths up to one year of age, of infant morbidity factors such as low birth weight and of maternal mortality provide direct evidence to support policy and healthcare services.

Chapter 1 provides information on trends in fertility and births in Australia, including crude, general and total fertility, age-specific fertility and teenage pregnancy

Chapter 2 provides information on the trends in the use of Assisted Reproductive Technologies (ART) in Australia/New Zealand including the number of claims for ART treatment, the number of oocyte pick up cycles and retrieval, clinical pregnancies resulting from embryo transfer cycles and live deliveries per embryo transfer cycle

Chapter 3 provides information on infant mortality and morbidity including risk factors such as smoking in pregnancy, early access to antenatal care, and outcomes including prematurity and low birth weight. The chapter also presents data on maternal mortality

**Family planning and contraception**

The ability to control fertility is an important public health issue. When accessible, effective and affordable, contraception offers women, and society more generally, choices about fertility and family planning. Measurement of overall rates of contraceptive use, the effective use of different contraceptive methods and types, and the reasons for these choices directly informs service provision and policy governing the products available and their costs.

The right of women to have access to affordable methods to terminate a pregnancy, in conditions of physical and psychological safety and wellbeing, supports the overall aim of providing women with choices regarding their fertility. The abortion rate, in women of different ages and from different areas and socioeconomic circumstances, provides key information on the reproductive and sexual health of a population. Measures of the abortion rate in a society, and the factors underlying that rate, speak directly to the effectiveness of policy on contraception and the wider position of women's health and status in society.

Chapter 4 provides information on contraceptive use, including levels and patterns of the use of condoms, oral contraceptive pills, long-acting reversible methods such as intra-uterine methods, implants and injections, sterilisation and the use of emergency contraception

Chapter 5 provides information on incidence and the rate of induced abortion, and examines trends in claims of induced abortion in Australia

**Reproductive and sexual health and related disease**

The incidence and prevalence of sexually transmissible infections (STIs) are indicators of safe-sex behaviour and the need for services and education to encourage individuals to engage in sex safely. STIs can cause significant population morbidity and mortality, and the rates of infection and patterns of that infection geographically and in sub-populations can direct healthcare and preventive services and interventions to manage and control disease and minimise harm and death.

The incidence of cancers of the reproductive tract and resulting mortality are further indicators of the reproductive and sexual health of a population. The major cause of cervical cancer (human papilloma virus, HPV) has now been identified and vaccination programs initiated in Australia. Monitoring of cervical cancer mortality, participation in preventive screening programs and the uptake of vaccination will continue to direct government expenditure and the balance between Pap test screening, the use of new technologies such as HPV-DNA testing and vaccination programs. Ovarian and uterine cancers are less well understood or controlled, and monitoring of these diseases contributes to the wider picture of cancer morbidity and mortality for women, as well as providing the epidemiological foundation for understanding disease patterns in the population.

Chapter 6 reviews the incidence of chlamydia, gonorrhoea, syphilis, hepatitis B, HIV/AIDS, genital warts and genital herpes within the Australian population and also reports the prevalence of the human papilloma virus (HPV) vaccine uptake.

Chapter 7 provides incidence and mortality rates for cancers of the reproductive tract, specifically cervical, ovarian and uterine cancer. The chapter also summarises cervical cancer screening rates in Australia, reporting screening participation rates, measures of screening undertaken by practice nurses and the quality of screening Pap smears.

**Reproductive and sexual health services**

Chapter 8 reviews non-directive pregnancy counselling in terms of Medicare data and data available from the Pregnancy, Birth and Baby Helpline.

Chapter 9 outlines the programs and services offered by FPOs in Australia and identifies areas of data need.

The report summarises sexual health measures and available data within each domain. Monitoring and assessment of national, state and sub-population performance provides the basis for the assessment of the reproductive and sexual health of Australia relevant to each domain and highlights unmet needs requiring research, policy review, services and education

Family Planning NSW and Family Planning Organisations across Australia utilise the data sources identified in this report to drive planning, service delivery and other activities as outlined in Chapter 9. However, it is intended that this report will provide other key stakeholders, including clinicians, educators, researchers and policy-makers, with access to data from which to gauge where further work is required to enhance the reproductive and sexual health and wellbeing of the Australian population. In particular, the report seeks to draw attention to population sub-groups that are already known to require specialised services, education, health promotion, and further research. Such groups include:

Aboriginal and Torres Strait Islanders

Young people (i.e. aged less than 25)

People living in rural and remote settings

People from culturally and linguistically diverse backgrounds

Other groups are people with a disability and LGBTI, however, there is very little data available on the reproductive and sexual health of these groups.

Each chapter includes an overview of content, key reproductive and sexual health indicators, primary data sources and a discussion of the limitations of these data and the opportunities for improved data on reproductive and sexual health.

**International perspective**

Australia's place in the international context is a key overall indicator of the reproductive and sexual health of Australians. Australia generally performs highly in comparison to similar developed countries, however this is not universally so. Moreover, overall measures of reproductive and sexual health used in comparison to other countries may mask important variation within Australia that requires attention to ensure that all Australians enjoy high quality reproductive and sexual health.

**National perspective**

Australia's progress in reproductive and sexual health can be measured by assessing national rates and trends for key sexual and reproductive health indicators over time. Where possible these indicators are provided for states and territories, and salient variation in relation to socio-demographic factors and population sub-groups including gender, age, geographic location, measures of advantage and disadvantage, culturally and linguistically diverse communities and for Aboriginal and Torres Strait Islander communities is examined.

## References


1. Cohen SA, Richards CL. The Cairo consensus: population, development and women. Fam Plann Perspect 1994; 26: 272-7.
2. Miller K, Rosenfield A. Population and women's reproductive health: an international perspective. Annu Rev Public Health 1996; 17:359-82.
3. Kane, P. Challenges to reproductive health in Australia. Journal Of Population Research 2000; 17: 163-73.
4. Glasier A, Gülmezoglu AM, Schmid GP, Moreno CG, Van Look PF. Sexual and reproductive health: a matter of life and death. Lancet 2006; 4(368):1595-607.
5. Dixon-Mueller R, Germain A. Fertility regulation and reproductive health in the millennium development goals: the search for a perfect indicator. Am J Public Health 2007; 97: 45-51.
6. United Nations. The millennium development goals report 2010. New York: United Nations, 2010.

# Chapter 1:
# Fertility

Lieu Trinh, Kevin McGeechan

# Chapter Outline

# Chapter Outline

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## Key indicators

Number of live births

Total fertility rate

Crude fertility rate

Maternal age

Age-specific fertility rate

Net reproduction rate

## Primary data sources

Australian Bureau of Statistics, Births, catalogue number 3301.0, 2010

United Nations, Department of Economic and Social Affairs, Population Division. World Population Prospects: The 2010 Revision, CD-ROM Edition

## Purpose of this chapter

To compare fertility rates between Australia and other countries

To describe fertility trends in Australia

To describe fertility rates and trends in population subgroups

To identify areas of data development

## Terms and definitions

Australian Bureau of Statistics (ABS) terms and definitions[1] are used in this chapter:

**Live births:** products of conception, irrespective of gestational age, which show any evidence of life such as breathing or heartbeat.

**Total fertility rate (TFR):** the average number of children that a woman could expect to have in her lifetime, assuming that the current age-specific fertility rate persists through her lifetime and she were to survive through to the end of her reproductive life. The TFR is the sum of the single-year age-specific rates at a given time.

**Crude fertility rate:** the number of live births per 1,000 population.

**Fertility rate:** the number of live births per 1,000 women.

**Age-specific fertility rate:** the number of live births per 1,000 women of a specified age or age group.

**Net reproduction rate:** the average number of daughters surviving to reproductive age per woman. A net reproduction rate of one means each generation of mothers is having enough daughters to replace themselves. The net reproduction rate is particularly relevant where the mortality rate is high or where the number of female babies is much less than the number of male babies because of the use of reproductive technologies.

**Area of remoteness:** The delimitation criteria for remote areas used by the ABS are based on the Accessibility/ Remoteness Index of Australia (ARIA) developed by the Australian Government Department of Health & Ageing and the National Key Centre for Social Applications of Geographic Information System. ARIA measures the remoteness of a point based on the physical road distance to the nearest Urban Centre (ASGC 1996).

**Indigenous birth:** Birth to Indigenous mothers or fathers, unless stated otherwise.

**Maternal median age:** The age that divides all mothers who give birth in the same year into two numerically equal groups; that is, half the mothers are younger than this age and half are older.

**Teenage birth:** Birth to women younger than 20 years.

## Data sources and limitations

### The Australian Bureau of Statistics

The ABS collects data from State and Territory Registrations of Births, Deaths and Marriages.[1] The ABS data includes all important fertility indicators including number of live births, total fertility rate, crude fertility rate, maternal age, age-specific fertility rate, and net reproduction rate. The data are available by state and territory of residence, remoteness status, Indigenous status and maternal country of birth. However, the ABS data have some limitations:

#### *Delayed registration*

Registration of births within 60 days of birth is compulsory in Australia. However, there can be delays in registration, especially in the months of November and December. To accommodate this, births that occur during the reference year but are registered by 31 March of the following year are counted in the reference year. A close examination showed 12% of births registered in 2006 actually occurred in previous years.[2] From 1 July 2007, to improve registration of births, parents are required to register the birth of their child prior to receiving the Baby Bonus.[2]

The ABS reports the number of live births both by year of occurrence and by year of registration at national and state level. However, data by year of occurrence for the most recent years are likely to be underreported due to delays in registration. Data on all other indicators are reported by year of registration.

#### *Intercensal errors*

Population data are used as denominators to calculate fertility rates. The census provides the most accurate information on population data. The most recent census years were 2001, 2006 and 2011. During intercensal periods, population estimates are used in lieu of census data and errors are likely to occur.

Data from the ABS, by year of registration were used for this chapter because the data set contained all important fertility indicators and data were available by state and territory of residence. The ABS data are also the main data source for other research on fertility in Australia.[2,3]

### The United Nations

The United Nations (UN) compiles data for each country using the most recent available information.[4] The UN uses the same definition of live births as the ABS.

### Other data source

The Australian Institute of Health and Welfare National Perinatal Epidemiology and Statistics Unit produces the annual Australia's Mothers and Babies reports. Information on the number of live births and maternal age is reported but information on other fertility indicators, such as total fertility rate (TFR) or crude birth rate, is not available. Data are reported by place where births occur rather than by place of usual residence.[5] Data from the Australian Institute of Health and Welfare were not used in this chapter.

## Summary

In 2010, Australia had a total fertility rate (TFR) of 1.9 children per woman, higher than the average for developed countries of 1.7 children per woman but below the replacement rate of 2.1 children per woman.

### Increased fertility

The number of live births increased from just over 246,000 in 2001 to nearly 298,000 in 2010, an increase of 21%. The TFR increased from 1.7 children per woman in 2001 to 1.9 children per woman in 2010.

### Maternal age

The median maternal age increased from 30.0 years in 2001 to 30.7 years in 2010. In 2010, women aged 30-34 years had the largest number of births (just over 94,000) and the highest fertility rate (123 live births per 1,000 women). From 2001 to 2010, the largest increases in the number of births were among women of older age groups of 30-34 years (18%), 35-39 years (54%) and 40-44 years (70%).

### Fertility by state and territory

Northern Territory and Tasmania had the highest TFR of 2.1 live births per woman and the lowest median maternal age (28.5 and 29.2 years, respectively). While other states and territories followed the national pattern of having the highest fertility rates among the age group of 30-34 years, Northern Territory and Tasmania had the highest fertility rates among the age group of 25-29 years.

### Fertility by area of remoteness

More remote areas had higher fertility rates compared to less remote areas. In 2010, the TFR increased from 1.8 children per woman in major cities to 2.1 children per woman in inner regional areas, 2.2 children per woman in outer regional areas and 2.5 children per woman for both remote and very remote areas.

### Indigenous births

In 2010, the number of Indigenous births accounted for 5.4% of total births. Indigenous women had a higher TFR of 2.6 live births per woman and a lower median maternal age (24.6 years) compared to all women in Australia. Northern Territory had the highest proportion of Indigenous births (40%).

### Fertility by maternal country of birth

In 2010, 29% of all live births were to mothers who were born overseas. Women from North Africa and the Middle East had the highest TFR of 3.0 children per woman.

### Fertility among teenagers

In 2010, 3.8% of total births were to teenage mothers. The fertility rate was 16 live births per 1,000 teenagers. The teenage fertility rate was higher in the Northern Territory (48 live births per 1,000 teenagers), in very remote areas (87 live births per 1,000 teenagers), among Indigenous teenagers (76 children per 1,000 teenagers) and among North African and Middle Eastern teenagers (29 children per 1,000 teenagers). The number of live births among teenagers decreased from approximately 11,700 in 2001 to nearly 11,300 in 2010, a reduction of 3.5%.

## 1.1 Introduction

For a population to replace itself from one generation to the next, the TFR, or the number of children born to a woman over her lifetime, needs to reach the replacement rate. The current replacement rate for developed countries is 2.1 children per woman and for developing countries, due to their higher mortality rates, ranges between 2.5 and 3.3 children per woman.[6]

The TFR has been declining across the world over the last decades.[4] In developed countries, the fertility rate has reduced from 2.8 children per woman in the 1950s to 1.7 children per woman in the 2000s, much lower than the replacement rate. Contributing factors to the decline in the fertility rate include increased availability and access to contraception, delayed childbearing, increased female participation in the formal workforce, increased direct and indirect cost of having children, reduced formation of partnerships, increased partnership breakdowns, increased social acceptance of having fewer or no children and increased parental desire to spend more time and energy on fewer children.[3] Global economics also play an important role. When there is an economic downturn, the fertility rate correspondingly declines. The most obvious example of this is the decline in the fertility rate during the Great Depression (1929-1940).[7] When there is economic prosperity, the fertility rate increases. An example of this was the Baby Boom after World War II which ended in 1945.[7,8,9]

Most developed countries have policies to boost fertility rates.[10-12] The main policies are monetary incentives (e.g. a payment for each new child and paid parental leave) and policies which assist parents to combine work force participation and parenting (e.g. child care assistance and flexible working arrangements).

In Australia, the TFR increased from 3 children per woman in the 1950s to 3.5 children per woman in the 1960s (Baby Boom) but reduced to below 2 children per woman in the 1980s.[2,9]

## 1.2 Fertility: international comparisons

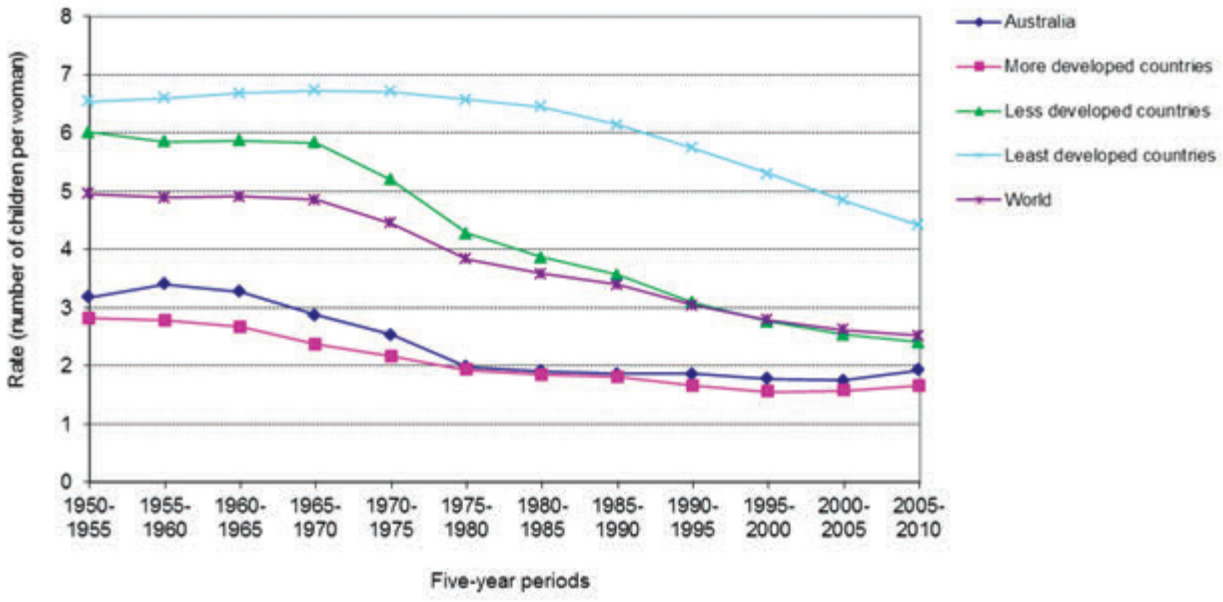
### 1.2.1 Live births

Between 2005 and 2010, there were around 670 million births worldwide.[4] During the same period, there were around 1.5 million births in Australia.

### 1.2.2 Total fertility rate

Between 1950 and 2010, the TFR decreased in all parts of the world (Figure 1.1). Australia consistently had a higher TFR than the average in developed countries, but much lower than the world average. For example, during the most recent years (2005-2010), the TFR in Australia was 1.9 children per woman, higher than the average for developed countries of 1.7 children per woman but lower than the replacement rate of 2.1 children per woman and much lower than the world average of 2.5 children per woman. The TFR was highest in least developed countries (4.4 children per woman).

**Figure 1.1: International comparison of total fertility rate in five year periods, 1950 to 2010**



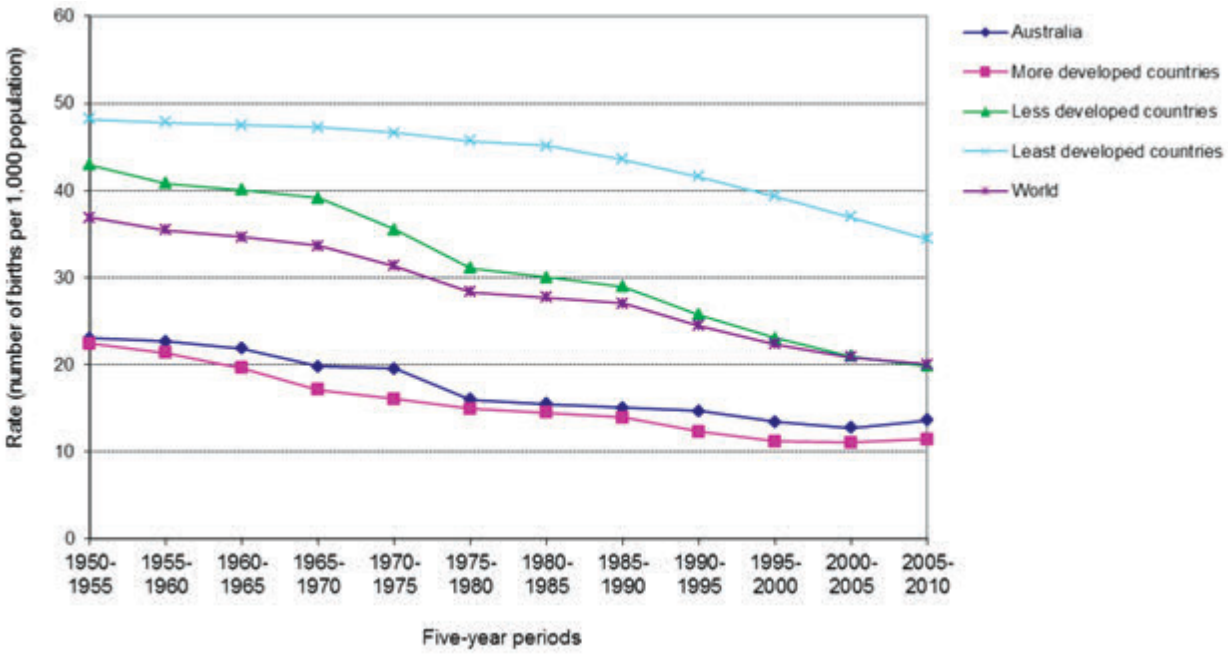

Notes: More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan.
Less developed countries comprise all Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia, excluding the least developed countries.
Least developed countries include 33 in Africa, 9 in Asia, 5 in Oceania plus one in Latin America and the Caribbean.

Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition. http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### 1.2.3 Crude fertility rate

Between 1950 and 2010, the crude fertility rate decreased in all regions (Figure 1.2). Australia consistently had a higher crude fertility rate than the average in developed countries, but much lower than in less and least developed countries. In the five year period between 2005 and 2010, the crude birth rate in Australia was 14 births per 1,000 population, compared to 11 births per 1,000 population for developed countries, 20 births per 1,000 population for less developed countries and 34 births per 1,000 population for least developed countries.

**Figure 1.2: International comparison of crude fertility rates in five-year periods, 1950 to 2010**

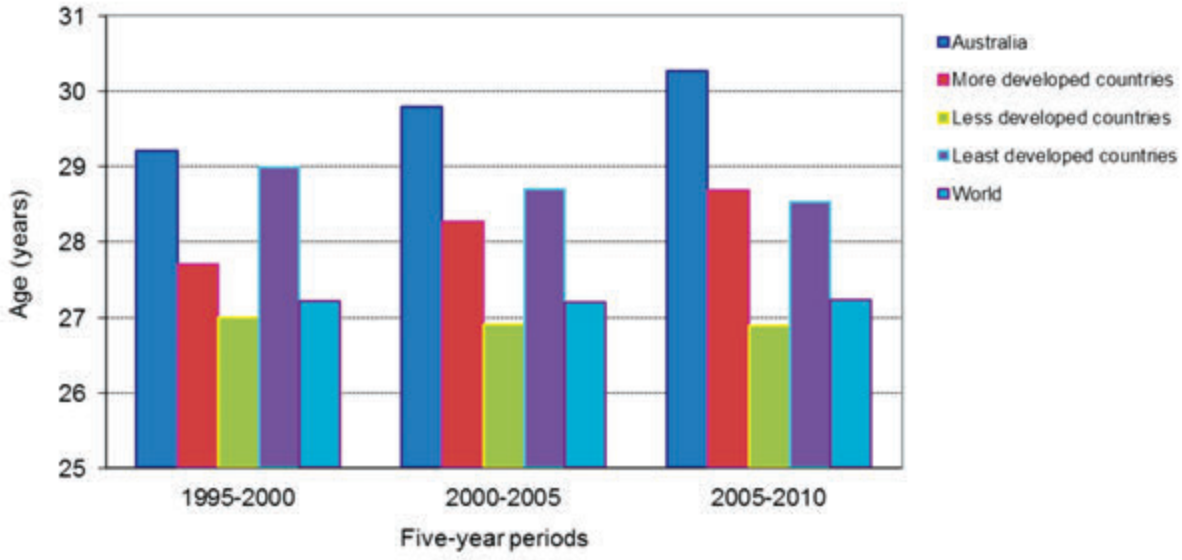



Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

## 1.2.4 Maternal age

Mean maternal age in Australia increased from 29.2 years in the five year period 1995-2000 to 30.3 years in 2005-2010 (Figure 1.3). Mean maternal age in Australia was higher than in more developed countries (28.7 in 2005-2010) and much higher than in less and least developed countries (26.9 and 28.5 respectively). While mean maternal age in the more developed countries increased, mean maternal age in less and least developed countries decreased.

**Figure 1.3: International comparison of mean maternal age in five-year periods, 1995-2000 to 2005-2010**




Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition. http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

## 1.2.5 Live births by age group

In Australia, the proportion of women giving birth varied by maternal age with women aged 30-34 years having the highest proportion of live births (33%) (Table 1.1). In more developed countries, women aged 25-29 years had the highest proportion of live births (29%). In less and least developed countries, women aged 20-24 years had the highest proportion of live births (35% and 30% respectively).

Australia had a smaller proportion of teenage births (4%) than the average in developed countries (6.5%) and much lower than the averages in less and least developed countries (12% and 16% respectively).

**Table 1.1: International comparison of births by age group (%), 2005 to 2010**

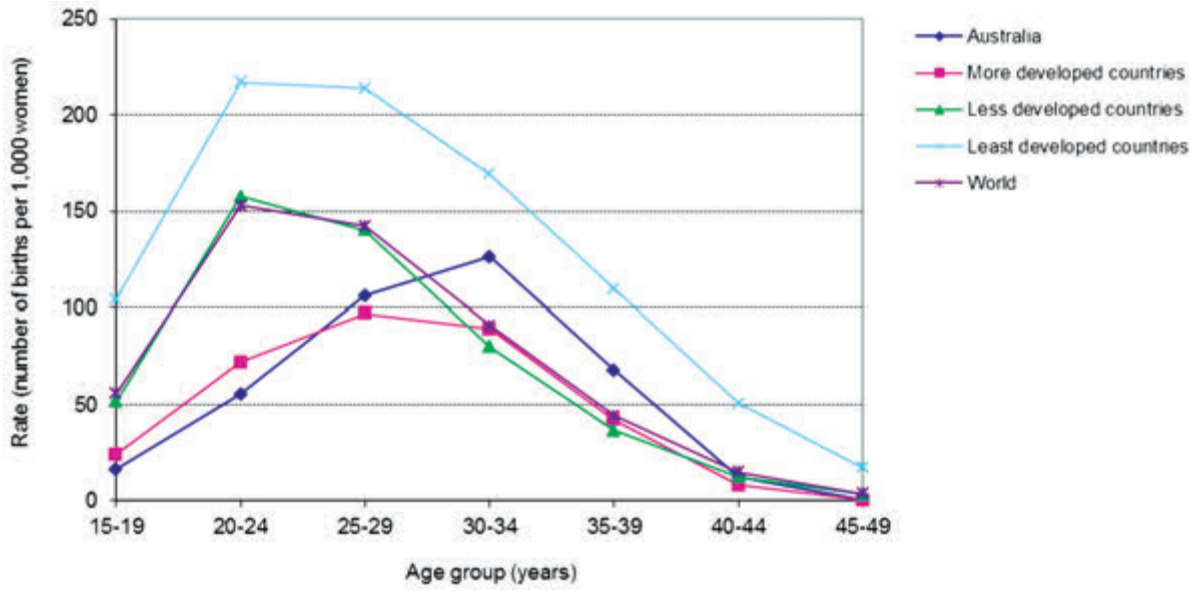
| | 15-19 years | 20-24 years | 25-29 years | 30-34 years | 35-39 years | 40-44 years | 45-49 years |
|---|---|---|---|---|---|---|---|
| Australia | 4.0 | 14 | 27 | 33 | 18 | 3.4 | 0.2 |
| More developed | 6.5 | 21 | 29 | 27 | 13 | 2.5 | 0.1 |
| Less developed | 12 | 35 | 28 | 15 | 6.7 | 2.0 | 0.5 |
| Least developed | 16 | 30 | 25 | 16 | 8.8 | 3.4 | 0.9 |
| World | 12 | 33 | 28 | 17 | 7.8 | 2.4 | 0.5 |

Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

## 1.2.6 Age-specific fertility rate

Women aged 30-34 years in Australia and women aged 25-29 years in more developed countries had the highest fertility rates. Women aged 20-24 years in less and least developed countries had the highest fertility rates (Figure 1.4). The teenage (15-19 years) fertility rate was lower in Australia (16 births per 1,000 women) than the average in developed countries (24 births per 1,000 women) and much lower than the averages in less and least developed countries (52 and 155 births per 1,000 women respectively).

**Figure 1.4: International comparison of age-specific fertility rate, 2005 to 2010**



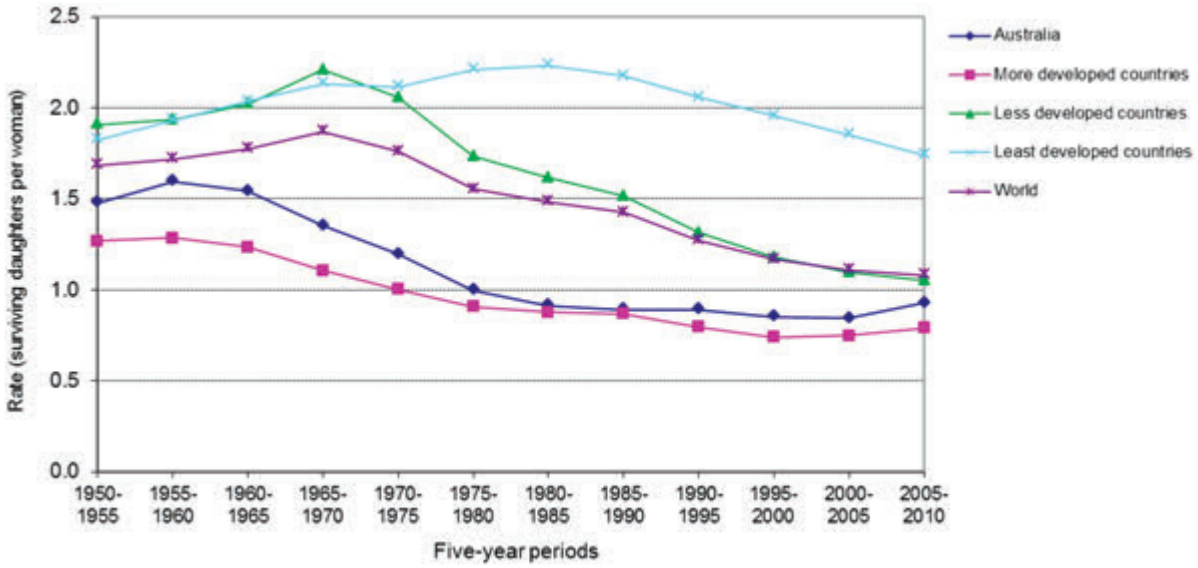

Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### 1.2.7 Net reproduction rate

From 1950 to 2010, the net reproduction rate reduced substantially in all parts of the world, except in least developed countries where the decrease was small (Figure 1.5).

Australia had a higher net reproduction rate than the average in developed countries (0.93 daughters per woman compared to 0.79 daughters per woman in 2005-2010), but lower than in less and least developed countries (1.05 and 1.74 daughters per woman in 2005-2010, respectively).

**Figure 1.5: International comparison of net reproduction rate in five-year periods, 1950 to 2010**




Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition. http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

## 1.3 Fertility in Australia

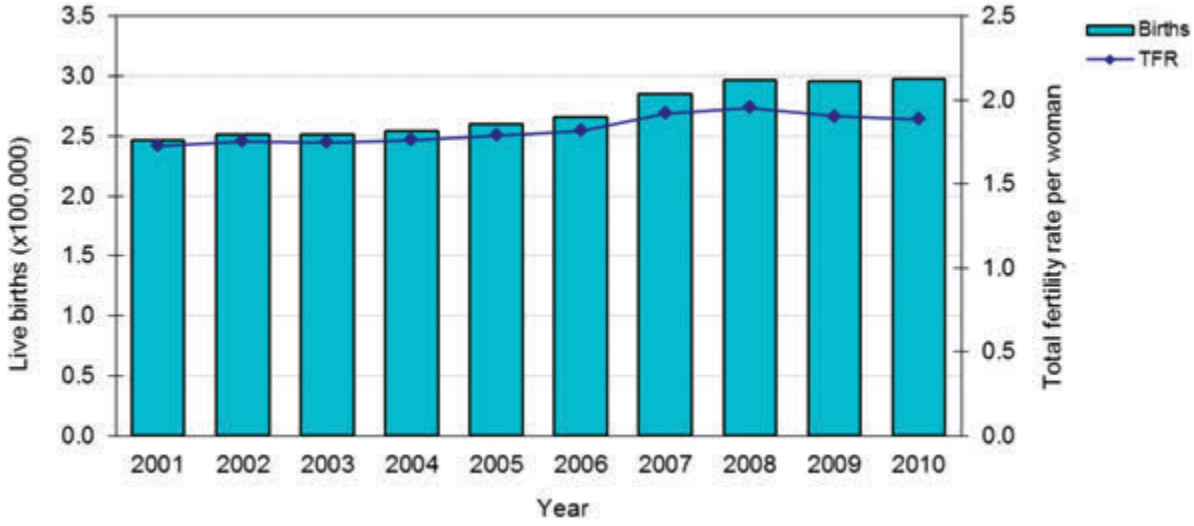
### 1.3.1 Live births

Between 2001 and 2004, the annual number of live births in Australia was stable at approximately 250,000 (Figure 1.6). After 2004, the number of live births increased to nearly 300,000 in 2008 and remained at this level in 2009 and 2010. There was an increase of 21% between 2001 and 2010. Most of the increase (18%) occurred between 2004 and 2008, when the Baby Bonus was introduced.

### 1.3.2 Total fertility rate

The TFR increased slightly from 1.73 live births per woman in 2001 to 1.82 in 2006, and increased to 1.96 in 2008 and fell to 1.89 in 2010 (Figure 1.6).

**Figure 1.6: Live births and total fertility rate in Australia, 2001 to 2010**

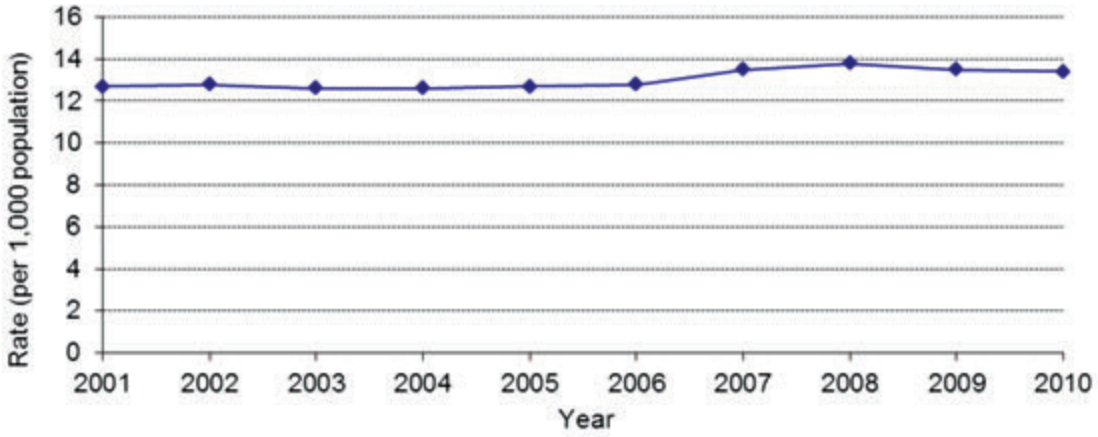



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.3.3 Crude fertility rate

From 2001 to 2006, the crude fertility rate fluctuated between 12.6 and 12.8 live births per 1,000 population. The crude fertility rate increased to 13.8 live births per 1,000 population in 2008, and declined to 13.4 in 2010 (Figure 1.7).

**Figure 1.7: Crude fertility rate in Australia, 2001 to 2010**

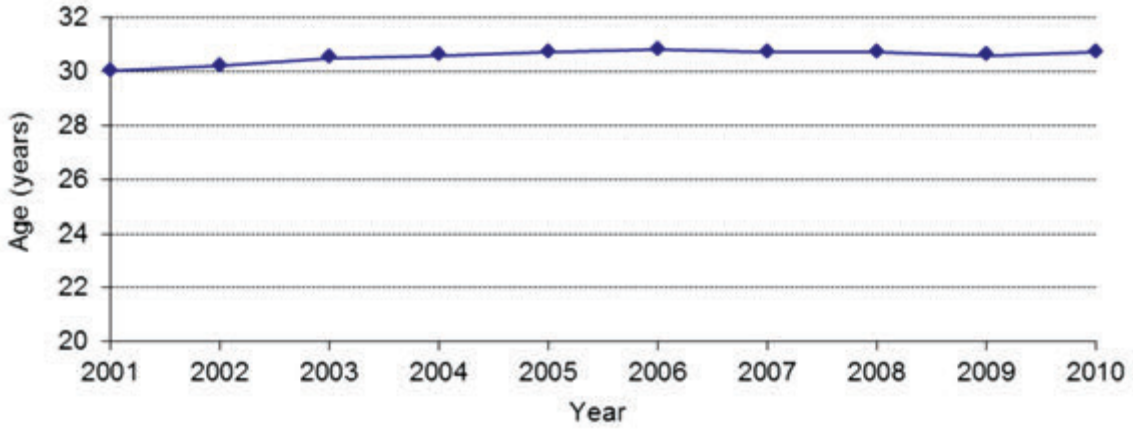



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.3.4 Maternal age

The median age of mothers in Australia increased slightly from 30 years in 2001 to 30.7 in 2010 (Figure 1.8).

**Figure 1.8: Median age of mothers in Australia, 2001 to 2010**

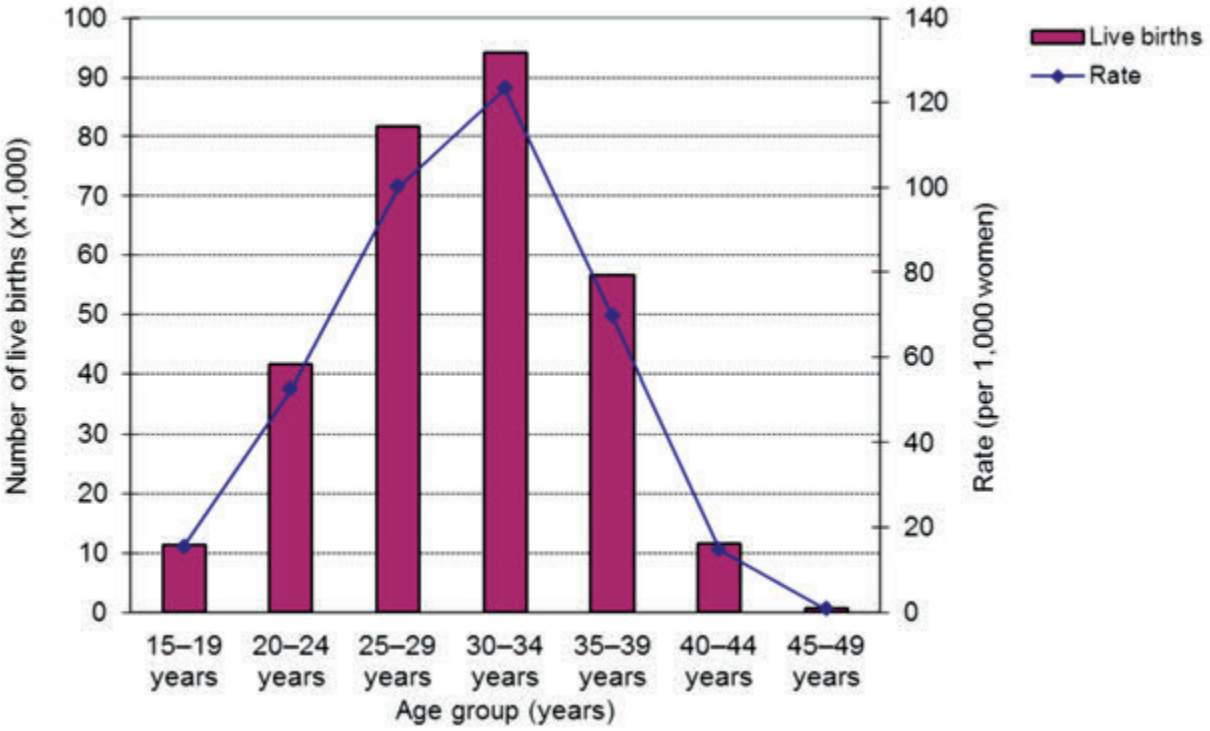



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.3.5 Live births by age group

In 2010, the number of live births was highest among women aged 30-34 years (over 94,000) and lowest among women aged 45-49 years (592) (Figure 1.9).

**Figure 1.9: Number of live births by age group and age-specific fertility rate in Australia, 2010**

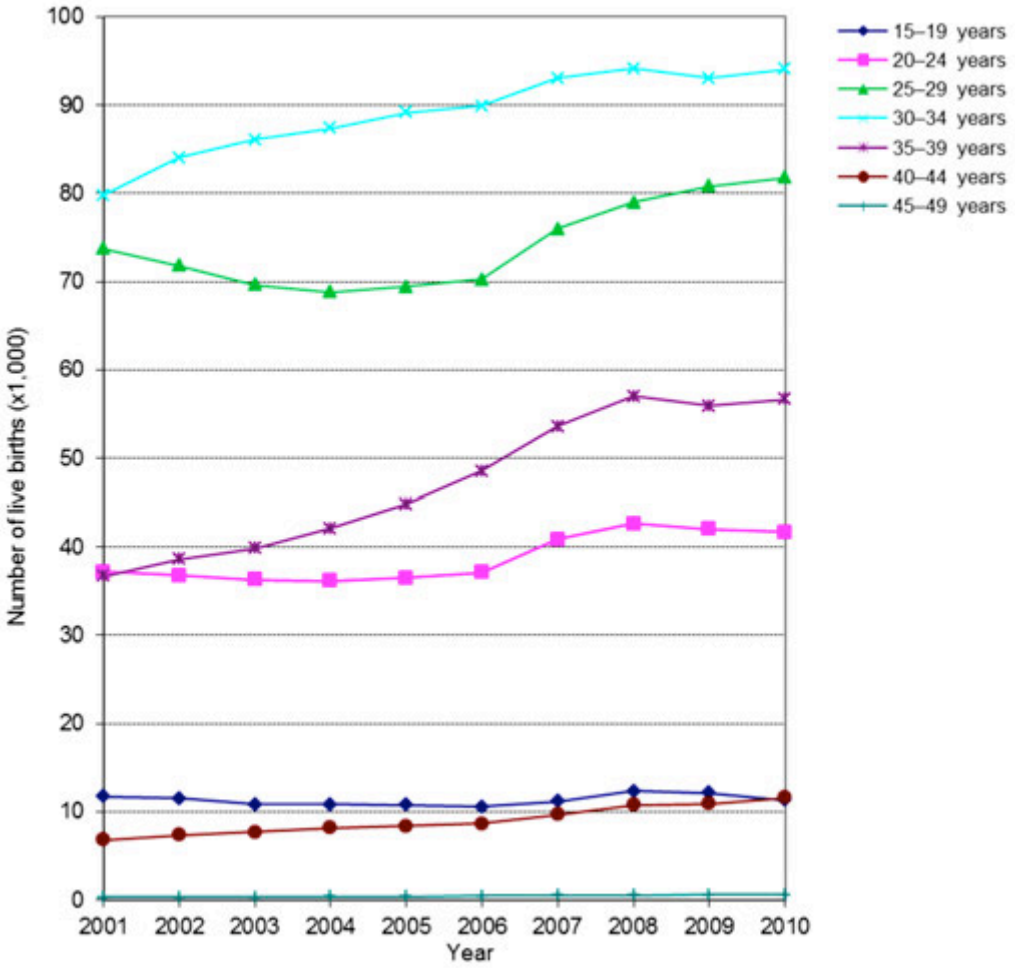



Note: Births to mothers younger than 15 years are included in the 15-19 year group and births to mothers older than 49 years are included in the 45-49 year group
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

Between 2001 and 2006, the number of live births decreased slightly among women aged 29 years or younger, but increased among women aged 30 years or older (Figure 1.10). For example, the number of live births among women aged 25-29 years decreased from nearly 74,000 in 2001 to just over 70,000 in 2006.

From 2006 to 2008, an increase was observed in all age groups; with the largest increases among women aged 25-29 years and 35-39 years. After 2008, the number of live births decreased slightly or remained the same. Overall, from 2001 to 2010, the number of live births increased in all age groups, except in teenage women (where the number of live births decreased by 3.5%). The largest increases were among the older age groups of 30-34 (18%), 35-39 (54%), 40-44 (70%) and 45-49 (104%).

**Figure 1.10: Number of live births by age group in Australia, 2001 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.3.6 Age-specific fertility rate

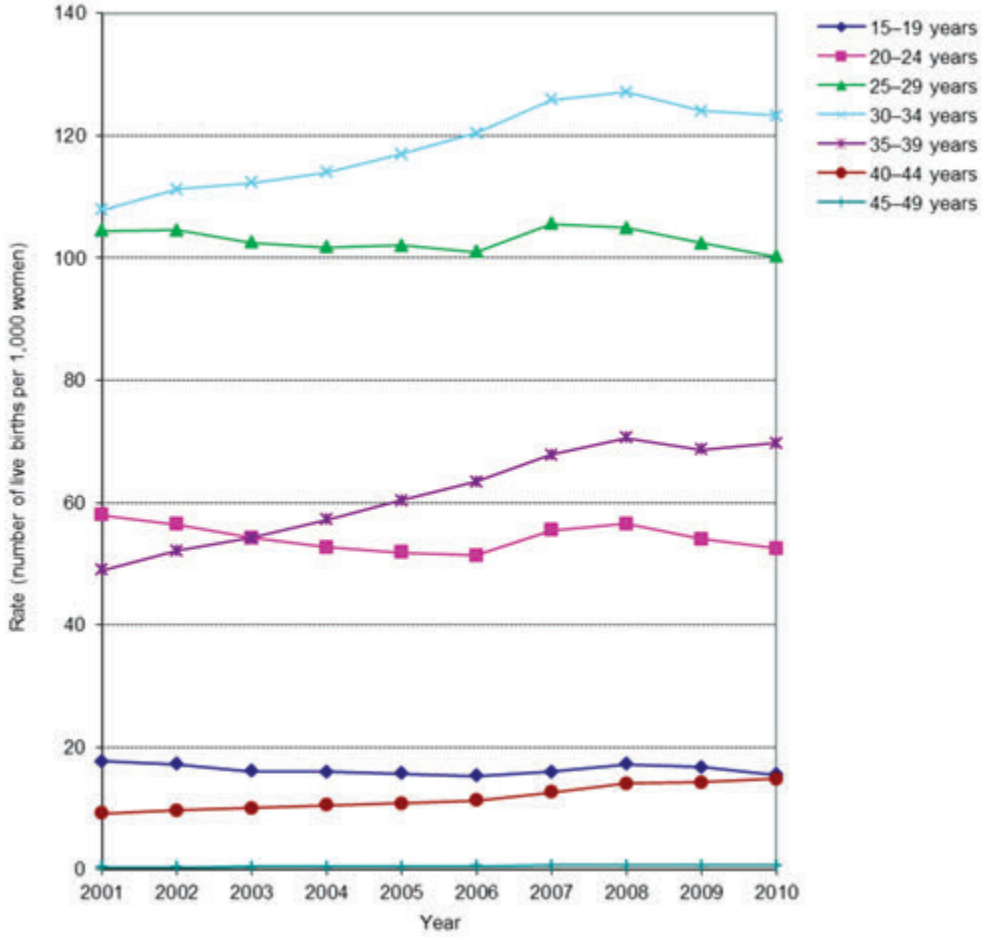
The trends for age-specific fertility rates reflected the pattern of live births for each age group (Figure 1.11). In 2010, the age group 30-34 years had the highest fertility rate of 123 live births per 1,000 women, followed by age group 25-29 years (100 live births per 1,000 women). The groups with lowest fertility rate were women aged 40-45 (15 live births per 1,000 women) and teenagers (16 live births per 1,000 women). The fertility rate among women aged 45 or older was very low, below 1 live birth per 1,000 women.

Between 2001 and 2006, the fertility rate decreased among women aged 29 years or younger but increased among women aged 30 years or older. For example, the fertility rate among women aged 25-29 years decreased from 104 live births per 1,000 women in 2001 to 101 live births per 1,000 women in 2006.

From 2006 to 2008, increases were observed in all age groups, but the largest increases were among age groups 35 years or older. After 2008, the fertility rates reduced in all age groups, except the 40-44 years group.

Overall, from 2001 to 2010, fertility rates decreased among women aged 29 years or younger and increased among women aged 30 years or older. The largest increases were among the older age groups 35-39 years (42%), 40-44 years (61%) and 45-49 years (75%).

**Figure 1.11: Age-specific fertility rate in Australia, 2001 to 2010**

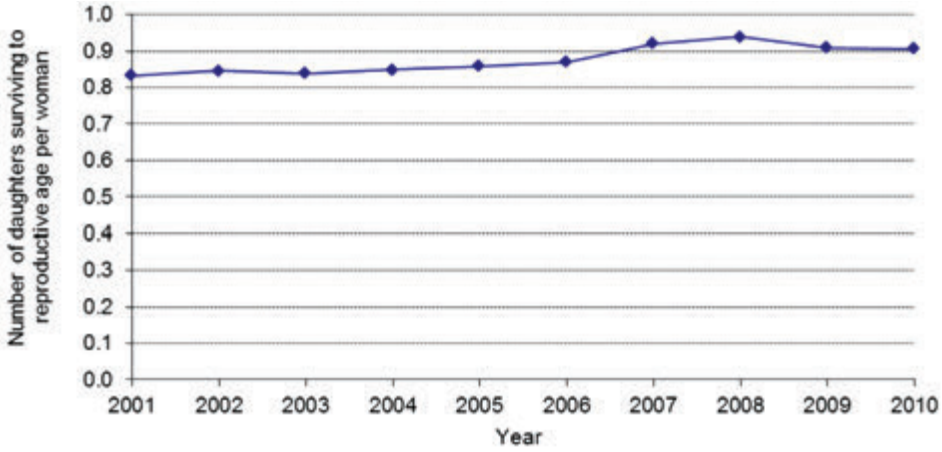



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.3.7 Net reproduction rate

The net reproduction rate increased from 0.83 daughters surviving to reproductive age per woman in 2001, to 0.87 in 2006 and to 0.94 in 2008; and fell to 0.91 in 2010 (Figure 1.12).

**Figure 1.12: Daughters surviving to reproductive age in Australia, 2001 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

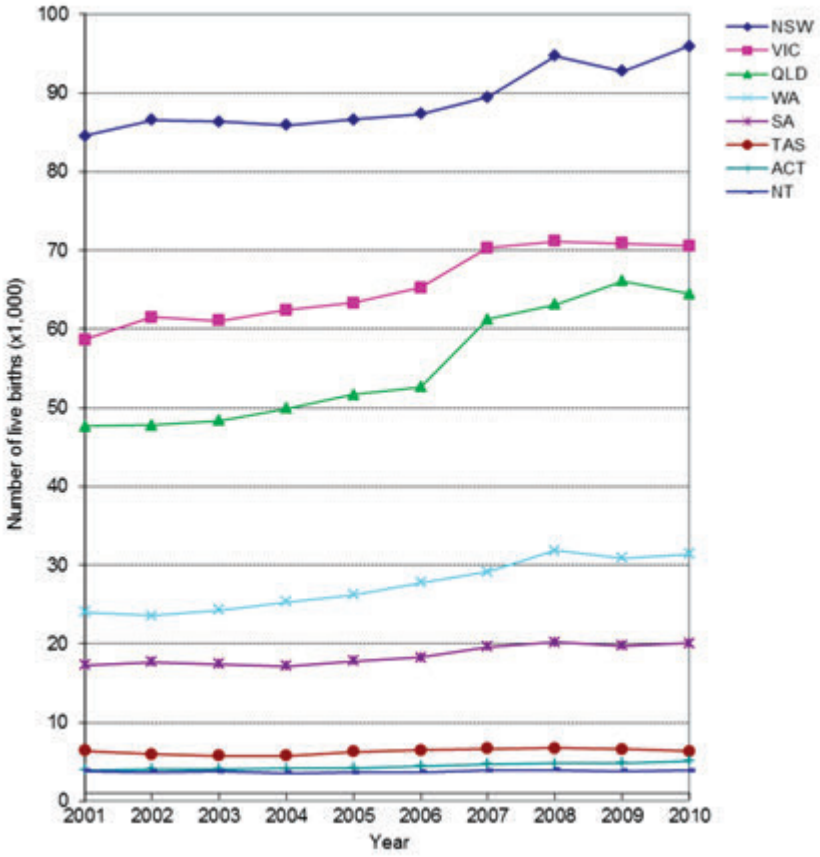
## 1.4 Fertility by state and territory

### 1.4.1 Live births

In 2010, NSW had the highest number of live births (close to 96,000 in 2010), followed by VIC (more than 71,500 live births) (Figure 1.13). The ACT and NT had the lowest number of live births (approximately 5,100 and 3,900 live births, respectively).

The number of live births in all states increased markedly between 2006 and 2008 with QLD having had the largest increase.

**Figure 1.13: Live births by state and territory, 2001 to 2010**



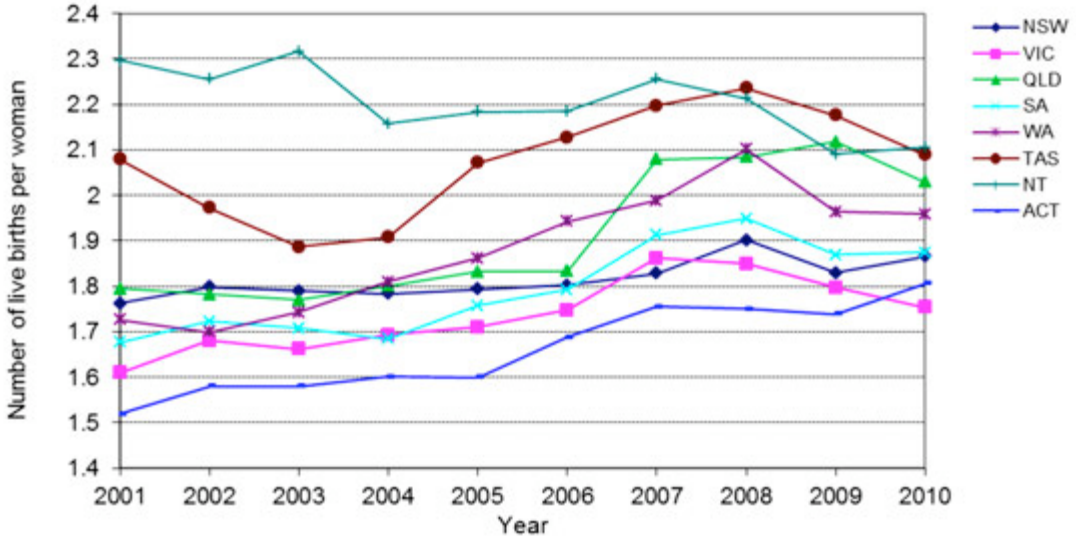

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.4.2 Total fertility rate

In 2010, NT and TAS had the highest TFR of 2.1 live births per woman. VIC, for the first time, became the state with the lowest TFR (1.8 live births per woman) (Figure 1.14).

Between 2001 and 2010, the TFR increased in all states and territories, except in NT where the TFR decreased from 2.3 live births per woman in 2001 to 2.1 live births per woman in 2010.

**Figure 1.14: Total fertility rate by state and territory, 2001 to 2010**

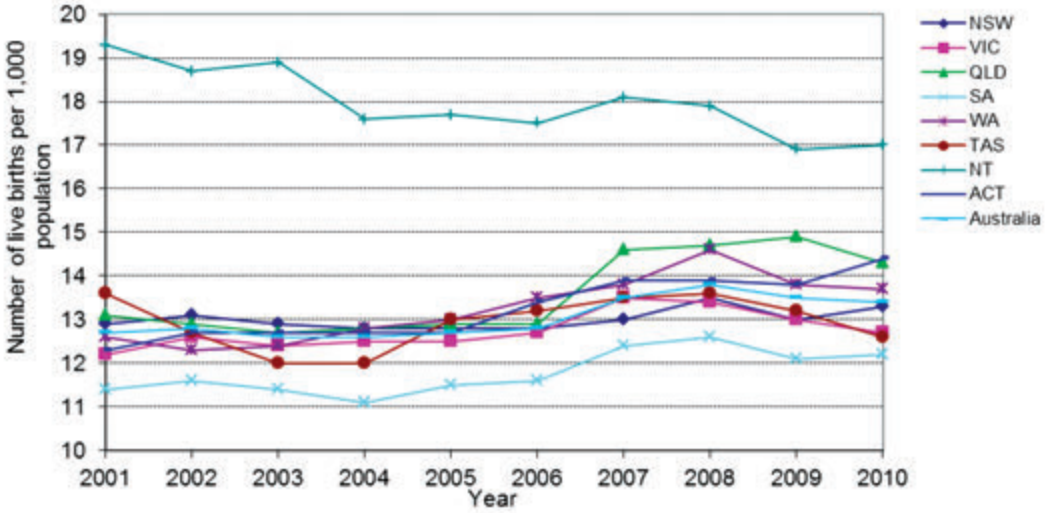



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.4.3 Crude fertility rate

NT consistently had a higher crude fertility rate than in other states and territories (Figure 1.15). In 2010, the crude fertility rate in NT was 17 live births per 1,000 population. SA had the lowest crude fertility rate of 12.2 live births per 1,000 population. The crude fertility rate in NT decreased from 19.3 live births per 1,000 population in 2001 to 17 live births per 1,000 population in 2010. In contrast, the crude fertility rates in other states increased slightly between 2001 and 2010.

**Figure 1.15: Crude fertility rate by state and territory, 2001 to 2010**

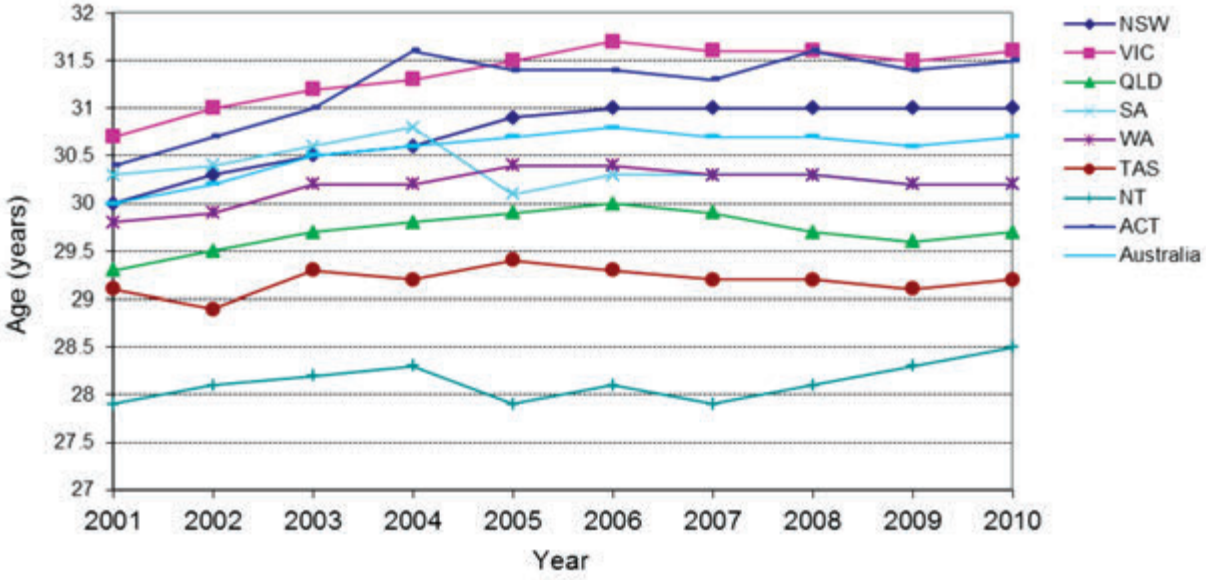



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.4.4 Maternal age

The NT consistently had the lowest median maternal age, followed by TAS (Figure 1.16). NSW and VIC had the highest median maternal age. The median age increased in all states and territories, except SA. For example, the median age in the NT increased from 27.9 years in 2001 to 28.5 years in 2010. The median age in VIC increased from 30.7 years in 2001 to 31.6 years in 2010.

**Figure 1.16: Median maternal age by state and territory, 2001 to 2010**

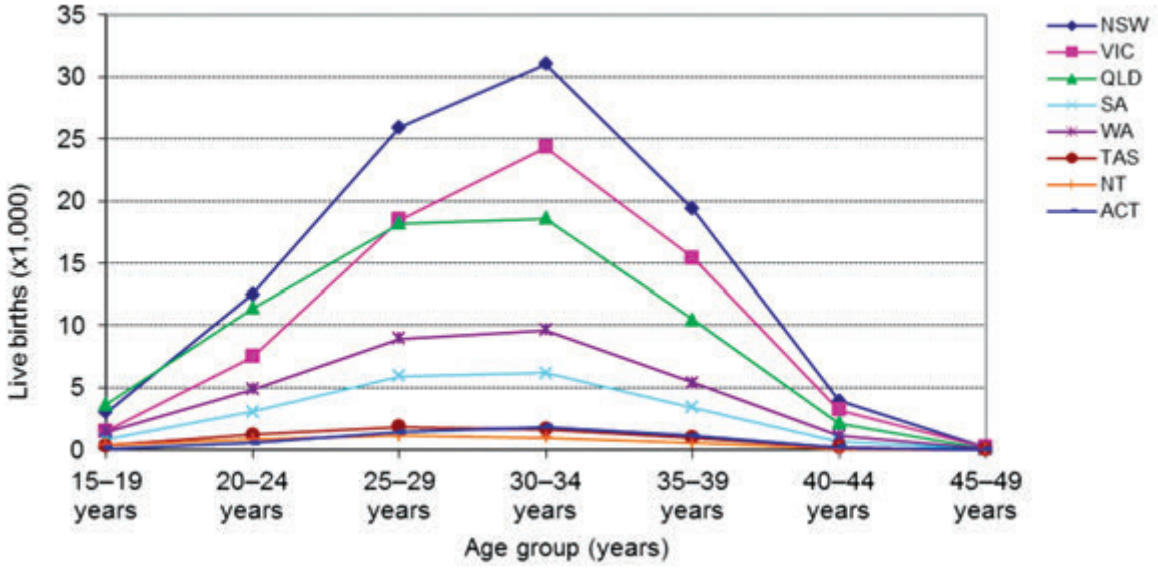



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.4.5 Live births by age group

NSW had more live births than any other state, in all age groups except the age group 15-19 years for which QLD had more live births (nearly 3,700 compared to approximately 3,000 in NSW) (Figure 1.17).

**Figure 1.17: Live births by age group by state and territory, 2010**

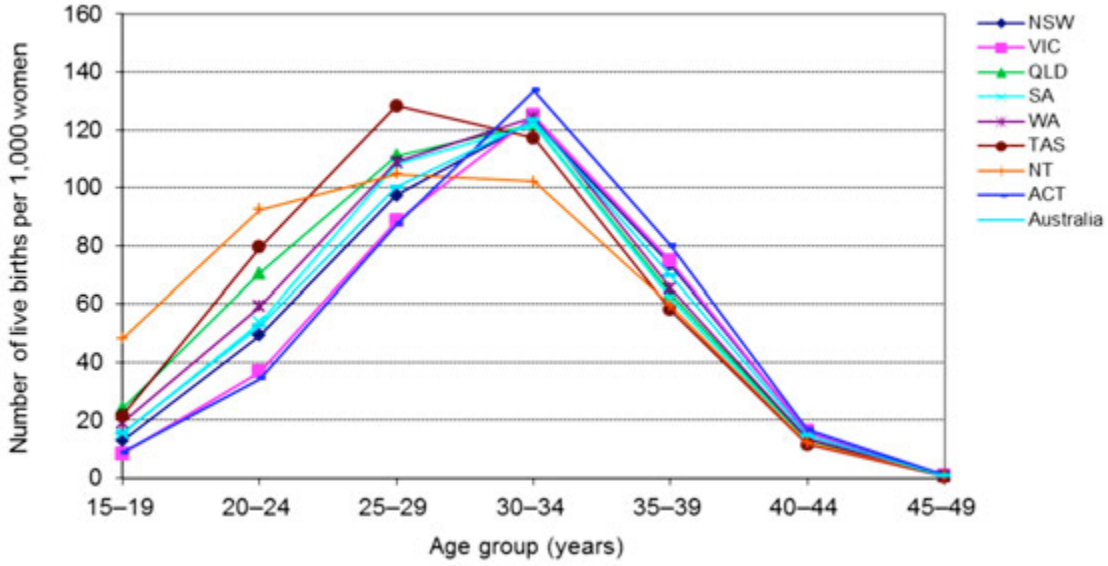



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### 1.4.6 Age-specific fertility rate

All states, except TAS and NT, followed the national pattern of having the highest fertility rates among the age group 30-34 years, followed by age group 25-29 years (Figure 1.18). In TAS and most notably in the NT, younger age groups had the highest fertility rates. In these states, the fertility rates for the age group 25-29 years were higher than the fertility rates for the age group 30-34 years. The fertility rates among teenagers and the 20-24 year age group in NT and TAS were much higher than in other states and territories. For example the fertility rate among teenagers in NT was 48 live births per 1,000 women, three times the national average of 16 live births per 1,000 women. The fertility rate amongst the age group 20-24 years in NT was 93 live births per 1,000 women, double the national average rate of 53 live births per 1,000 women.

**Figure 1.18: Age-specific fertility rate by state and territory, 2010**



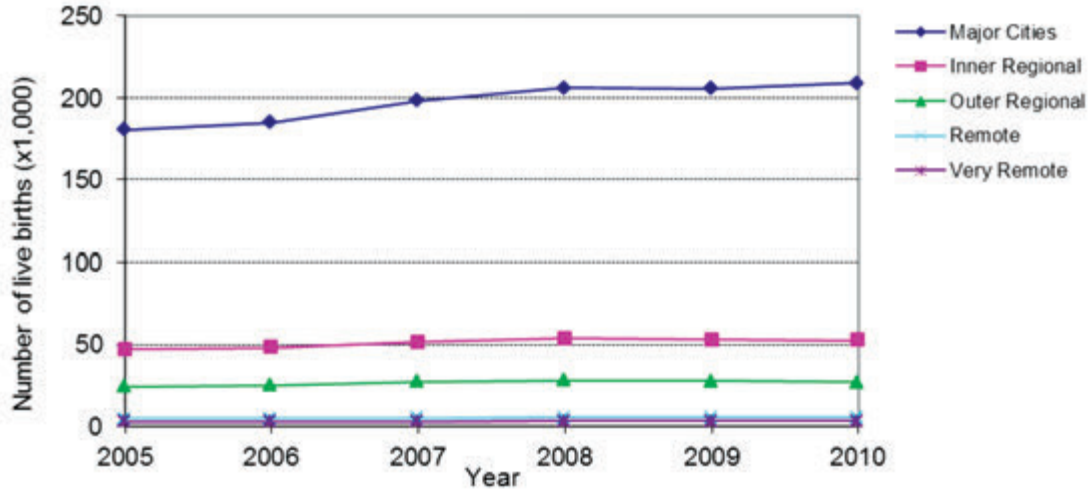

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5 Fertility by area of remoteness

### 1.5.1 Live births

In 2010, the number of live births in very remote areas was approximately 3,300 (1.1% of total births), around 5,300 in remote areas (1.8%), about 26,900 in outer regional areas (9%) and close to 52,500 in inner regional areas (18%) (Figure 1.19). Between 2005 and 2010, the number of live births increased in all groups. For example, the number of live births in very remote areas increased from approximately 2,700 in 2005 to more than 3,300 in 2010.

**Figure 1.19: Number of live births by area of remoteness, 2010**

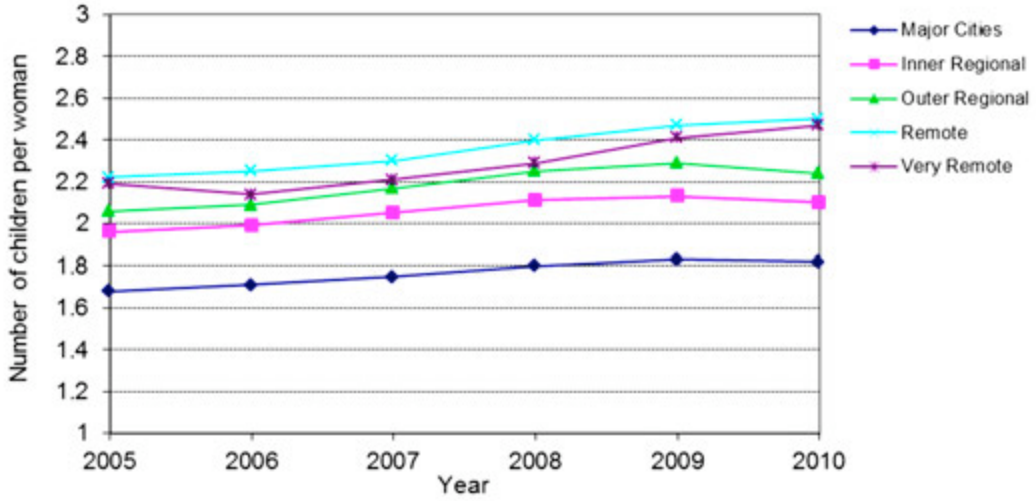



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5.2 Total fertility rate

The TFR for women living in remote or very remote areas were consistently higher than for women living in other areas (Figure 1.20). In 2010, the TFR for women living in remote areas and very remote areas was 2.5 children per woman, higher than the fertility rates for women living in major cities (1.8 children per woman), inner regional areas (2.1 children per woman) and outer regional areas (2.2 children per woman). The TFR in all groups increased slightly between 2005 and 2010. For example, the TFR for women living in remote areas increased from 2.2 children per woman in 2005 to 2.5 children per woman in 2010.

**Figure 1.20: Total fertility rate by area of remoteness, 2005 to 2010**

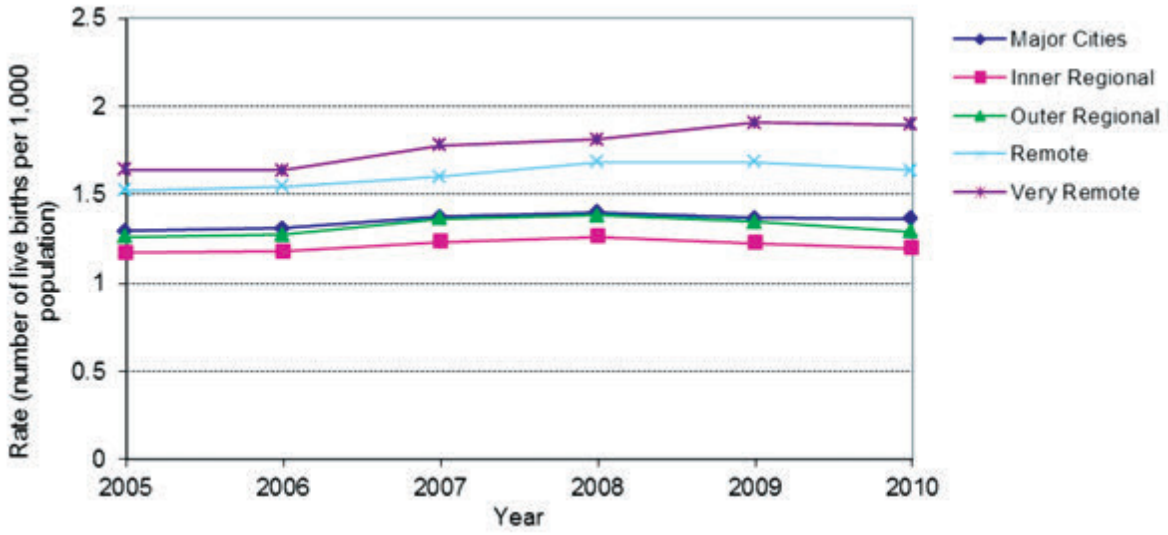



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5.3 Crude fertility rate

The crude fertility rates in remote and very remote areas were consistently higher than in other areas (Figure 1.21). In 2010, the crude fertility rate in very remote areas was 1.9 births per 1,000 population and in remote areas was 1.6 births per 1,000 population. Inner regional areas had the lowest crude rate of 1.2 births per 1,000 population. From 2005 to 2010, the crude fertility rate increased slightly in all groups with very remote areas having the largest increase, from 1.6 live births per 1,000 population in 2005 to 1.9 in 2010.

**Figure 1.21: Crude fertility rate by area of remoteness, 2005 to 2010**

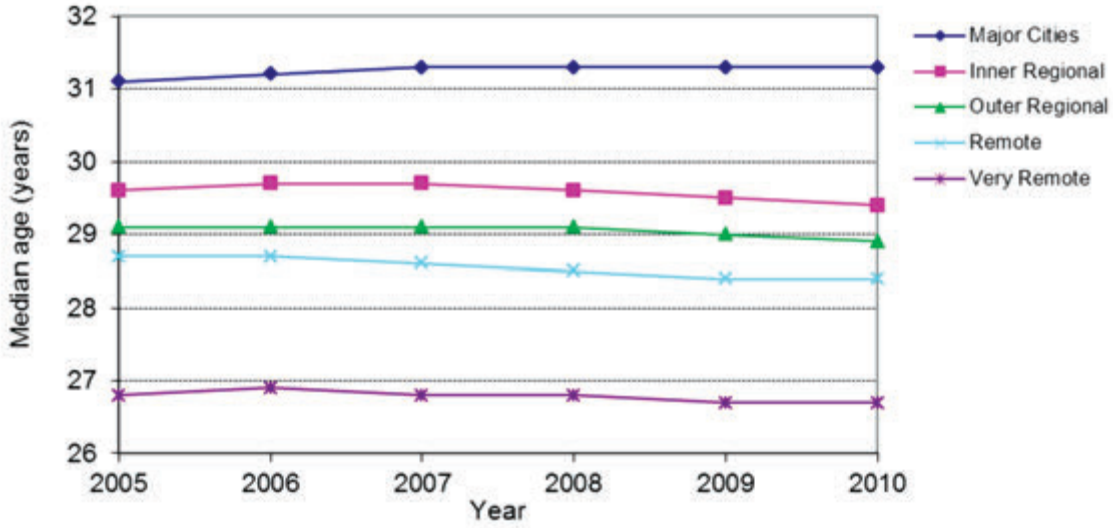



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5.4 Maternal age

The median maternal age was highest among women residing in the major cities (31.3 years in 2010) and lowest in those residing in very remote areas (26.7 years in 2010). Between 2005 and 2010, the median maternal age marginally decreased in all areas, except in major cities. The largest decline was in remote areas where the median maternal age declined by 0.3 years, from 28.7 years in 2005 to 28.4 years in 2010 (Figure 1.22).

**Figure 1.22: Median maternal age by area of remoteness, 2005 to 2010**

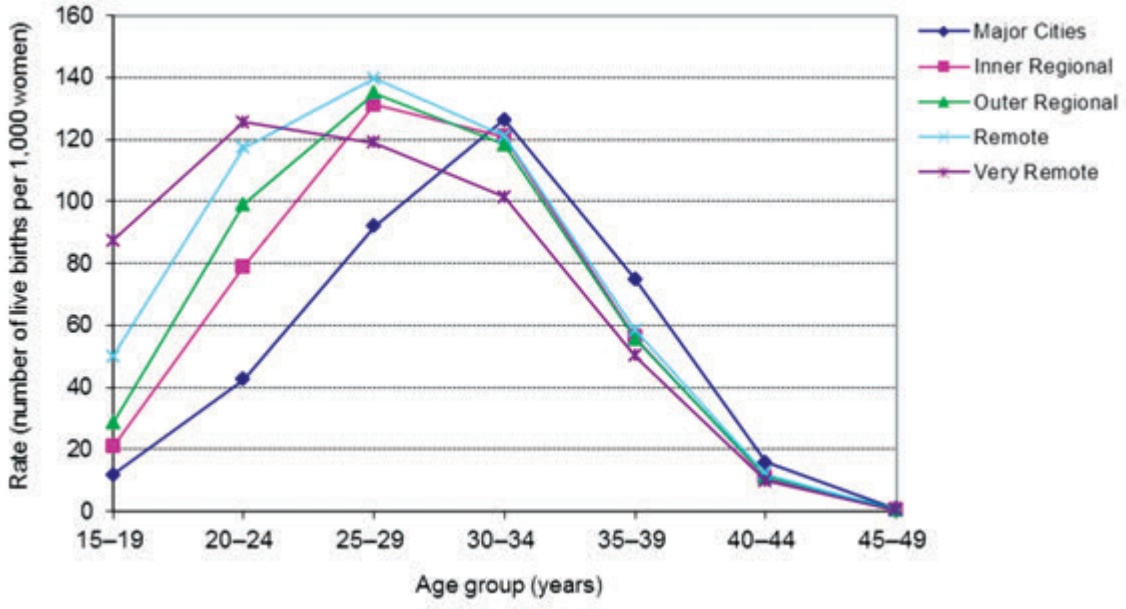



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5.5 Age-specific fertility rate

Age-specific fertility rates were higher among younger women in remote and very remote areas and older women in major cities (Figure 1.23). In 2010, in very remote areas, the fertility rate was highest among women aged 20-24 years (126 births per 1,000 women). In remote areas, the fertility rate was highest among women aged 25-29 years (140 births per 1,000 women). In major cities, the fertility rate was highest among women aged 30-34 years (126 births per 1,000 women).

**Figure 1.23: Age-specific fertility rate by area of remoteness, 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.5.6 Fertility by area of remoteness, by state and territory

### Live births

Most live births in remote and very remote areas were in QLD, NT and WA (Table 1.2). In 2010, the total number of live births in very remote areas in these states was more than 3,000 or 91% of all live births in very remote areas. The total number of live births in remote areas in the three states and territories was almost 4,200 or 78% of all live births in remote areas.

**Table 1.2: Number of live births by area of remoteness, by state and territory, 2010**

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| Major Cities | 73,402 | 55,047 | 38,729 | 14,875 | 21,944 | - | - | 5,141 |
| Inner Regional | 16,360 | 12,649 | 12,922 | 2,263 | 3,984 | 4,269 | - | - |
| Outer Regional | 5,243 | 2,724 | 9,942 | 2,124 | 2,925 | 1,953 | 2,009 | - |
| Remote | 446 | 46 | 1,571 | 599 | 1,639 | 105 | 943 | - |
| Very Remote | 52 | - | 1,212 | 202 | 885 | 35 | 944 | - |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

When the number of live births in each state was taken into account, NT had the highest proportion of births in outer regional areas (52%), remote areas (24%) and very remote areas (24%) (Table 1.3). In TAS, most births occurred in inner regional areas (67%) and in outer regional areas (31%).

**Table 1.3: Proportion of live births by area of remoteness, by state and territory, 2010**

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT | Australia |
|---|---|---|---|---|---|---|---|---|---|
| | % | % | % | % | % | % | % | % | % |
| Major Cities | 77 | 78 | 60 | 74 | 70 | - | - | 100 | 70 |
| Inner Regional | 17 | 18 | 20 | 11 | 13 | 67 | - | - | 18 |
| Outer Regional | 5.5 | 3.9 | 15 | 11 | 9 | 31 | 52 | - | 9.1 |
| Remote | 0.46 | 0.07 | 2.4 | 3.0 | 5.2 | 1.6 | 24 | - | 1.8 |
| Very Remote | 0.05 | - | 1.9 | 1.0 | 2.8 | 0.5 | 24 | - | 1.1 |

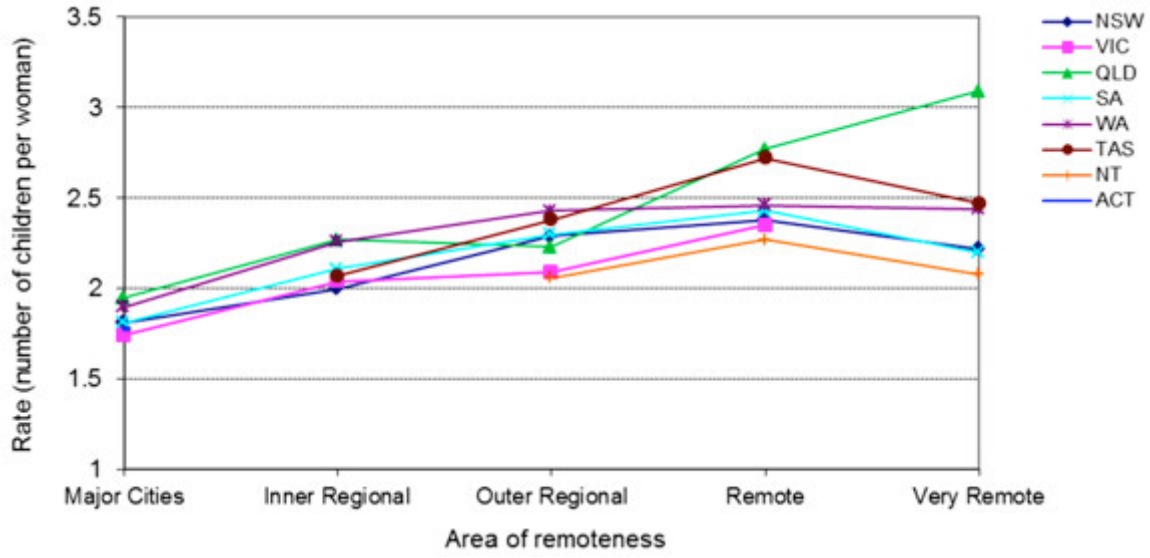
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## Total fertility rate

The TFRs in all states and territories, except QLD, was lowest in major cities and highest in remote areas (Figure 1.24). In QLD, the TFR was highest in very remote areas. The TFR in QLD increased from 2.0 children per woman in major cities to 3.1 children per woman in very remote areas.

QLD also had the highest TFR in remote areas (2.8 children per woman) and in very remote areas (3.1 children per woman). In contrast, NT had the lowest TFR in remote areas (2.3 children per woman) and in very remote areas (2.1 children per woman).

**Figure 1.24: Total fertility rate by area of remoteness, by state and territory, 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

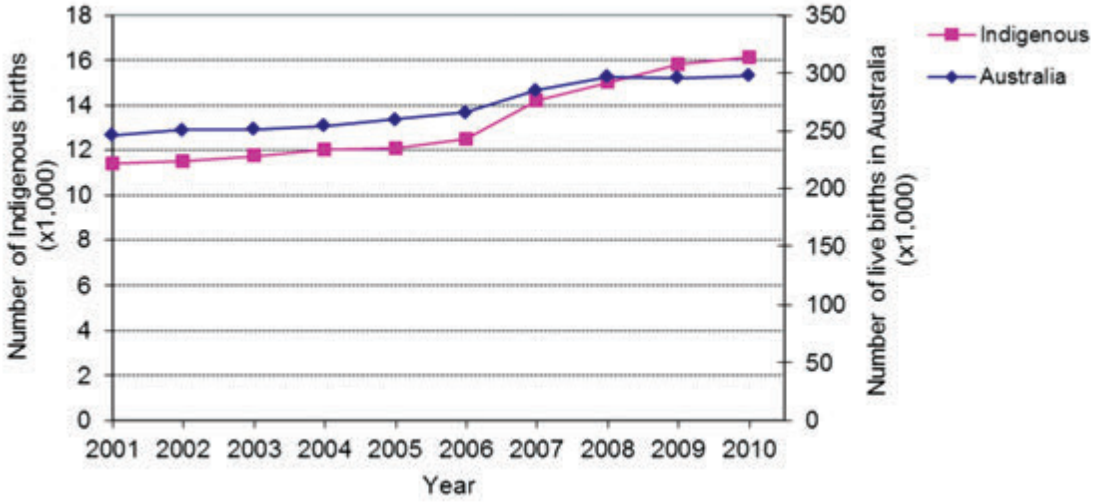
## 1.6 Fertility by Indigenous status

### 1.6.1 Live births

In 2010, the number of Indigenous live births was just over 16,000, accounting for 5.4% of the total births in Australia (Figure 1.25). In comparison, Indigenous people account for 2.5% of total Australian population.[20]

Between 2001 and 2006, the number of Indigenous live births increased in parallel to the national trend. However, from 2007 to 2010, the number of Indigenous live births increased at a faster rate.

**Figure 1.25: Number of Indigenous births, 2001 to 2010**

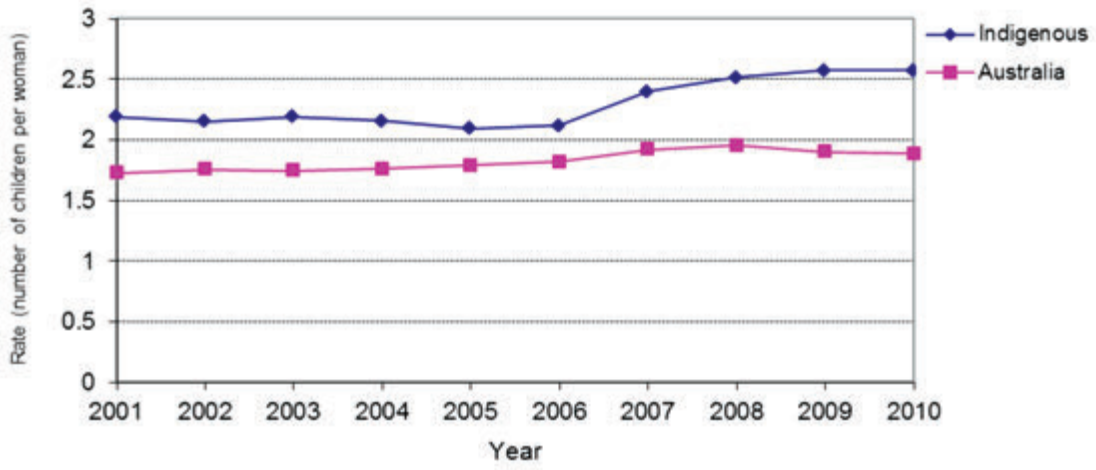



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### 1.6.2 Total fertility rate

The TFR among Indigenous women reduced slightly from 2.2 live births per woman in 2001 to 2.1 live births per woman in 2006 and increased to 2.6 live births per woman in 2010. Between 2001 and 2010, the TFR among Indigenous women was consistently higher than the national average (Figure 1.26).

**Figure 1.26: Total fertility rate in Indigenous women, 2001 to 2010**

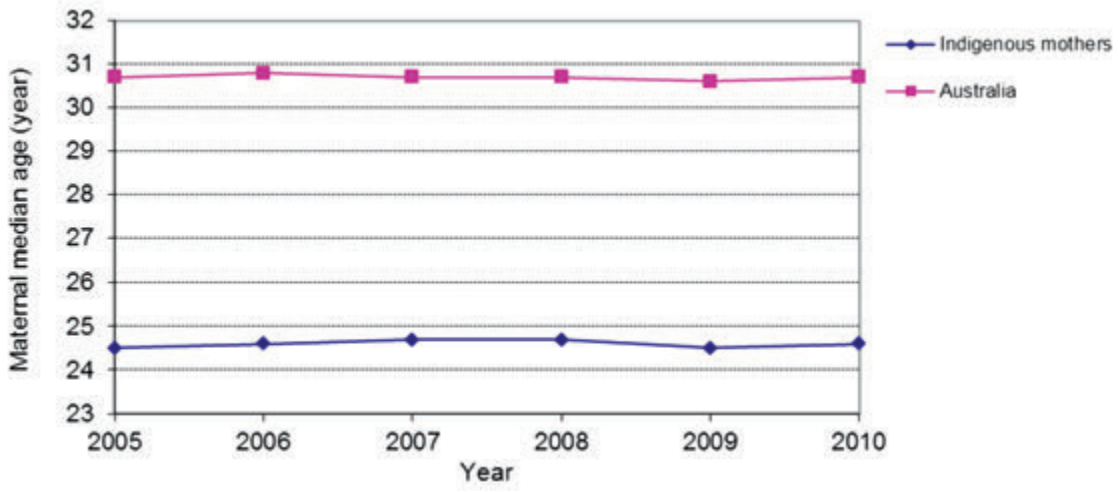



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.6.3 Maternal age

The median age of Indigenous mothers increased slightly from 24.5 years in 2005 to 24.6 years in 2010 and was consistently less than the national median age of 30.7 years (Figure 1.27).

**Figure 1.27: Median age of Indigenous mothers, 2005 to 2010**

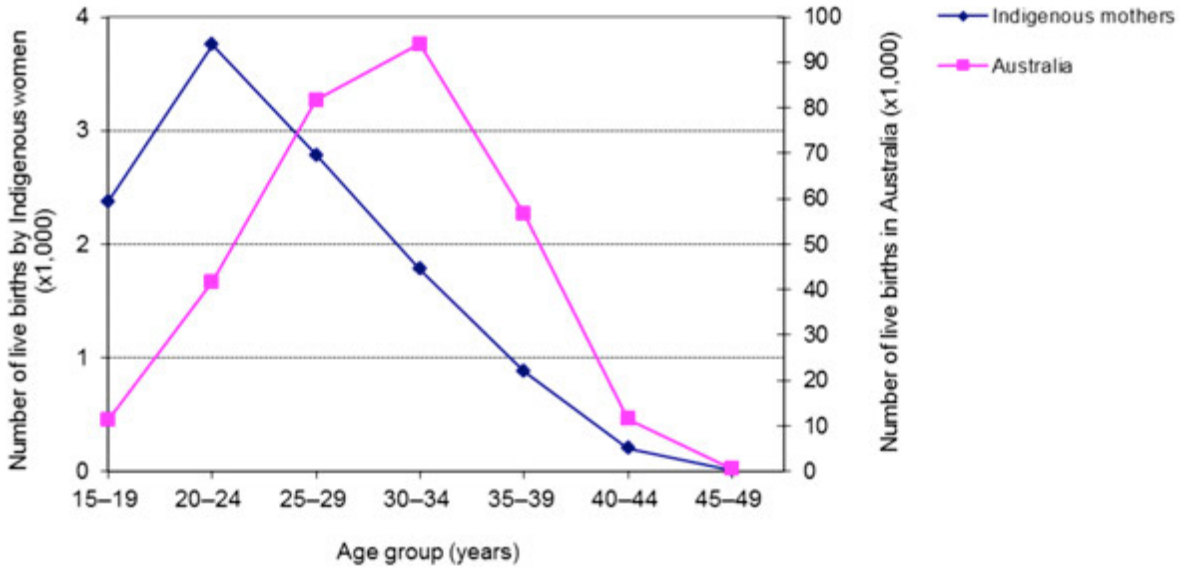



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.6.4 Live births by age group

In 2010, the number of live births to Indigenous women was highest among the 20-24 years age group (nearly 3,800), followed by the 25-29 years age group (just under 2,800) and teenagers (about 2,400) (Figure 1.28). In comparison, the number of live births in Australia was highest among the 30-34 years age group, followed by those in the 25-29 years age group and 35-39 years age group.

**Figure 1.28: Number of live births to Indigenous mothers by age group, 2010**



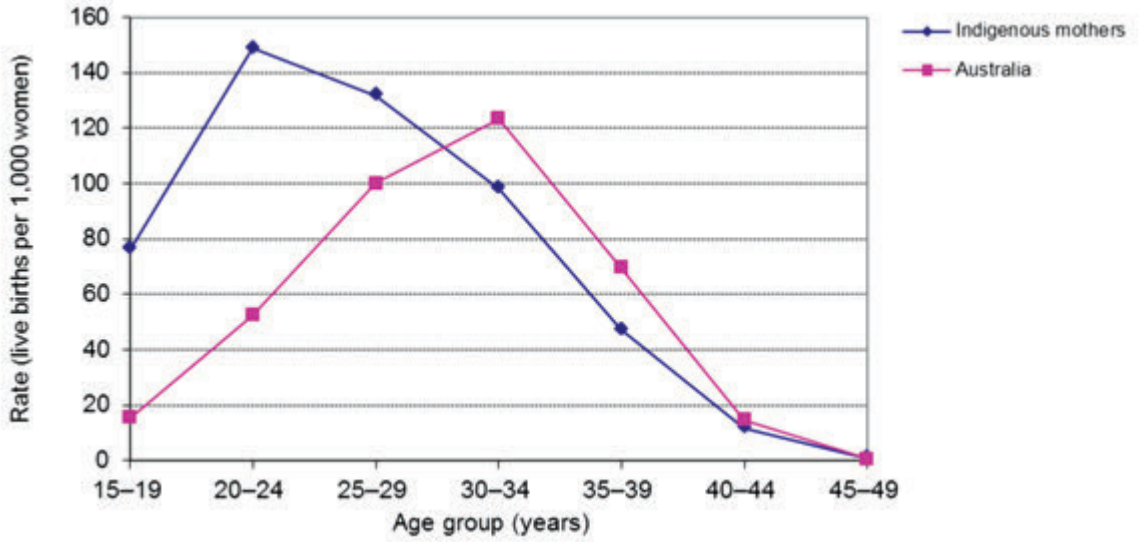

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.6.5 Age-specific fertility rate

In 2010, the fertility rate in Indigenous women was highest among the age group 20-24 years (149 live births per 1,000 women) (Figure 1.29). In comparison, the fertility rate in Australia was highest among the age group 30-34 years (132 live births per 1,000 women). The fertility rate among Indigenous teenagers was much higher than the national average (76 live births per 1,000 women compared to 16 live births per 1,000 women).

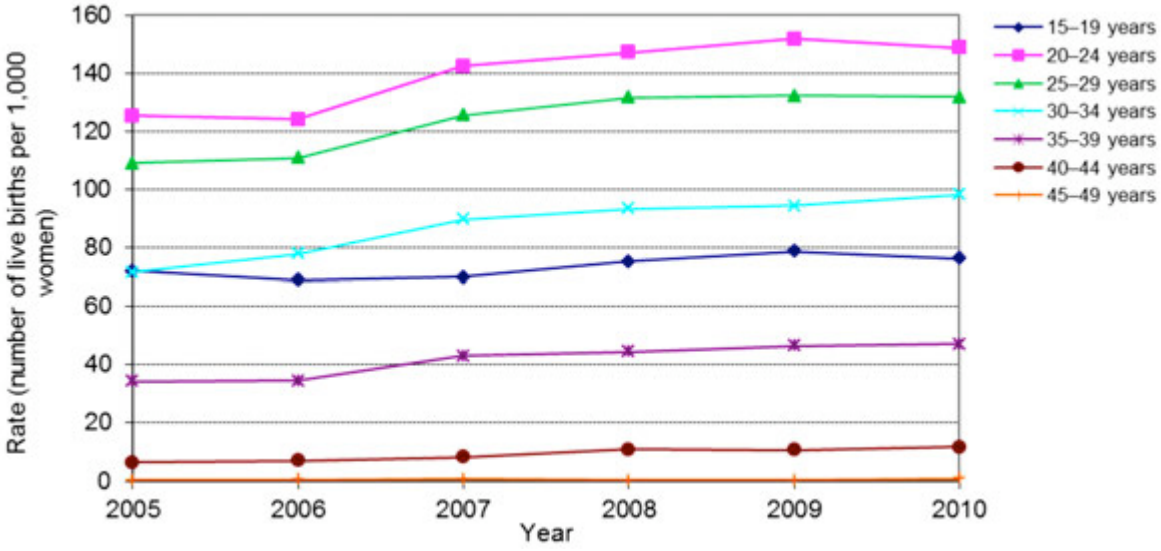
From 2006 to 2010, Indigenous fertility rates increased in all age groups (Figure 1.30). For example, the fertility rates increased from 125 live births per 1,000 women in 2006 to 149 live births per 1,000 women in 2010 for women aged 20-24 years.

**Figure 1.29: Age specific fertility rate by Indigenous status, 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

**Figure 1.30: Age-specific fertility rate in Indigenous women, 2005 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

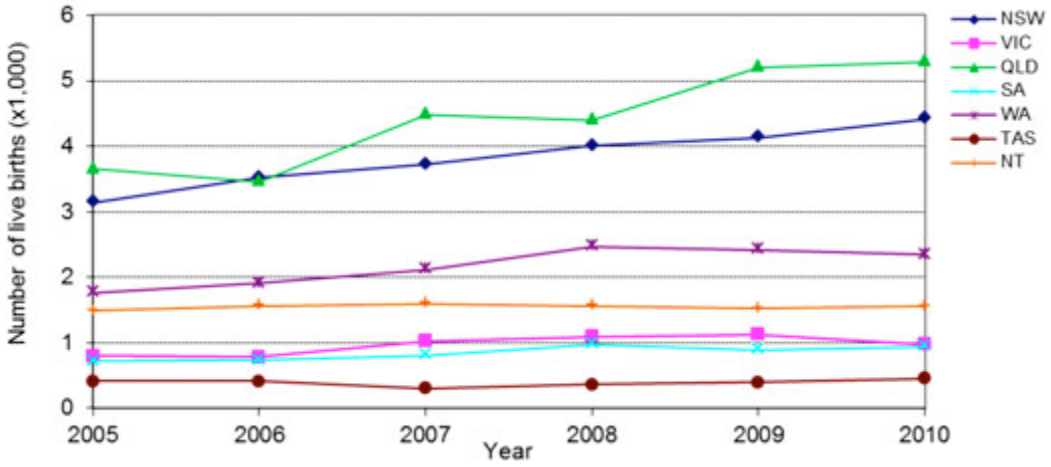
## 1.6.6 Fertility in Indigenous people by state and territory

### Live births

Data on Indigenous births in the ACT is not presented separately due to small number, but is included in total number of births for Australia.[1] The number of Indigenous births in QLD was highest, followed by NSW, WA and NT. From 2005 to 2010, the number of Indigenous births increased in all states and territories except NT and TAS (Figure 1.31). The largest increase was in QLD, from nearly 3,700 in 2005 to about 5,300 in 2010, an increase of 45%. Measures to improve ascertainment of Indigenous status in QLD and nationally[1] may account for the increase.

The proportion of Indigenous births per total number of births was highest in the NT (around 40%). In other states and territories, Indigenous births accounted for between 1% of total births in VIC and 8% in WA.

**Figure 1.31: Indigenous births by state and territory, 2005 to 2010**

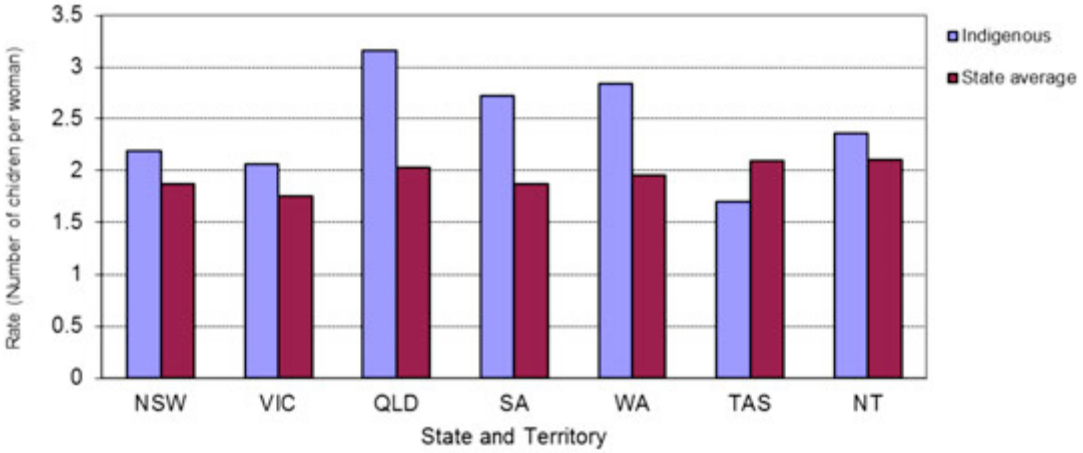



Note: Data for the ACT is not available due to the small number of Indigenous births but is included in totals for Australia
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.6.7 Total fertility rate

In 2010, the TFR among Indigenous women was highest in QLD (3.2 children per woman) and lowest in TAS (1.7 children per woman) (Figure 1.32). In all states and territories, except TAS, the TFR among Indigenous women was higher than the state average.

**Figure 1.32: Total fertility rate in Indigenous women by state and territory, 2010**



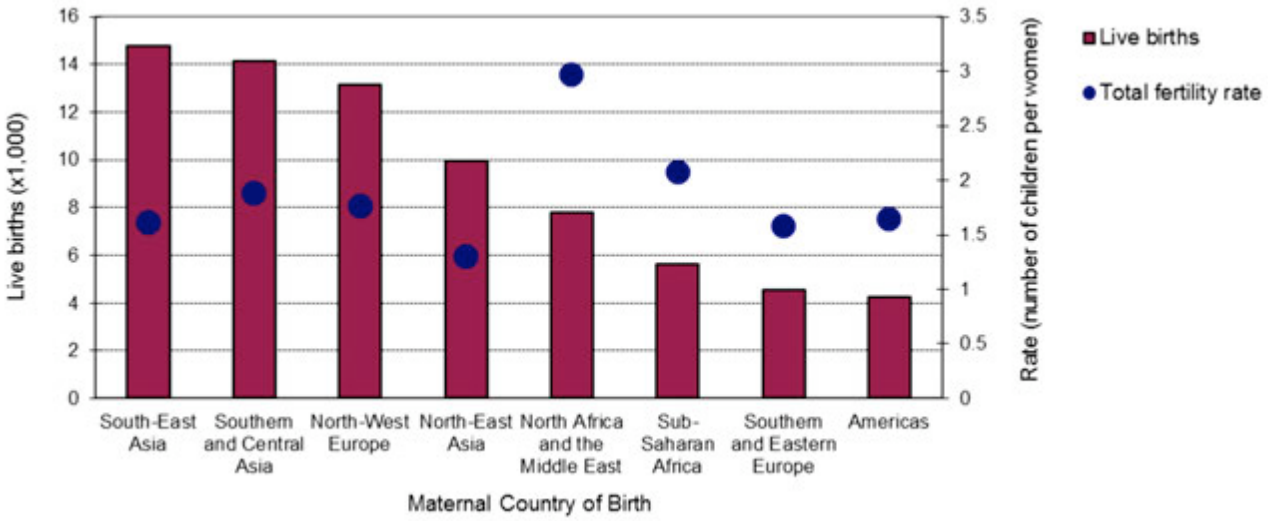

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.7 Fertility by maternal country of birth

### 1.7.1 Live births

In 2010, there were nearly 87,000 live births in Australia to mothers born overseas (29% of all live births in Australia) (Figure 1.33). The number of live births born to mothers from South East Asia was highest (close to 15,000), followed by live births to mothers from Southern and Central Asia (more than 14,000) and North West Europe (over 13,000).

**Figure 1.33: Number of live births and total fertility rate by maternal country of birth, 2010**




Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

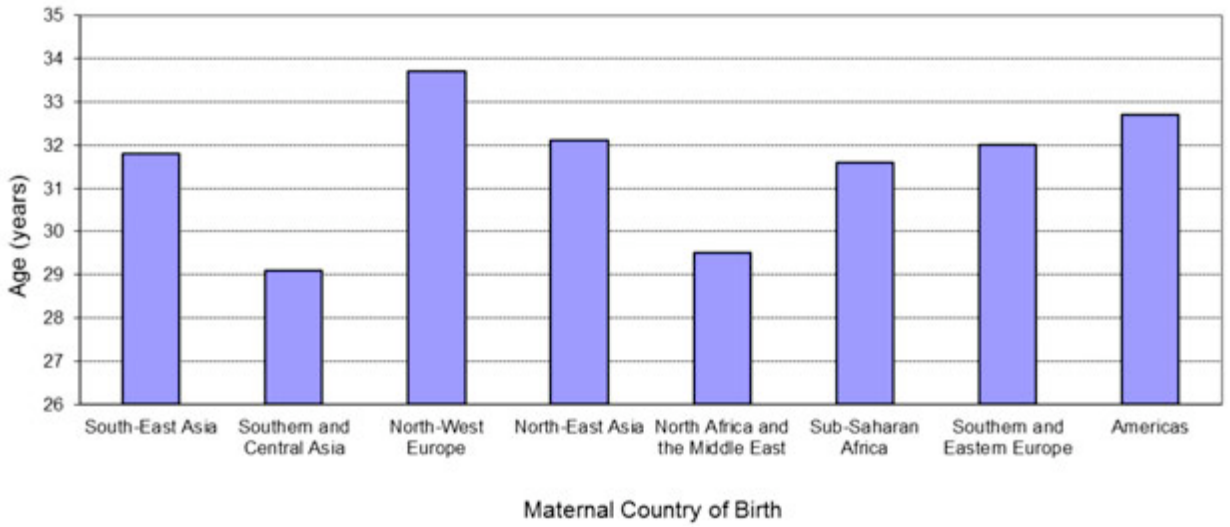
### 1.7.2 Total fertility rate

The TFR was highest among women from North Africa and the Middle East (3 live births per woman compared to the national average of 1.9) and lowest among women from North-East Asia (1.3 live births per woman) (Figure 1.33).

### 1.7.3 Maternal age by country of birth

In 2010, the median maternal age was highest among women from North-West Europe (33.7 years) and was lowest among women from Southern and Central Asia (29.1 years) (Figure 1.34).

**Figure 1.34: Median maternal age by country of birth, 2010**

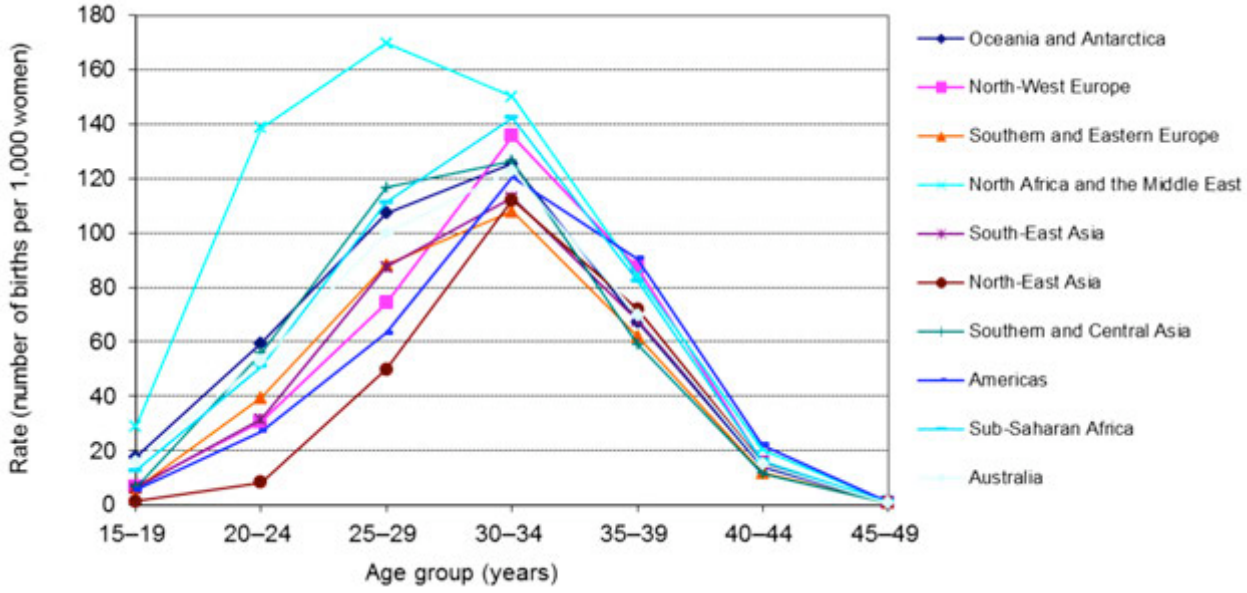



Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.7.4 Age-specific fertility rate by maternal country of birth

Women from North Africa and the Middle East had higher fertility rates among the younger age groups than women from other countries (Figure 1.35). The fertility rate among women from North Africa and the Middle East was highest among the age group 25-29 years (170 live births per 1,000 women, compared to 100 live births per 1,000 women in Australia for the same age group). For women from other countries, the fertility rate was highest among the age group 30-34 years.

**Figure 1.35: Age-specific fertility rate by maternal country of birth, 2010**




Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

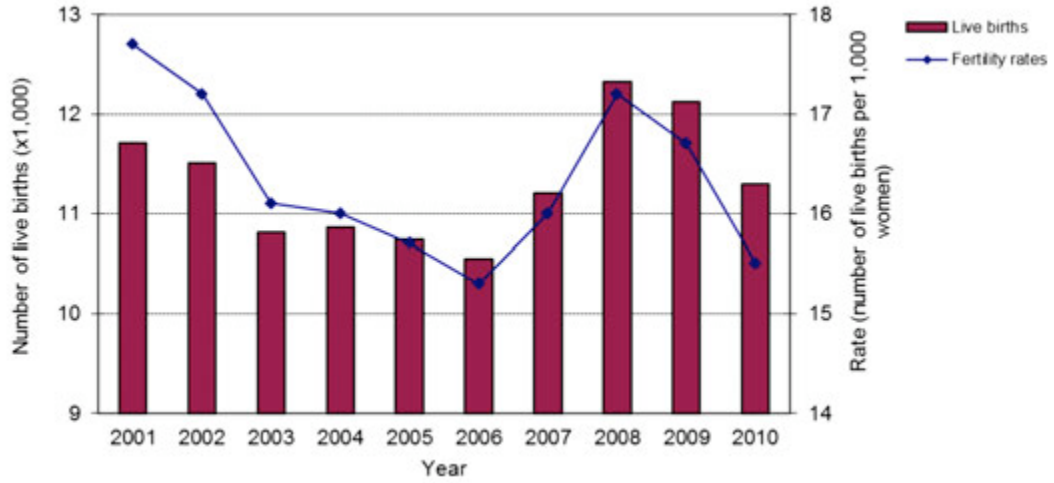
## 1.8 Fertility among teenagers

### 1.8.1 Teenage fertility in Australia

In 2010, there were over 11,000 births to teenage mothers in Australia or 3.8% of total births. The number of teenage births decreased from approximately 11,700 in 2001 to just fewer than 10,600 in 2006, increased to over 12,300 in 2008 and decreased again to nearly 11,300 in 2010 (Figure 1.36).

The fertility rate also followed the pattern of live births. The fertility rate reduced from 18 live births per 1,000 women in 2001 to 15 live births per 1,000 women in 2006, then decreased to 17 live births per 1,000 women and reduced again to 16 live births per 1,000 women in 2010.

**Figure 1.36: Number of live births and fertility rate among teenagers in Australia, 2001 to 2010**



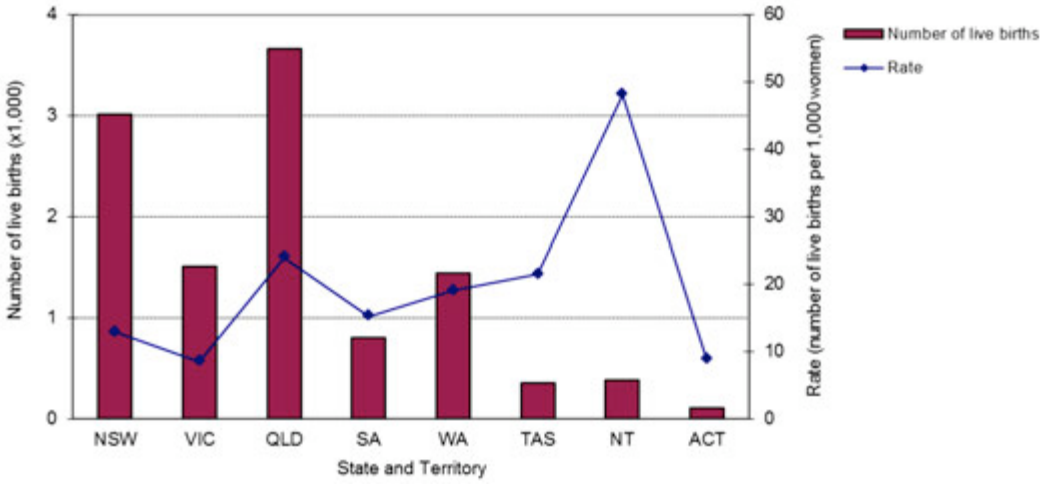

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### 1.8.2 Teenage fertility by state and territory

In 2010, the number of live births by teenage mothers was highest in QLD (nearly 3,700) and lowest in the ACT (105) (Figure 1.37). The proportion of teenage births per total births ranged from 2% in the ACT to 10% in NT.

The number of teenage births in NT was small (388), however the teenage fertility rate was much higher than in other states and territories (48 live births per 1,000 women).

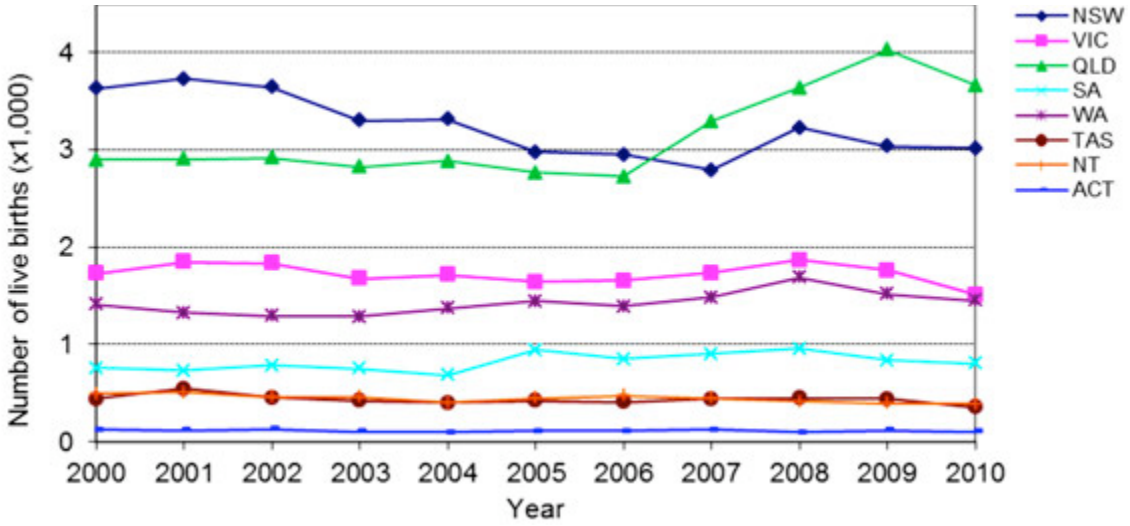
**Figure 1.37: Number of live births and fertility rate among teenagers by state and territory, 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

The number of teenage births in QLD increased sharply from more than 2,700 in 2006 to its peak in 2009 of approximately 4,000 (Figure 1.38). Smaller increases were observed in SA and WA. In other states, the number of teenage births reduced. The largest reduction was in NSW, from more than 3,700 in 2001 to approximately 3,000 in 2010.

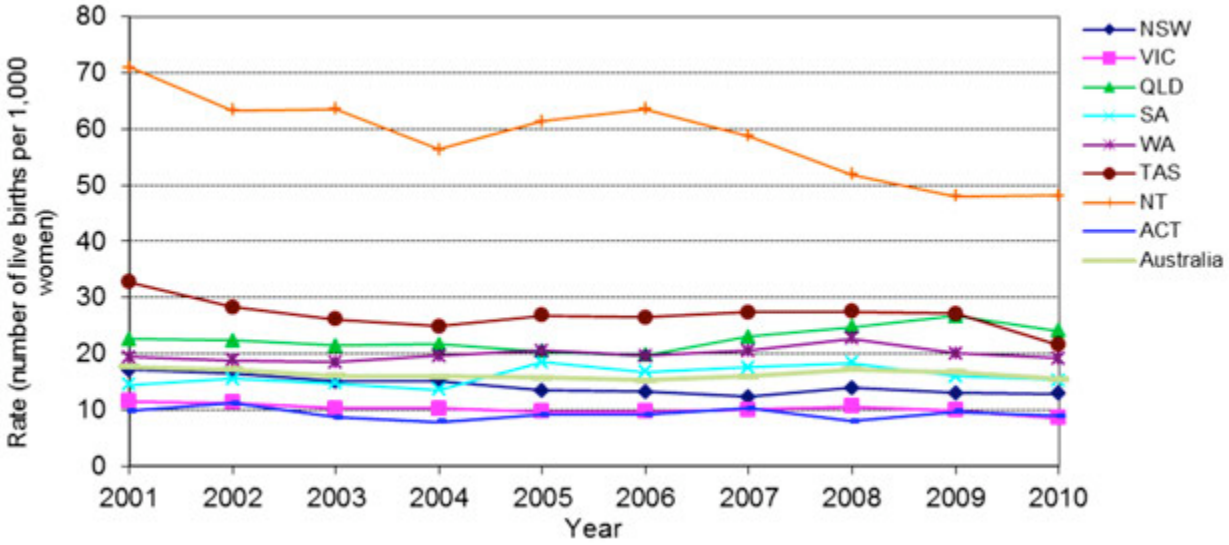
**Figure 1.38: Number of live births among teenagers by state and territory, 2001 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

The teenage fertility rate in NT was consistently higher than in other states and territories (Figure 1.39). However, teenage fertility in NT fell from 71 live births per 1,000 women in 2001 to 48 live births per 1,000 women in 2010. The teenage fertility rate also fell in other states and territories, except QLD and SA. For example, the teenage fertility rate in TAS decreased from 33 live births per 1,000 women in 2001 to 22 live births per 1,000 women in 2010.

**Figure 1.39: Teenage fertility rate by state and territory, 2001 to 2010**

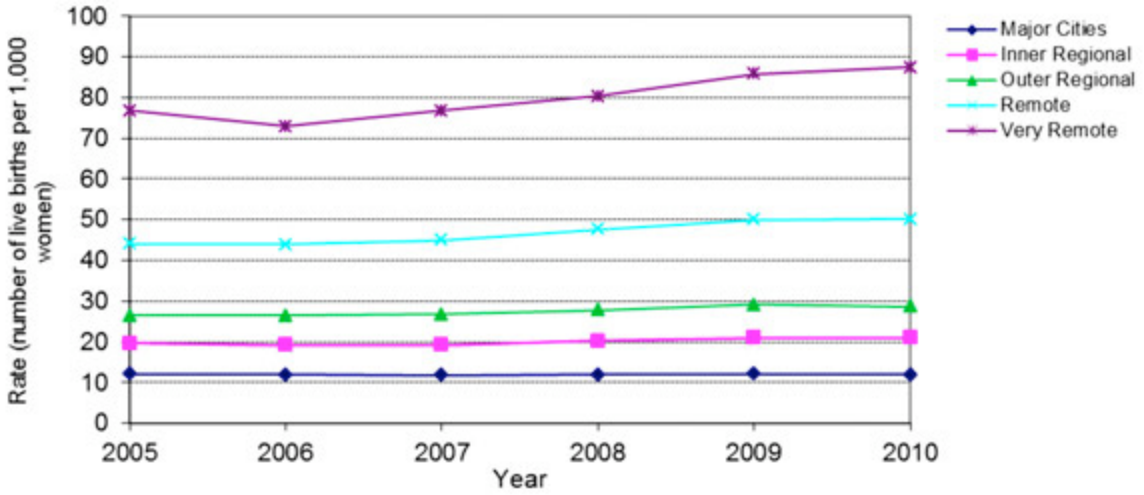



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### 1.8.3 Teenage births by area of remoteness

In 2010, the teenage fertility rate increased from 12 live births per 1,000 women in major cities to 87 live births per 1,000 women in very remote areas (Figure 1.40). Between 2005 and 2010, the teenage fertility rate increased in all areas, except in the major cities. The largest increase was in very remote areas (from 77 live births per 1,000 women to 87 live births per 1,000 in 2010) and in remote areas (from 44 live births per 1,000 women to 50 live births per 1,000 in 2010).

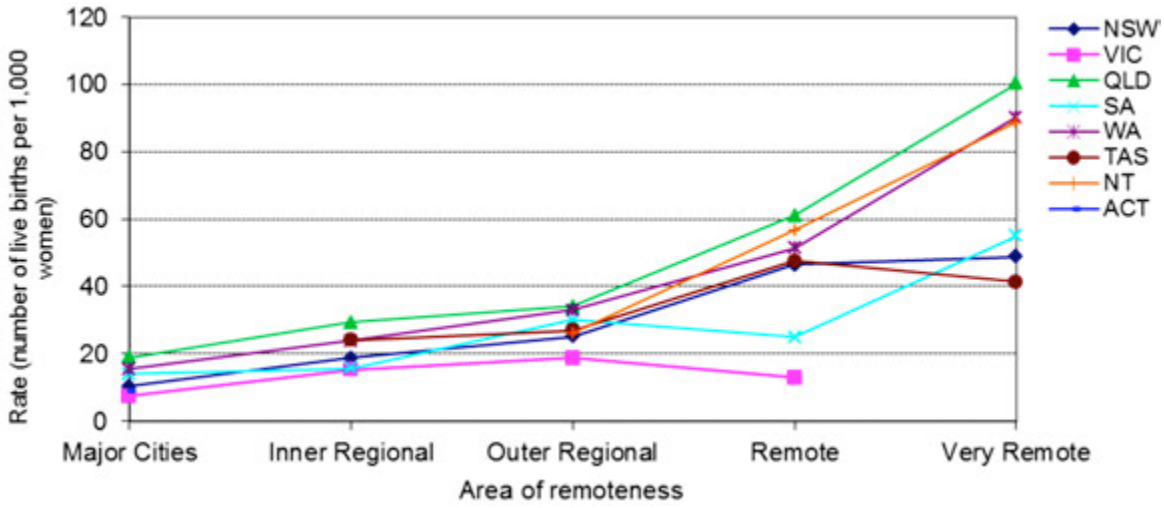
**Figure 1.40: Teenage fertility rate by area of remoteness, 2005 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

In most states, except VIC and SA, teenagers living in remote and very remote areas had a higher fertility rate than teenagers living in other areas (Figure 1.41). For example, the teenage fertility rate in QLD increased five-fold, from 19 live births per 1,000 women in major cities to 100 live births per 1,000 women in very remote areas.

**Figure 1.41: Teenage fertility rate by area of remoteness, by state and territory, 2010**

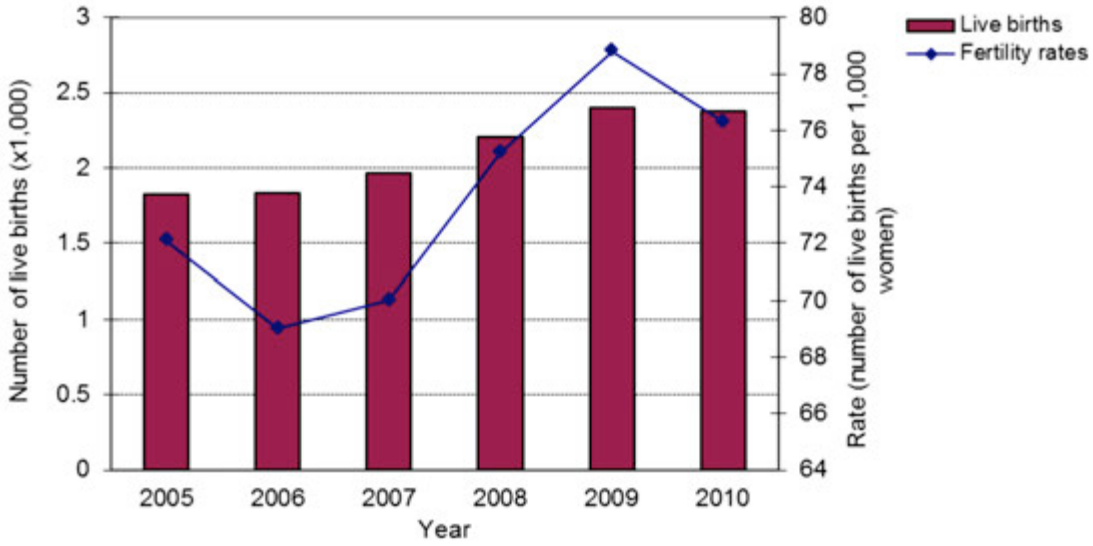



Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.8.4 Teenage fertility in Indigenous people

The number of live births among Indigenous teenage mothers increased from more than 1,800 in 2005 to nearly 2,400 in 2010 (Figure 1.42). The fertility rate among Indigenous teenage mothers increased from 69 children per 1,000 women in 2006 to 76 children per 1,000 women in 2009. The fertility rate among Indigenous teenage mothers was about five times the fertility rate of all teenage mothers in Australia (17 children per 1,000 women in 2009).

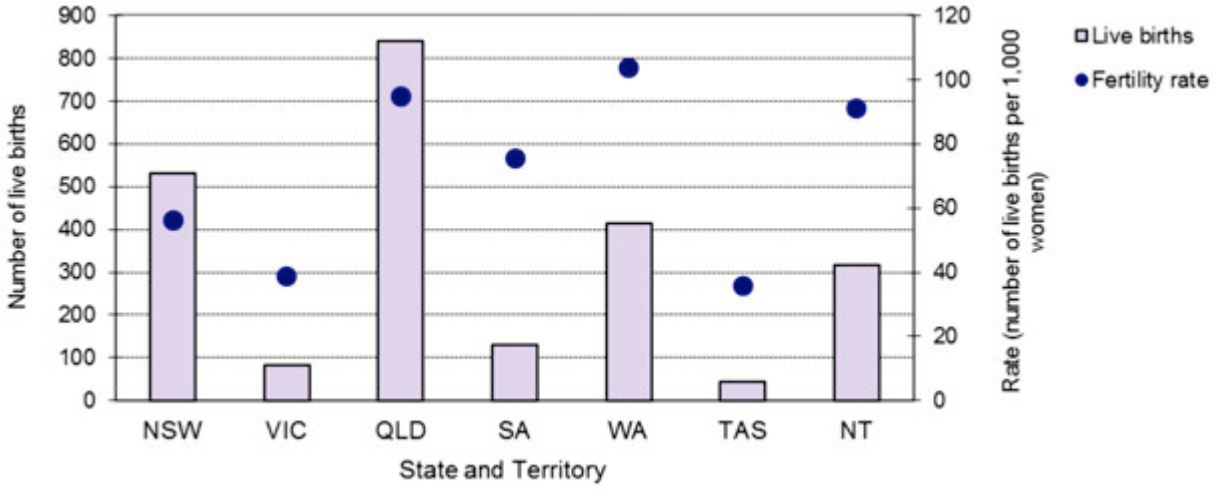
**Figure 1.42: Number of live births and fertility rate in Indigenous teenagers, 2005 to 2010**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

In 2010, the number of live births among Indigenous teenage mothers was highest in QLD (839), followed by NSW (539) and WA (413) (Figure 1.43). The fertility rate was highest in WA (104 live births per 1,000 women) and QLD (95 live births per 1,000 women). NT had a relatively small number of Indigenous teenage births (318) but a high Indigenous teenage fertility rate (91 live births per 1,000 women).

**Figure 1.43: Number of live births and fertility rate in Indigenous teenage mothers by state and territory, 2010**

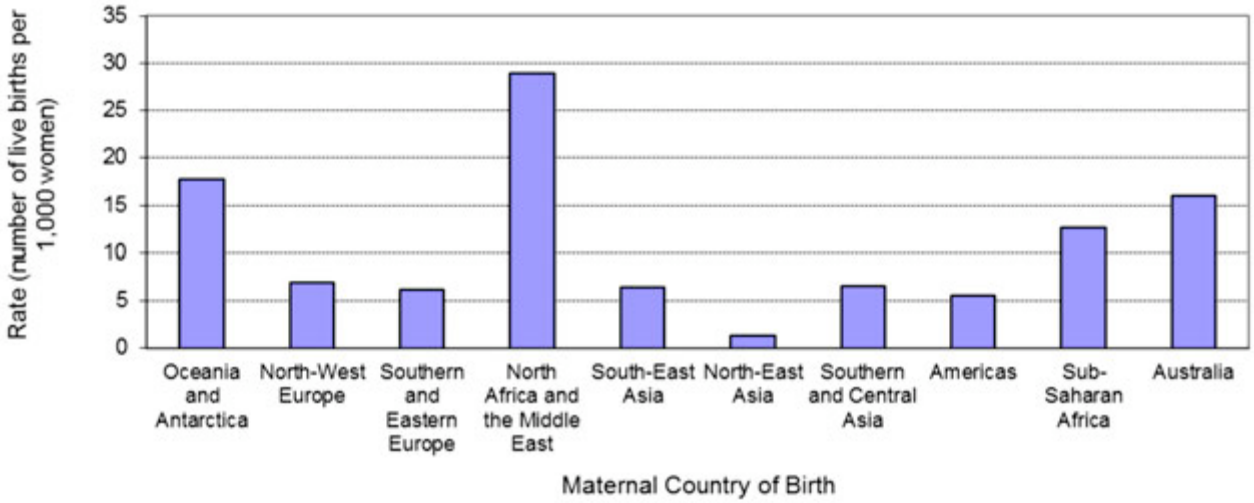



Note: Data for the ACT were not available
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.8.5 Teenage fertility by maternal country of birth

The teenage fertility rate was highest among women from North Africa and the Middle East (29 live births per 1,000 women) and was lowest among women from North East Asia (1.4 live births per 1,000 women) (Figure 1.44).

**Figure 1.44: Teenage fertility rate by maternal country of birth, 2010**




Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

## 1.9 Discussion

The fertility rate of 1.9 children per woman in Australia is above the average of 1.7 children per woman for developed countries but below the replacement rate of 2.1 children per woman. A number of studies have examined the reasons for the differences in fertility rates between developed countries.[13-15] Countries with policies that provide parents with the means to balance family life and career, and where the financial costs of having children are lower, tend to have higher fertility rates.[13,14] Women's education and employment levels do not appear to account for the difference in fertility rates between countries.[15]

Australia has a number of policies that financially support families with children, such as Family Tax Benefits, Child Care Benefits, the Child Care Rebate, Immunisation Allowances, Paid Maternity Leave and the Baby Bonus.[3] Many employers also allow parents to take paid and unpaid leave for up to two years after the birth of a child. When the parent returns to work, they may also be allowed to work part time for a certain length of time and can use their sick leave to care for sick children. The national health insurance system Medicare and social welfare agency Centrelink provide a safety net for families with reduced levels of income. These policies may have contributed to a relatively higher fertility rate in Australia than in other developed countries. However, the total fertility rate (TFR) in Australia is still below that required for replacement.

The number of births in Australia had already started to increase prior to the introduction of the Baby Bonus. After the Baby Bonus was introduced in 2004 and especially after the Baby Bonus was increased in 2006, the number of births increased sharply to reach its peak in 2008. The effect of the Baby Bonus on the number of births has been confirmed in several studies.[2,16-18] However, the second increase to the Baby Bonus in 2008, by a further $1,000, did not produce the same effect; the number of births remained the same in 2009 and 2010. The payment which is now made in fortnightly installments may not be as appealing as the previous lump sum payment. Alternately, the Baby Bonus, when first introduced, may have encouraged families to bring their baby plan forward, but may have had no more effect once the desired number of children has been achieved. Government policies in Europe also found that monetary incentives only have a short term effect on fertility rates.[10]

Anecdotal evidence suggests that the Baby Bonus has increased the fertility rate among teenagers. However, from 2001 to 2010 the fertility rate in Australia increased in all age groups, except in teenage women. Also, a study carried out using population data from WA showed no difference in the increase in fertility rates between age groups.[16] Although a study in NSW found an increase in the fertility rate among teenage women, there was an absolute increase of only 40 births among this age group.[15] In fact, the Baby Bonus had the greatest impact on women residing in the highest socioeconomic areas in WA[17] and among women having third or subsequent births in NSW.[16]

The peak in the number of births in all states and territories occurred in 2008, except for QLD where the peak was observed in 2009. This may have been as a result of a project which aimed to improve birth registrations in QLD in 2009.[1] The project also improved the ascertainment of Indigenous status in QLD birth registrations which was reflected in the increase in the number of Indigenous births seen in 2009.

NT and TAS had the highest fertility rate of 2.1 live births per women compared to the national average of 1.9 live births per women. The higher fertility rate seen in the NT likely reflects the higher proportion of Indigenous people (28% compared to the national average of 2.3%)[20] and the higher proportion of the population living in remote areas than in other states and territories. All the people in NT either live in outer regional areas (54%), remote areas (21%) or very remote areas (25%).[21] There are no areas classified as major cities or inner regional in NT. Large proportions of Indigenous people in NT also live in remote areas (18%) or very remote areas (63%).[20] Lower use of contraceptive methods among Indigenous women (50%) compared to non-Indigenous women (66%) (refer to Chapter 4; Contraception) may also contribute to the higher fertility rate in NT.

In TAS, the high proportion of women aged 25-35 years who have highest birth rates[22] may account for the higher fertility rate.

### 1.9.1 Data development

The registration of births in Australia has been improved. However, more efforts are still needed to improve under and delayed registration and to improve the ascertainment of Indigenous status.

## 1.10 References


1. Australian Bureau of Statistics. Births, Australia, 2010. ABS Cat. no. 3301.0. Canberra: ABS, 2011. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3301.0. Accessed on 28 March 2013.
2. Lattimore R, Pobke C. Recent trends in Australian fertility: Productivity Commission Staff Working Paper. Canberra: Productivity Commission, 2008.
3. Gray M, Qu L, Weston R. Fertility and family policy in Australia 2008. Australian Government: Australian Institute of Family Studies, 2008.
4. United Nations. Department of Economic and Social Affairs, Population Division. World population prospects, the 2010 revision. Available at: http://esa.un.org/wpp/. Accessed on 28 March 2013.
5. Li Z, McNally L, Hilder L, Sullivan EA. Australia's mothers and babies 2009. Perinatal statistics series no. 25. Cat. no PER 52. Sydney AIHW National Perinatal Epidemiology and Statistics Unit, 2011. Available at http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737420980. Accessed on 28 March 2013.
6. Espenshade TJ, Guzman JC, Westoff CF. The surprising global variation in replacement fertility. Population Research and Policy Review 2003; 22(5/6):575.
7. Caldwell JC. The Western fertility decline: reflections from a chronological perspective. Journal of Population Research 2006; 23(2): 225-42.
8. Pool I. The baby boom in New Zealand and other western developed countries. Journal of Population Research 2007; 24(2):141-61.
9. Weston R, Qu L, Parker R, Alexander M. "It's not for lack of wanting kids": A report on the Fertility Decision Making Project. Australian Government: Australian Institute of Family Studies, 2004.
10. Grant J HS, Sivadasan S, et al,. Trends in European fertility: should Europe try to increase its fertility rate … or just manage the consequences? Int J Androl 2006; 29(1):17-24.
11. Anon. Birthrates in Europe tick upward after a generation of decline. Work & Family Life 2007; 21:1
12. Shaerraden M. Singapore announces "Baby Bonus" and children's development accounts. St Louis: Center for Social Developments, Washington University, 2001.
13. d'Addio A dEM. Trends and determinants of fertility rates: The role of policies. OECD Social, Employment and Migration Working Papers No. 27. OECD Publishing, 2005.
14. McDonald P. Fertility and the State: the efficacy of policy. Available at: http://iussp2005.princeton.edu/papers/50830. Accessed on 28 March 2013.
15. Australia Bureau of Statistics. Australian Social Trends, 2007. ABS Cat. no. 4102.0. Canberra: ABS, 2007. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/0/7E874EFF832BAB79CA25732C002072CF?opendocument. Accessed on 28 March 2013.
16. Lain SJ, Raynes-Greenow CH, Hadfield RM, et al. The impact of the Baby Bonus payment in New South Wales: who is having "one for the country"? Med J Aust 2009; 190(5):238-41.
17. Langridge AT, Nassar N, Li J, Jacoby P, Stanley FJ. The impact of monetary incentives on general fertility rates in Western Australia. J Epidemiol Community Health 2012; 66(4):296-301.
18. Lain SJ, Raynes-Greenow CH, Morris J. The impact of the baby bonus on maternity services in New South Wales. Aust N Z J Obstet Gynaecol 2010; 50(1):25-9.
19. Australian Government Department of Human Services. Budget 2012-13: Mid Year Economic and Fiscal Outlook Budget measure: Reduce Baby Bonus from $5000 to $3000 for second and subsequent children. Available at: http://www.humanservices.gov.au/corporate/publications-and-resources/budget/1213/measures/families/reduce-baby-bonus. Accessed on 28 March 2013.
20. Australian Bureau of Statistics. Population Distribution, Aboriginal and Torres Strait Islander Australians, 2006. ABS Cat. no. 4705.0. Canberra: ABS, 2007. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/b06660592430724fca2568b5007b8619/14e7a4a075d53a6cca2569450007e46c! OpenDocument. Accessed on 28 March 2013.
21. Australia Bureau of Statistics. Year Book Australia, 2004. ABS Cat. no. 1301.0. Canberra: ABS, 2004. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/2f762f95845417aeca25706c00834efa/e6aff66c68ced997ca256dea000539d6! OpenDocument. Accessed on 28 March 2013.
22. Australian Bureau of Statistics. 3201.0 - Population by Age and Sex, Australian States and Territories, Jun 2010. 2010.

## 1.11 Appendices

### 1.11.1 Appendix 1 – Country classification

ABS country classification 25 used in Figure 1.34.

**OCEANIA AND ANTARCTICA**

Australia, Norfolk Island, Australian External Territories, New Zealand, New Caledonia, Papua New Guinea, Solomon Islands, Vanuatu, , Guam, Kiribati, Marshall Islands, Micronesia, Federated States of, Nauru, Northern Mariana Islands, Palau, Cook Islands, Fiji, French Polynesia, Niue, Samoa, Samoa, American, Tokelau, Tonga, Tuvalu, Wallis and Futuna, Pitcairn Islands, Polynesia (excludes Hawaii), Adelie Land (France), Argentinian Antarctic Territory, Australian Antarctic Territory, British Antarctic Territory, Chilean Antarctic Territory, Queen Maud Land (Norway), Ross Dependency (New Zealand).

**NORTH-WEST EUROPE**

England, Isle of Man, Northern Ireland, Scotland, Wales, Guernsey, Jersey, , Ireland, , Austria, Belgium, France, Germany, Liechtenstein, Luxembourg, Monaco, Netherlands, Switzerland, , Denmark, Faroe Islands, Finland, Greenland, Iceland, Norway, Sweden, Aland Islands.

**SOUTHERN AND EASTERN EUROPE**

Andorra, Gibraltar, Holy See, Italy, Malta, Portugal, San Marino, Spain, , Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Former Yugoslav Republic of Macedonia (FYROM), Greece, Moldova, Romania, Slovenia, Montenegro, Serbia, Kosovo, , Belarus, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Russian Federation, Slovakia, Ukraine.

**NORTH AFRICA AND THE MIDDLE EAST**

Algeria, Egypt, Libya, Morocco, Sudan, Tunisia, Western Sahara, Spanish North Africa, South Sudan, Bahrain, Gaza Strip and West Bank, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen.

**SOUTH-EAST ASIA**

Burma (Republic of the Union of Myanmar), Cambodia, Laos, Thailand, Vietnam, Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Timor-Leste.

**NORTH-EAST ASIA**

China (excludes SARs and Taiwan), Hong Kong (SAR of China), Macau (SAR of China), Mongolia, Taiwan, Japan, Korea, Democratic People's Republic of (North), Republic of Korea South.

**SOUTHERN AND CENTRAL ASIA**

Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka, Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan.

**AMERICAS**

Bermuda, Canada, St Pierre and Miquelon, United States of America, , Argentina, Bolivia, Plurinational State of, Brazil, Chile, Colombia, Ecuador, Falkland Islands, French Guiana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela, Bolivarian Republic of, South America, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, Cayman Islands, Cuba, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Puerto Rico, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands, Virgin Islands, British Virgin Islands, United States, St Barthelemy, St Martin (French part), Bonaire, Sint Eustatius and Saba, Curacao, Sint Maarten (Dutch part).

**SUB-SAHARAN AFRICA**

Benin, Burkina Faso, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Republic of, Congo, Democratic Republic of, Cote d'Ivoire, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Sao Tome and Principe, Senegal, Sierra Leone, Togo, , Angola, Botswana, Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mayotte, Mozambique, Namibia, Reunion, Rwanda, St Helena, Seychelles, Somalia, South Africa, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe, Southern and East Africa.

## 1.11.2 Appendix 2 – Data for figures presented in this chapter

### Table A 1.1: International comparison of total fertility rates in five-year periods, 1950 to 2010

| | 1950-1955 | 1955-1960 | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 | 2000-2005 | 2005-2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 3.2 | 3.4 | 3.3 | 2.9 | 2.5 | 2.0 | 1.9 | 1.9 | 1.9 | 1.8 | 1.8 | 1.9 |
| More developed countries | 2.8 | 2.8 | 2.7 | 2.4 | 2.2 | 1.9 | 1.9 | 1.8 | 1.7 | 1.6 | 1.6 | 1.7 |
| Less developed countries | 6.0 | 5.9 | 5.9 | 5.8 | 5.2 | 4.3 | 3.9 | 3.6 | 3.1 | 2.8 | 2.5 | 2.4 |
| Least developed countries | 6.5 | 6.6 | 6.7 | 6.7 | 6.7 | 6.6 | 6.5 | 6.2 | 5.7 | 5.3 | 4.9 | 4.4 |
| World | 5.0 | 4.9 | 4.9 | 4.9 | 4.5 | 3.8 | 3.6 | 3.4 | 3.0 | 2.8 | 2.6 | 2.5 |

Note: More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan
Less developed countries comprise all Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia, excluding the least developed countries. Least developed countries include 33 in Africa, 9 in Asia, 5 in Oceania plus one in Latin America and the Caribbean
Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). Rate: Per woman
World Population Prospects: The 2010 Revision, CD-ROM Edition. http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### Table A 1.2: International comparison of crude fertility rates in five-year periods, 1950 to 2010

| | 1950-1955 | 1955-1960 | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 | 2000-2005 | 2005-2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 23 | 23 | 22 | 20 | 20 | 16 | 15 | 15 | 15 | 13 | 13 | 14 |
| More developed countries | 22 | 21 | 20 | 17 | 16 | 15 | 14 | 14 | 12 | 11 | 11 | 11 |
| Less developed countries | 43 | 41 | 40 | 39 | 36 | 31 | 30 | 29 | 26 | 23 | 21 | 20 |
| Least developed countries | 48 | 48 | 47 | 47 | 47 | 46 | 45 | 44 | 42 | 39 | 37 | 34 |
| World | 37 | 35 | 35 | 34 | 31 | 28 | 28 | 27 | 24 | 22 | 21 | 20 |

Note: Rate per 1,000 population
Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### Table A 1.3: International comparison of mean maternal age in five-year periods, 1995 to 2010

| | 1995-2000 | 2000-2005 | 2005-2010 |
|---|---|---|---|
| Australia | 29 | 30 | 30 |
| More developed countries | 28 | 28 | 29 |
| Less developed countries | 27 | 27 | 27 |
| Least developed countries | 29 | 29 | 29 |
| World | 27 | 27 | 27 |

Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition. http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### Table A 1.4: International comparison of age-specific fertility rate, 2005 to 2010

| | 15-19 years | 20-24 years | 25-29 years | 30-34 years | 35-39 years | 40-44 years | 45-49 years |
|---|---|---|---|---|---|---|---|
| Australia | 16 | 55 | 106 | 126 | 68 | 13 | 0.65 |
| More developed countries | 24 | 72 | 97 | 89 | 42 | 8.0 | 0.42 |
| Less developed countries | 52 | 158 | 140 | 80 | 36 | 12 | 3.3 |
| Least developed countries | 105 | 217 | 214 | 169 | 110 | 51 | 17 |
| World | 56 | 153 | 142 | 91 | 44 | 15 | 3.7 |

Note: Rate per 1,000 women
Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### Table A 1.5: International comparison of net reproduction rate in five-year periods, 1950 to 2010

| | 1950-1955 | 1955-1960 | 1960-1965 | 1965-1970 | 1970-1975 | 1975-1980 | 1980-1985 | 1985-1990 | 1990-1995 | 1995-2000 | 2000-2005 | 2005-2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 1.5 | 1.6 | 1.5 | 1.4 | 1.2 | 1.0 | 0.91 | 0.89 | 0.89 | 0.85 | 0.84 | 0.93 |
| More developed countries | 1.3 | 1.3 | 1.2 | 1.1 | 1.0 | 0.91 | 0.88 | 0.87 | 0.8 | 0.74 | 0.75 | 0.79 |
| Less developed countries | 1.9 | 1.9 | 2.0 | 2.2 | 2.1 | 1.7 | 1.6 | 1.5 | 1.3 | 1.2 | 1.1 | 1.1 |
| Least developed countries | 1.8 | 1.9 | 2.0 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 1.9 | 1.7 |
| World | 1.7 | 1.7 | 1.8 | 1.9 | 1.8 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 1.1 | 1.1 |

Note: Rate per women
Source: United Nations, Department of Economic and Social Affairs, Population Division (2011). World Population Prospects: The 2010 Revision, CD-ROM Edition http://esa.un.org/unpd/wpp/Excel-Data/fertility.htm

### Table A 1.6: Live births and total fertility rate in Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Births by year of registration | 246,394 | 250,988 | 251,161 | 254,246 | 259,791 | 265,949 | 285,213 | 296,621 | 295,738 | 297,903 |
| Births by year of occurrence | 246,504 | 247,514 | 247,725 | 248,071 | 262,880 | 267,245 | 281,687 | 288,109 | 289,497 | 263,240 |
| Total Fertility Rate | 1.73 | 1.76 | 1.75 | 1.76 | 1.79 | 1.82 | 1.92 | 1.96 | 1.90 | 1.89 |

Note: Rate per women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.7: Crude fertility rate in Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 13 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 | 13 |

Note: Rate per 1,000 population
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.8: Median age of mothers in Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Age (years) | 30.0 | 30.2 | 30.5 | 30.6 | 30.7 | 30.8 | 30.7 | 30.7 | 30.6 | 30.7 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.9: Number of live births by age group and age-specific fertility rate in Australia, 2010

| | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|
| Live births | 11,294 | 41,690 | 81,763 | 94,093 | 56,650 | 11,563 | 592 |
| Rate | 16 | 53 | 100 | 123 | 70 | 15 | 0.70 |

Note: Births to mothers younger than 15 years are included in the 15-19 year group and births to mothers older than 49 years are included in the 45-49 year group
Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.10: Number of live births by age group in Australia, 2001 to 2010

| Age (years) | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 11,704 | 11,505 | 10,811 | 10,857 | 10,744 | 10,552 | 11,204 | 12,326 | 12,120 | 11,294 |
| 20-24 | 37,208 | 36,782 | 36,302 | 36,146 | 36,482 | 37,151 | 40,907 | 42,678 | 42,067 | 41,690 |
| 25-29 | 73,711 | 71,820 | 69,604 | 68,846 | 69,420 | 70,224 | 75,998 | 79,012 | 80,863 | 81,763 |
| 30-34 | 79,784 | 84,052 | 86,077 | 87,395 | 89,158 | 89,883 | 93,072 | 94,124 | 93,027 | 94,093 |
| 35-39 | 36,733 | 38,621 | 39,876 | 42,139 | 44,873 | 48,505 | 53,561 | 56,976 | 55,937 | 56,650 |
| 40-44 | 6,812 | 7,362 | 7,706 | 8,183 | 8,376 | 8,679 | 9,642 | 10,771 | 10,905 | 11,563 |
| 45-49 | 290 | 305 | 330 | 379 | 358 | 438 | 506 | 512 | 565 | 592 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.11: Age-specific fertility rate in Australia, 2001 to 2010

| Age (years) | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 18 | 17 | 16 | 16 | 16 | 15 | 16 | 17 | 17 | 16 |
| 20-24 | 58 | 56 | 54 | 53 | 52 | 51 | 56 | 57 | 54 | 53 |
| 25-29 | 104 | 105 | 103 | 102 | 102 | 101 | 106 | 105 | 102 | 100 |
| 30-34 | 108 | 111 | 112 | 114 | 117 | 120 | 126 | 127 | 124 | 123 |
| 35-39 | 49 | 52 | 54 | 57 | 60 | 63 | 68 | 71 | 69 | 70 |
| 40-44 | 9.2 | 9.7 | 10 | 11 | 11 | 11 | 13 | 14 | 14 | 15 |
| 45-49 | 0.40 | 0.40 | 0.50 | 0.50 | 0.50 | 0.60 | 0.70 | 0.70 | 0.70 | 0.70 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.12: Daughters surviving to reproduction age in Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 0.83 | 0.85 | 0.84 | 0.85 | 0.86 | 0.87 | 0.92 | 0.94 | 0.91 | 0.91 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.13: Live births by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 84,578 | 86,583 | 86,344 | 85,894 | 86,589 | 87,336 | 89,495 | 94,684 | 92,783 | 95,918 |
| VIC | 58,626 | 61,478 | 61,058 | 62,417 | 63,287 | 65,236 | 70,313 | 71,175 | 70,920 | 70,568 |
| QLD | 47,678 | 47,771 | 48,342 | 49,940 | 51,661 | 52,665 | 61,249 | 63,132 | 66,097 | 64,467 |
| SA | 17,281 | 17,665 | 17,443 | 17,140 | 17,800 | 18,260 | 19,662 | 20,229 | 19,734 | 20,076 |
| WA | 24,002 | 23,601 | 24,273 | 25,295 | 26,253 | 27,776 | 29,164 | 31,850 | 30,878 | 31,424 |
| TAS | 6,430 | 6,003 | 5,752 | 5,809 | 6,308 | 6,475 | 6,662 | 6,775 | 6,626 | 6,385 |
| NT | 3,822 | 3,724 | 3,790 | 3,551 | 3,659 | 3,696 | 3,894 | 3,942 | 3,819 | 3,899 |
| ACT | 3,938 | 4,112 | 4,128 | 4,174 | 4,206 | 4,479 | 4,753 | 4,804 | 4,858 | 5,149 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.14: Total fertility rate by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.8 | 1.9 |
| VIC | 1.6 | 1.7 | 1.7 | 1.7 | 1.7 | 1.7 | 1.9 | 1.8 | 1.8 | 1.8 |
| QLD | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 1.8 | 2.1 | 2.1 | 2.1 | 2.0 |
| SA | 1.7 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 | 1.9 |
| WA | 1.7 | 1.7 | 1.7 | 1.8 | 1.9 | 1.9 | 2.0 | 2.1 | 2.0 | 2.0 |
| TAS | 2.1 | 2.0 | 1.9 | 1.9 | 2.1 | 2.1 | 2.2 | 2.2 | 2.2 | 2.1 |
| NT | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 |
| ACT | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.8 | 1.7 | 1.8 |

Note: Rate per women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.15: Crude fertility rate by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 13 | 13 | 13 | 13 | 13 | 13 | 13 | 14 | 13 | 13 |
| VIC | 12 | 13 | 12 | 13 | 13 | 13 | 14 | 13 | 13 | 13 |
| QLD | 13 | 13 | 13 | 13 | 13 | 13 | 15 | 15 | 15 | 14 |
| SA | 11 | 12 | 11 | 11 | 12 | 12 | 12 | 13 | 12 | 12 |
| WA | 13 | 12 | 12 | 13 | 13 | 14 | 14 | 15 | 14 | 14 |
| TAS | 14 | 13 | 12 | 12 | 13 | 13 | 14 | 14 | 13 | 13 |
| NT | 19 | 19 | 19 | 18 | 18 | 18 | 18 | 18 | 17 | 17 |
| ACT | 12 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 | 14 |
| Australia | 13 | 13 | 13 | 13 | 13 | 13 | 14 | 14 | 14 | 13 |

Note: Rate per 1,000 population
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.16: Median maternal age by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |
| VIC | 31 | 31 | 31 | 31 | 32 | 32 | 32 | 32 | 32 | 32 |
| QLD | 29 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| SA | 30 | 30 | 31 | 31 | 30 | 30 | 30 | 30 | 30 | 30 |
| WA | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
| TAS | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 | 29 |
| NT | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 29 |
| ACT | 30 | 31 | 31 | 32 | 31 | 31 | 31 | 32 | 31 | 32 |
| Australia | 30 | 30 | 31 | 31 | 31 | 31 | 31 | 31 | 31 | 31 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.17: Live births by age group by state and territory, 2010

| Age (years) | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| 15-19 | 3,014 | 1,512 | 3,660 | 806 | 1,449 | 357 | 388 | 105 |
| 20-24 | 12,470 | 7,467 | 11,359 | 3,043 | 4,842 | 1,191 | 802 | 509 |
| 25-29 | 25,927 | 18,477 | 18,165 | 5,929 | 8,926 | 1,852 | 1,099 | 1,386 |
| 30-34 | 31,009 | 24,280 | 18,590 | 6,149 | 9,633 | 1,651 | 958 | 1,820 |
| 35-39 | 19,365 | 15,401 | 10,450 | 3,409 | 5,409 | 966 | 544 | 1,104 |
| 40-44 | 3,946 | 3,200 | 2,119 | 684 | 1,106 | 195 | 101 | 212 |
| 45-49 | 184 | 172 | 114 | 44 | 49 | 10 | 7 | 12 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.18: Age-specific fertility rate by state and territory, 2010

| Age (years) | NSW | VIC | QLD | SA | WA | TAS | NT | ACT | Australia |
|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 13 | 9 | 24 | 15 | 19 | 22 | 48 | 9 | 16 |
| 20-24 | 49 | 37 | 71 | 54 | 59 | 80 | 93 | 34 | 53 |
| 25-29 | 97 | 89 | 111 | 108 | 109 | 128 | 105 | 87 | 100 |
| 30-34 | 123 | 125 | 122 | 122 | 124 | 117 | 102 | 134 | 123 |
| 35-39 | 73 | 75 | 63 | 62 | 65 | 58 | 60 | 80 | 70 |
| 40-44 | 16 | 16 | 13 | 12 | 14 | 12 | 12 | 17 | 15 |
| 45-49 | 0.7 | 0.9 | 0.7 | 0.7 | 0.6 | 0.5 | 0.9 | 0.9 | 0.7 |

Note: Rate per 1000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.19: Number of live births by area of remoteness, 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Major Cities | 180,376 | 184,843 | 198,045 | 205,899 | 205,750 | 209,138 |
| Inner Regional | 46,919 | 48,047 | 51,196 | 53,450 | 52,947 | 52,458 |
| Outer Regional | 24,389 | 24,957 | 27,136 | 27,957 | 27,675 | 26,919 |
| Remote | 4,765 | 4,848 | 5,071 | 5,397 | 5,461 | 5,349 |
| Very Remote | 2,729 | 2,730 | 3,018 | 3,120 | 3,319 | 3,341 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.20: Total fertility rate by area of remoteness, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Major Cities | 1.7 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 |
| Inner Regional | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 |
| Outer Regional | 2.1 | 2.1 | 2.2 | 2.3 | 2.3 | 2.2 |
| Remote | 2.2 | 2.3 | 2.3 | 2.4 | 2.5 | 2.5 |
| Very Remote | 2.2 | 2.1 | 2.2 | 2.3 | 2.4 | 2.5 |
| Total Australia | 1.8 | 1.8 | 1.8 | 1.9 | 1.9 | 1.9 |

Note: Rate per woman
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.21: Crude fertility rate by area of remoteness, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Major Cities | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 1.4 |
| Inner Regional | 1.2 | 1.2 | 1.2 | 1.3 | 1.2 | 1.2 |
| Outer Regional | 1.3 | 1.3 | 1.4 | 1.4 | 1.3 | 1.3 |
| Remote | 1.5 | 1.5 | 1.6 | 1.7 | 1.7 | 1.6 |
| Very Remote | 1.6 | 1.6 | 1.8 | 1.8 | 1.9 | 1.9 |
| Total Australia | 1.3 | 1.3 | 1.4 | 1.4 | 1.3 | 1.3 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.22: Median maternal age by area of remoteness, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Major Cities | 31 | 31 | 31 | 31 | 31 | 31 |
| Inner Regional | 30 | 30 | 30 | 30 | 30 | 29 |
| Outer Regional | 29 | 29 | 29 | 29 | 29 | 29 |
| Remote | 29 | 29 | 29 | 29 | 28 | 28 |
| Very Remote | 27 | 27 | 27 | 27 | 27 | 27 |
| Remote and Very Remote | 28 | 28 | 28 | 28 | 28 | 28 |
| Total Australia | 31 | 31 | 31 | 31 | 31 | 31 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.23: Age-specific fertility rate by area of remoteness, 2010

| | 15–19 years | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–49 years |
|---|---|---|---|---|---|---|---|
| Major Cities | 12 | 43 | 92 | 126 | 75 | 16 | 0.80 |
| Inner Regional | 21 | 79 | 131 | 121 | 56 | 11 | 0.50 |
| Outer Regional | 29 | 99 | 135 | 118 | 56 | 11 | 0.50 |
| Remote | 50 | 117 | 140 | 121 | 58 | 12 | 0.40 |
| Very Remote | 87 | 126 | 119 | 102 | 50 | 9.9 | 0.40 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.24: Total fertility rate by area of remoteness, by state and territory, 2010

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| Major Cities | 1.8 | 1.7 | 2.0 | 1.8 | 1.9 | - | - | 1.8 |
| Inner Regional | 2.0 | 2.0 | 2.3 | 2.1 | 2.3 | 2.1 | - | - |
| Outer Regional | 2.3 | 2.1 | 2.2 | 2.3 | 2.4 | 2.4 | 2.1 | - |
| Remote | 2.4 | 2.4 | 2.8 | 2.4 | 2.5 | 2.7 | 2.3 | - |
| Very Remote | 2.2 | - | 3.1 | 2.2 | 2.4 | 2.5 | 2.1 | - |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.25: Number of Indigenous births, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Indigenous | 11,405 | 11,488 | 11,740 | 12,006 | 12,078 | 12,496 | 14,192 | 15,011 | 15,825 | 16,129 |
| Australia | 246,394 | 250,988 | 251,161 | 254,246 | 259,791 | 265,949 | 285,213 | 296,621 | 295,738 | 297,903 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.26: Total fertility rate in Indigenous women, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Indigenous | 2.2 | 2.2 | 2.2 | 2.2 | 2.1 | 2.1 | 2.4 | 2.5 | 2.6 | 2.6 |
| Australia | 1.7 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 | 1.9 | 2.0 | 1.9 | 1.9 |

Note: Rate per woman
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.27: Median age of Indigenous mothers, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Indigenous mothers | 25 | 25 | 25 | 25 | 25 | 25 |
| Australia | 31 | 31 | 31 | 31 | 31 | 31 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.28: Number of live births to Indigenous mothers by age group, 2010

| | 15–19 years | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–49 years |
|---|---|---|---|---|---|---|---|
| Indigenous mothers | 2,373 | 3,754 | 2,785 | 1,784 | 881 | 204 | 13 |
| Australia | 11,294 | 41,690 | 81,763 | 94,093 | 56,650 | 11,563 | 592 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.29: Age-specific fertility rate by Indigenous status, 2010

| | 15–19 years | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–49 years |
|---|---|---|---|---|---|---|---|
| Indigenous mothers | 76 | 149 | 132 | 98 | 47 | 12 | 0.90 |
| Australia | 16 | 53 | 100 | 123 | 70 | 15 | 0.70 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.30: Age-specific fertility rate in Indigenous women, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| 15–19 years | 72 | 69 | 70 | 75 | 79 | 76 |
| 20–24 years | 125 | 124 | 143 | 147 | 152 | 149 |
| 25–29 years | 109 | 111 | 126 | 132 | 132 | 132 |
| 30–34 years | 72 | 78 | 90 | 93 | 94 | 98 |
| 35–39 years | 34 | 35 | 43 | 45 | 47 | 47 |
| 40–44 years | 6.5 | 7.1 | 8.2 | 11 | 11 | 12 |
| 45–49 years | 0.30 | 0.50 | 0.70 | 0.30 | 0.40 | 0.90 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.31: Number of Indigenous births by state and territory, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| NSW | 3,139 | 3,516 | 3,720 | 4,003 | 4,128 | 4,415 |
| VIC | 802 | 782 | 1,025 | 1,096 | 1,129 | 973 |
| QLD | 3,657 | 3,463 | 4,486 | 4,402 | 5,205 | 5,291 |
| SA | 718 | 733 | 808 | 976 | 889 | 943 |
| WA | 1,763 | 1,910 | 2,121 | 2,473 | 2,416 | 2,341 |
| TAS | 415 | 413 | 308 | 364 | 397 | 453 |
| NT | 1,485 | 1,565 | 1,595 | 1,560 | 1,523 | 1,558 |

Note: Data for the ACT is not available due to the small number of Indigenous births but is included in totals for Australia.
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.32: Total fertility rate in Indigenous women by state and territory, 2010

| | NSW | VIC | QLD | SA | WA | TAS | NT |
|---|---|---|---|---|---|---|---|
| Indigenous | 2.2 | 2.1 | 3.2 | 2.7 | 2.8 | 1.7 | 2.4 |
| State average | 1.9 | 1.8 | 2.0 | 1.9 | 2 | 2.1 | 2.1 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.33: Number of live births and total fertility rate by maternal country of birth, 2010

| | Live births | Total Fertility Rate |
|---|---|---|
| South-East Asia | 14,756 | 1.6 |
| Southern and Central Asia | 14,128 | 1.9 |
| North-West Europe | 13,168 | 1.8 |
| North-East Asia | 9,955 | 1.3 |
| North Africa and the Middle East | 7,813 | 3.0 |
| Sub-Saharan Africa | 5,617 | 2.1 |
| Southern and Eastern Europe | 4,571 | 1.6 |
| Americas | 4,236 | 1.7 |

Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.34: Median maternal age by country of birth, 2010

| | Age (years) |
|---|---|
| South-East Asia | 31.8 |
| Southern and Central Asia | 29.1 |
| North-West Europe | 33.7 |
| North-East Asia | 32.1 |
| North Africa and the Middle East | 29.5 |
| Sub-Saharan Africa | 31.6 |
| Southern and Eastern Europe | 32.0 |
| Americas | 32.7 |

Note: Refer to Appendix 1 for country classification
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.35: Age-specific fertility rate by maternal country of birth, 2010

| | 15–19 years | 20–24 years | 25–29 years | 30–34 years | 35–39 years | 40–44 years | 45–49 years |
|---|---|---|---|---|---|---|---|
| Oceania and Antarctica | 18 | 59 | 107 | 125 | 67 | 14 | 0.60 |
| North-West Europe | 6.9 | 31 | 74 | 136 | 87 | 16 | 0.80 |
| Southern and Eastern Europe | 6.2 | 39 | 88 | 108 | 62 | 12 | 0.70 |
| North Africa and the Middle East | 28.9 | 139 | 170 | 150 | 85 | 21 | 1.2 |
| South-East Asia | 6.4 | 32 | 87 | 113 | 68 | 16 | 0.90 |
| North-East Asia | 1.4 | 8.3 | 50 | 112 | 72 | 15 | 0.90 |
| Southern and Central Asia | 6.6 | 56 | 117 | 126 | 59 | 12 | 0.80 |
| Americas | 5.6 | 27 | 63 | 121 | 91 | 22 | 1.2 |
| Sub-Saharan Africa | 12.6 | 51 | 111 | 142 | 83 | 16 | 1.2 |
| Australia | 16 | 53 | 100 | 123 | 70 | 15 | 0.70 |

Note: Refer to Appendix 1 for country classification. Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.36: Number of live births and fertility rate among teenagers in Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Live births | 11,704 | 11,505 | 10,811 | 10,857 | 10,744 | 10,552 | 11,204 | 12,326 | 12,120 | 11,294 |
| TFRs | 18 | 17 | 16 | 16 | 16 | 15 | 16 | 17 | 17 | 16 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.37: Number of live births and fertility rate among teenagers by state and territory, 2010

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| Number of live births | 3,014 | 1,512 | 3,660 | 806 | 1,449 | 357 | 388 | 105 |
| Rate | 13 | 8.5 | 24 | 15 | 19 | 22 | 48 | 8.9 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.38: Number of live births among teenagers by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 3,727 | 3,643 | 3,301 | 3,310 | 2,974 | 2,949 | 2,788 | 3,226 | 3,037 | 3,014 |
| VIC | 1,849 | 1,830 | 1,673 | 1,713 | 1,641 | 1,652 | 1,731 | 1,864 | 1,762 | 1,512 |
| QLD | 2,905 | 2,915 | 2,821 | 2,883 | 2,764 | 2,723 | 3,289 | 3,636 | 4,022 | 3,660 |
| SA | 730 | 786 | 751 | 686 | 943 | 848 | 902 | 953 | 836 | 806 |
| WA | 1,325 | 1,292 | 1,286 | 1,371 | 1,446 | 1,392 | 1,485 | 1,686 | 1,514 | 1,449 |
| TAS | 543 | 450 | 419 | 397 | 418 | 405 | 437 | 449 | 443 | 357 |
| NT | 509 | 459 | 458 | 402 | 448 | 471 | 449 | 412 | 391 | 388 |
| ACT | 116 | 129 | 101 | 94 | 109 | 108 | 123 | 95 | 115 | 105 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.39: Teenage fertility rate by state and territory, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 17 | 17 | 15 | 15 | 13 | 13 | 12 | 14 | 13 | 13 |
| VIC | 12 | 11 | 10 | 10 | 9.7 | 9.7 | 10 | 11 | 9.9 | 8.5 |
| QLD | 23 | 22 | 21 | 22 | 20 | 20 | 23 | 25 | 27 | 24 |
| SA | 15 | 16 | 15 | 14 | 19 | 17 | 18 | 18 | 16 | 15 |
| WA | 19 | 19 | 19 | 20 | 21 | 20 | 21 | 23 | 20 | 19 |
| TAS | 33 | 28 | 26 | 25 | 27 | 27 | 27 | 28 | 27 | 22 |
| NT | 71 | 63 | 64 | 56 | 61 | 64 | 59 | 52 | 48 | 48 |
| ACT | 9.8 | 11 | 8.6 | 7.8 | 9.1 | 9.1 | 10 | 8 | 9.7 | 8.9 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.40: Teenage fertility rate by area of remoteness, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Major cities | 12 | 12 | 12 | 12 | 12 | 12 |
| Inner regional | 20 | 19 | 19 | 20 | 21 | 21 |
| Outer regional | 26 | 27 | 27 | 28 | 29 | 29 |
| Remote | 44 | 44 | 45 | 48 | 50 | 50 |
| Very remote | 77 | 73 | 77 | 80 | 86 | 87 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.41: Teenage fertility rate by area of remoteness, by state and territory, 2010

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| Major cities | 10 | 7.4 | 19 | 14 | 16 | - | - | 8.9 |
| Inner regional | 19 | 15 | 29 | 16 | 24 | 24 | - | - |
| Outer regional | 25 | 19 | 34 | 30 | 33 | 27 | 26 | - |
| Remote | 47 | 13 | 61 | 25 | 51 | 48 | 57 | - |
| Very remote | 49 | - | 100 | 55 | 90 | 41 | 89 | - |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.42: Number of live births and fertility rate in Indigenous teenagers, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Live births | 1,829 | 1,833 | 1,962 | 2,206 | 2,400 | 2,373 |
| Fertility rates | 72 | 69 | 70 | 75 | 79 | 76 |

Note: Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.43: Number of live births and total fertility rate in Indigenous teenager mothers by state and territory, 2010

| | NSW | VIC | QLD | SA | WA | TAS | NT |
|---|---|---|---|---|---|---|---|
| Live births | 531 | 82 | 839 | 131 | 413 | 43 | 318 |
| Fertility rate | 56 | 39 | 95 | 76 | 104 | 36 | 91 |

Note: Data for the ACT were not available. Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 1.44: Teenage fertility rate by maternal country of birth, 2010

| Country | Rate |
|---|---|
| Oceania and Antarctica | 18 |
| North-West Europe | 6.9 |
| Southern and Eastern Europe | 6.2 |
| North Africa and the Middle East | 29 |
| South-East Asia | 6.4 |
| North-East Asia | 1.4 |
| Southern and Central Asia | 6.6 |
| Americas | 5.6 |
| Sub-Saharan Africa | 13 |
| Australia | 16 |

Note: Refer to Appendix 1 for country classification. Rate per 1,000 women
Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

# Chapter 2:
# Infertility and Assisted Reproductive Technology

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Chapter Outline

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## Key indicators

Prevalence of infertility

Number of Assisted Reproductive Technology (ART) treatment cycles undertaken

Numbers of embryo transfers, clinical pregnancies and live deliveries

Live delivery rates associated with ART

Miscarriage, stillbirth and neonatal death rates associated with ART

Mean age and age distribution of women who have undertaken ART, and who have achieved live deliveries

Number of Medicare claims for ART-related Medicare Benefits Schedule (MBS) items - state and territory totals and rates per 100,000 population

Medicare benefits paid for ART-related MBS items

## Primary data sources

Online Medicare Australia data regarding claims for ART-related MBS items in the years 2000 to 2011

Data from the Australian and New Zealand Assisted Reproduction Database (ANZARD), extracted from the following annual reports:

Bryant J, Sullivan EA, Dean JH. Assisted reproductive technology in Australia and New Zealand 2002. Cat. no. PER 26. Canberra: AIHW, 2004

Waters AM, Dean JH, Sullivan EA. Assisted reproduction technology in Australia and New Zealand 2003. Cat. no. PER 31. Canberra: AIHW, 2005

Wang YA, Dean JH, Grayson N, Sullivan EA. Assisted reproduction technology in Australia and New Zealand 2004. Cat. no. PER 39. Canberra: AIHW, 2006

Wang YA, Dean JH, Sullivan EA. Assisted reproduction technology in Australia and New Zealand 2005. Cat. no. PER 36. Canberra: AIHW, 2007

Wang YA, Dean JH, Badgery-Parker T, Sullivan EA. Assisted reproduction technology in Australia and New Zealand 2006. Cat. no. PER PER 43. Canberra: AIHW, 2008

Wang YA, Chambers GM, Dieng M, Sullivan EA. Assisted reproduction technology in Australia and New Zealand 2007. Cat. no. PER 47. Canberra: AIHW, 2009

Sullivan EA, Wang YA, Chambers G. Assisted reproductive technology in Australia and New Zealand 2008. Cat. no. PER 49. Canberra: AIHW, 2010

Wang YA, Macaldowie A, Hayward I, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2009. Cat. no. PER 51. Canberra: AIHW, 2011

Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Cat. no. PER 55. Canberra: AIHW, 2012

## Purpose of this chapter

To examine changes over time in utilisation of assisted reproduction technology (ART) treatment in Australia and New Zealand

To examine changes over time in the process and outcomes of ART treatment in Australia and New Zealand

To examine changes over time in cost to Medicare of ART-related health services in Australia

To identify areas of data development

## Terms and definitions

**AIHW:** Australian Institute of Health and Welfare.

**ANZARD:** Australian and New Zealand Assisted Reproduction Database.

**Assisted Reproductive Technology (ART):** all treatments or procedures that include in vitro handling of both human oocytes (eggs) and sperm, or embryos, for the purpose of establishing a pregnancy.

**Autologous cycle:** an ART treatment cycle in which a woman intends to use, or uses her own oocytes or embryos.

**Blastocyst:** an embryo five or six days after fertilisation comprising about 100 cells.

**Cleavage stage embryo:** an embryo comprising about eight cells, which is usually developed by two or three days after fertilisation.

**Clinical pregnancy:** a pregnancy in which at least one of the following criteria is satisfied:

- known to be ongoing at 20 weeks
- evidence by ultrasound of an intrauterine sac (with or without a fetal heart)
- examination of products of conception reveal chorionic villi
- an ectopic pregnancy diagnosed by laparoscope or ultrasound

**Clinical pregnancy rate:** the number of clinical pregnancies per 100 initiated cycles or embryo transfer cycles.

**(ART) cycle:** a series of treatment steps over a period of several weeks that begin when a woman starts ovarian monitoring or starts taking drugs to stimulate egg production with the intention of having embryos transferred.

**Donation cycle:** an ART treatment cycle in which a woman intends to donate, or donates her oocytes to another woman (the recipient). A donation cycle may result in the donation of either oocytes or embryos to a recipient. Use of donor sperm does not alter the donor status of the cycle.

**Embryo transfer:** the procedure in which one or more embryos are transferred (usually) into a woman's uterus.

**Embryo transfer cycle:** an ART cycle in which one or more embryos are transferred (usually) into a woman's uterus.

**EMSN:** Extended Medicare Safety Net.

**Fetal death (stillbirth):** death prior to the complete expulsion or extraction from its mother of a product of fertilisation, at or after 20 completed weeks of gestational age.

**Fresh cycle:** an ART treatment cycle that intends to involve use of, or uses oocytes or embryo(s) that have not been cryopreserved (frozen).

**Infertility:** inability to become pregnant in spite of a period of regular, unprotected sexual intercourse. Current infertility usually refers to the most recent 12 month period, lifetime infertility refers to any (usually 12 month) period during a lifetime.

**Intracytoplasmic sperm injection (ICSI):** a procedure in which a single sperm is injected directly into an oocyte.

**In Vitro Fertilisation (IVF):** a procedure in which one or more eggs are retrieved from the body of a woman and are combined with sperm outside the body to achieve fertilisation.

**Live birth:** the World Health Organization defines a live birth as the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of the pregnancy, which after such separation, breathes or shows any other evidence of life.

**Live delivery:** a live delivery is the delivery of one or more liveborn infants, with the birth of twins, triplets or more counted as one live delivery.

**Live delivery rate:** is the number of live deliveries per 100 initiated ART treatment cycles or embryo transfer cycles. These rates reported herein are approximate, as most deliveries actually occur in the year after the relevant ART cycle is initiated.

**Neonatal death:** death of a liveborn baby within 28 days of birth.

**NPESU:** National Perinatal Epidemiology and Statistics Unit.

**Oocyte donation cycle:** a cycle in which oocytes are collected from a donor.

**Oocyte pick-up (OPU):** the procedure of collecting oocytes (eggs, ova) from ovaries by ultrasound-guided trans-vaginal aspiration or by laparoscopic surgery.

**Recipient cycle:** an ART treatment cycle in which a woman receives oocytes or embryos from another (donor) woman.

**Thaw (frozen) embryo transfer cycle:** an ART treatment cycle in which cycle monitoring is carried out with the intention of transferring one or more frozen/thawed embryos.

## Data sources and limitations

**Australian Institute of Health and Welfare (AIHW)**

Australian ART data are collected in the Australian and New Zealand Assisted Reproduction Database (ANZARD), and are reported annually by the Australian Institute of Health and Welfare's (AIHW) National Perinatal Epidemiology and Statistics Unit (NPESU).

- Nearly all ANZARD data reported by the NPESU relate to ART treatment cycles, not individuals. ANZARD was modified in 2009 (ANZARD2.0) to enable reporting of women-based data as well as the traditional cycle-based data. Full transition to women-based data takes several years and requires validation of the data. The NPESU's most recent reports in 2009 and 2010 have progressively introduced women-based data reporting.
- Most of the data that are reported from ANZARD by the NPESU relate to ART services in Australia and New Zealand, which are not reported separately. Between 7.3% and 12.0% (median of 8.4%) of the autologous fresh ART cycles that were recorded in the ANZARD database for the years 2002 to 2010 were initiated in New Zealand; this limits ability to accurately compare ANZARD data with Australia-only data such as Medicare data.
- Assisted reproductive technology cycles that are started at the end of a given year may not have outcomes until near the end of the following year, leading to delay in availability of ANZARD data in comparison with Medicare data.
- Any incompleteness in the graphs and tables that illustrate particular ANZARD data reflect availability of published data.

**Medicare Benefits Schedule data**

The only readily available source of Australian ART cost data is Medicare MBS online item statistics data which have a range of limitations.

- These data only include services that qualify for benefits regarding specific ART-related Medicare Benefits Schedule (MBS) items and for which reimbursement claims have been processed (Table 2.1).
- Medicare MBS items do not cover all ART-related healthcare costs, such as costs of some required drugs, some diagnostic tests, day or over night hospital admissions, general anaesthesia, culturing of blastocysts, freezing and storage of embryos or sperm, and advanced embryo selection procedures.
- These data do not include services that have been provided in public hospitals or outpatient departments (which are funded by state and territory governments), and do not include services that patients choose to pay for without claiming from Medicare.
- Medicare rebates received by patients are generally only equal to 85% of the Schedule Fee for eligible services provided by medical specialists; ART clinicians can, and commonly do, charge patients fees that are higher than the Medicare schedule fees.
- Medicare does not cover any cost of ART treatment for women who donate their oocytes or embryos, which must be paid for by the oocyte and embryo recipients.
- Costs that are reimbursed to patients through Medicare safety nets are not included in MBS item data, as they are not based on claims for individual MBS items.

Infertility prevalence data have nearly always been collected only from women.[1,2] However, infertility prevalence necessarily includes infertility that is due to male factors. Most infertility prevalence data actually refers to couples even though such data are commonly reported in terms of prevalence in the female sample of survey participants, a significant proportion of whom are, in fact, probably not infertile.

Published infertility prevalence data should be examined with attention to the definition of infertility that has been used, and to characteristics of the survey sample, including the participants' age range, and inclusion or exclusion of the following:

- females who do not have sex with males, or who are voluntarily childless (i.e., with "untested" fertility)
- females who are surgically infertile
- females who have not been married or cohabiting for at least 12 months
- females who, during the relevant survey period, had not been having "regular" (usually not defined) intercourse, or who were using any contraceptive method (usually not specified in surveys as including avoidance of high-fertility periods or engaging in pre-ejaculation withdrawal)

## Table 2.1: Medicare (MBS) item numbers for assisted reproductive technology

| Item number | Description 2000 - 2009 | Description 2010 - 2011 |
|---|---|---|
| 13200 | Assisted reproductive services rendered during 1 treatment cycle, if the duration of the treatment cycle is at least 9 days | Assisted reproductive technologies super-ovulated treatment cycle proceeding to oocyte retrieval - services rendered during one treatment cycle. Excludes transfer of frozen embryos or donated embryos or ova. INITIAL cycle in a single calendar year |
| 13201 | | Assisted reproductive technologies super-ovulated treatment cycle proceeding to oocyte retrieval rendered during one treatment cycle Each cycle SUBSEQUENT to the first in a single calendar year |
| 13202 | | Assisted reproductive technologies super-ovulated treatment cycle that is cancelled before oocyte retrieval, rendered during one treatment cycle |
| 13203 | Ovulation monitoring services, for super-ovulated treatment cycles of less than 9 days duration and artificial insemination, rendered during 1 treatment cycle | Ovulation monitoring services, for artificial insemination |
| 13206 | Assisted reproductive services using unstimulated ovulation or ovulation stimulated only by clomiphene citrate, rendered during 1 treatment cycle | Assisted reproductive technologies treatment cycle using either the natural cycle or oral medication only to induce oocyte growth and development |
| 13209 | Planning and management by a specialist for the purpose of treatment by ART payable once only during one treatment cycle | Planning and management of a referred patient by a specialist for the purpose of treatment by assisted reproductive technologies |
| 13212 | Oocyte retrieval for the purposes of ART | Oocyte retrieval for the purposes of ART |
| 13215 | Transfer of embryos or both ova and sperm to the female reproductive system | Transfer of embryos or both ova and sperm to the female reproductive system |
| 13218 | Preparation and transfer of frozen or donated embryos or both ova and sperm, to the female reproductive system | Preparation of frozen or donated embryos or oocytes |
| 13221 | Preparation of semen for the purposes of ART | Preparation of semen for the purposes of artificial insemination |
| 13251 | Intracytoplasmic sperm injection for the purposes of ART (this item was added in May 2007) | Intracytoplasmic sperm injection for the purposes of ART |
| 13290 | Semen, collection of, from a patient with spinal injuries or medically induced impotence, for the purposes of analysis, storage or ART | Semen, collection of, from a patient with spinal injuries or medically induced impotence, for the purposes of analysis, storage or ART |
| 13292 | Semen, collection of, from a patient with spinal injuries or medically induced impotence, under general anaesthetic | Semen, collection of, from a patient with spinal injuries or medically induced impotence, under general anaesthetic |

Source: Medicare Benefits Schedule, Commonwealth of Australia

## Summary

Infertility is commonly defined in terms of inability to achieve a pregnancy during a period of 12 months or more of unprotected regular sexual intercourse. Published Australian studies found that 3.5% of women were "currently infertile", that 6% of women had never been pregnant despite trying, and that between 17% and 23% had ever been infertile during their lifetimes. Recent, accurate data regarding the prevalence of current infertility in Australia are lacking.

Australia has one of the highest rates of utilisation of assisted reproductive technology in the western world. Between 2002 and 2009, the numbers of autologous assisted reproductive technology (ART) cycles that were undertaken in Australia and New Zealand, and the consequent embryo transfer cycles, clinical pregnancies and live deliveries each approximately doubled.

In 2010, there were a total of 61,774 ART treatment cycles carried out in Australia (56,489, 91%) and New Zealand (5,285, 9%). These numbers of treatment cycles represented 12 cycles per 1,000 women of reproductive age (15–44 years) in Australia, and 5.8 cycles per 1,000 women of reproductive age in New Zealand. In 2010, 75% of ART treatment cycles were undertaken by women who had no children. Nearly all (95%) treatment cycles in 2010 were autologous cycles. The remaining cycles were comprised of cycles in which women either received oocytes (2.9%) or embryos (0.5%) from a donor, donated their oocytes (1.5%), or undertook surrogacy cycles (0.2%).

In 2010, the total number of live deliveries in Australia and New Zealand decreased by 8% in comparison with 2009. In Australia specifically, the number of live babies born through ART reduced from 12,019 in 2009 to 10,897 in 2010 (a reduction of 1,122 live babies or 9%), which was 3.6% of all Australian babies born in 2010. This was more than double the proportion of ART-related Australian births in 1998 (1.5%), and was relatively high in comparison with other western countries.

Between 2000 and 2009, the number of claims for ART-related Medicare items approximately doubled. Over the same period, the total Medicare benefits that were paid for ART-related Medicare Benefits Schedule (MBS) items increased nearly six-fold from $46 million in 2002 to $255 million in 2009 (unadjusted for inflation). Following a change in Medicare funding policy regarding ART treatment that was implemented from January 2010, total Medicare payments for relevant MBS items reduced to $204 million in 2010, and then increased again to $217 million in 2011.

## 2.1 Introduction

### 2.1.1 Prevalence of infertility

To provide a context in which to examine utilisation of ART treatments, it is useful to consider the concept of infertility. Causes of infertility among females include ovulation disorders, blockage of the fallopian tubes (tubal factors), endometriosis, oocyte aging, hormonal or genetic problems, and certain current or past sexually transmitted and other diseases and infections. Causes of infertility among males include low sperm count, reduced sperm motility, abnormal sperm morphology (shape), impaired genetic integrity of sperm and certain current or past sexually transmitted and other diseases and infections.[3-10]

The term "current infertility" refers to a specified period of time (e.g., 12 months) immediately prior to the date when relevant information is collected. "Lifetime infertility" means having ever failed to conceive a pregnancy during a specified period of time (e.g., 12 months) of actively trying to conceive. It has been rare for a survey to measure both current and lifetime prevalence of infertility; usually only lifetime infertility has been measured.

"Infertility" has been defined differently by relevant organisations and in various published studies.[2] Differences between definitions include reference to "conceiving" versus "achieving a clinical pregnancy" versus "achieving a successful pregnancy" versus "carrying a pregnancy to term"; whether the relevant time period for trying to achieve a pregnancy should be 24 months or 12 months for all women or should be 6 months for women aged under 35 years; and whether there needs to be no evidence of a known cause of infertility. It is important to note that infertility has commonly been defined in terms of inability to become pregnant rather than inability to achieve a live birth. Appendix 1 shows infertility definitions that have been published by relevant organisations and findings of a range of infertility prevalence surveys.

"Current" prevalence of infertility has generally been lower (1.6% - 14%) than "lifetime" prevalence (9% - 25%). Two studies that measured both of these variables reported 3.4% and 3.5% current infertility versus 25% and 19% lifetime infertility, respectively.[11,12]

Three studies that used both the 12 month and 24 month timeframes found that infertility prevalence based on 12 months of trying to conceive (16%, 17%, 18%) was higher than prevalence based on 24 months of trying to conceive (13%, 12%, 9%, respectively).[13-15]

Three surveys of women who had ever tried to conceive or had been pregnant found that only 2.4% to 5.9% of the survey participants had never been pregnant.[15-17]

It can be concluded from the findings of published studies that:

- Many women of childbearing age who satisfy criteria for having been infertile at some time during their lives will not satisfy the criteria for current infertility today.
- A significant proportion of women who fail to become pregnant during a 12 month period of trying to do so will succeed if they keep trying for longer, even without ART treatment.
- Although the term "infertile" is generally used, it is potentially misleading, and "subfertile" is probably more informative.

### 2.1.2 Assisted reproductive technology (ART) treatment

Assisted reproductive technology (ART) is a set of clinical treatments and laboratory procedures that involves in vitro (outside of the body) handling of human oocytes (eggs), sperm and embryos in order to establish a pregnancy for women and their partners who have been unable to do so "naturally". An ART cycle commonly involves the following steps:

1. Controlled ovarian hyperstimulation during which follicle stimulating hormone is administered to a woman to induce maturation of multiple oocytes.
2. Oocyte pick-up then typically involves up to 20 mature oocytes being extracted from ovarian follicles under anaesthesia, and being placed in aculturing medium.

3. Then either:
   a. Incubating the collected oocytes with a quantity of sperm in order to achieve fertilisation; or
   b. Injecting a single selected sperm directly into each oocyte (ICSI).
4. If fertilisation is successful, the fertilised oocytes are cultured to form cleavage stage embryos (6–8 cells), usually in three days, or blastocysts (60–100 cells) usually in five days.
5. One or more embryos (either as cleavage embryos or blastocysts) are then transferred into the woman's uterus. This is known as a fresh cycle.
6. Embryos that are not transferred in the initial fresh treatment cycle can be frozen, stored, and subsequently thawed and transferred. This is known as a thaw cycle.
7. If one or more embryos implant in the recipient woman's uterus, the cycle may progress to a clinical pregnancy, and may then progress further to delivery of one or more live babies.

### 2.1.3 ART process and outcomes - international comparisons

With 12 assisted reproductive technology (ART) cycles being undertaken per thousand women aged 15-44 years, and 3.6% of babies being born through ART, Australia has one of the highest ART service activity levels, and one of the highest proportions of ART infants born in the western world (Table 2.2).

**Table 2.2: ART treatment activity and outcomes in selected countries**

| Country | Number of cycles | Number of cycles per thousand women 15-45 | ART infants per national births |
|---|---|---|---|
| USA | 146,224 | 2.4 * | 1.4% |
| United Kingdom | 35,922 | 3.7 † | 1.8% |
| Italy | 40,005 | 3.8 † | 1.2% |
| Germany | 45,182 | 3.9 † | 1.5% |
| France | 67,572 | 5.4 † | 1.8% |
| New Zealand | 5,285 | 5.8 ‡ | 2.0% |
| Sweden | 10,191 | 8.9 † | 3.1% |
| Australia | 56,489 | 12.0 ‡ | 3.6% |
| Belgium | 24,459 | 12.2 † | 4.1% |
| Denmark | 11,035 | 14.1 † | 4.9% |

Note: * Based on US women aged 15-44 years in 2009.[18]
† Based on women aged 15-45 years in 2007.[19]
‡ Based on women aged 15-44 years in 2010.[20,21]

Table 2.3 shows process and outcome data that were collected in 2010 by the US Centers for Disease Control and Prevention (CDC) from 443 ART clinics and which included 97% of ART cycles undertaken in the USA. Both USA data and Australia and New Zealand data show a decline in live delivery rate as female age increased that was more pronounced in fresh cycles than in thaw cycles. Clinics in the USA achieved higher crude rates of live delivery than Australian and New Zealand clinics. The data are not adjusted for the number of embryos transferred; and may be in part explained by US clinics commonly transferring more embryos per cycle (averages of two to three embryos) than Australian and New Zealand clinics. In 2010, 70% of Australian and New Zealand embryo transfers involved one embryo, 29% involved two embryos, and 1% involved three or more embryos (i.e. an average of approximately 1.3 embryos transferred per cycle).

**Table 2.3: Live birth rates per 100 cycles at ART clinics in the USA and Australia, 2010**

| USA | | | Australia | |
|---|---|---|---|---|
| | <35 years | 45+ years | <35 years | 45+ years |
| Live birth rate in autologous fresh cycles | 42% | 1% | 28% | 0% |
| Live birth rate in autologous thaw cycles | 38% | 13% | 22% | 8% |

Sources: USA - http://apps.nccd.cdc.gov/art/Apps/NationalSummaryReport.aspx
Australia - Macaldowie A, Wang YA, Chambers GM and Sullivan EA 2010. Assisted Reproductive Technology in Australia and New Zealand 2012 Assisted Reproduction Technology Series no. 16. Cat. no. PER 55. Canberra: AIHW

Most published studies[22] and the Australian Institute of Health and Welfare's National Perinatal Epidemiology and Statistics Unit have reported ART treatment outcomes in terms of rates per number of treatment cycles (e.g., live birth rates). However, cumulative outcomes over specific number of cycles, or over an entire ART treatment history, are probably more useful to couples who wish to make well-informed decisions about either undertaking, or continuing with, ART treatment.

Malizia, Hacker, & Penzias[23] analysed up to six IVF cycles for each of 6,164 American women. Their average age at the start of IVF treatment was 36 years and an average of between 2.3 and 2.8 embryos were transferred per cycle. Malizia et al. 'conservatively' estimated cumulative live birth rates (CLBR) of 25% after one cycle, 45% after three cycles, and 51% after six cycles. For women younger than 35 years, the CLBR was 33% after one cycle, 59% after three cycles, and 65% after six cycles, whereas for women older than 40 years, the rates were 9%, 19%, and 23%, respectively.[24] Gnoth et al. (2011) studied 3,011 German patients who undertook a total of 8,048 cycles, with an average of 2.1 cycles per woman (range 1 to 22), and an average of two embryos being transferred per cycle. The CLBR from one fresh cycle and all of its subsequent thaw cycles was 33%. The CLBRs were 52% after three cycles, and 72% after six cycles. Stewart[25] studied 5,117 Australian women who started ART treatment between 1993 and 2002, at an average age of 34 years, and who undertook an average of three ART cycles. The average number of embryos transferred per cycle was not reported. In a "conservative" analysis, the CLBR increased for at least the first five cycles. Luke et al.[26] analysed data from most American women who undertook ART treatment from 2004 to 2008, and found that live birth rates increased very little beyond the third ART cycle (Table 2.4). This may have been due to achieving most of the available success in the initial cycles by transferring multiple embryos. Luke et al. did not report the average number of embryos that were transferred per cycle. However, the US Centers for Disease Control and Prevention[27] reported that only 11% of embryo transfers carried out in the USA in 2006 involved a single embryo and 43% involved three or more embryos.

**Table 2.4: "Conservative" cumulative live birth rates (CLBR) per 100 cycles using autologous oocytes by female age, USA, 2004 to 2008**

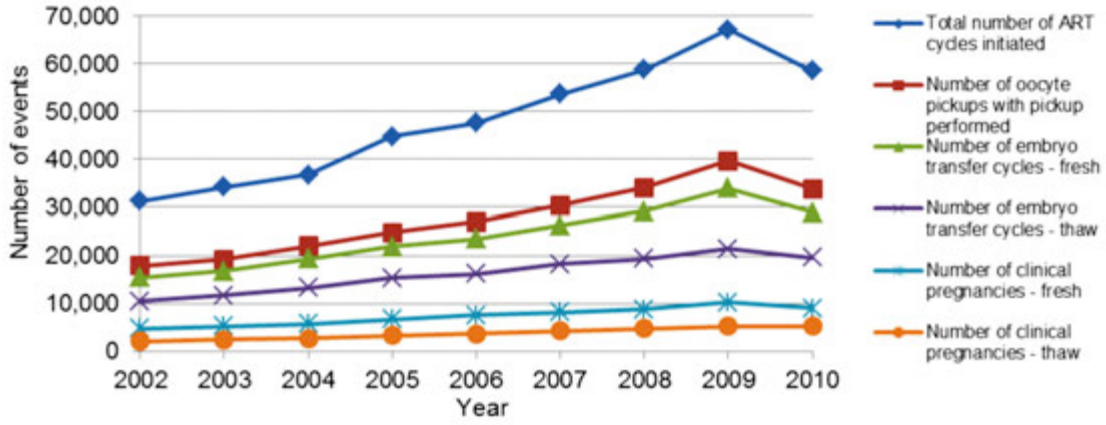
| Cycle | <31 years | 31-34 years | 35-37 years | 38-40 years | 41-42 years | >42 years |
|---|---|---|---|---|---|---|
| 1 | 43% | 39% | 32% | 22% | 11% | 4% |
| 2 | 57% | 54% | 45% | 31% | 16% | 6% |
| 3 | 63% | 60% | 50% | 35% | 19% | 7% |
| 4 | 66% | 63% | 52% | 37% | 19% | 7% |
| 5 | 67% | 64% | 53% | 37% | 20% | 7% |

Source: Luke B, Brown MB, Wantman E, Lederman A, Gibbons W, Schattman GL, et al. Cumulative birth rates with linked assisted reproductive technology cycles. N Engl J Med 2012; 366(26):2483-91

## 2.2 Autologous ART process and outcomes in Australia and New Zealand

Figure 2.1 displays process and outcome data relating to autologous fresh and thaw ART cycles that were undertaken between 2002 and 2010. The number of autologous ART cycles that were carried out in Australia and New Zealand increased by a factor of 2.2, from 31,253 in 2002 to 67,229 in 2009, an average increase of 5,100 additional cycles per year. The increase over time in the number of cycles undertaken was paralleled by very similar increases in the number of oocyte pickups (increased by a factor of 2.2), the number of fresh and thaw embryo transfer cycles (increased by 2.1), and the number of clinical pregnancies that were achieved (increased by 2.3). However, the clinical pregnancy rate in autologous cycles increased only slightly over time, from 22% in 2002 to 23% and 24% in 2009 and 2010, respectively.

**Figure 2.1: Process and outcomes of autologous fresh and thaw ART cycles, Australia and New Zealand, 2002 to 2010**



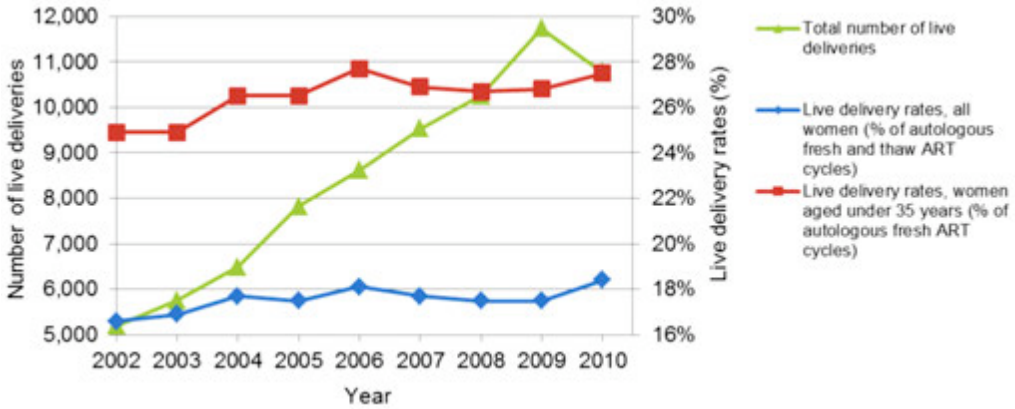

Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

Figure 2.2 displays data regarding live deliveries achieved by women through autologous fresh and thaw ART cycles between 2002 and 2010. Between 2002 and 2009, the total number of live deliveries achieved increased from 5,194 to 11,732 (by a factor of 2.3), at an average of 930 extra live deliveries per year. In 2010, the total number of live deliveries achieved through autologous cycles decreased by 962 to 10,770, an 8% decrease in comparison with 2009.

In 2010, the total number of live deliveries decreased by 962 to 10,770, an 8% decrease in comparison with 2009. In Australia, 12,019 live babies were born through ART in 2009, and approximately 10,897 live babies were born in 2010, a reduction of 1,122 live babies or 9%.

The live delivery rate achieved through all autologous fresh and thaw ART cycles increased slightly from 16.6% in 2002 to 18.4% in 2010, an increase of 1.8% at an average rate of increase of 0.2% per year. The live delivery rate achieved through fresh cycles undertaken by women aged under 35 years was consistently 8% to 9% higher in each year than the rate achieved by all women.

**Figure 2.2: Live deliveries from autologous ART cycles that were initiated by all women, and by women aged under 35 years, Australia and New Zealand, 2002 to 2010**




Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

Table 2.5 shows the live delivery rates that were achieved by Australian and New Zealand ART clinics, grouped into quartiles, between 2002 and 2010 for women aged under 35 years who undertook autologous fresh cycles (i.e., cycles involving women with a relatively good prognosis). Overall live delivery rates improved slightly over time, from 24.9% in 2002 to 26.8% and 27.5% in 2009 and 2010 respectively, representing an average increase of 0.3% per year. These data show a wide range in the live delivery rates achieved by various ART clinics. The wide range does not appear to have narrowed over time.

**Table 2.5: Live delivery rates achieved by ART clinics grouped into quartile groups - autologous fresh cycles that were initiated by women aged under 35 years, Australia and New Zealand, 2002 to 2010**

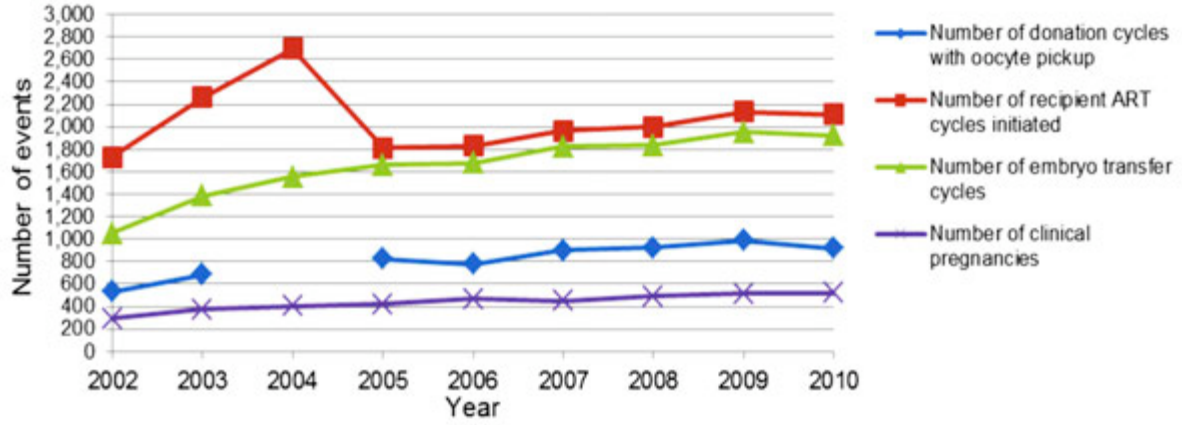
| Year | Mean | 1st quartile | 2nd quartile | 3rd quartile | 4th quartile |
|---|---|---|---|---|---|
| 2002 | 24.9% | 40.7 - 30.1% | 30.0 - 23.0% | 22.9 - 18.5% | < 18.5% |
| 2003 | 24.9% | 40.9 - 28.0% | 27.9 - 24.3% | 24.2 - 22.1% | < 22.1% |
| 2009 | 26.8% | 33.5 - 29.1% | 29.0 - 26.0% | 25.9 - 19.8% | 19.7 - 5.5% |
| 2010 | 27.5% | 39.4 - 32.1% | 32.0 - 26.3% | 26.2 - 18.9% | 18.8 - 5.7% |

Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8, 9, 15, 16. Canberra: AIHW

## 2.3 Recipient and donor ART process and outcomes in Australia and New Zealand

Figure 2.3 shows process and outcome data relating to oocyte and embryo donor and recipient cycles undertaken between 2002 and 2010. The number of oocyte donation cycles undertaken increased gradually over time, from 531 in 2002 to 919 in 2010. The number of oocyte and embryo recipient cycles undertaken increased from 1,733 in 2002 to 2,692 in 2004, reduced to 1,811 in 2005, and thereafter increased gradually to 2,113 in 2010. Over that period of time, the number of recipient embryo transfer cycles increased from 1,052 to 1,923. The average number of embryo transfer cycles that followed each oocyte donation changed little over time, having increased from 2.0 in 2002 to 2.1 in 2010. The number of clinical pregnancies achieved from recipient cycles increased from 294 to 518. The average clinical pregnancy rate achieved in recipient cycles increased from 17% in 2002 to 25% in 2010.

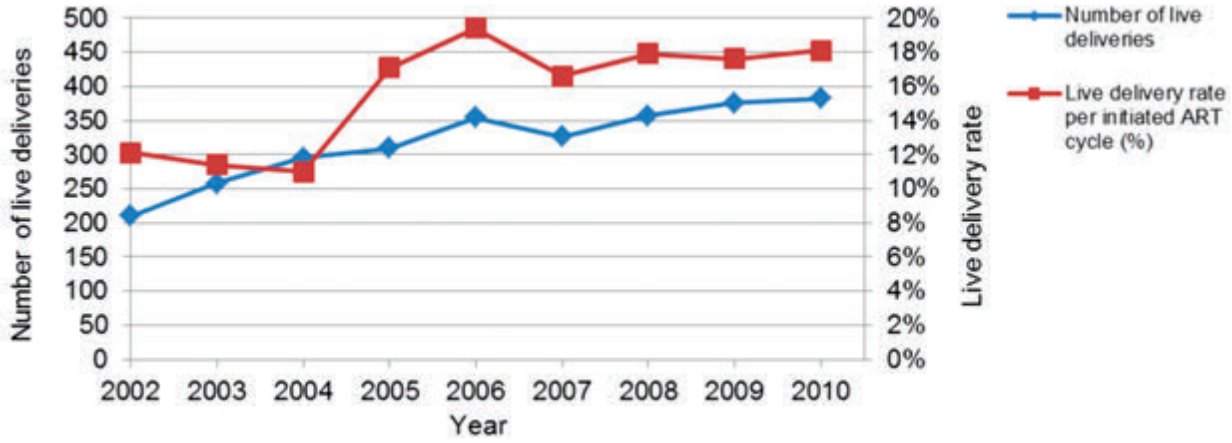
**Figure 2.3: Process and outcomes of oocyte and embryo recipient cycles and donation cycles, Australia and New Zealand, 2002 to 2010**




Note: Some relevant data were not reported by the NPESU for 2004
Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

Figure 2.4 shows the number of live deliveries and the live delivery rates that were achieved by women who were recipients of donated oocytes or embryos between 2002 and 2010. Over that period of time, the number of live deliveries increased from 210 to 382. The live delivery rate achieved in recipient cycles increased from 12% in 2002 to 19% in 2006, and thereafter remained around 17% to 18%.

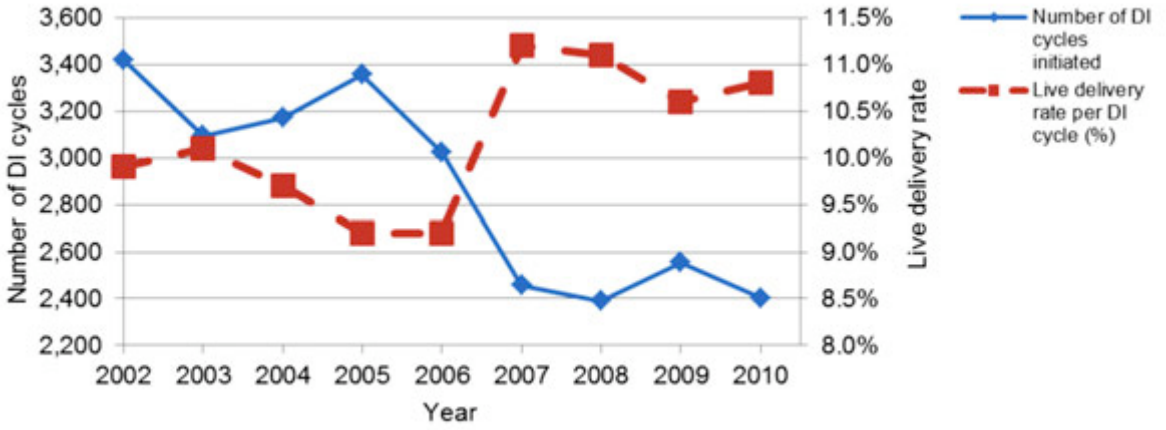
**Figure 2.4: Process and outcomes of oocyte and embryo recipient cycles, Australia and New Zealand, 2002 to 2010**




Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

The annual number of sperm donor insemination cycles that were carried out reduced from 3,419 in 2002 to 2,405 in 2010 (Figure 2.5). The live delivery rate that was achieved from those cycles fluctuated between 9% and 11% over time.

**Figure 2.5: Outcomes of sperm donor insemination (DI) ART cycles, Australia and New Zealand, 2002 to 2010**

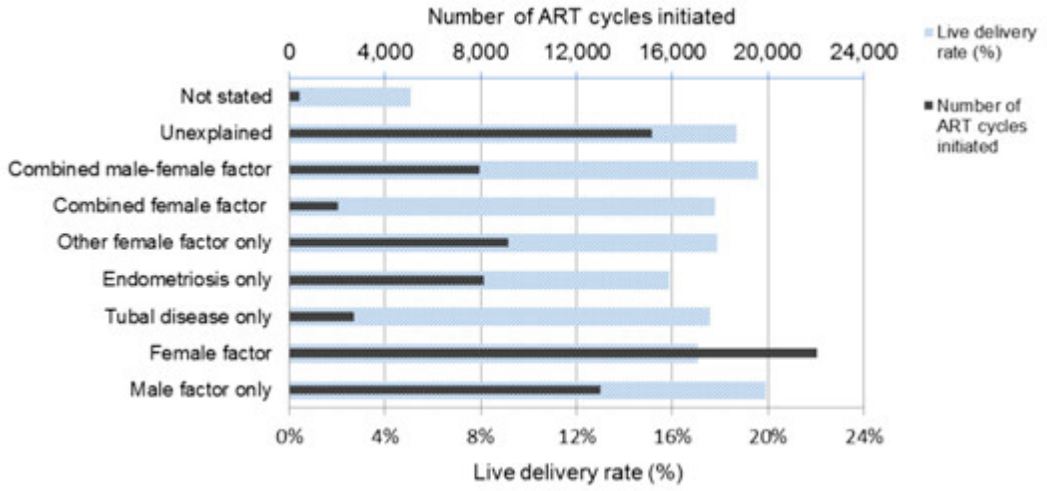



Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

## 2.4 Number of ART cycles undertaken by couples with various causes of infertility, and associated live delivery rates in Australia and New Zealand

Figure 2.6 shows data regarding the number of ART cycles undertaken and their outcomes, given various recorded causes of infertility in 2010. In autologous cycles undertaken, couples with male factor or combined male-female factors as the identified cause of infertility had the highest live delivery rates per cycle (19.7%), followed by couples with unexplained infertility (18.7%), and then by couples with female factor infertility (17.3%). Within female factor infertility, women with endometriosis-only and tubal disease-only mediated infertility had live delivery rates per initiated cycle of 15.4% and 18.3% respectively. The live delivery rates that were achieved by ART treatment differed little between the various cause-of-infertility categories.

**Figure 2.6: Number of ART cycles undertaken and live delivery rates associated with various causes of infertility, autologous fresh and thaw cycles, Australia and New Zealand, 2010**




Note: Male factor includes low sperm count, low sperm motility, abnormal sperm shape, and impaired genetic integrity of sperm
Endometriosis involves presence of tissue similar to the lining of the uterus (known as endometrial tissue) in abnormal locations, e.g., the ovaries
Tubal disease means blocking or damage of the woman's fallopian tubes that interferes with fertilisation of eggs or movement of embryos to the uterus
Other female factors include abnormal oocyte production, lack of oocyte production, and disorders of the uterus
Unexplained means that no specific cause of infertility was found in the male or the female

Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

For comparison, Table 2.6 shows live birth rates achieved in fresh autologous cycles by ART clinics in the USA in 2009 in given various causes of infertility (Centers for Disease Control and Prevention, 2011), which are not categorised in the same way as they are in Australia and New Zealand. It is noteworthy that the US data shows a wider range of live birth rates between the various causes of infertility.

**Table 2.6: Percentages of autologous fresh cycles that resulted in live births in ART clinics in the USA in 2009 given various causes of infertility**

| Diagnosed cause of infertility | Percentage of live births |
|---|---|
| Ovulatory dysfunction | 40% |
| Male factor | 38% |
| Endometriosis | 35% |
| Unexplained cause | 34% |
| Tubal factor | 32% |
| Multiple factors, female + male | 29% |
| Multiple factors, female only | 23% |
| Diminished ovarian reserve | 15% |

Source: Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted Reproductive Technology. 2009 Assisted Reproductive Technology Success Rates: National Summary and Fertility Reports. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, 2011

## 2.5 ART process and outcomes in female age groups in Australia and New Zealand

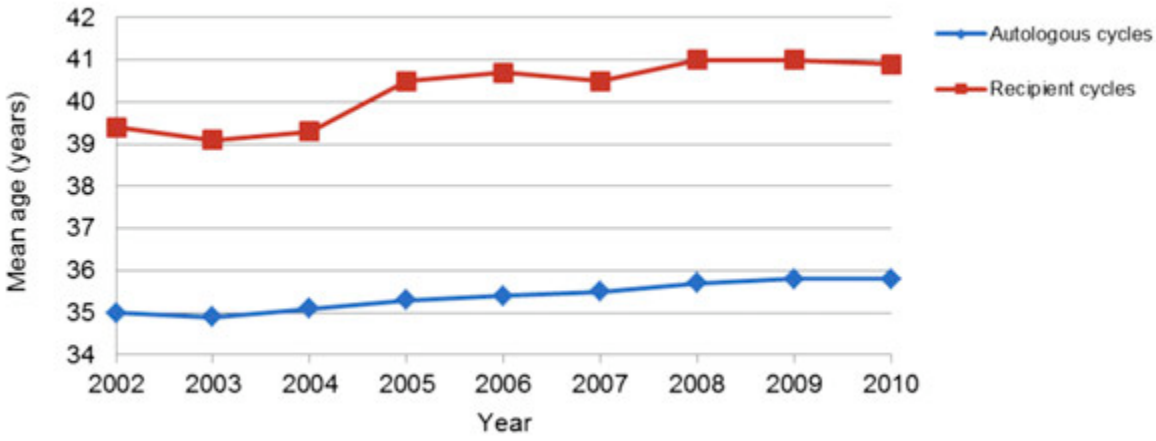
Women throughout the world have been increasingly delaying childbearing in the past several decades. Some examples that were included in a review by Mills et al.[28] are shown in Table 2.7. Similarly to the general trend in society, the average age of women who undertook autologous ART cycles in Australia and New Zealand increased from 35.0 in 2002 to 35.8 in 2010, and the average age of women who undertook oocyte and embryo recipient ART cycles increased from 39.4 in 2002 to 40.9 in 2010. The average age of women who donated oocytes or embryos in 2010 was 33.0 years (Figure 2.7). The review by Mills et al.[28] and a meta-analysis of relevant studies carried out by Cooke, Mills, and Lavender[29] identified many reasons why couples delay childbearing, including availability of efficient and reliable contraceptives, women's' changing social role and competing educational and career aspirations, women's' desire for financial security and the support of a stable relationship with a suitable partner, desire to experience "all that life has to offer" before having children, and a reduction over time in desired family size, commonly to include two children.

**Table 2.7: Mean age of women at the birth of their first child in selected OECD countries**

| Country | 1970 | 2008 |
|---|---|---|
| Denmark | 23.8 | 28.4 |
| Germany | 24.0 | 28.5 |
| Greece | 25.0 | 28.7 |
| France | 24.4 | 27.8 |
| Japan | 25.6 | 28.9 |
| United States | 24.1 | 25.6 |

Source: Mills M, Rindfuss RR, McDonald P, Velde E. Why do people postpone parenthood? Reasons and social policy incentives. Hum Reprod Update 2011; 17(6):848-860

**Figure 2.7: Average age (years) of females who undertook autologous and recipient ART cycles, Australia and New Zealand, 2002 to 2010**




Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

Almost one-quarter (24%) of the women who undertook autologous ART cycles in 2010 were aged 40 years or older, compared with only 19% in 2002 (Table 2.8). In 2010, two-thirds (65%) of the women who undertook ART treatment using donor oocytes or embryos were aged 40 years or older, compared with only 37% in 2002.

**Table 2.8: Numbers of ART cycles undertaken by women in various age groups, Australia and New Zealand, 2002 and 2010**

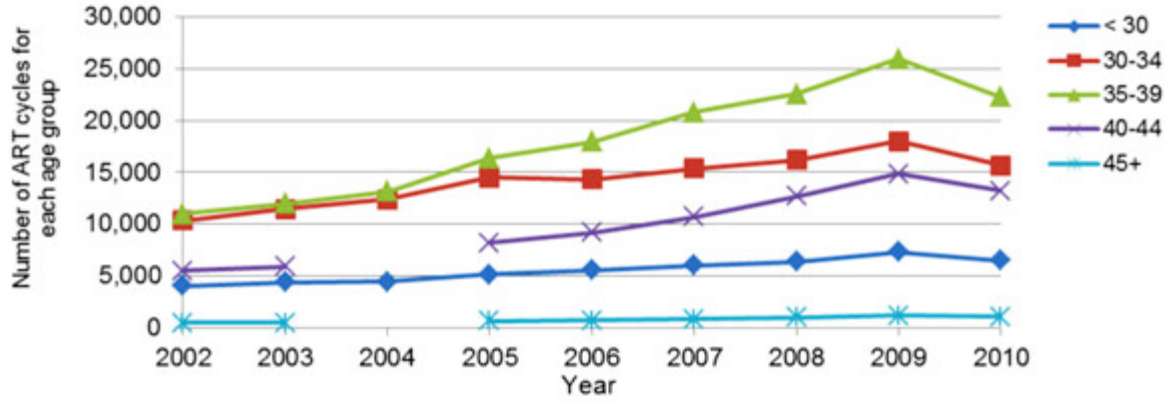
| | 2002 | | 2010 | |
|---|---|---|---|---|
| | **Autologous cycles** | | | |
| | Number of cycles | % of total cycles | Number of cycles | % of total cycles |
| < 35 years | 14,350 | 46% | 22,110 | 38% |
| 35-39 years | 10,949 | 35% | 22,224 | 38% |
| 40-44 years | 5,483 | 18% | 13,194 | 23% |
| > 44 years | 439 | 1% | 1,046 | 2% |
| Total | 31,253 | | 58,574 | |
| | **Oocyte and embryo recipient cycles** | | | |
| | Number of cycles | % of total cyclesNumber of cycles | | % of total cycles |
| < 35 years | 273 | 16% | 283 | 13% |
| 35-39 years | 316 | 18% | 462 | 22% |
| 40-44 years | 382 | 22% | 790 | 38% |
| > 44 years | 262 | 15% | 578 | 27% |
| Total | 1,733 | | 2,113 | |

Note: Total includes cases with age not recorded
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 8 (2004) and 16 (2012). Canberra: AIHW

## 2.5.1 Process and outcomes of autologous cycles in Australia and New Zealand by female age

Figure 2.8 displays data regarding the number of autologous cycles undertaken between 2002 and 2010. The number of cycles undertaken by women in every age group increased between 2002 and 2009, and then decreased in 2010. Between 2002 and 2009, the number of autologous ART cycles undertaken by women aged 45 or more increased by a factor of 2.6, from 439 to 1,141. The number of cycles undertaken by women aged 40-44 increased the most of any age group, by a factor of 2.7 from 5,483 cycles in 2002 to 14,853 cycles in 2009. The number of cycles undertaken by women aged 35-39 years also increased markedly, by a factor of 2.4 from 10,949 in 2002 to 25,953 in 2009. This was the age group that undertook the largest number of autologous cycles in every year. The number of cycles undertaken by women aged 30-34 increased less steeply, by a factor or 1.7 from 10,354 in 2002 to 17,979 in 2009, as did the number of cycles undertaken by women aged under 30 years, by a factor of 1.8 from 3,996 in 2002 to 7,303 in 2009.

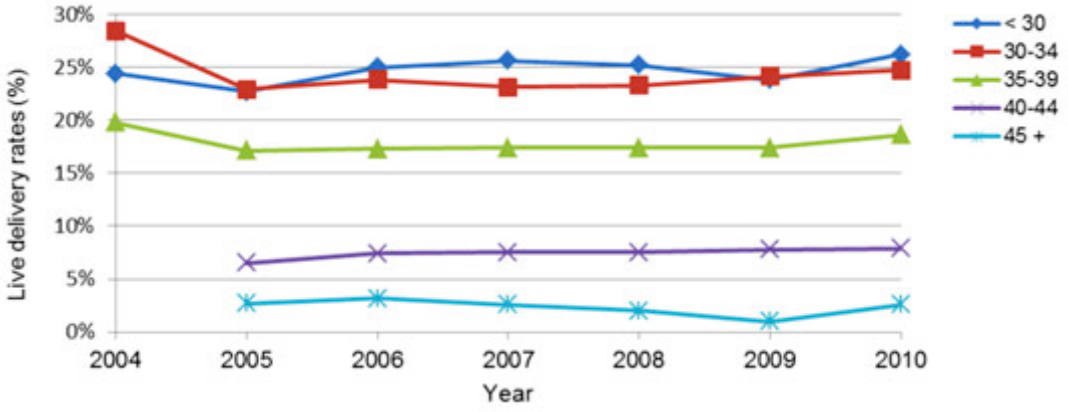
**Figure 2.8: Number of autologous fresh and thaw ART cycles initiated by female age group, Australia and New Zealand, 2002 to 2010**




Note: Some relevant data were not reported by the NPESU for 2004
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2002 to 2010

The live delivery rates achieved through autologous cycles by women in various age groups remained fairly constant over time in each age group (Figure 2.9). Live delivery rates were generally highest or equal-highest for women aged under 30 years (23 - 26%), and were consistently much lower for women aged 40-44 years (7 - 8%), and women aged more than 44 years (1 - 3%).

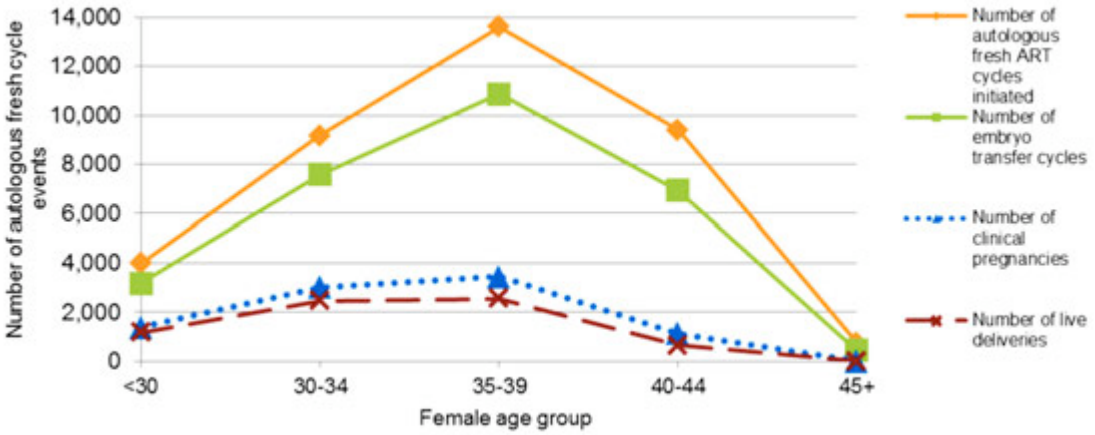
**Figure 2.9: Live delivery rates per 100 autologous fresh and thaw ART cycles (%), by female age group, Australia and New Zealand, 2004 to 2010**




Note: Some relevant data were not reported by the NPESU for 2004
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 10-16. Canberra: AIHW, 2004 to 2012

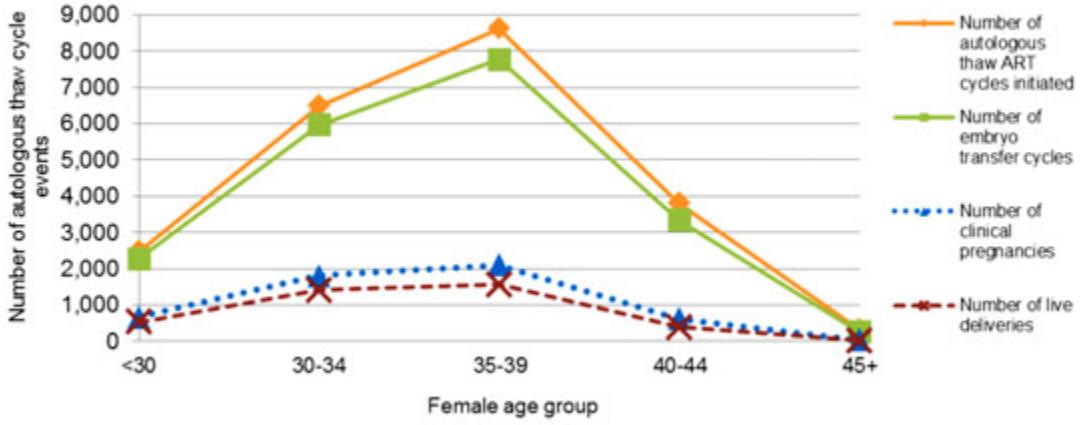
Figures 2.10 and 2.11 display data regarding process and outcomes of autologous fresh and thaw ART cycles respectively, for women in various age groups in 2010. Most of both types of autologous cycles were undertaken by women who were aged between 30 and 44 years, particularly women aged 35-39 years. A greater proportion of thaw cycles than fresh cycles proceeded to embryo transfer. Most clinical pregnancies and live deliveries that resulted from both types of cycle were achieved by women aged 30-39 years, and very few were achieved by women aged 45 or more.

**Figure 2.10: ART process and outcomes for autologous fresh cycles by female age group, Australia and New Zealand, 2010**




Source: Macaldowie A, Wang YA, Chambers GM, and Sullivan EA 2012. Assisted Reproductive Technology in Australia and New Zealand 2010 Assisted Reproduction Technology Series no. 16. Cat. no. PER 55. Canberra: AIHW

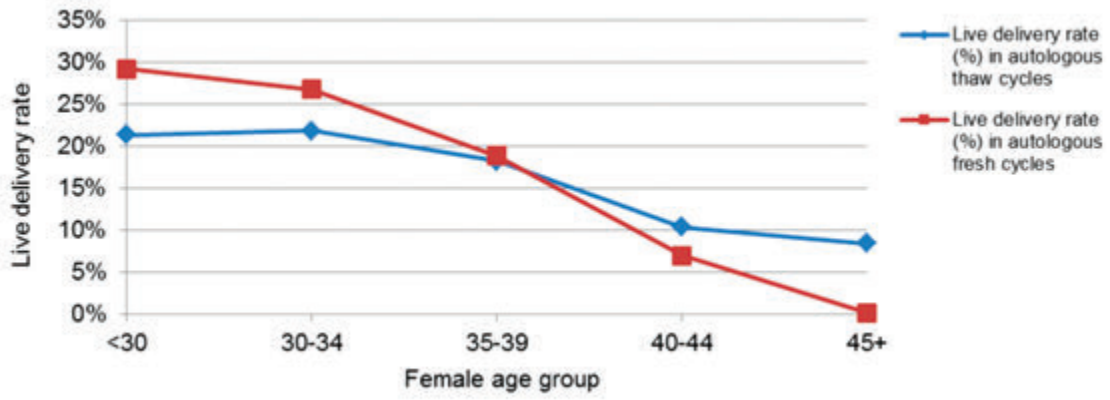
**Figure 2.11: ART process and outcomes for autologous thaw cycles by female age group, Australia and New Zealand, 2010**




Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

As shown in Figure 2.12, live delivery rates achieved through autologous fresh cycles in 2010 decreased with increasing female age, from 29% among women aged under 30 years to 0.1% among women aged 45 years or more. Live delivery rates achieved through autologous thaw cycles also decreased with increasing female age, from 21% among women aged under 30 years to 8% among women aged 45 years or more. Live delivery rates were higher in fresh cycles than in thaw cycles for women aged under 35 years, but were higher in thaw cycles for women aged 40-44 years and for women aged more than 45 years.

**Figure 2.12: Live delivery rates (%) per 100 autologous fresh and thaw cycles by female age group, Australia and New Zealand, 2010**

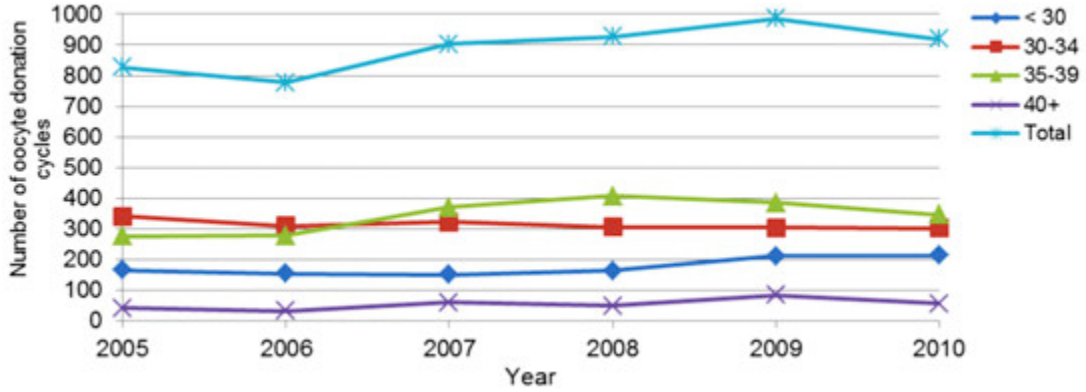



Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

## 2.5.2 Process and outcomes of donor and recipient cycles in Australia and New Zealand by female age

Figure 2.13 shows the numbers of cycles in which donated oocytes were collected in each year between 2005 and 2010. The total number of collections of donated oocytes increased from 531 in 2002 to 919 in 2010, with an average of 59 additional oocyte collections per year. Since 2005, the increase was due mostly to an increased number of oocyte collections from donors aged 35-39 years and, to a lesser extent, from donors aged under 30 years. In 2010, only 56% of oocyte donation cycles were undertaken by women aged 34 years or less, 38% of donations were from women aged 35-39, and 6% were from women aged 40 years or more. It should be noted, as shown earlier in Figure 2.10, that live delivery rates in autologous cycles fall after female age of 34 years.

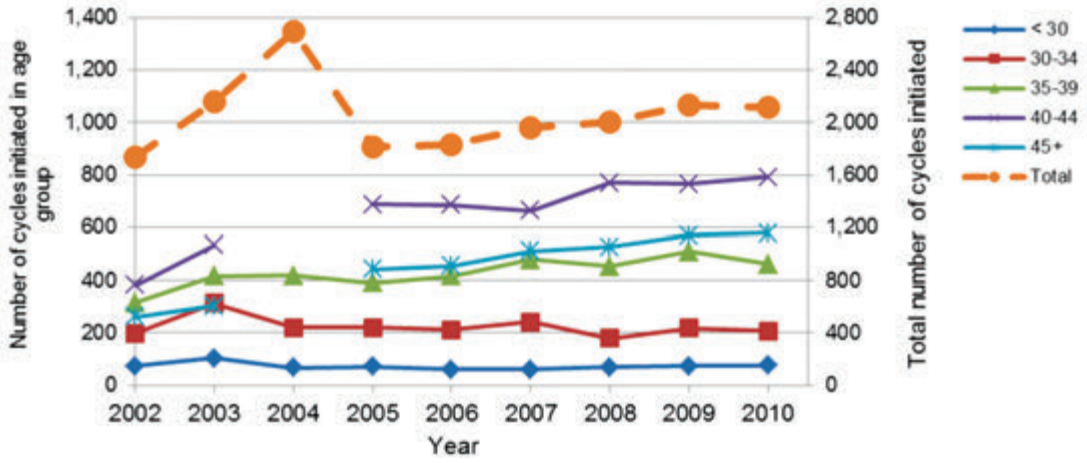
**Figure 2.13: Number of oocyte donation cycles with oocyte collection performed by donor female age group, Australia and New Zealand, 2002 to 2010**




Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 11-16. Canberra: AIHW, 2007 to 2012

Figure 2.14 shows numbers of oocyte and embryo recipient ART cycles that were undertaken by women in various age groups between 2002 and 2010. The number of cycles undertaken increased to a peak of 2,692 in 2004, reduced to 1,811 in 2005, and thereafter increased gradually to 2,113 in 2010, with an average of 71 additional cycles per year from 2005 onwards. Between 2002 and 2010, the numbers of recipient cycles undertaken increased most among women aged 40-44 years (from 382 to 790), and women aged 45 years or older (from 262 to 578).

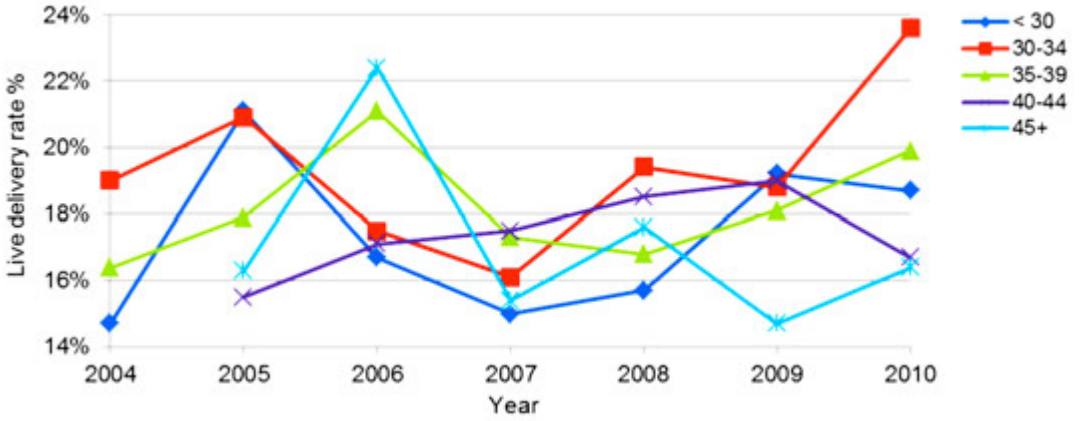
**Figure 2.14: Number of ART cycles initiated by oocyte and embryo recipients by recipient female age group, Australia and New Zealand, 2002 to 2010**




Note: Some relevant data were not reported by the NPESU for 2004
Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

Figure 2.15 shows the live delivery rates achieved by oocyte and embryo recipients from 2004 to 2010, which were fairly similar in each age group. The live delivery rates fluctuated over time rather than following a steady trend. For example, the rates among recipient women aged 45 years or more ranged from 15 to 22%.

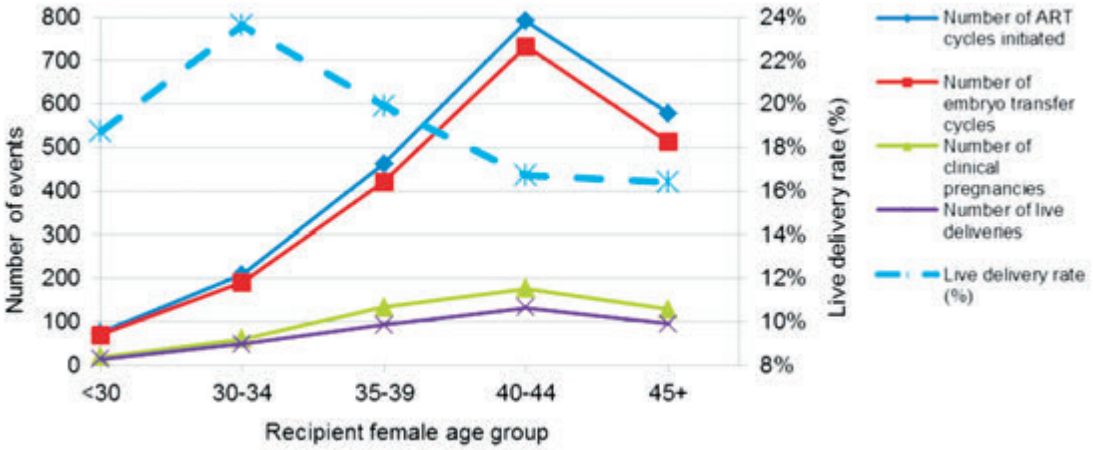
**Figure 2.15: Live delivery rates per 100 oocyte and embryo recipient ART cycles by recipient female age group, Australia and New Zealand, 2004 to 2010**




Note: Some relevant data were not reported by the NPESU for 2004
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 10-16. Canberra: AIHW, 2004 to 2012

Figure 2.16 shows the number of oocyte and embryo recipient cycles undertaken by women in various age groups in 2010. The number of recipient cycles increased markedly with recipient age, from 75 cycles by women aged under 30 years to 790 cycles (ten times more) by women aged 40-44 years. The number of live deliveries increased more gradually with age, from 18 deliveries for women aged under 30, peaking at 132 deliveries (seven times more) for women aged 40-44 years. The overall live delivery rate as a proportion of initiated cycles was 18%, and was highest among recipients aged 30-34 (24%), reducing with recipient age to 20%, 17% and 16% among recipients aged 35-35, 40-44, and 45 years or more, respectively.

**Figure 2.16: Outcomes of ART for oocyte and embryo recipients by recipient female age group, fresh and thaw cycles combined, Australia and New Zealand, 2010**




Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

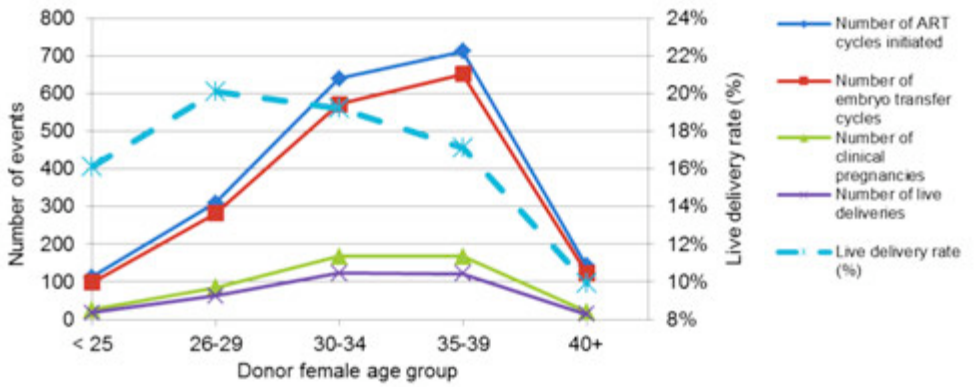
Figure 2.17 shows process and outcome data regarding oocyte and embryo donation and recipient cycles that were undertaken in 2010. The number of recipient cycles undertaken was highest based on donations from donors aged 35-39 years (712 cycles), followed by donors aged 30-34 years (639 cycles). Relatively few recipient cycles were undertaken based on donations by women aged under 25 years (112 cycles), or more than 39 years (142 cycles).

As was the case with autologous cycles, the live delivery rate from recipient cycles was associated with donors' age. The live delivery rate was maximal (20%) from donors who were aged 26-29 years, reducing to its minimum of 10%

from donors who were aged more than 39 years. The association between live delivery rate and donor age was very similar to the association that was evident in autologous thaw cycles, with a maximum rate of 22% for 30-34 years old women, reducing to rates of 10 and 8% for women aged 40-44 years, and more than 44 years, respectively.

**Figure 2.17: Outcomes of ART for oocyte and embryo recipients by donor female age group, fresh and thaw cycles combined, Australia and New Zealand, 2010**

Figure 2.17: Outcomes of ART for oocyte and embryo recipients by donor female age group, fresh and thaw cycles combined, Australia and New Zealand, 2010

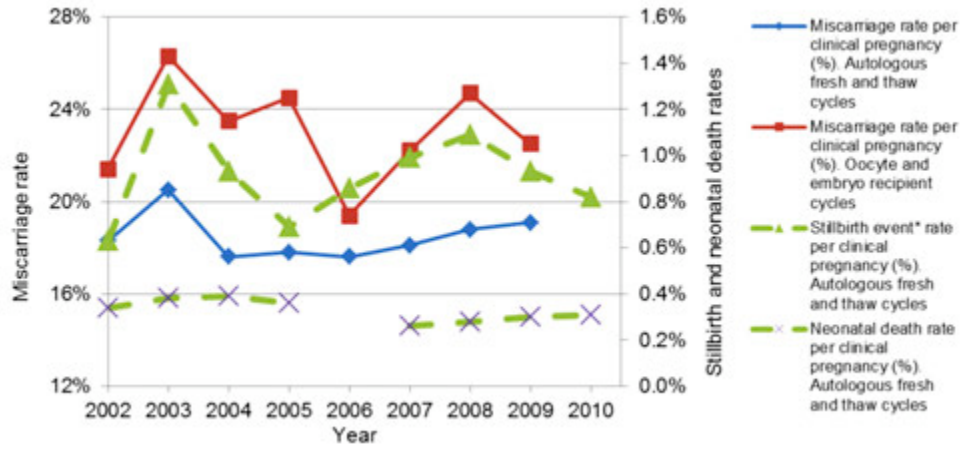



Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

## 2.6 Adverse events: miscarriages, stillbirth events, and neonatal deaths in ART treatment in Australia and New Zealand

Since 2002, the miscarriage rates in pregnancies that resulted from autologous cycles undertaken in Australia and New Zealand have been consistently lower each year (an average of 18.6%) than the miscarriage rates in pregnancies that resulted from oocyte and embryo recipient cycles (an average of 23.6%) (Figure 2.18). The stillbirth rate in Australian and New Zealand autologous ART cycles fluctuated slightly over time, between a minimum of 0.6% in 2002 and a maximum of 1.3% in 2003, with an average of 0.9%. The neonatal death rate in pregnancies that resulted from autologous ART cycles remained stable over time, at an average of 0.4%. Between 2002 and 2010 the stillbirth and neonatal death rates that resulted from oocyte and embryo recipient cycles averaged 0.9% and 0.3%, respectively (Figure 2.18).

**Figure 2.18: Number of miscarriages, stillbirth (fetal death) events, neonatal deaths (within 28 days) in autologous and recipient cycles, Australia and New Zealand, 2002 to 2010**




Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012.

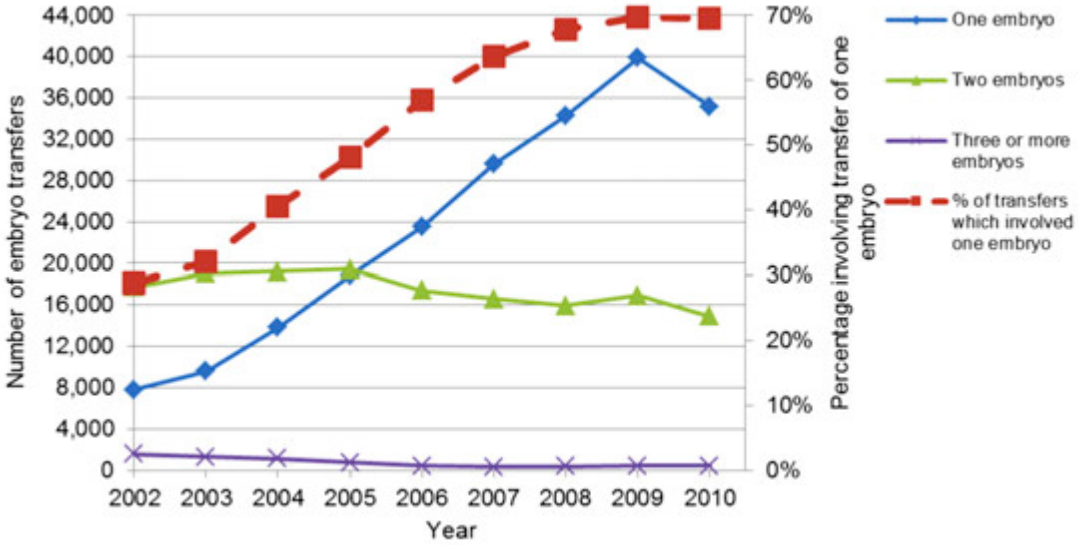
## 2.7 Changes in ART clinical practice in Australia and New Zealand over time

### 2.7.1 Decreasing number of embryos transferred per transfer cycle

Early in the history of ART treatment, transferring of three or more embryos per transfer cycle was commonplace. For example, in 1994 approximately 50% of transfers involved three or more embryos.[28] However, over time, the practice of transferring multiple embryos on each occasion has declined in Australia and in other countries. One reason for this change is the increased likelihood of twin and triplet births when two or more embryos are transferred, and the associated increased risk of miscarriage, premature birth, low birth weight, and need for neonatal intensive care. As a consequence of this change in practice, the proportion of singleton deliveries increased from 81% in 2002 to 92% in 2010.

In 2002, 29%, 65%, and 6% of autologous and recipient transfers involved one, two, or three or more embryos, respectively. In contrast, most transfers in 2010 involved only a single embryo (70%), with two embryos having been transferred in 30% of cycles, and three or more embryos transferred in 1% of cycles (Figure 2.19). Transfer of only one embryo per transfer cycle was more likely for younger women. In 2010, 79% of transfer cycles for women aged under 35 years involved a single embryo, compared with 70% and 54% for women aged 35-39 years and 40+ years, respectively.

**Figure 2.19: Number of embryo transfers by number of embryos transferred per transfer occasion, autologous and recipient fresh and thaw ART cycles, Australia and New Zealand, 2002 to 2010**



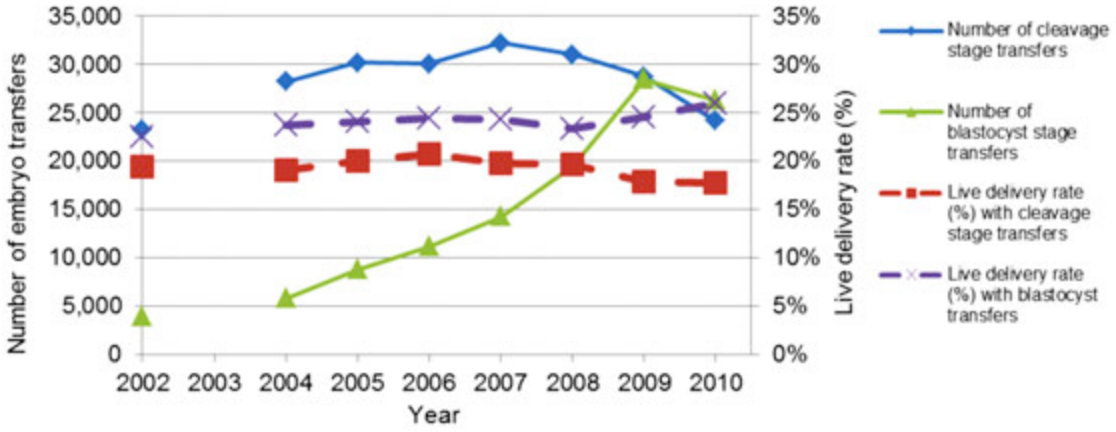

Source: Australian Institute of Health and Welfare . Assisted Reproduction Technology nos. 8-16. Canberra: AIHW, 2004 to 2012

### 2.7.2 Increasing proportion of blastocyst rather than cleavage stage embryo transfers

Figure 2.20 shows that from 2002 there has been a shift away from transferring cleavage stage (about 8 cells) embryos that have developed after three days of culturing in the laboratory towards transferring blastocysts (~100 cells) that require more prolonged culturing, usually for five days. The extended culturing period enables selection of more viable embryos. The number of blastocyst transfers increased rapidly from 2002 onwards and the number of cleavage stage transfers reduced gradually from 2007 onwards. As a consequence, the proportion of embryo transfers that involved blastocysts increased from 14% in 2002 to 52% in 2010.

The live delivery rates that have been achieved with blastocysts have consistently been slightly higher (average of 23%) than with cleavage stage embryos (average of 20%). The difference in live delivery rates achieved by the two methods appears to have widened slightly in recent years, from a difference of about 4% prior to 2009 to 8% in 2010.

**Figure 2.20: Outcomes of embryo transfers by stage of embryo development, autologous and recipient fresh and thaw ART cycles, Australia and New Zealand, 2002 to 2010**




Note Some relevant data were not reported by the NPESU for 2003
Source: Australian Institute of Health and Welfare . Assisted Reproduction Technology nos. 8-16. Canberra: AIHW, 2004 to 2012

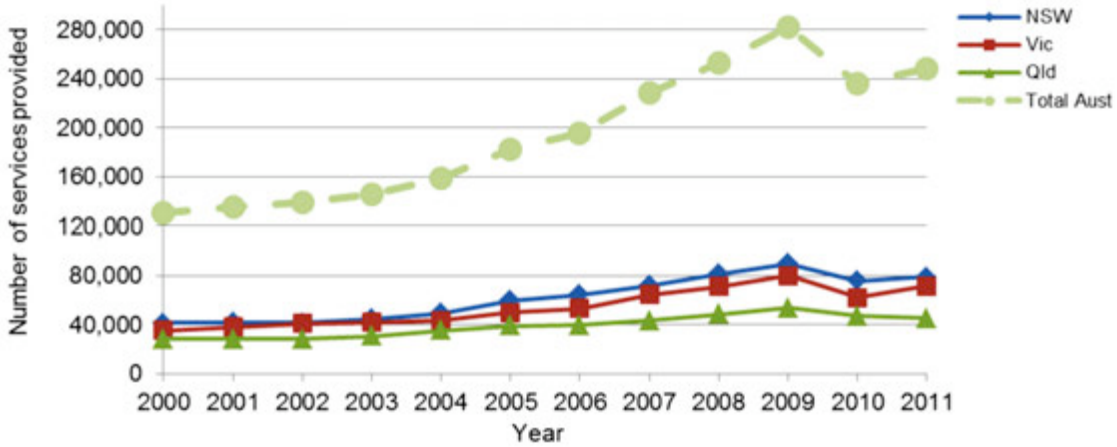
## 2.8 Trends in Medicare-funded ART treatment in Australia

### 2.8.1 Total annual numbers of Medicare reimbursement claims for ART-related MBS items by state and territory

Medicare Benefits Schedule (MBS) items that are relevant to ART procedures are listed in Table 2.1, earlier in this chapter. Figures 2.21 and 2.22 show the numbers of ART-related MBS claims lodged across Australia and in each state and territory between 2000 and 2011. It should be noted that these MBS data represent numbers of claims rather than numbers of individual patients (i.e., a patient may have had multiple ART cycles in a calendar year and therefore may have submitted multiple Medicare claims). The number of claims lodged across Australia increased steadily from 130,965 in 2000 to 282,653 in 2009, reducing to 235,743 in 2010 and then increasing to 248,056 in 2011. The average increase between 2000 and 2009 was 17,000 additional claims per year.

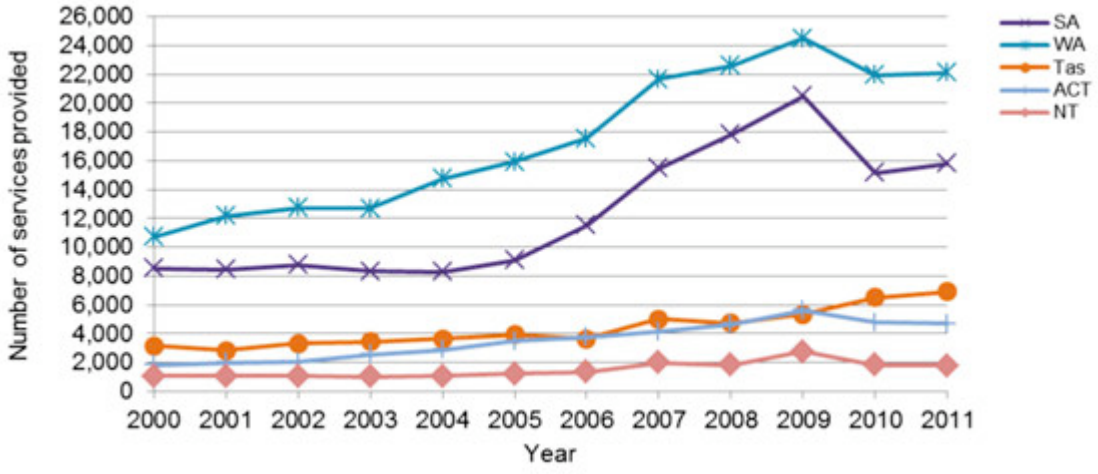
The largest numbers of MBS claims were lodged in NSW followed by VIC and QLD. The numbers of claims were markedly lower in other states and territories, particularly TAS, the ACT, and the NT. The numbers of claims lodged in each state and territory also increased steadily between 2000 and 2009, after which the numbers of claims lodged in all states and territories, except for TAS, reduced somewhat. An upward trend in the number of claims between 2000 and 2009 followed by a decline in 2010 and a levelling off in 2011 was evident in most states and territories.

**Figure 2.21: Number of services for Medicare-funded ART items in New South Wales, Victoria, Queensland and Australia, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

**Figure 2.22: Numbers of services for Medicare-funded ART items in South Australia, Western Australia, Tasmania, Australian Capital Territory and Northern Territory, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

Table 2.9 shows data regarding the numbers of ART-related MBS claims that were lodged in each state and territory, to enable comparison with related ANZARD data, and to indicate the apparent impact of the change in Medicare ART funding policy that took effect in January 2010. Between 2000 and 2009, the number of claims increased by a factor of between 1.6 (NT) and 3.1 (ACT), with an increase of 2.2 across Australia. The numbers of claims lodged fell after a change to Medicare funding policy for ART treatment in 2010, such that increases between 2000 and 2011 were by factors of only between 1.6 (QLD) and 2.6 (ACT), with an increase of 1.9 across Australia. For comparison with the timeframe for data extracted from the NPESU's annual ART reports, the increase between 2002 and 2010 was by a factor of 1.7 across Australia.

**Table 2.9: Numbers of ART-related MBS reimbursement claims in selected years, and increases over time, by state and territory, 2000 to 2011**

| State and Territory | Total number of ART-related MBS claims | | | | | Increased by a factor of (% increase) | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | 2002 | 2009 | 2010 | 2011 | 2000- 2009 | 2002- 2010 | 2000- 2011 |
| NSW | 41,778 | 41,618 | 90,083 | 75,814 | 79,348 | 2.2 (116%) | 1.8 (82%) | 1.9 (90%) |
| VIC | 35,534 | 41,273 | 79,953 | 62,388 | 71,805 | 2.3 (125%) | 1.5 (51%) | 2.0 (102%) |
| QLD | 28,374 | 28,251 | 53,931 | 47,301 | 45,572 | 1.9 (90%) | 1.7 (67%) | 1.6 (61%) |
| SA | 8,526 | 8,773 | 20,486 | 15,147 | 15,817 | 2.4 (140%) | 1.7 (73%) | 1.9 (86%) |
| WA | 10,722 | 12,755 | 24,501 | 21,933 | 22,096 | 2.3 (129%) | 1.7 (72%) | 2.1 (106%) |
| TAS | 3,145 | 3,323 | 5,343 | 6,518 | 6,915 | 1.7 (70%) | 2.0 (96%) | 2.2 (120%) |
| ACT | 1,835 | 2,036 | 5,607 | 4,798 | 4,706 | 3.1 (206% | 2.4 (136%) | 2.6 (156%) |
| NT | 1,051 | 1,046 | 2,749 | 1,844 | 1,797 | 1.6 (162%) | 1.8 (76%) | 1.7 (71%) |
| All Australia | 130,965 | 139,075 | 282,653 | 235,743 | 248,056 | 2.2 (116%) | 1.7 (70%) | 1.9 (89%) |

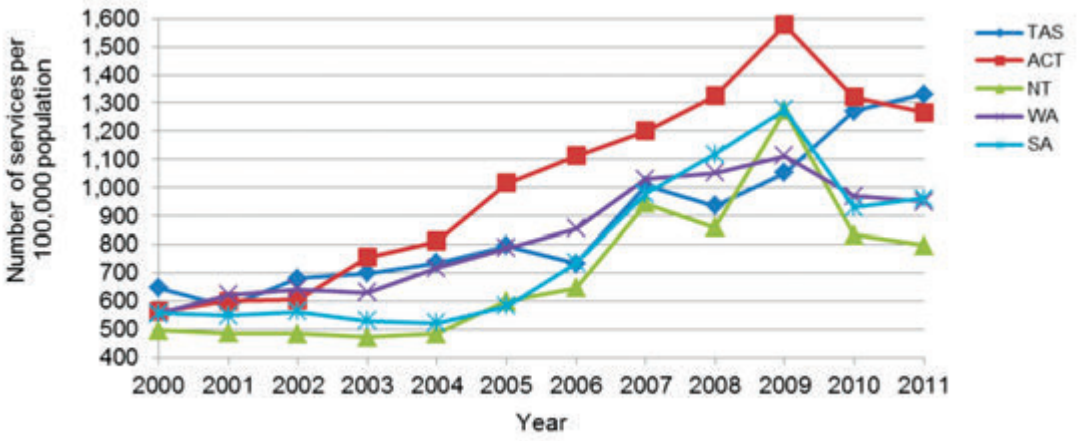
Source: Medicare Australia online MBS item statistics

Most data that are recorded in the Australian and New Zealand Assisted Reproduction Database ANZARD is based on individual ART cycles rather than on women who undertake ART. Some woman-based data were available for 95% of the ART cycles that were recorded in the ANZARD in 2010. Based on those data, 27,277 Australian women undertook ART treatment in 2010. This compares with Medicare "woman-based" data (MBS item 13200), which indicated that 23,290 Australian women claimed for an initial ART cycle in 2010. The gap may be partly due to non-claiming or delays in claiming by some ART patients.

## 2.8.2 Total annual numbers of reimbursement claims for Medicare-funded services per 100,000 population by state and territory

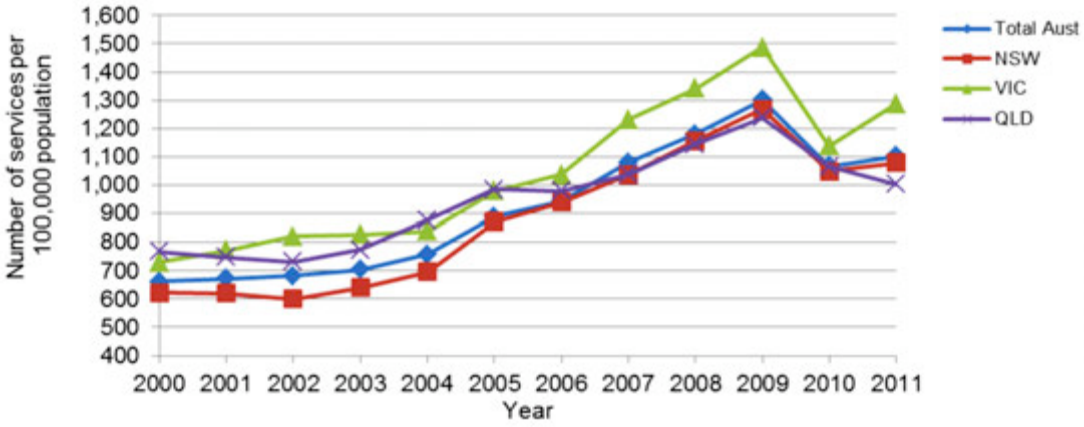
Figures 2.23 and 2.24 show the rates of ART-related MBS claims per 100,000 population that were lodged across Australia and in each state and territory between 2000 and 2011. Between 2000 and 2009, the number of claims per 100,000 population across Australia nearly doubled, from 663 to 1302, with an average of 74 additional claims per year. In 2010, there was a decrease in the number of claims per 100,000 population that were lodged across Australia and also in most of the states and territories. In 2011, the sharp decline generally levelled out, with small decreases or increases in each state and territory in comparison with 2010. In most years, the largest numbers of claims per 100,000 population were lodged in VIC and the ACT, and the smallest number was lodged in the NT.

**Figure 2.23: Number of services for Medicare-funded ART items per 100,000 population in New South Wales, Victoria, Queensland and Australia, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

**Figure 2.24: Number of services for Medicare-funded ART items per 100,000 population in South Australia, Western Australia, Tasmania, Australian Capital Territory and Northern Territory, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

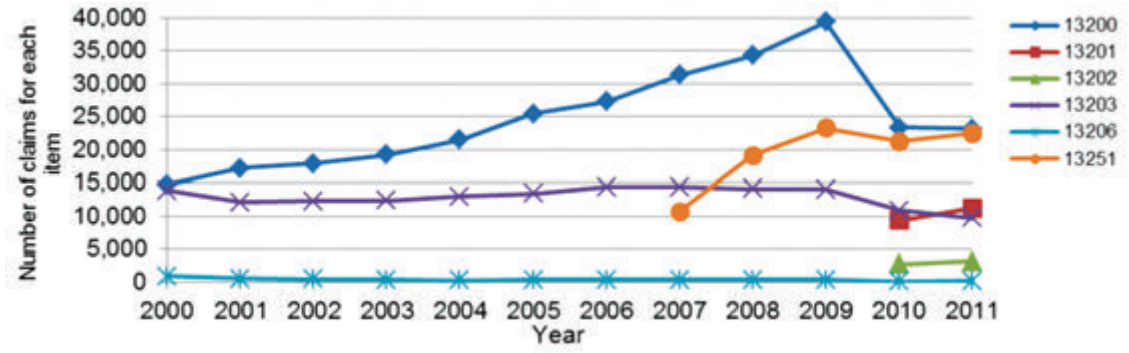
## 2.8.3 Total annual number of Medicare reimbursement claims for particular ART-related MBS items in Australia

Figures 2.25 and 2.26 display data regarding numbers of claims lodged between 2000 and 2011 for each of the specific ART-related MBS items that are listed in Table 2.1. Until the end of 2009, Medicare item number 13200 covered all initial, subsequent, and cancelled ART cycles in a calendar year. The number of claims relating to item 13200 increased steadily from 14,740 in 2000 to 39,362 in 2009. From January 2010, the definition of item 13200 was changed to refer only to initial cycles in a calendar year, and two new items were created to cover subsequent cycles (13201) and cancelled cycles (13202). The data relating to item 13200 show that 23,290 and 23,143 Australian women undertook an initial ART cycle in 2010 and 2011, respectively. In 2010 and 2011, the total number of claims relating to items 13200, 13201 and 13202 dropped in comparison with 2009, to 35,383 in 2010 and 37,539 in 2011.

The number of claims for item 13203 (ovulation monitoring) increased gradually from 2000 to 2009, and then also dropped in 2010 and 2011. The numbers of claims for item 13206 (ART using unstimulated ovulation or ovulation stimulated only by clomiphene citrate) were relatively low in each year, and decreased over time from 850 claims in 2000 to 141 claims in 2011. Claiming for item 13251 (intracytoplasmic sperm injection, ICSI) began in 2007, and the number of claims for this procedure then increased until 2009 and levelled out thereafter.

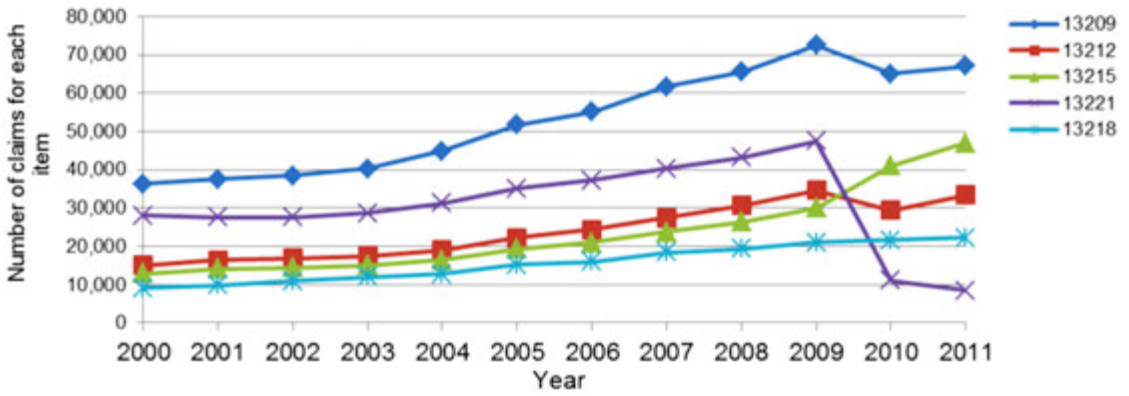
The numbers of claims for item 13209 (planning and management by an ART treatment specialist), item 13212 (oocyte retrieval) and item 13221 (preparation of semen) increased from 2000 to 2009 and reduced thereafter. The number of claims for item 13215 (transfer of embryos, or ova and sperm, to a female) and item 13218 (preparation / transfer of frozen or donated embryos, or ova plus sperm, to a female) increased after 2009 rather than reducing like most other items.

**Figure 2.25: Numbers of services for MBS items 13200, 13201, 13202, 13206 and 13251, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

**Figure 2.26: Numbers of services for MBS items 13209, 13212, 13215, 13221 and 13218, 2000 to 2011**



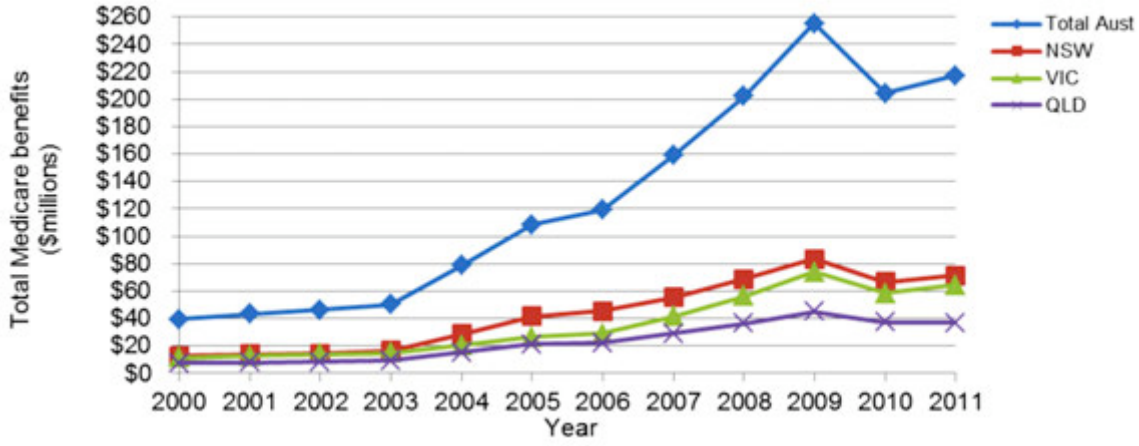

Source: Medicare Australia online MBS item statistics

## 2.8.4 Total annual Medicare benefits paid for ART-related MBS items by state and territory

Figures 2.27 and 2.28 and Tables 2.10 and 2.11 show data regarding Medicare benefits that were paid for ART-related MBS items. These data are the only readily available ART cost data. It should be noted here that Medicare MBS items do not cover the costs of some clinical practice changes that have occurred in the past decade, such as blastocyst culturing, vitrification (snap freezing) of embryos, and some advanced diagnostic and embryo selection laboratory tests. These Medicare data exclude several cost coverage sources (including rebates from private health insurance, reimbursement via Medicare safety nets, and patients' out-of-pocket expenditure), and so do not constitute a comprehensive health economic analysis. They do, however, provide a useful indication of change in the cost of ART over time.

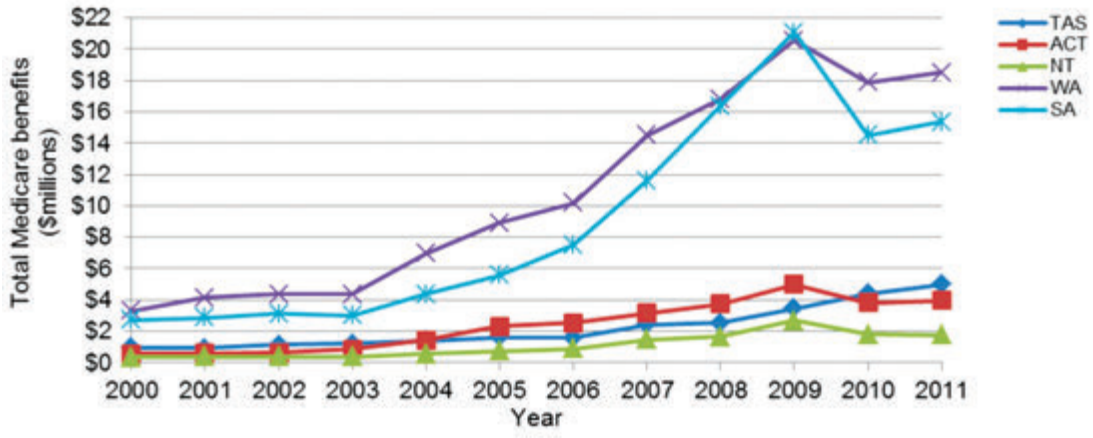
The total Medicare benefits paid for MBS ART items (unadjusted for inflation) increased from $39 million in 2000 to $255 million in 2009, dropped to $204 million in 2010, and then increased to $217 million in 2011. Between 2000 and 2009, the total benefits paid increased by an average of an extra $23.4 million dollars per year. Similar trends were evident in most states and territories. In most years, the largest total amount of MBS benefits were paid to claimants in NSW, followed by VIC, QLD, WA, SA, ACT, TAS, and NT.

**Figure 2.27: Total Medicare benefits paid for ART items in Australia, New South Wales, Victoria and Queensland, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

**Figure 2.28: Total Medicare benefits paid for ART items in Tasmania, Australian Capital Territory, Northern Territory, Western Australia and South Australia, 2000 to 2011**




Source: Medicare Australia online MBS item statistics

Table 2.10 shows the increases that occurred over time in each state and territory in the Medicare benefits that were paid for ART-related MBS items. The total benefits paid in Australia increased by a factor of 6.5 between 2000 and 2009 and, due to the reduction caused by the changed Medicare funding policy in 2010, by a smaller factor of 5.5 between 2000 and 2011. The total MBS item cost (unadjusted for inflation) increased proportionally much more in each of the three timeframes (4.4 to 6.5 times) than the respective number of MBS item claims (1.7 to 2.2 times) shown in Table 2.9.

**Table 2.10: Increases in Medicare benefits that were paid for ART-related MBS items by state and territory between 2000 and 2011**

| Medicare MBS item cost ratio | ACT | SA | VIC | NSW | WA | All Aust | TAS | QLD | NT |
|---|---|---|---|---|---|---|---|---|---|
| 2011 / 2000 | 7.3 | 5.7 | 5.6 | 5.6 | 5.6 | 5.5 | 5.2 | 5.1 | 5.0 |
| 2009 / 2000 | 9.2 | 7.7 | 6.5 | 6.5 | 6.2 | 6.5 | 3.6 | 6.2 | 7.7 |
| 2010 / 2002 | 6.0 | 4.6 | 4.2 | 4.7 | 4.1 | 4.4 | 3.9 | 4.6 | 4.8 |

Note: Medicare MBS item cost ratio unadjusted for inflation

Table 2.11 shows the increases that occurred in some key indicators of ART treatment activity between 2002 and 2010 in Australia and New Zealand (this timeframe is determined by the ANZARD data included in this chapter). Over that period of time, the total number of ART cycles undertaken increased by a factor of 1.7, the total number of live babies born increased by a factor of 1.8, and the live delivery rate per 100 cycles increased by a factor of 1.1. The total number of Medicare claims specifically for ART-related MBS items increased by 1.7, however the total cost to Medicare for ART-related MBS items increased substantially more, by a factor of 4.4.

**Table 2.11: Comparison of key indicators of ART treatment activity: 2002 and 2010**

| | 2002 | 2010 | 2002-2010 increased by a factor of: |
|---|---|---|---|
| Live delivery rate in autologous ART cycles * | 16.6% | 18.4% | 1.1 |
| Total number of ART cycles initiated † | 32,958 | 56,489 | 1.7 |
| Total number of live babies born † | 5,953 | 10,897 | 1.8 |
| Total number of Medicare claims for ART-related MBS items † | 139,075 | 235,743 | 1.7 |
| Total nominal cost to Medicare of ART-related MBS items ‡ | $46,047,277 | $204,345,942 | 4.4 |

Note: * In Australia and New Zealand. Approximately 95% of all ART cycles were autologous
† In Australia only
‡ Unadjusted for inflation

## 2.9 Discussion

### 2.9.1 What is infertility and how many Australians would benefit from infertility treatment?

Published population surveys have found that 16 to 25% of women had, at some time in their lives, experienced a period of infertility (i.e., inability to become pregnant despite trying to) that lasted 12 months or more, and that between 3.4 and 14% were currently infertile (i.e. in the preceding 12 months). Marino et al.[17] reported that 24% of Australian women had ever had difficulty getting pregnant, but only 6% had never been pregnant despite trying. That is, the longer the timeframe for trying to achieve pregnancy, the lower is the apparent prevalence of infertility.

Relatedly, there is evidence that many couples who satisfy infertile criteria can achieve pregnancy without ART treatment. The 4th and 5th triennial surveys of the Australian Longitudinal Study on Women's Health collected data from women aged 28-36 years who reported ever having tried unsuccessfully to achieve a pregnancy for more than 12 months.[30] This study found that 43% of those women who had not used infertility treatments were nevertheless able to achieve a birth in the three years between the two surveys. Troude et al.[31] carried out a 7 to 9 year follow up of 814 French women who had not had a baby after IVF treatment (with a median age of 34 years at the start of IVF treatment). They found that 24% of those women nevertheless delivered a live baby after ceasing IVF treatment, almost 60% of which occurred during the first two years after their last IVF cycle. Finally, Stewart et al.[25] studied Australian women who undertook an average of three ART cycles and found that 44% delivered an IVF baby, and an additional 18% delivered an "IVF-independent" baby.

Such data should be borne in mind when examining outcomes of ART treatment, a process that couples can engage in over a period of several years. More specifically, given a lack of relevant randomised controlled trials in this health service area, it is unclear what proportion of the births that occur during ART treatment could have occurred "naturally" anyway without ART treatment.

### 2.9.2 ART treatment activity and outcomes in Australia and New Zealand

Coincident with the trend towards childbearing being delayed until later in life, demand for ART treatment has increased over time. Between 2002 and 2009, the number of autologous ART cycles undertaken in Australia and New Zealand increased to 67,229, by an average of 5,100 additional cycles per year. There were similar increases in the number of clinical pregnancies achieved, and the number of live deliveries, which increased from 5,194 to 11,732.

The key outcome indicator following initiation of ART treatment is delivery of a live baby. In 2010, almost 95% of the ART cycles undertaken by 30,588 Australian and New Zealand women were autologous. Live delivery rates achieved in autologous ART cycles increased slightly from 16.6% in 2002 to 18.4% in 2010. Live delivery rates for women aged under 35 years who undertook autologous fresh cycles (i.e., cycles for women with a relatively good prognosis) also increased slightly over time, from 25% in 2002 to 28% in 2010. The live delivery rate achieved in oocyte and embryo recipient cycles increased proportionally more, from 12% in 2002 to 19% in 2006 and thereafter remained around 17% to 18%. ART clinics in the USA have been achieving higher live delivery rates, on average, than Australian and New Zealand clinics (Table 3), which is likely partly due to USA clinics commonly transferring more embryos per cycle (averages of between two and three embryos) than Australian and New Zealand clinics. In 2010, 70% of Australian and New Zealand transfers involved only one embryo (average numbers of embryos transferred per cycle are not reported from the ANZARD dataset).

In 2010, the cause of infertility among couples who undertook ART treatment in Australia and New Zealand was recorded as female factor in 38% of cycles, unexplained infertility in 26% of cycles, male factor in 22% of cycles, and combined male-female factor in 14% of cycles. The associated live delivery rates ranged from 16 to 20%; ART treatment was about equally effective regardless of the diagnosed cause of infertility. This was markedly different from outcomes at clinics in the USA, which in 2009 ranged from 15 to 40% live births in autologous fresh cycles given various causes of infertility.

### 2.9.3 Age of women who have undertaken ART treatment in Australia and New Zealand

Between 2002 and 2010, the average age of women who undertook autologous ART cycles increased from 35.0 to 35.8, and the average age of women who undertook oocyte and embryo recipient ART cycles increased from 39.4 to 40.9. Both of those groups of women were older than the average age of all women who gave birth in Australia, which increased from 29.2 years in 2001 to 30.0 years in 2010.[20] Between 2002 and 2010, the number of autologous ART cycles undertaken by women aged 40-44 years and women aged 45 years or more both increased by a factor of 2.4. Almost a quarter (24%) of the women who undertook autologous ART cycles in 2010 were aged 40 years or older, compared with 19% in 2002. The number of cycles undertaken by women aged 35-39 years increased by a factor of 2.0 between 2002 and 2010; this was the age group that undertook the largest number of autologous cycles in every year. The numbers of cycles undertaken by women aged 30-34 years and under 30 years both increased less steeply over the same period, by factors of 1.5 and 1.6, respectively.

In 2010, women who donated their oocytes or embryos in Australia and New Zealand were aged 33 years on average. The largest number of recipient cycles that were undertaken were based on donations from women aged 35-39 years, followed by women aged 30-34 years; 44% of donated oocyte collections involved donors aged 35 years or more. This is noteworthy, as live delivery rates (in autologous cycles) start to fall beyond age group 30-34 years. That is, many Australian and New Zealand donors are beyond the optimal age. In comparison, the average age of American oocyte donors in 2009 was 28 years.[32] Between 2002 and 2010, the numbers of oocyte and embryo recipient cycles that were undertaken increased most among women aged 40-44 years, and women aged 45 years or older. In 2010, two-thirds of recipients were aged 40 years or older, compared with only 37% in 2002.

### 2.9.4 Association between age and ART outcomes

Many published studies have found that the likelihood of a live birth from ART treatment diminishes as women's age increases. Precisely measuring the independent causal effects of male and female age on reproductive outcomes is difficult because of the many uncontrollable confounding variables that are involved in observational studies, and because it is not feasible to carry out the randomised trials that would be needed to investigate this issue.

Live delivery rates that resulted from autologous cycles in Australia and New Zealand remained fairly constant in each female age group between 2002 and 2010; they were generally highest or equal-highest for women aged under 30 years (23% - 26%), and were consistently much lower for women aged 40-44 years (7% - 8%), and women aged more than 44 years (1% - 3%). In 2010, the live delivery rates achieved in autologous fresh cycles decreased from 29% among women aged less than 30 years to 0.1% among women aged 45 years or more. Live delivery rates achieved through autologous thaw cycles also decreased with increasing female age, although less steeply, from 21% for women aged under 30 years to 8% for women aged 45 years or more. These age trends were consistent with findings of published studies of fertility in the general community,[4,10] and studies of ART outcomes among women aged 45 years or more.[33,34] In 2010, the overall live delivery rate achieved by recipients of donated oocytes and embryos in Australia and New Zealand was 18%. It was highest among recipients aged 30-34 years (24%) and reduced gradually to 16% among recipients aged 45 years or more. Luke et al.[26] analysed data regarding the first ART cycle undertaken by 16,272 women in the USA who used donor oocytes. They found that live birth rate was virtually unrelated to recipients' age, reducing from 50% for women aged under 31 years to 49% for women aged 43 years or more. Live delivery rate in Australian and New Zealand recipient cycles was also associated with donors' age; it was maximal (20%) from donors aged 26-29 years, and reduced to its minimum of 10% from donors aged more than 39 years. Wang, Farquhar and Sullivan[35] analysed outcomes of 3,889 fresh oocyte recipient cycles in which Australian and New Zealand women used their partners' sperm. Wang et al.[35] found no significant relationship between live delivery rates and either recipients' age or male partners' ages. However, live delivery rates were associated with oocyte donors' ages, reducing from 27% for donors aged under 30 years to 14% for donors aged 40 years or more.

Much discussion about infertility focuses on female age; few studies have examined effects of male age on ART outcomes.[36] Sartorius and Nieschlag[9] noted that several studies had found evidence of an independent effect of male age in reducing fertility (time to pregnancy), particularly for males aged over 40 years. There is also evidence of an association between increasing male age and increasing likelihood of DNA damage which, in turn, is associated with increases in miscarriage rate and incidence of birth defects and some diseases in the offspring. Dain, Auslander & Dirnfeld[37] carried out a systematic review of findings of relevant studies. Two of four studies found that increased paternal age was associated with decreased live delivery rates, two of eight studies found a significant relationship

between paternal age and fertilisation rates, and two of 10 studies found an association with pregnancy rate. Most of the relevant studies found that sperm concentration, motility and morphology (abnormality) were not significantly associated with age.

There is evidence of insufficient community awareness of the decline in fertility with age, and overestimation of the chance of bearing a healthy child through ART treatment.[38,39] Pregnancies in women of advanced age are more likely to result in miscarriage, ectopic pregnancy, premature birth, congenital defects, and stillbirths. Many women are apparently not aware of the impact of delayed childbearing on their ability to have healthy children.[36] Australian research is required to identify information gaps and misconceptions regarding fertility that could be addressed to ensure that couples who choose to delay childbirth are fully aware of the strengths and weaknesses of infertility treatment. All potential and actual consumers of ART treatment, and particularly older women and their partners, should have ready access to appropriate, objective advice and counselling regarding their chances of a successful pregnancy through ART.

### 2.9.5 Adverse events: Miscarriages, stillbirths, and neonatal deaths

Since 2002, miscarriage rates in pregnancies that resulted from autologous ART cycles in Australia and New Zealand were consistently around 5% lower in each year (an average of 19%) than the miscarriage rates in pregnancies that resulted from oocyte and embryo recipient cycles (an average of 24%). In comparison, ART clinics in the USA reported a miscarriage rate of 16.4% in fresh autologous ART cycles in 2009.[32] Women who undertake ART treatment are routinely tested for their pregnancy status after each embryo transfer and are monitored closely, whereas many women who become pregnant "naturally" do not have such testing, and are not always aware that they have become pregnant, so it is difficult to accurately compare ART-related miscarriage rates with non-ART rates. Nonetheless, several studies have reported data that suggest that the rates in these two groups are similar. Eskild et al.[40] studied 27,932 Norwegian women aged 15-49 years who were pregnant during a three-year study period. They reported that 9.4% had only a miscarriage, and a further 6.8% had both a miscarriage and a delivery (total 16.4% miscarriage). Hure et al.[41] analysed data collected from 5,806 Australian women aged 31-36 years who reported outcomes from one or more pregnancies, and reported a miscarriage rate of 20%, which would not have included unnoticed miscarriages. Finally, Li et al.[42] carried out a cohort study of 969 female members of an American health maintenance organisation with a median age of 31 years who experienced a cumulative risk of miscarriage of 22% over their first 20 weeks of gestation.

Between 2002 and 2010 the stillbirth and neonatal death rates that resulted from oocyte and embryo recipient cycles undertaken in Australian and New Zealand averaged 0.9% and 0.3%, respectively. The stillbirth rate in autologous ART cycles varied slightly over time, between a minimum of 0.6% in 2002 and a maximum of 1.3% in 2003, with an average of 0.9%. In comparison, the stillbirth rate among all Australian women in 2010 was similar at 0.7%,[43] ART clinics in the USA reported a stillbirth rate of 0.7% in fresh autologous ART cycles in 2009,[32] and the study of 3,011 German women by Gnoth et al.[24] reported a stillbirth rate of 0.4%. The neonatal death rate that resulted from autologous ART cycles in Australia and New Zealand was stable over time, at an average of 0.4%, which was similar to the neonatal death rate among all Australian women of 0.3% in 2010.[43]

### 2.9.6 Changes in clinical ART treatment practice over time

In 2002, 29%, 65%, and 6% of autologous and recipient embryo transfers involved one, two, or three or more embryos, respectively. This situation changed over time, such that by 2010, 70% of transfers involved only one embryo, with two embryos having been transferred in 30% of cycles, and three or more embryos transferred in only 1% of cycles. In contrast, 14% of the embryo transfer cycles that were carried out in the USA in 2009 involved only one embryo and 35% involved three or more embryos.[32] There is no public funding for ART in the USA,[44] which provides an incentive for couples to minimise the number of ART cycles that they undertake by transferring more embryos on each occasion. Figures 21 and 22 earlier in this chapter show trends over time in the number of claims that were lodged for ART-related MBS items before and after restrictions on Medicare funding that were implemented in January 2010. Whereas the numbers of claims for most MBS ART items either decreased or increased only slightly after 2009, the number of claims for Item 13215 (embryo transfers) increased relatively sharply in 2010 and 2011. This would have contributed to the reversal in 2011 of the decrease in total Medicare benefits paid for ART that had occurred in 2010.

In clinics in the USA, 38% of autologous fresh transfers in 2009 involved blastocysts.[32] In comparison, the proportion of Australian and New Zealand embryo transfers that involved blastocysts rather than cleavage stage embryos increased from 14% in 2002 to 52% in 2010. The difference in live delivery rates that were achieved by the two transfer approaches appears to have increased slightly in recent years, from a difference of about 4% in favour of blastocysts prior to 2009 to 8% in 2010. This change in practice over time would have increased out-of-pocket costs for Australian patients as blastocyst culturing is not covered by a Medicare MBS item.

Changes in clinical practice that have occurred over time in Australia and New Zealand appear to have led to a small improvement in live delivery rates, for example from 24.9% in 2002 to 27.5% in 2010 in autologous fresh cycles undertaken by women aged under 35 years. Outcome data show a wide range in the live delivery rates achieved by various ART clinics (e.g., between 6% and 39% in fresh ART cycles undertaken by women aged under 35 years in 2010), which does not appear to have narrowed significantly over time, that is, with "underperforming" clinics catching up. This is perhaps surprising given the volume of published clinical research in this area, and given that ART clinics in Australia and New Zealand potentially have access to much the same technology.

### 2.9.7 The cost of ART treatment in Australia

The Extended Medicare Safety Net (EMSN), which was introduced in 2004, provides reimbursement of 80% of out-of-pocket expenditure for out-of-hospital Medicare-rebatable services after an annual EMSN expenditure threshold is reached by an individual or a family. ART patients commonly reach that threshold after one ART treatment cycle, making subsequent cycles in the same calendar year cheaper. Consequently, introduction of the EMSN was followed by increased utilisation of ART services. Between 2000 and 2009, the number of ART-related MBS claims per 100,000 population in Australia nearly doubled, from 663 to 1302. On the basis of an independent review carried out by the Centre for Health Economics Research and Evaluation[45], a cap was implemented from January 2010 on EMSN benefits that were payable for ART services (and other MBS items) once the EMSN threshold ($1,126 in 2010) was reached. The capping was followed by a reduction in ART-related MBS claims.[46] The number of claims per 100,000 population lodged across Australia, and in most states and territories, decreased in 2010. However, the Medicare claim rate generally leveled out in 2011, with relatively small decreases or increases being observed in each state and territory in comparison with 2010. Following the change in Medicare funding policy, which led to a $51 million reduction in Medicare costs, the total number of live babies born in Australia (only) through ART reduced from 12,019 in 2009 to approximately 10,786 in 2010, a reduction of 1,233 babies or 10%.

The total cost to the Australian community of ART treatment is not known. Sullivan et al[34] analysed data regarding costs and outcomes of 1,101 autologous fresh ART cycles that were undertaken by Australian women aged 45 years or more. Their economic modelling estimated that each live birth that was achieved cost an average of €753,000 in 2005. This was approximately equivalent to A$1.20 million in 2005, or A$1.46 million in 2012 if the cost of the ART services had increased at the average Consumer Price Index inflation rate of 2.9%. Of relevance here is a clinical guideline regarding infertility treatment (#156) that was issued recently by the UK National Institute for Health and Clinical Excellence[47] which states, in part:

- If a woman reaches the age of 40 during [infertility] treatment, complete the current full cycle but do not offer further full cycles
- In women aged 40-42 years who have not conceived after two years of regular unprotected intercourse ... offer one full cycle of IVF … provided that they have never previously had IVF treatment and there is no evidence of low ovarian reserve

Relatedly, the Ethics Committee of the American Society for Reproductive Medicine[48] recently published a paper that encourages and supports ART clinicians to refuse to initiate treatment in cases that they assess as having either a "very poor prognosis" (i.e., with an estimated 1-5% chance of a live birth per cycle), or as being "futile" (i.e., with less than a 1% chance of achieving a live birth). It may be appropriate for similar guidelines to be developed and adopted in Australia.

### 2.9.8 Data development

Australia has one of the highest ART treatment activity levels in the western world, yet there is a lack of recent, reliable published data regarding the prevalence of infertility in Australia. It is therefore difficult to assess the extent to which the Australian community's need for infertility treatment services is being satisfied, or the extent to which the community's potential to benefit from infertility treatment is being achieved. Adding relevant questions to a large-scale community survey would enable collection of useful data regarding these issues.

Data regarding ART services are available through two main sources: the Australian and New Zealand Assisted Reproduction Database (ANZARD) and Medicare Australia. Both sets of data have limitations.

- Medicare online item statistics data include only ART-relevant MBS items for which claims have been processed. However, the costs of various aspects of ART treatment are covered by several different sources: from Medicare for relevant MBS items and via Medicare safety nets; via rebates for health expenditure and private health insurance from the Federal Government; via rebates from private health funds; and from patients themselves. There is no central, comprehensive source of information regarding the total cost of ART treatment in Australia, and it would be useful for such a database to be established.
- Medicare does not collect ART treatment outcome data, and there is currently no convenient way to accurately assess costs that are involved in achieving ART outcomes, or the cost-effectiveness of different ART treatment approaches. Enabling linkage of Medicare data to ANZARD data would be very useful.
- Nearly all reported ANZARD data relate to ART treatment services in Australia and New Zealand combined. Pooling of the two countries' data limits direct comparisons with Australia-only data, for example regarding Medicare claims for ART-related items. In contrast, the US Centers for Disease Control and Prevention collects and annually publishes process and outcome data regarding each of almost all individual fertility clinics in the USA.[49] The NPESU should report Australian data separately, and ideally, should also report data for individual states and territories.
- The NPESU reports Australian and New Zealand ART outcomes in terms of, for example, live birth rates per 100 cycles rather than per 100 patients reflecting that the data collection was historically cycle based. Most live delivery outcomes are achieved in an individual woman's initial cycles,[26] thus averaging across all cycles that are undertaken understates early cycle success rates.
- ANZARD was modified in 2009 to commence collection of woman-based data. Women-based reporting is being progressively introduced. Reporting of cumulative pregnancy rates or live birth rates across multiple ART cycles requires a baseline of first cycles followed over time and was not available in the initial years of reporting.
- The NPESU reports no outcome data broken down by male age, despite the fact that approximately 35% of autologous cycles were specified in 2010 as having male factor only or combined male-female international studies,[37,50,51] and it would be useful to have ANZARD data on outcomes by male age, both as a single variable and statistically controlling for female partners' age.

## 2.10 References


1. Boivin J, Bunting L, Collins JA, Nygren KG. International estimates of infertility prevalence and treatment seeking: potential need and demand for infertility medical care. Hum Reprod 2007; 22(6):1506-1512
2. Gurunath S, Pandian Z, Anderson RA, Bhattacharya S. Defining infertility - a systematic review of prevalence studies. Hum Reprod Update 2011; 17(5):575-588.
3. Aziz N. Laparoscopic evaluation of female factors in infertility. Journal of the College of Physicians and Surgeons-Pakistan 2010; 20:649-52.
4. Baird D, Collins J, Egozcue J, Evers L, Gianaroli L, Leridon H, et al. Fertility and ageing. Hum Reprod Update 2005; 11(3):261-76.
5. Giudice LC, Kao LC. Endometriosis. Lancet 2004; 364(9447):1789-99.
6. Jansen R. The effect of female age on the likelihood of a live birth from one in-vitro fertilisation treatment. Med J Aust 2003; 178(6):258-61.
7. Kamel RM. Management of the infertile couple: an evidence-based protocol. Reprod Biol Endocrinol 2010; 8:21.
8. Maheshwari A, Hamilton M, Bhattacharya S. Effect of female age on the diagnostic categories of infertility. Hum Reprod 2008; 23(3):538-42.
9. Sartorius GA, Nieschlag E. (2010). Paternal age and reproduction. Hum Reprod Update, 16(1):65-79.
10. Tufan E, Elter K, Durmusoglu F. Assessment of reproductive ageing patterns by hormonal and ultrasonographic ovarian reserve tests. Hum Reprod 2004; 19(11):2484-9.
11. Vahidi S, Ardalan A, & Mohammad K. Prevalence of primary infertility in the Islamic Republic of Iran in 2004-2005. Asia Pac J Public Health 2009; 21(3):287-293.
12. Webb S, Holman D. A survey of infertility, surgical sterility and associated reproductive disability in Perth, Western Australia. Aust J Public Health 1992; 16(4):376-381.
13. Gunnell DJ, Ewings P. Infertility prevalence, needs assessment and purchasing. J Public Health Med 1994; 16 (1):29-35.
14. Buckett W, Bentick B. The epidemiology of infertility in a rural population. Acta Obstetrica et Gynecologica Scandinavica 1997; 76(3):233-237.
15. Bhattacharya S, Porter M, Amalraj E, Templeton A, Hamilton M, Lee AJ, Kurinczuk JJ. The epidemiology of infertility in the North East of Scotland. Hum Reprod 2009; 24(12):3096-3107.
16. Oakley L, Doyle P, Maconochie N. Lifetime prevalence of infertility and infertility treatment in the UK: results from a population-based survey of reproduction. Hum Reprod 2008; 23(2):447-450.
17. Marino JL, Moore VM, Rumbold AR, Davies MJ. Fertility treatments and the young women who use them: an Australian cohort study. Hum Reprod 2011; 26(2):473-479.
18. Sunderam S, Kissin DM, Flowers L, Anderson JE, Folger SG, Jamieson DJ, et al. Assisted reproductive technology surveillance - United States 2009. MMWR Surveillance Summary 2012; 61:1-23.
19. de Mouzon J, Goossens V, Bhattacharya S, Castilla JA, Ferraretti AP, Korsak V, Kupka M, et al. Assisted reproductive technology in Europe, 2007: results generated from European registers by ESHRE. Hum Reprod 2012; 27(4):954-966.
20. Li Z, Zeki R, Hilder L,Sullivan EA. Australia's mothers and babies 2010. Perinatal statistics series no. 27. Cat. no. PER 57. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit, 2012.
21. Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012.
22. Moragianni VA, Penzias AS. Cumulative live birth rates after assisted reproductive technology. Curr Opin Obstet Gynaecol 2010; 22(3):189-192.
23. Malizia BA, Hacker MR, Penzias AS. Cumulative live birth rates after In Vitro Fertilization. New Engl J Med 2009; 360(3):236-43.

24. Gnoth C, Maxrath B, Skonieczny T, Friol K, Godehardt E, Tigges J. Final ART success rates: a 10 years survey. Hum Reprod 2011; 26(8):2239-2246.

25. Stewart LM, Holman DJ, Hart R, Finn J, Mai Q, Preen DB. How effective is in vitro fertilisation, and how can it be improved? Fertil Steril 2011; 95(5):1677-83.

26. Luke B, Brown MB, Wantman E, Lederman A, Gibbons W, Schattman GL, et al. Cumulative birth rates with linked assisted reproductive technology cycles. N Engl J Med 2012; 366(26):2483-91.

27. Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted reproductive Technology. 2006 Assisted reproductive Technology Success Rates: National Summary and Fertility Reports. Atlanta: US Department of Health and Human Services, Centers for Disease control and Prevention, 2008.

28. Mills M, Rindfuss RR, McDonald P, Velde E. Why do people postpone parenthood? Reasons and social policy incentives. Hum Reprod Update 2011; 17(6):848-860.

29. Cooke A, Mills TA, Lavender T. 'Informed and uninformed decision making' - women's reasoning, experiences and perceptions with regard to advanced maternal age and delayed childbearing: a meta-synthesis. Int J Nurs Stud 2010; 47(10):1317-29.

30. Herbert DL, Lucke JC, Dobson AJ. Infertility, medical advice and treatment with fertility hormones and/or in vitro fertilisation: a population perspective from the Australian Longitudinal Study on Women's Health. Aust N Z J Public Health 2009; 33(4):358-364.

31. Troude P, Bailly E, Guibert J, Bouyer J, de la Rochebrochard E. Spontaneous pregnancies among couples previously treated by in vitro fertilization. Fertili Steril 2011; 98(1):63-68.

32. Centers for Disease Control and Prevention, American Society for Reproductive Medicine, Society for Assisted reproductive Technology. 2009 Assisted reproductive Technology Success Rates: National Summary and Fertility Reports. Atlanta: US Department of Health and Human Services, Centers for Disease Control and Prevention, 2011.

33. Spandorfer SD, Bendikson K, Dragisic K, Schattman G, Davis OK, Rosenwaks Z. Outcome of in vitro fertilisation in women 45 years and older who use autologous oocytes. Fertil Steril 2007; 87(1):74-76.

34. Sullivan E, Wang Y, Chapman M, Chambers G. Success rates and cost of a live birth following fresh assisted reproduction treatment in women aged 45 years and older, Australia 2002 - 2004. Hum Reprod 2008; 23(7):1639- 643.

35. Wang YA, Farquhar C, Sullivan EA. Donor age is a major determinant of success of oocyte donation/recipient programme. Hum Reprod 2012; 27(1):118-125.

36. Balasch J, Gratacos E. Delayed childbearing: effects on fertility and the outcome of pregnancy. Curr Opin Obstet Gynecol 2012; 24(3):187-193.

37. Dain L, Auslander R, Dirnfeld M. The effect of paternal age on assisted reproduction outcome. Fertil Steril 2011; 95(1):1-8.

38. Lampic C, Svanberg AS, Karlstrom P, Tyden T. Fertility awareness, intentions concerning childbearing, and attitudes towards parenthood among female and male academics. Hum Reprod 2005; 21(2):558-64.

39. Wang YA, Healy D, Black D, Sullivan EA. Age-specific success rate for women undertaking their first assisted reproduction technology treatment using their own oocytes in Australia, 2002–2005. Hum Reprod 2008; 23(7):1633-38.

40. Eskild A, Vatten LJ, Nesheim B-I, Vangen S. The estimated risk of miscarriage should be corrected for induced abortion rates. Acta Obstet Gynecol Scand 2009; 88(5):569-574.

41. Hure AJ, Powers JR, Mishra GD, Herbert DL, Byles JE, Loxton D. Miscarriage, preterm delivery, and stillbirth: large variations in rates within a cohort of Australian women. PLoS One 2012; 7(5):e37109.

42. Li DK, Odouli R, Wi S, et al. A population based prospective cohort study of personal exposure to magnetic fields during pregnancy and the risk of miscarriage. Epidemiology 2002; 13(1):9-20.

43. Australian Bureau of Statistics (2010). Births, Australia, 2010. ABS Cat. no. 3301.0 Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3301.0Main+Features12010?OpenDocument. Accessed on 9 May 2103.

44. Chambers GM, Hoang VP, Zhu R, Illingworth PJ. A reduction in public funding for fertility treatment - an econometric analysis of access to treatment and savings to government. BMC Health Serv Res 2012; 12:142.

45. Centre for Health Economics Research and Evaluation. Extended Medicare Safety Net Review Report. Sydney: University of Technology, 2009.

46. Centre for Health Economics Research and Evaluation. Extended Medicare Safety Net. Review of Capping Arrangements Report. Sydney: University of Technology, 2011.

47. NICE: National Institute for Health and Clinical Excellence. Fertility: Assessment and treatment for people with fertility problems. NICE Clinical Guideline 156. Available at: guidance.nice.org.uk/cg156. Accessed on 9 May 2013.

48. Ethics Committee of the American Society for Reproductive Medicine. Fertility treatment when the prognosis is very poor or futile: a committee opinion. Fertil Steril 2010; 98(1):e6-e9.

49. Centers for Disease Control and Prevention. Assisted Reproductive Technology (ART) Report – Fertility clinic success rates. Available at: http://apps.nccd.cdc.gov/art/Apps/FertilityClinicReport.aspx. Accessed on 9 May 2013.

50. Whitcomb BW, Levens ED, Turzanski-Fortner R, Richter KS, Kipersztok S, Stillman RJ, et al. Contribution of male age to outcomes in assisted reproductive technologies - addressing methodological challenges. Fertil Steril 2011, 95(1):147-151.

51. Matorras R, Matorras F, Esposito A, Martinez L, & Crisol L. Decline in human fertility rates with male age: a consequence of a decrease in male fecundity with aging? Gynecol Obstet Invest 2009; 71(4):229-235.

52. Zegers-Hochschild F, Adamson GD, de Mouzon,J, Ishihara, O, Mansour R, Nygren,K, et al. International Committee for Monitoring Assisted reproductive Technology (ICMART) and the World Health Organisation (WHO) revised glossary of ART terminology, 2009. Fertil Steril 92:1520-1524.

53. Practice Committee of the American Society for Reproductive Medicine. Definitions of infertility and recurrent pregnancy loss. Fertil Steril 2008; 90(Suppl):S60.

## 2.11 Appendices

### 2.11.1 Appendix 1 – Infertility definitions and findings from infertility prevalence surveys

Relevant organisations have defined infertility as:

- Inability to conceive or carry a pregnancy to term after 12 months of trying to conceive. If the woman is over the age of 35, the time of trying to conceive is reduced to 6 months. (The US National Infertility Association)
- Failure to conceive after 12 months of unprotected sexual intercourse in the absence of any known cause of infertility. National Institute for Health and Clinical Excellence (NICE) guideline: Fertility: Assessment and Treatment for People with Fertility Problems. 2013. (National Institute for Health and Clinical Excellence (NICE) Clinical Guideline156. United Kingdom)
- Failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse[52]
- Failure to achieve a successful pregnancy after 12 months or more of regular unprotected intercourse (American Society for Reproductive Medicine, 2008)[53]

| Findings of published infertility prevalence surveys | | | |
|---|---|---|---|
| Variable measured | Authors | Country | Prevalence |
| Current infertility (in the past 12 months) | Vahidi et al., 2009 | Iran | 3.4% |
| | Webb & Holman, 1992 | Australia | 3.5% |
| | Stephen & Chandra, 2006 | USA | 7.4% |
| Bushnik et al., 2012 | | Canada | 14% |
| Current infertility (in the past 36 months) | Chandra & Stephen, 1998 | USA | 1.6% |
| Lifetime infertility (in any 12 month period) | Gunnell & Ewings, 1994 | UK | 16% |
| | Bhattacharya et al., 2009 | Scotland | 18% |
| | Webb & Holman, 1992 | Australia | 19% |
| | Vahidi et al., 2009 | Iran | 25% |
| Lifetime infertility (in any period of 12 months or more) | Buckett & Bentick,1997 | UK | 17% |
| | Herbert et al., 2009 | Australia | 17% |
| | Dick et al., 2003 | Australia | 23% |
| Lifetime infertility (in any period of 24 months) | Bhattacharya et al., 2009 | Scotland | 9% |
| | Gunnell & Ewings, 1994 | UK | 13% |
| Lifetime infertility (in any period of more than 24 months) | Buckett & Bentick,1997 | UK | 12% |
| Lifetime ever had difficulty getting pregnant (for no specified period) | Smith et al., 2003 | Australia | 16% |
| | Marino et al., 2011 | Australia | 24% |
| Lifetime never pregnant despite trying | Oakley et al., 2008 | UK | 2.4% |
| | Bhattacharya et al., 2009 | Scotland | 4% |
| | Marino et al., 2011 | Australia | 6% |

## 2.11.2 Appendix 2 – Data for figures presented in this chapter

### Table A2.1: Process and outcomes of autologous fresh and thaw cycles, Australia and New Zealand, 2002 to 2010

| | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | | R13, R15 | R13, R15 | 11, 15 | 12, 14, 19 | 12, 14, 19 | 8, 13 | 8, 13 | 9, 14 | 9, 14 |
| Total number of ART cycles initiated | | 31,253 | 34,145 | 36,728 | 44,754 | 47,643 | 53,696 | 58,740 | 67,229 | 58,574 |
| Number of oocyte pickups with collection performed | | 17,877 | 19,191 | 22,035 | 24,874 | 27,044 | 30,483 | 34,127 | 39,683 | 33,879 |
| Number of embryo transfer cycles | Fresh | 15,482 | 16,842 | 19,397 | 21,949 | 23,459 | 26,337 | 29,256 | 33,900 | 28,955 |
| | Thaw | 10,505 | 11,634 | 13,273 | 15,354 | 16,126 | 18,301 | 19,402 | 21,370 | 19,617 |
| Number of clinical pregnancies | Fresh | 4,739 | 5,203 | 5,673 | 6,724 | 7,535 | 8,081 | 8,764 | 10,222 | 8,981 |
| | Thaw | 2,086 | 2,370 | 2,713 | 3,302 | 3,671 | 4,250 | 4,693 | 5,214 | 5,234 |

Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.2: Live deliveries from autologous ART cycles that were initiated by all women and by women aged under 35 years, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table or Figure numbers) | tF, tR12 | t5, F7, F9 | t11, t14, t15 | t13, t18, t19 | F7, t13, t18 | t8, t12, t13 | t8, t12, t13 | t9, t13, t14 | t9, t13, t14 |
| Live delivery rates per 100 autologous fresh and thaw ART cycles, all women | 16.6% | 16.9% | 17.7% | 17.5% | 18.1% | 17.7% | 17.5% | 17.5% | 18.4% |
| Live delivery rates per 100 autologous fresh ART cycles, only women aged under 35 years | 24.9% | 24.9% | 26.5% | 26.5% | 27.7% | 26.9% | 26.7% | 26.8% | 27.5% |
| Total number of ART cycles initiated | 31,253 | 34,145 | 36,728 | 44,754 | 47,643 | 53,696 | 58,740 | 67,229 | 58,574 |

Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.3: Process and outcomes of oocyte and embryo recipient cycles and donation cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R12 | R5, R12 | 1, 2, 19 | 24, 25 | 4, 7, 10, F11 | 18, 19 | 18, 19 | 20, 21 | 22 |
| Number of oocyte donation cycles with oocyte collection performed | 531 | 683 | NR | 826 | 777 | 903 | 926 | 986 | 919 |
| Number of recipient ART cycles initiated | 1,733 | 2,262 | 2,692 | 1,811 | 1,827 | 1,962 | 1,999 | 2,135 | 2,113 |
| Number of embryo transfer cycles | 1,052 | 1,387 | 1,557 | 1,659 | 1,678 | 1,826 | 1,837 | 1,953 | 1,923 |
| Number of clinical pregnancies | 294 | 373 | 405 | 424 | 470 | 451 | 493 | 515 | 518 |
| Number of live deliveries | 210 | 258 | 295 | 309 | 354 | 326 | 357 | 376 | 382 |
| Live delivery rate per 100 initiated ART cycles (%) | 12.1% | 11.4% | 11.0% | 17.1% | 19.4% | 16.6% | 17.9% | 17.6% | 18.1% |

Note: NR = Data not reported by the NPESU
Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.4: Process and outcomes of oocyte and embryo recipient cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R12 | R5, R12 | 1, 2, 19 | 24, 25 | 4, 7, 10, F11 | 18, 19 | 18, 19 | 20, 21 | 22 |
| Number of live deliveries | 210 | 258 | 295 | 309 | 354 | 326 | 357 | 376 | 382 |
| Live delivery rate per 100 initiated ART cycles (%) | 12.1% | 11.4% | 11.0% | 17.1% | 19.4% | 16.6% | 17.9% | 17.6% | 18.1% |

Note: NR = Data not reported by the NPESU
Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.5: Outcomes of sperm donor insemination (DI) ART cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R12 | R12 | 33 | 41 | 41 | 34 | 34 | 38 | 38 |
| Number of DI cycles initiated | 3,419 | 3,093 | 3,170 | 3,356 | 3,022 | 2,458 | 2,390 | 2,556 | 2,405 |
| Live delivery rate per 100 DI cycles (%) | 9.9% | 10.1% | 9.7% | 9.2% | 9.2% | 11.2% | 11.1% | 10.6% | 10.8% |

Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.6: Number of ART cycles undertaken and live delivery rates associated with various causes of infertility, autologous fresh and thaw cycles, Australia and New Zealand, 2010

| Cause of Infertility | Number of ART cycles initiated (% of ART cycles) | Live delivery rate per 100 cycles (%) |
|---|---|---|
| Male factor only | 12,987 (22.2%) | 19.9% |
| Female factor | 22,054 (37.7%) | 17.1% |
| Tubal disease only | 2,720 (4.6%) | 17.6% |
| Endometriosis only | 8,137 (13.9%) | 15.9% |
| Other female factor only | 9,137 (15.6%) | 17.9% |
| Combined female factor | 2,060 (3.5%) | 17.8% |
| Combined male-female factor | 7,969 (13.6%) | 19.6% |
| Unexplained | 15,154 (25.9%) | 18.7% |
| Not stated | 410 (0.7%) | 5.1% |
| TOTAL | 58,574 (100%) | 18.4% |

Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

### Table A2.7: Average age (years) of females who undertook autologous and recipient ART cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Autologous cycles | 35.0 | 34.9 | 35.1 | 35.3 | 35.4 | 35.5 | 35.7 | 35.8 | 35.8 |
| Recipient cycles | 39.4 | 39.1 | 39.3 | 40.5 | 40.7 | 40.5 | 41.0 | 41.0 | 40.9 |

Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.8: Number of autologous fresh and thaw ART cycles initiated by female age group, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R10 | R10 | 6 | 14, 19 | 14, 19 | 8, 13 | 8, 13 | 2 | 9, 14 |
| Female age group at start of cycle | | | | | | | | | |
| < 30 | 3,996 | 4,398 | 4,406 | 5,143 | 5,539 | 6,021 | 6,373 | 7,303 | 6,469 |
| 30-34 | 10,354 | 11,461 | 12,380 | 14,495 | 14,312 | 15,376 | 16,154 | 17,979 | 15,641 |
| 35-39 | 10,949 | 11,980 | 13,144 | 16,327 | 17,947 | 20,799 | 22,573 | 25,953 | 22,224 |
| 40-44 | 5,483 | 5,868 | NR | 8,155 | 9,153 | 10,680 | 12,663 | 14,853 | 13,194 |
| 45+ | 439 | 438 | NR | 634 | 688 | 819 | 977 | 1,141 | 1,046 |
| Total cycles | 31,253 | 34,145 | 36,782 | 44,754 | 47,643 | 53,696 | 58,740 | 67,229 | 58,574 |

Note: NR = Not reported by the NPESU
Total cycles includes cases with age not recorded
Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.9: Live delivery rates per 100 autologous fresh and thaw ART cycles, and number of live deliveries by female age group, Australia and New Zealand, 2004 to 2010

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | 11, 15 | 14, 19 | 14, 19 | 8, 13 | 8, 13 | 9, 14 | 9, 14 |
| Female age group | | | | | | | |
| < 30 | 24.4% | 22.7% | 25.0% | 25.6% | 25.2% | 23.8% | 26.2% |
| 30-34 | 28.4% | 22.9% | 23.8% | 23.1% | 23.3% | 24.1% | 24.7% |
| 35-39 | 19.8% | 17.1% | 17.3% | 17.4% | 17.4% | 17.4% | 18.6% |
| 40-44 | NR | 6.5% | 7.4% | 7.5% | 7.5% | 7.8% | 7.9% |
| 45 + | NR | 2.7% | 3.2% | 2.6% | 2.0% | 1.0% | 2.6% |
| Total number of live deliveries | 6,496 | 7,826 | 8,609 | 9,528 | 10,257 | 11,732 | 10,770 |

Note NR = Not reported by the NPESU
Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.10: Outcomes of autologous fresh ART cycles by female age group, Australia and New Zealand, 2010

| | Number of ART cycles initiated (% of cycles) | Number of embryo transfer cycles | Number of clinical pregnancies | Number of live deliveries |
|---|---|---|---|---|
| Female age group at start of treatment cycle | | | | |
| <30 | 3,988 | 3,165 | 1,374 | 1,164 |
| 30-34 | 9,150 | 7,561 | 3,022 | 2,451 |
| 35-39 | 13,606 | 10,860 | 3,441 | 2,565 |
| 40-44 | 9,392 | 6,939 | 1,135 | 652 |
| 45+ | 737 | 430 | 9 | 1 |
| Total | 36,873 | 28,955 | 8,981 | 6,833 |

Note: Total includes cases with age not recorded
Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

### Table A2.11: Outcomes of autologous thaw ART cycles by female age group, Australia and New Zealand, 2010

| | Number of ART cycles initiated (% of cycles) | Number of embryo transfer cycles | Number of clinical pregnancies | Number of live deliveries |
|---|---|---|---|---|
| Female age group at start of treatment cycle | | | | |
| <30 | 2,481 | 2,279 | 673 | 530 |
| 30-34 | 6,491 | 5,967 | 1,808 | 1,417 |
| 35-39 | 8,618 | 7,776 | 2,098 | 1,570 |
| 40-44 | 3,802 | 3,345 | 620 | 394 |
| 45+ | 309 | 250 | 35 | 26 |
| Total | 21,701 | 19,617 | 5,234 | 3,937 |

Note : Total includes cases with age not recorded
Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

### Table A2.12: Live delivery rates (%) per 100 autologous fresh and thaw cycles by female age group, Australia and New Zealand, 2010

| Female age group at start of treatment cycle | Live deliveries per 100 initiated cycles (%) | |
|---|---|---|
| | Fresh | Thaw |
| <30 | 29.2% | 21.4% |
| 30-34 | 26.8% | 21.8% |
| 35-39 | 18.9% | 18.2% |
| 40-44 | 6.9% | 10.4% |
| 45+ | 0.1% | 8.4% |
| Total | 18.5% | 18.1% |

Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012

### Table A2.13: Number of oocyte donation cycles with oocyte collection performed by donor female age group, Australia and New Zealand, 2005 to 2010

| | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|
| Data sources (Table numbers) | 24 | 24 | 18 | 18 | 20 | 20 |
| Donor female age group | | | | | | |
| < 30 | 166 | 155 | 150 | 164 | 212 | 214 |
| 30-34 | 341 | 310 | 323 | 305 | 304 | 302 |
| 35-39 | 277 | 279 | 370 | 408 | 385 | 346 |
| 40+ | 42 | 32 | 60 | 49 | 85 | 57 |
| Total | 826 | 777 | 903 | 927 | 986 | 919 |

Note: Total includes cases with age not recorded
Source: Australian Institute of Health and Welfare . Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.14: Number of ART cycles initiated by oocyte and embryo recipients by recipient female age group, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R10 | R10 | 7 | 8 | 7 | 2 | 2 | 2 | 2 |
| Recipient female age group | | | | | | | | | |
| < 30 | 74 | 103 | 68 | 71 | 60 | 60 | 70 | 73 | 75 |
| 30-34 | 199 | 314 | 221 | 220 | 211 | 242 | 180 | 218 | 208 |
| 35-39 | 316 | 417 | 420 | 392 | 417 | 480 | 453 | 509 | 462 |
| 40-44 | 382 | 534 | NR | 686 | 684 | 662 | 768 | 765 | 790 |
| 45+ | 262 | 302 | NR | 442 | 455 | 512 | 528 | 570 | 578 |
| Total | 1,733 | 2,157 | 2,692 | 1,811 | 1,827 | 1,962 | 1,999 | 2,135 | 2,113 |

Note: NR = Not reported by the NPESU
Total includes cases with age not recorded (1074 in 2004)
Source: Table number in the relevant Australian Institute of Health and Welfare. Assisted Reproduction Technology Series nos. 8-16. Canberra: AIHW, 2004 to 2012

### Table A2.15: Live delivery rates per 100 oocyte and embryo recipient ART cycles by recipient female age group, Australia and New Zealand, 2004 to 2010

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | | | | | | | |
| Recipient female age group | t19 | t25 | t25 | t20 | t20 | t22 | t22 |
| < 30 | 14.7% | 21.1% | 16.7% | 15.0% | 15.7% | 19.2% | 18.7% |
| 30-34 | 19.0% | 20.9% | 17.5% | 16.1% | 19.4% | 18.8% | 23.6% |
| 35-39 | 16.4% | 17.9% | 21.1% | 17.3% | 16.8% | 18.1% | 19.9% |
| 40-44 | NR | 15.5% | 17.1% | 17.5% | 18.5% | 19.0% | 16.7% |
| 45+ | NR | 16.3% | 22.4% | 15.4% | 17.6% | 14.7% | 16.4% |

Note: NR = Not reported by the NPESU
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 8-16.Canberra: AIHW, 2004 to 2012

### Table A2.16: Outcomes of ART for oocyte and embryo recipients by recipient female age group, fresh and thaw cycles combined, Australia and New Zealand, 2010

| | Number of ART cycles initiated | Number of embryo transfer cycles | Number of clinical pregnancies | Number of live deliveries | Live deliveries per initiated cycle (%) |
|---|---|---|---|---|---|
| Recipient female age group | | | | | |
| <30 | 75 | 69 | 19 | 14 | 18.7% |
| 30-34 | 208 | 190 | 60 | 49 | 23.6% |
| 35-39 | 462 | 420 | 134 | 92 | 19.9% |
| 40-44 | 790 | 732 | 176 | 132 | 16.7% |
| 45+ | 578 | 512 | 129 | 95 | 16.4% |
| Total | 2,113 | 1,923 | 518 | 382 | 18.1% |

Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010. Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012. Source of data: Table 22

### Table A2.17: Outcomes of ART for oocyte and embryo recipients by donor female age group, fresh and thaw cycles combined, Australia and New Zealand, 2010

| | Number of ART cycles initiated | Number of embryo transfer cycles | Number of clinical pregnancies | Number of live deliveries | Live deliveries per initiated cycle (%) |
|---|---|---|---|---|---|
| Donor female age group | | | | | |
| < 25 | 112 | 98 | 26 | 18 | 16.1% |
| 26-29 | 309 | 282 | 85 | 62 | 20.1% |
| 30-34 | 639 | 572 | 167 | 123 | 19.2% |
| 35-39 | 712 | 652 | 168 | 122 | 17.1% |
| 40+ | 142 | 123 | 21 | 14 | 9.9% |
| Age not recorded | 199 | 196 | 51 | 43 | 21.6% |
| Total | 2,113 | 1,923 | 518 | 382 | 18.1% |

Source: Macaldowie A, Wang YA, Chambers GM, Sullivan EA. Assisted reproductive technology in Australia and New Zealand 2010
Assisted reproduction technology series no. 16. Cat. no. PER 55. Canberra: AIHW, 2012
Source of data: Table 23

## Table A2.18: Number of miscarriages, stillbirth (fetal death) events, neonatal deaths (within 28 days) in autologous and recipient cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R18 | R18 W16 | 21, 22 W23 | 28 W22 | 28, 29 | 24 24 W21 | 28 W21 | 28 W20 | S20 |
| Miscarriage rate per 100 clinical pregnancies (%). Autologous fresh and thaw cycles | 18.3% | 20.5% | 17.6% | 17.8% | 17.6% | 18.1% | 18.8% | 19.1% | NR |
| Miscarriage rate per 100 clinical pregnancies (%). Oocyte and embryo recipient cycles | 21.4% | 26.3% | 23.5% | 24.5% | 19.4% | 22.2% | 24.7% | 22.5% | NR |
| Stillbirth event rate per 100 clinical pregnancies (%). Autologous fresh and thaw cycles | 0.63% | 1.31% | 0.93% | 0.69% | 0.86% | 0.99% | 1.09% | 0.93% | 0.82% |
| Neonatal death rate per 100 clinical pregnancies (%). Autologous fresh and thaw cycles | 0.34% | 0.38% | 0.39% | 0.36% | NR | 0.26% | 0.28% | 0.30% | 0.31% |

Note: NR = Not reported by the NPESU
A stillbirth event refers to no live delivery, and may involve more than one fetus
Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

## Table A2.19: Number of embryo transfers by number of embryos transferred per transfer occasion, autologous and recipient fresh and thaw cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | R8 | R8 | 4 | 5 | 5 | 6 | 6 | W4 | 6 |
| Number of embryos transferred per cycle | Number of cycles (% of the total number of cycles per year) | | | | | | | | |
| One | 7,797<br>28.8% | 9,604<br>32.1% | 13,797<br>40.5% | 18,793<br>48.2% | 23,460<br>56.9% | 29,589<br>63.7% | 34,225<br>67.8% | 39,912<br>69.8% | 35,156<br>69.6% |
| Two | 17,714<br>65.4% | 19,051<br>63.6% | 19,205<br>56.3% | 19,420<br>49.8% | 17,402<br>42.2% | 16,576<br>35.7% | 15,940<br>31.6% | 16,923<br>29.6% | 14,929<br>29.6% |
| Three or more | 1,560<br>5.8% | 1,292<br>4.3% | 1,092<br>3.2% | 749<br>1.9% | 401<br>1.0% | 299<br>0.6% | 330<br>0.7% | 388<br>0.7% | 410<br>0.8% |
| Total number of transfer cycles | 27,071 | 29,947 | 34,094 | 38,962 | 41,263 | 46,464 | 50,495 | 57,223 | 50,495 |

Source: Australian Institute of Health and Welfare . Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

## Table A2.20: Outcomes of embryo transfers by stage of embryo development, autologous and recipient fresh and thaw ART cycles, Australia and New Zealand, 2002 to 2010

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| Data sources (Table numbers) | W21 | | W16 | 16, 21, 27 | 6, 16, 21, 27 | 7 | 7, 11, 16, 22 | W5 | 7, 12, 17, 25 |
| Stage of embryo development when transferred | | | | | | | | | |
| Cleavage stage<br>Live delivery rate per 100 | 23,261 | NR | 28,235<br>5,384 | 30,221<br>6,030 | 30,101<br>6,245 | 32,223<br>6,396 | 31,014<br>6,072 | 28,740<br>5,139 | 24,167<br>4,311 |
| embryo transfer cycles (%) with cleavage stage transfer | 19.4% | NR | 19.1% | 20.0% | 20.7% | 19.8% | 19.6% | 17.9% | 17.8% |
| Blastocyst | 3864 | NR | 5,792 | 8,741 | 11,162 | 14,241 | 19,499 | 28,483 | 26,328 |
| Live delivery rate per 100 embryo transfer cycles (%) with blastocyst transfers | 22.5% | NR | 1,373<br>23.7% | 2,105<br>24.1% | 2,718<br>24.4% | 3,458<br>24.3% | 4,542<br>23.3% | 6,969<br>24.5% | 6,841<br>26.0% |

Note: NR = Not reported by the NPESU
Source: Australian Institute of Health and Welfare. Assisted Reproduction Series nos. 8-16. Canberra: AIHW, 2004 to 2012

**Table A2.21: Number of services for Medicare-funded ART items in New South Wales, Victoria, Queensland and Australia, 2000 to 2011**

| Year | NSW | VIC | QLD | Total Aust |
|---|---|---|---|---|
| 2000 | 41,778 | 35,534 | 28,374 | 130,965 |
| 2001 | 42,224 | 38,168 | 28,273 | 135,155 |
| 2002 | 41,618 | 41,273 | 28,251 | 139,075 |
| 2003 | 44,705 | 42,200 | 30,547 | 145,505 |
| 2004 | 49,464 | 43,484 | 35,579 | 159,156 |
| 2005 | 59,809 | 49,989 | 39,352 | 182,827 |
| 2006 | 64,635 | 53,278 | 39,791 | 195,552 |
| 2007 | 72,238 | 64,445 | 43,266 | 228,241 |
| 2008 | 81,494 | 71,039 | 48,653 | 252,805 |
| 2009 | 90,083 | 79,953 | 53,931 | 282,653 |
| 2010 | 75,814 | 62,388 | 47,301 | 235,743 |
| 2011 | 79,348 | 71,805 | 45,572 | 248,056 |

Source: Medicare Australia online item statistics

**Table A2.22: Number of services for Medicare-funded ART items in South Australia, Western Australia, Tasmania, Australian Capital Territory and Northern Territory, 2000 to 2011**

| Year | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|
| 2000 | 8,526 | 10,722 | 3,145 | 1,835 | 1,051 |
| 2001 | 8,463 | 12,161 | 2,832 | 1,990 | 1,044 |
| 2002 | 8,773 | 12,755 | 3,323 | 2,036 | 1,046 |
| 2003 | 8,335 | 12,696 | 3,436 | 2,565 | 1,021 |
| 2004 | 8,299 | 14,752 | 3,650 | 2,872 | 1,056 |
| 2005 | 9,116 | 15,933 | 3,917 | 3,478 | 1,233 |
| 2006 | 11,533 | 17,560 | 3,638 | 3,784 | 1,333 |
| 2007 | 15,497 | 21,658 | 5,022 | 4,143 | 1,972 |
| 2008 | 17,829 | 22,597 | 4,721 | 4,645 | 1,827 |
| 2009 | 20,486 | 24,501 | 5,343 | 5,607 | 2,749 |
| 2010 | 15,147 | 21,933 | 6,518 | 4,798 | 1,844 |
| 2011 | 15,817 | 22,096 | 6,915 | 4,706 | 1,797 |

Source: Medicare Australia online item statistics

**Table A2.23: Number of services for Medicare-funded ART items per 100,000 population in New South Wales, Victoria, Queensland and Australia, 2000 to 2011**

| Year | Total Aust | NSW | VIC | QLD |
|---|---|---|---|---|
| 2000 | 663 | 622 | 730 | 767 |
| 2001 | 672 | 620 | 772 | 748 |
| 2002 | 682 | 601 | 822 | 732 |
| 2003 | 705 | 640 | 828 | 773 |
| 2004 | 757 | 697 | 839 | 878 |
| 2005 | 889 | 871 | 980 | 985 |
| 2006 | 943 | 939 | 1,036 | 979 |
| 2007 | 1,081 | 1,036 | 1,233 | 1,039 |
| 2008 | 1,181 | 1,157 | 1,341 | 1,144 |
| 2009 | 1,302 | 1,267 | 1,487 | 1,239 |
| 2010 | 1,066 | 1,049 | 1,138 | 1,064 |
| 2011 | 1,102 | 1,079 | 1,287 | 1,003 |

Source: Medicare Australia online item statistics

**Table A2.24: Number of services for Medicare-funded ART items per 100,000 population in South Australia, Western Australia, Tasmania, Australian Capital Territory and Northern Territory, 2000 to 2011**

| Year | TAS | ACT | NT | WA | SA |
|---|---|---|---|---|---|
| 2000 | 648 | 563 | 497 | 557 | 557 |
| 2001 | 584 | 602 | 486 | 624 | 549 |
| 2002 | 682 | 606 | 484 | 644 | 563 |
| 2003 | 699 | 756 | 473 | 632 | 532 |
| 2004 | 735 | 811 | 485 | 718 | 523 |
| 2005 | 795 | 1,017 | 601 | 787 | 583 |
| 2006 | 734 | 1,113 | 647 | 855 | 736 |
| 2007 | 1,006 | 1,200 | 945 | 1,031 | 979 |
| 2008 | 937 | 1,325 | 860 | 1,052 | 1,119 |
| 2009 | 1,052 | 1,578 | 1,273 | 1,112 | 1,276 |
| 2010 | 1,270 | 1,321 | 833 | 970 | 930 |
| 2011 | 1,332 | 1,267 | 798 | 950 | 963 |

Source: Medicare Australia online item statistics

**Table A2.25: Number of services for MBS items 13200, 13201, 13202, 13206 and 13251, 2000 to 2011**

| Item | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13200 | 14,740 | 17,131 | 17,908 | 19,220 | 21,483 | 25,415 | 27,241 | 31,293 | 34,252 | 39,362 | 23,290 | 23,143 |
| 13201 | - | - | - | - | - | - | - | - | - | - | 9,376 | 11,217 |
| 13202 | - | - | - | - | - | - | - | - | - | - | 2,717 | 3,179 |
| 13203 | 13,836 | 12,092 | 12,247 | 12,334 | 12,958 | 13,384 | 14,324 | 14,404 | 14,074 | 14,045 | 10,835 | 9,725 |
| 13206 | 850 | 478 | 413 | 371 | 275 | 353 | 316 | 328 | 345 | 348 | 113 | 141 |
| 13218 | 9,027 | 9,825 | 10,983 | 11,974 | 12,774 | 15,224 | 15,963 | 18,401 | 19,367 | 20,998 | 21,597 | 22,259 |

Source: Medicare Australia online item statistics

**Table A2.26: Number of services for MBS items 13209, 13212, 13215, 13221 and 13218, 2000 to 2011**

| Item | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13209 | 36,382 | 37,486 | 38,484 | 40,350 | 44,839 | 51,728 | 55,150 | 61,683 | 65,510 | 72,531 | 65,075 | 67,072 |
| 13212 | 15,093 | 16,469 | 16,932 | 17,482 | 19,090 | 22,285 | 24,397 | 27,443 | 30,660 | 34,671 | 29,389 | 33,352 |
| 13215 | 12,958 | 14,116 | 14,493 | 15,049 | 16,471 | 19,334 | 21,005 | 23,765 | 26,417 | 30,058 | 41,099 | 47,043 |
| 13221 | 28,079 | 27,558 | 27,615 | 28,725 | 31,266 | 35,104 | 37,156 | 40,259 | 43,127 | 47,430 | 11,080 | 8,459 |
| 13251 | - | - | - | - | - | - | - | 10,665 | 19,053 | 23,210 | 21,172 | 22,466 |

Source: Medicare Australia online item statistics

**Table A2.27: Total Medicare benefits paid for ART items in Australia, New South Wales, Victoria and Queensland, 2000 to 2011**

| Year | Total Aust | NSW | VIC | QLD |
|---|---|---|---|---|
| 2000 | 39,282,172 | 12,744,896 | 11,394,683 | 7,263,273 |
| 2001 | 43,331,145 | 13,929,117 | 12,605,209 | 7,887,896 |
| 2002 | 46,047,277 | 14,313,328 | 13,995,842 | 8,095,249 |
| 2003 | 50,012,333 | 16,350,735 | 14,611,043 | 9,187,099 |
| 2004 | 78,588,383 | 28,362,163 | 20,447,248 | 15,025,968 |
| 2005 | 108,356,138 | 41,626,999 | 26,257,141 | 21,309,728 |
| 2006 | 119,253,745 | 45,399,087 | 28,931,800 | 22,238,603 |
| 2007 | 158,901,453 | 55,331,317 | 41,508,243 | 28,898,378 |
| 2008 | 202,214,080 | 68,692,561 | 56,203,284 | 36,176,318 |
| 2009 | 255,052,094 | 83,263,160 | 73,989,570 | 45,069,681 |
| 2010 | 204,345,942 | 66,682,240 | 58,197,318 | 37,025,230 |
| 2011 | 217,130,806 | 71,487,250 | 64,258,044 | 36,785,575 |

Source: Medicare Australia online item statistics

**Table A2.28: Total Medicare benefits paid for ART items in Tasmania, Australian Capital Territory, Northern Territory, Western Australia and South Australia, 2000 to 2011**

| Year | TAS | ACT | NT | WA | SA |
|---|---|---|---|---|---|
| 2000 | 956,040 | 542,521 | 351,406 | 3,307,690 | 2,721,664 |
| 2001 | 930,683 | 600,504 | 364,547 | 4,149,972 | 2,863,217 |
| 2002 | 1,126,568 | 639,021 | 381,400 | 4,361,782 | 3,134,087 |
| 2003 | 1,216,380 | 846,664 | 389,062 | 4,383,849 | 3,027,501 |
| 2004 | 1,411,100 | 1,446,691 | 574,820 | 6,954,745 | 4,365,649 |
| 2005 | 1,618,076 | 2,324,820 | 755,984 | 8,905,710 | 5,557,680 |
| 2006 | 1,586,950 | 2,519,513 | 900,658 | 10,176,055 | 7,501,080 |
| 2007 | 2,430,901 | 3,168,615 | 1,455,703 | 14,506,500 | 11,601,795 |
| 2008 | 2,550,701 | 3,731,173 | 1,662,341 | 16,824,195 | 16,373,506 |
| 2009 | 3,438,995 | 4,982,710 | 2,699,845 | 20,555,876 | 21,052,257 |
| 2010 | 4,408,600 | 3,799,490 | 1,813,245 | 17,897,569 | 14,522,252 |
| 2011 | 4,990,820 | 3,980,896 | 1,768,361 | 18,493,241 | 15,366,618 |

Source: Medicare Australia online item statistics

# Chapter 3:
# Infant Mortality, Infant Morbidity and Maternal Mortality

Lieu Trinh, Kevin McGeechan

# Chapter Outline

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## Key indicators

**Perinatal mortality**

**Fetal mortality rate**

**Neonatal mortality rate**

**Perinatal mortality rate**

**Infant mortality**

**Infant mortality rate**

**Infant morbidity**

Proportion of babies born prematurely

Proportion of babies born with low birth weight

**Antenatal factors**

Proportion of mothers who had five or more antenatal care visits

Proportion of mothers who smoked during pregnancy

Proportion of mothers who drank alcohol during pregnancy

**Maternal mortality**

Maternal mortality ratio

Maternal mortality rate

## Primary data sources

World Health Organisation, World Health Statistics 2011

Australian Bureau of Statistics, 3304.0 - Perinatal Deaths, and 3302.0 - Deaths 2012

Australian Bureau of Statistics, special data request on fetal, neonatal and perinatal deaths by state and territory 2012

Australian Institute of Health and Welfare, National Perinatal Epidemiology and Statistics Unit's Australia's Mothers and Babies reports, from 2000 to 2009

## Purpose of this chapter

To compare infant mortality, infant morbidity and maternal mortality between Australia and other countries

To describe the trends in infant mortality, infant morbidity and maternal mortality in Australia between 2000 and 2009

To identify population subgroups with higher levels of infant mortality, infant morbidity and maternal mortality than in other groups

To identify areas of data development

## Terms and definitions

**Fetal mortality:** Death of a product of conception prior to the complete expulsion or extraction from its mother and that has attained at least 20 weeks gestational age or a birth weight of 400 grams.[1] The fetal mortality rate is the number of fetal deaths per 1,000 births, including live births and fetal deaths.

**Neonatal mortality:** Death within 28 days after birth.[1] The neonatal mortality rate is the number of neonatal deaths per 1,000 live births.

**Perinatal mortality:** Sum of fetal and neonatal mortality. The perinatal mortality rate is the number of perinatal deaths per 1,000 births including live births and fetal deaths.[1]

**Infant mortality:** Death of a live-born child younger than one year of age. The infant mortality rate is the number of infant deaths per 1,000 live births.[2]

**Preterm birth:** Birth before 37 weeks of gestation.

**Post-term birth:** Birth at or after 42 completed weeks of gestation.

**Low birth weight:** Birth weight of less than 2,500 grams. Very low birth weight is birth weight of less than 1,500 grams. Extremely low birth weight is birth weight of less than 1,000 grams.

**Maternal deaths:** Death while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. Direct maternal death is death from obstetric complications. Indirect maternal death is death from pre-existing health problems or newly developed health problems during pregnancy.

**Maternal mortality ratio:** Present risk of death during pregnancy. Maternal mortality ratio is the number of maternal deaths per 100,000 live births.

**Maternal mortality rate:** Present risk of death due to pregnancy during the female reproductive life. Maternal mortality rate is the number of maternal deaths per 100,000 women of reproductive age, defined as between 15-49 years.

## Data sources and limitations

### The Australian Bureau of Statistics

The Australian Bureau of Statistics (ABS) sources data from state and territory Registrars of Births, Deaths and Marriages. ABS data provide the most complete ascertainment of fetal, neonatal, perinatal and infant deaths by place of usual residence. However, the ABS does not collect data on infant morbidity, maternal mortality and antenatal factors.

### Australian Institute of Health and Welfare

The Australian Institute of Health and Welfare (AIHW) National Perinatal Epidemiology and Statistics Unit produces the annual Australia's Mothers and Babies reports. Data are from state and territory health departments which source data from maternal and perinatal administrative and clinical record systems. The AIHW collects a large range of indicators that are not collected by the ABS. However, the AIHW data has several limitations:[1]

- Data are often reported by place of occurrence rather than by mothers' usual place of residence. Many women travel interstate and territory to give birth. For example, around 16% of women who give birth in the ACT do not live in the ACT. Data by usual place of residence was only reported in recent years for some indicators.
- Data on perinatal deaths may not be complete because deaths that occur at home, during transfer to other facilities or during readmission may not be recorded. Deaths of patients from other states and territories are also not recorded.
- Data on Indigenous status of babies is limited for this period of reporting.[3,4] The Indigenous status of mothers is reported and used as a proxy for the baby. The Indigenous status of fathers is not reported. In VIC, the Indigenous status of babies has been only reported from 2009. There have been improvements in ascertainment of Indigenous status in all jurisdictions in recent years.
- Reporting of maternal death is not mandatory at a national level. Notifications involve several levels of reporting and review. There are inconsistencies among states and territories in notification protocols of maternal deaths.[5]

### World Health Organisation

The World Health Organisation (WHO) publishes an annual World Health Statistics report which contains data on key health indicators for nearly 200 countries. Data are compiled using multiple sources from each country. Statistical and modelling techniques are used when data are not available.[6]

### Comparison between the ABS, AIHW and WHO data

Table 3.1 presents the different definitions for perinatal deaths used by the AIHW, ABS and WHO. The ABS and WHO define neonatal death as any death of a live born infant occurring within 28 days regardless of gestation or birth weight. The AIHW only reports deaths with birth weight of 400 grams or more, or gestation of 20 weeks or more.

Babies whose birth weight are less than 400 grams, or unavailable with a gestational age of less than 20 weeks are not included in the data, as are babies where the birth weight and gestational age are not recorded.

Due to the different scope, definitions and completeness of data sources, estimates of the same parameter may not be the same. For example, in 2009, the AIHW reported the perinatal mortality rate of 9.8 deaths per 1,000 births, the ABS reported 9 deaths per 1,000 births and the WHO reported 6 deaths per 1,000 births.

For this report, data from the ABS were used for the main indicators of infant mortality and morbidity as data were reported by state and territory of residence hence allowing comparisons between states and territories. Additionally the data included neonatal and infant deaths that occur outside of hospitals or not recorded in clinical recording systems. For indicators that were not collected by the ABS such as gestational age and birth weight, data from the AIHW were used. Refer to Appendix 1 for the detail of data sources for each indicator.

## Table 3.1: Definitions and estimates of fetal, neonatal and perinatal mortality in Australia, variation by reporting system, 2009

| Definition | AIHW | ABS | WHO-International comparison |
|---|---|---|---|
| Live birth | Live births with birth weight>=400 grams or gestational age>=20 weeks | Evidence of life, such as breath or heartbeat, regardless of gestation or birth weight | Evidence of life, such as breath or heartbeat, regardless of gestation or birth weight |
| Fetal death | Death of a fetus with a birth weight>=400 grams or gestational age>=20 weeks | Death of a fetus with a birth weight>=400 grams or gestational age>=20 weeks | Death of a fetus with a birth weight>=1,000 grams or gestational age>=28 weeks |
| Neonatal | Death of a live-born child with a birth weight>=400 grams or gestational age>=20 weeks within 28 days | Death of a live-born child within 28 days, regardless of gestation or birth weight | Death of a live-born child within 28 days, regardless of gestation or birth weight |
| Mortality rate (per 1,000 births) | | | |
| Fetal | 7.8 | 6 | 3 |
| Neonatal | 3* | 3 | 3 |
| Perinatal | 9.8* | 9 | 6 |

Notes: AIHW = Australian Institute of Health and Welfare, ABS = Australian Bureau of Statistics, WHO = World Health Organisation
*Data for Victoria not included

Sources: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths
Li Z, McNally L, Hilder L & Sullivan EA 2011. Australia's mothers and babies 2009. Perinatal statistics series no. 25. Cat. no. PER 52. Sydney: AIHW National Perinatal Epidemiology and Statistics Unit
World Health Statistic, http://www.who.int/whosis/whostat/2011/en/index.html

## Summary

Infant mortality, infant morbidity and maternal mortality rates in Australia between 2000 and 2009 were low and declining compared to other developed countries. However, some indicators on antenatal risk factors remained high. Some population subgroups consistently had higher mortality and morbidity rates, and higher antenatal risk factors than others.

**Perinatal mortality**

In 2009, there were 1,780 fetal deaths and 891 neonatal deaths in Australia. These made up a total of 2,671 perinatal deaths. The perinatal mortality rate reduced from 10 deaths per 1,000 births in 2000 to 9 deaths per 1,000 births in 2009.

**Infant mortality**

There were 1,229 infant deaths in 2010. The infant mortality rate fell from 5.2 deaths per 1,000 births in 2000 to 4.1 deaths per 1,000 births in 2010.

**Infant morbidity**

In 2009, there were around 24,600 preterm births, 2,600 post-term births and 18,300 low birth weight babies in Australia. The proportion of preterm births increased slightly from 7.9% in 2000 to 8.2% in 2009.

The proportion of post-term births decreased from 1.8% in 2000 to 0.9% in 2009. The proportion of low birth weight babies decreased from 6.8% in 2000 to 6.2% in 2009.

**Antenatal factors**

In 2009, nine out of ten Australian mothers had five or more antenatal care visits. Seventy one per cent of mothers in states and territories, where data were available, accessed antenatal care before 14 weeks of pregnancy. The proportion of women who smoked during pregnancy reduced from 19% in 2001 to 15% in 2009. The proportion of women who did not drink alcohol during pregnancy increased from 40% in 2007 to 49% in 2010.

**Maternal mortality**

In a three year period, 2003 to 2005, the maternal mortality ratio was 8.4 deaths per 100,000 women who gave birth. The maternal mortality rate was 0.5 deaths per 100,000 women of reproductive age.

## 3.1 Introduction

There has been a reduction in maternal and infant mortality and morbidity over the last decades. However, millions of children and hundreds of thousands of women still die every year during pregnancy and childbirth around the world.[6] Most of these deaths occur in developing countries. The reduction of child and maternal mortality is included in two of the eight United Nations' Millennium Development Goals.[7]

In Australia, infant mortality has reduced dramatically during the last century, from 100 infant deaths per 1,000 live births in the early 1900s to 50 deaths per 1,000 live births in the 1920s, to less than 10 deaths per 1,000 live births in the 1980s[8,9] and less than five deaths per 1,000 live births in the 2000s.[2] Maternal mortality in Australia also reduced from around one death per 1,000 live births in the 1970s to around 0.5 deaths per 1,000 live births in the early 2000s.[5]

Perinatal morbidity, including prematurity and low birth weight are closely related to neonatal and infant mortality and may affect physical and mental development during childhood. Potentially modifiable antenatal risk factors for neonatal mortality and morbidity include smoking, alcohol and drug consumption during pregnancy, late or no access to antenatal care and other risk factors including pre-existing medical conditions.[10-13] Smoking and alcohol consumption while breastfeeding negatively impact infant health[14-16] and paternal smoking is also associated with infant mortality and morbidity.[17]

Despite reductions in infant mortality and morbidity and maternal mortality, there remain almost 3,000 perinatal deaths, over 1,000 infant deaths and tens of thousands of preterm births and low birth weight babies born each year.[1] Further decreases may be achievable with a reduction in antenatal risk factors. In 2009, 29% of mothers accessed antenatal care after 14 weeks of pregnancy and 15% of mothers smoked during pregnancy.[1]

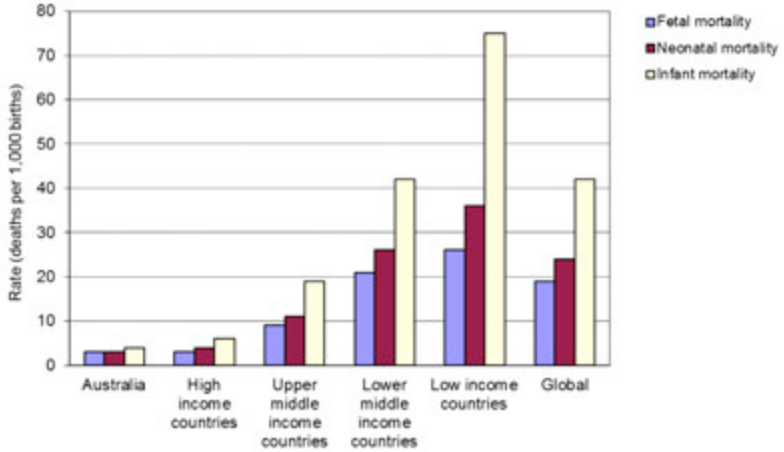
Some population subgroups experience higher infant mortality and morbidity, and maternal mortality than other groups. Maternal deaths in Indigenous women are two and a half times greater than the national average.[5] Indigenous women, women born in developing countries, women living in low socioeconomic areas, teenagers, multiparous women and smokers access antenatal care later than other women.[18] Identifying subpopulation groups with relatively higher levels of infant mortality and morbidity, and maternal mortality is important for policy makers to allocate appropriate resources to improve pregnancy outcomes in these groups.

## 3.2 Fetal, Neonatal, Perinatal and Infant Mortality

### 3.2.1 Fetal, neonatal, perinatal and infant mortality: international comparison

Australia has very low fetal, neonatal and infant mortality rates compared to other countries, and lower than the average of high income countries.[6] For example, in 2009, the infant mortality rate of 4 deaths per 1,000 live births in Australia was lower than the average of 6 deaths per 1,000 live births for high income countries and much lower than the world average of 42 deaths per 1,000 live births (Figure 3.1).

**Figure 3.1: International comparison of fetal, neonatal and infant mortality rates, 2009**



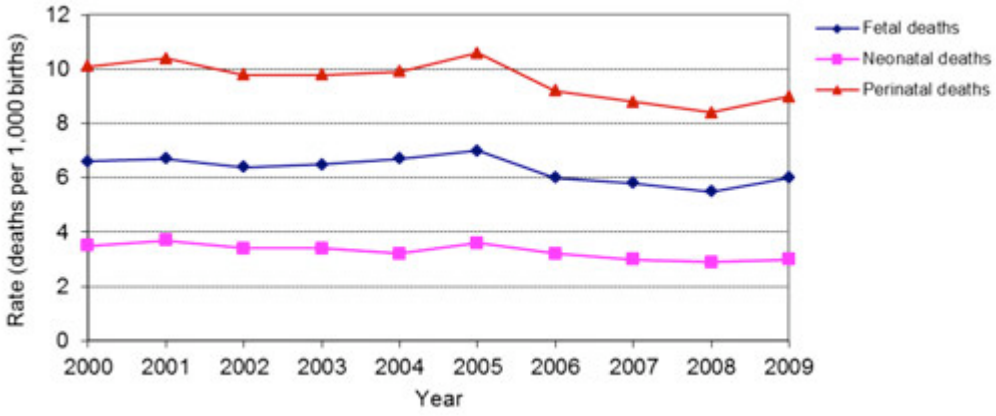

Note: Refer to Appendix 1 for country classification
Fetal mortality rate was number of deaths per 1,000 all births (live births and fetal deaths). Neonatal mortality was number of deaths per 1,000 live births
Infant mortality was number of deaths per 1,000 live births
Source: World Health Statistic - http://www.who.int/whosis/whostat/2011/en/index.html

## 3.2.2 Fetal, neonatal and perinatal mortality

### Fetal, neonatal and perinatal mortality in Australia

In 2009, there were 1,780 fetal deaths and 891 neonatal deaths in Australia. These made up a total of 2,671 perinatal deaths. The fetal mortality rate reduced slightly from 6.6 deaths per 1,000 births in 2000 to 6 deaths per 1,000 births in 2009. The neonatal mortality rate also reduced from 3.5 deaths per 1,000 births in 2000 to 3 deaths per 1,000 births in 2009. These resulted in the reduction of the perinatal mortality rate from 10 deaths per 1,000 births in 2000 to 9 deaths per 1,000 births in 2009 (Figure 3.2).

**Figure 3.2: Fetal, neonatal and perinatal mortality rates in Australia, 2000 to 2009**

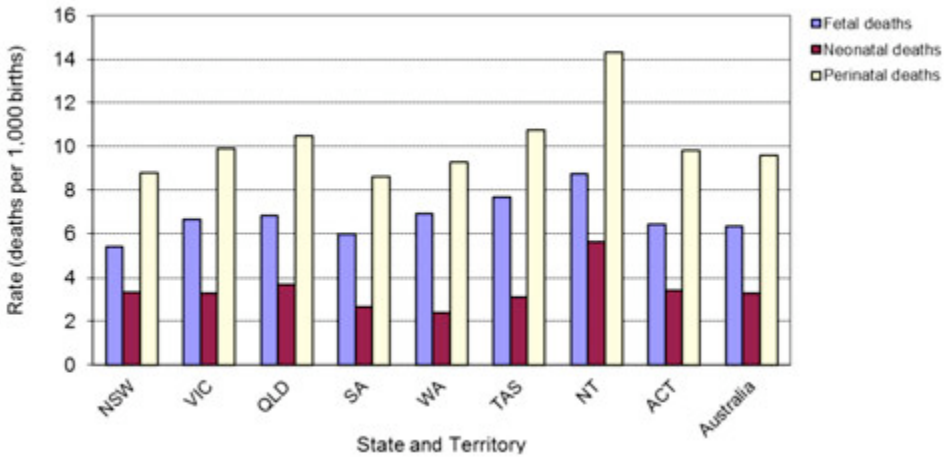



Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Fetal, neonatal and perinatal mortality by state and territory of residence

Due to the small number of deaths in Australia, the number of deaths in each state and territory for each year fluctuated. Because of this, the averages between 2000 and 2009 are presented, instead of numbers for each year (Figure 3.3). NT had the highest fetal mortality rate of 8.7 deaths per 1,000 births, the highest neonatal mortality rate of 5.6 deaths per 1,000 live births and the highest perinatal mortality rate of 14 deaths per 1,000 births. NSW had the lowest fetal mortality rate of 5.4 deaths per 1,000 births. WA had the lowest neonatal mortality rate of 2.4 deaths per 1,000 live births and SA had the lowest perinatal mortality rate of 8.6 deaths per 1,000 births.

**Figure 3.3: Fetal, neonatal and perinatal mortality rates by state and territory of residence, average for 2000 to 2009**




Notes: Fetal mortality rates were calculated as number of deaths per 1,000 all births (live births and stillborn) Neonatal mortality rates were calculated as number of deaths per 1,000 live births
Perinatal mortality rates were calculated as the sum of fetal and neonatal deaths per 1,000 all births
Number of live births from the ABS website was used to calculate denominators

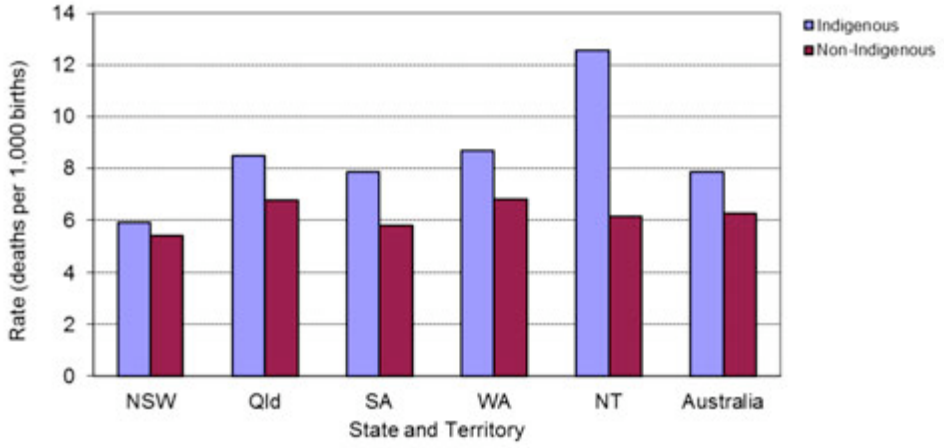
Sources: Australian Bureau of Statistics. Data on fetal, neonatal and perinatal deaths received January 2012
Australian Bureau of Statistics. 3301.0 – Births

### Fetal, neonatal and perinatal mortality by Indigenous status

Indigenous babies consistently had higher fetal, neonatal and perinatal mortality rates than non-Indigenous babies (Figure 3.4, Figure 3.5, Figure 3.6). For instance, the perinatal mortality rate for Indigenous babies was 13 deaths per 1,000 live births and for non-Indigenous babies was 9.5 deaths per 1,000 live births.

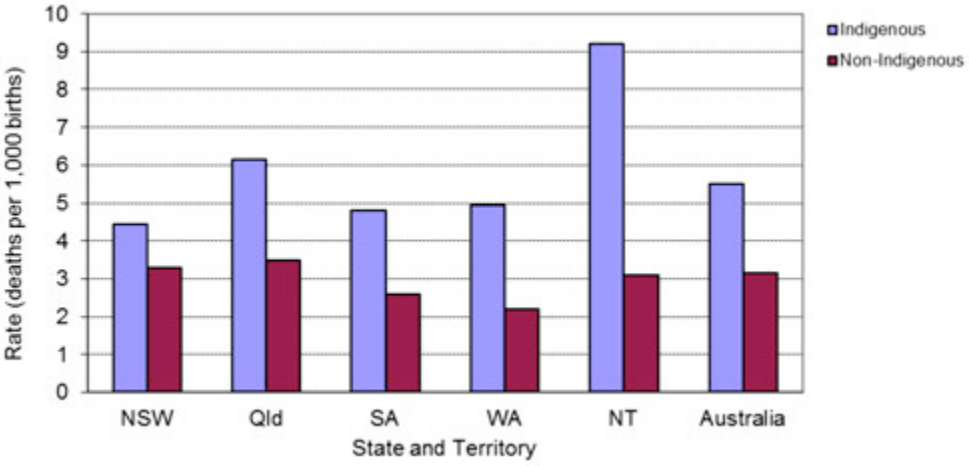
The mortality rates for Indigenous babies in NT were much higher than the mortality rates for Indigenous babies in other states and territories. For example, the fetal mortality rate for Indigenous babies in NT was 13 deaths per 1,000 live births compared to the national average of 7.9 deaths per 1,000 live births (Figure 3.4).

**Figure 3.4: Fetal mortality rate by Indigenous status, by state and territory, average for 2000 to 2009**



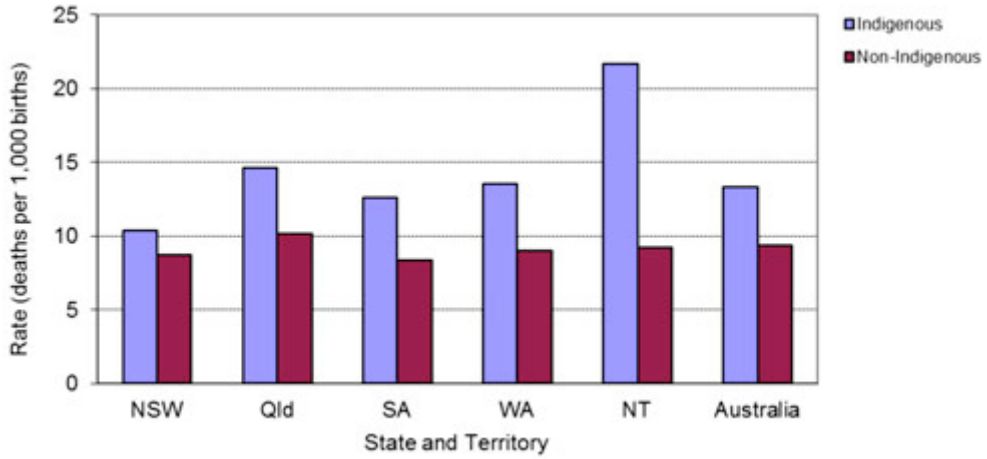

Source: Australian Bureau of Statistics, 3304.0 - Perinatal Death

**Figure 3.5: Neonatal mortality rate by Indigenous status, by state and territory, average for 2000 to 2009**




Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

**Figure 3.6: Perinatal mortality rate by Indigenous status, by state and territory, average for 2000 to 2009**

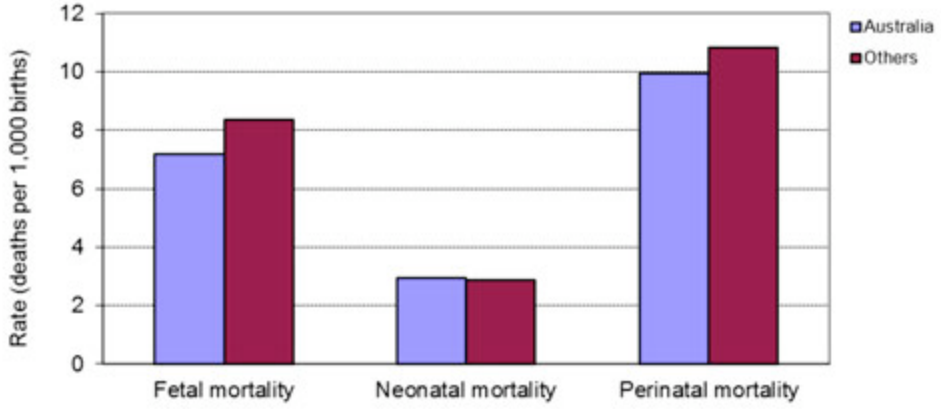



Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Fetal, neonatal and perinatal mortality by maternal country of birth

Babies of mothers born outside Australia had higher mortality rates than babies of mothers born in Australia. The average fetal mortality rate between 2006 and 2009 among babies of mothers born outside Australia was 8.4 deaths per 1,000 births compared to 7.2 deaths per 1,000 births among babies of mothers born in Australia. Similarly, the perinatal mortality rate among babies of mothers born outside Australia was 11 deaths per 1,000 births compared to 10 deaths per 1,000 births among babies of mothers born in Australia. Neonatal mortality rates were similar between babies of mothers born outside Australia and babies of mothers born in Australia (Figure 3.7).

**Figure 3.7: Fetal mortality rate by maternal country of birth, 2006 to 2009**




Note: Rates were the average of rates from 2006-2009
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2006-2009

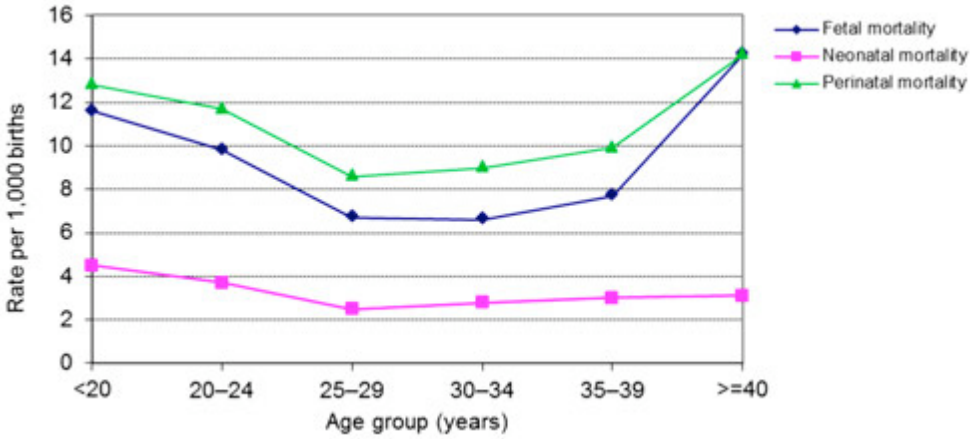
### Fetal, neonatal and perinatal mortality by maternal age

Mortality rates between 2006 and 2009 were lowest among babies of mothers aged 25-29 years (8.6 deaths per 1,000 births) (Figure 3.8). Although perinatal mortality rates for this same period were high among babies of teenage mothers (13 deaths per 1,000 births), the highest levels were among babies of mothers aged 40 years or older (14 deaths per 1,000 births).

### Fetal, neonatal and perinatal mortality by gender

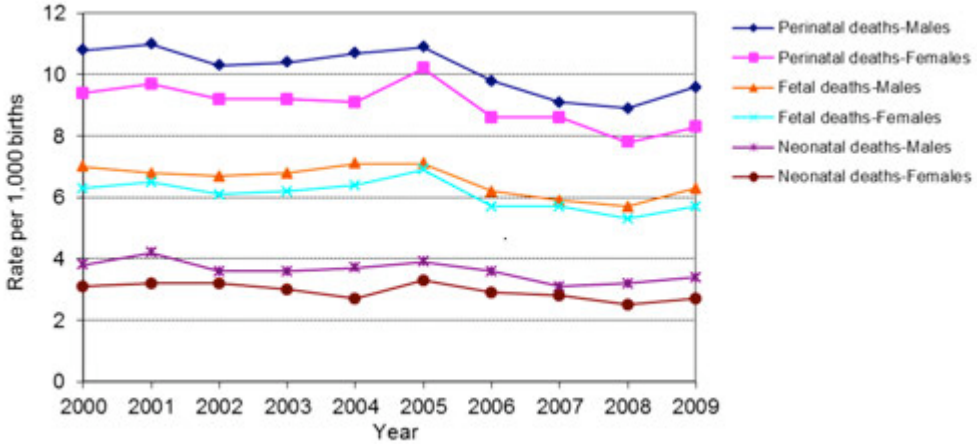
Male babies consistently had higher perinatal mortality rates than females (Figure 3.9). In 2009, the perinatal mortality rate among males was 9.6 deaths per 1,000 live births compared to 8.3 deaths per 1,000 live births for females. Male babies are more likely to be born premature and more susceptible to infections than female babies and this offsets the higher male birth rate.[19]

**Figure 3.8: Fetal, neonatal and perinatal mortality rates by maternal age group, 2009**




Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

**Figure 3.9: Fetal, neonatal and perinatal mortality rates by gender, 2000 to 2009**

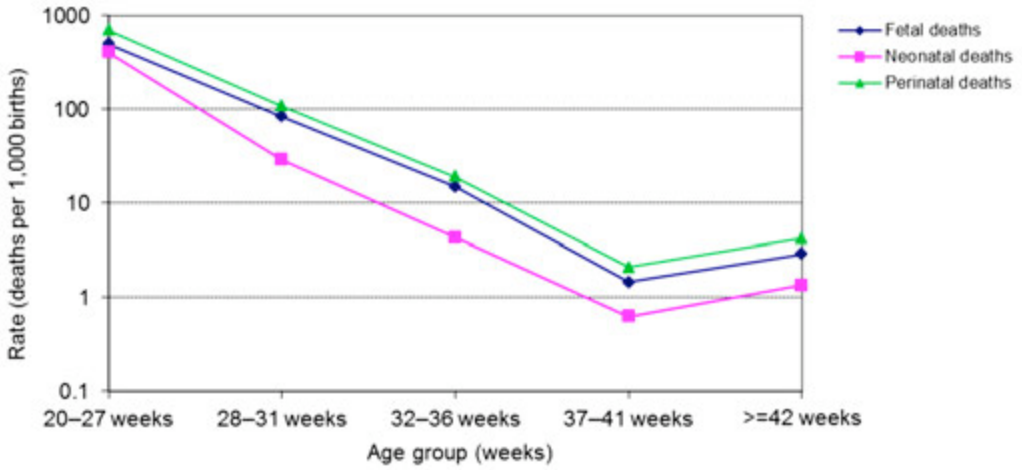



Note: "Male" category includes sex indeterminate
Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Fetal, neonatal and perinatal mortality by gestational age

Every year from 2007 to 2009, there were around 2,700 preterm births at 20-27 weeks, 2,400 preterm births at 28-31 weeks, 19,500 preterm births at 32-36 weeks and 2,600 post-term births in Australia. As the gestational age increases to 41 weeks, all the fetal, neonatal and perinatal mortality rates reduce (Figure 3.10). The perinatal mortality rate then increased slightly to 4.2 deaths per 1,000 births for post-term pregnancy (gestational age >=42 weeks).

**Figure 3.10: Fetal, neonatal and perinatal mortality rates by gestational age, 2007 to 2009**




Note: Logarithmic scale for y-axis of graph
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2007-2009

## 3.2.3 Infant mortality

### Infant mortality in Australia

Data for infant mortality were available up to 2010. There were 1,229 infant deaths in Australia in 2010. Infant mortality rate reduced from 5.2 deaths per 1,000 births in 2000 to 4.1 deaths per 1,000 births in 2010 (Table 3.2).

### Infant mortality by state and territory of residence

The NT consistently had the highest infant mortality rate (Table 3.2). In 2010, the infant mortality rate in NT was 7.2 deaths per 1,000 live births compared to the national average of 4.1 deaths per 1,000 live births. However, infant mortality rates in NT have reduced in the last decade, from 12 deaths per 1,000 live births in 2000 to 7.2 deaths per 1,000 live births in 2010.

**Table 3.2: Infant mortality rate by state and territory of residence, 2000 to 2010**

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 5.2 | 5.3 | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.3 | 4.4 | 4.2 | 4.1 |
| VIC | 4.5 | 4.8 | 5 | 5.1 | 4.5 | 5.1 | 4.3 | 3.8 | 3.7 | 3.9 | 3.3 |
| QLD | 6.2 | 5.9 | 5.8 | 4.8 | 5.2 | 5.1 | 5.3 | 5 | 4.9 | 5.4 | 5.4 |
| SA | 4.6 | 4.6 | 5.1 | 3.7 | 3.2 | 5.1 | 3.2 | 4.5 | 2.9 | 3.7 | 3.8 |
| WA | 4.3 | 5.1 | 4.3 | 4.1 | 3.9 | 4.6 | 4.9 | 2.4 | 3.4 | 3.2 | 3.6 |
| TAS | 5.8 | 6.2 | 6.2 | 7 | 3.6 | 3.5 | 3.9 | 4.2 | 3.8 | 3.6 | 4.1 |
| NT | 12 | 11 | 11 | 8.4 | 11 | 9.6 | 8.9 | 8.5 | 6.1 | 7.1 | 7.2 |
| ACT | 4.2 | 3 | 3.4 | 5.8 | 6.9 | 5.7 | 5.1 | 3.8 | 5 | 3.5 | 3.7 |
| Australia | 5.2 | 5.3 | 4.6 | 4.6 | 4.6 | 4.9 | 4.9 | 4.3 | 4.4 | 4.3 | 4.1 |

Source: Australian Bureau of Statistics, 3302 Deaths

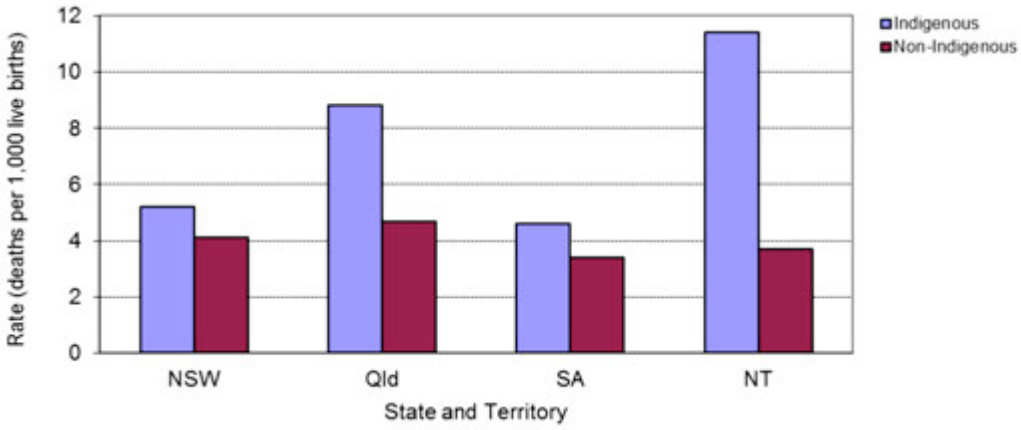
### Infant mortality by Indigenous status

The infant mortality rate was much higher among Indigenous infants than among non-Indigenous infants. The largest difference was seen in NT (Figure 3.11). Between 2008 and 2010, the infant mortality rate in NT was 11 deaths per 1,000 live births for Indigenous infants, almost three times the rate of 3.7 deaths per 1,000 live births for non-Indigenous infants.

### Infant mortality by gender

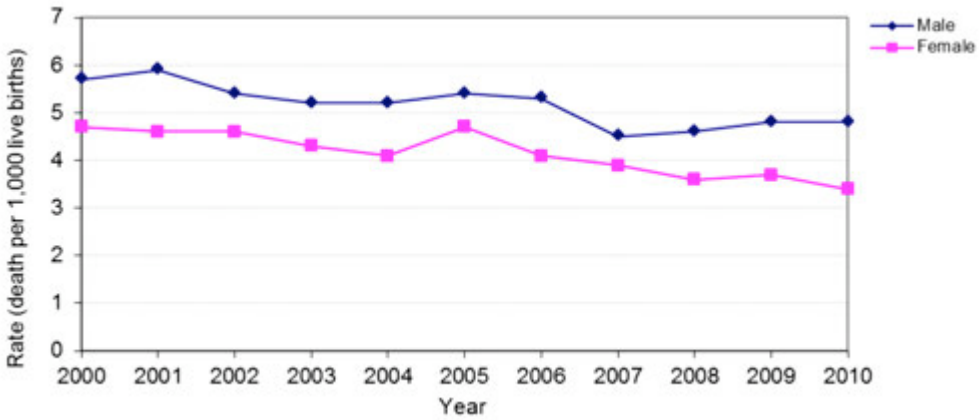
The infant mortality rate for male infants generally exceeded that for females (Figure 3.12). In 2010, the infant mortality rate for males was 4.8 and the infant mortality rate for females was 3.4.

**Figure 3.11: Infant mortality rate by Indigenous status by state and territory, 2008 to 2010**




Note: Data on other states and territories was not available from ABS due to the small number of registered Indigenous deaths
Source: Australian Bureau of Statistics, 3302 Deaths

**Figure 3.12: Infant mortality rate by gender, 2000 to 2010**




Note: "Male" category includes sex indeterminate
Source: Australian Bureau of Statistics, 3302 Deaths

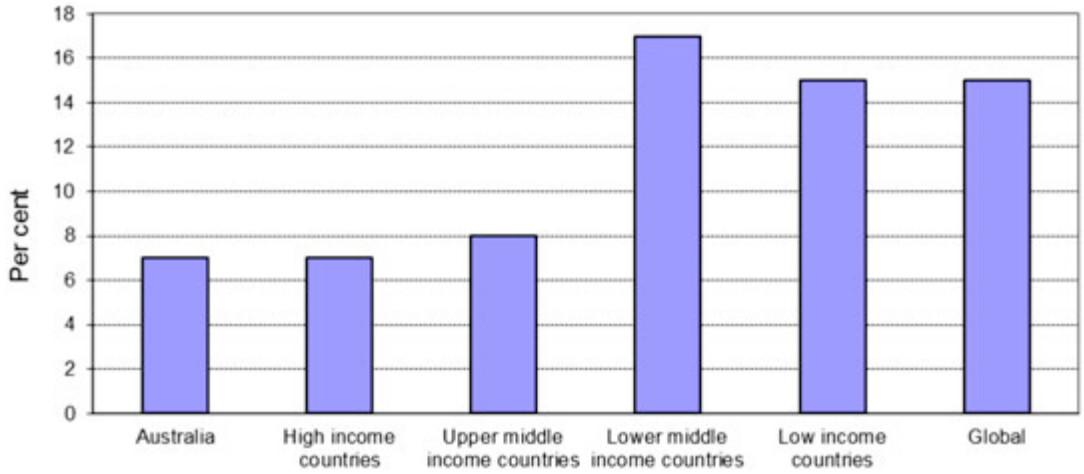
## 3.3 Infant Morbidity

The most common indicators for infant morbidity are preterm birth, post-term birth and low birth weight.

### 3.3.1 Infant morbidity: international comparison

The proportion of low birth weight babies in Australia between 2000 and 2009 was 7%. This was equal to the average for high income countries and half of the world average of 15% (Figure 3.13).

**Figure 3.13: International comparison of low birth weight (<2,500 grams), 2000 to 2009**




Source: World Health Organisation, World Health Statistics 2011

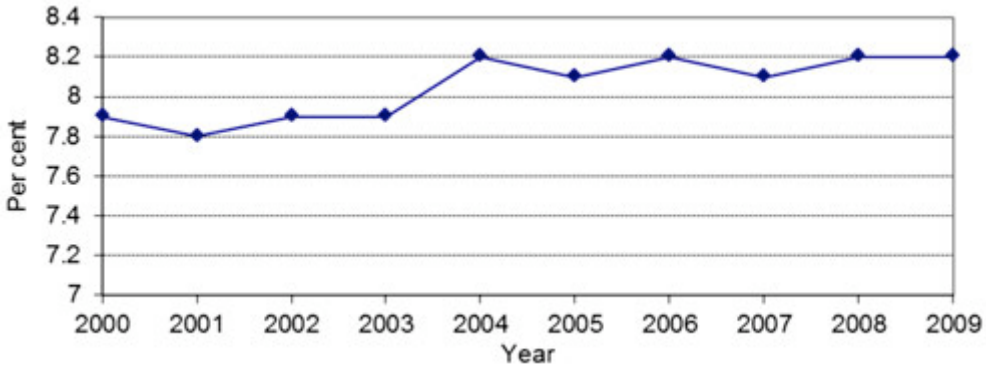
### 3.3.2 Preterm births

The ABS does not collect information on infant morbidity. Information in this section was obtained from the AIHW Australian Mothers and Babies Reports. Data are presented by state and territory of the health facilities rather than state and territory of residence.

#### Preterm births in Australia

In 2009, there were around 24,600 preterm births in Australia. The proportion of preterm births increased slightly from 7.9% in 2000 to 8.2% in 2009 (Figure 3.14). Most of the preterm births occurred during late pregnancy, between 32 and 36 weeks of gestation (from 6.1% to 6.5%). Very small proportions of births occurred between 28 and 31 weeks (<1%) and between 20 and 27 weeks (<1%). The mean gestational age was stable over time, at around 33 weeks.

**Figure 3.14: Proportion of preterm births in Australia, 2000 to 2009**




Note: Per cent of total births
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Preterm births by state and territory of occurrence of births

The NT consistently had the highest proportion of preterm births (between 10% and 12%). NSW consistently had the lowest proportion of preterm births (around 7%) (Table 3.3). However, care must be taken when interpreting these figures because data from the AIHW are reported by location of health facilities rather than by mothers' usual place of residence. For example, in 2009, the reported proportion of preterm births in the ACT was 8.2% but the proportion of preterm births among babies of mothers who lived in the ACT was only 6.9%.

**Table 3.3: Proportion of preterm births by state and territory of occurrence of births, 2000 to 2009**

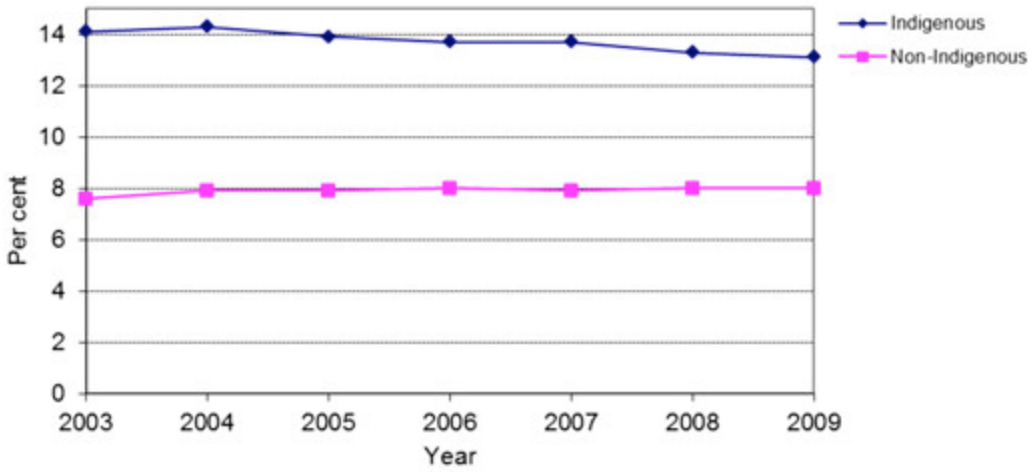
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 7.3 | 7.2 | 7.1 | 7 | 7.3 | 7.2 | 7.4 | 7.4 | 7.5 | 7.3 |
| VIC | 7.6 | 7.6 | 7.9 | 8 | 8.1 | 8.1 | 8.2 | 8.3 | 8.4 | 8.4 |
| QLD | 8.5 | 8.2 | 8.6 | 8.5 | 8.8 | 8.7 | 9 | 8.7 | 8.6 | 8.8 |
| WA | 8.1 | 8.2 | 8.1 | 8.2 | 8.8 | 8.9 | 8.8 | 8.5 | 8.6 | 8.6 |
| SA | 8.3 | 8.1 | 8.3 | 8.4 | 8.7 | 9 | 8.2 | 8.5 | 8.6 | 9 |
| TAS | 7.8 | 8.2 | 8.6 | 9.1 | 8.8 | 6.9 | 8.2 | 8.1 | 9.1 | 8.9 |
| ACT | 9.2 | 9 | 8.6 | 8.8 | 9.9 | 8.9 | 9.1 | 8.7 | 8.5 | 8.4 |
| NT | 11 | 10 | 11 | 11 | 11 | 11 | 12 | 10 | 9.8 | 10 |
| Australia | 7.9 | 7.8 | 7.9 | 7.9 | 8.2 | 8.1 | 8.2 | 8.1 | 8.2 | 8.2 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Preterm births by Indigenous status

The proportion of preterm births among Indigenous babies decreased slightly from 14% in 2003 to 13% in 2009. The proportion of preterm births among non-Indigenous babies was stable at around 8% (Figure 3.15).

**Figure 3.15: Proportion of preterm births by Indigenous status, 2003 to 2009**

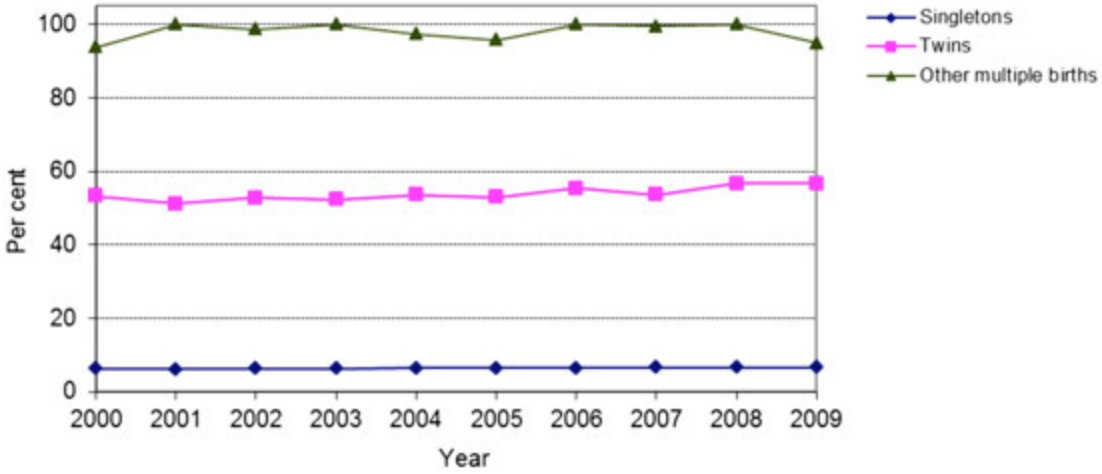



Source: Australian Institute of Health and Welfare, Australia's Mothers and Babies reports 2003-2009

### Preterm births by plurality

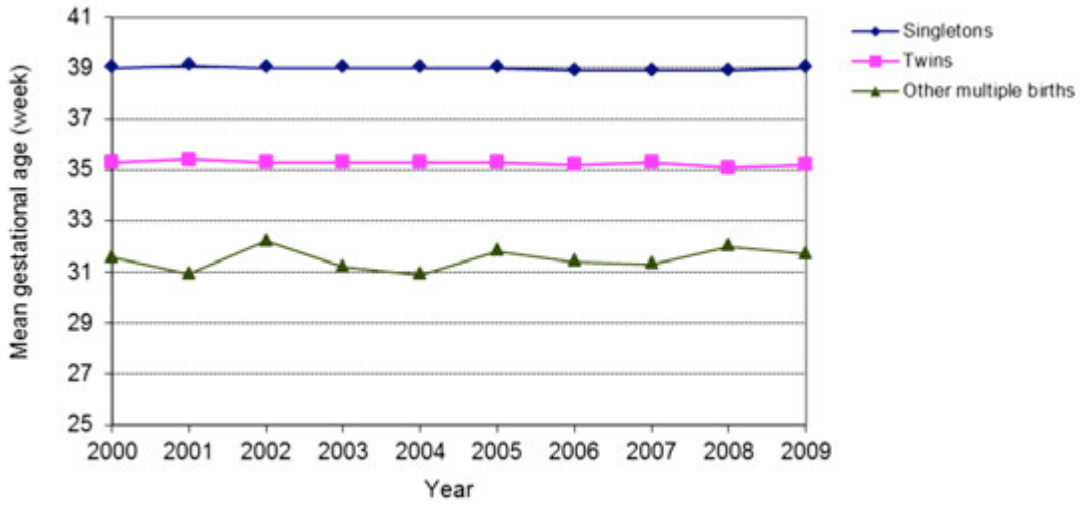
In 2009, there were 9,030 twins and 261 other multiple births in Australia. Nearly all triplets and quadruplets were born preterm. More than half of twins were born preterm (Figure 3.16). Mean gestational age was approximately 31 weeks for triplets and quadruplets, around 35 weeks for twins and around 39 weeks for singletons (Figure 3.17).

**Figure 3.16: Proportion of preterm births by plurality, 2000 to 2009**




Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

**Figure 3.17: Mean gestational age by plurality, 2000 to 2009**



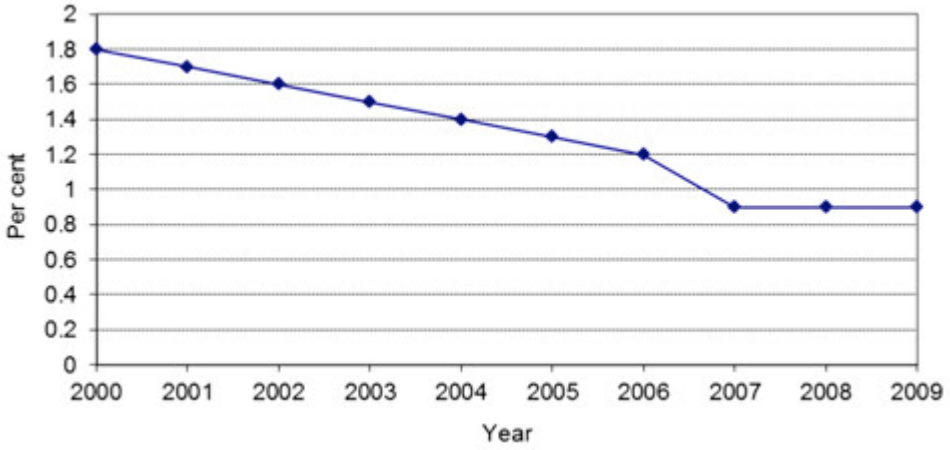

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

## 3.3.3 Post-term births

### Post-term births in Australia

In 2009, there were 2,624 post-term babies born in Australia. The proportion of post-term babies decreased from 1.8% in 2000 to 0.9% in 2007 and remained stable until 2009 (Figure 3.18).

**Figure 3.18: Proportion of post-term birth in Australia, 2000 to 2009**




Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Post-term births by state and territory of occurrence of births

Between 2000 and 2009, the proportion of post-term births reduced in all states and territories (Table 3.4). NSW had the largest reduction, from the highest proportion of post-term births in Australia in 2000 (2.5%), to one of the states and territories with a lower proportion in 2009 (0.8%). SA had the lowest percentage of post-term births (0.4% in 2009).

**Table 3.4: Percentage of post-term births by state and territory of occurrence of births, 2000 to 2009**

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 2.5 | 2.5 | 2.4 | 2.5 | 2.1 | 1.9 | 1.6 | 1 | 0.8 | 0.8 |
| VIC | 1.3 | 1.3 | 1.2 | 1.2 | 1.3 | 1.3 | 1.4 | 1.3 | 1.4 | 1.4 |
| QLD | 1.9 | 1.5 | 1.3 | 1 | 0.8 | 0.7 | 0.6 | 0.7 | 0.7 | 0.7 |
| WA | 1 | 0.9 | 0.8 | 0.9 | 0.8 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 |
| SA | 1.2 | 1.1 | 1 | 0.9 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| TAS | 1.6 | 1.2 | 1.2 | 1.1 | 1.1 | 1 | 1 | 1 | 0.9 | 0.6 |
| ACT | 2.5 | 1.6 | 2.7 | 1.7 | 1.5 | 1.8 | 1.6 | 1.4 | 1.8 | 1.7 |
| NT | 1.4 | 1.6 | 2 | 0.8 | 1 | 0.5 | 0.8 | 0.6 | 0.9 | 0.8 |
| Australia | 1.8 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 |

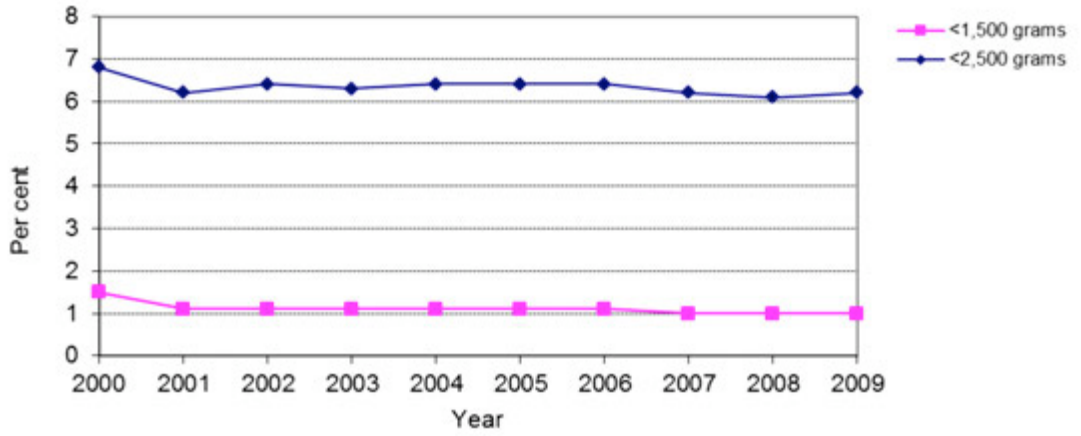
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

## 3.3.4 Low birth weight

### Low birth weight in Australia

In 2009, there were 18,347 babies weighing less than 2,500 grams (6.2%), 3,017 babies weighing less than 1,500 grams (1.0%) and 1,357 babies weighing less than 1,000 grams (0.5%) in Australia. The proportion of babies weighing less than 2,500 grams decreased slightly from 6.8% in 2000 to 6.2% in 2009. The proportion of babies weighing less than 1,500 grams also decreased slightly from 1.5% in 2000 to 1% in 2009 (Figure 3.19). The mean birth weight between 2000 and 2009 was around 3,400 grams.

**Figure 3.19: Proportion of babies with low birth weight in Australia, 2000 to 2009**




Note: Birth weights "Less than 1500g" and "Less than 2500g" are cumulative
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Low birth weight by state and territory of occurrence of births

Between 2000 and 2009, live born babies in NT consistently had lower birth weight than live born babies in any other state or territory. The proportions of babies born in NT with birth weight less than 2,500 grams ranged from 8% to 10% (Table 3.5). The average birth weight of babies born in NT was around 3,300 grams, 100 grams lighter than the national average of 3,400 grams.

**Table 3.5: Proportion of babies with low birth weight (<2,500 grams) by state and territory of occurrence of births, 2000 to 2009**

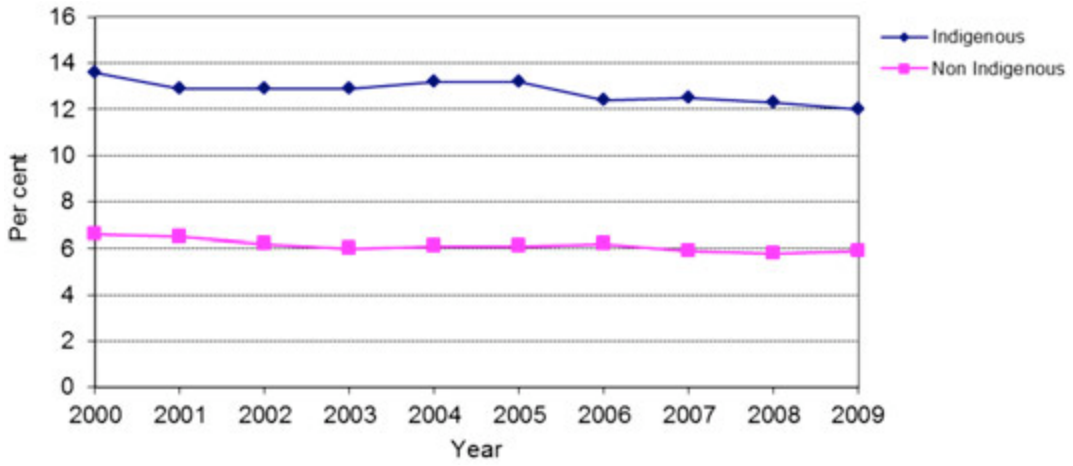
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 6.4 | 6 | 6 | 5.8 | 5.9 | 5.9 | 6 | 5.7 | 5.8 | 5.6 |
| VIC | 6.7 | 6.2 | 6.5 | 6.4 | 6.3 | 6.4 | 6.4 | 6.3 | 6.2 | 6.3 |
| QLD | 7.1 | 6.3 | 6.8 | 6.5 | 6.7 | 6.6 | 6.8 | 6.3 | 6.3 | 6.6 |
| WA | 6.9 | 6.5 | 6.2 | 6.4 | 6.6 | 6.5 | 6.4 | 6.4 | 6.2 | 6.2 |
| SA | 7.2 | 6.3 | 6.6 | 6.5 | 6.6 | 7 | 6.4 | 6.4 | 6.4 | 6.8 |
| TAS | 6.7 | 6.4 | 6.9 | 7.6 | 7.1 | 6.1 | 6.2 | 6.7 | 6.8 | 6.2 |
| ACT | 7.6 | 6.7 | 7 | 6.5 | 7.9 | 7.3 | 7.4 | 7.2 | 6.5 | 6.6 |
| NT | 9.8 | 8.7 | 8.2 | 9.7 | 9.3 | 9.6 | 9.8 | 7.9 | 8 | 9.2 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Low birth weight by Indigenous status

Between 2000 and 2009, Indigenous babies consistently had lower birth weight than non-Indigenous babies. The proportion of Indigenous babies with birth weight less than 2,500 grams reduced from 14% in 2000 to 12% in 2009 but was still double the figure for non-Indigenous babies (around 6%) (Figure 3.20). The average birth weight of Indigenous babies was around 3,200 grams, 200 grams lighter than the average birth weight of 3,400 grams of non-Indigenous babies.

**Figure 3.20: Proportion of babies with low birth weight (<2,500 grams) by Indigenous status, 2000 to 2009**




Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

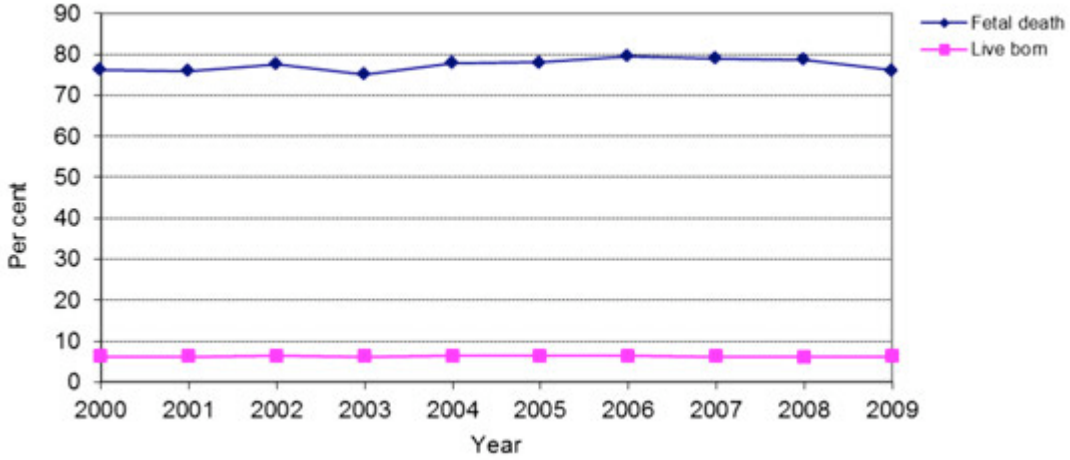
### Low birth weight by maternal smoking status

Live born babies of mothers who smoked during pregnancy had lower birth weight than babies of mothers who did not smoke. Between 2005 and 2009, the proportion of babies with birth weight less than 2,500 grams of mothers who smoked was around 11%, more than double the figure for babies of mothers who did not smoke (around 5%).

### Low birth weight by birth status

Stillborn babies were much lighter than live born babies. Stillborn babies had a mean birth weight of around 1,300 grams, much less than the mean birth weight of live born babies (around 3,400 grams). The majority of stillborn babies had a birth weight less than 1,500 grams (around 65%) and less than 2,500 grams (around 75%). On the contrary, very few live born babies had a birth weight less than 1,500 grams (around 1%) and less than 2,500 grams (around 6%) (Figure 3.21).

**Figure 3.21: Proportion of babies with low birth weight (<2,500 grams) by birth status, 2000 to 2009**

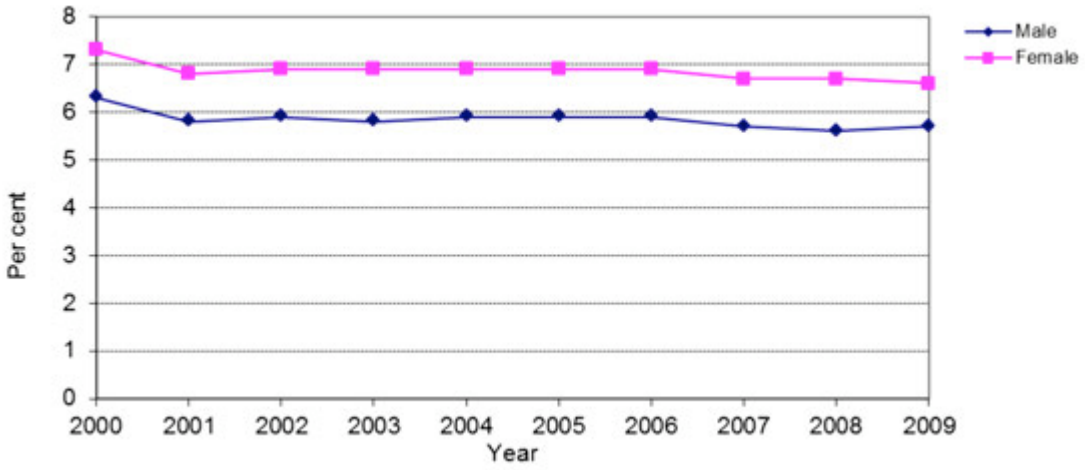



Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Low birth weight by gender

Female live born babies were lighter than male live born babies. Between 2000 and 2009, the average birth weight of female live born babies was around 3,300 grams, 100 grams lighter than the average birth weight of male live born babies of around 3,400 grams. The proportion of female babies with a birth weight less than 2,500 grams was consistently higher than that of male babies. For example, in 2009, the proportion of female babies with a low birth weight was 6.9%, higher than the figure of 5.9% for male babies (Figure 3.22).

**Figure 3.22: Proportion of babies with low birth weight (<2,500 grams) by gender, 2000 to 2009**



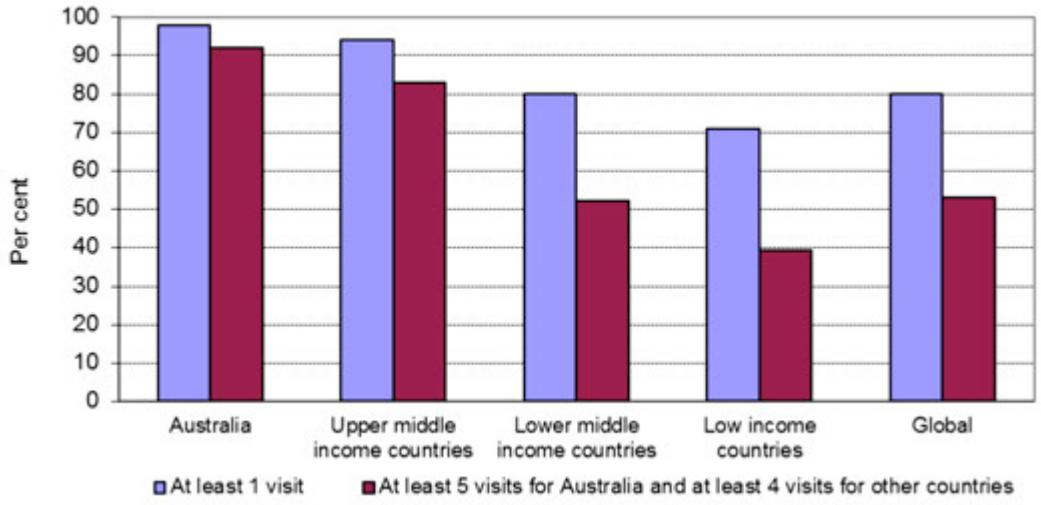

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

## 3.4 Antenatal factors

### 3.4.1 Antenatal factors: international comparison

Figure 3.23 presents the average number of antenatal care visits for the period 2000 to 2010 from the WHO. Almost all women in Australia had at least one antenatal care visit (98%) during pregnancy. This was higher than the world average of 80%. The proportion of women who had at least five antenatal care visits in Australia was 92%, much higher than the world average of 53% of women who had at least four antenatal care visits.

**Figure 3.23: International comparison of number of antenatal care visits for the period 2000 to 2010**



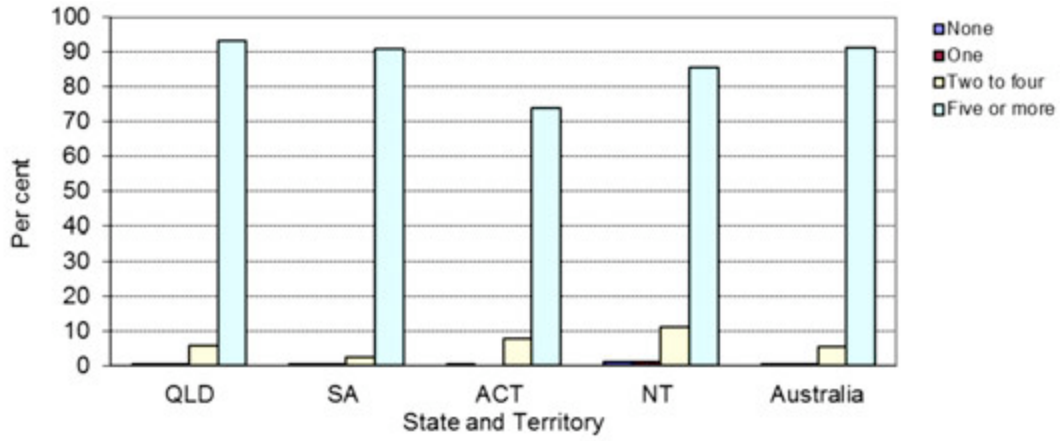

Note: Data for high income countries was not available
Source: World Health Organisation, World Health Statistics 2011

## 3.4.2 Antenatal care

### Antenatal care in Australia

Antenatal care visit data were available for QLD, SA, NT (2007 to 2009) and the ACT (2009). In 2009, between 74% and 93% of mothers in these states and territories had five or more visits. Very small proportions of women had no antenatal care visits (up to 1.2% in NT) (Figure 3.24).

**Figure 3.24: Antenatal care visits in Australia by state and territory, 2009**




Note: For the ACT, two to four antenatal visits includes women who had one and five antenatal visits
Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

Pregnancy duration at first antenatal visit data were available for NSW, QLD, SA, ACT and NT. In 2009, 71% of mothers in these states and territories entered antenatal care before 14 weeks of pregnancy.

### Antenatal care by state and territory of occurrence of births

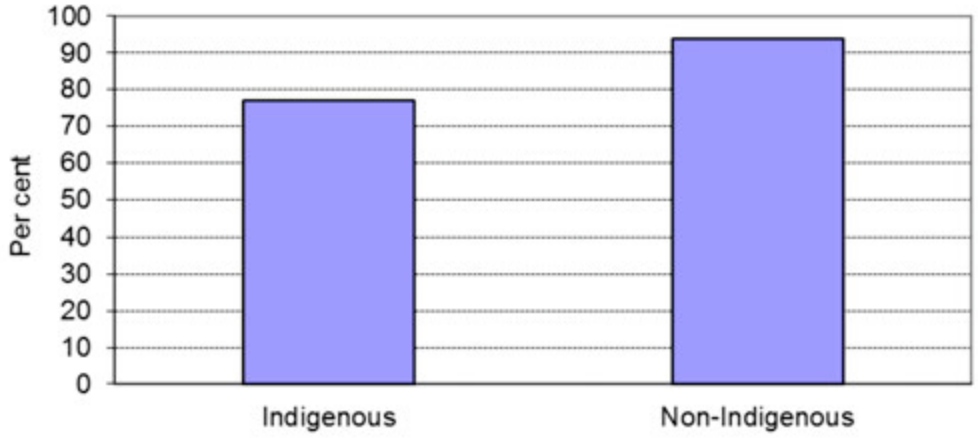
In 2009, the proportion of mothers who had five or more visits was highest in QLD (93%) and lowest in the NT (86%). The proportion of women who had five or more visits in the ACT was low (74%) because a number of women who had five visits were included in the two to four visits group (Figure 3.24).

### Antenatal care by Indigenous status

Indigenous mothers had fewer antenatal care visits than non-Indigenous mothers. Of mothers who gave birth at 32 weeks of pregnancy or more, the proportion of mothers who had five or more antenatal care visits was 77% for Indigenous mothers, much lower than 94% for non-Indigenous mothers (Figure 3.25).

The Healthy For Life program, an Australian Government funded program which aimed to improve the health of Indigenous people, data showed that in 2008, 49% of Indigenous mothers attended antenatal care during the first trimester, a 7% increase from 42% in 2007.[20] These figures were much lower than the 71% of the Australian mothers who attended antenatal care before 14 weeks of pregnancy.[1]

**Figure 3.25: Proportion of mothers who had five or more antenatal care visits by Indigenous status, 2007 to 2009**



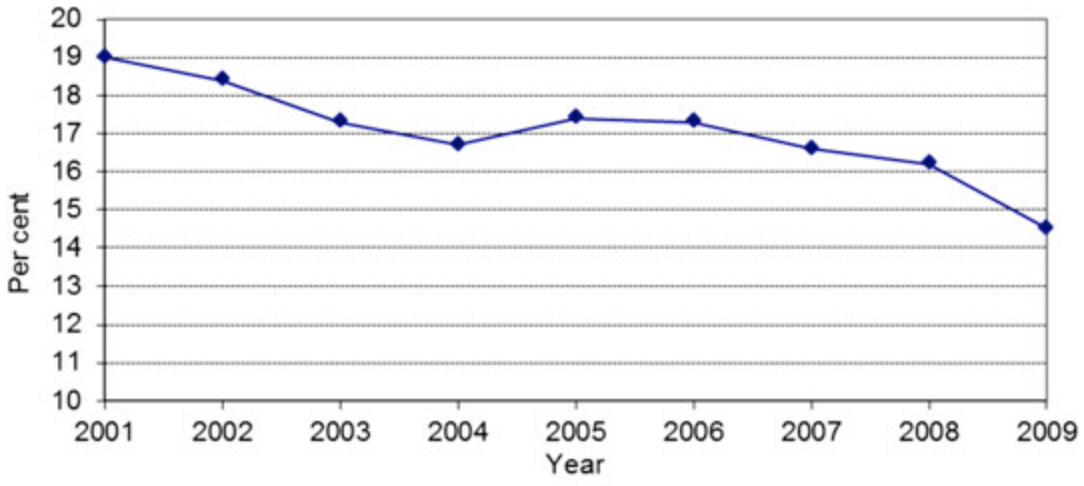

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2007-2009

## 3.4.3 Smoking during pregnancy

### Smoking during pregnancy in Australia

Data on smoking during pregnancy were available from the AIHW from 2001. The proportion of women who smoked during pregnancy reduced from 19% in 2001 to 15% in 2009 (Figure 3.27).

**Figure 3.26: Proportion of women who smoked during pregnancy in Australia, 2001 to 2009**

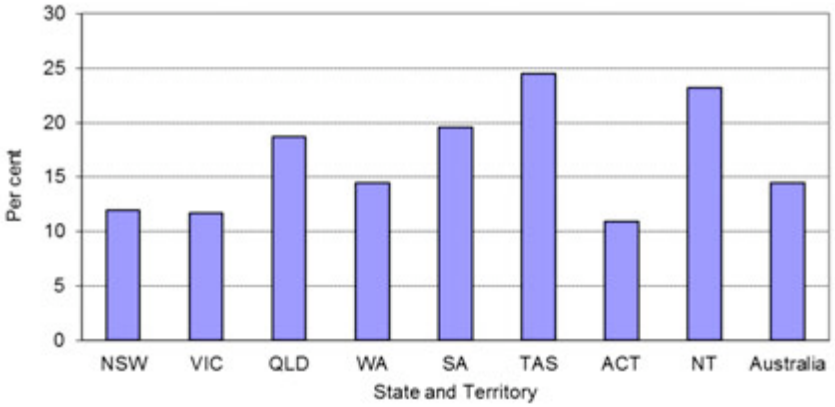



Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2001-2009

### Smoking during pregnancy by state and territory of occurrence of births

In 2009, data on smoking during pregnancy was available for the first time for all states and territories. The proportion of women who smoked during pregnancy ranged from 11% in the ACT to 25% in TAS (Figure 3.27).

**Figure 3.27: Proportion of women who smoked during pregnancy by state and territory of occurrence of births, 2009**

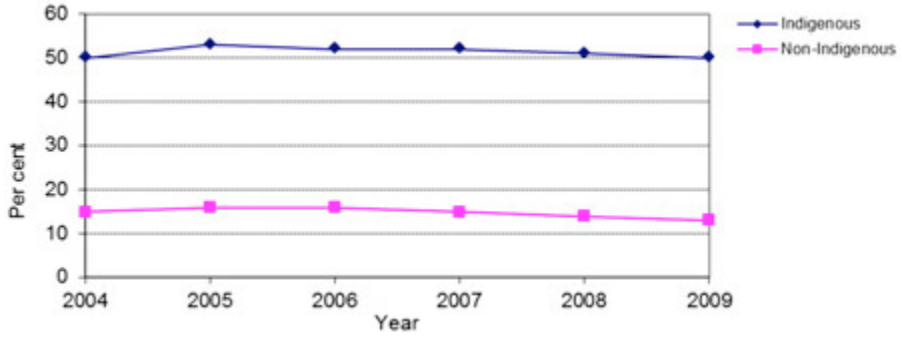



Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

### Smoking during pregnancy by Indigenous status

Between 2004 and 2009, around half of Indigenous mothers smoked during pregnancy compared to around 15% of non-Indigenous mothers (Figure 3.28).

**Figure 3.28: Proportion of women who smoked during pregnancy by Indigenous status, 2004 to 2009**

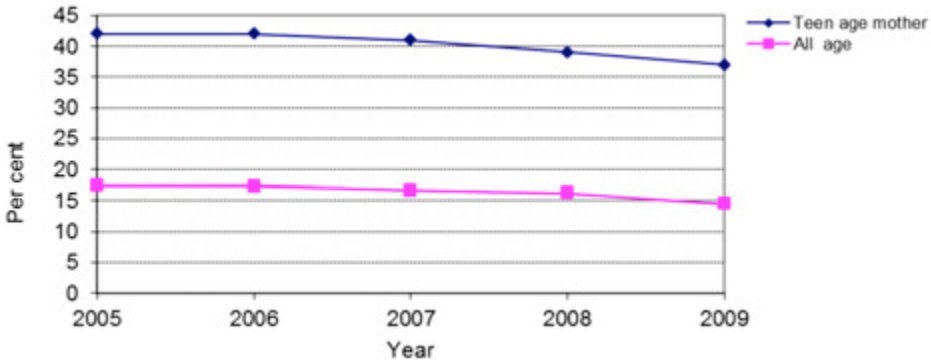



Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2004-2009

### Smoking during pregnancy in teenage mothers

Smoking among teenage mothers reduced from 42% in 2005 to 37% in 2009 but was still much higher than the national average of 15% in 2009 (Figure 3.29).

**Figure 3.29: Proportion of teenage mothers who smoked during pregnancy, 2005 to 2009**




Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2005-2009

### 3.4.4 Alcohol consumption during pregnancy

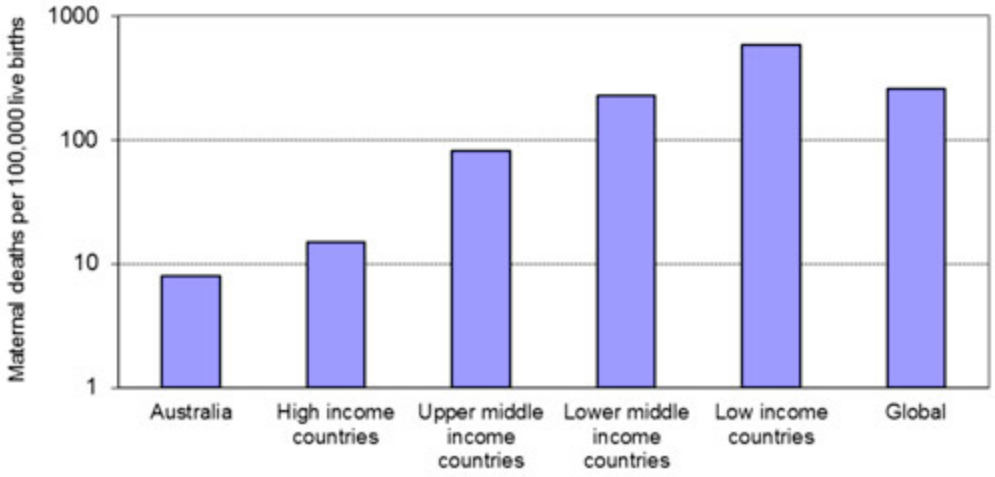
Pregnant women are recommended to abstain completely from alcohol during pregnancy.[21] In the 2010 national survey on 819 pregnant women, nearly half of women (47%) drank alcohol while pregnant before knowing that they were pregnant and 20% of women drank while pregnant, knowing that they were pregnant.[22] For breastfeeding women, around 34% did not drink alcohol in the 2010 survey, an increase of 9%, from 25% in the 2007 survey.[23]

## 3.5 Maternal Mortality

### 3.5.1 Maternal mortality: international comparison

In 2008, the maternal mortality ratio in Australia was eight deaths per 100,000 live births, which was around half of the high income country average of 15 deaths per 100,000 live births and much lower than the world average of 260 deaths per 100,000 live births (Figure 3.30).

**Figure 3.30: International comparison of maternal mortality ratio, 2008**




Note: Logarithmic scale for y-axis of graph
Source: World Health Organisation, World Health Statistics 2011

### 3.5.2 Maternal mortality in Australia

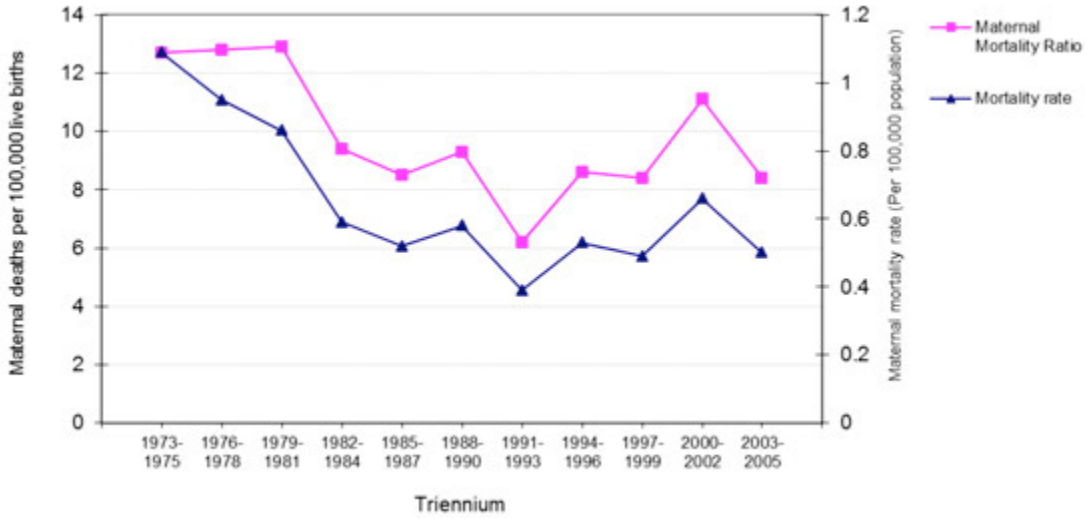
Available data from previous years showed that maternal mortality in Australia is very rare. From 2003 to 2005, 65 maternal deaths were recorded (29 direct and 36 indirect maternal deaths). The direct causes included amniotic fluid embolism, hypertensive disorders, thrombosis, obstetric haemorrhage and cardiac conditions. The indirect causes included cardiac conditions, psychosocial causes, non-obstetric haemorrhage and infections.

The AIHW used a three-year period for reporting national maternal mortality ratios. Because of the small number of cases and inconsistent case ascertainment over time, maternal mortality data should be interpreted with caution when making comparisons or assessing trends.

The maternal mortality ratio declined from over 12 deaths per 100,000 women who gave birth in the 1970s and early 1980s, to around 8.4 deaths per 100,000 women who gave birth between 2003 and 2005. The maternal mortality rate also reduced from 1.1 deaths per 100,000 women of reproductive age in 1973-1975 to 0.5 deaths per 100,000 women of reproductive age in 2003 to 2005 (Figure 3.31).

Decrease in direct maternal mortality and population growth has been attributed to the decreasing maternal mortality ratio and rate. The higher maternal mortality ratio and maternal mortality rates for 2000 to 2002 may reflect the improvement in case ascertainment and changes in the classification of deaths. In particular, the change in the classification of some causes of incidental death categories (not previously counted) to indirect maternal deaths (counted) resulted in a marked increase in maternal mortality for that triennium.

**Figure 3.31: Maternal mortality ratio and maternal mortality rate by triennia 1973-1975 to 2003-2005**




Source: Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

## 3.5.3 Maternal deaths by state and territory of occurrence of births

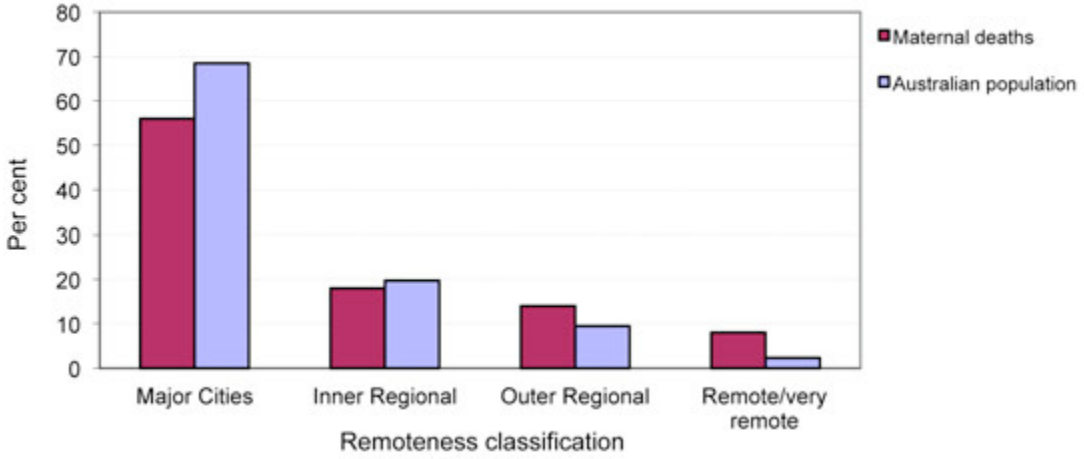
Because of the very small numbers of cases per jurisdiction, maternal deaths by state and territory are reported by six-year periods. For 2000 to 2005, QLD had the highest maternal mortality ratio (13.7 deaths per 100,000 births). WA had the lowest maternal mortality ratio (6.7 deaths per 100,000 births) (Figure 3.32).

There was a disproportionate distribution of maternal deaths by remoteness (Figure 3.33). Over the period 2003 to 2005, outer regional areas accounted for 9% of the Australian population and recorded 14% of maternal deaths. Similarly, remote or very remote areas accounted for only 2% of the population, yet recorded 8% of maternal deaths.

**Figure 3.32: Maternal mortality ratio by state and territory, 2000 to 2005**


Source: Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

**Figure 3.33: Proportion of maternal deaths and population by place of residence, 2003 to 2005**




Sources: Population estimates: Australian Bureau of Statistics 3218.0 - Regional Population Growth, Australia, 2006-07;
Sullivan EA, Hall B and King JF. 2007. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

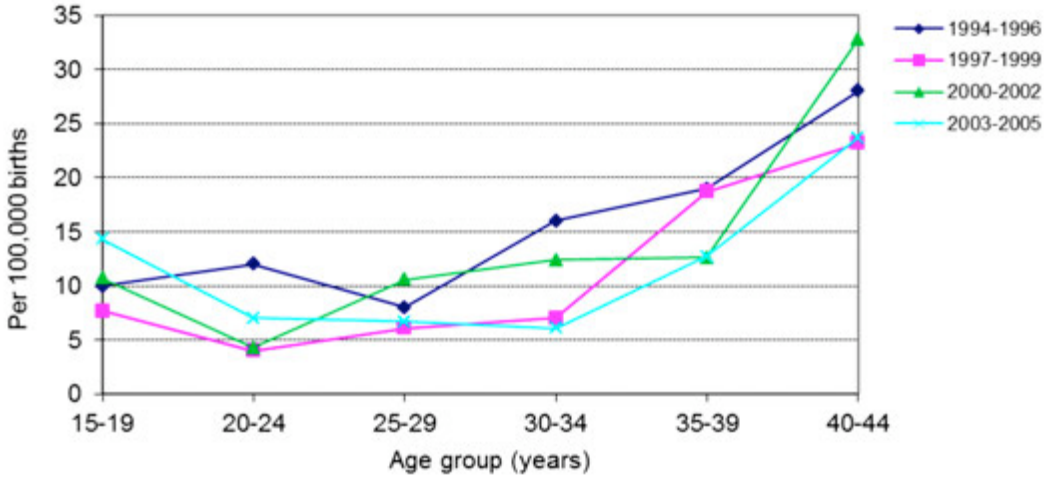
## 3.5.4 Maternal mortality by Indigenous status

In the triennium 2003 to 2005, six maternal deaths were recorded in Indigenous women. The maternal mortality ratio was 22 deaths per 100,000 Indigenous women who gave birth, much higher than the ratio for non-Indigenous women (7.9 deaths per 100,000 births). The number of deaths was too small to make any meaningful statistical inferences.

## 3.5.5 Maternal mortality by age group

Mothers aged between 20 and 24 years had the lowest maternal mortality ratio (from 4.3 to 12 deaths per 100,000 live births, depending on the triennia). After the age of 34, maternal mortality ratios increased sharply and were highest among 40-44 year olds (Figure 3.34).

**Figure 3.34: Maternal mortality ratio by age group, triennia 1994-1996 to 2003-2005**




Note: Mortality rate per 100,000 live births, direct and indirect deaths
Sources: Report on Maternal Deaths in Australia, 1994–96, Commonwealth of Australia 2001 and AIHW Maternal deaths series Cat. Nos. PER 24, 32 and 42 Sydney: AIHW National Perinatal Statistics Unit. Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

## 3.6 Discussion

Australia has lower levels of infant mortality, infant morbidity and maternal mortality than other developed countries. In 2009, the infant mortality rate in Australia was 4 deaths per 1,000 live births, lower than the average of 6 deaths per 1,000 live births for high income countries and considerably lower than the world average of 42 deaths per 1,000 live births. Australia also performs well in relation to other health indicators including life expectancy and immunisation coverage.[6] The WHO ranked the health care system in Australia above the United States and New Zealand.[24] Contributing factors include high quality in patient safety, efficiency and equity with the universal health insurance scheme, Medicare, playing an important role.[25]

### 3.6.1 Fetal, neonatal and infant mortality, and infant morbidity

All infant mortality indicators improved between 2000 and 2009. Improvements in neonatal and intensive care, and reduction of Sudden Infant Death Syndrome in recent years are contributing factors.[26,27] In 2005, the Australian government provided $102.4 million of funding over four years for the Healthy For Life program to improve the health of Indigenous mothers, babies and infants.[28] The proportion of Indigenous perinatal deaths reduced from 14.5% in the five year period 2000 to 2004, before the program to 12% in the five year period 2005 to 2009, during and after the program.[20]

Infant morbidity indicators, except preterm births, also reduced. The proportion of post-term births reduced from 1.8% in 2000 to 0.9% in 2009. The proportion of low birth weight babies reduced from 6.8% in 2000 to 6.2% in 2009. The Healthy For Life program reported a reduction of Indigenous low birth weight babies, from 14.6% in 2007 to 13.3% in 2008.[20]

### 3.6.2 Antenatal factors

There was some improvement of modifiable antenatal risk factors. The proportion of women who smoked during pregnancy reduced from 19% in 2001 to 15% in 2009. National, state and territory legislations to reduce tobacco smoking in the general population since 2001[29] may have contributed to the reduction in smoking during pregnancy.

Almost all Australian women (92%) had five or more antenatal care visits in 2009. A large proportion of women (71%) entered antenatal care before 14 weeks of pregnancy. In a study in NSW in 2004,[18] 59% of women entered antenatal care before 12 weeks of pregnancy. Due to different classifications for late entry to antenatal care, it is not possible to conclude that there had been an improvement.

For Indigenous women, data from the Healthy For Life program show an improvement in the proportion of mothers who attended antenatal care during the first trimester, from 42% in 2007 to 49% in 2008[20] but still compared poorly with the figure of 71% for the general population.

In 2010, the proportion of women who drank alcohol while pregnant reduced from 47% before knowledge of their pregnancy to 20% after knowledge of their pregnancy. Although the decrease was significant, one in five women still drank throughout pregnancy.

### 3.6.3 Higher risk groups

Women living in the NT, Indigenous women, women born outside Australia, teenagers and women aged 40 years or older had higher mortality rates and antenatal risk factors than other women. Babies of these women also had higher levels of perinatal mortality and morbidity. Between 2000 and 2009, the perinatal mortality rate for the NT was 14.0 deaths per 1,000 births compared to the national average of 9.6 deaths per 1,000 births. This high rate is associated with the high proportion of Indigenous people in NT (30% compared to the national average of 2.5%)[30] as well as the high proportion of Indigenous people living in remote or very remote areas (18% in remote areas and 63% in very remote areas compared to the national average of 8% and 16% respectively).[31]

Pregnancy outcomes are consistently poorer among Indigenous mothers and babies. The perinatal mortality rate for Indigenous babies was 13 deaths per 1,000 live births, compared to 9.5 deaths per 1,000 live births for non-Indigenous babies. Poorer health[32] and late entry to antenatal care[18] may partly explain poorer pregnancy outcomes among Indigenous women. Indigenous mothers also have much higher antenatal risk factors than others. Around half of Indigenous mothers smoked during pregnancy compared to only around 15% of non-Indigenous mothers. A cross-sectional survey also found 46% of Indigenous women smoked at the beginning of pregnancy. Factors associated with smoking during pregnancy were low education, high parity, poor knowledge of risks associated with smoking, and negative attitudes toward quitting.[33]

Babies of mothers born outside Australia had higher mortality rates than babies of mothers born in Australia. In the three year period 2006 to 2009, the fetal mortality rate among babies of mothers born outside Australia was 8.4 deaths per 1,000 births compared to 7.2 deaths per 1,000 births among babies of mothers born in Australia. Contributing factors could be related to accessing antenatal care later,[18] lack of information and support, cultural perception and poor English skills.

Maternal age is important in relation to pregnancy outcomes. Teenagers and women aged 40 years or older had poorer pregnancy outcomes than others. In 2009 the perinatal mortality rate for babies of teenage mothers was 13 deaths per 1,000 births and for babies of mothers aged 40 or older was 14 deaths per 1,000 births, much higher than the rate of 8.6 deaths per 1,000 births for babies of mothers aged 25-29. Contributing factors for poorer pregnancy outcomes among very young teenagers are low socioeconomic status and inadequate antenatal care;[34] and smoking during pregnancy.[1] The main cause for poor pregnancy outcomes among older mothers are biological factors including gestational diabetes, hypertension, miscarriage, preeclampsia and placenta previa.[35,36]

### 3.6.4 Data development

The ABS and AIHW data sets each have their own strengths and limitations. Data from ABS provides the most complete ascertainment of deaths by place of usual residence but does not include data on antenatal care, smoking during pregnancy, gestational age, birth weight and maternal mortality. Data from the AIHW include a large range of indicators but are often reported by state or territory of occurrence of births rather than by mothers' usual place of residence. This reflects reporting based on accessing services.

Combining both data sources provides relatively comprehensive information on infant mortality, infant morbidity and maternal mortality in Australia. However, some important information is currently lacking and has been added into the Perinatal National Minimum Data Set. The information includes pregnancy duration at entry to antenatal care, smoking status during the first 20 weeks of pregnancy, smoking status after 20 weeks of pregnancy and number of cigarettes smoked per day after 20 weeks of pregnancy.

Other items should be considered to be included in the Perinatal National Minimum Data Set in the future. These items are alcohol consumption and illicit drug use during pregnancy. Although the Perinatal National Minimum Data Set collects data of mothers and babies, it is possible to collect information on paternal smoking.

Information that may not be collected in the Perinatal National Minimum Data Set but could be collected in early childhood data or surveys include maternal smoking, alcohol consumption and illicit drug use while breastfeeding; and second hand smoking exposure during infancy.

## 3.7 References


1. Li Z, McNally L, Hilder L, Sullivan EA. Australia's mothers and babies 2009. Perinatal statistics series no. 25. Cat. no. PER 52. Sydney: AIHW National Perinatal Statistics Unit, 2011. Available at: http://www.aihw.gov.au/publication-detail/?id=10737420870. Accessed on 19 February 2013.
2. Australian Bureau of Statistics. Deaths, Australia, 2010. ABS Cat. no. 3302.0. Canberra: ABS, 2011. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3302.0Explanatory%2Notes12010?OpenDocument. Accessed on 19 February 2013.
3. Laws PJ, Hilder L. Australia's mothers and babies 2006. Perinatal statistics series no. 22. Cat. no PER 46. Sydney: AIHW National Perinatal Statistics Unit, 2008. Available at: http://www.aihw.gov.au/publicationdetail/?id=6442468191. Accessed on 19 February 2013.
4. Leeds KL, Gourley M, Laws PJ, Zhang J, Al-Yaman F, Sullivan EA. Indigenous mothers and their babies, Australia 2001–2004. Perinatal statistics series no. 19. Cat. no. PER 38. Sydney: AIHW National Perinatal Statistics Unit, 2007. Available at: http://www.aihw.gov.au/publication-detail/?id=6442468038. Accessed on 19 February 2013.
5. Sullivan EA, Hall B, King JF. Maternal deaths in Australia 2003-2005.Maternal deaths series no. 3. Cat. no. PER 42. Sydney: AIHW National Perinatal StatisticsUnit, 2008. Available at: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=10737421514. Accessed on 25 February 2013.
6. World Health Organization. World health statistics 2011. Available at: http://www.who.int/whosis/whstat/2011/en/index.html. Accessed on 25 February 2013.
7. United Nations. Millennium campaign. Available at: http://www.un.org/millenniumgoals/. Accessed on 25 February 2013.
8. Cumpston JHL. Heath and disease in Australia. Canberra: Australian Government Publishing Service, 1989.
9. Australian Bureau of Statistics. Australian social trends, 2002. ABS Cat. no. 4102.0. Canberra: ABS, 2002. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/778E130171EE7102CA25709F0025EB7A?opendocument. Accessed on 25 February 2013.
10. Liu X, Roth J. Development and validation of an infant morbidity index using latent variable models. Stat Med 2008; 27(7):971-89.
11. Campbell OMR, Graham WJ. Strategies for reducing maternal mortality: getting on with what works. Lancet 2006; 368(9543):1284-1299.
12. Orvos H, Hoffmann I, Frank I, Katona M, Pal A, Kovacs L. The perinatal outcome of pregnancy without prenatal care - A retrospective study in Szeged, Hungary. Eur J Obstet Gynecol Reprod Biol 2002; 100(2):171-3.
13. McCaw Binns A, Greenwood R, Ashley D, Golding J. Antenatal and Perinatal-Care in Jamaica - do They Reduce Perinatal Death Rates? Paediatr Perinat Epidemiol 1994; 8:86-97.
14. Liston J. Breastfeeding and the use of recreational drugs - alcohol, caffeine, nicotine and marijuana. Breastfeed Rev 1988; 6(2):27-30.
15. Mannella JA, Yourshaw LM, Morgan LK. Breastfeeding and smoking: Short-term effects on infant feeding and sleep. Pediatrics 2007; 120(3):497-502.
16. Giglia R, Binns, C. Alcohol and lactation: a systematic review. Nutrition and Dietetics 2006; 63:103-116.
17. Leeder S. Health is a whole-of-life issue. Association of Australian Medical Research Institutes Conference. 2005. Available at: http://www.menzieshealthpolicy.edu.au/other_tops/pdfs_about/aamri0905.pdf. Accessed on 25 February 2013.
18. Trinh LTT, Rubin G. Late entry to antenatal care in New South Wales, Australia. Reproductive Health 2006; 3(1):8.
19. Drevenstedt GL, Crimmins EM, Vasunilashorn S, Finch CE. The rise and fall of excess male infant mortality. Proc Natl Acad Sci U S A 2008; 105(13):5016–5021.
20. Urbis. Evaluation of the healthy for life program: final report. 2009. Available at: http://www.health.gov.au/internet/h4l/publishing.nsf/Content/21D7AED124027F5DCA2571950002F31E/$File/HFL%20-%20Evaluation.pdf. Accessed on 25 February 2013.
21. National Health and Medical Research Council. Australian guidelines to reduce health risks from drinking alcohol. Canberra: Commonwealth of Australia, 2009.

22. Foundation for Alcohol Research & Education. Alcohol consumption during pregnancy: Results from the 2010 National Drug Strategy Household Survey. 2012. Available at: http://wwwfareorgau/wp-content/u loads/2011/07/Alcohol-Consumption-During-Pregnancy-Finalpdf. Accessed on 25 February 2013.
23. Australian Institute of Health and Welfare. 2010 National Drug Strategy Household Survey report. Drug statistics series no 25. Cat no. PHE 145. Canberra: AIHW, 2011.
24. World Health Organization. World Health Report 2000. Available at: http://wwwwhoint/whr/2000/media_centre/press_release/en/indexhtml. Accessed on 25 February 2013.
25. Davis K, Schoen C, Schoenbaum SC, Doty MM, Holmgren AL, Kriss JL, et al. Mirror, mirror on the wall: An international update on the comparative performance of American health care. The Commonwealth Fund. 2007. Available at: http://www.commonwealthfund.org/Publications/Fund-Reports/2007/May/Mirror--Mirror-on-the-Wall--An-International-Update-on-the-Comparative-Performance-of-American-Healt.aspx. Accessed on 25 February 2013.
26. Laws P, Sullivan EA. Australia's mothers and babies 2007. Perinatal statistics series no. 23. Cat no. PER 48. Sydney: AIHW National Perinatal Statistics Unit, 20
27. Taylor R, Lewis M, Powles J. The Australian mortality decline: all-cause mortality 1788-1990. Aust N Z J Public Health 1998; 22(1):27-36.
28. Department of Health and Aging. Healthy for life. Available at: http://www.health.gov.au/healthyforlife. Accessed on 25 February 2013.
29. Scollo MM, Winstanley MH (eds). Tobacco in Australia: Facts and issues. 3rd ed. Melbourne: Cancer Council Victoria, 2008. Available at: http://www.tobaccoinaustralia.org.au. Accessed on 25 February 2013.
30. Australian Bureau of Statistics. The health and welfare of Australia's Aboriginal and Torres Strait Islander Peoples, Oct 2010. ABS Cat no. 4704.0. Canberra: ABS, 2012. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4704.0/. Accessed on 25 February 2013.
31. Australian Bureau of Statistics. Population distribution, Aboriginal and Torres Strait Islander Australians, 2006. ABS Cat no. 4705.0. Canberra: ABS, 2007. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/b06660592430724fca2568b5007b8619/14e7a4a075d53a6cca2569450007e46c!OpenDocument. Accessed on 25 February 2013.
32. Australian Bureau of Statistics. Year book Australia, 2005. ABS Cat no. 1301.0. Canberra: ABS, 2005. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/Previousproducts/1301.0Contents12005?opendocument&tabname=Summary&prodno=1301.0&issue=2005&num=&view=. Accessed on 25 February 2013.
33. Passey ME, D'Este CA, Stirling JM, Sanson-Fisher RW. Factors associated with antenatal smoking among Aboriginal and Torres Strait Islander women in two jurisdictions. Drug Alcohol Rev 2012; 31(5):608-16.
34. Makinson C. The health consequences of teenage fertility. Fam Plann Perspect 1985; 17(3):132-9.
35. Salihu HM, Shumpert MN, Slay M, Kirby RS, Alexander GR. Childbearing Beyond Maternal Age 50 and Fetal Outcomes in the United States. Obstet Gynecol 2003; 102(5):1006-1014.
36. Lister Hill Center for Health Policy. Pregnancy after 50: more risky than we thought? Lister Hill Center for Health Policy 2003; 41(1). Available at: http://www.soph.uab.edu/isoph/LHC/Childbearing.pdf. Accessed on 25 February 2013.

## 3.8 Appendices

### 3.8.1 Appendix 1 – Country classification

**Country groups:**

(Source: World Health Statistic, www.who.int/whosis/whostat/2011/en/index.html)

Low income countries: Afghanistan, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Democratic People's Republic of Korea, Democratic Republic of the Congo, Eritrea, Ethiopia, Gambia, Ghana, Guinea, Guinea-Bissau, Haiti, Kenya, Kyrgyzstan, Lao People's Democratic Republic, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Sierra Leone, Solomon Islands, Somalia, Tajikistan, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe.

Lower middle income: Angola, Armenia, Belize, Bhutan, Bolivia (Plurinational State of ), Cameroon, Cape Verde, China, Congo, Côte d'Ivoire, Djibouti, Ecuador, Egypt, El Salvador, Georgia, Guatemala, Guyana, Honduras, India, Indonesia, Iraq, Jordan, Kiribati, Lesotho, Maldives, Marshall Islands, Micronesia (Federated States of), Mongolia, Morocco, Nicaragua, Nigeria, Pakistan, Papua New Guinea, Paraguay, Philippines, Republic of Moldova, Samoa, Sao Tome and Principe, Senegal, Sri Lanka, Sudan, Swaziland, Syrian Arab Republic, Thailand, Timor-Leste, Tonga, Tunisia, Turkmenistan, Tuvalu, Ukraine, Uzbekistan, Vanuatu, Viet Nam, Yemen.

Upper middle income: Albania, Algeria, Antigua and Barbuda, Argentina, Azerbaijan, Belarus, Bosnia & Herzegovina, Botswana, Brazil, Bulgaria, Chile, Colombia, Cook Islands, Costa Rica, Cuba, Dominica, Dominican Republic, Fiji, Gabon, Grenada, Iran (Islamic Republic of ), Jamaica, Kazakhstan, Lebanon, Libyan Arab Jamahiriya, Lithuania, Malaysia, Mauritius, Mexico, Montenegro, Namibia, Nauru, Niue, Palau, Panama, Peru, Romania, Russian Federation, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Serbia, Seychelles, South Africa, Suriname, The former Yugoslav Republic of Macedonia, Turkey, Uruguay, Venezuela (Bolivarian Republic of ).

High income: Andorra, Australia, Austria, Bahamas, Bahrain, Barbados, Belgium, Brunei Darussalam, Canada, Croatia, Cyprus, Czech Republic, Denmark, Equatorial Guinea, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Kuwait, Latvia, Luxembourg, Malta, Monaco, Netherlands, New Zealand, Norway, Oman, Poland, Portugal, Qatar, Republic of Korea, San Marino, Saudi Arabia, Singapore, Slovakia, Slovenia, Spain, Sweden, Switzerland, Trinidad and Tobago, United Arab Emirates, United Kingdom, United States of America.

### 3.8.2 Appendix 2 – Methodological note

Data for 10 years between 2000 and 2009 (and 2010 whenever possible) were analysed for this report. The ABS online data includes data on fetal, neonatal and perinatal mortality up to 2009 (3304.0 - Perinatal Deaths) and for infant mortality up to 2010 (3302.0 – Deaths). However, data by state and territory for fetal, neonatal and perinatal mortality were only available from 2007 to 2009. Data for missing years were requested from the ABS.

Rates were calculated by calendar year. Numbers of live births from the ABS website (3301.0 - Births) was used as denominators.

The AIHW Australia's Mothers and Babies Report between 2000 and 2009 were available online at http://www.preru.unsw.edu.au/PRERUWeb.nsf/page/Perinatal+Statistics (Accessed January 2012).

Data from the reports were downloaded and analysed. When the number of deaths in some categories such as Indigenous status was too small, data were reported as the average of several years rather than by single year.

Data from the ABS were used for the main indicators of infant mortality and morbidity. Data from the AIHW were used for indicators that were not collected by the ABS such as gestational age and birth weight (Table 3.6).

Table 3.6. Data source for each indicator

| | Data source | Data source detail |
|---|---|---|
| **INFANT MORTALITY** | | |
| Infant mortality: International comparison | WHO | World Health Statistics |
| **Fetal, neonatal and perinatal mortality** | | |
| Fetal, neonatal and perinatal mortality in Australia | ABS | 3304.0 - Perinatal Deaths |
| Fetal, neonatal and perinatal mortality by state and territory of residence | ABS | Data request and 3301.0 - Births |
| Fetal, neonatal and perinatal mortality by Indigenous status | ABS | 3304.0 - Perinatal Deaths |
| Fetal, neonatal and perinatal mortality by maternal country of birth | AIHW | Australia's mothers and babies reports |
| Fetal, neonatal and perinatal mortality by maternal age | AIHW | Australia's mothers and babies reports |
| Fetal, neonatal and perinatal mortality by gestational age | AIHW | Australia's mothers and babies reports |
| Fetal, neonatal and perinatal mortality by gender | ABS | 3304.0 - Perinatal Deaths |
| **Infant mortality** | | |
| Infant mortality in Australia | ABS | 3302 Deaths |
| Infant mortality by state and territory of residence | ABS | 3302 Deaths |
| Infant mortality by Indigenous status | ABS | 3302 Deaths |
| Infant mortality by gender | ABS | 3302 Deaths |
| **INFANT MORBIDITY** | | |
| Infant Morbidity: international comparison | WHO | World Health Statistics |
| **Preterm births** | | |
| Preterm births in Australia | AIHW | Australia's mothers and babies reports |
| Preterm births by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| Preterm births by Indigenous status | AIHW | Australia's mothers and babies reports |
| Preterm births by plurality | AIHW | Australia's mothers and babies reports |
| **Post-term births** | | |
| Post-term births in Australia | AIHW | Australia's mothers and babies reports |
| Post-term births by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| **Low birth weight** | | |
| Low birth weight in Australia | AIHW | Australia's mothers and babies reports |
| Low birth weight by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| Low birth weight by Indigenous status | AIHW | Australia's mothers and babies reports |
| Low birth weight by maternal smoking status | AIHW | Australia's mothers and babies reports |
| Low birth weight by birth status | AIHW | Australia's mothers and babies reports |
| Low birth weight by gender | AIHW | Australia's mothers and babies reports |
| **ANTENATAL FACTORS** | | |
| Antenatal factors: International comparison | WHO | World Health Statistics |
| **Antenatal care** | | |
| Antenatal care in Australia | AIHW | Australia's mothers and babies reports |
| Antenatal care by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| Antenatal care by Indigenous status | AIHW | Australia's mothers and babies reports |
| **Smoking during pregnancy** | | |
| Smoking during pregnancy in Australia | AIHW | Australia's mothers and babies reports |
| Smoking during pregnancy by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| Smoking during pregnancy by Indigenous status | AIHW | Australia's mothers and babies reports |
| Smoking during pregnancy by maternal age | AIHW | Australia's mothers and babies reports |
| Alcohol consumption during pregnancy | | |
| Alcohol consumption during pregnancy in Australia | AIHW | National Drug Strategy Household Survey reports |
| **MATERNAL MORTALITY** | | |
| Maternal Mortality: international comparison | WHO | World Health Statistics |
| Maternal Mortality in Australia | AIHW | Australia's mothers and babies reports |
| Maternal Deaths by state and territory of occurrence of births | AIHW | Australia's mothers and babies reports |
| Maternal Mortality by Iindigenous status | AIHW | Australia's mothers and babies reports |
| Maternal Mortality by age | AIHW | Australia's mothers and babies reports |

## 3.8.3 Appendix 3 – Data for figures presented in this chapter

### Table A3.1: International comparison of fetal, neonatal and infant mortality rates, 2009

| | Fetal mortality | Neonatal mortality | Infant mortality |
|---|---|---|---|
| Australia | 3 | 3 | 4 |
| High income countries | 3 | 4 | 6 |
| Upper middle income countries | 9 | 11 | 19 |
| Lower middle income countries | 21 | 26 | 42 |
| Low income countries | 26 | 36 | 75 |
| Global | 19 | 24 | 42 |

Note: Refer to Appendix 1 for country classification. Fetal mortality rate was number of deaths per 1,000 all births (live births and fetal deaths). Neonatal mortality was number of deaths per 1,000 live births. Infant mortality was number of deaths per 1,000 live births
Source: World Health Statistic - http://www.who.int/whosis/whostat/2011/en/index.html

### Table A3.2: Fetal, neonatal and perinatal mortality rates in Australia, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fetal mortality | 6.6 | 6.7 | 6.4 | 6.5 | 6.7 | 7 | 6 | 5.8 | 5.5 | 6 |
| Neonatal mortality | 3.5 | 3.7 | 3.4 | 3.4 | 3.2 | 3.6 | 3.2 | 3 | 2.9 | 3 |
| Perinatal mortality | 10 | 10 | 9.8 | 9.8 | 9.9 | 11 | 9.2 | 8.8 | 8.4 | 9 |

Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Table A3.3: Fetal, neonatal and perinatal mortality rates by state and territory of residence, average for 2000 to 2009

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT | Australia |
|---|---|---|---|---|---|---|---|---|---|
| Fetal mortality | 5.4 | 6.7 | 6.8 | 6 | 6.9 | 7.7 | 8.7 | 6.4 | 6.3 |
| Neonatal mortality | 3.3 | 3.3 | 3.7 | 2.7 | 2.4 | 3.1 | 5.7 | 3.4 | 3.3 |
| Perinatal mortality | 8.8 | 9.9 | 10 | 8.6 | 9.3 | 11 | 14 | 9.8 | 9.6 |

Note: Fetal mortality rates were calculated as number of deaths per 1,000 all births (live births and stillborn) Neonatal mortality rates were calculated as number of deaths per 1,000 live births. Perinatal mortality rates were calculated as the sum of fetal and neonatal deaths per 1,000 all births. Number of live births from the ABS website was used to calculate denominators
Source: Australian Bureau of Statistics. Data on fetal, neonatal and perinatal deaths received January 2012
Australian Bureau of Statistics. 3301.0 – Births

### Table A3.4: Fetal mortality rate by Indigenous status by state and territory, average for 2000 to 2009

| | NSW | QLD | SA | WA | NT | Australia |
|---|---|---|---|---|---|---|
| Indigenous | 5.9 | 8.5 | 7.9 | 8.7 | 13 | 7.9 |
| Non-Indigenous | 5.5 | 6.8 | 5.8 | 6.8 | 6.2 | 6.3 |

Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Table A3.5: Neonatal mortality rate by Indigenous status by state and territory, average for 2000 to 2009

| | NSW | QLD | SA | WA | NT | Australia |
|---|---|---|---|---|---|---|
| Indigenous | 4.5 | 6.2 | 4.8 | 5.0 | 9.2 | 5.5 |
| Non-Indigenous | 3.3 | 3.5 | 2.6 | 2.2 | 3.1 | 3.2 |

Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Table A3.6: Perinatal mortality rate by Indigenous status by state and territory, average for 2000 to 2009

| | NSW | QLD | SA | WA | NT | Australia |
|---|---|---|---|---|---|---|
| Indigenous | 10 | 15 | 13 | 14 | 22 | 13 |
| Non-Indigenous | 8.7 | 10 | 8.4 | 9 | 9.2 | 9.4 |

Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Table A3.7: Fetal mortality rate by maternal country of birth, 2006 to 2009

| | Fetal mortality | Neonatal mortality | Perinatal mortality |
|---|---|---|---|
| Australia | 7.2 | 3.0 | 10 |
| Others | 8.4 | 2.9 | 11 |

Note: Rates were the average of rates from 2006-2009
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2006-2009

### Table A3.8: Fetal, neonatal and perinatal mortality rates by maternal age group, 2009

| | <20 years | 20-24 years | 25-29 years | 30-34 years | 35-39 years | >=40 years |
|---|---|---|---|---|---|---|
| Fetal mortality | 12 | 9.8 | 6.7 | 6.6 | 7.7 | 14 |
| Neonatal mortality | 4.5 | 3.7 | 2.5 | 2.8 | 3 | 3.1 |
| Perinatal mortality | 13 | 12 | 8.6 | 9 | 9.9 | 14 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

### Table A3.9: Fetal, neonatal and perinatal mortality rates by gender, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Perinatal deaths-Males | 11 | 11 | 10 | 10 | 11 | 11 | 9.8 | 9.1 | 8.9 | 9.6 |
| Perinatal deaths-Females | 9.4 | 9.7 | 9.2 | 9.2 | 9.1 | 10 | 8.6 | 8.6 | 7.8 | 8.3 |
| Fetal deaths-Males | 7 | 6.8 | 6.7 | 6.8 | 7.1 | 7.1 | 6.2 | 5.9 | 5.7 | 6.3 |
| Fetal deaths-Females | 6.3 | 6.5 | 6.1 | 6.2 | 6.4 | 6.9 | 5.7 | 5.7 | 5.3 | 5.7 |
| Neonatal deaths-Males | 3.8 | 4.2 | 3.6 | 3.6 | 3.7 | 3.9 | 3.6 | 3.1 | 3.2 | 3.4 |
| Neonatal deaths-Females | 3.1 | 3.2 | 3.2 | 3 | 2.7 | 3.3 | 2.9 | 2.8 | 2.5 | 2.7 |

Note: "Male" category includes sex indeterminate
Source: Australian Bureau of Statistics, 3304.0 - Perinatal Deaths

### Table A3.10: Fetal, neonatal and perinatal mortality rates by gestational age, 2007 to 2009

| | 20–27 weeks | 28–31 weeks | 32–36 weeks | 37–41 weeks | >=42 weeks |
|---|---|---|---|---|---|
| Fetal deaths | 502 | 84 | 15 | 1.5 | 2.9 |
| Neonatal deaths | 405 | 29 | 4.3 | 0.6 | 1.4 |
| Perinatal deaths | 695 | 108 | 19 | 2.1 | 4.2 |

Note: Logarithmic scale for y-axis of graph
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2007-2009

### Table A3.11: Infant mortality rate by Indigenous status by state and territory, 2008 to 2010

| | Indigenous | Non-Indigenous |
|---|---|---|
| NSW | 5 | 4.1 |
| QLD | 9 | 4.7 |
| SA | 5 | 3.4 |
| NT | 11 | 3.7 |

Note: Data on other states and territories was not available from ABS due to the small number of registered Indigenous deaths
Source: Australian Bureau of Statistics, 3302 Deaths

### Table A3.12: Infant mortality rate by gender, 2000 to 2010

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 5.7 | 5.9 | 5.4 | 5.2 | 5.2 | 5.4 | 5.3 | 4.5 | 4.6 | 4.8 | 4.8 |
| Female | 4.7 | 4.6 | 4.6 | 4.3 | 4.1 | 4.7 | 4.1 | 3.9 | 3.6 | 3.7 | 3.4 |

Note: "Male" category includes sex indeterminate
Source: Australian Bureau of Statistics, 3302 Deaths

### Table A3.13: International comparison of low birth weight (<2,500 grams), 2000 to 2009

| Country | Low birth weight (%) |
|---|---|
| Australia | 7 |
| High income countries | 7 |
| Upper middle income countries | 8 |
| Lower middle income countries | 17 |
| Low income countries | 15 |
| Global | 15 |

Source: World Health Organisation, World Health Statistics 2011

### Table A3.14: Proportion of preterm births in Australia, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| All | 7.9 | 7.8 | 7.9 | 7.9 | 8.2 | 8.1 | 8.2 | 8.1 | 8.2 | 8.2 |
| 20–27 weeks | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| 28–31 weeks | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| 32–36 weeks | 6.2 | 6.1 | 6.2 | 6.2 | 6.5 | 6.4 | 6.5 | 6.5 | 6.5 | 6.5 |
| Mean (week) | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 | 33 |

Note: Per cent of total births
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.15: Proportion of preterm births by Indigenous status, 2003 to 2009

| | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|
| Indigenous | 14 | 14 | 14 | 14 | 14 | 13 | 13 |
| Non-Indigenous | 7.6 | 7.9 | 7.9 | 8 | 7.9 | 8 | 8 |

Source: Australian Institute of Health and Welfare, Australia's Mothers and Babies reports 2003-2009

### Table A3.16: Proportion of preterm births by plurality, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|
| Singletons | 6.3 | 6.2 | 6.3 | 6.3 | 6.5 | 6.5 | 6.5 | 6.6 | 6.6 |
| Twins | 53 | 51 | 53 | 52 | 54 | 53 | 56 | 54 | 57 |
| Other multiple births | 94 | 100 | 99 | 100 | 98 | 96 | 100 | 100 | 100 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.17: Mean gestational age by plurality, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Singletons | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 | 39 |
| Twins | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Other multiple births | 32 | 31 | 32 | 31 | 31 | 32 | 31 | 31 | 32 | 32 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.18: Proportion of post-term births in Australia, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Australia | 1.8 | 1.7 | 1.6 | 1.5 | 1.4 | 1.3 | 1.2 | 0.9 | 0.9 | 0.9 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.19: Proportion of babies with low birth weight in Australia, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| <1,500 grams | 1.5 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 |
| <2,500 grams | 6.8 | 6.2 | 6.4 | 6.3 | 6.4 | 6.4 | 6.4 | 6.2 | 6.1 | 6.2 |

Note: Birth weights "Less than 1500g" and "Less than 2500g" are cumulative
Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.20: Proportion of babies with low birth weight (<2,500 grams) by Indigenous status, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Indigenous | 3,166 | 3,166 | 3,165 | 3,160 | 3,158 | 3,157 | 3,169 | 3,182 | 3,196 | 3,183 |
| Non Indigenous | 3,364 | 3,382 | 3,378 | 3,380 | 3,382 | 3,377 | 3,378 | 3,382 | 3,385 | 3,382 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.21: Proportion of babies with low birth weight (<2,500 grams) by birth status, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Fetal death | 76 | 76 | 78 | 75 | 78 | 78 | 80 | 79 | 79 | 76 |
| Live born | 6.3 | 6.2 | 6.4 | 6.3 | 6.4 | 6.4 | 6.4 | 6.2 | 6.1 | 6.2 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.22: Proportion of babies with low birth weight (<2,500 grams) by gender, 2000 to 2009

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|---|
| Male | 6.3 | 5.8 | 5.9 | 5.8 | 5.9 | 5.9 | 5.9 | 5.7 | 5.6 | 5.7 |
| Female | 7.3 | 6.8 | 6.9 | 6.9 | 6.9 | 6.9 | 6.9 | 6.7 | 6.7 | 6.6 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2000-2009

### Table A3.23: International comparison of number of antenatal care visits for the period 2000 to 2010

| | At least 1 visit (%) | At least 5 visits for Australia and at least 4 visits for other countries (%) |
|---|---|---|
| Australia | 98 | 92 |
| Upper middle income countries | 94 | 83 |
| Lower middle income countries | 80 | 52 |
| Low income countries | 71 | 39 |
| Global | 80 | 53 |

Note: Data for high income countries was not available
Source: World Health Organisation, World Health Statistics 2011

### Table A3.24: Antenatal care visits in Australia by state and territory, 2009

| | QLD (%) | SA (%) | ACT (%) | NT (%) | Australia (%) |
|---|---|---|---|---|---|
| None | 0.3 | 0.2 | 0.1 | 1.2 | 0.3 |
| One | 0.5 | 0.2 | 0 | 1.2 | 0.4 |
| Two to four | 5.9 | 2.4 | 7.9 | 11 | 5.5 |
| Five or more | 93.3 | 91 | 73.8 | 85.7 | 91.2 |

Note: For the ACT, two to four antenatal visits includes women who had one and five antenatal visits
Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

### Table A3.25: Proportion of mothers who had five or more antenatal care visits by Indigenous status, 2007 to 2009

| | % |
|---|---|
| Indigenous | 77 |
| Non-Indigenous | 94 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2007-2009

### Table A3.26: Proportion of women who smoked during pregnancy in Australia, 2001 to 2009

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| Australia | 19 | 18 | 17 | 17 | 17 | 17 | 17 | 16 | 15 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2001-2009

### Table A3.27: Proportion of women who smoked during pregnancy by state and territory of occurrence of births, 2009

| NSW | VIC | QLD | WA | SA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|
| 12 | 12 | 19 | 15 | 20 | 25 | 11 | 23 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies report 2009

### Table A3.28: Proportion of women who smoked during pregnancy by Indigenous status, 2004 to 2009

| | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|
| Indigenous | 50 | 53 | 52 | 52 | 51 | 50 |
| Non-Indigenous | 15 | 16 | 16 | 15 | 14 | 13 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2004-2009

### Table A3.29: Proportion of teenage mothers who smoked during pregnancy, 2005 to 2009

| | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|
| Teen age mother | 42 | 42 | 41 | 39 | 37 |
| All age | 17 | 17 | 17 | 16 | 15 |

Source: Australian Institute of Health and Welfare, Australia's mothers and babies reports 2005-2009

### Table A3.30: International comparison of maternal mortality ratios, 2008

| Income group | Maternal Mortality Ratio |
|---|---|
| Australia | 8 |
| High income countries | 15 |
| Upper middle income countries | 82 |
| Lower middle income countries | 230 |
| Low income countries | 580 |
| Global | 260 |

Note: Logarithmic scale for y-axis of graph
Source: World Health Organisation, World Health Statistics 2011

### Table A3.31: Maternal mortality ratio and maternal mortality rate by triennia 1973-1975 to 2003-2005

| Triennium | Maternal mortality ratio | Mortality rate |
|---|---|---|
| 1973-1975 | 13 | 1.1 |
| 1976-1978 | 13 | 1.0 |
| 1979-1981 | 13 | 0.9 |
| 1982-1984 | 9.4 | 0.6 |
| 1985-1987 | 8.5 | 0.5 |
| 1988-1990 | 9.3 | 0.6 |
| 1991-1993 | 6.2 | 0.4 |
| 1994-1996 | 8.6 | 0.5 |
| 1997-1999 | 8.4 | 0.5 |
| 2000-2002 | 11 | 0.7 |
| 2003-2005 | 8.4 | 0.5 |

Source: Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

### Table A3.32: Maternal mortality ratio by state and territory, 2000 to 2005

| | NSW/ACT | VIC | QLD | WA | SA | TAS | NT |
|---|---|---|---|---|---|---|---|
| 2000-2005 | 7.6 | 10 | 14 | 6.7 | 9.5 | 8.9 | 9.2 |

Source: Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

### Table A3.33: Proportion of maternal deaths and population by place of residence, 2003 to 2005

| Remoteness | Maternal deaths | Australian population |
|---|---|---|
| Major cities | 56 | 68 |
| Inner regional | 18 | 20 |
| Outer regional | 14 | 9 |
| Remote/very remote | 8 | 2.3 |

Sources: Population estimates: Australian Bureau of Statistics 3218.0 - Regional Population Growth, Australia, 2006-07; Sullivan EA, Hall B and King JF. 2007 Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

### Table A3.34: Maternal mortality ratio by age group, triennia 1994 -1996 to 2003-2005

| | 15-19 yrs | 20-24 yrs | 25-29 yrs | 30-34 yrs | 35-39 yrs | 40-44 yrs |
|---|---|---|---|---|---|---|
| 1994-1996 | 10 | 12 | 8 | 16 | 19 | 28 |
| 1997-1999 | 7.7 | 4 | 6.1 | 7 | 19 | 23 |
| 2000-2002 | 11 | 4.3 | 11 | 12 | 13 | 33 |
| 2003-2005 | 14 | 7 | 6.7 | 6.1 | 13 | 24 |

Note: Mortality rate per 100,000 live births, direct and indirect deaths

Sources: Report on Maternal Deaths in Australia, 1994–96, Commonwealth of Australia 2001 and AIHW Maternal deaths series Cat. Nos. PER 24, 32 and 42. Sydney: AIHW National Perinatal Statistics Unit

Sullivan EA, Hall B and King JF. 2008. Maternal deaths in Australia 2003-2005. Maternal deaths series no. 3. Cat. No. PER 42. Sydney: AIHW National Perinatal Statistics Unit

# Chapter 4:
# Contraception

Lieu Trinh, Kevin McGeechan

Chapter Outline

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## Key indicators

Prevalence and patterns of contraceptive use

Choices of contraceptive methods

Contraceptive use by state and territory, age group, Indigenous status, country of birth and relationship status

Pharmaceutical Benefits Scheme (PBS) claims for oral contraception, injections, implants and the hormonal intrauterine system (IUS) between 2003 and 2011

Medicare Benefits Schedule (MBS) claims for intrauterine device insertions, tubal ligation and vasectomy procedures between 2003 and 2011

## Primary data sources

The Household, Income and Labour Dynamics in Australia (HILDA) survey 2008 and 2011; data obtained from the Melbourne Institute of Applied Economic and Social Research

Published survey data

- The HILDA survey 2005
- The Australian Longitudinal Study on Women's Health 2000, 2003 and 2006
- The Australian Study of Health and Relationships population health survey 2001-2002
- The Australian Bureau of Statistics National Health Survey 2001
- The National Surveys of Australian Secondary Students and Sexual Health 2003 and 2008
- The Australian Bureau of Statistics National Aboriginal and Torres Strait Islander Health Survey 2004-2005

Pharmaceutical Benefits Scheme (PBS) data 2003-2011, obtained from the Department of Health and Ageing

Online Medicare Benefits Schedule (MBS) data 2003-2011

## Purpose of this chapter

To compare contraceptive use in Australia and other countries

To describe the trends in contraceptive use in Australia

To describe contraceptive use in population subgroups

To identify areas of data development

## Terms and definitions

**Reproductive age:** 15-49 years for women and 15-64 years for men[1] unless specified.

**Rate:** Number of women or men of reproductive age using a contraceptive method per 100 women or men of reproductive age.

**Age specific rate:** Number of women or men in an age group using a contraceptive method per 100 women or men in that age group.

**IUDs:** Intrauterine contraceptive methods including copper IUDs and hormonal devices IUSs.

**IUSs:** Intrauterine contraceptive hormonal devices with progestogen.

**Medicare data:** Refer to both MBS and PBS data.

## Data sources and limitations

No routinely collected data on contraceptive use that is both reliable and complete are available in Australia. Information presented in this Chapter is collated from survey and Medicare data.

### HILDA survey 2008 and 2011 data

The Melbourne Institute of Applied Economic and Social Research has been conducting the HILDA survey every year since 2001. The first survey involved 7,682 households and 19,917 individuals. In 2005, 2008 and 2011 women aged 18-44 years and men aged 18-55 years were asked questions about contraceptive use. The de-identified HILDA 2011 & 2008 survey data were obtained and analysed for this report.

### Published surveys

The HILDA survey 2005[2,3]

The Australian Bureau of Statistics (ABS) National Health Survey (NHS) 2001 on women aged 18-49 years and their partners[4]

The Australian Study of Health and Relationships (ASHR) population health survey in 2001-2002 on people aged 16 to 59 years[5-7]

The Australian Longitudinal Study on Women's Health (ALSWH) commenced in 1996 with randomly selected cohorts of women then aged 18 to 23, 45 to 50 and 70 to 75 years. The cohorts were surveyed again in 2000, 2003 and 2006[8]

The National Survey of Australian Secondary Students and Sexual Health (NSASS) 2003 and 2008 of Year 10 and 12 students from more than 100 secondary schools[9-12]

The ABS 2004-2005 National Aboriginal and Torres Strait Islander Health Survey (NATSIH)[13]

The Bettering the Evaluation and Care of Health (BEACH) data 2007-2011 on women aged 12-54 years who consulted GPs for contraception[14]

The United Nations, World contraceptive use 2011 report. Information about contraceptive use for countries was reported using data from national data and United Nation's own estimate. Only data for women who were part of a couple were available.

#### *Limitations*

Selection bias might be an issue in many surveys. In the ASHR survey, telephone interviews with households were conducted.[5-7] Households without a landline telephone, people not living in a household but in colleges, prisons, oil rigs, camps, and hospitals might not be selected. The NSASS survey of Year 10 and 12 students[9-12] did not include young people who were out of school. These young people have a lower age at first intercourse and are at greater risk of unintended pregnancy and STIs.[11,12]

Measurement bias may also be an issue. Comparatively new contraceptive methods are not captured in many surveys. For example, the ALSWH survey did not collect data on copper intrauterine devices, hormonal IUS or the vaginal ring. The HILDA surveys did not collect information on hormonal IUS. Use of condoms for contraception or for STI protection is rarely differentiated in surveys. Therefore use of condoms for contraception may be overestimated.

Comparisons between surveys and over time are limited by differences in the classification of contraceptive methods, the sampling frames and populations from which the samples were drawn. The ABS survey results in 1995 and 2001 were not directly comparable because of the differences in the classification of contraceptive methods. The HILDA surveys interviewed women up to the age of 44 years while the ABS surveyed women up to the age of 49 years.

The BEACH study, although conducted recently (2007 to 2011), was limited to women who consulted selected GPs.[14] Some contraceptive products such as condoms and the emergency contraceptive pills can be bought over the counter without a prescription and therefore are not captured in the BEACH data. Women can also go to other health care providers, such as family planning clinics, community health and women's health clinics or hospitals for contraceptive consultations.

### Medicare data

Claims for reimbursement can be tracked through Medicare data,[15] PBS data for contraceptive related products and MBS data for contraceptive related medical procedures. While survey data reflect prevalence of contraceptive use, Medicare data reflect the number of claims presented each year.

#### *Limitations*

The MBS data do not include procedures carried out at facilities which do not bill through Medicare such as public hospitals. Item numbers for contraceptive implants were only added to the MBS in November 2012 and therefore these data were not available for this report. There are no specific MBS items for contraceptive injection. Only intrauterine device and sterilisation have specific items for these procedures.

PBS subsidy is not available for all products. The newer oral contraceptive pills containing drospirenone and oestrogens, and also the vaginal ring and copper intrauterine device are not listed on the PBS. The hormonal IUS was only listed in 2001 and the contraceptive implant in 2003.

The online PBS data only reflect prescriptions filled, not numbers of users and do not contain information on number of scripts by age group. For these reasons, PBS data were obtained from the Department of Health and Ageing for this report.

Both MBS and PBS data cannot provide information about how long a woman has used a particular contraceptive method for or whether she has switched to another method.

## Summary

### Contraceptive use in Australia

Similar to other developed countries, two-thirds of Australian women of reproductive age use contraception and up to 85% of women have ever used contraception. Oral contraception use was most common (27 to 34%), followed by condom use (20 to 23%), vasectomy (8.5 to 12%) and tubal ligation (4.1 to 8.6%). Very few women used long acting reversible contraception (LARCs) with injectable contraception accounting for 0.9 to 2.1% of contraceptive use with similar proportions of use for the implant (1.1 to 3.6%) and intrauterine contraceptive methods (IUDs) (1.2 to 3.2%). Conversely, use of oral contraception and sterilisation was more common in Australia than in other developed countries, but use of IUDs was much less common.

### Contraceptive use by age group

The proportion of women who used contraception increased from 62% among women aged 18-24 years to 74% among women aged 25-29 years, decreased to 66% among women aged 30-34 years and increased again to 70% among women aged 40-44 years. Use of oral contraception and condoms were more common among young people. In contrast, sterilisations were more common among older age groups.

### Contraceptive use by number of children

Contraceptive use increased from 61% among women with no children to 81% among women with three or more children. Women with fewer children were more likely to use oral contraception and condoms while women with more children were more likely to use permanent methods.

### Contraceptive use by relationship status

Women who were in a relationship used contraception more than women who were not in a relationship (77% compared to 46%). Oral contraception and condom use were the most common choices for both groups.

### Contraceptive use by country of birth

Women from non-English speaking countries reported lower contraceptive use than women from Australia or other English speaking countries (50% compared to 71%). Women from non-English speaking countries used oral contraception less than women from Australia or other English speaking countries (21% vs. 35%). Partner sterilisation was also less prevalent among women from non-English speaking countries (4.3%) than among women from English speaking countries (9.4%).

### Contraceptive use by Indigenous status

Contraceptive use among Indigenous women was lower than for non-Indigenous women (64% compared to 71%). Use of oral contraception was less common among Indigenous women than among non-Indigenous women (23% vs. 35%) but tubal ligation was more common (14% vs. 4.1%).

### Medicare data

#### *Pharmaceutical Benefits Scheme*

The oral contraceptive pill is the most commonly claimed contraceptive on the PBS. In 2011, around 252,000 women claimed for approximately 556,000 scripts for combined oral contraception (COCP). However, between 2003 and 2011, the number of women who received PBS benefits for oral contraception decreased by 35%.

#### *Medicare Benefits Schedule*

Among all the MBS contraceptive items, IUD insertion was most commonly claimed. In 2011, over 42,000 women claimed for IUD insertion. Between 2003 and 2011, the number of women who received MBS benefits for IUD insertion increased by 300%.

## 4.1 Introduction

Approximately one in four pregnancies in Australia are terminated.[16] Unintended pregnancies that do not result in abortion may result in poorer pregnancy outcomes than those which have been planned.[17-20]

The majority of unintended pregnancies result from either not using contraception or using contraception incorrectly while having sex, and only a small proportion of unintended pregnancies are due to contraceptive failure.[21] Types of contraceptive methods that are available in Australia are presented in Table 4.1. Shorter term methods, such as the oral contraceptive pill, require daily attention from users, are more difficult to comply with and have lower effectiveness than long acting reversible contraceptives (LARCs) and permanent methods of sterilisation.[15] Improving the uptake of highly effective contraceptive methods, especially LARCs, is essential in reducing unintended pregnancies.[23] Increasing the uptake of LARCs is a national health priority in the UK and the US.[24,25]

To improve contraceptive uptake and effective use in Australia, health care providers must have a thorough understanding of the prevalence of and trends in contraceptive use, choices of contraceptive methods and factors associated with their use, especially for population sub-groups.

**Table 4.1: Type of contraceptive methods in Australia**

| Contraceptive method | Use | Products available | Availability | Government subsidised |
|---|---|---|---|---|
| Shorter-term | | | | |
| Fertility awareness based methods (e.g. standard days, symptothermal methods) | As required | | | |
| Withdrawal | As required | | | |
| Lactational Amenorrhoea Method | As required | | | |
| Condoms (male) | As required | Many | Over the counter | |
| Condoms (female) | As required | Many | Over the counter | |
| Diaphragms | As required | 1 | Over the counter<br>Fitted by a trained clinician | |
| Combined hormonal contraceptive pills (oestrogen and progestogen) | Daily | ≈30 | Prescription required | PBS: 18 |
| Progestogen-only pills (mini-pills) | Daily | 2 | Prescription required | PBS: 2 |
| Combined hormonal vaginal rings | Every month | 1 | Prescription required<br>Carried out by a trained clinician | |
| LARCs | | | | |
| Contraceptive injections | Every 3 months | 2 | Prescription required<br>Carried out by a trained clinician | PBS: 2 |
| Contraceptive implants | 3 years | 1 | Prescription required<br>Carried out by a trained clinician | PBS: 1 |
| Copper-bearing non-hormonal intrauterine device | 5-10 years | 2 | Prescription required<br>Carried out by a trained clinician | MBS only |
| Hormonal releasing intrauterine system | 5 years | 1 | Prescription required<br>Carried out by a trained clinician | MBS & PBS |
| Permanent | | | | |
| Female sterilisation | - | 2 | Carried out by a trained clinician | MBS |
| Male sterilisation | - | 2 | Carried out by a trained clinician | MBS |
| Emergency contraception | | | | |
| Emergency contraceptive pills | 72 hrs after intercourse (can be up to 120 hrs) | 3 | OTC at pharmacies | |
| Copper-bearing non-hormonal intrauterine device | Up to 5 days after intercourse | 2 | Prescription required<br>Carried out by a trained clinician | MBS onl |

Notes: PBS = Pharmaceutical Benefits Scheme; MBS = Medicare Benefits Schedule. Products listed on the PBS or procedures on the MBS are available to the consumer at decreased cost
OTC = Over-the-counter; no prescription is required and products may be available at pharmacies and supermarkets

Sources: MBS- Medicare Benefits Schedule Book Commonwealth of Australia 2009; PBS- Schedule of Pharmaceutical Benefits Commonwealth of Australia 2010
Family Planning New South Wales (FPNSW), Family Planning Queensland (FPQ), Family Planning Victoria (FPV) (2012) "Contraception: an Australian clinical practice handbook (3rd edition)."

## 4.2 Methods

### 4.2.1 Analyses of HILDA survey data 2011 and 2008

Data from women who were of reproductive age, at risk of pregnancy and responded to the questions on contraception use in the 2008 (n=2,510) and 2011 (n=2,677) surveys were analysed. Women were considered to be at risk of pregnancy if they were not currently pregnant, did not report any physical difficulties that would affect their ability to become pregnant and had not had a hysterectomy.

Indicators analysed were:

- Proportion of women who were using contraception at the time of the survey
- Proportion of women who ever used any contraception
- Proportion of women who were using each type of contraceptive method
- Proportion of women who were using more than one contraceptive method

Information was analysed by state, age group, relationship status, Indigenous status and country of birth. A woman was considered to be in a relationship if she had a partner, regardless of marital status and whether or not she lived with her partner.

Data were analysed in Stata MP/10.1 (StataCorp LP). The survey command "svy" was used to adjust for stratification sampling. The data was adjusted for stratification sampling by Major Statistical Region "hhhmsr" and cluster sampling by randomised area id "ahhraid". The cross-section responding person population weight "hhhwtrps" was used for weighting.[26]

Results from the HILDA 2011 survey are the main source of data presented in this Chapter, unless stated otherwise.

### 4.2.2 Literature review

Estimates of current and ever contraceptive use, types of contraceptive methods and factors associated with contraceptive use were extracted from the published literature described in the Data Sources section.

### 4.2.3 Analyses of Medicare data

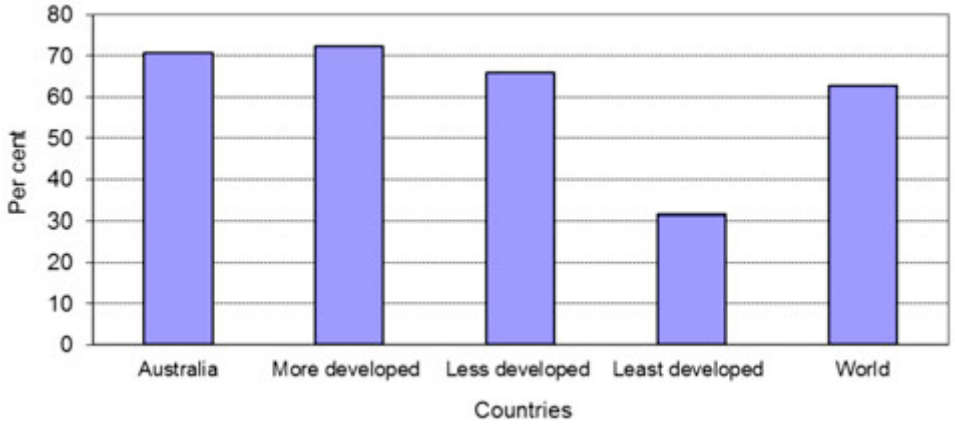
The total number of Medicare claims, cost and rate per 100 women or men of reproductive age were analysed for Australia, each state and territory and age group. For each type of contraceptive method, rates were calculated using numbers of claims from women aged 15-49 years or men aged 15 or over as numerators. The numbers of women aged 15-49 years or men aged 15-64 years from the ABS website[27] were the denominators.

## 4.3 Contraceptive use: International comparison

### 4.3.1 Prevalence of contraceptive use

Seventy one per cent of partnered women in Australia used contraception (Figure 4.1). This was similar to other developed countries (72%), but higher than the less developed countries (66%) and much higher than the least developed countries (31%).

**Figure 4.1: Prevalence of reported contraceptive use among partnered women in Australia and selected regions, 2009**

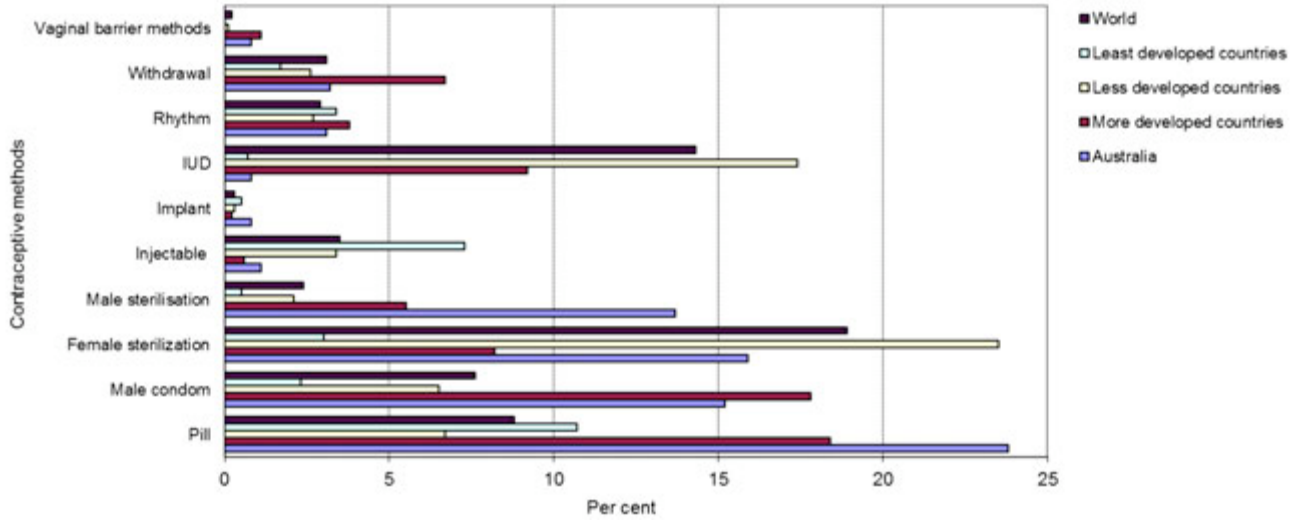



Note: Data are for women who were part of a couple. Refer to Appendix 1 for country classification.
Source: United Nations. World contraceptive use 2011, http://www.un.org/esa/population/publications/contraceptive2011/contraceptive2011.htm

### 4.3.2 Choice of contraceptive methods

A higher proportion of partnered women in Australia reported using oral contraception than in other developed countries (24% compared to 18%) while condom use was less prevalent (15% compared to 18%) (Figure 4.2). Female sterilisation was more common in Australia than in other developed countries (16% vs. 8.3%). Male sterilisation in Australia was also more common (14% vs. 5.5%). In contrast, use of IUDs in Australia (0.8%) was much lower than in other developed countries (9.2%).

**Figure 4.2: Prevalence of reported contraceptive method use among partnered women in Australia and selected regions, 2009**




Note: Data are for women who were part of a couple. Refer to Appendix 1 for country classification
Source: United Nations. World contraceptive use 2011, http://www.un.org/esa/population/publications/contraceptive2011/contraceptive2011.htm

## 4.4 Contraceptive use in Australia

### 4.4.1 Prevalence of contraceptive use

The majority of Australian women use or have used contraception (Table 4.2). About two thirds of women who were at risk of pregnancy were currently using contraception (66% to 71%), and from 83% to 85% of women had ever used contraception. Variation exists between studies due to different age ranges of participants and exclusion criteria.

**Table 4.2: Contraceptive use among Australian women**

| | HILDA, 2011 n=2,677* | HILDA, 2008 n=2,582* | HILDA, 2005 n=2,221# | ASHR, 2002 n=6,278@ |
|---|---|---|---|---|
| Age range (year) | 18-44 | 18-44 | 18-44 | 16-59 |
| Current use of contraception (%) | 67~ | 66~ | 66^ | 71† |
| Ever use contraception (%) | 83 | 80 | 85 | - |

Notes: Sample-* Women aged 18-44 years, not pregnant, no hysterectomy, and no physical difficutly in getting pregnant
# Women aged 18-44 years, not pregnant or subfecund, they or their partner had not been sterilised
@ Women aged 16-59 years
Current use of contraception-
~ Exclude hysterectomy
^ Exclude sterilisation
† Includes hysterectomy

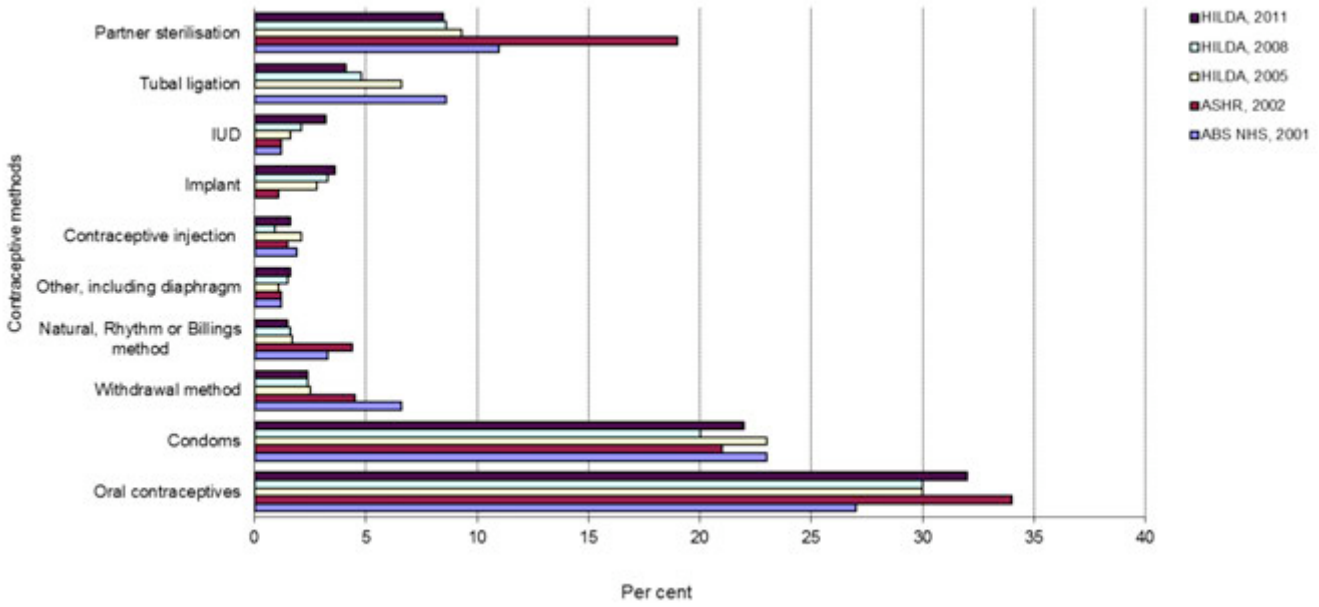
Sources: Household survey on families, income, employment and wellbeing survey (HILDA, 2011): data obtained from the Melbourne Institute of Applied Economic and Social Research
Household survey on families, income, employment and wellbeing survey (HILDA, 2005). Parr N, Siedlecky S. Use of 'dual protection' and other combinations of contraceptive methods in Australia. Aust N Z J Public Health 2007; 31(6): 567-570
Australian Study of Health and Relationships (ASHR, 2002): Richters J et al. Sex in Australia: Contraceptive practices among a representative sample of women. Aust N Z J Public Health 2003, 27: 210-6

### 4.4.2 Choice of contraceptive methods

Considering all women in the identified surveys, oral contraception was the most commonly reported contraceptive method (27% to 34%), followed by condoms (20% to 23%), partner vasectomy (8.5% to 11%) and tubal ligation (4.1% to 8.6%) (Figure 4.3). A high proportion of partner sterilisation was reported in the ASHR survey 2002 (19%) but this may be due to the older age of the respondents (up to 59 years) compared with other surveys (e.g. up to 44 years in the HILDA surveys). Very small proportions of women used injectable contraception (0.9% to 2.1%), implants (1.1% to 3.6%) or IUDs (1.2% to 3.2%).

In the BEACH study of female patients aged 12-54 years who consulted a GP for contraception,[14] 69% of the medications prescribed were for oral contraception, 8.6% were for contraceptive injection, 4.9% were for contraceptive implant and 2.0% were for IUDs.

**Figure 4.3: Estimates of contraceptive use in Australia**




Notes: The ASHR survey did not report tubal ligation separately but included it in the hysterectomy/tubal ligation category
The ABS survey did not include implants
A woman may use more than one method, therefore the sum of all methods may be more than the proportion of women who used contraception

Sources: Household survey on families, income, employment and wellbeing survey (HILDA, 2008 & 2011): data obtained from the Melbourne Institute of Applied Economic and Social Research
Household survey on families, income, employment and wellbeing survey (HILDA, 2005). Gray E, McDonald P. Using a reproductive life course approach to understand contraceptive method use in Australia. Journal of biosocial science. 2010;42(01):43-57
Australian Study of Health and Relationships (ASHR, 2002): Richters J et al. Sex in Australia: Contraceptive practices among a represen tative sample of women. Aust N Z J Public Health 2003, 27: 210-6
Australian Bureau of Statistics National Health Survey (ABS, 2002), Cat. No. 4364.0 National Health Survey 2001

## Emergency contraception

In the HILDA 2011 survey, when asked "which of the methods listed are you using that prevent pregnancy", 0.4% of women reported "emergency contraception".

The proportion of women who ever used emergency contraception ranged from 19% to 27% (Table 4.3). Use of emergency contraception was higher among women who were students,[28,29] aged 20 to 29 years,[7,30,31] had more education, lived in major cities, were bisexual[7] and had a regular sex partner.[29] Use of emergency contraception was lower among women from non-English speaking countries[7], married women[31] and high school students.[9,10]

**Table 4.3: Proportion of Australian women reporting ever having used emergency contraception**

| | Ever use emergency contraception (%) | Sample size | Age range (years) | Sampling frame |
|---|---|---|---|---|
| ASHR; 2002 | 19 | 8,988 | 16-59 | Random sample, telephone interview |
| Marie Stopes; 2008 | 20 | 1,033 | 18-50 | Self-selected marketing survey pool of women who had an unintended pregnancy |
| Mohoric-Stare et al; 2009 | 29 | 460 | Not specified | University students, self-completed questionnaire |
| Hobbs et al.; 2008 | 27 | 600 | 16-35 | Random sample, telephone interview |

Sources: Richters J, Grulich AE, de Visser RO, et al. Sex in Australia: Sexual difficulties in a representative sample of adults
Aust NZ J Public Health. 2003;27(2):164-70
Marie-Stopes International 2008. Real Choices: Women, Contraception and Unintended Pregnancy;
http://issuu.com/mariestopes/docs/real_choices_key_findings/3?mode=a_p
Mohoric-Stare D and De Costa C. Knowledge of emergency contraception amongst tertiary students in far North Queensland."
Aust NZ J Obstet Gynaecol 2009; 49: 307-11
Hobbs et al. Pharmacy access to the emergency contraceptive pill: a national survey of a random sample of Australian women
Contraception 2011; 83: 151-8

**Dual protection**

Condoms can be used to provide protection from unintended pregnancy or STIs or both. In the ABS survey 2001,[4] 48% of women whose partners used condoms indicated this was for contraception only, 16% for protection against STIs only and 36% for both.

Use of more than one method in the HILDA surveys were 15% in 2005,[32] 10% in 2008 and 12% in 2008. Among sexually active secondary school students, 17% used more than one method.[33] Oral contraception and condoms is the most common combination of contraceptive methods reported. Factors associated with the use of more than one method were attitude to condoms, intention to use and discussion with partner.[34]

## 4.4.3 Not using contraception

In the ASHR survey 2002 on women aged 16 to 59 years,[6] the most common reasons for not using contraception were not having intercourse (42%), menopause (22%), current or intended pregnancy (16%) and infertility including partner infertility (7.1%).

Among women at risk of pregnancy (sexually active, not sterile or postmenopausal and not pregnant), the most common reasons for not using contraception were side effects (23%), leaving it to chance (20%), forgetfulness or lack of interest (19%), breast feeding (17%) and believing that it is unnatural/unhealthy (14%) (Table 4.4).

In a study conducted by Marie Stopes on women who reported a previous unintended pregnancy,[35] the most common reason reported for not using contraception was unexpected sexual intercourse or the effects of drugs or alcohol (45%).

In the Secondary Students and Sexual Health Survey[10] in 2002 and 2008, questions about condom use to prevent STIs, having trust or knowledge of the partner, or being unprepared for sex were the most common reasons reported for young people not using condoms. However, the questions regarding condom use were placed in the the context of STI prevention rather than unintended pregnancy prevention. The students were not asked about use of other contraceptive methods.

**Table 4.4: Reasons for not using contraception among women at risk of pregnancy**

| | Study | |
|---|---|---|
| | ASHR, 2002 (%) n=336 | Marie Stopes, 2006 (%) n=418 |
| Wasn't planning or expecting sex, drugs or alcohol impaired judgment | - | 45 |
| Embarrassed to buy or use | 1 | 4 |
| I or partner didn't want to use contraception or condoms | - | 8 |
| Don't care, forgot, have never got pregnant, didn't think I would get pregnant from one time, thought I was infertile | 19 | 17 |
| Restricted access or service | 0 | 3 |
| Side effects | 23 | 8 |
| Unnatural, unhealthy | 14 | - |
| Leave it to chance, fate, god | 20 | - |
| Other including breast feeding, missing | 23 | - |

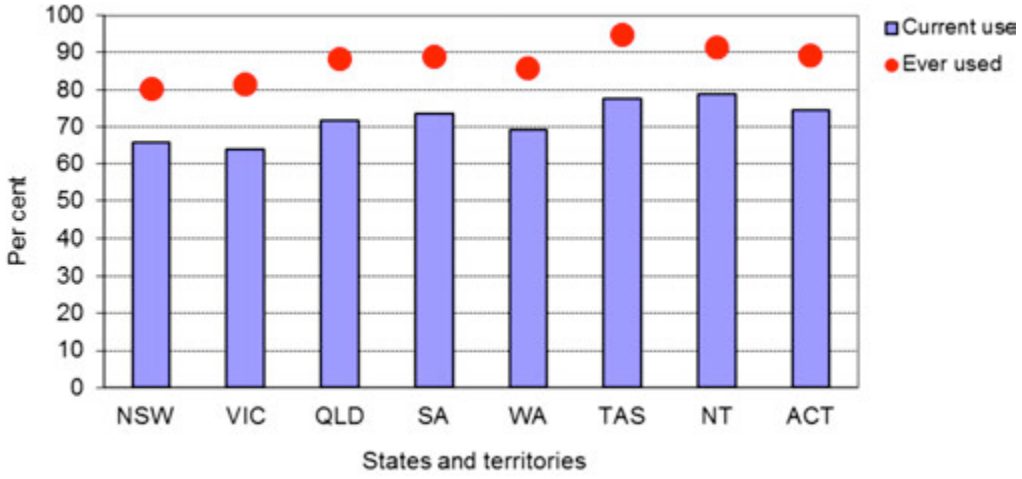
Notes: ASHR survey included women 'at risk of pregnancy', single response only
Marie Stopes study included women who reported a previous unintended pregnancy
Years in table are years surveys conducted
Missing cells: item not explicitly collected in survey

Sources: Australian Study of Health and Relationships (ASHR): Richters J et al. Sex in Australia: Contraceptive practices among a representative sample of women Aust NZ J Public Health 2003, 27: 210-6;
Marie Stopes International. Real choices: Women, contraception and unintended pregnancy. Melbourne: Marie Stopes International, 2008

## 4.5 Contraceptive use by state and territory

The prevalence of current use of contraception ranged from 64% in VIC to 79% in NT and of ever having used of contraception ranged from 80% in NSW to 95% in TAS (Figure 4.4).

**Figure 4.4: Prevalence of contraceptive use by state and territory, Australia, 2011**

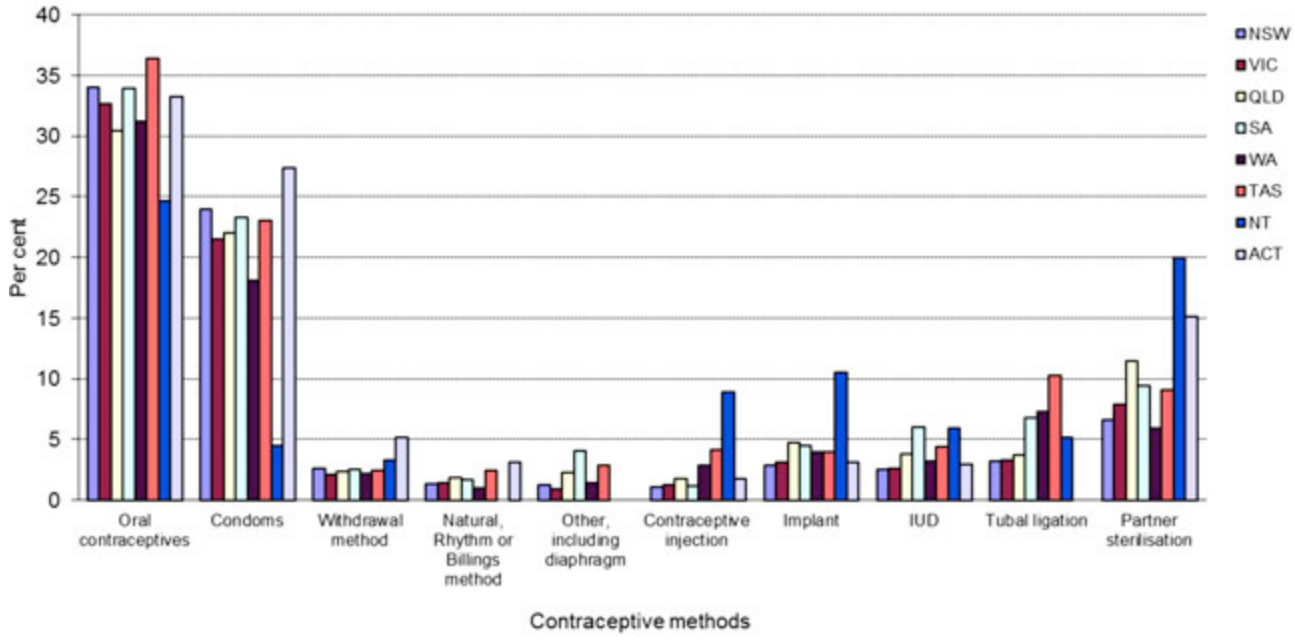



Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

The most common choices of contraceptive methods in all states were oral contraception and condoms. Use of oral contraception ranged from 25% in NT to 36% in TAS and use of condoms ranged from 18% in WA to 27% in ACT (Figure 4.5). Tubal ligation was highest in TAS (10%). Partner sterilisation was highest in NT (20%).

The results were slightly different from results from the ABS survey 2001 where use of condom was more common than oral contraception in VIC (26% and 25% respectively).[4]

**Figure 4.5: Type of contraceptive method by state and territory, Australia, 2011**



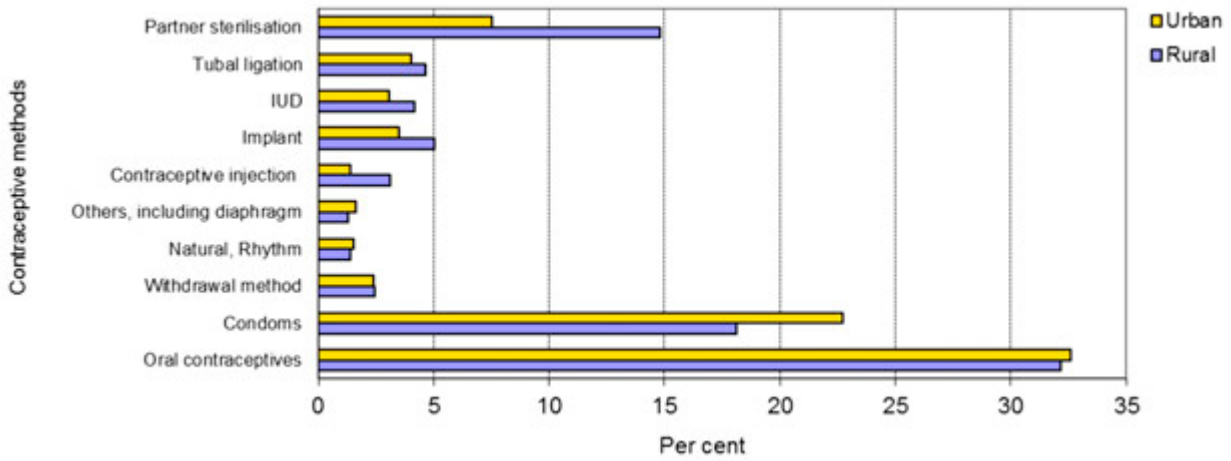

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

## 4.6 Contraceptive use among women living in urban and rural areas

A higher proportion of women from rural areas reported currently using contraception compared to women from urban areas (75% vs. 67%). The proportion of women who ever used contraception was also higher among women from rural areas (88%) than women from urban areas (84%).

Oral contraception and condoms were the most common contraceptive methods used by women from both urban and rural areas. A smaller proportion of women from rural areas reported using condoms compared to women from urban areas (18% vs 23%). However, partner sterilisation was more common among women from rural areas (15% vs. 7.5% in urban areas) (Figure 4.5).

**Figure 4.6: Type of contraceptive method used by women living in urban and rural areas, 2011**

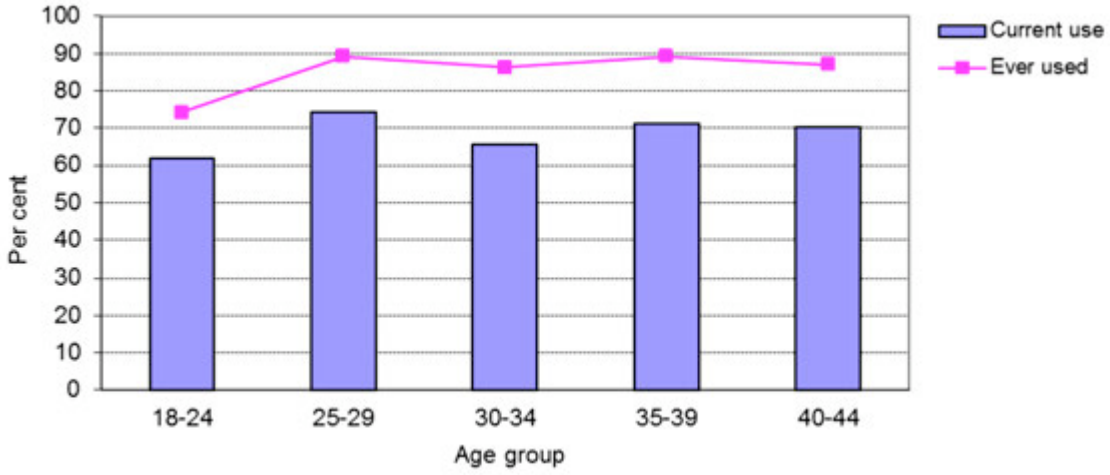



Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

## 4.7 Contraceptive use by age group

Current contraceptive use was highest among women aged 25-29 years (74%), and lowest among those aged 18-24 years (62%) (Figure 4.7). By age 30 approximately 90% of women had ever used contraception.

**Figure 4.7: Prevalence of contraceptive use by age group, 2011**

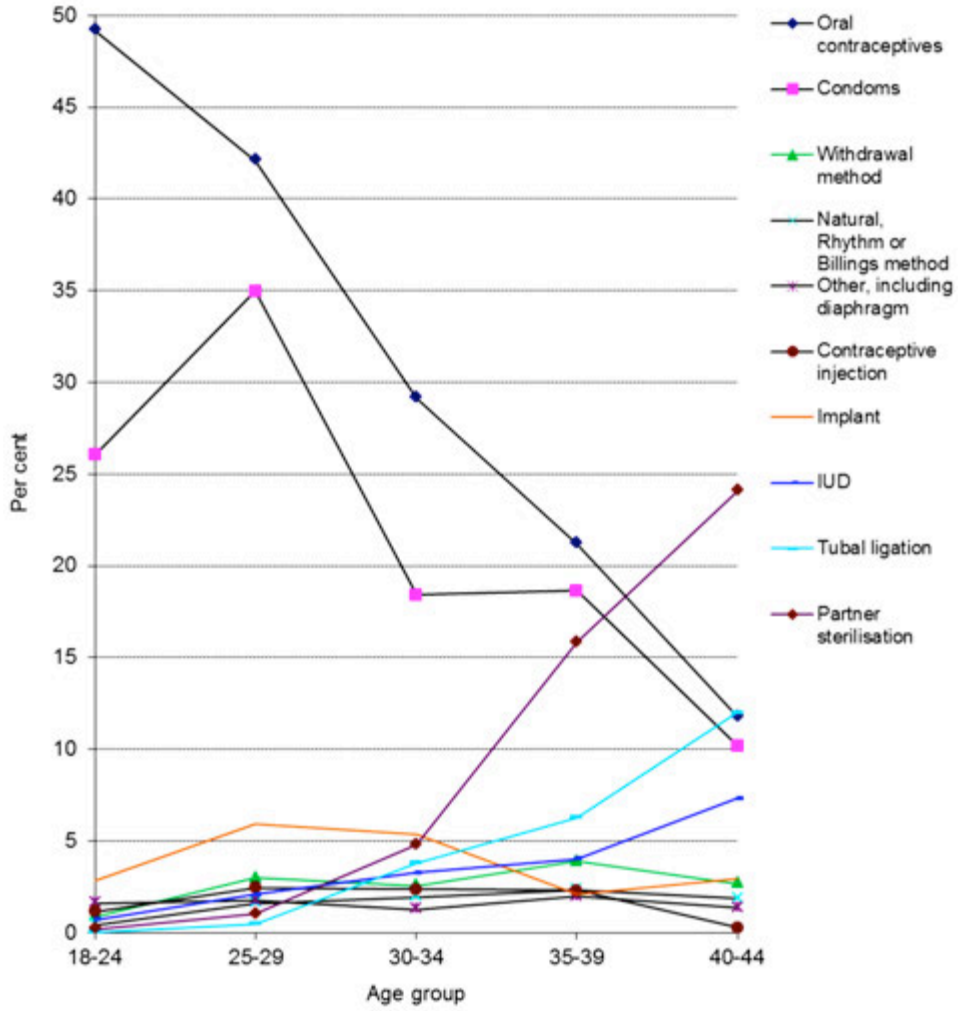



Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research.

Oral contraception and condoms were the most commonly reported methods used by all age groups except for those aged 40-44 years (Figure 4.8). The proportion of women reporting using oral contraception or condoms declined with increasing age. Use of oral contraception decreased from 49% among women aged 18-24 years to 12% among women aged 40-44 years. In contrast, partner sterilisation increased from almost none in the age groups younger than 24 years to 24% in the age group 40-44 years.

The ABS survey in 2001 also reported a reduction in the use of oral contraception with increasing age, from 43% among women aged 18-24 years to 15% among women aged 40-44 years.

**Figure 4.8: Choice of contraceptive methods by age group, 2011**




Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

## Young people

In the ASHR survey 2002[6] 53% of the women aged 16 -19 years used oral contraception and 51% used condoms. In the Sex in Australia study, prevalence of condom use was higher in the 16 to 19 year group than in any other age group (80% of males and 54% of females).[5] In the NSASS survey 2008, 68% of Year 10 and 12 students reported using a condom and 50% reported using the oral contraceptive pill.[9]

Changes in contraceptive behaviour among young people can be observed comparing the NSASS surveys of 2002 and 2008.[10] The proportion of students who were not using any method of contraception at their last sexual encounter decreased from 9% in 2002 to 0.2% in 2008. Condom use increased from 65% in 2002 to 68% in 2008. Use of oral contraception increased from 37% in 2002 to 50% in 2008. Use of the withdrawal method decreased slightly from 12% in 2002 to 9.5% in 2008, while use of the emergency contraception increased from 4% in 2002 to 8% in 2008.

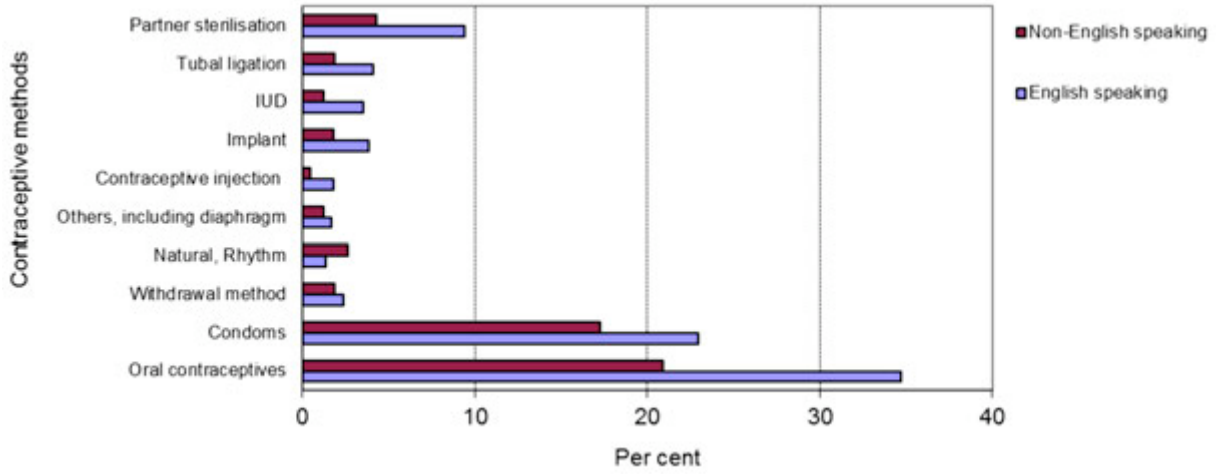
## 4.8 Contraceptive use by country of birth

Women from non-English speaking countries reported lower contraceptive use than women from Australia or other English speaking countries (50% compared to 71%). Similarly, the proportion of women from non-English speaking countries who had ever used contraception was also lower (67% compared to 86% of women from English speaking countries).

The use of all forms of contraception, except for the withdrawal and natural/rhythm method, was lower among women from non-English speaking countries than those from English speaking countries. For example, 21% of women from non-English speaking countries reported using oral contraception compared to 35% of women from English speaking countries (Figure 4.9).

Similar results were reported in the ASHR survey in 2002. Oral contraception and condom use were more common among women who spoke English at home (32% and 36%, respectively) than among women who did not speak English at home (15% and 20%, respectively).[6]

**Figure 4.9: Choice of contraceptive methods by country of birth, 2011**




Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

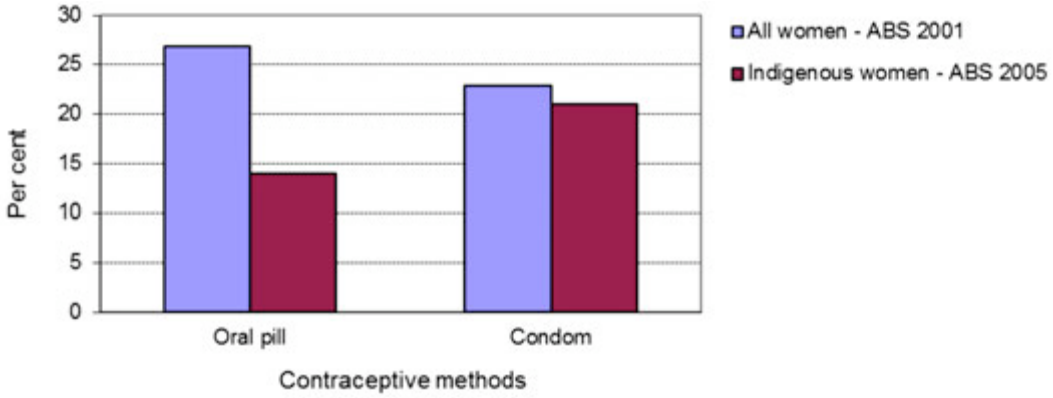
## 4.9 Contraceptive use by Indigenous status

In the HILDA survey 2011, Indigenous women reported lower contraceptive use than non-Indigenous women (64% compared to 71%). The ABS conducted a survey on 5,757 Indigenous adults in 2004-2005 (NATSIH survey). Fifty per cent of Indigenous women used contraception.[36] This was lower than the national average of 66% that was reported in a survey also conducted by the ABS on 5,872 Australian women in 2001.[4]

Information on the choices of contraceptive methods in the HILDA survey 2011 was only available on 109 Indigenous women. The number was too small to make statements about contraceptive choices. In the NATSIH survey, in contrast with the national pattern of oral contraception being the most common choice, Indigenous women reported the use of condoms more than oral contraception (21% and 14%, respectively) (Figure 4.10). Use of oral contraception among Indigenous women was much lower than the national average reported in the ABS survey 2001 (14% compared to 27%). However, implant and injection were more common among Indigenous women (7% and 8%, respectively) than the national average (less than 2% for both methods).[4]

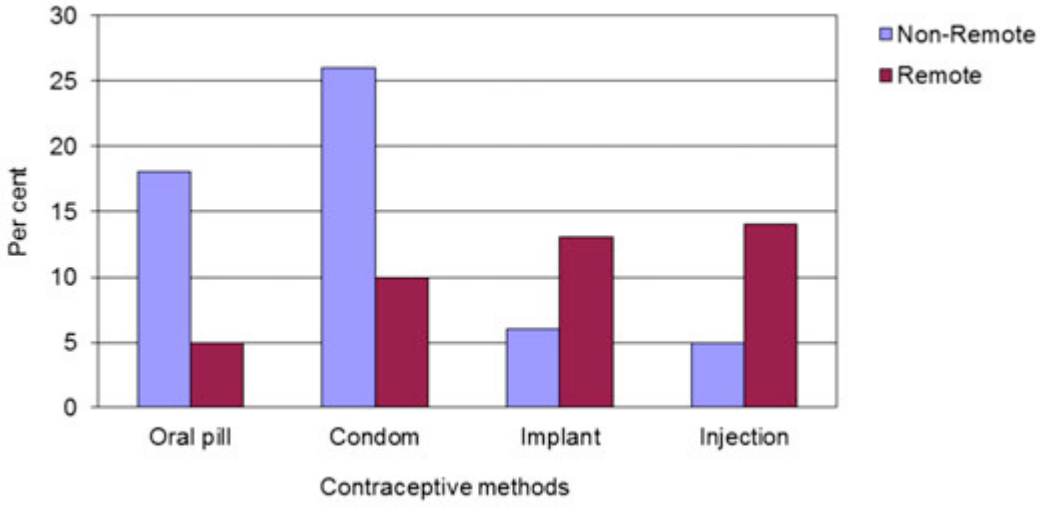
Choice of contraceptive method differed between Indigenous women who were living in remote and non-remote areas (Figure 4.11). Condom use was most common among Indigenous women living in non-remote areas (26%), followed by oral contraception (18%), injection (6%) and implant (5%). In contrast, Indigenous women living in remote areas were more likely to use injection (14%) or implant (13%) than condoms (10%) and oral contraception (5%).

**Figure 4.10: Choice of contraceptive methods by Indigenous status, 2004 and 2005**




Sources: Australian Bureau of Statistics (2006). National Aboriginal and Torres Strait Islander Health Survey Australia 2004–05 Catalogue No. 4715.0
Australian Bureau of Statistics (2002). National Health Survey 2001-Summary of results, Catalogue. No. 4364.0

**Figure 4.11: Choice of contraceptive methods among Indigenous women living in remote and non-remote areas**




Source: ABS National Indigenous Health Survey Australia 2004–05. ABS Catalogue No. 4715. Commonwealth of Australia 2006

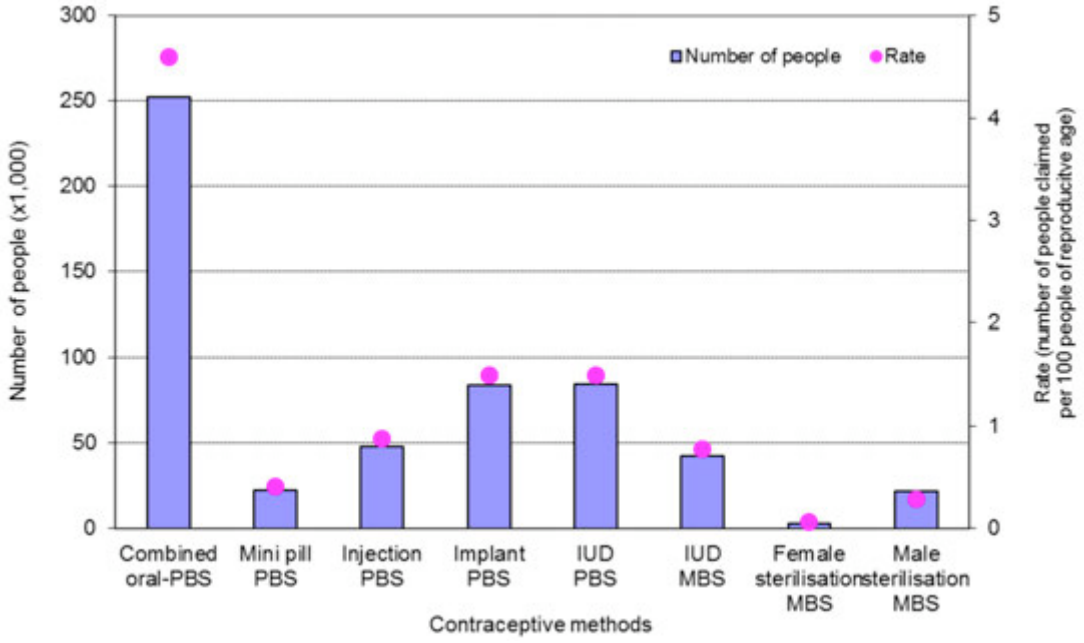
## 4.10 Medicare data

The Australian government subsidises contraceptive related products, such as oral contraception and the hormonal IUS, under the PBS and contraceptive related medical procedures such as medical consultation to prescribe contraception or IUD insertion procedure, under the MBS.

### 4.10.1 Overview of Medicare data

The number of women who received benefits for combined oral contraception (COCPs) was higher than the number of women who received benefits for any other contraceptive (Figure 4.12). In 2011, approximately 252,000 women claimed for COCPs from the PBS. In 2011, the total benefit claims for all forms of contraception was nearly $51 million or about $10 for each woman of reproductive age. Although COCPs were claimed by the highest number of women, the costs for the IUD device and insertion was highest (over $22 million). The cost for contraceptive implants was the second highest (nearly $16 million).

**Figure 4.12: Claims for Medicare benefits, 2011**




Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Data obtained from the Department of Health and Ageing, 2012
Numbers of men and women of reproductive age were downloaded from Australian Bureau of Statistic website:
http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### 4.10.2 Oral contraception

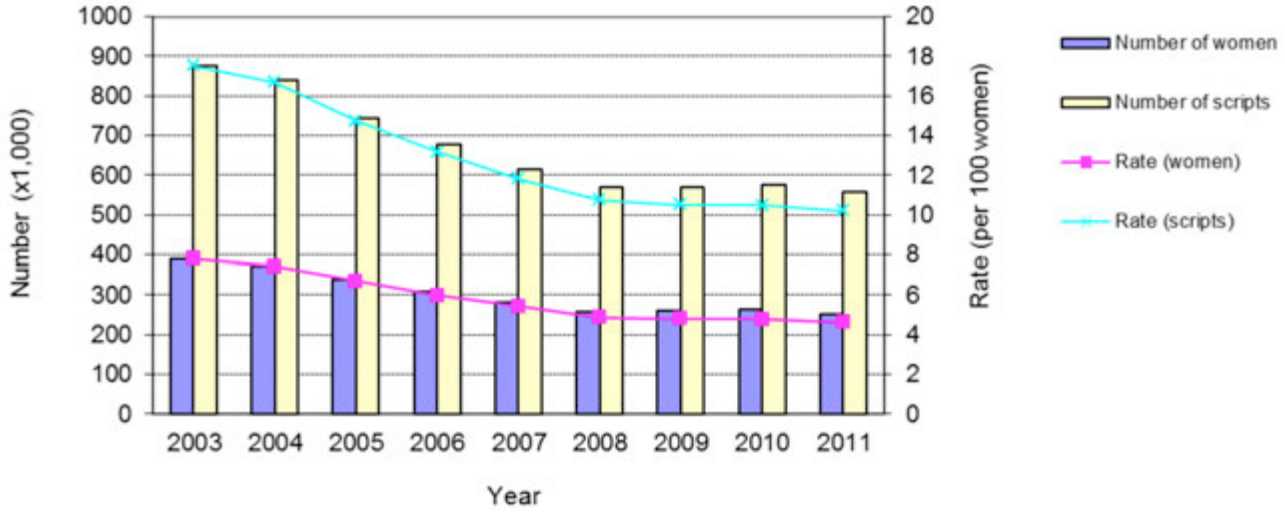
#### PBS claims for oral contraception in Australia

##### *PBS claims for COCPs*

The number of women who received benefits for the COCPs decreased sharply from around 391,000 in 2003 to around 258,000 in 2008 and decreased slightly to 252,000 in 2011 (Figure 4.13). The rate of women who received benefits for the COCPs also decreased from 7.8 per 100 women in 2003 to 4.9 per 100 women in 2008 and to 4.6 per 100 women in 2011.

Similar patterns were observed with the number of prescriptions claimed. The number of prescriptions claimed decreased sharply from around 876,000 claims in 2003 to about 569,000 in 2008 and decreased slightly to approximately 556,000 claims in 2011.

**Figure 4.13: PBS claims for COCPs in Australia, women aged 15-49 years, 2003 to 2011**




Note: PBS items 1456P, 1394J, 1393H, 1392G, 2774B, 2775C, 3176E, 3179H
Source: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

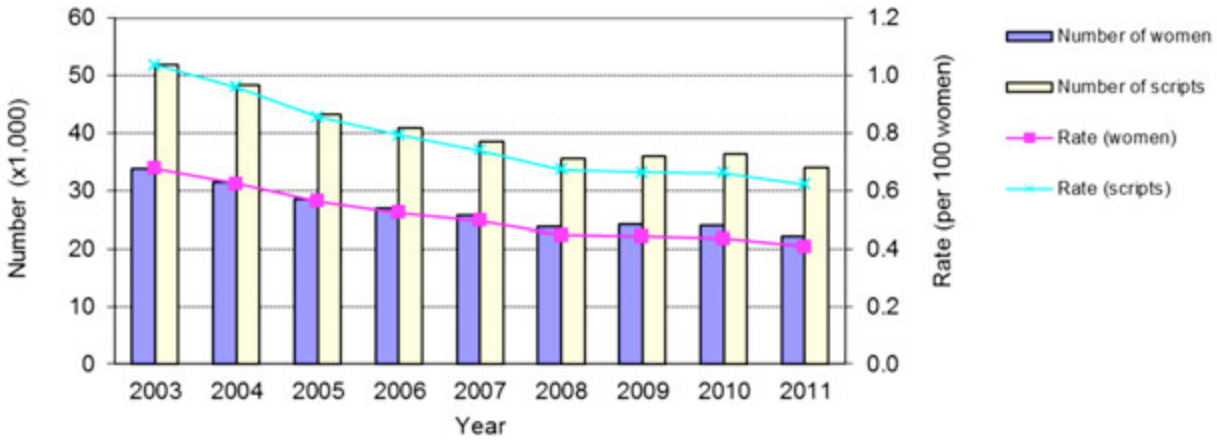
### *PBS claims for POP*

Similar to the trend of claims for COCPs, claims for Progestogen-only Contraceptive Pill (POP) also decreased sharply from around 34,000 in 2003 to 24,000 in 2008 and decreased slightly to 22,000 in 2011. The rate of women who received benefits for POPs per 100 women decreased from 0.68 in 2003 to 0.45 in 2008 and 0.41 in 2011 (Figure 4.14).

The number of prescriptions claimed for the POPs decreased from approximately 52,000 in 2003 to around 36,000 in 2008 and to about 34,000 in 2011. The rate of prescriptions claimed per 100 women decreased from 1.0 in 2003 to 0.67 in 2008 and 0.62 in 2011. The decrease may reflect the increasing availability of other effective progestogen only alternatives such as the implant and hormonal IUS. Medicare claims for these methods increased between 2003 and 2011 as presented in the following sections.

However, the proportion of women who received benefits for oral contraceptions, both for COCPs or POPs (5.4% in 2008) was much lower than the 30% of women who used oral contraception in the HILDA 2011 survey. One explanation would be that more women are purchasing oral contraceptions that are not listed on the PBS.

**Figure 4.14: PBS claims for POP in Australia, women aged 15-49 years, 2003 to 2011**




Note: PBS items 2913H, 1967M
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### PBS claims for oral contraception by state and territory

#### *PBS claims for COCPs by state and territory*

The reduction in rates of PBS claims for COCPs between 2003 and 2008 was seen in all states and territories (Appendix 2 - Table 4.5). TAS consistently had the highest claim rate (8.9 women and 20 prescriptions per 100 women in 2011). NT had the lowest claim rate (0.84 women and 1.5 scripts per 100 women in 2011).

#### *PBS claims for POPs by state and territory*

The claim rate for POPs also decreased from 2003 to 2011 in all states and territories (Appendix 2 - Table 4.6). TAS had the highest claim rate of 0.68 women who received benefits and 1.1 scripts per 100 women in 2011. NT had the lowest rates of claims of only 0.08 women who received benefits and 0.12 scripts per 100 women in 2011.

### PBS claims for oral contraception by age group

#### *PBS claims for COCPs by age group*

Between 2003 and 2008, the rate of women who received benefits for COCPs and the rate of prescriptions filled for COCPs decreased in all age groups (Appendix 2 - Table 4.7). Older women had a lower claim rate for COCPs than younger women. In 2011, women aged 15-49 had the highest claim rate (9 women and 17 scripts per 100 women). Women aged 45-49 years had the lowest claim rate (1.7 women and 3.9 scripts per 100 women).

#### *PBS claims for POPs by age group*

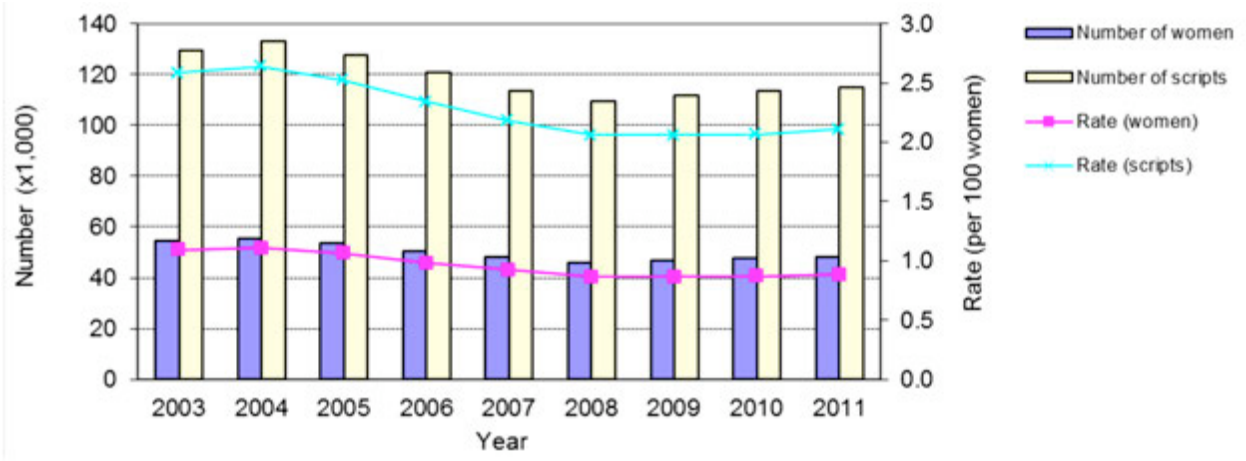
Between 2003 and 2008, the rate of women who received benefits and scripts claimed for POPs decreased in all age groups (Appendix 2 - Table 4.8). In 2011, women aged 25-29 had the highest claim rate (0.63 women and 0.84 scripts per 100 women). The rate of women who received benefits was lowest among women aged 45-49 years (0.16 women per 100 women) but the rate of claim was lowest among women aged 15-19 years (0.26 scripts per 100 women).

## 4.10.3 Injectable contraceptives

### PBS claims for injectable contraceptives in Australia

The number of women who received benefits for injectable contraceptives in Australia decreased from around 55,000 in 2003 to around 48,000 in 2011 (Figure 4.15). The number of scripts claimed also decreased from just over 129,000 in 2003 to around 115,000 in 2011. The rates of women who received benefits decreased from 1.1 women per 100 women in 2003 to 0.88 per 100 women in 2011.

**Figure 4.15: PBS claims for injectable contraceptives in Australia, 2003 to 2011**




Note: PBS item 3118D
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### PBS claims for injectable contraceptives by state and territory

Tasmania had the highest claim rate for injectable contraceptive (1.9 women who received benefits and 4.6 scripts per 100 women) (Appendix 2 - Table 4.9). NT had the lowest claim rate for injectable contraceptive (0.18 women who received benefits and 0.33 scripts per 100 women).

### PBS claims for injectable contraceptives by age group

Between 2003 and 2011, the number of PBS claims decreased for all age groups younger than 40 years (Appendix 2 - Table 4.10). In 2011, women aged 20-24 years had the highest claim rate of 1.2 women who received benefits and 2.3 scripts per 100 women. Women aged 45-49 years had the lowest claim rate of 0.43 women who received benefits and 1.2 scripts per 100 women in 2011.

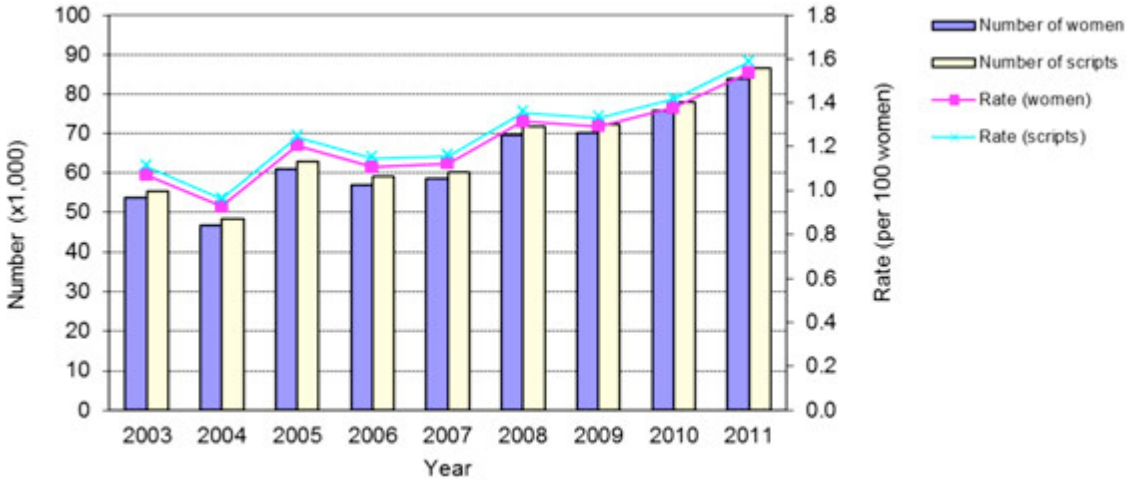
## 4.10.4 Contraceptive implant

### PBS claims for contraceptive implant in Australia

The number of women who received benefits for the contraceptive implant in Australia increased from around 54,000 in 2003 to around 84,000 in 2011 (Figure 4.16). The claim rate of women who received benefits per 100 women increased from 1.1 in 2003 to 1.5 in 2011.

The number of scripts claimed also increased from just over 55,000 in 2003 to around 86,000 in 2011. The claim rate per 100 women increased from 1.1 in 2003 to 1.6 in 2011. The number of scripts claimed per year was only slightly higher than the number of women who received benefits because the contraceptive implant is effective for up to three years. A second prescription is required within that time only if there are issues with the initial implant. Because of this, only data on number of women who received benefits are presented by state and territory and age.

**Figure 4.16: PBS claims for contraceptive implant in Australia, 2003 to 2011**




Note: PBS item 8487Q
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### PBS claims for contraceptive implant by state and territory

In 2011, ACT had the highest rate of PBS claims for contraceptive implant (2.8 women who received benefits and 2.9 scripts per 100 women) and NSW had the lowest claim rate (1.2 women who received benefits and 1.2 scripts per 100 women) (Appendix 2 - Table 4.11).

### PBS claims for contraceptive implant by age group

In 2011, women aged 15-19 years had the highest PBS claim rate for contraceptive implant (2.8 women and 2.8 scripts per 100 women) and women aged 45-49 years had the lowest claim rate (0.41 women and 0.41 scripts per 100 women in 2011) (Appendix 2 - Table 4.12).

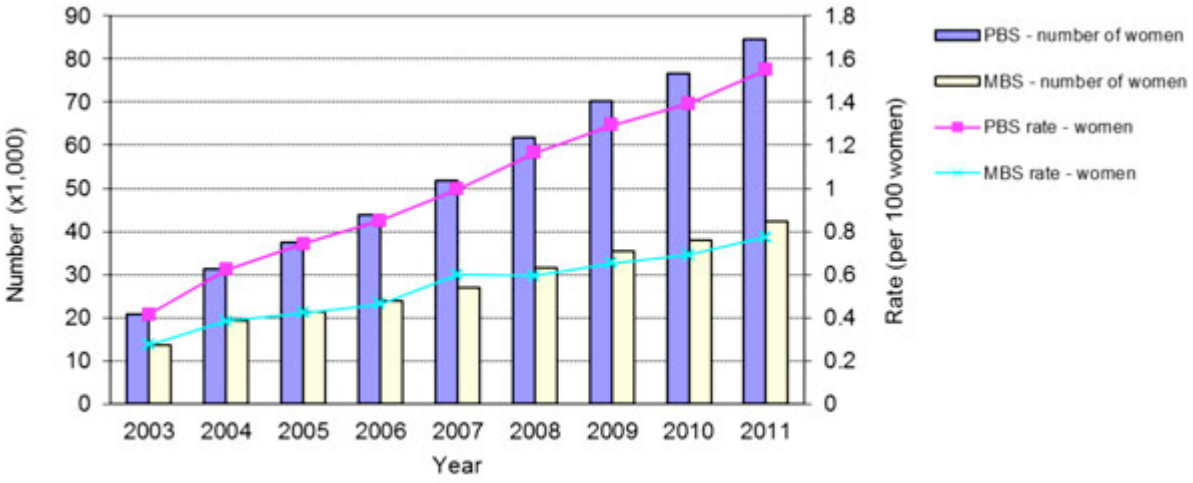
## 4.10.5 Intrauterine contraception

### Medicare claims for intrauterine contraception in Australia

The use of IUDs in Australia has increased since the introduction of the hormonal IUS on the PBS in 2001 (Figure 4.17). The increase was observed in both PBS items (reimbursement of the cost of the hormonal IUS) and MBS items (insertion procedure for both the copper intrauterine device and the hormonal IUS). The number of women who received benefits for the cost of the intrauterine hormonal IUS increased from nearly 21,000 in 2003 to approximately 85,000 in 2011. The number of scripts claimed was slightly more than the number of women who received benefits, and increased from around 22,000 in 2003 to around 88,000 in 2011. The number of insertion procedures claimed also increased from nearly 14,000 in 2003 to about 42,000 in 2011.

In 2011, the rate of PBS claims for IUDs was 1.5 per 100 women while the rate of MBS claims was 0.77 per 100 women, about half of the rate for PBS. Possible explanations for the much lower MBS claim rate could be that some doctors may not claim this item number, and procedures that were carried out in facilities that do not bill through Medicare, such as certain hospitals and Family Planning clinics which are not included in MBS data.

**Figure 4.17: Medicare claim for intrauterine contraceptive device in Australia, 2003 to 2011**




Note: MBS item 35503. PBS item 8633J
Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### MBS and PBS claims for intrauterine contraception by state and territory

The increasing trends in claims for IUDs were observed in all states and territories for both PBS and MBS data (Table A 4.13). In 2011, the PBS and MBS claim rates were highest in the ACT (2.4 and 1.4 women who received benefits per 100 women, respectively). NT had the lowest claim rates in the PBS (0.62 women per 100 women) and MBS (0.42 per 100 women).

### Medicare claims for intrauterine contraception by age group

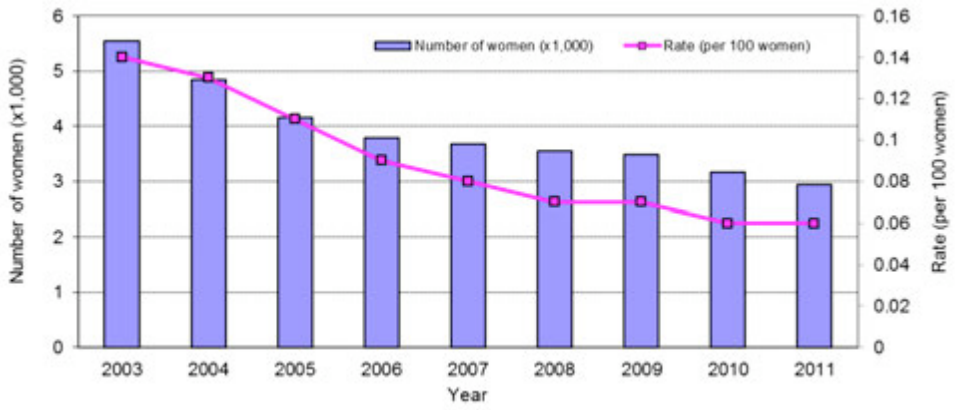
Between 2003 and 2008, claim rates for IUDs increased in all age groups. Women aged 35-39 years and 40-44 years had the highest claim rates for the PBS (2.2 women who received benefits per 100 women for both age groups in 2011). In 2011, women aged 35-44 years, had the highest MBS claim rate for IUDs (1.1 insertions per 100 women) (Appendix 2- Table 4.14).

## 4.10.6 Female sterilisation

### MBS claims for female sterilisation in Australia

Claims for tubal ligation decreased sharply from about 5,500 in 2003 to about 2,900 in 2011, a reduction of 47% (Figure 4.18). The claim rate also decreased from 0.14 per 100 women aged 15-49 years in 2003 to 0.06 in 2011.

**Figure 4.18: MBS claims for female sterilisation in Australia, 2003 to 2011**




Note: MBS items 35688, 35687 and 35691 for tubal ligation.
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### MBS claims for female sterilisation by state and territory

The reduction in rates for female sterilisation between 2003 and 2011 was observed in all states and territories and there was little difference in the rates between states and territories (Appendix 2- Table 4.15).

### MBS claims for female sterilisation by age group

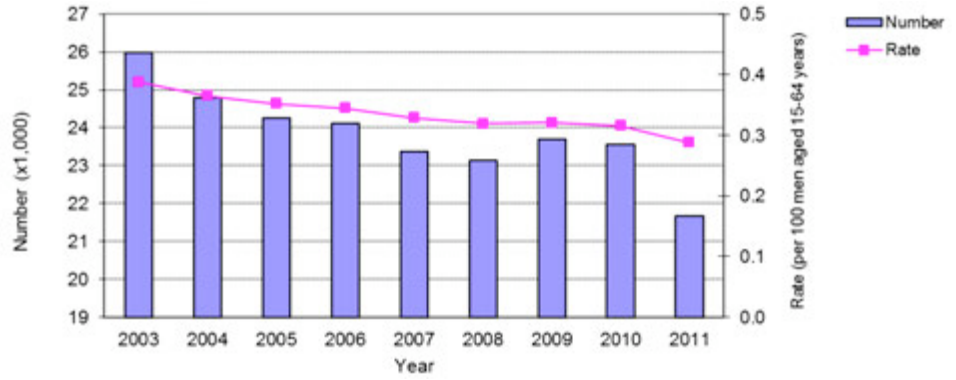
Women aged 25-35 years had the highest claim rate for sterilisation (0.04 per 100 women in 2011), followed by women older than 35 years (0.03 per 100 women in 2011). The claim rate for women aged 24 years or younger was very low (0.001 per 100 women) (Appendix 2 - Table 4.16).

## 4.10.7 Male sterilisation

### MBS claims for male sterilisation in Australia

Claims for vasectomy declined from approximately 26,000 in 2003 to about 22,000 in 2011. The claim rate per 100 men aged 15-64 years also decreased from 0.39 in 2003 to 0.29 in 2011 (Figure 4.19).

**Figure 4.19: MBS claims for male sterilisation in Australia, 2003 to 2011**




Note: MBS items 37622 and 37623
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtm.
Number of men aged 15-64 years was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202011?OpenDocument#Time

### MBS claims for male sterilisation by state and territory

In 2011, ACT had the highest claim rate for vasectomy (0.40 per 100 men aged 15-64 years) and NT had the lowest claim rate (0.19 per 100 men aged 15-64 years) (Appendix 2 - Table 4.17).

### MBS claims for male sterilisation by age group

Vasectomy was most common among men aged 35-44 years (0.81 claims per 100 men in 2011). Claim rates for men younger than 25 years, or older than 55 years, were very low (0.003 per 100 men younger than 25 years and 0.029 per 100 men older than 55 years) (Appendix 2 - Table 4.18).

## 4.11 Discussion

**Contraceptive use in Australia**

Two-thirds of Australian women of reproductive age report that they are currently using contraception. Oral contraception was most common (survey estimates range from 27% to 34%), followed by condom use (20% to 23%), vasectomy (8.6% to 11%) and tubal ligation (4.8% to 8.6). Only between 1.2% and 2.1% of women used IUDs. Compared to other developed countries, the use of oral contraception and sterilisation was more common in Australia while the use of IUDs was much less frequent.

The high use of oral contraception may be attributed to its high effectiveness, ease of use and reversibility.[37] Since its introduction in the 1960s the uptake of oral contraception rapidly increased and in part contributed to the sexual revolution of the 60s.[38-39]

In contrast, the use of LARCs remains very low. In the 1970s, lawsuits against the manufacturers of the Dalkon Shield in the USA created a concern that IUD use was associated with a higher risk of pelvic infection, infertility, and even death from sepsis.[40] In Australia the use of IUDs fell by 80% between 1984 and 1995.[8] Despite the development of newer devices, misconceptions about IUDs remain and appear to have resulted in their low uptake in Australia.[41] Barriers to the use of IUDs persist among health care providers, the health care system and women.[42] Some concerns were that IUDs may cause pelvic inflammatory disease, infertility, ectopic pregnancy and are unsuitable for nulliparous women.[43-46] The high upfront cost may also be an issue for government and women.[42,47,48] Increasing the uptake of LARCs has been identified as a public priority in the UK[24] and in the US.[25]

Over-the-counter access to emergency contraception has not decreased unintended pregnancy or abortion rates in Australia or other similar countries.[49,50] This failure of emergency contraception to affect abortion rates is in part attributable to issues of knowledge: while most women are aware of emergency contraception, many are not aware that it is available without requiring a visit to the doctor, nor that the efficacy may extend beyond 24 hours after unprotected intercourse.[49,50] Moreover, many women continue to harbour misinformation about the safety and potential effects of emergency contraception, and underestimate their ability to become pregnant.[49,50]

**Contraceptive use by age group**

The data in this report are similar to those from other studies: as women get older, contraceptive use increases but declines at age 30-35 years, then increases again. The average maternal age in Australia is 30 years.[53] Women aged between 30-35 years may try to conceive and do not use contraception.[3,6,54] For teenage girls, not having the power to decide about contraceptive use may partly account for their low use of contraception.[6,55]

Choice of contraceptive methods also changes with age. Young women who want to have children in the future use short term methods of oral contraception and condoms; older women, who may have achieved their desired number of children, use LARCs and permanent methods.[3,5,54]

**Contraceptive use by Indigenous status**

Contraceptive use among Indigenous women was lower than among non-Indigenous women (50% compared to 66%). Access has been identified as a factor contributing to low use of contraceptives among Indigenous people.[51] Cost of contraceptives,[52] low income,[56] lack of private health insurance,[56] less access to and less ability to drive a motor vehicle[57] are all associated factors.

A positive attitude toward having more children at a young age in Indigenous culture may discourage contraceptive use.[58-60] Indigenous teenage girls may be reluctant to refuse sex[59] and sex without using a condom.[52] Indigenous children have a higher drop-out-of-school rate, and are therefore less likely to receive reproductive and sexual health education which is part of the high school curriculum.[51] In small communities in remote areas, fear of being recognised and judged by someone they know when accessing a reproductive and sexual health service or product is also an important barrier.[51,52,61] Finally, the health services provided may not be culturally appropriate.[51]

**Contraceptive use by country of birth**

Contraceptive use among non-English speaking women was much lower than among English speaking women (50% compared to 71%, HILDA survey 2011). These results are similar to findings from other studies.[5,6,30,32] Lack of English skills may be a barrier for women from non-English speaking countries when seeking contraceptive products or services. People born overseas have, on average, a lower income than people born in Australia ($431 a week compared to $488 as at 2006)[62] and may therefore be less able to afford contraception. In order to encourage the uptake of health services, the services provided to these population should also be culturally appropriate.[63,64]

### Medicare data

Medicare data only reflect products or procedures listed on the PBS or MBS. This may explain the discrepancy between the 5.4% of women of reproductive age who received PBS benefits for oral contraception and the estimated 30% of women of reproductive age using oral contraception in surveys. Nonetheless, the number of women who received benefits for oral contraception was still higher than the number of women who received benefits for any of the other listed contraceptive products or procedures. The number of women who received PBS benefits for oral contraception decreased by 31% between 2004 and 2008. The increasing availability of new products including pills containing the progestogen drospirenone released in 2001,[65] that are not listed on the PBS, and the introduction of longer-acting progestogen-only methods such as the contraceptive implant and hormonal IUS[65] may have contributed to the reduction.

The number of women who received PBS or MBS benefits for IUDs had increased sharply, by 300% for both PBS and MBS claims, and the number of women who received benefits for implants increased by 57% over the last decade. The rapid increase in claims for IUD may be due to inclusion of the intrauterine hormonal IUS on the PBS since 2003. Mandatory training and accreditation requirements introduced in 2003[66] together with improved insertion techniques[67] have increased uptake of the implant.

The total expenditure on PBS and MBS benefits for contraceptives in 2011 was about $51 million, which was mostly for IUDs ($22 million) and implants ($16 million). The upfront cost to the government for IUDs and implants may be high but because of the long lasting effect (5 years for the hormonal IUS and 3 years for implant), these methods are still the most cost effective contraceptives.[68-70]

Claims for contraceptive methods differed between states and territories. NT had the lowest claim rate for most of the products and procedures. Many people in the NT live in remote areas (21%) or very remote areas (25%)[71] and limited access is a major barrier in contraceptive use in those areas.[51] NT also has the highest proportion of Indigenous people (28% compared to the national average of 2.3%) [73] who have lower use of contraception.[36]

## 4.11.1 Data development

### Survey data

Future surveys should adopt a common classification of contraceptive methods and definitions of current sexual activity and reproductive age range. This will allow more direct and valid comparisons between studies.

Information on contraceptive use among Indigenous people is limited. The last survey regarding contraceptive use which was carried out among Indigenous people was in 2004 to 2005. Although some Indigenous people are included in surveys of the general population the numbers are too small to allow meaningful statistical analysis. Where possible, surveys of the general population should consider over-sampling Indigenous participants.

### Medicare data

An MBS item number was assigned for the insertion of contraceptive implants in November 2012. This will allow monitoring of the numbers of contraceptive implants. However contraceptive injection still does not have a specific item number.

The possibility of linking Medicare data with other data sources that contain demographic characteristics should be examined. This will allow comparisons to be made between important population subgroups.

## 4.12 References


1. United Nations DESA, Population Division. World contraceptive use 2010. Available at: http://www.un.org/esa/population/publications/wcu2010/Metadata/CPR.html. Accessed on 9 April 2013.
2. Wilkins R, Warren D, Hahn M, Houng B. Families, incomes and jobs, Volume 3. A statistical report on Waves 1 to 5 of the Household, Income and Labour Dynamics in Australia Survey. Melbourne: Melbourne Institute of Applied Economic and Social Research, 2008.
3. Gray E, McDonald P. Using a reproductive life course approach to understand contraceptive method use in Australia. J Biosoc Sci 2010; 42(01):43-57.
4. Australian Bureau of Statistics. National Health Survey 2001-Summary of results. ABS Cat. no. 4364.0. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4364.0Main+Features12001. Accessed on 9 April 2013.
5. de Visser RO, Smith AM, Rissell CE, Richters J, Grulich AE. Sex in Australia: Safer sex and condom use among a representative sample of adults. Aust N Z J Public Health 2003; 27:223-9.
6. Richters J, Grulich AE, de Visser RO, Smith AM, Rissel CE. Sex in Australia: Contraceptive practices among a representative sample of women. Aust N Z J Public Health 2003; 27:210-6.
7. Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: Reproductive experiences and reproductive health among a representative sample of women. Aust N Z J Public Health 2003; 27:204-9.
8. Lucke J, Watson M, Herbert D. Changing patterns of contraceptive use in Australian women. Contraception 2009; 80(6):533-9.
9. Smith AM, Agius P, Barrett C, Mitchell A, Pitts M. Secondary Students and Sexual Health 2008. Results of the 4th National Survey of Australian Secondary Students, HIV/AIDS and Sexual Health. Melbourne: Australian Research Centre in Sex, Health & Society, La Trobe University, 2009.
10. Smith AM, Dyson S, Mitchell A, Pitts M. Secondary Students and Sexual Health 2002. Results of the 3rd National Survey of Australian Secondary Students, HIV/AIDS and Sexual Health. Melbourne: Australian Research Centre in Sex, Health & Society, La Trobe University, 2003.
11. Grunseit A, Richters JA. Age at first intercourse in an Australian national sample of technical college students. Aust N Z J Public Health 2000; 24(1):11-6.
12. Grunseit A. Precautionary tales: Condom and contraceptive use among young Australian apprentices. Culture, Health & Sexuality 2004; 6(6):517-35.
13. Australian Bureau of Statistics. National Aboriginal and Torres Straight Islander Health Survey 2004-05. ABS Cat. no. 4715.0. Canberra: ABS, 2006. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4715.0/. Accessed on 9 April 2013.
14. Mazza D, Harrison C, Taft A, et al. Current contraceptive management in Australian general practice: an analysis of BEACH data. Med J Aust 2012; 197(2):110-114.
15. Medicare Australia. Medicare Australia Statistics.
16. Annabelle Chan and Leonie C Sage. Estimating Australia's abortion rates 1985–2003. Med J Aust; 182 (9): 447-452. 2005.
17. Gipson JD, Koenig MA, Hindin MJ. The effects of unintended pregnancy on infant, child, and parental health: A review of the literature. Stud Fam Plann 2008; 39(1):18-38.
18. David HP. Born unwanted, 35 years later: The Prague study. Health Matters 2006; 14(27):181-190.
19. Lordan G, Frijters P. Unplanned pregnancy and the impact on sibling health outcomes. Health Econ 2012; doi: 10.1002/hec.2866 [Epub ahead of print].
20. Eisenberg L, Brown SS. The best intentions: unintended pregnancy and the well-being of children and families. Washington, DC: National Academy Press, 1995.
21. Hatcher RD. Contraceptive technology. 20th ed. US: Ardent Media, 2012.
22. Sexual Health & Family Planning Australia. Contraception: an Australian clinical practice handbook. Queensland: Family Planning QLD, 2006.

23. American College of Obstetricians and Gynecologists Committee on Gynecologic Practice. Long-Acting Reversible Contraception Working Group. ACOG Committee Opinion no. 450: Increasing use of contraceptive implants and intrauterine devices to reduce unintended pregnancy. Obstet Gynecol 2009; 114:1434-8.

24. National Collaborating Centre for Women's and Children's Health. Long-acting reversible contraception: the effective and appropriate use of long-acting reversible contraception. London: RCOG Press, 2005.

25. National Research Council. Initial national priorities for comparative effectiveness research. Washington, DC: National Academies Press, 2009.

26. Summerfield M, Dunn R, Freidin S, et al. HILDA user manual - release 10. Melbourne: Melbourne Institute of Applied Economic and Social Research, University of Melbourne, 2011.

27. Australian Bureau of Statistics. Australian demographic statistics, Sep 2012. ABS Cat. no. 3101.0. Canberra: ABS, 2013. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/. Accessed on 10 April 2013

28. Mohoric-Stare D, De Costa C. Knowledge of emergency contraception amongst tertiary students in far North Queensland. Aust N Z J of Obstet Gynaecol 2009; 49(3):307-11.

29. Shawe J, Ineichen B, Lawrence R. Emergency contraception: who are the users? J Fam Plann Reprod Health Care 2001; 27(4): 209-12.

30. Yusuf F, Siedlecky S. Patterns of contraceptive use in Australia: Analysis of the 2001 National Health Survey. J Biosoc Sci 2007; 39:735-44.

31. Hobbs M, Taft A, Amir L, et al. Pharmacy access to the emergency contraceptive pill: a national survey of a random sample of Australian women. Contraception 2011; 83(2):151-8.

32. Parr N, Siedlecky S. Use of 'dual protection' and other combinations of contraceptive methods in Australia. Aust N Z J Public Health 2007; 31(6):567-70.

33. Agius P, Pitts MK, Dyson S, Mitchell AM, Smith AMA. Pregnancy and contraceptive use in a national sample of Australian secondary school students. Aust N Z J Public Health 2006; 30(6):555-7.

34. de Visser R. Why do heterosexual young adults who use reliable contraception also use condoms? Results from a diary-based prospective longitudinal study. Br J Health Psychol 2007; 12(2):305-13.

35. Marie Stopes International. Real choices: Women, contraception and unplanned pregnancy. Available at: http://www.mariestopes.org.au/images/stories/libraryfiles/Real-Choices-Key-Findings.pdf. Accessed on 9 April 2013.

36. Australian Bureau of Statistics. Population Distribution, Aboriginal and Torres Straight Islander Australians 2006. ABS Cat. no. 4705.0. Canberra: ABS, 2006. Available at: http://www.abs.gov.au/ausstats/abs@.nsfb066605924 30724fca2568b5007b8619/14e7a4a075d53a6cca2569450007e46c!OpenDocument. Accessed on 9 April 2013.

37. Fraser I. Forty years of combined oral contraception: the evolution of a revolution. Med J Aust 2000; 173(10):541-4.

38. Read C, Bateson D, Weisberg E, Estoesta J. Contraception and pregnancy then and now: Examining the experiences of a cohort of mid age Australian women. Aust N Z J Obstet Gynaecol 2009; 49(4):429-33.

39. Tone A. Devices and desires: A history of contraceptives in America. New York, USA: Hill & Wang, 2001.

40. Byrne K. Medical records in litigation: The Dalkon Shield story. AMRO 1992; 32:11-4.

41. Stubbs E, SchampSA. The evidence is in. Why are IUDs still out?: Family physicians ' perceptions of risk and indications. Can Fam Physician 2008; 54(4):560-6.

42. Black K, Lotke P, Buhling KJ, et al. A review of barriers and myths preventing the more widespread use of intrauterine contraception in nulliparous women. Eur J Contracept Reprod Health Care 2012; 17(5):340-50.

43. Canavan TP. Appropriate use of the intrauterine device. Am Fam Phys 1998; 58:2077-84.

44. Fleming KL Sokoloff A, Raine TR. Attitudes and beliefs about the intrauterine device among teenagers and young women. Contraception 2010; 82(2):178-82.

45. Whitaker AK, Johnson LM, Harwood B, et al. Adolescent and young adult women's knowledge of and attitudes toward the intrauterine device. Contraception 2008; 78(3):211-7.

46. Bateson D, Harvey C, Williams J, Black KI. Intrauterine contraception: Why are so few Australian women using this effective method? Med J Aust 2011; 194(6):324.

47. Kittur ND, Secura GM, Peipert JF, et al. Comparison of contraceptive use between the Contraceptive CHOICE Project and state and national data. Contraception 2011; 83(5):479-85.

48. Mazza D. Take a fresh look at IUDs. Australian Family Physician 2002; 31(10):1-5.

49. Black KI. Developments and challenges in emergency contraception. Best Pract Res Clin Obstet Gynaecol 2009; 23(2):221-31.

50. Novikova N, Weisberg E, Fraser IS. Does readily available emergency contraception increase women's awareness and use? Eur J Contracept Reprod Health Care 2009; 14(1):39-45.

51. Department of Health and Ageing. National Aboriginal and Torres Strait Islander Sexual Health and Blood Borne Virus Strategy 2005-2008. Canberra: Department of Health and Ageing, 2005.

52. Larkins SL, Page RP, Panaretto KS, et al. Attitudes and behaviours of young Indigenous people in Townsville concerning relationships, sex and contraception: the" U Mob Yarn Up" project. Med J Aust 2007; 186(10):513.

53. Li Z, Zeki R, Hilder L, Sullivan EA. Australia's mothers and babies 2010. Perinatal statistics series no. 27. Cat. no. PER 57. Canberra: AIHW, 2012.

54. Yusuf F, Siedlecky S. Contraceptive use in Australia: evidence from the 1995 National Health Survey. Aust N Z J Obstet Gynaecol 1999; 39(1):58-62.

55. Evans A. Power and negotiation: young women's choices about sex and contraception. Journal of Population Research 2000; 17(2):143-62.

56. Australian Bureau of Statistics. Population characteristics, Aboriginal and Torres Strait Islander Peoples 2006. ABS cat no 4713.0. Canberra: ABS, 2010. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4713.0Explanatory%20Notes12006?OpenDocument. Accessed on 9 April 2013.

57. Australian Institute of Health and Welfare. Access to health services for Aboriginal and Torres Strait Islander people. AIHW Cat. no. 46. Canberra: AIHW, 2011.

58. Skinner SR, Smith J, Fenwick J, et al. Pregnancy and protection: perceptions, attitudes and experiences of Australian female adolescents. Women Birth 2009; 22(2):50-56.

59. Senior K, Chenhall R. 'Walkin' about at night': The background to teenage pregnancy in a remote Aboriginal community. Journal of Youth Studies 2008; 11(3):269-281.

60. Arabena K. Preachers, policies and power: the reproductive health of adolescent Aboriginal and Torres Strait Islander peoples in Australia. Health Promot J Austr 2006; 17(2):85-90.

61. Warr D HL. That's the problem with living in a small town: privacy and sexual health issues for young rural people. Aust J Rural Health 1997; 5(3):132-139.

62. Department of Immigration and Citizenship. The People of Australia, Statistics from the 2006 Census. Available at: http://www.immi.gov.au/media/publications/research/_pdf/poa-2008.pdf. Accessed on 9 April 2013.

63. Omeri A, Raymond L. Diversity in the context of multicultural Australia: Implications for nursing practice. In J Daly, S Speedy & D Jackson (Eds), Contexts of nursing: An introduction, Ch 19, 3rd Edition, Australia: Elsevier, Churchill Livingstone, 2009.

64. Bloomfield RD. Cultural sensitivity and health care. J Natl Med Assoc 1994; 86(11):819-820.

65. Allen K. Catching up on contraception. Australian Family Physician 2009; 38(6):380-2.

66. Wenck B, Johnston P. Implanon and medical indemnity: a case study of risk management using the Australian standard. Med J Aust 2004; 181(2):117-9.

67. Mansour D, Mommers E, Teede H, et al. Clinical satisfaction and insertion characteristics of a new applicator to insert radiopaque Implanon: an open-label, non-controlled, multicenter trial. Contraception 2010; 82(3):243-9. 68. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin No. 121: Long-acting reversible contraception: Implants and intrauterine devices . Obstet Gynecol 2011; 118:184-96.

69. Mavranezouli I, LARC Guideline Development Group. The cost-effectiveness of long-acting reversible contraceptive methods in the UK: Analysis based on a decision-analytic model developed for a National Institute for Health and Clinical Excellence (NICE) clinical practice guideline. Hum Reprod 2008; 23(6):1338-45.

70. Trussell J, Lalla AM, Doan QV, et al. Cost effectiveness of contraceptives in the United States. Contraception 2009; 79(1):5-14.

71. Australia Bureau of Statistic. 1301.0 - Year Book Australia, 2004 2004.

## 4.13 Appendices

### 4.13.1 Appendix 1 – Country classification

(Source: United Nations DoEaSA, Population Division. World Contraceptive Use 2010 [POP/DB/CP/Rev2010]. http://wwwunorg/esa/population/publications/wcu2010/Metadata/CPRhtml. 2011.)

**More developed regions:** comprise all regions of Europe plus Northern America, Australia, New Zealand and Japan. Developed countries are those in the more developed regions.

**Less developed regions:** comprise all regions of Africa, Asia (excluding Japan) and Latin America and the Caribbean, as well as Melanesia, Micronesia and Polynesia.

**Least developed countries:** includes 49 countries

Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina, Burundi, Cambodia, Central, Chad, Comoros, Dem, Djibouti, Equatorial, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao, Lesotho, Liberia, Madagascar, Malawi, Maldives1, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao, Senegal, Sierra, Solomon, Somalia, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United, Vanuatu, Yemen, Zambia.

Other less developed countries: comprise the less developed regions excluding the least developed countries.

## 4.13.2 Appendix 2 – Data for figures presented in this chapter

### Table 4.5: Rate of Medicare claims for COCP by state and territory, 2003 to 2011

| | | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 6.6 | 7.9 | 9.5 | 9.5 | 8.0 | 13.1 | 8.9 | 2.0 |
| | 2004 | 6.4 | 7.6 | 8.8 | 9.0 | 7.5 | 12.7 | 8.3 | 1.9 |
| | 2005 | 5.8 | 7.0 | 7.7 | 8.2 | 6.6 | 11.7 | 7.2 | 1.7 |
| | 2006 | 5.3 | 6.3 | 6.7 | 7.4 | 5.5 | 10.7 | 6.1 | 1.4 |
| | 2007 | 4.8 | 5.9 | 6.0 | 6.8 | 4.6 | 9.7 | 5.4 | 1.2 |
| | 2008 | 4.4 | 5.4 | 5.2 | 6.2 | 3.8 | 9.2 | 4.7 | 1.0 |
| | 2009 | 4.3 | 5.4 | 5.2 | 6.1 | 3.8 | 9.0 | 4.3 | 1.0 |
| | 2010 | 4.3 | 5.3 | 5.2 | 6.1 | 3.8 | 9.0 | 4.4 | 1.0 |
| | 2011 | 4.2 | 5.2 | 5.1 | 6.0 | 3.4 | 8.9 | 4.3 | 0.84 |
| Scripts | 2003 | 14.6 | 17.6 | 20.6 | 21.3 | 17.8 | 29.9 | 18.4 | 3.8 |
| | 2004 | 14.1 | 17.0 | 19.1 | 20.5 | 16.6 | 29.1 | 16.8 | 3.6 |
| | 2005 | 12.6 | 15.2 | 16.4 | 18.3 | 14.3 | 26.1 | 14.2 | 3.1 |
| | 2006 | 11.4 | 13.9 | 14.3 | 16.4 | 12.0 | 24.0 | 12.3 | 2.7 |
| | 2007 | 10.4 | 12.9 | 12.6 | 14.9 | 9.6 | 21.6 | 10.7 | 2.2 |
| | 2008 | 9.6 | 12.0 | 11.0 | 13.9 | 8.2 | 20.3 | 9.2 | 1.9 |
| | 2009 | 9.3 | 11.9 | 10.8 | 13.6 | 8.0 | 20.0 | 8.6 | 1.9 |
| | 2010 | 9.3 | 11.6 | 10.9 | 13.5 | 8.1 | 19.9 | 8.7 | 1.8 |
| | 2011 | 9.0 | 11.4 | 10.8 | 13.4 | 7.3 | 19.7 | 8.6 | 1.5 |

Notes: PBS items 1456P, 1394J, 1393H, 1392G, 2774B, 2775C, 3176E, 3179H. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table 4.6: Rate of Medicare claims for POPs by state and territory, 2003 to 2011

| | | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 0.57 | 0.64 | 0.76 | 0.81 | 0.92 | 1.02 | 0.76 | 0.20 |
| | 2004 | 0.53 | 0.63 | 0.69 | 0.71 | 0.81 | 0.89 | 0.63 | 0.19 |
| | 2005 | 0.49 | 0.55 | 0.65 | 0.64 | 0.67 | 0.87 | 0.50 | 0.16 |
| | 2006 | 0.45 | 0.54 | 0.59 | 0.60 | 0.57 | 0.84 | 0.46 | 0.17 |
| | 2007 | 0.44 | 0.53 | 0.54 | 0.57 | 0.50 | 0.74 | 0.42 | 0.15 |
| | 2008 | 0.41 | 0.48 | 0.48 | 0.51 | 0.40 | 0.74 | 0.39 | 0.14 |
| | 2009 | 0.39 | 0.48 | 0.49 | 0.51 | 0.42 | 0.72 | 0.39 | 0.12 |
| | 2010 | 0.38 | 0.47 | 0.49 | 0.50 | 0.41 | 0.69 | 0.37 | 0.09 |
| | 2011 | 0.36 | 0.44 | 0.47 | 0.47 | 0.36 | 0.68 | 0.32 | 0.08 |
| Scripts | 2003 | 0.86 | 0.99 | 1.14 | 1.22 | 1.39 | 1.60 | 1.16 | 0.27 |
| | 2004 | 0.80 | 0.96 | 1.03 | 1.09 | 1.26 | 1.39 | 1.02 | 0.26 |
| | 2005 | 0.73 | 0.85 | 0.95 | 0.97 | 1.03 | 1.35 | 0.80 | 0.22 |
| | 2006 | 0.68 | 0.82 | 0.87 | 0.90 | 0.87 | 1.33 | 0.68 | 0.24 |
| | 2007 | 0.65 | 0.79 | 0.79 | 0.85 | 0.76 | 1.14 | 0.60 | 0.19 |
| | 2008 | 0.60 | 0.72 | 0.70 | 0.78 | 0.63 | 1.18 | 0.59 | 0.18 |
| | 2009 | 0.58 | 0.72 | 0.71 | 0.76 | 0.63 | 1.14 | 0.55 | 0.15 |
| | 2010 | 0.58 | 0.70 | 0.73 | 0.75 | 0.64 | 1.09 | 0.57 | 0.12 |
| | 2011 | 0.54 | 0.67 | 0.69 | 0.72 | 0.58 | 1.06 | 0.48 | 0.12 |

Notes: PBS items 2913H and 1967M. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.7: Rate of Medicare claims for COCP by age group, 2003 to 2011

| | | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 14 | 15 | 8.6 | 7.6 | 6.4 | 4.3 | 2.2 |
| | 2004 | 13 | 14 | 8.1 | 7.1 | 6.1 | 4.2 | 2.2 |
| | 2005 | 12 | 12 | 7.2 | 6.4 | 5.6 | 3.9 | 2.1 |
| | 2006 | 11 | 10 | 6.4 | 5.8 | 5.2 | 3.7 | 2.0 |
| | 2007 | 10 | 9 | 5.7 | 5.3 | 4.7 | 3.4 | 1.9 |
| | 2008 | 8.9 | 7.7 | 5.0 | 4.7 | 4.2 | 3.1 | 1.7 |
| | 2009 | 8.9 | 7.7 | 4.9 | 4.6 | 4.1 | 3.1 | 1.7 |
| | 2010 | 9.0 | 7.9 | 4.8 | 4.4 | 4.0 | 3.1 | 1.7 |
| | 2011 | 8.9 | 7.5 | 4.5 | 4.2 | 3.9 | 2.9 | 1.7 |
| Scripts | 2003 | 29 | 30 | 17 | 16 | 14 | 10 | 5 |
| | 2004 | 27 | 28 | 16 | 15 | 14 | 10 | 5 |
| | 2005 | 24 | 23 | 14 | 14 | 12 | 9 | 5 |
| | 2006 | 21 | 19 | 13 | 12 | 11 | 8 | 5 |
| | 2007 | 19 | 17 | 11 | 11 | 10 | 8 | 4 |
| | 2008 | 17 | 15 | 10 | 10 | 9 | 7 | 4 |
| | 2009 | 17 | 15 | 10 | 9.4 | 9.1 | 7.0 | 4.0 |
| | 2010 | 17 | 15 | 10 | 9.2 | 9.0 | 7.0 | 4.0 |
| | 2011 | 17 | 15 | 9 | 8.7 | 8.5 | 6.7 | 3.9 |

Notes: PBS items 1456P, 1394J, 1393H, 1392G, 2774B, 2775C, 3176E, 3179H. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.8: Rate of Medicare claims for POPs by age group, 2003 to 2011

| | | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 0.41 | 1.05 | 1.10 | 0.91 | 0.59 | 0.36 | 0.21 |
| | 2004 | 0.34 | 0.97 | 1.00 | 0.84 | 0.57 | 0.34 | 0.21 |
| | 2005 | 0.30 | 0.84 | 0.91 | 0.74 | 0.53 | 0.31 | 0.20 |
| | 2006 | 0.27 | 0.76 | 0.88 | 0.74 | 0.50 | 0.28 | 0.19 |
| | 2007 | 0.23 | 0.73 | 0.84 | 0.71 | 0.47 | 0.27 | 0.17 |
| | 2008 | 0.22 | 0.64 | 0.74 | 0.63 | 0.43 | 0.25 | 0.15 |
| | 2009 | 0.23 | 0.61 | 0.72 | 0.64 | 0.43 | 0.26 | 0.15 |
| | 2010 | 0.22 | 0.61 | 0.71 | 0.60 | 0.43 | 0.27 | 0.16 |
| | 2011 | 0.21 | 0.56 | 0.63 | 0.55 | 0.41 | 0.25 | 0.16 |
| Scripts | 2003 | 0.50 | 1.36 | 1.48 | 1.32 | 0.94 | 0.65 | 0.43 |
| | 2004 | 0.42 | 1.26 | 1.36 | 1.22 | 0.90 | 0.63 | 0.43 |
| | 2005 | 0.37 | 1.07 | 1.21 | 1.06 | 0.83 | 0.56 | 0.40 |
| | 2006 | 0.32 | 0.95 | 1.16 | 1.03 | 0.77 | 0.49 | 0.37 |
| | 2007 | 0.27 | 0.91 | 1.12 | 0.97 | 0.71 | 0.46 | 0.33 |
| | 2008 | 0.27 | 0.81 | 0.98 | 0.89 | 0.65 | 0.44 | 0.30 |
| | 2009 | 0.28 | 0.76 | 0.94 | 0.90 | 0.65 | 0.46 | 0.30 |
| | 2010 | 0.27 | 0.76 | 0.93 | 0.84 | 0.66 | 0.47 | 0.32 |
| | 2011 | 0.26 | 0.70 | 0.84 | 0.76 | 0.61 | 0.44 | 0.31 |

Notes: PBS items 2913H and 1967M. Rate per 100 women
Source: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.9: Rate of Medicare claims for injectable contraceptive by state and territory, 2003 to 2011

| | | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 1.01 | 0.92 | 1.49 | 1.16 | 1.09 | 1.93 | 1.14 | 0.43 |
| | 2004 | 1.02 | 0.92 | 1.50 | 1.19 | 1.10 | 2.05 | 1.10 | 0.39 |
| | 2005 | 0.96 | 0.90 | 1.45 | 1.20 | 0.98 | 2.05 | 1.02 | 0.34 |
| | 2006 | 0.89 | 0.83 | 1.33 | 1.13 | 0.89 | 1.93 | 0.85 | 0.35 |
| | 2007 | 0.83 | 0.78 | 1.25 | 1.09 | 0.82 | 1.90 | 0.73 | 0.30 |
| | 2008 | 0.78 | 0.75 | 1.16 | 1.08 | 0.73 | 1.80 | 0.62 | 0.26 |
| | 2009 | 0.77 | 0.74 | 1.20 | 1.08 | 0.71 | 1.80 | 0.63 | 0.23 |
| | 2010 | 0.77 | 0.72 | 1.20 | 1.11 | 0.76 | 1.81 | 0.64 | 0.23 |
| | 2011 | 0.79 | 0.74 | 1.24 | 1.13 | 0.73 | 1.85 | 0.64 | 0.18 |
| Scripts | 2003 | 2.36 | 2.16 | 3.46 | 2.77 | 2.44 | 4.64 | 2.64 | 0.86 |
| | 2004 | 2.39 | 2.19 | 3.54 | 2.86 | 2.46 | 5.10 | 2.54 | 0.81 |
| | 2005 | 2.26 | 2.16 | 3.37 | 2.87 | 2.21 | 4.89 | 2.38 | 0.71 |
| | 2006 | 2.09 | 2.00 | 3.12 | 2.75 | 2.00 | 4.67 | 1.91 | 0.70 |
| | 2007 | 1.94 | 1.86 | 2.92 | 2.60 | 1.80 | 4.67 | 1.72 | 0.57 |
| | 2008 | 1.82 | 1.80 | 2.72 | 2.59 | 1.65 | 4.44 | 1.41 | 0.55 |
| | 2009 | 1.81 | 1.76 | 2.81 | 2.59 | 1.61 | 4.45 | 1.42 | 0.44 |
| | 2010 | 1.79 | 1.74 | 2.82 | 2.64 | 1.70 | 4.48 | 1.46 | 0.43 |
| | 2011 | 1.85 | 1.75 | 2.92 | 2.73 | 1.66 | 4.63 | 1.48 | 0.33 |

Notes: PBS item 3118D. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.10: Rate of Medicare claims for injectable contraceptives by age group, 2003 to 2011

| | | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|---|
| Women | 2003 | 1.2 | 1.8 | 1.6 | 1.4 | 1.1 | 0.71 | 0.32 |
| | 2004 | 1.2 | 1.8 | 1.6 | 1.4 | 1.1 | 0.76 | 0.36 |
| | 2005 | 1.1 | 1.6 | 1.5 | 1.3 | 1.1 | 0.77 | 0.37 |
| | 2006 | 1.0 | 1.4 | 1.4 | 1.3 | 1.1 | 0.75 | 0.39 |
| | 2007 | 0.93 | 1.2 | 1.2 | 1.2 | 1.0 | 0.75 | 0.40 |
| | 2008 | 0.86 | 1.1 | 1.1 | 1.1 | 0.98 | 0.73 | 0.41 |
| | 2009 | 0.90 | 1.1 | 1.1 | 1.1 | 0.97 | 0.75 | 0.42 |
| | 2010 | 0.93 | 1.1 | 1.1 | 1.0 | 0.97 | 0.76 | 0.43 |
| | 2011 | 0.96 | 1.2 | 1.1 | 1.0 | 0.97 | 0.77 | 0.43 |
| Scripts | 2003 | 2.3 | 3.7 | 3.4 | 3.1 | 2.6 | 1.8 | 0.9 |
| | 2004 | 2.3 | 3.6 | 3.3 | 3.2 | 2.7 | 1.9 | 0.9 |
| | 2005 | 2.2 | 3.2 | 3.1 | 3.0 | 2.7 | 2.0 | 1.0 |
| | 2006 | 2.0 | 2.7 | 2.8 | 2.8 | 2.6 | 1.9 | 1.0 |
| | 2007 | 1.8 | 2.4 | 2.6 | 2.6 | 2.4 | 1.9 | 1.1 |
| | 2008 | 1.7 | 2.2 | 2.4 | 2.4 | 2.4 | 1.8 | 1.1 |
| | 2009 | 1.8 | 2.2 | 2.3 | 2.3 | 2.3 | 1.9 | 1.1 |
| | 2010 | 1.8 | 2.2 | 2.3 | 2.3 | 2.3 | 1.9 | 1.1 |
| | 2011 | 1.9 | 2.3 | 2.2 | 2.2 | 2.3 | 2.0 | 1.2 |

Notes: PBS item 3118D. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table 4.11: Rate of Medicare claims for the contraceptive implant by state and territory, 2003 to 2011

| | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| 2003 | 0.82 | 1.02 | 1.26 | 1.69 | 0.99 | 1.83 | 2.15 | 0.84 |
| 2004 | 0.65 | 0.89 | 1.03 | 1.49 | 1.09 | 1.73 | 1.64 | 0.80 |
| 2005 | 0.85 | 1.15 | 1.42 | 1.77 | 1.34 | 2.30 | 2.36 | 1.04 |
| 2006 | 0.81 | 1.08 | 1.26 | 1.54 | 1.29 | 1.87 | 2.16 | 1.01 |
| 2007 | 0.82 | 1.07 | 1.28 | 1.50 | 1.36 | 1.99 | 2.13 | 0.98 |
| 2008 | 0.97 | 1.24 | 1.55 | 1.75 | 1.54 | 2.31 | 2.37 | 1.24 |
| 2009 | 0.95 | 1.25 | 1.49 | 1.65 | 1.55 | 2.17 | 2.43 | 1.20 |
| 2010 | 1.02 | 1.31 | 1.62 | 1.71 | 1.63 | 2.43 | 2.51 | 1.24 |
| 2011 | 1.15 | 1.46 | 1.83 | 1.99 | 1.73 | 2.66 | 2.79 | 1.24 |

Note: PBS item 8487Q. Rate per 100 women
Source: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table 4.12: Rate of Medicare claims for the contraceptive implant by age group, 2003 to 2011

| | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 |
|---|---|---|---|---|---|---|---|
| 2003 | 1.6 | 2.0 | 1.6 | 1.2 | 0.77 | 0.35 | 0.11 |
| 2004 | 1.3 | 1.6 | 1.3 | 1.1 | 0.72 | 0.39 | 0.15 |
| 2005 | 1.5 | 2.1 | 1.7 | 1.3 | 0.97 | 0.59 | 0.26 |
| 2006 | 1.7 | 2.0 | 1.5 | 1.2 | 0.82 | 0.46 | 0.19 |
| 2007 | 1.8 | 1.9 | 1.5 | 1.2 | 0.83 | 0.49 | 0.22 |
| 2008 | 2.1 | 2.1 | 1.7 | 1.3 | 1.01 | 0.66 | 0.34 |
| 2009 | 2.2 | 2.1 | 1.6 | 1.3 | 0.94 | 0.59 | 0.28 |
| 2010 | 2.5 | 2.3 | 1.7 | 1.3 | 1.00 | 0.62 | 0.31 |
| 2011 | 2.8 | 2.4 | 1.8 | 1.4 | 1.09 | 0.76 | 0.41 |

Note: PBS item 8487Q. Rate per 100 women
Source: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.13: Rate of Medicare claims for intrauterine contraceptive device by state and territory, 2003 to 2011

| | | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|---|
| PBS | 2003 | 0.38 | 0.38 | 0.46 | 0.54 | 0.37 | 0.72 | 0.76 | 0.20 |
| | 2004 | 0.58 | 0.54 | 0.72 | 0.81 | 0.59 | 0.90 | 1.04 | 0.30 |
| | 2005 | 0.70 | 0.63 | 0.89 | 1.00 | 0.68 | 0.97 | 0.97 | 0.35 |
| | 2006 | 0.79 | 0.73 | 0.99 | 1.15 | 0.87 | 1.08 | 1.10 | 0.37 |
| | 2007 | 0.89 | 0.88 | 1.15 | 1.41 | 1.04 | 1.17 | 1.33 | 0.42 |
| | 2008 | 1.04 | 1.05 | 1.31 | 1.70 | 1.21 | 1.52 | 1.54 | 0.52 |
| | 2009 | 1.12 | 1.21 | 1.47 | 1.84 | 1.32 | 1.58 | 1.83 | 0.64 |
| | 2010 | 1.23 | 1.25 | 1.57 | 2.08 | 1.45 | 1.62 | 2.13 | 0.61 |
| | 2011 | 1.36 | 1.37 | 1.78 | 2.25 | 1.61 | 2.11 | 2.36 | 0.62 |
| MBS | 2003 | 0.32 | 0.21 | 0.28 | 0.26 | 0.23 | 0.55 | 0.46 | 0.16 |
| | 2004 | 0.44 | 0.29 | 0.41 | 0.35 | 0.35 | 0.72 | 0.63 | 0.22 |
| | 2005 | 0.48 | 0.30 | 0.46 | 0.41 | 0.39 | 0.73 | 0.64 | 0.27 |
| | 2006 | 0.52 | 0.35 | 0.50 | 0.45 | 0.45 | 0.79 | 0.75 | 0.26 |
| | 2007 | 0.58 | 0.39 | 0.55 | 0.56 | 0.50 | 0.82 | 0.87 | 0.31 |
| | 2008 | 0.64 | 0.45 | 0.62 | 0.68 | 0.61 | 1.02 | 1.03 | 0.41 |
| | 2009 | 0.66 | 0.53 | 0.72 | 0.69 | 0.69 | 1.01 | 1.14 | 0.44 |
| | 2010 | 0.71 | 0.53 | 0.76 | 0.81 | 0.74 | 0.91 | 1.18 | 0.42 |
| | 2011 | 0.78 | 0.59 | 0.88 | 0.89 | 0.86 | 1.06 | 1.39 | 0.42 |

Notes: PBS item 8633J, MBS item 35503. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table 4.14. Rate of Medicare claims for intrauterine contraceptive device by age group, 2003 to 2011

| | | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| PBS | 15-19 | 0.00 | 0.00 | 0.10 | 0.10 | 0.09 | 0.11 | 0.15 | 0.19 | 0.22 |
| | 20-24 | 0.20 | 0.30 | 0.30 | 0.30 | 0.40 | 0.50 | 0.50 | 0.60 | 0.70 |
| | 25-29 | 0.30 | 0.50 | 0.60 | 0.70 | 0.80 | 0.90 | 1.00 | 1.00 | 1.20 |
| | 30-34 | 0.60 | 0.90 | 1.00 | 1.20 | 1.30 | 1.50 | 1.60 | 1.60 | 1.80 |
| | 35-39 | 0.60 | 0.90 | 1.10 | 1.30 | 1.50 | 1.76 | 1.96 | 2.05 | 2.22 |
| | 40-44 | 0.54 | 0.80 | 0.95 | 1.10 | 1.32 | 1.60 | 1.83 | 1.99 | 2.16 |
| | 45-49 | 0.41 | 0.59 | 0.69 | 0.83 | 1.02 | 1.21 | 1.38 | 1.54 | 1.66 |
| MBS | 15-24 | 0.06 | 0.09 | 0.10 | 0.11 | 0.13 | 0.14 | 0.17 | 0.19 | 0.22 |
| | 25-34 | 0.35 | 0.49 | 0.55 | 0.60 | 0.65 | 0.72 | 0.77 | 0.78 | 0.86 |
| | 35-44 | 0.37 | 0.51 | 0.58 | 0.66 | 0.74 | 0.87 | 0.99 | 1.04 | 1.12 |
| | 45-54 | 0.14 | 0.18 | 0.19 | 0.22 | 0.26 | 0.31 | 0.36 | 0.40 | 0.43 |

Notes: PBS item 8633J, MBS item 35503. MBS data were only available in 10 year age group Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml.
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table 4.15: Rate of MBS claims for female sterilisation by state and territory, 2003 to 2011

| | NSW/ACT | VIC/TAS | QLD | SA/NT | WA |
|---|---|---|---|---|---|
| 2003 | 0.11 | 0.12 | 0.10 | 0.12 | 0.12 |
| 2004 | 0.10 | 0.10 | 0.09 | 0.10 | 0.10 |
| 2005 | 0.09 | 0.08 | 0.08 | 0.08 | 0.09 |
| 2006 | 0.08 | 0.07 | 0.08 | 0.07 | 0.07 |
| 2007 | 0.07 | 0.07 | 0.07 | 0.06 | 0.07 |
| 2008 | 0.07 | 0.07 | 0.07 | 0.07 | 0.05 |
| 2009 | 0.07 | 0.07 | 0.06 | 0.06 | 0.06 |
| 2010 | 0.06 | 0.06 | 0.06 | 0.05 | 0.05 |
| 2011 | 0.06 | 0.05 | 0.05 | 0.06 | 0.05 |

Notes: MBS items 35688, 35687 and 35691 for tubal ligation. Rate per 100 women
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2011
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Jun 2012

### Table 4.16: Rate of MBS claims for female sterilisation by age group, 2003 to 2011

| | <=24 years | 25-34 years | >=35 years |
|---|---|---|---|
| 2001 | 0.005 | 0.141 | 0.087 |
| 2002 | 0.003 | 0.129 | 0.084 |
| 2003 | 0.003 | 0.109 | 0.070 |
| 2004 | 0.002 | 0.091 | 0.059 |
| 2005 | 0.002 | 0.079 | 0.054 |
| 2006 | 0.002 | 0.068 | 0.050 |
| 2007 | 0.002 | 0.069 | 0.046 |
| 2008 | 0.001 | 0.063 | 0.044 |
| 2009 | 0.001 | 0.059 | 0.043 |
| 2010 | 0.001 | 0.05 | 0.039 |
| 2011 | 0.001 | 0.045 | 0.034 |

Notes: MBS items 35688, 35687 and 35691 for tubal ligation. Rate per 100 women
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2011
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Jun 2012

### Table 4.17: Rate of MBS claims for male sterilisation (%) by state and territory, 2003 to 2011

| | NSW | VIC | QLD | SA | WA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| 2003 | 0.32 | 0.37 | 0.53 | 0.38 | 0.36 | 0.46 | 0.51 | 0.30 |
| 2004 | 0.31 | 0.34 | 0.50 | 0.35 | 0.34 | 0.43 | 0.49 | 0.27 |
| 2005 | 0.30 | 0.32 | 0.48 | 0.33 | 0.34 | 0.40 | 0.48 | 0.26 |
| 2006 | 0.29 | 0.32 | 0.48 | 0.32 | 0.33 | 0.41 | 0.46 | 0.22 |
| 2007 | 0.27 | 0.31 | 0.45 | 0.29 | 0.33 | 0.39 | 0.45 | 0.25 |
| 2008 | 0.26 | 0.30 | 0.44 | 0.30 | 0.30 | 0.39 | 0.44 | 0.22 |
| 2009 | 0.27 | 0.30 | 0.44 | 0.29 | 0.32 | 0.39 | 0.43 | 0.22 |
| 2010 | 0.26 | 0.30 | 0.44 | 0.28 | 0.31 | 0.37 | 0.39 | 0.22 |
| 2011 | 0.22 | 0.28 | 0.39 | 0.27 | 0.30 | 0.37 | 0.40 | 0.19 |

Notes: MBS items 37622 and 37623. Rate per 100 men
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtm
Number of men aged 15-64 years was downloaded from Australian Bureau of Statistic website:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202011?OpenDocument#Time

### Table 4.18: Rate of MBS claims for male sterilisation by age group, 2003 to 2011

| | 15-24 | 25-34 | 35-44 | 45-54 | 55-64 | >=65 |
|---|---|---|---|---|---|---|
| 2003 | 0.005 | 0.438 | 0.954 | 0.269 | 0.035 | 0.005 |
| 2004 | 0.004 | 0.409 | 0.903 | 0.249 | 0.031 | 0.005 |
| 2005 | 0.004 | 0.401 | 0.922 | 0.259 | 0.034 | 0.002 |
| 2006 | 0.005 | 0.393 | 0.914 | 0.263 | 0.031 | 0.003 |
| 2007 | 0.004 | 0.362 | 0.885 | 0.251 | 0.031 | 0.006 |
| 2008 | 0.004 | 0.337 | 0.878 | 0.254 | 0.031 | 0.004 |
| 2009 | 0.004 | 0.336 | 0.900 | 0.254 | 0.033 | 0.006 |
| 2010 | 0.004 | 0.320 | 0.892 | 0.248 | 0.027 | 0.007 |
| 2011 | 0.003 | 0.278 | 0.811 | 0.226 | 0.029 | 0.004 |

Notes: MBS items 37622 and 37623 for vasectomy. Rate per 100 women
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtm
Number of men aged 15-64 years was downloaded from Australian Bureau of Statistic website:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202011?OpenDocument#Time

### Table A 4.1: Prevalence of reported contraceptive use among partnered women in Australia and selected regions, 2009

| | Per cent |
|---|---|
| Australia | 71 |
| More developed countries | 72 |
| Less developed countries | 66 |
| Least developed countries | 31 |
| World | 63 |

Notes: Data are for women who were part of a couple. Refer to Appendix 1 for country classification
Source: United Nations. World contraceptive use 2011 http://www.un.org/esa/population/publications/contraceptive2011/contraceptive2011.htm

### Table A 4.2: Prevalence of reported contraceptive method use among partnered women in Australia and selected regions, 2009

| | Australia | More developed countries | Less developed countries | Least developed countries | World |
|---|---|---|---|---|---|
| Pill | 24 | 18 | 6.7 | 11 | 8.8 |
| Male condom | 15 | 18 | 6.5 | 2.3 | 7.6 |
| Female sterilisation | 16 | 8.2 | 24 | 3 | 19 |
| Male sterilisation | 14 | 5.5 | 2.1 | 0.5 | 2.4 |
| Injectable | 1.1 | 0.6 | 3.4 | 7.3 | 3.5 |
| Implant | 0.8 | 0.2 | 0.3 | 0.5 | 0.3 |
| IUD | 0.8 | 9.2 | 17 | 0.7 | 14 |
| Rhythm | 3.1 | 3.8 | 2.7 | 3.4 | 2.9 |
| Withdrawal | 3.2 | 6.7 | 2.6 | 1.7 | 3.1 |
| Vaginal barrier methods | 0.8 | 1.1 | 0.1 | 0.0 | 0.2 |

Notes: Data are for women who were part of a couple. Refer to Appendix 1 for country classification
Source: United Nations. World contraceptive use 2011, http://www.un.org/esa/population/publications/contraceptive2011/contraceptive2011.htm

### Table A 4.3: Estimates of contraceptive use in Australia (%)

| | ABS NHS, 2001 | ASHR, 2002 | HILDA, 2005 | HILDA, 2008 | HILDA, 2011 |
|---|---|---|---|---|---|
| Oral contraceptives | 27 | 34 | 30 | 30 | 32 |
| Condoms | 23 | 21 | 23 | 20 | 22 |
| Withdrawal method | 6.6 | 4.5 | 2.5 | 2.4 | 2.4 |
| Natural, Rhythm or Billings method | 3.3 | 4.4 | 1.7 | 1.6 | 1.5 |
| Others, including diaphragm | 1.2 | 1.2 | 1.1 | 1.5 | 1.6 |
| Contraceptive injection | 1.9 | 1.5 | 2.1 | 0.9 | 1.6 |
| Implant | | 1.1 | 2.8 | 3.3 | 3.6 |
| IUD | 1.2 | 1.2 | 1.6 | 2.1 | 3.2 |
| Tubal ligation | 8.6 | 23† | 6.6 | 4.8 | 4.1 |
| Partner sterilisation | 11 | 19 | 9.3 | 8.6 | 12 |

Notes: The ASHR survey did not report tubal ligation separately but included it in the hysterectomy/tubal ligation category
The ABS survey did not include implants
A woman may use more than one method, therefore the sum of all methods may be more than the proportion of women who used contraception

Sources: Household survey on families, income, employment and wellbeing survey (HILDA, 2008 & 2011): data obtained from the Melbourne Institute of Applied Economic and Social Research
Household survey on families, income, employment and wellbeing survey (HILDA, 2005). Gray E, McDonald P. Using a reproductive life course approach to understand contraceptive method use in Australia. Journal of biosocial science. 2010;42(01):43-57
Australian Study of Health and Relationships (ASHR, 2002): Richters J et al. Sex in Australia: Contraceptive practices among a representative sample of women. Aust N Z J Public Health 2003, 27: 210-6
Australian Bureau of Statistics National Health Survey (ABS, 2002), Cat. No. 4364.0 National Health Survey 2001

### Table A 4.4: Prevalence of contraceptive use by state and territory, Australia, 2011

| | Current use (%) | Ever used (%) |
|---|---|---|
| NSW | 66 | 80 |
| VIC | 64 | 82 |
| QLD | 72 | 88 |
| SA | 74 | 89 |
| WA | 69 | 86 |
| TAS | 77 | 95 |
| NT | 79 | 91 |
| ACT | 74 | 89 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.5: Type of contraceptive method by state and territory, Australia, 2011

| | NSW | VIC | QLD | SA | WA | TAS | NT | ACT |
|---|---|---|---|---|---|---|---|---|
| Oral contraceptives | 34 | 33 | 30 | 34 | 31 | 36 | 25 | 33 |
| Condoms | 24 | 22 | 22 | 23 | 18 | 23 | 4 | 27 |
| Withdrawal method | 2.6 | 2.1 | 2.4 | 2.5 | 2.2 | 2.4 | 3.3 | 5.2 |
| Natural, Rhythm or Billings method | 1.3 | 1.4 | 1.9 | 1.7 | 1.0 | 2.4 | 0.0 | 3.1 |
| Other, including diaphragm | 1.2 | 1.0 | 2.2 | 4.0 | 1.4 | 2.8 | 0.0 | 0.0 |
| Contraceptive injection | 1.1 | 1.2 | 1.8 | 1.2 | 2.8 | 4.1 | 8.9 | 1.8 |
| Implant | 2.9 | 3.1 | 4.7 | 4.5 | 4.0 | 4.0 | 11 | 3.1 |
| IUD | 2.5 | 2.6 | 3.8 | 6.1 | 3.2 | 4.4 | 5.9 | 2.9 |
| Tubal ligation | 3.2 | 3.3 | 3.7 | 6.7 | 7.3 | 10 | 5.2 | 0.0 |
| Partner sterilisation | 6.6 | 7.9 | 11.5 | 9.4 | 5.9 | 9.1 | 20 | 15 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.6: Type of contraceptive method used by women living in urban and rural areas, 2011

| | Rural (%) | Urban (%) |
|---|---|---|
| Oral contraceptives | 32 | 33 |
| Condoms | 18 | 23 |
| Withdrawal method | 2.4 | 2.4 |
| Natural, Rhythm | 1.4 | 1.5 |
| Others, including diaphragm | 1.3 | 1.6 |
| Contraceptive injection | 3.1 | 1.4 |
| Implant | 5.0 | 3.5 |
| IUD | 4.2 | 3.1 |
| Tubal ligation | 4.7 | 4.0 |
| Partner sterilisation | 15 | 7.5 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.7: Prevalence of contraceptive use by age group, 2011

| Age group (year) | 18-24 | 25-29 | 30-34 | 35-39 | 40-44 |
|---|---|---|---|---|---|
| Current use of contraception | 62 | 74 | 66 | 71 | 70 |
| Ever used contraception | 74 | 89 | 86 | 89 | 87 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.8: Choice of contraceptive methods by age group, 2011

| Age group (year) | 18-24 | 25-29 | 30-34 | 35-39 | 40-44 |
|---|---|---|---|---|---|
| Oral contraceptives | 49 | 42 | 29 | 21 | 12 |
| Condoms | 26 | 35 | 18 | 19 | 10 |
| Withdrawal method | 0.9 | 3.0 | 2.6 | 3.9 | 2.7 |
| Natural, Rhythm or Billings method | 0.4 | 1.6 | 2.0 | 2.3 | 1.9 |
| Other, including diaphragm | 1.6 | 1.7 | 1.3 | 2.0 | 1.3 |
| Contraceptive injection | 1.2 | 2.4 | 2.4 | 2.3 | 0.3 |
| Implant | 2.8 | 5.9 | 5.4 | 2.1 | 2.9 |
| IUD | 0.7 | 2.1 | 3.3 | 4.0 | 7.3 |
| Tubal ligation | 0.0 | 0.5 | 3.8 | 6.3 | 12 |
| Partner sterilisation | 0.2 | 1.0 | 4.8 | 16 | 24 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.9: Choice of contraceptive methods by country of birth, 2011

| | Non-English speaking | English speaking |
|---|---|---|
| Oral contraceptives | 21 | 35 |
| Condoms | 17 | 23 |
| Withdrawal method | 1.9 | 2.4 |
| Natural, Rhythm | 2.6 | 1.4 |
| Others, including diaphragm | 1.2 | 1.7 |
| Contraceptive injection | 0.5 | 1.8 |
| Implant | 1.8 | 3.8 |
| IUD | 1.2 | 3.6 |
| Tubal ligation | 1.8 | 4.1 |
| Partner sterilisation | 4.3 | 9.4 |

Source: HILDA data 2011 obtained from the Melbourne Institute of Applied Economic and Social Research

### Table A 4.10: Choice of contraceptive methods by Indigenous status, ABS 2004 to 2005

| | Oral pill | Condom |
|---|---|---|
| All women - ABS 2001 | 26.8 | 22.9 |
| Indigenous women - ABS 2005 | 14 | 21 |

Sources: Australian Bureau of Statistics (2006). National Aboriginal and Torres Strait Islander Health Survey Australia 2004–05 Catalogue No. 4715.0
Australian Bureau of Statistics (2002). National Health Survey 2001-Summary of results, Catalogue. No. 4364.0

### Table A 4.11: Choice of contraceptive methods among Indigenous women living in remote and non-remote areas

| | Oral pill | Condom | Implant | Injection |
|---|---|---|---|---|
| Non-Remote | 18 | 26 | 6 | 5 |
| Remote | 5 | 10 | 13 | 14 |

Source: ABS National Indigenous Health Survey Australia 2004–05. ABS Catalogue No. 4715. Commonwealth of Australia 2006

### Table A 4.12: Claims for Medicare benefits, 2011

| | Number of people | Rate |
|---|---|---|
| PBS-Combined oral | 252,201 | 4.6 |
| PBS-Mini pill | 22,268 | 0.4 |
| PBS-Injection | 48,216 | 0.9 |
| PBS-Implant | 83,828 | 1.5 |
| PBS-IUD | 84,501 | 1.5 |
| MBS-IUD | 42,228 | 0.8 |
| MBS-Female sterilisation | 2,938 | 0.1 |
| MBS-Male sterilisation | 21,661 | 0.3 |

Notes: Rate per 100 women
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml. Data obtained from the Department of Health and Ageing, 2012
Numbers of men and women of reproductive age were downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.13: PBS claims for COCP in Australia, women aged 15-49 years, 2003 to 2011

| | Number of women | Rate (women) | Number of scripts | Rate (scripts) |
|---|---|---|---|---|
| 2003 | 390,682 | 7.8 | 876,317 | 18 |
| 2004 | 372,839 | 7.4 | 839,916 | 17 |
| 2005 | 338,079 | 6.7 | 744,425 | 15 |
| 2006 | 307,095 | 6.0 | 678,681 | 13 |
| 2007 | 282,297 | 5.4 | 615,417 | 12 |
| 2008 | 257,798 | 4.9 | 569,198 | 11 |
| 2009 | 260,085 | 4.8 | 570,914 | 11 |
| 2010 | 261,844 | 4.8 | 575,456 | 10 |
| 2011 | 252,201 | 4.6 | 556,092 | 10 |

Notes: PBS items 1456P, 1394J, 1393H, 1392G, 2774B, 2775C, 3176E, 3179H. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.14: PBS claims for POP in Australia, women aged 15-49 years, 2003 to 2011

| | Number of women | Rate (women) | Number of scripts | Rate (scripts) |
|---|---|---|---|---|
| 2003 | 33,865 | 0.7 | 51,797 | 1.0 |
| 2004 | 31,424 | 0.6 | 48,268 | 1.0 |
| 2005 | 28,435 | 0.6 | 43,201 | 0.9 |
| 2006 | 26,958 | 0.5 | 40,806 | 0.8 |
| 2007 | 25,815 | 0.5 | 38,470 | 0.7 |
| 2008 | 23,701 | 0.4 | 35,595 | 0.7 |
| 2009 | 24,095 | 0.4 | 35,976 | 0.7 |
| 2010 | 23,949 | 0.4 | 36,328 | 0.7 |
| 2011 | 22,268 | 0.4 | 33,892 | 0.6 |

Notes: PBS items 2913H, 1967M, Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.15: PBS claims for injectable contraceptives in Australia, 2003 to 2011

| | Number of women | Rate (women) | Number of scripts | Rate (scripts) |
|---|---|---|---|---|
| 2003 | 54,763 | 1.1 | 129,317 | 2.6 |
| 2004 | 55,639 | 1.1 | 132,800 | 2.6 |
| 2005 | 53,729 | 1.1 | 127,465 | 2.5 |
| 2006 | 50,558 | 1.0 | 120,576 | 2.3 |
| 2007 | 48,185 | 0.9 | 113,643 | 2.2 |
| 2008 | 45,835 | 0.9 | 109,223 | 2.1 |
| 2009 | 47,002 | 0.9 | 111,856 | 2.1 |
| 2010 | 47,784 | 0.9 | 113,639 | 2.1 |
| 2011 | 48,216 | 0.9 | 114,959 | 2.1 |

Notes: PBS item 3118D. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.16: PBS claims for contraceptive implant in Australia, 2003 to 2011

| | Number of women | Rate (women) | Number of scripts | Rate (scripts) |
|---|---|---|---|---|
| 2003 | 53,554 | 1.1 | 55,410 | 1.1 |
| 2004 | 46,575 | 0.9 | 48,274 | 1.0 |
| 2005 | 60,885 | 1.2 | 62,800 | 1.2 |
| 2006 | 57,009 | 1.1 | 59,148 | 1.1 |
| 2007 | 58,413 | 1.1 | 60,275 | 1.2 |
| 2008 | 69,648 | 1.3 | 71,775 | 1.4 |
| 2009 | 70,142 | 1.3 | 72,319 | 1.3 |
| 2010 | 75,768 | 1.4 | 77,863 | 1.4 |
| 2011 | 83,828 | 1.5 | 86,468 | 1.6 |

Notes: PBS item 8487Q. Rate per 100 women
Sources: Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.17: Medicare claims for intrauterine contraceptive device in Australia, 2003 to 2011

| | PBS-women | PBS-rate | MBS-women | MBS-rate |
|---|---|---|---|---|
| 2003 | 20,785 | 0.4 | 13,784 | 0.3 |
| 2004 | 31,336 | 0.6 | 19,365 | 0.4 |
| 2005 | 37,505 | 0.7 | 21,349 | 0.4 |
| 2006 | 43,847 | 0.9 | 23,947 | 0.5 |
| 2007 | 51,837 | 1.0 | 27,015 | 0.6 |
| 2008 | 61,775 | 1.2 | 31,476 | 0.6 |
| 2009 | 70,177 | 1.3 | 35,512 | 0.7 |
| 2010 | 76,592 | 1.4 | 38,008 | 0.7 |
| 2011 | 84,501 | 1.5 | 42,228 | 0.8 |

Note: MBS item 35503. PBS item 8633J. Rate per 100 women
Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Data obtained from the Department of Health and Ageing, 2012
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

### Table A 4.18: MBS claims for female sterilisation in Australia, 2003 to 2011

| | Number | Rate |
|---|---|---|
| 2003 | 5,540 | 0.14 |
| 2004 | 4,844 | 0.13 |
| 2005 | 4,160 | 0.11 |
| 2006 | 3,787 | 0.09 |
| 2007 | 3,674 | 0.08 |
| 2008 | 3,547 | 0.07 |
| 2009 | 3,489 | 0.07 |
| 2010 | 3,165 | 0.06 |
| 2011 | 2,938 | 0.06 |

Note: MBS items 35688, 35687 and 35691 for tubal ligation. Rate per 100 women
Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml
Number of women aged 15-49 was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/

## Table A 4.19: MBS claims for male sterilisation in Australia, 2003 to 2011

| | Number | Rate |
|---|---|---|
| 2003 | 25,981 | 0.39 |
| 2004 | 24,781 | 0.37 |
| 2005 | 24,253 | 0.35 |
| 2006 | 24,112 | 0.34 |
| 2007 | 23,359 | 0.33 |
| 2008 | 23,128 | 0.32 |
| 2009 | 23,700 | 0.32 |
| 2010 | 23,564 | 0.32 |
| 2011 | 21,661 | 0.29 |

Note: MBS items 37622 and 37623. Rate per 100 women
Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtm.
Number of men aged 15-64 years was downloaded from Australian Bureau of Statistic website:
http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Dec%202011?OpenDocument#Time

# Chapter 5:
# Induced Abortion

Lieu Trinh, Kevin McGeechan

Chapter Outline

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## Key indicators

Number of induced abortions

Rate of induced abortions per 1,000 women aged 15-44 years

Proportion of induced abortions per known pregnancies (live births plus abortions and miscarriages)

Trend in induced abortions

Induced abortions by state, territory, age and area of remoteness

## Primary data sources

State mandatory notification data for SA and WA

Scheil W, Scott J, Catcheside B, Sage L. Pregnancy outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012.

Pregnancy Outcome Statistics Unit, Epidemiology branch, Department of Health, Government of South Australia, Annual reports, http://www.health.sa.gov.au/pehs/pregnancyoutcome.htm

Joyce A, Tran B. Induced abortions in Western Australia 2006-2009. Report of the Western Australian Abortion Notification System. Statistical series number 90. Western Australia: Department of Health Perth, 2011.

Online Medicare Benefits Schedule (MBS) data

Published studies and reports

Chan A, Sage LC. Estimating Australia's abortion rates 1985-2003. Med J Aust 2005;182(9):447-52.

Laws P, Grayson N, Sullivan E. Australia's mothers and babies 2004. Perinatal statistics series no. 18. Cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit, 2006.

Grayson N, Hargreaves J, Sullivan EA. Use of routinely collected national data sets for reporting on induced abortion in Australia. Perinatal statistics series no. 17. Cat. no. PER 30. Sydney: AIHW National Perinatal Statistics Unit, 2005.

McLennan W. Australian social trends 1998. ABS Cat. No. 4102.0. Canberra: Australian Bureau of Statistics, 1998.

Expert panel of the National Health and Medical Research Council. An information paper on termination of pregnancy in Australia. Canberra: NHMRC, 1996.

Henshaw SK, Haas TA, Berentsen K, Carbone E. Readings on induced abortion. Vol 2: A world review 2000. New York: Alan Guttmacher Institute, 2001.

Gilda Sedgh SS, Iqbal H Shah, Elisabeth Åhman, Stanley K Henshaw, Akinrinola Bankole. Induced abortion: incidence and trends worldwide from 1995 to 2008. Lancet 2012; 379(9816):625-632.

## Purpose of this chapter

To compare rates of induced abortion between Australia and other countries

To describe the trends in induced abortion in Australia

To describe the trends in induced abortion in population subgroups

To identify areas of data development

## Terms and definitions

**Spontaneous abortion:** Or miscarriage, is when the embryo or fetus is incapable of surviving independently.

**Induced abortion:** Termination of pregnancy through medical or surgical intervention.

**Surgical abortion:** Also known as suction aspiration or suction curette. Surgical abortion involves removing the lining and contents of the uterus. Commonly used during the first trimester of pregnancy (7 to 12 weeks).

**Medical abortion:** Refers to the administration of medications for the purpose of terminating a pregnancy. Medical abortion is approved to use in Australia for pregnancies up to 49 days of gestation.

**Abortion rate:** Number of induced abortions per 1,000 women aged 15–44 years.

**Abortion percentage:** Number of abortions out of 100 known pregnancies (pregnancies include live births, abortions and miscarriages).

## Data sources and limitations

There is no national data collection on the incidence of induced abortion in Australia. The available data on the number of and indications for induced abortions are limited. Data on socioeconomic characteristics, sexual and reproductive health of women who present for abortion are also very limited. Lack of data limits the capacity of reproductive and sexual health services to target reductions of unwanted pregnancies and to provide services for the management of these pregnancies.

### State mandatory notification

Notification of abortions is mandatory in SA, WA and NT but only SA and WA publish data on induced abortions.[1-3] Data from SA was very similar to estimates using data from both the National Hospital Mortality Database (NHMD) and Medicare Benefits Schedule data.[4,5] For WA data, between 5.4% and 10% more induced abortions were reported to the notification data than to (NHMD).[5]

### Medicare Benefits Schedule data

For surgical abortion, the Medicare Benefits Schedule (MBS) data include procedures relating to but not exclusive to both spontaneous and induced abortion under two items:

- Item 35643: evacuation of the contents of the gravid uterus by curettage or suction curettage
- Item 16525: management of second trimester labour, with or without induction, for intrauterine fetal death, gross fetal abnormality or life threatening maternal disease

The coding of procedures to these items does not give unique data on induced abortions that are related to unwanted pregnancies as it also counts abortive procedures that are performed for other reasons. The item number 35643 has been used to estimate induced abortions in several studies.[4,5] This item number can also be used for molar pregnancy (a tumour that forms in the uterus) or spontaneous abortion.[6] However, molar pregnancy in the uterus and spontaneous abortion are more likely to be treated in hospitals, which does not attract a Medicare rebate, except if the treatments are in private hospitals or if patients are private patients in public hospitals . Therefore, most of the claims under this item are thought to be for induced abortions.[5] The MBS item 16525 is for procedures performed for intra-uterine fetal death and therefore is not applicable to induced abortion.

There is no specific MBS item for medical abortion. A consultation for the prescribing of medications for termination of pregnancy is classified as general practitioner attendances (MBS items 3, 23, 36 or 44), non-referred specialist attendances (MBS items 52, 53, 54 or 57) or referred specialist consultations (MBS items 104 or 105).[7] Until a specific MBS item is assigned to medical abortion, it is not possible to determine how many consultations are for medical abortion.

#### *Limitations*

The NHMD does not include services conducted in outpatient clinics and non-hospital facilities. The NHMD also does not include a small number of private hospitals. Some hospitals or day facilities that had not previously been included in the databases are now included. This may have implications for comparisons over time. The quality of coding for abortion in the NHMD has not been assessed at the national level to date. Misclassification of diagnosis between induced abortion and spontaneous abortion, or misclassification of an abortion related procedure and other procedures may occur[10] which may affect the reliability of the data.

### Study estimates using both Medicare Benefits Schedule and National Hospital Morbidity Database

Several studies have used both Medicare and NHMD data to estimate the number of induced abortions,[4,5,12] as using either dataset alone may result in inaccurate estimates. These studies were conducted before the availability of medical abortion therefore the results referred to surgical abortion only. The methods used to combine the datasets have varied. In the SA study,[4] the number of Medicare claims by private patients was added to the number of separations for public patients in the NHMD. Adjustments were also made to allow for overestimation in the NHMD and MBS datasets, and for the underestimation due to private patients not claiming the Medicare rebate.

In the AIHW studies,[5 12] the number of non-hospital services in the MBS data was added to the number of separations in the NHMD. Due to different legislation on abortion and the classification of hospitals in each state and territory, the application of this method and its validity varied for each state and territory. For example, in QLD induced abortion must be performed in hospitals, therefore the number of abortions equals the number of separations with induced abortion from the NHMD. In NSW, abortion can be performed in both hospital and non-hospital settings, therefore the number of abortions is the sum of the number of separations from the NHMD and the number of non-hospital services for MBS item 35643.[5] An adjustment of 13.1% was made for underestimation in MBS data due to patients who do not claim Medicare rebates for induced abortion.

Although different methods were applied, the results were fairly consistent across studies. For 2003, the estimated number of induced abortions in Australia reported by Chan and Sage was 84,460[4] and reported by Grayson et al was 84,218.[5]

## Summary

### Induced abortion in Australia

Reliable estimates on induced abortion were only available up to 2004 when the number of induced abortions was just over 83,000 or one abortion per every four known pregnancies. The abortion rate was 19 per 1,000 women. The estimated rate of induced abortion in Australia is similar to the average of developed countries.

MBS claims decreased slightly from about 77,000 (19/1,000 women) in 1994 to less than 72,000 (16/1,000 women) in 2009 and fell sharply to approximately 62,000 (13/1,000 women) in 2011. The Medicare benefit claimed in 2011 was approximately $10 million.

The reduction in MBS claims for surgical abortion since 2009 may be due to the introduction of medical abortion in Australia. In the two years between September 2009 and August 2011 at least 13,345 early medical abortions were conducted at 15 Marie Stopes International Australia clinics.

### Induced abortion by state and territory

In 2011, the MBS claim rate was highest in NSW/ACT (16 per 1,000 women) and was lowest in SA/NT (2.2 per 1,000 women). However, this variance was more likely due to differences in the legislation regarding abortion provision and the number and the type of abortion providers between states, rather than the state specific rate of abortions. Furthermore, the actual abortion rate in SA was 16 per 1,000 women compared to the SA/NT figure of 2.2 per 1,000 women reflecting the differences in availability and provision of services.

SA and WA are the only states that collect and publish data on induced abortion. In 2010, there were approximately 5,000 induced abortions (16/1,000 women) in SA. Between 2009 and 2010, mifepristone was used for 947 early medical abortions, or 9.5% of all abortions during the same period in SA. In 2009, the number of induced abortions in WA was around 8,900 (19/1,000 women).

### Induced abortion by age group

Women aged 20-24 years have the highest abortion rate. In 2011, the MBS claim rate decreased from 18 per 1,000 women aged 20-24 years to 9.5 per 1,000 women aged 35-44 years.

In 2010, the abortion rate from notification data in SA decreased from 26 per 1,000 women aged 20-24 years to 3.8 per 1,000 women aged 40-44 years. In 2009, the abortion rate from notification data in WA decreased from 34 per 1,000 women aged 20-24 years to 4.9 per 1,000 women aged 40-44 years.

## 5.1 Introduction

Induced abortion is an important health indicator for women of reproductive age. There is a difference between an unplanned and an unwanted pregnancy. An unplanned pregnancy may not be unwanted and not result in an abortion. In a survey of two thousand Australian women, approximately half (51%) experienced an unplanned pregnancy. Of those, about half (49%) continued the pregnancy, 31% had an abortion, 18% miscarried and 2% adopted out.[13] Induced abortion can also occur when there is a fetal abnormality.[14]

Surgical abortion is the most common type of induced abortion in Australia. Medical abortion is limited and until recently, had been highly regulated. Abortion pills that contain mifepristone and misoprostol were first available in Australia in 2006 to prescribers authorised by the Therapeutic Goods Administration (TGA).[16] On 30th August 2012, the abortion pills were registered with the TGA and at that time there were 187 authorised prescribers.[7] Medical practitioners can now prescribe after completing approved training.[17] It is expected that the number of medical abortions will increase in the future.

Medical abortion has been widely used in other developed countries since 1988.[18-21] Medical abortion accounts for the majority of all abortions: 86% in Finland,[22] 74% in both Sweden,[23] and in Scotland,[18] and for most of abortions within approved gestational limits: 83% in Scotland[18] and 89% in Sweden.[23]

Each state and territory has its own legislation, service provision and reporting system regarding abortions. In all states, abortion can be conducted if there are concerns for the health and wellbeing of the woman and the fetus.[24]

The type of health facility where abortions are performed varies by state. For example, abortions can be carried out at both public and private facilities in NSW, but only at the main public hospitals in the NT, and in prescribed hospitals in SA. Overall, the majority of induced abortions in Australia are carried out in private clinics or private licensed day hospitals.[25,26]

Notification of abortions is mandatory in SA, WA and NT. Hence, data from SA, WA and NT provide a fairly accurate picture of the number of abortions performed in those states. Data for other states and territories are derived from indirect estimates using different data sources and may be less reliable. The different service provision and reporting systems between states and territories makes it difficult to carry out useful comparisons between states and territories.

**Table 5.1: State and territory provision of abortion services**

| State or territory | Public Hospital | Private Clinic or Hospital |
|---|---|---|
| Queensland | Very limited | Yes† |
| New South Wales | Limited | Yes |
| Victoria | Yes limited | Yes |
| Australian Capital Territory | No | Yes |
| South Australia | Prescribed hospital‡ | No |
| Western Australia | Very limited – single hospital | Yes |
| Tasmania | Limited | Yes |
| Northern Territory | Limited | No |

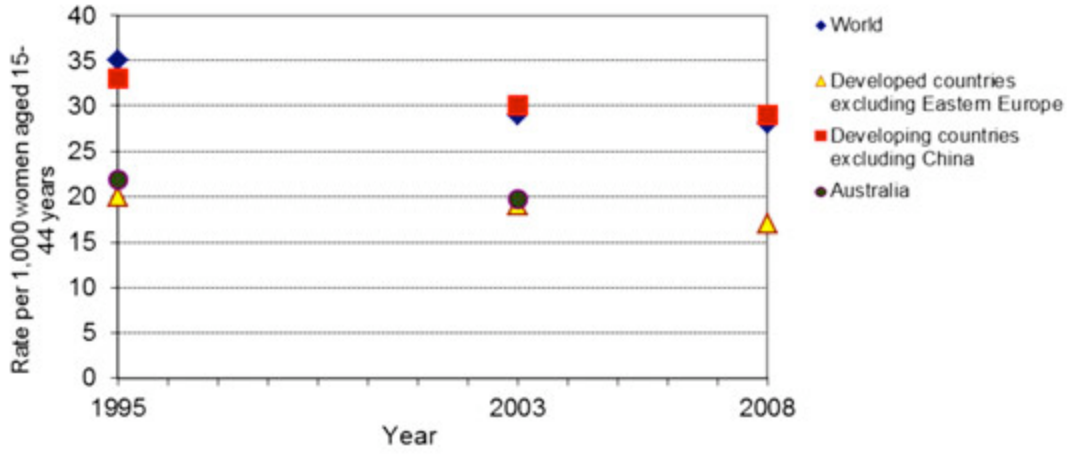
Notes: † Legislation in relation to private health facilities in Queensland requires that facilities providing abortion services are licensed as hospitals
‡ Declared by regulation to be a prescribed hospital (to provide abortions) – all such hospitals are part of the Area Health Services, but may be in a 'standalone' clinic setting

Sources: Children by Choice. Available at: www.childrenbychoice.org.au;
Calcutt C. Abortion Services in Australia. O&G Magazine 2007; 9: 27-28
Personal communications with state-based Family Planning organisations

## 5.2 Induced abortion: International comparison

It is estimated that 43.8 million abortions occurred worldwide in 2008. The majority of all abortions took place in the developing world (86%). The abortion rate per 1,000 women aged 15-44 years decreased from 35 in 1995 to 29 in 2003 and to 28 in 2008. The reduction was observed in both developed and developing countries. In developed countries, the abortion rate per 1,000 women aged 15-44 years decreased from 20 in 1995 to 19 in 2003 and to 17 in 2008. Data for Australia were only available up to 2004. The abortion rates per 1,000 women aged 15-44 years in Australia were comparable to that of developed countries (22 in 1995 and 20 in 2003) (Figure 5.1).

**Figure 5.1: International comparison of abortion rates, 1995 to 2008**




Sources: International data: Gilda Sedgh SS, Iqbal H Shah, Elisabeth Åhman, Stanley K Henshaw, Akinrinola Bankole. Induced abortion: incidence and trends worldwide from 1995 to 2008. The Lancet, Volume 379, Issue 9816, Pages 625 - 632, 18 February 2012
Australian data: Chan A, Sage LC. Estimating Australia's abortion rates 1983-2003. Medical Journal of Australia. 2005;182(9):447-52

## 5.3 Induced abortions in Australia

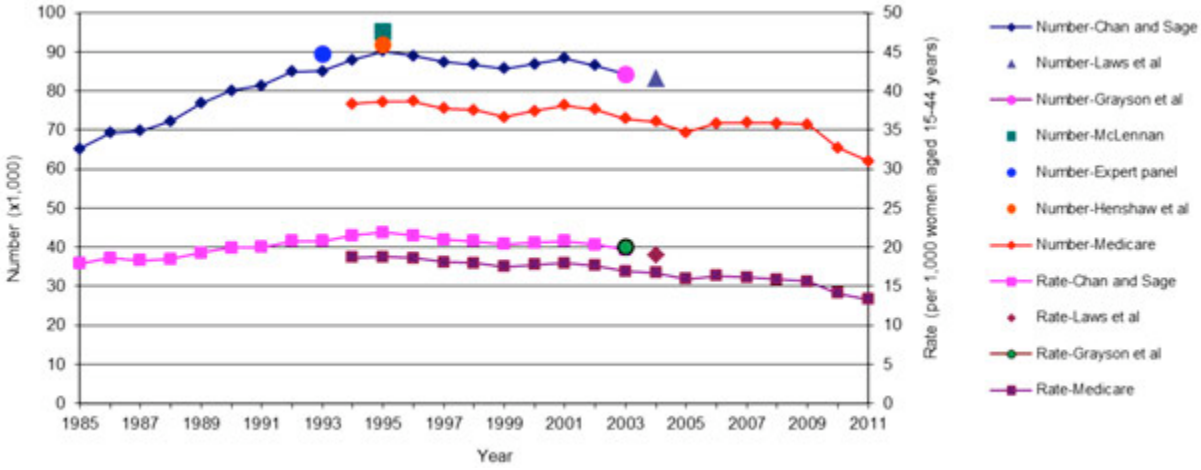
### 5.3.1 Estimates of induced abortions

In 2004, the number of induced abortion was estimated to be over 83,000[12] and the number of live births was over 254,000.[27] This equates to approximately one abortion for every four known pregnancies and was similar to the result from a study in 2003.[4]

The number of induced abortions in Australia increased from over 65,000 in 1985 to over 90,000 in 1995 and decreased to about 83,000 in 2004. Similarly, the abortion rate also increased from 18 per 1,000 women aged 15-44 years in 1985 to 22 per 1,000 women aged 15-44 years in 1995 and decreased to 19 per 1,000 women aged 15-44 years in 2004[4] (Figure 5.2).

In a cohort study of Australian women, the proportion of women who ever had an abortion increased from 7% when the women were aged 18-23 years to 16% by the time the women were aged 28-33 years.[28] In other studies, 23% of women aged 16-59 years[29] and 20% of women aged 45-50 years who had ever been pregnant, had an abortion.[30]

**Figure 5.2: Induced abortions in Australia, 1985 to 2011**




Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage

Sources: Chan A, Sage LC. Estimating Australia's abortion rates 1983-2003. Medical Journal of Australia. 2005;182(9):447-52.
Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit
Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17).
McLennan W. Australian social trends 1998. Canberra: Australian Bureau of Statistics, 1998, ABS Cat. No. 4102.0
Expert panel of the National Health and Medical Research Council. An information paper on termination of pregnancy in Australia. Canberra: NHMRC, 1996
Henshaw SK, Haas TA, Berentsen K, Carbone E.Readings on induced abortion. Vol 2: A world review 2000. New York: Alan Guttmacher Institute, 2001
Medicare Australia, www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## 5.3.2 MBS claims for induced abortions

MBS claims for induced abortions decreased slightly from under 77,000 in 1994 to less than 72,000 in 2009 and fell sharply to over 62,000 in 2011, possibly due to the introduction of medical abortion. The claim rate per 1,000 women aged 15-44 years also decreased gradually from 19 in 1994 to 16 in 2009 and fell to 13 in 2011 (Figure 5.2). In 2011, the Medicare benefit claimed for abortion was about $10 million a year.

## 5.3.3 Medical abortions

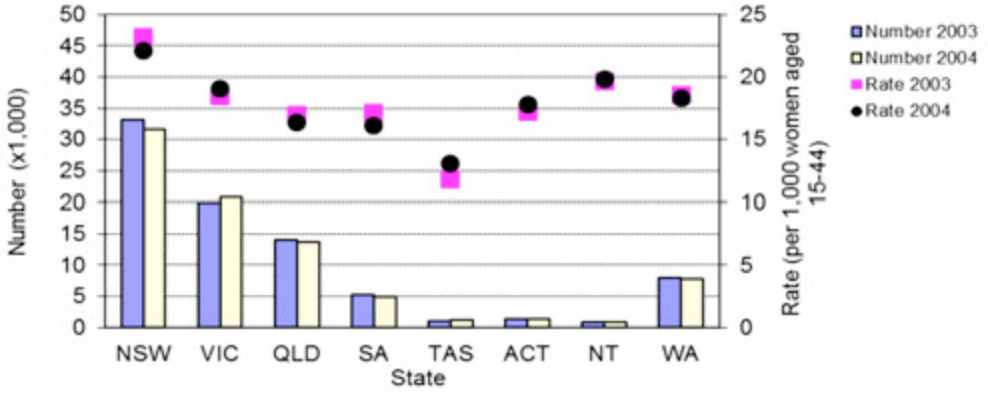
Between 1 September 2009 and 31 August 2011, 13,345 medical abortions were conducted at 15 Marie Stopes International Australia clinics.[31]

## 5.4 Induced abortions by state and territory

### 5.4.1 Study estimates of induced abortions by state and territory

In 2003 and 2004, NSW had the highest abortion rates of between 22 and 23 per 1,000 women and TAS had the lowest abortion rates of between 12 and 13 per 1,000 women (Figure 5.3).

**Figure 5.3: Estimated number and rate of induced abortions by state and territory, 2003 and 2004**



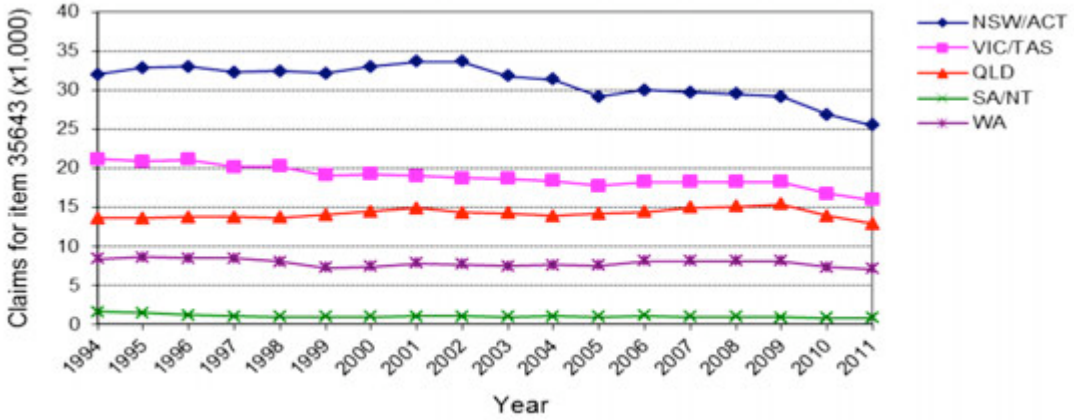

Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004: Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit
Data for WA were not reported in the above reports. Data for WA presented here were from WA Department of Health Report: Joyce Alan, Tran B,(2011) Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System. Department of Health. Perth, Western Australia, Statistical series number 90

### 5.4.2 MBS claims for induced abortions by state and territory

Similar to the national trend, the number of claims and claim rates decreased in all states between 1994 and 2011 (Figure 5.4 and 5.5). The claim rate was highest in NSW/ACT (16 per 1,000 women aged 15-44 years in 2011) and lowest in SA/NT (2.2 per 1,000 women aged 15-44 years in 2011) (Figure 5.5).

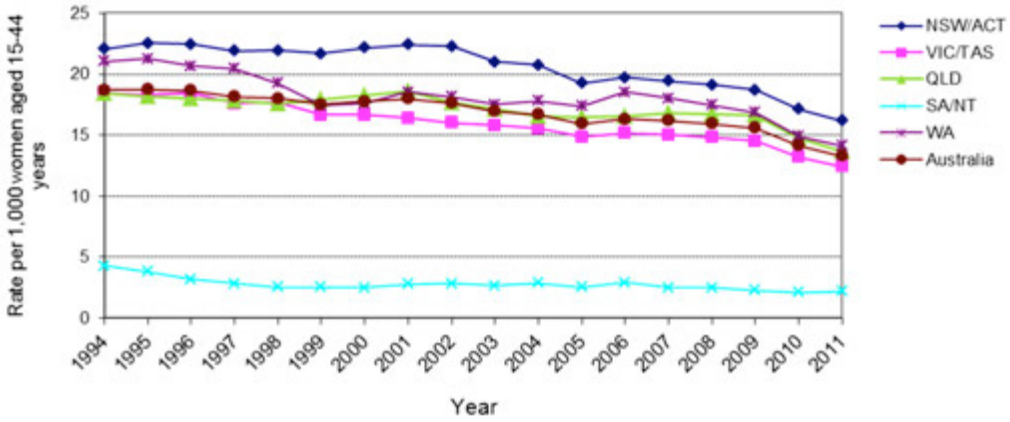
SA, WA and NT are the only states where notification of induced abortion is compulsory but only SA and WA publish data on abortion notification.

**Figure 5.4: MBS claims for item 35643 by state and territory, 1994 to 2011**




Notes: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage
Due to small number of abortions in the ACT and in TAS, ACT data is reported together with NSW data and TAS data is reported together with VIC data
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

**Figure 5.5: MBS claim rate for item 35643 by state and territory, 1994 to 2011**

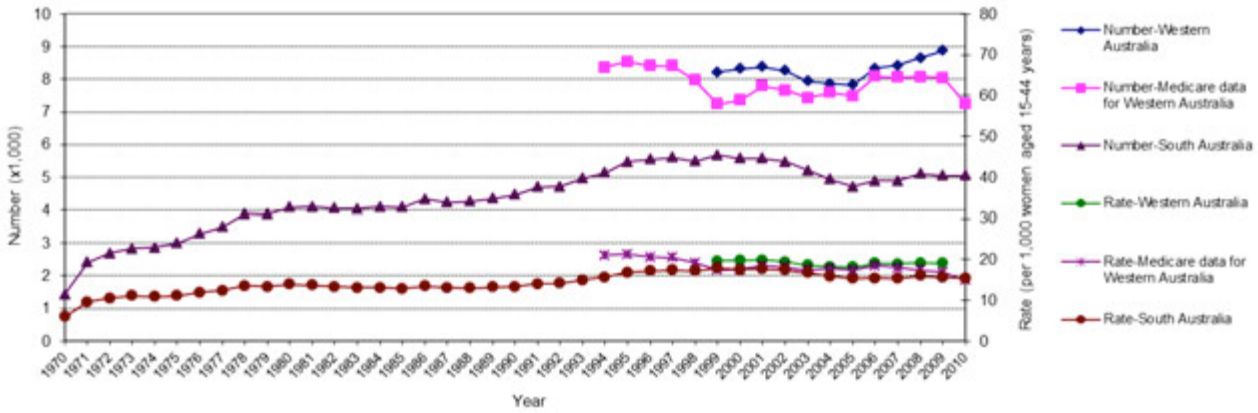



Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## 5.4.3 Induced abortions in SA

Induced abortion data for SA were available from 1970 to 2010 (Figure 5.6). The number of induced abortions in SA increased from just over 2,400 in 1971 to about 3,900 in 1979 and around 4,300 in 1989 and reached the peak of around 5,700 in 1999. During the last decade, the number of abortions decreased to approximately 4,700 in 2005, then increased again to around 5,000 in 2010. The abortion rate per 1,000 in SA displayed similar trends (Figure 5.6). Information about medical abortion was also available from SA. Between 1 January 2009 and 31 December 2010, mifepristone was used for 947 early medical abortions up to 9 weeks in five health centres.[33] This accounted for 9.5% of the 10,102 abortions notified in SA during the same time period.[1]

**Figure 5.6: Induced abortions in South Australia and Western Australia, 1970 to 2010**




Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Sources: Scheil W, Scott J, Catcheside B, Sage L. Pregnancy Outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012.
Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System. Department of Health. Perth, Western Australia, Statistical series number 90
Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## 5.4.4 Induced abortions in WA

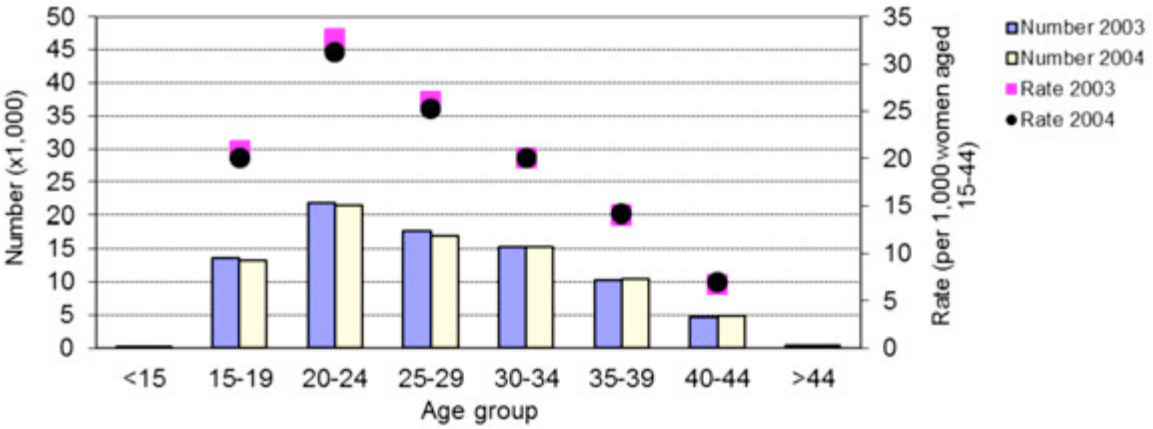
Data from WA were available from 1999 to 2009. The trend in WA was similar to SA during this time. In WA, the number of abortions decreased from over 8,200 in 1999 to around 7,800 in 2005 and increased to approximately 8,900 in 2009. The rate per 1,000 women also displayed a similar trend (Figure 5.6).

## 5.5 Induced abortions by age group

### 5.5.1 Estimate of induced abortions by age group

The AIHW estimates of the number of induced abortions by age group for 2004 (Figure 5.7) showed women aged 20-24 years had the highest abortion rate (31.3 per 1,000 women), with the lowest rate occurring in women aged 40-44 years (7.0 per 1,000).

**Figure 5.7: Induced abortion by age group, 2003 and 2004**




Note: Rates for age groups younger than 15 and older than 44 years were not available due to small number of abortions in these groups
Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004: Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18 AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit

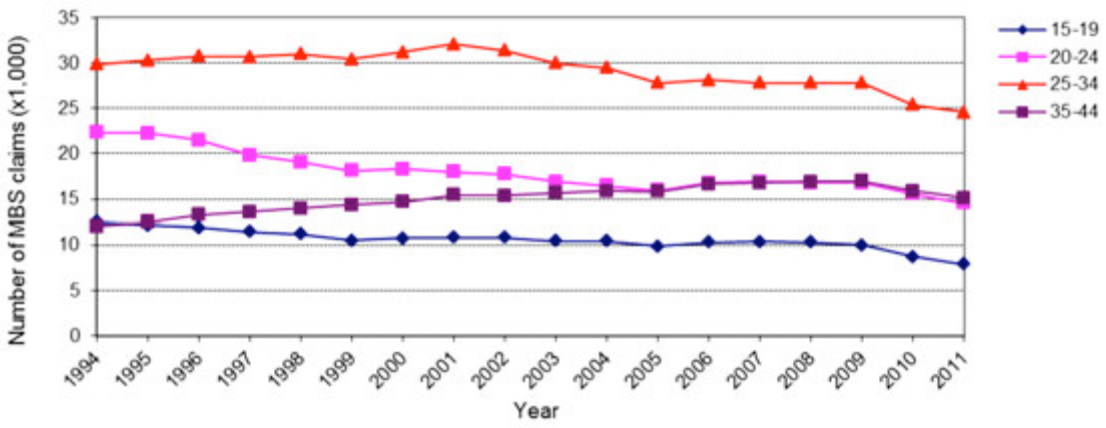
### 5.5.2 MBS claims for induced abortions by age group

In 2011, the number of MBS claims was highest in the age group 25-34 years (approximately 25,000) and lowest among the age group younger than 20 years (approximately 8,000). Between 1994 and 2005, the number of claims decreased in all age groups, except the age group 35 years or older which increased from around 12,000 in 1994 to around 16,000 in 2005. Between 2005 and 2009, the number of claims in all age groups remained stable and then decreased in 2010 and 2011 (Figure 5.8).

The claim rate was highest among women aged 20-24 years (18 per 1,000 women in 2011) and was lowest among women aged 35-44 years (9 per 1,000 women in 2011). The claim rate decreased in all age groups, except women aged 35 years or older. The claim rate in women aged less than 25 has been declining since 1994, but in women aged 25-34 this decline has only occurred since 2001 (Figure 5.9).

Women aged 20-24 years had the highest claim rates, in all states and territories except in SA/NT where the claim rate among women aged 25-34 years was highest (3.1 per 1,000 women) (Figure 5.10).

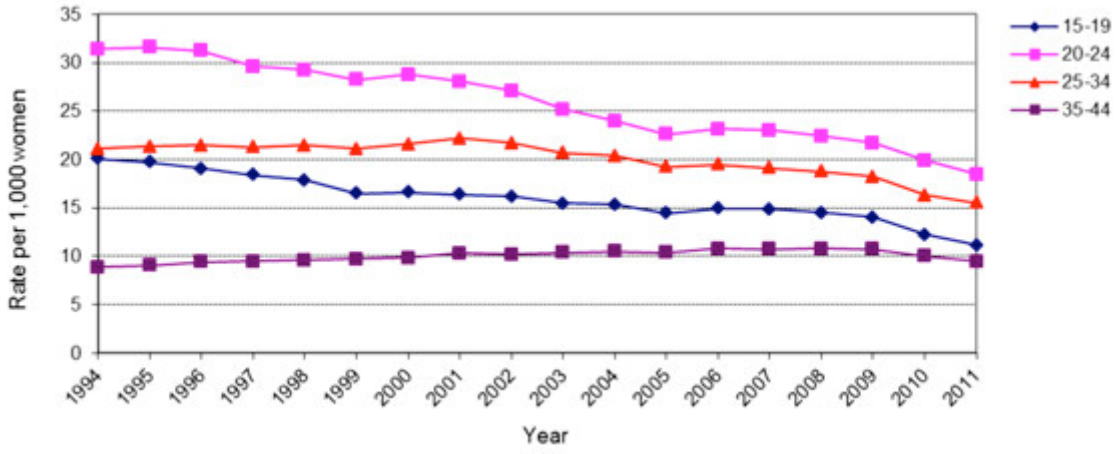
## Figure 5.8: MBS claims for item 35643 by age group, 1994 to 2011




Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Age group 15-19 years might also include women younger than 15 years and age group 35-44 years might also include women older than 44 years who had abortions

Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

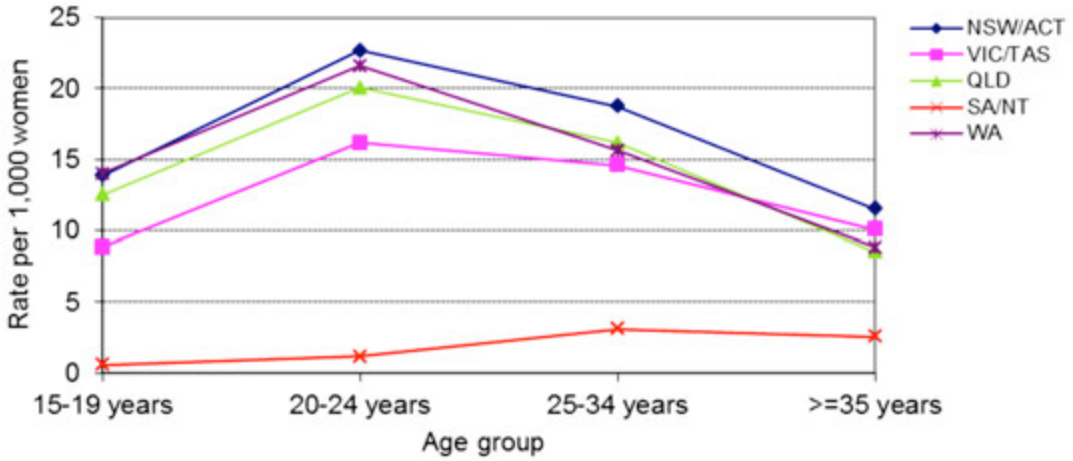
## Figure 5.9: MBS claim rate for item 35643 by age group, 1994 to 2011




Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Age group 15-19 years might also include women younger than 15 years
Age group 35-44 years might also include women older than 44 years

Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

**Figure 5.10: MBS claim rate for item 35643 by age group and state and territory, 2011**

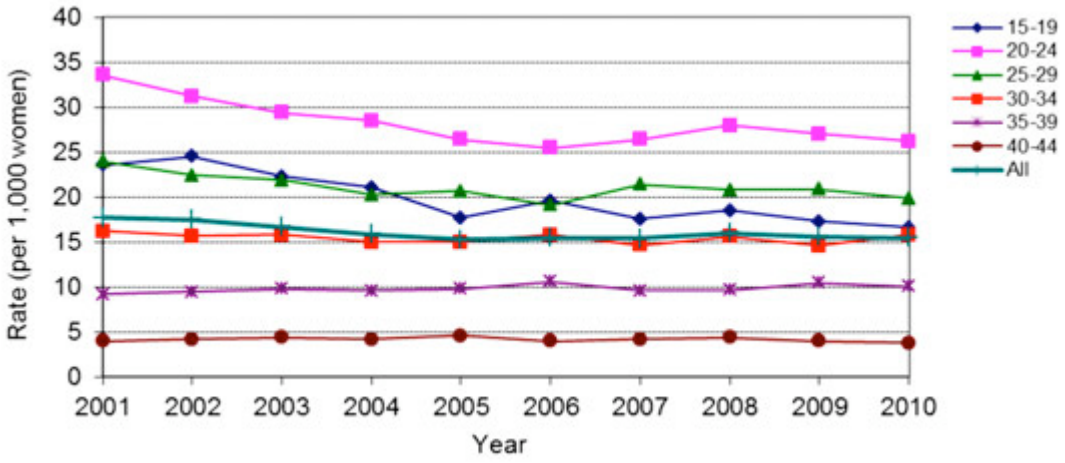



Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage
Age group 15-19 years might also include women younger than 15 years
Age group 35-44 years might also include women older than 44 years
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## 5.5.3 Induced abortion by age group in SA

Between 2001 and 2010, the abortion rates among women in SA aged 20-24 years were consistently highest but decreased from 34 per 1,000 women to 26 per 1,000 women (Figure 5.11). The abortion rates among women aged 40-44 years were consistently lowest and were around 4 per 1,000 women. The abortion rates also decreased among women aged 15-19 years, from 24 per 1,000 women to 17 per 1,000 women. The abortion rate decreased slightly among women aged 25-29 years, from 24 per 1,000 women to 20 per 1,000 women.

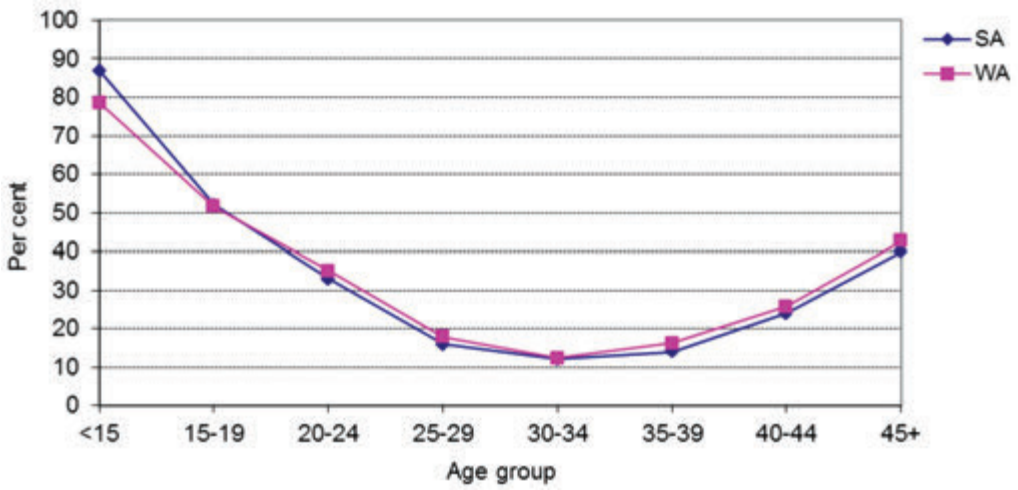
**Figure 5.11: Induced abortion rate by age group in South Australia, 2001 to 2010**




Sources: Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System. Department of Health. Perth, Western Australia, Statistical series number 90
Scheil W, Scott J, Catcheside B, Sage L. Pregnancy Outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012

The proportion of abortions among all pregnancies (live births plus abortions) was highest among women younger than 15 years (87%) and women aged 15-19 years (52%), followed by women aged 20-24 years (33%). The average proportion of abortions among all pregnancies for all age groups was 20% [1] (Figure 5.12).

**Figure 5.12: Proportion of induced abortion per total births by age group in South Australia, 2010 and Western Australia, 2009**




Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010
http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3301.0Main+Features12010?OpenDocument (Accessed January 2012)

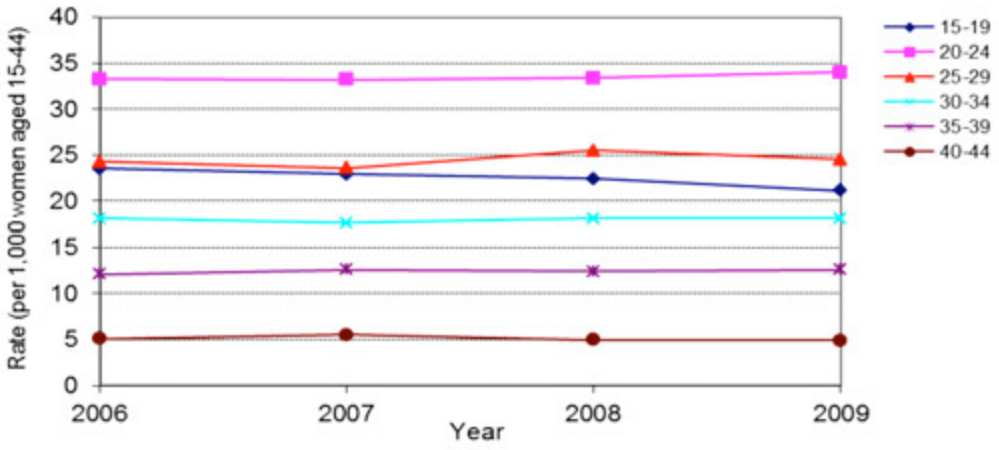
## 5.5.4 Induced abortion by age group in WA

Notification data from WA between 2006 and 2009 also showed that the abortion rates were highest among women aged 20-24 years (34 per 1,000 women) and lowest among women aged 40-44 years (4.9 per 1,000 women) (Figure 5.13).

The induced abortion rate among women aged 15-19 years decreased from 24 per 1,000 women in 2006 to 21 per 1,000 women in 2009. The induced abortion rate among women aged 25-29 years increased from 24 per 1,000 women in 2006 to 26 per 1,000 women in 2008 but decreased to 25 per 1,000 women in 2009.

The proportion of abortions among all pregnancies (live births plus abortions) was highest among women younger than 15 years (79%) and women aged 15-19 years (52%), followed by women aged 20-24 years (35% in WA). The average proportion of abortions among all pregnancies for all age groups in WA was 22%.[2]

**Figure 5.13: Induced abortion rate by age group in Western Australia, 2006 to 2009**

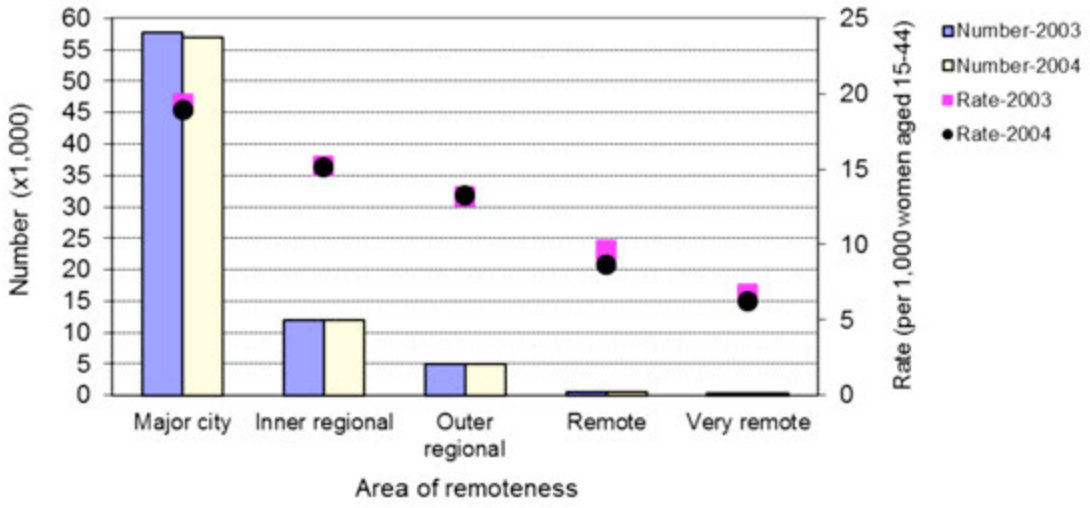



Source: Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System Department of Health. Perth, Western Australia, Statistical series number 90

## 5.6 Induced abortions by area of remoteness

Most abortions were carried out in major cities and very few were carried out in very remote areas. In 2004, the number of induced abortions was around 58,000 in major cities and was only 251 in very remote areas. The induced abortion rate was 19 per 1,000 women in the major cities and 6.2 per 1,000 women in very remote areas (Figure 5.14). The lower abortion rate in remote areas may reflect issues regarding access to abortion services and or that women from remote areas may be travelling to other centres where facilities are more available to have abortion.

**Figure 5.14: Induced abortion by area of remoteness, Australia, 2003 and 2004**




Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004: Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34 Sydney: AIHW National Perinatal Statistics Unit

## 5.7 Induced abortions by Indigenous status

Data on induced abortion by Indigenous status is only available from WA. In 2009, the proportion of women who had induced abortions among non-Indigenous women (22%) was higher than among Indigenous women (12%).[2]

## 5.8 Other factors associated with induced abortions

In the Australian Study of Health and Relationships among women aged 16-59 years, those with higher levels of education and lesbian or bisexual women were more likely to have an abortion. Location, English speaking background, income or occupation were not associated with having had an abortion.[29]

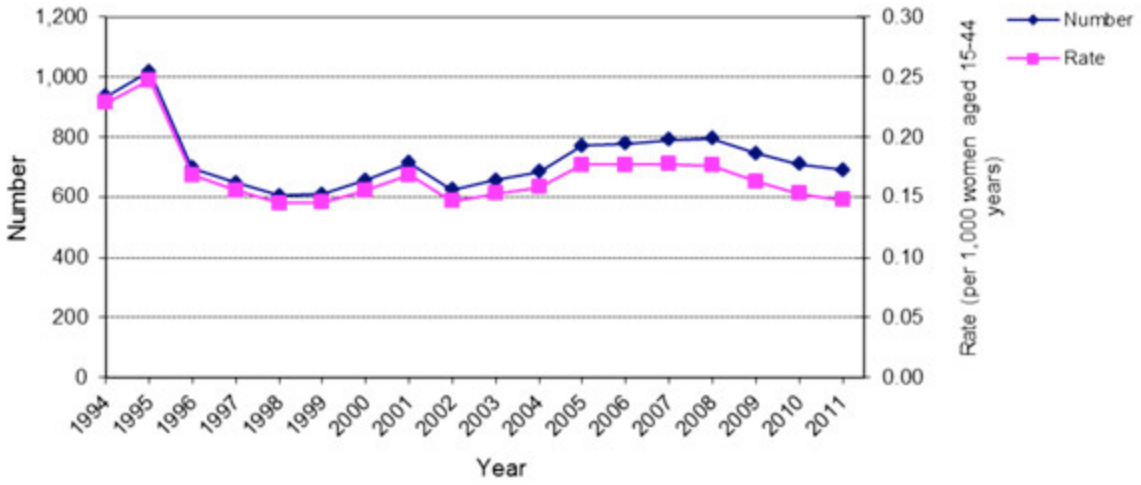
In the Australian Longitudinal Study on Women's Health, teenage abortion was more common among teenagers who had a lower level of education, were in a de facto relationship, had no private health insurance or were victims of partner violence.[28]

## 5.9 Abortion at or after 20 weeks

Information about induced abortion at or after 20 weeks of pregnancy is limited. In 2003, there were 325 separations in Australia with induced abortion and duration of pregnancy of 20 completed weeks or more in the NHMD. One hundred and twenty-five (39%) of these separations were for fetal abnormality and damage (e.g. by alcohol or drugs). The number of induced abortions after 20 weeks accounted only for 0.4% of over 84,000 induced abortions during the same period.[5]

In the MBS data, abortions at or after 20 weeks may be recorded as MBS item 16525, (Management of second trimester labour) although it also includes induced abortions of pregnancies after 13 weeks. The number of claims for item number 16525 decreased from 936 in 1994 to 689 in 2011. The rate also decreased from 0.23 per 1,000 women aged 15-44 years in 1994 to 0.15 per 1,000 women aged 15-44 years in 2011 (Figure 5.15). Between 1994 and 2011, the number of MBS claims for abortion at or after 20 weeks was less than 1% of the claims for item 35643.

**Figure 5.15: MBS claims for item number 16525 (Management of second trimester labour), 1994 to 2011**




Note: MBS item 16525 Management of second trimester labour
Source: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## 5.10 Discussion

### 5.10.1 Induced abortions in Australia

National information on abortions that is reliable and up-to-date is not currently available. MBS data are available and up-to-date but these data are subject to many limitations. The number of MBS claims decreased sharply from less than 72,000 in 2009 to more than 62,000 in 2011 with the claim rate per 1,000 women aged 15-44 years falling from 16 in 2009 to 13 in 2011. The introduction of medical abortion since 2009[31] is one explanation for the reduction in Medicare claims. With the registration of Mifepristone Linepharma (RU 486) and GyMiso® (misoprostol) by the Therapeutic Goods Administration in August 2012, the establishment of a training and accreditation process for prescribers,[17] and the subsequent PBS listing, it is anticipated that the number of medical abortions will increase in the future.

The latest estimates from 2004 indicated that there were more than 83,000 induced abortions annually in Australia, resulting in one abortion per four known pregnancies. In a country where contraception is widely available and accessible, measures such as health education targeting women at risk of unintended pregnancy may be important.

### 5.10.2 Induced abortions by state and territory

In 2011, the MBS claim rate was highest in NSW/ACT (16 per 1,000 women) and lowest in SA/NT (2 per 1,000 women). The variation in the MBS claim rate is likely to reflect the difference in the service provision and legislation between states rather than the differences in the actual number of induced abortions. For instance, in SA and NT, most abortions are carried out in public facilities (Table 6.1). Therefore most abortions are not claimed through Medicare in SA and NT and hence the number of MBS claims underestimates the number of abortions in these states compared to other states. In contrast, most abortions in QLD are carried out in private clinics or hospitals, therefore, the number of MBS claims was almost equal to the estimated number of abortions.

### 5.10.3 Induced abortion by age group

Medicare and notification data both show that the abortion rate is highest among women aged 20-24 years, and then reduces as women get older. Between 1994 and 2011, MBS claim rates decreased in all age groups, except the age group 35 years or older where the MBS claim rate remained stable.

### 5.10.4 Data development

In order to have reliable information on abortion in Australia, all states and territories should have mandatory notification as in SA, WA and NT.[10]

When notification data are not available, the number of abortions can be estimated using methods that combine existing data from MBS and the NHMD.[5] These methods may need to be validated whenever there are changes in service provision or state legislation that affect the recording of abortion in these datasets.

For medical abortions, an MBS item/s for medical abortion consultation would be useful to monitor the number of medical abortions. The addition of Mifepristone Linepharma (RU 486) and GyMiso® (misoprostol) to the PBS will enable improved data collection.

## 5.11 References


1. Scheil W, Scott J, Catcheside B, Sage L. Pregnancy outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012.
2. Joyce A, Tran B. Induced abortions in Western Australia 2006-2009. Report of the Western Australian Abortion Notification System. Statistical series number 90. Western Australia: Department of Health Perth, 2011.
3. Australian Institute of Health and Welfare. Australia's Health 2004. Canberra: AIHW, 2004.
4. Chan A, Sage LC. Estimating Australia's abortion rates 1985-2003. Med J Aust 2005;182(9):447-52.
5. Grayson N, Hargreaves J, Sullivan EA. Use of routinely collected national data sets for reporting on induced abortion in Australia. Perinatal statistics series no. 17. Cat. no. PER 30. Sydney: AIHW National Perinatal Statistics Unit, 2005.
6. Bayly C. Informing the Abortion Debate. O&G 2005; 7(1)50-1.
7. Department of Health and Ageing, Therapeutic Goods Administration. Registration of medicines for the medical termination of early pregnancy. Available at: http://www.tga.gov.au/hp/information-medicines-mifepristone-gymiso.htm. Accessed on 9 May 2013.
8. Adelson PL, Frommer MS, Weisberg E. A survey of women seeking termination of pregnancy in New South Wales. Med J Aust 1995; 163(8):419-22.
9. Nickson C, Smith AM, Shelley JM. Intention to claim a Medicare rebate among women receiving private Victorian pregnancy termination services. Aust N Z J Public Health 2004; 28(2):120-3.
10. Pratt A, Biggs A, Buckmaster L. How many abortions are there in Australia? A discussion of abortion statistics, their limitations, and options for improved statistical collection. Canberra: Social Policy Section, Parliament of Australia, 2005.
11. Senator Kay Patterson. Question without Notice: Health: Abortion, Senate, Debates, 15 September 2003.
12. Laws P, Grayson N, Sullivan E. Australia's mothers and babies 2004. Perinatal statistics series no. 18. Cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit, 2006.
13. Marie Stopes International. Real choices: women, contraception and unplanned pregnancy. Available at: http://www.mariestopes.org.au/images/stories/libraryfiles/Real-Choices-Key-Findings.pdf. Accessed on 9 May 2013.
14. de Crespigny LJ, Savulescu J. Pregnant women with fetal abnormalities: the forgotten people in the abortion debate. Med J Aust 2008; 188(2):100-103.
15. Victorian Law Reform Commission. Law of abortion: final report. Melbourne: VLRC. 2008.
16. de Costa CM, Carrette M. Early medical abortion – available and safe. Med J Aust 2012; 197(5):257-258.
17. Department of Health and Ageing, Therapeutic Goods Administration. Registration of Mifepristone Linepharma (RU 486) and GyMiso (misoprostol). Available at: http://www.tga.gov.au/newsroom/btn-tga-statement-mifepristone-gymiso-120830.htm. Accessed on 9 May 2013.
18. Information and Statistics Division (ISD). Abortion Statistics. Available at: http://www.isdscotland.org/Health-Topics/Sexual-Health/Publications/2011-05-31/2011-05-31-Abortions-Report.pdf. Accessed on 9 May 2013.
19. Fiala C, Gemzel-Danielsson K. Review of medical abortion using mifepristone in combination with a prostaglandin analogue. Contraception 2006; 74(1):66-86.
20. Kulier R, Kapp N, Gülmezoglu AM, Hofmeyr GJ, Cheng L, Campana A. Medical methods for first trimester abortion. Cochrane Database Syst Rev 2011; 11:CD002855.
21. Royal College of Obstetricians and Gynaecologists. The care of women requesting induced abortion: Evidence-based clinical guideline number 7. London: RCOG Available at: http://www.rcog.org.uk/files/rcog-corp/Abortion%20guideline_web_1.pdf. Accessed on 9 May 2013.

22. Anna Heino, Mika Gissler, Anne Soimula. Raskaudenkeskeytykset 2010 (Induced abortions 2010). Helsinki: Suomen virallinen tilasto (Official Statistics of Finland), Terveyden ja hyvinvoinnin laitos (National Institute for Health and Welfare), Finland, 2011.
23. Socialstyrelsen (National Board of Health and Welfare). Aborter 2011 (Induced Abortions 2011). Stockholm, Sweden, 2011.
24. Children by choice. Fact sheet: Queensland abortion law. Available at: http://www.childrenbychoice.org.au/info-a-resources/facts-and-figures/queensland-abortion-law. Accessed on 9 May 2013.
25. Calcutt C. Abortion services in Australia. O&G 2007; 9(4):27-8.
26. National Health and Medical Research Council (NHMRC). An information paper on termination of pregnancy in Australia, Canberra: NHMRC, 1996.
27. Australian Bureau of Statistics. Births, Australia, 2010. ABS Cat. no.3301.0.Canberra: ABS, 2011. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3301.0. Accessed on 9 May 2013.
28. Herbert D, Lucke J, Dobson A. Pregnancy losses in young Australian women : findings from the Australian Longitudinal Study on Women's Health. Womens Health Issues 2009; 19(1):21-29.
29. Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: Reproductive experiences and re productive health among a representative sample of women. Aust N Z J Public Health 2003; 27(2):204-9.
30. Women's Health Australia. Data book for the baseline survey of the Australian Longitudinal Study on Women's Health: Mid-age cohort 45-50 years. Newcastle: Research Institute for Gender and Health, University of Newcastle, 1997.
31. Goldstone, Michelson J, Williamson E. Early medical abortion using low-dose mifepristone followed by buccal misoprostol: a large Australian observational study. Med J Aust 2012; 197(5):282-286.
32. Medicare Australia. Medicare Australia Statistics. Canberra: Department of Health and Ageing, 2012.
33. Mulligan E, Messenger H. Mifepristone in South Australia, the first 1343 tablets. Menopause 2011; 40(5):342-345.

## 5.12 Appendices

### 5.12.1 Appendix 1 – Data for figures presented in this chapter

**Table A 5.1: International comparison of abortion rates, 1995 to 2008**

| | 1995 | 2003 | 2008 |
|---|---|---|---|
| World | 35 | 29 | 28 |
| Developed countries | 39 | 25 | 24 |
| Developed countries excluding Eastern Europe | 20 | 19 | 17 |
| Developing countries | 34 | 29 | 29 |
| Developing countries excluding China | 33 | 30 | 29 |
| Australia | 21.9 | 19.7 | - |

Sources: International data: Gilda Sedgh SS, Iqbal H Shah, Elisabeth Åhman, Stanley K Henshaw, Akinrinola Bankole. Induced abortion: incidence and trends worldwide from 1995 to 2008. The Lancet, Volume 379, Issue 9816, Pages 625 - 632, 18 February 2012
Australian data: Chan A, Sage LC. Estimating Australia's abortion rates 1983-2003. Medical Journal of Australia. 2005;182(9):447-52

## Table A 5.2: Induced abortions in Australia, 1985 to 2011

| Year | Number - Chan & | Rate - Chan & | Number - Laws Sage | Rate - Laws Sage | Number - Grayson et al | Rate - Grayson et al | Number - McLennan et al | Number - Expert et al | Number - Henshaw panel | Number - Medicare et al | Rate - Medicare |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 65240 | 18 | | | | | | | | | |
| 1986 | 69296 | 19 | | | | | | | | | |
| 1987 | 69752 | 18 | | | | | | | | | |
| 1988 | 72240 | 19 | | | | | | | | | |
| 1989 | 76862 | 19 | | | | | | | | | |
| 1990 | 80113 | 20 | | | | | | | | | |
| 1991 | 81430 | 20 | | | | | | | | | |
| 1992 | 85003 | 21 | | | | | | | | | |
| 1993 | 85153 | 21 | | | | | | 89521 | | | |
| 1994 | 87965 | 22 | | | | | | | | 76691 | 18.7 |
| 1995 | 90182 | 22 | | | | | 95200 | | 91944 | 77218 | 18.7 |
| 1996 | 89076 | 22 | | | | | | | | 77375 | 18.6 |
| 1997 | 87497 | 21 | | | | | | | | 75569 | 18.1 |
| 1998 | 86862 | 21 | | | | | | | | 75183 | 18.0 |
| 1999 | 85731 | 20 | | | | | | | | 73392 | 17.5 |
| 2000 | 86931 | 21 | | | | | | | | 74888 | 17.8 |
| 2001 | 88306 | 21 | | | | | | | | 76332 | 18.0 |
| 2002 | 86552 | 20 | | | | | | | | 75282 | 17.6 |
| 2003 | 84460 | 20 | | | 84218 | 20 | | | | 72967 | 17.0 |
| 2004 | | | 83210 | 19 | | | | | | 72214 | 16.7 |
| 2005 | | | | | | | | | | 69383 | 15.9 |
| 2006 | | | | | | | | | | 71773 | 16.3 |
| 2007 | | | | | | | | | | 71848 | 16.1 |
| 2008 | | | | | | | | | | 71800 | 15.9 |
| 2009 | | | | | | | | | | 71554 | 15.6 |
| 2010 | | | | | | | | | | 65491 | 14.1 |
| 2011 | | | | | | | | | | 62131 | 13.3 |

Note: MBS item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;

Sources: Chan A, Sage LC. Estimating Australia's abortion rates 1983-2003. Medical Journal of Australia. 2005;182(9):447-52
Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit
Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
McLennan W. Australian social trends 1998. Canberra: Australian Bureau of Statistics, 1998, ABS Cat. No. 4102.0
Expert panel of the National Health and Medical Research Council. An information paper on termination of pregnancy in Australia. Canberra: NHMRC, 1996
Henshaw SK, Haas TA, Berentsen K, Carbone E.Readings on induced abortion. Vol 2: A world review 2000. New York: Alan Guttmacher Institute, 2001
Medicare Australia, www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

### Table A 5.3: Estimated number and rate of induced abortions by state and territory, 2003 and 2004

| | NSW | VIC | QLD | SA | TAS | ACT | NT | WA |
|---|---|---|---|---|---|---|---|---|
| Number 2003 | 33088 | 19896 | 14041 | 5274 | 1116 | 1335 | 938 | 7942 |
| Rate 2003 | 23 | 19 | 17 | 17 | 12 | 17 | 20 | 18.6 |
| Number 2004 | 31619 | 20772 | 13781 | 4981 | 1247 | 1380 | 941 | 7868 |
| Rate 2004 | 22 | 19 | 16 | 16 | 13 | 18 | 20 | 18.3 |

Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004: Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit
Data for WA were not reported in the above reports. Data for WA presented here were from WA Department of Health Report: Joyce Alan, Tran B,(2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System. Department of Health. Perth, Western Australia, Statistical series number 90

### Table A 5.4: MBS claims for item 35643 by state and territory, 1994 to 2011

| Year | NSW/ACT | VIC/TAS | QLD | SA/NT | WA |
|---|---|---|---|---|---|
| 1994 | 32,001 | 21,131 | 13,595 | 1,599 | 8,365 |
| 1995 | 32,815 | 20,834 | 13,608 | 1,411 | 8,550 |
| 1996 | 32,960 | 21,101 | 13,738 | 1,168 | 8,408 |
| 1997 | 32,290 | 20,126 | 13,702 | 1,043 | 8,408 |
| 1998 | 32,396 | 20,216 | 13,669 | 928 | 7,974 |
| 1999 | 32,119 | 19,087 | 14,010 | 934 | 7,242 |
| 2000 | 32,993 | 19,191 | 14,434 | 910 | 7,360 |
| 2001 | 33,624 | 19,031 | 14,861 | 1,015 | 7,801 |
| 2002 | 33,607 | 18,711 | 14,273 | 1,026 | 7,665 |
| 2003 | 31,791 | 18,605 | 14,185 | 960 | 7,426 |
| 2004 | 31,349 | 18,373 | 13,862 | 1,034 | 7,596 |
| 2005 | 29,164 | 17,692 | 14,113 | 924 | 7,490 |
| 2006 | 29,998 | 18,232 | 14,386 | 1,071 | 8,086 |
| 2007 | 29,683 | 18,246 | 14,935 | 921 | 8,063 |
| 2008 | 29,468 | 18,243 | 15,096 | 924 | 8,069 |
| 2009 | 29,127 | 18,187 | 15,330 | 860 | 8,050 |
| 2010 | 26,874 | 16,731 | 13,825 | 798 | 7,263 |
| 2011 | 25,477 | 15,934 | 12,839 | 827 | 7,054 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Due to small number of abortions in the ACT and in TAS, ACT data is reported together with NSW data and TAS data is reported together with VIC data
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

**Table A 5.5: MBS claims for item 35643 by state and territory, 1994 to 2011**

| Year | NSW/ACT | VIC/TAS | QLD | SA / NT | WA | Aust. |
|---|---|---|---|---|---|---|
| 1994 | 22 | 18 | 18 | 4.3 | 21 | 19 |
| 1995 | 23 | 18 | 18 | 3.8 | 21 | 19 |
| 1996 | 22 | 18 | 18 | 3.2 | 21 | 19 |
| 1997 | 22 | 18 | 18 | 2.8 | 20 | 18 |
| 1998 | 22 | 18 | 18 | 2.5 | 19 | 18 |
| 1999 | 22 | 17 | 18 | 2.6 | 17 | 18 |
| 2000 | 22 | 17 | 18 | 2.5 | 18 | 18 |
| 2001 | 22 | 16 | 19 | 2.8 | 19 | 18 |
| 2002 | 22 | 16 | 18 | 2.8 | 18 | 18 |
| 2003 | 21 | 16 | 17 | 2.6 | 17 | 17 |
| 2004 | 21 | 16 | 17 | 2.9 | 18 | 17 |
| 2005 | 19 | 15 | 17 | 2.5 | 17 | 16 |
| 2006 | 20 | 15 | 17 | 2.9 | 19 | 16 |
| 2007 | 19 | 15 | 17 | 2.5 | 18 | 16 |
| 2008 | 19 | 15 | 17 | 2.5 | 17 | 16 |
| 2009 | 19 | 15 | 17 | 2.3 | 17 | 16 |
| 2010 | 17 | 13 | 15 | 2.1 | 15 | 14 |
| 2011 | 16 | 12 | 14 | 2.2 | 14 | 13 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## Table A 5.6: Induced abortions in South Australia and Western Australia, 1970 to 2010

| Year | Number - Western Australia | Number - MBS data for Western Australia | Number - South Australia | Rate - Western Australia | Rate - MBS data for Western Australia | Rate - South Australia |
|---|---|---|---|---|---|---|
| 1970 | | | 1,440 | | | 6 |
| 1971 | | | 2,409 | | | 9.6 |
| 1972 | | | 2,692 | | | 10.6 |
| 1973 | | | 2,847 | | | 11.1 |
| 1974 | | | 2,867 | | | 10.9 |
| 1975 | | | 3,000 | | | 11.1 |
| 1976 | | | 3,289 | | | 11.9 |
| 1977 | | | 3,494 | | | 12.4 |
| 1978 | | | 3,895 | | | 13.6 |
| 1979 | | | 3,880 | | | 13.3 |
| 1980 | | | 4,081 | | | 13.9 |
| 1981 | | | 4,096 | | | 13.7 |
| 1982 | | | 4,061 | | | 13.4 |
| 1983 | | | 4,036 | | | 13.1 |
| 1984 | | | 4,091 | | | 13.1 |
| 1985 | | | 4,079 | | | 12.9 |
| 1986 | | | 4,327 | | | 13.5 |
| 1987 | | | 4,229 | | | 13.1 |
| 1988 | | | 4,263 | | | 13 |
| 1989 | | | 4,342 | | | 13.2 |
| 1990 | | | 4,463 | | | 13.4 |
| 1991 | | | 4,696 | | | 14.1 |
| 1992 | | | 4,717 | | | 14.2 |
| 1993 | | | 4,959 | | | 15 |
| 1994 | | 8,365 | 5,140 | | 21 | 15.7 |
| 1995 | | 8,550 | 5,475 | | 21 | 16.9 |
| 1996 | | 8,408 | 5,545 | | 21 | 17.2 |
| 1997 | | 8,408 | 5,609 | | 20 | 17.5 |
| 1998 | | 7,974 | 5,488 | | 19 | 17.2 |
| 1999 | 8,216 | 7,242 | 5,679 | 19.7 | 17 | 17.9 |
| 2000 | 8,328 | 7,360 | 5,580 | 19.8 | 18 | 17.6 |
| 2001 | 8,378 | 7,801 | 5,579 | 19.9 | 19 | 17.7 |
| 2002 | 8,262 | 7,665 | 5,467 | 19.4 | 18 | 17.5 |
| 2003 | 7,941 | 7,426 | 5,216 | 18.6 | 17 | 16.7 |
| 2004 | 7,869 | 7,596 | 4,931 | 18.3 | 18 | 15.9 |
| 2005 | 7,825 | 7,490 | 4,715 | 18.2 | 17 | 15.3 |
| 2006 | 8,336 | 8,086 | 4,889 | 19.1 | 19 | 15.5 |
| 2007 | 8,424 | 8,063 | 4,884 | 19 | 18 | 15.4 |
| 2008 | 8,664 | 8,069 | 5,101 | 19.2 | 17 | 16 |
| 2009 | 8,885 | 8,050 | 5054 | 19.1 | 17 | 15.6 |
| 2010 | | 7,263 | 5048 | | 15 | 15.5 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;

Sources: Scheil W, Scott J, Catcheside B, Sage L. Pregnancy Outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012
Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System Department of Health. Perth, Western Australia, Statistical series number 90
Medicare Australia:www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

## Table A 5.7: Induced abortion by age group, 2003 and 2004

| | <15 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | >44 |
|---|---|---|---|---|---|---|---|---|
| Number 2003 | 306 | 13,549 | 21,826 | 17,654 | 15,407 | 10,350 | 4,628 | 498 |
| Rate 2003 | | 20.8 | 32.7 | 26 | 20.1 | 14.1 | 6.7 | |
| Number 2004 | 296 | 13,262 | 21,504 | 17,072 | 15,258 | 10,432 | 4,889 | 497 |
| Rate 2004 | | 20.1 | 31.3 | 25.3 | 20 | 14.2 | 7 | |

Note: Rates for age groups younger than 15 and older than 44 years were not available due to small number of abortions in these groups

Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004:Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit

## Table A 5.8: MBS claims for item 35643 by age group, 1994 to 2011

| Year | 15-19 | 20-24 | 25-34 | 35-44 |
|---|---|---|---|---|
| 1994 | 12,477 | 22,288 | 29,827 | 12,059 |
| 1995 | 12,182 | 22,243 | 30,261 | 12,511 |
| 1996 | 11,905 | 21,475 | 30,715 | 13,251 |
| 1997 | 11,465 | 19,830 | 30,701 | 13,562 |
| 1998 | 11,212 | 19,076 | 30,961 | 13,925 |
| 1999 | 10,511 | 18,106 | 30,437 | 14,337 |
| 2000 | 10,796 | 18,288 | 31,165 | 14,629 |
| 2001 | 10,848 | 17,985 | 32,103 | 15,391 |
| 2002 | 10,830 | 17,732 | 31,345 | 15,373 |
| 2003 | 10,434 | 16,886 | 29,983 | 15,663 |
| 2004 | 10,415 | 16,472 | 29,453 | 15,874 |
| 2005 | 9,877 | 15,954 | 27,771 | 15,779 |
| 2006 | 10,289 | 16,735 | 28,141 | 16,608 |
| 2007 | 10,397 | 16,892 | 27,829 | 16,730 |
| 2008 | 10,314 | 16,791 | 27,814 | 16,881 |
| 2009 | 10,023 | 16,754 | 27,800 | 16,976 |
| 2010 | 8,735 | 15,537 | 25,371 | 15,847 |
| 2011 | 7,904 | 14,550 | 24,559 | 15,118 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage;
Age group 15-19 years might also include women younger than 15 years and age group 35-44 years might also include women older than 44 years who had abortions

Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

### Table A 5.9: MBS claim rate for item 35643 by age group, 1994 to 2011

| Year | 15-19 | 20-24 | 25-34 | 35-44 |
|---|---|---|---|---|
| 1994 | 20 | 31 | 21 | 8.9 |
| 1995 | 20 | 32 | 21 | 9.1 |
| 1996 | 19 | 31 | 21 | 9.4 |
| 1997 | 18 | 30 | 21 | 9.5 |
| 1998 | 18 | 29 | 21 | 10 |
| 1999 | 17 | 28 | 21 | 10 |
| 2000 | 17 | 29 | 22 | 10 |
| 2001 | 16 | 28 | 22 | 10 |
| 2002 | 16 | 27 | 22 | 10 |
| 2003 | 15 | 25 | 21 | 10 |
| 2004 | 15 | 24 | 20 | 10 |
| 2005 | 14 | 23 | 19 | 10 |
| 2006 | 15 | 23 | 19 | 11 |
| 2007 | 15 | 23 | 19 | 11 |
| 2008 | 15 | 22 | 19 | 11 |
| 2009 | 14 | 22 | 18 | 11 |
| 2010 | 12 | 20 | 16 | 10 |
| 2011 | 11 | 18 | 16 | 9.5 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage; Age group 15-19 years might also include women younger than 15 years Age group 35-44 years might also include women older than 44 years

Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

### Table A 5.10: MBS claim rate or item 35643 by age group and state and territory, 2011

| Age group | NSW/ACT | VIC/TAS | QLD | SA/NT | WA |
|---|---|---|---|---|---|
| 15-19 | 14 | 8.8 | 13 | 0.6 | 14 |
| 20-24 | 23 | 16 | 20 | 1.2 | 22 |
| 25-34 | 19 | 15 | 16 | 3.1 | 16 |
| >=35 | 11 | 10 | 8.5 | 2.6 | 8.9 |

Note: Item 35643 Evacuation of the contents of the gravid uterus by curettage or suction curettage. Age group 15-19 years might also include women younger than 15 years. Age group 35-44 years might also include women older than 44 years

Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012.
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

### Table A 5.11: Induced abortion rate by age group in South Australia, 2001 to 2010

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| 15-19 | 23.6 | 24.5 | 22.3 | 21.1 | 17.7 | 19.6 | 17.6 | 18.5 | 17.3 | 16.6 |
| 20-24 | 33.6 | 31.2 | 29.4 | 28.5 | 26.4 | 25.5 | 26.4 | 28 | 27 | 26.2 |
| 25-29 | 24 | 22.4 | 21.9 | 20.3 | 20.7 | 19.1 | 21.4 | 20.8 | 20.9 | 19.9 |
| 30-34 | 16.2 | 15.7 | 15.8 | 15 | 15 | 15.8 | 14.7 | 15.6 | 14.6 | 15.8 |
| 35-39 | 9.2 | 9.5 | 9.8 | 9.6 | 9.8 | 10.6 | 9.6 | 9.7 | 10.5 | 10.1 |
| 40-44 | 4 | 4.2 | 4.4 | 4.2 | 4.6 | 4 | 4.2 | 4.4 | 4 | 3.8 |
| All | 17.7 | 17.5 | 16.7 | 15.9 | 15.3 | 15.5 | 15.4 | 16 | 15.6 | 15.5 |

Sources: Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System Department of Health. Perth, Western Australia, Statistical series number 90
Scheil W, Scott J, Catcheside B, Sage L. Pregnancy Outcome in South Australia 2010. Adelaide: Pregnancy Outcome Unit, SA Health, Government of South Australia, 2012

### Table A 5.12: Proportion of induced abortion per total births by age group in South Australia, 2010 and Western Australia, 2009

| | <15 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45+ |
|---|---|---|---|---|---|---|---|---|
| SA | 87 | 52 | 33 | 16 | 12 | 14 | 24 | 40 |
| WA | 79 | 52 | 35 | 18 | 12 | 16 | 26 | 43 |

Source: Australian Bureau of Statistics, 3301.0 - Births, Australia, 2010

### Table A 5.13: Induced abortion rate by age group in Western Australia, 2006 to 2009

| | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 |
|---|---|---|---|---|---|---|
| 2006 | 24 | 33 | 24 | 18 | 12 | 5.1 |
| 2007 | 23 | 33 | 24 | 18 | 13 | 5.5 |
| 2008 | 22 | 33 | 26 | 18 | 12 | 5.0 |
| 2009 | 21 | 34 | 25 | 18 | 13 | 4.9 |

Source: Joyce Alan, Tran B (2011). Induced Abortions in Western Australia 2006–2009. Report of the Western Australian Abortion Notification System Department of Health. Perth, Western Australia, Statistical series number 90

### Table A 5.14: Induced abortion by area of remoteness, Australia, 2003 and 2004

| | Major city | Inner regional | Outer regional | Remote | Very remote |
|---|---|---|---|---|---|
| Number-2003 | 57,727 | 11,986 | 5,035 | 611 | 272 |
| Rate-2003 | 19.3 | 15.2 | 13.2 | 9.6 | 6.7 |
| Number-2004 | 56,877 | 11,977 | 5,030 | 544 | 251 |
| Rate-2004 | 18.9 | 15.1 | 13.3 | 8.7 | 6.2 |

Sources: Data for 2003: Grayson N, Hargreaves J, Sullivan EA 2005. Use of routinely collected national data sets for reporting on induced abortion in Australia. AIHW Cat. No. PER 30. Sydney: AIHW National Perinatal Statistics Unit (Perinatal Statistics Series No. 17)
Data for 2004:Laws PJ, Grayson N & Sullivan EA 2006. Australia's mothers and babies 2004. Perinatal statistics series no. 18. AIHW cat. no. PER 34. Sydney: AIHW National Perinatal Statistics Unit

### Table A 5.15: MBS claims for item number 16525, 1994 to 2011

| | Number | Rate |
|---|---|---|
| 1994 | 936 | 0.23 |
| 1995 | 1019 | 0.25 |
| 1996 | 697 | 0.17 |
| 1997 | 647 | 0.16 |
| 1998 | 605 | 0.14 |
| 1999 | 609 | 0.15 |
| 2000 | 655 | 0.16 |
| 2001 | 714 | 0.17 |
| 2002 | 624 | 0.15 |
| 2003 | 656 | 0.15 |
| 2004 | 683 | 0.16 |
| 2005 | 770 | 0.18 |
| 2006 | 777 | 0.18 |
| 2007 | 790 | 0.18 |
| 2008 | 794 | 0.18 |
| 2009 | 746 | 0.16 |
| 2010 | 709 | 0.15 |
| 2011 | 689 | 0.15 |

Note: MBS item 16525 Management of second trimester labour
Sources: Medicare Australia: www.medicareaustralia.gov.au/statistics/mbs_item.shtml, accessed Oct 2012
Number of women aged 15-44 years as denominator was downloaded from Australian Bureau of Statistic website: http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0/, accessed Oct 2012

# Chapter 6:
# Sexually Transmissible Infections

David Tunnicliffe, Lieu Trinh, Kevin McGeechan

Chapter Outline

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## Key indicators

**Chlamydia, gonorrhoea, syphilis and hepatitis B**

Incidence rate per 100,000 population

Incidence by state and territory, Indigenous status, age group and gender

Gonorrhoea resistance to antibiotic therapy

**HIV/AIDS**

Incidence rate per 100,000 population

Incidence by state and territory, Indigenous status, age group and gender

Incidence by mode of transmission: male to male, heterosexual and intravenous drug use

AIDS cases and related deaths

**Genital warts and genital herpes**

Incidence and prevalence rates per 100,000 population

Prevalence of the human papilloma virus (HPV) vaccine uptake

## Primary data sources

National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database

The Kirby Institute for infection and immunity in society, Faculty of Medicine, University of New South Wales, Australian HIV Public Access Dataset

Online Medicare Benefits Schedule (MBS) data

## Purpose of this chapter

To compare rates of Sexually Transmissible Infections (STIs) between Australia and other countries

To describe the trends of STIs in Australia

To describe rates of HPV vaccination

To identify population sub-groups with higher rates of STIs

To identify areas of data development

## Terms and definitions

**Incidence rate:** the number of new cases during each year divided by the total number in the population at risk.

**Age specific rate:** the number of new cases per 1,000 population of a specified age or age group.

**HIV:** Human immunodeficiency virus.

**AIDS:** Acquired Immune Deficiency Syndrome.

## Data sources and limitations

### National Notifiable Disease Surveillance System (NNDSS)

The Communicable Diseases Surveillance Online Database, Department of Health and Ageing, reports communicable diseases from all states and territories. Indicators include numbers and rates of tests and diagnoses over time and by demographic characteristics. The data set has a number of limitations:

*Underestimation*

The asymptomatic silent nature of STIs means that individuals are less likely to seek testing and treatment, and as a result, the true prevalence of STIs is not accurately reflected in notification data. STI prevalence among Indigenous communities may be further underestimated[1,2] because Indigenous communities have less access to health services, and Indigenous status is often under reported.[3,4] Data on Indigenous people are only presented where completeness of data for Indigenous status exceeds 50%. In NSW, only data for HIV, syphilis and hepatitis meet this criterion.[3] As a result, STI surveillance data for Indigenous people are largely regarded as incomplete.[5,6] The quality of notification data for Indigenous people can be improved by the use of multiple sources of data (data linkage) to confirm Indigenous status. This has resulted in 74% reduction in missing data about Indigenous status for STI and Blood Borne Virus (BBV) notifications.[1]

*Overestimation of differences*

Interventions to encourage testing in vulnerable, remote or disadvantaged populations, such as a program to increase chlamydia testing in sexually active people under 25 years old,[4] may bring estimates of prevalence in the target population closer to the true value, but also artificially inflate differences between before and after the intervention, and between the target population and other populations. Interpretation of apparently inflated rates of STIs must therefore be made within the context of health interventions and changes in other relevant factors.

*Varied quality*

The quality and extent of information collected varies according to the process of disease notification and whether additional demographic information is collected or public health follow-up is routinely required. Comparisons of rates between places and over time, must take these factors into account.

### The Kirby Institute for infection and immunity in society

All states and territories report HIV diagnoses, AIDS cases and deaths to the Kirby Institute. For reporting purposes the ACT is grouped with NSW, and TAS is grouped with VIC, due to the small number of residents and notifications in ACT and TAS.

### Medicare Benefits Schedule (MBS) data

Testing for chlamydia can be tracked through MBS online data using the following items:

69316 Detection of chlamydia trachomatis by any method – one test
69317 One test described in item 69316 and a test described in 69494
69319 Two tests described in item 69494 and a test described in 69316

MBS data may be underestimated if sexual health clinics do not claim through Medicare or people who are eligible for Medicare choose not to claim for confidentiality reasons.

There are other MBS items for testing of viruses, microbial antigen or microbial nucleic acid, but these items are not specific to any STIs, therefore they are not reported in this chapter:

69494 Detection of a virus or microbial antigen or microbial nucleic acid – one test
69495 Two tests described in 69494
69496 Three or more tests described in 69494

## Summary

Australia has similar rates of chlamydia, gonorrhoea and HIV to other developed countries but has higher rates of Hepatitis B.

### Chlamydia

Chlamydia is the most commonly notified STI in Australia. The number of chlamydia notifications increased from 24,400 in 2002 to 80,800 in 2011. The notification rate increased from 122 per 100,000 in 2002 to 358 per 100,000 population in 2011. The notification rates were highest in the NT (1,142 per 100,000), among Indigenous people (1,342 per 100,000 population), and young women (2,231 per 100,000 among women aged 15-19 years and 2,184 per 100,000 women aged 20-24 years).

### Gonorrhoea

The number of notified cases of gonorrhoea doubled from approximately 6,400 in 2002 to just over 12,000 in 2011. The notification rates fluctuated between 30 and 40 per 100,000 population between 2002 and 2009 and then increased to approximately 53 per 100,000 population in 2011. The notification rates were highest in the NT (849 per 100,000 in 2011), among Indigenous people (673 per 100,000 population), and young men (213 per 100,000 men aged 20-24 years).

### Syphilis

From 2002 to 2011, the rate of syphilis (of less than two years duration) ranged from 3 to 7 per 100,000 population and of more than two years duration ranged from 5 to 6 per 100,000 population. Congenital syphilis is rare (7 notifications). The syphilis rates were highest in the NT (13 per 100,000 population for syphilis of less than two years and 26 per 100,000 population for syphilis of more than two years duration in 2011), among Indigenous people (32 per 100,000 population) and older men (23 per 100,000 men aged 40-44 years for syphilis of less than two years duration and 19 men aged 85 years or older for syphilis of more than two years duration).

### Hepatitis B

Hepatitis B (newly acquired) notification rates decreased from 2 per 100,000 population (394 notifications) in 2002 to 0.8 per 100,000 population (192 notifications) in 2011. Hepatitis B (unspecified) notification rates fluctuated from 27 per 100,000 population to 33 per 100,000 population between 2002 and 2011. Hepatitis B rates are highest in the NT (1.7 newly acquired per 100,000 population and 69 unspecified per 100,000 population in 2011), among Indigenous people (3 newly acquired per 100,000 population), men aged 35-39 years (1.2 newly acquired per 100,000) and women 25-29 years (71 unspecified per 100,000).

### HIV

The HIV notification rate has decreased from 11 per 100,000 population in 1987 to 5.3 per 100,000 population in 2011. HIV notification rates were highest in VIC/TAS (5.9 per 100,000 population in 2011) and among men aged 25-29 years (174 per 100,000 population). In 2011, 113 cases of AIDS and 18 AIDS related deaths were reported.

### Genital herpes

The estimated seroprevalence of HSV-1 and HSV-2 among Australian adults was 76% and 12%, respectively. Seroprevalence was highest among women (80% have HSV-1 and 16% have HSV-2) and people aged 65 to 74 years (85% have HSV-1).

### Genital warts

It is estimated that 4% of males and 4.4% of females have ever been diagnosed with genital and/or anal warts.

## 6.1 Introduction

Infections with chlamydia, gonorrhoea, syphilis, hepatitis B, HIV, genital warts and genital herpes impact on an individual's sexual and reproductive health[7] and are recognised as public health issues in Australia and worldwide.[8] Unprotected sex is associated with an increased risk of contracting STIs. Population sub-groups such as Indigenous people, young people and men who have sex with men (MSM) have higher prevalence of STIs.[7,9-11]

### Chlamydia

Chlamydia trachomatis infection occurs in the tubes and the urethra of women and the urethra of men.[12] Untreated chlamydia infection in women is associated with Pelvic Inflammatory Disease (PID), ectopic pregnancy, neonatal infection[12,13] and tubal infertility.[14,15] Among men, chlamydia infection can lead to epididymitis.[12] Chlamydia can be transmitted vaginally through sex or childbirth, or through anal or oral sex.[12] Ninety percent of chlamydia infections are asymptomatic in women and 80% are asymptomatic in men.[16,17] Consequently, the majority of cases are undetected, suggesting underestimation of the true extent of infection.[18] Chlamydia infection rate is highest in people younger than 25 years, and people with two or more sexual partners within a 12 month period.[19-22]

### Gonorrhoea

The symptoms of Neisseria gonorrhoea infection for males depend on the site of infection. Infection of the urethra causes discharge from the penis, pain while urinating and redness around the opening of the penis. Infection of the anus results in anal discharge and discomfort. In women, infection affects the cervix and results in symptoms such as abnormal vaginal discharge, pain when urinating and abnormal vaginal bleeding. The infection can spread to the fallopian tubes and may result in PID, which if left untreated can cause infertility and ectopic pregnancy.[13,23] Gonorrhoea is spread through vaginal, anal and oral intercourse. Around 55 to 60% of male cases and 80 to 85% of female cases are asymptomatic.[15,16] Infections are more prevalent among Indigenous people,[24] MSM, commercial sex workers in non-approved premises, clients of sex workers, and international travellers.[25-28]

### Syphilis

Syphilis is caused by the bacterium Treponema pallidum. Syphilis is primarily transmitted by sexual contact and early syphilis can be transmitted through oral, anal or vaginal sex. Early syphilis (primary, secondary or early latent) is generally symptomatic and considered infectious. Once the infection becomes latent, the carrier is usually asymptomatic and only minimally infectious. In approximately 50% of cases latent syphilis can progress to cause tertiary disease which may cause neurological and cardiovascular complications and potentially death.[29] Transmission can also occur through mother to fetus during pregnancy resulting in congenital syphilis. Screening for syphilis infection is a routine antenatal test in Australia.

The NNDSS categorises syphilis into syphilis of less than two years duration, syphilis of more than two years or unknown duration, and congenital syphilis. This catergorisation was implemented in 2004 although SA does not conform and reports non-congenital syphilis as infectious syphilis.[30]

### Hepatitis B

The hepatitis B virus (HBV) is transmitted through sexual or blood contact or from mother to child during childbirth. Acute hepatitis B causes inflammation of the liver resulting in nausea, vomiting and jaundice. In the majority of cases, the infection is cleared relatively quickly, although in 5% of adult cases and 80% of perinatal cases, the infection will lead to chronic disease resulting in cirrhosis and potential liver cancer. Since 2000 a hepatitis B vaccine has been incorporated for use in routine immunisations for babies and in a catch up program for high school students. Additionally the immunisation of high risk groups, such as health care workers, inmates and workers of long-term correctional facilities and MSM has also been implemented. This has resulted in decreased hepatitis B infection and decreased hepatic cancers in Australia.[31]

Hepatitis B cases are notified as either newly acquired or unspecified. Newly acquired cases require either that the patient was shown to be negative for the virus in the previous 24 months or the absence of prior evidence of hepatitis B infection. Unspecified infection is based on the detection of the virus that does not meet the criteria for newly acquired infection or where there is no evidence to suggest that the infection is recent (i.e. within the last 24 months). Notifications received from laboratories do not always distinguish between incident cases (newly infected), and those with a chronic infection (who carry the virus from a past infection but have only been recently diagnosed).[32]

**HIV and AIDS**

HIV is the causative agent of AIDS. HIV is transmitted through unprotected sexual contact (vaginal and anal intercourse), direct blood contact (injection drug needles, blood transfusions, accidents in health care settings or certain blood products) and mother to baby (before or during birth, or through breast milk). HIV can also be transmitted through oral sex (mouth-penis, mouth-vagina). HIV attacks the CD4 T-cells of the body and as a result the carrier is open to opportunistic infections, with tuberculosis being the largest killer of AIDS patients worldwide.[33]

**Genital herpes**

Herpes Simplex virus (HSV) is the causative agent of genital herpes and is spread through physical contact including sexual activity. HSV occurs in two types (HSV-1 and HSV-2). Infection generally presents as sores or blisters. Whilst not curative, antiviral drugs can help reduce the duration and severity of symptoms. Once acquired, HSV establishes lifelong infection. HSV-1 is primarily associated with the lips and mouth and HSV-2 remains the predominant viral type causing genital herpes. There is a growing proportion of genital and anal HSV-1 infection, primarily owing to engagement in oral sex.[34-38] In MSM and women, HSV-1 may represent the major cause of first-episode infection.[38]

**Genital warts**

Human Papilloma Virus (HPV) types 6 and 11 are associated with genital warts (while HPV types 16 and 18 are mainly related to cervical cancer). Genital warts are transmitted through sexual contact. Infection is usually asymptomatic, wart development variable and often undetected.[39] However, genital warts remain one of the most commonly reported STIs globally[40,41] and incur large costs to health care systems and to patient quality of life and psychological wellbeing.[41-43]

**Others**

Donovanosis has not been included in this report because the disease is currently well controlled and there are less than 10 cases each year.[44] There are other STIs such as infections with Trichomonas and M. genitalium but data are not available in the NNDSS or any other data sources.

Beside genital warts, HPV also causes cervical cancer, which is presented in the Cancer Chapter.

## 6.2 International comparison

It is estimated that 448 million curable STIs, including chlamydia, gonorrhoea, syphilis and trichomoniasis occur annually worldwide.[45] The rates of chlamydia, gonorrhoea and syphilis in Australia were similar to that for other developed nations such as the United Kingdom and Canada. The United States had markedly higher rates of chlamydia and gonorrhoea (Table 6.1).

**Table 6.1: Notification rates per 100,000 population for bacterial sexually transmissible infections, 2009**

| Country | Chlamydia | Gonorrhoea | Syphilis |
|---|---|---|---|
| Australia[1] | 283 | 37 | 5.8 |
| Canada[2] | 259 | 33 | 5.0 |
| United Kingdom[3] | 351 | 28 | 5.2 |
| United States[4] | 405 | 98 | 4.4 |

Note: Syphilis rates include primary, secondary and early latent stages

Sources: 1 National Centre in HIV Epidemiology and Clinical Research, 2010. HIV, viral hepatitis and sexually transmissible infections in Australia annual surveillance report 2010. NCHECR, The University of New South Wales, Sydney, NSW
2 Public Health Agency of Canada. 2010. 2009 Canadian Sexually Transmitted Infections Surveillance CCD 2010
3 Health Protection Agency 2012. Number and rates of selected STI diagnoses in the UK, 2008-2011. Health Protection Agency, London
4 Communicable Disease Control and Prevention 2012, Sexual Transmitted Disease Surveillance 2011. National Center for HIV/AIDS, Viral Hepatitis, STD and TB prevention, CDC and prevention, Atlanta, Georgia

### Hepatitis B

The global epidemiology of hepatitis B is defined by the presence of hepatitis B surface antigen (HBsAg) in the population. Populations with an HBsAg rate greater than 8% are defined as highly endemic areas. There are many countries in western sub-Saharan Africa that report highly endemic rates among children 5-9 years and adults 19-49 years. The rest of sub-Saharan Africa, East Asia, regions of Latin America and Oceania have high intermediate endemicity levels of 5 to 7%. High income countries within North America and Western Europe are classified as low endemicity with less than 2% HBsAg seroprevalence. Australia, New Zealand and India are classified as low intermediate endemicity with 2 to 3% HBsAg seroprevalence.[46]

### HIV/AIDS

Globally there were 34 million (0.8% of adults aged 15-49 years worldwide) people living with HIV in 2011 and 1.7 million people died of AIDS related illness in 2011.[33] The overall prevalence of HIV and AIDS has increased from 3 million in 1990 to 34 million in 2011. The majority of new HIV infections occur in low to middle income countries, with sub-Saharan Africa accounting for 71% of all new adult and child HIV infections.[33]

The prevalence of HIV in Australia is similar to that of the United Kingdom, Canada and Indonesia, but lower than the United States (Table 6.2).

**Table 6.2: Estimated HIV prevalence among 15 to 49 year olds in selected countries, 2011**

| Country | | Adult 15-49 years % | Lower Estimate Bounds* | Higher Estimate Bounds* |
|---|---|---|---|---|
| Australia | | 0.2 | 0.1 | 0.2 |
| New Zealand | | 0.1 | <0.1 | 0.1 |
| Canada | | 0.3 | 0.3 | 0.4 |
| United Kingdom | | 0.3 | 0.2 | 0.3 |
| United States | | 0.7 | 0.5 | 1.0 |
| Asia | Indonesia | 0.3 | 0.2 | 0.4 |
| | Cambodia | 0.6 | 0.5 | 0.9 |
| Africa | Swaziland | 26.0 | 24.8 | 26.2 |
| | South Africa | 16.6 | 16.6 | 18.1 |

Note: * Lower and higher estimate bounds are the limits of the 95% confidence interval

Source: UNAIDS report on Global AIDS epidemic- 2012. Available at http://www.who.int/gho/publications/world_health_statistics/2012/en/ Accessed 07/02/2013

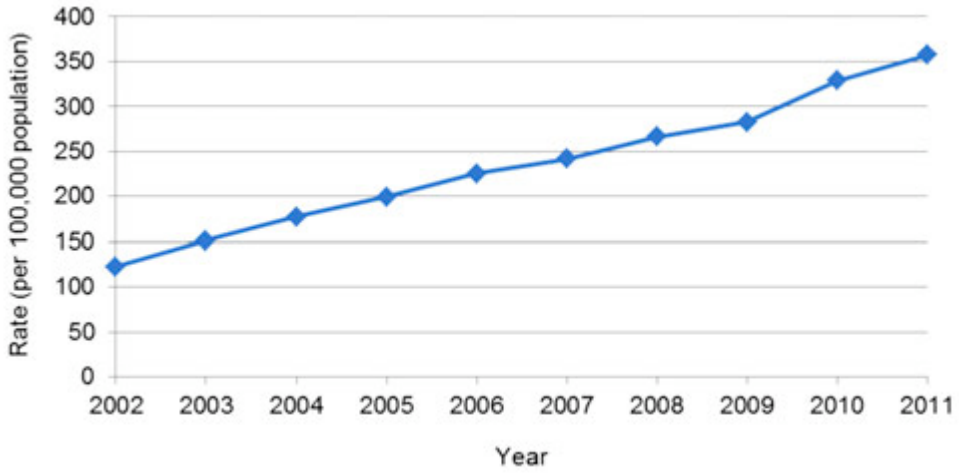
## 6.3 Chlamydia

### 6.3.1 Chlamydia in Australia

Chlamydia is the most common notifiable STI in Australia[7]. Chlamydia notifications increased from 24,400 in 2002 to approximately 80,800 in 2011. The notification rate increased from 122 per 100,000 population in 2002 to 358 per 100,000 population in 2011 (Figure 6.1).

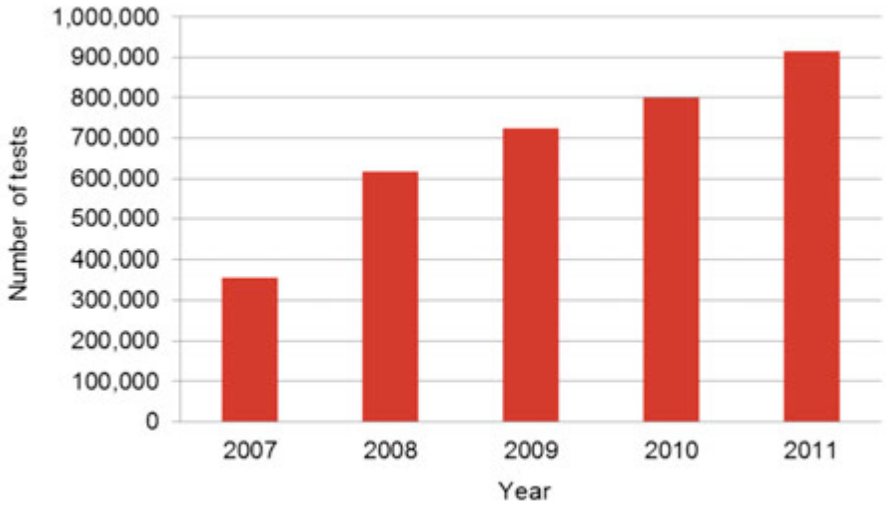
MBS claims for chlamydia testing also increased from around 350,000 in 2007 to approximately 910,000 in 2011 (Figure 6.2).

**Figure 6.1: Chlamydia notification rate in Australia, 2002 to 2011**




Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

**Figure 6.2: MBS claims for Chlamydia testing in Australia, 2007 to 2011**

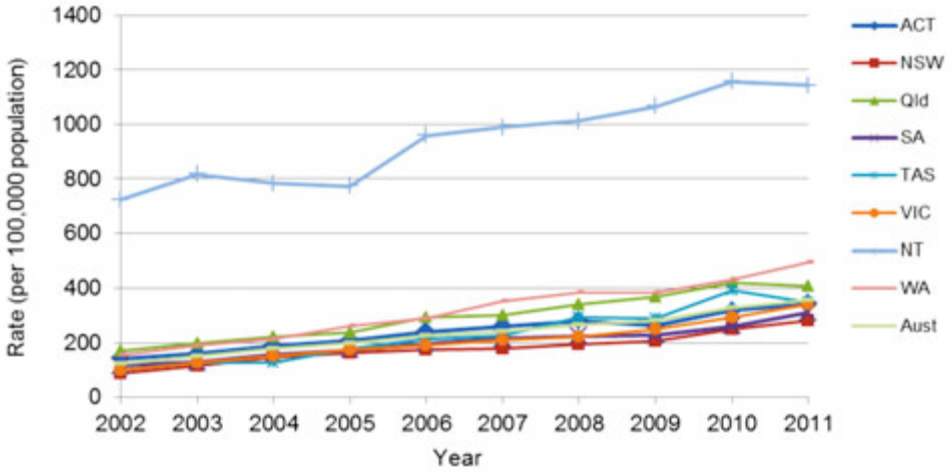



Note: MBS items 69316, 69317 and 69319
Source: Online Medicare Benefits Schedule Item Reports, Medicare Australia

## 6.3.2 Chlamydia by state and territory

Chlamydia notification rates increased in all states and territories from 2002 to 2011 (Figure 6.3) and were consistently highest in the NT. In 2011, the NT chlamydia notification rate was 1,142 per 100,000 population, more than three times the national average of 358 per 100,000 population.

**Figure 6.3: Chlamydia notification rate by state and territory, 2002 to 2011**

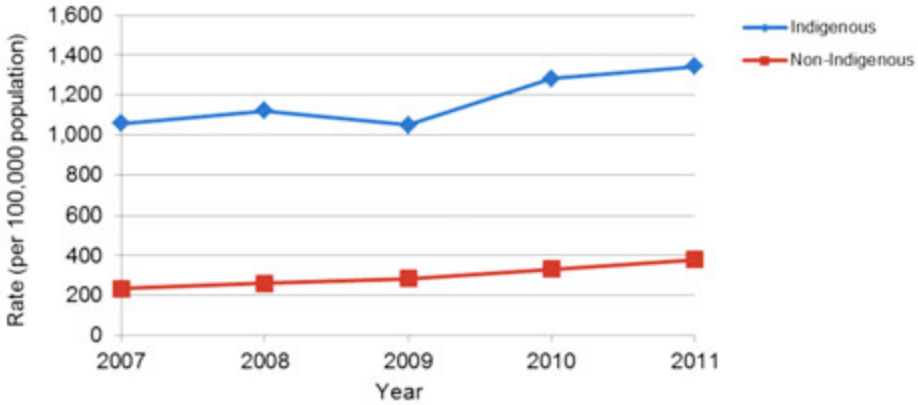



Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

## 6.3.3 Chlamydia by Indigenous status

Chlamydia notification rates are higher in the Indigenous population than in the non-Indigenous population (Figure 6.4). In 2011, the chlamydia notification rate among Indigenous people was 1,342 per 100,000 population, 3.6 times the rate among non-Indigenous people of 378 per 100,000 population.

**Figure 6.4: Chlamydia notification rate by Indigenous status, 2007 to 2011**




Note: Includes data from jurisdictions where reporting of Aboriginal status was greater than 50% complete: NT, SA, TAS, VIC, WA
Source: NCHECR. HIV, viral hepatitis and sexually transmissible infections in Australia, Annual Surveillance Report 2012. National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW

### 6.3.4 Chlamydia by age group and gender

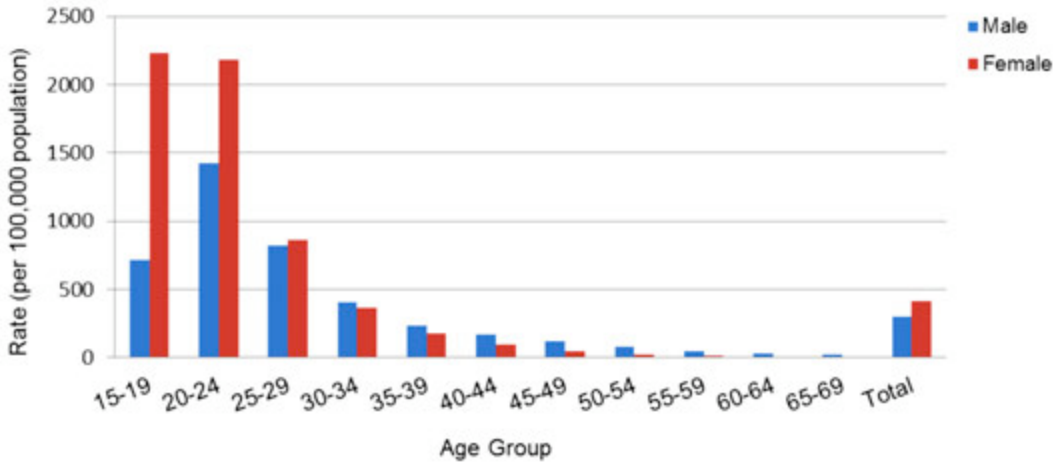
In 2011, the majority of chlamydia notifications were for young people aged 15-19 years (27% of all notifications), 20-24 years (37%) and 25-29 years (18%). Notification rates were also highest in these age groups (1,455 per 100,000 population for age group 15-19 years, 1,796 per 100,000 population for age group 20-24 years and 843 per 100,000 population for age group 25-29 years).[47]

Notification rates were higher among women compared to men in those aged 30 and under. In 2011 the notification rate for females in the 15-19 age group was 2,231 per 100,000 population, three times that for males of 716 per 100,000 population (Figure 6.5). This observed difference in notification rates among young males and females is likely due to increased chlamydia testing and increased opportunity for chlamydia screening in young women compared to young men.[48]

In contrast, among people aged 30 or older, men had similar or higher rates of notification than women. Men aged 30-34 years had a slightly higher rate than women (405 per 100,000 population and 363 per 100,000 population, respectively) (Figure 6.5).

Chlamydia notification rates have increased in all age groups with the highest rate of increase seen in the younger age groups. Notifications within the 20-24 age group increased from 458 per 100,000 population in 2002 to 1,425 per 100,000 population in 2011.

**Figure 6.5: Chlamydia notification rate by age group and gender, Australia, 2011**




Source: Communicable Disease Surveillance Online Dataset, National Notifiable Disease Surveillance System 2012, Commonwealth Department of Health and Ageing. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm.

## 6.4 Gonorrhoea

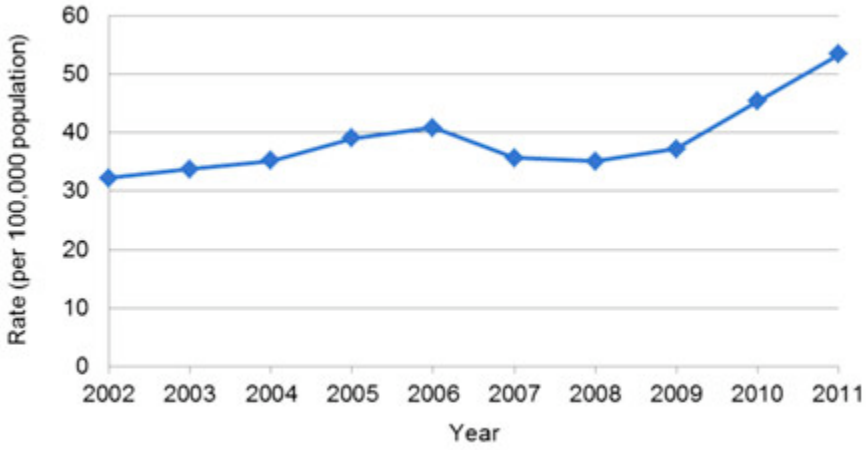
### 6.4.1 Gonorrhoea in Australia

The number of notified cases of gonorrhoea almost doubled from approximately 6,400 in 2002 to 12,086 in 2011.[46] Notification rates fluctuated between 30 and 40 per 100,000 population between 2002 and 2009 and then increased to approximately 53 per 100,000 population in 2011 (Figure 6.6). This increase has been attributed to an increasing rate of rectal gonorrhoea in the MSM community.[7,49]

### 6.4.2 Gonorrhoea by state and territory

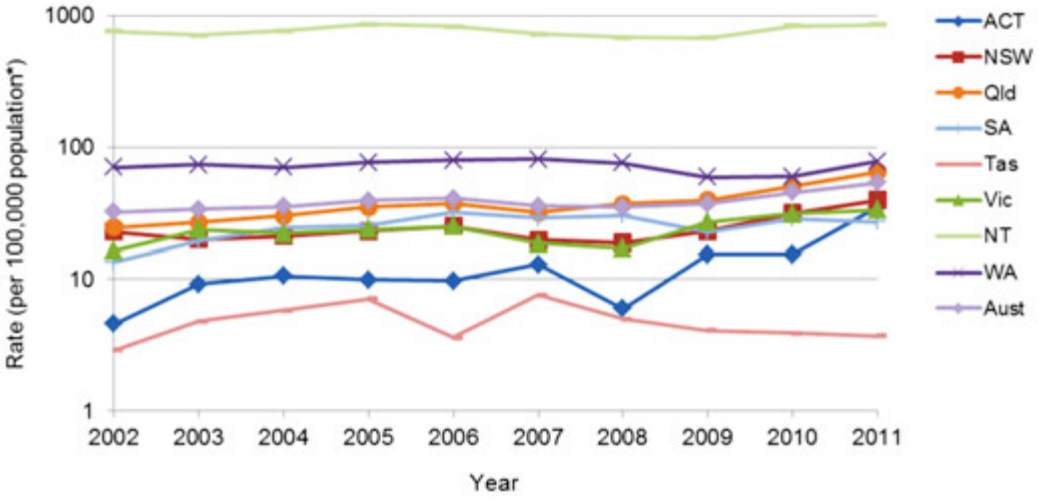
The NT consistently had the highest rates of gonorrhoea. In 2011, the notification rate in the NT was 849 per 100,000 population compared to 53 per 100,000 population for Australia (Figure 6.7).

**Figure 6.6: Gonorrhoea notification rate in Australia, 2002 to 2011**




Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

**Figure 6.7: Gonorrhoea notification rate by state and territory, 2002 to 2011**

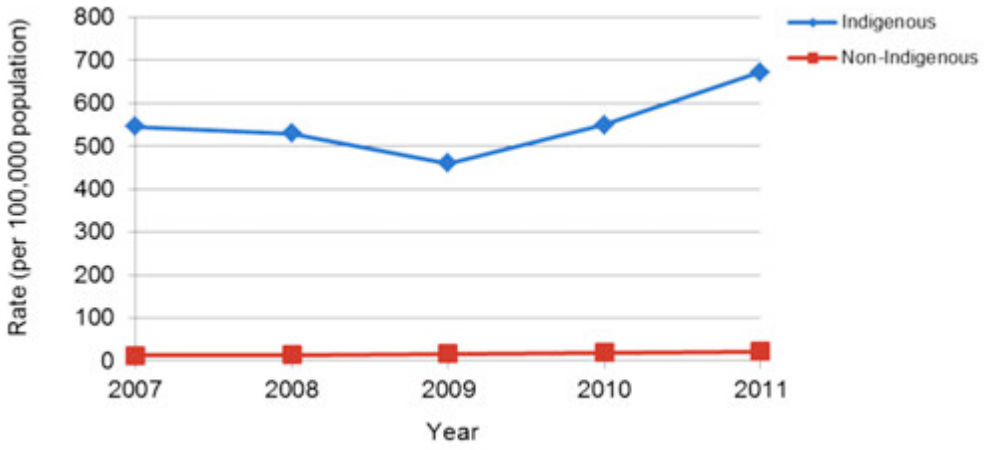



Note: *Y axis plotted on logarithmic scale
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm. Accessed 14/01/201

### 6.4.3 Gonorrhoea by Indigenous status

Indigenous people have a much higher rate of gonorrhoea notifications than non-Indigenous people (673 per 100,000 compared to 22 per 100,000 in 2011) (Figure 6.8).

**Figure 6.8: Gonorrhoea notification rate by Indigenous status, 2007 to 2011**



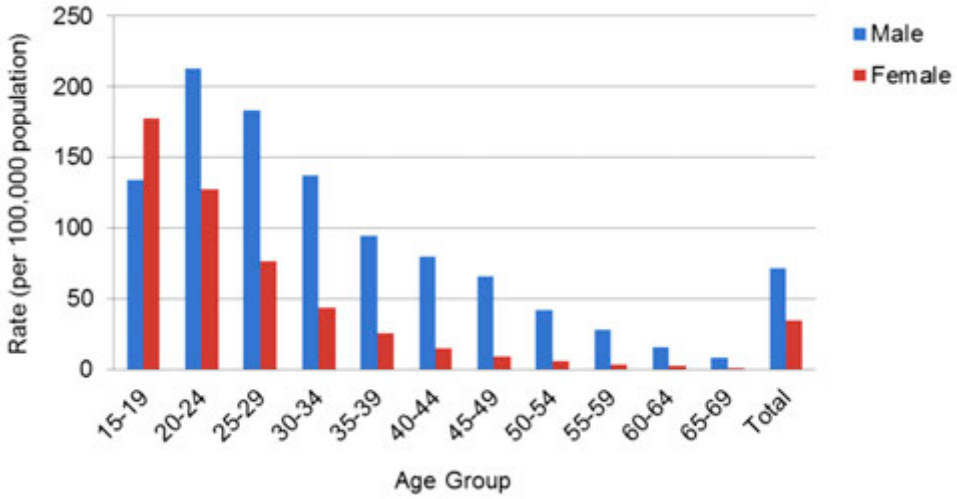

Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

### 6.4.4 Gonorrhoea by age group and gender

Gonorrhoea notification rates were higher among younger people. Among people aged 15-19 years, females had a higher rate (178 per 100,000 population) than males (134 per 100,000 population) (Figure 6.9).

After the age of 20, rates were higher in males compared to females. For example, the rate in the 20-24 age groups for males was 213 per 100,000 population, almost double the rate for females (127 per 100,000 population).

**Figure 6.9: Gonorrhoea notification rate by age group and gender, 2011**



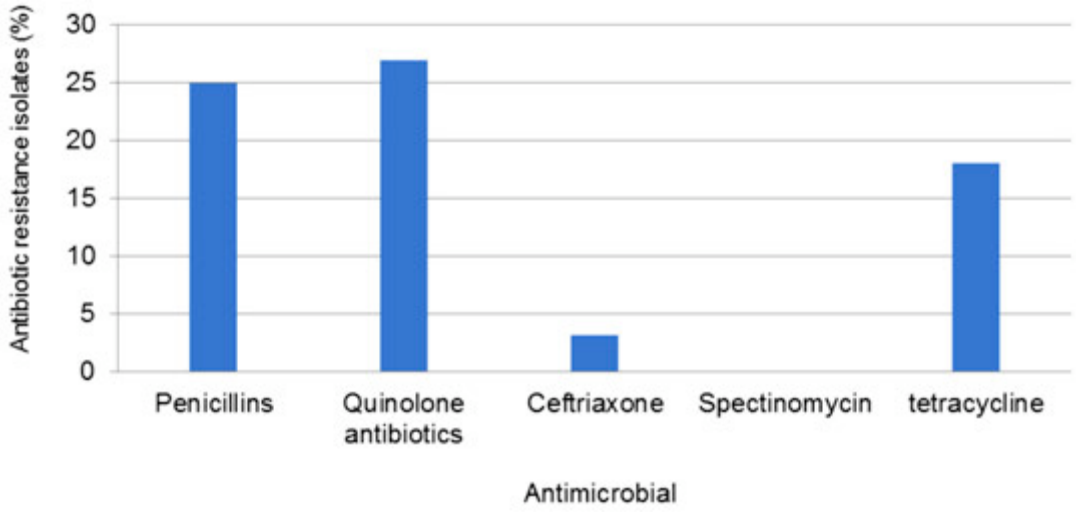

Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm.

### 6.4.5 Gonococcal resistance to treatment

The increased rate of Gonococcal infections globally and the wide availability of treatment since the 1930s has resulted in the development of antimicrobial resistance in N. gonorrhoeae. In Australia, treating and managing gonorrhoea has been based on a single regime which is 95% effective.[50] However, treatments have changed in response to the resistance to penicillin, quinolones, cephalosporin and more recently, ceftriaxone, a third-generation cephalosporin antibiotic.

The Australian Gonococcal Surveillance Program has monitored the percentage of isolates that exhibit resistance to multiple antibiotics since 1981. Resistance to penicillin fell from 29% in 2010 to 25% in 2011 and quinolone antibiotic resistance fell from 35% in 2010 to 27% in 2011. Ceftriaxone resistance, currently the recommended first-line treatment for gonorrhoea,[51] has decreased from 5% in 2010 to 3% in 2011. Resistance to tetracyclines, has decreased from 21% in 2009 to 18% in 2010 (Figure 6.10).

**Figure 6.10: Gonorrhoea antibiotic resistance isolates, 2010**




Source: The Australian Gonococcal Surveillance Programme. Annual Report of the Australian Gonococcal Surveillance Programme, 2011 Commun Dis Intell 2012; 36:2 166-173 [50]

## 6.5 Syphilis

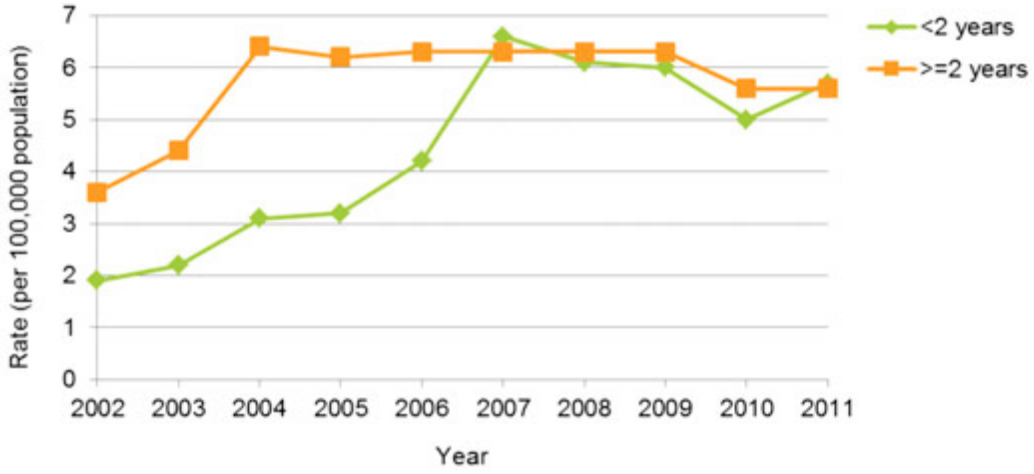
Since 2004 the Australian National Notifiable Disease Surveillance System (NNDSS) has reported syphilis using three categories: syphilis of less than two years duration; syphilis of greater than two years or unknown duration; and congenital syphilis.

### 6.5.1 Syphilis in Australia

#### Syphilis less than two years duration

From 2004 to 2011, the notification rate of syphilis of less than two years duration was less than 10 per 100,000 population (Figure 6.11). There was an increase from 2005 to 2007 which corresponded to syphilis notifications from laboratories becoming mandatory in 2006.[47,52]

**Figure 6.11: Syphilis notification rate in Australia, 2002 to 2011**




Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

#### Syphilis greater than two years duration or unknown duration

The rate of syphilis greater than two years duration was below 10 per 100,000 population throughout the period of 2004 to 2011 (Figure 6.11).

#### Congenital syphilis

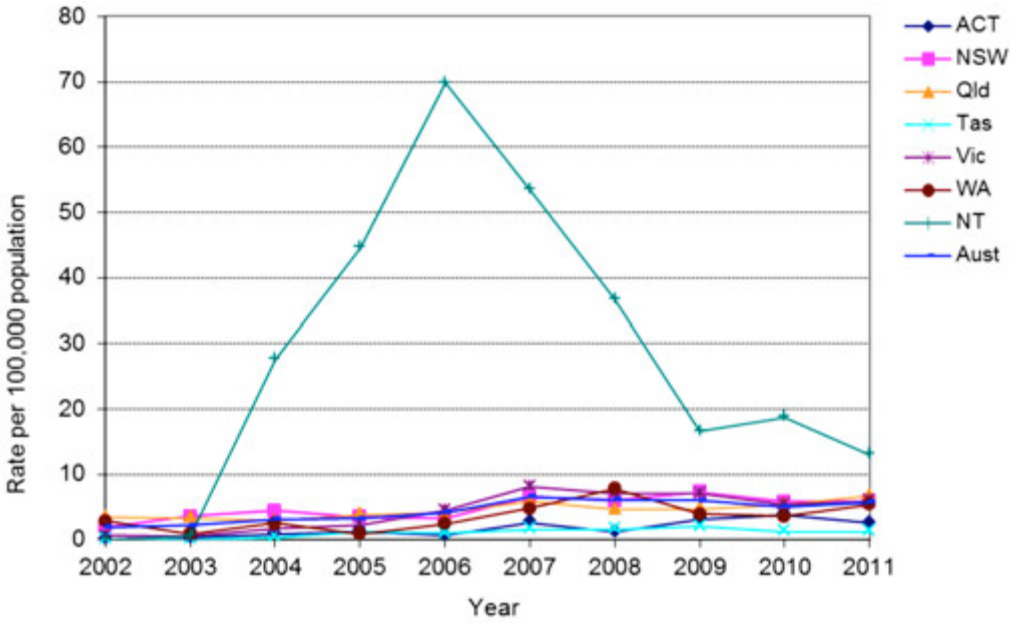
Congenital syphilis is a rare condition in Australia, with only seven notifications in 2011.[47] From 2002, congenital syphilis notifications have decreased to a rate of <0.1 per 100,000 population. Between 2002 to 2011, the NT had the highest rate of congenital syphilis with 13 notifications (6.5 per 100,000 population) in 2002 and zero in 2011.[47]

### 6.5.2 Syphilis by state and territory

#### Syphilis less than two years duration by state and territory

From 2004 to 2011, the NT had consistently higher syphilis notification rates than in other states and territories (Figure 6.12). The introduction of mandatory notifications in 2006 and increased screening in Aboriginal communities saw the syphilis notification rate peak at 70 per 100,000 population in 2006 but decreased to 13 per 100,000 population in 2011, despite increased syphilis testing,[52] indicating a decrease in syphilis prevalence.

**Figure 6.12: Syphilis < 2 years notification rate by state and territory, 2002 to 2011**

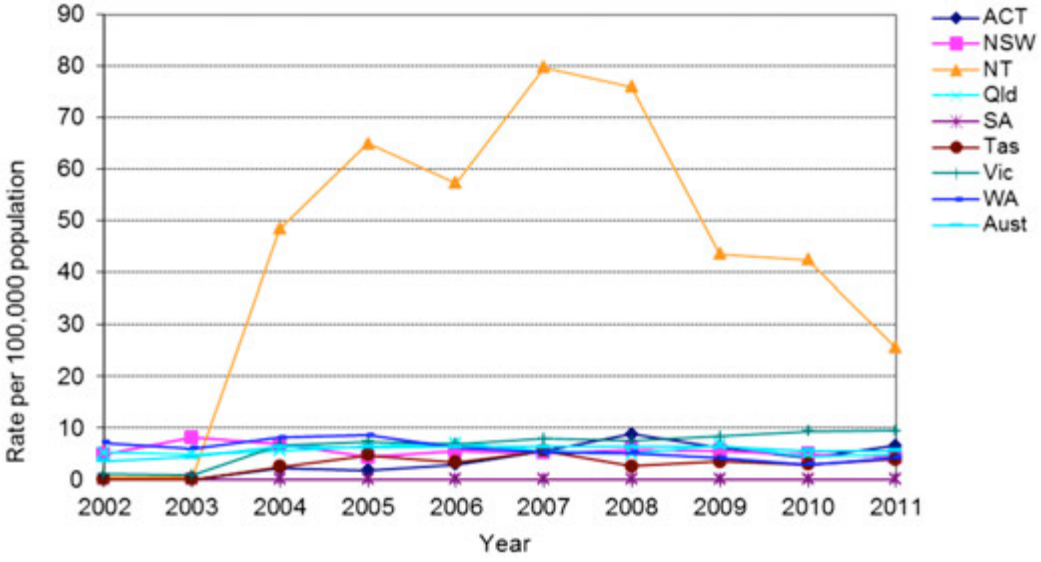



Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Syphilis greater than two years duration by state and territory

The NT had consistently higher rates of syphilis greater than 2 years duration than other states and territories, with a peak of 80 per 100,000 population in 2007 (Figure 6.13). The rate of syphilis in the NT decreased to 26 per 100,000 population in 2011.

**Figure 6.13: Syphilis >2 years notification rate by state and territory, 2002 to 2011**

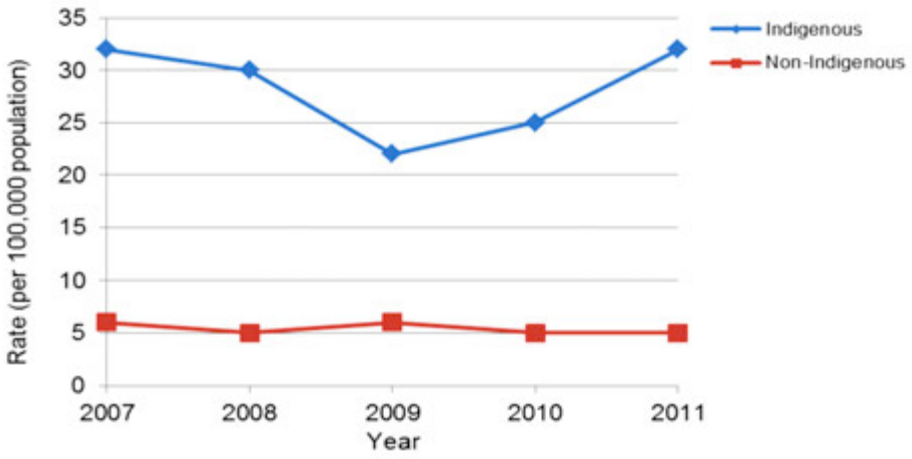



Note: National rate does not include South Australia, as South Australia does not report on Syphilis >2yrs duration
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

## 6.5.3 Syphilis by Indigenous status

The notification rate was higher among the Indigenous population compared to the non-indigenous population (Figure 6.14). In 2011 the syphilis notification rate in Indigenous people was 32 per 100,000 population compared to only 5 per 100,000 population in non-Indigenous people.

**Figure 6.14: Syphilis notification rate by Indigenous status, 2007 to 2011**




Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

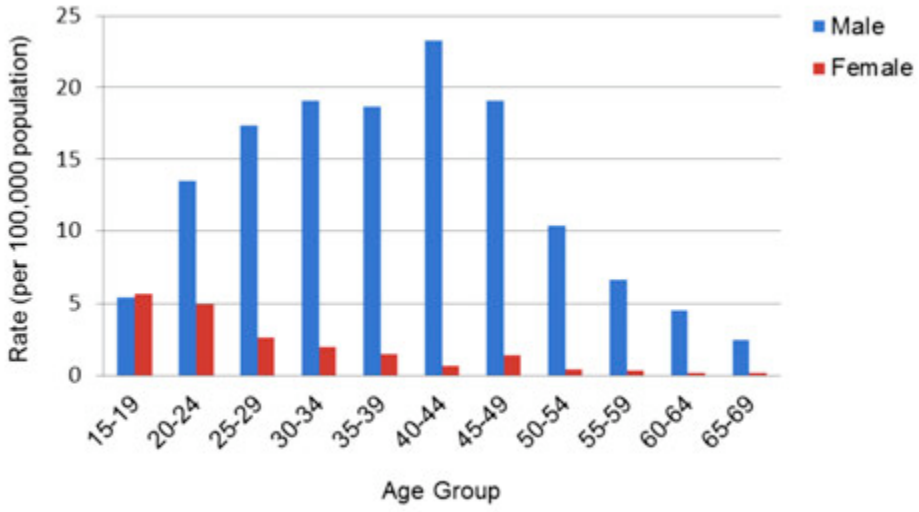
## 6.5.4 Syphilis by age group and gender

### Syphilis less than two years duration by age group and gender

The number of notifications for syphilis less than two years duration was highest in those aged 40-44 years (190 notifications and a rate of 12 per 100,000 population in 2011).[47]

The majority of notifications were in males (86% in 2011).[47] Among males, the rates generally increased up to age 40 to 44 and then decreased. In contrast, the notification rate in females was highest in the 15-19 age group (6 per 100,000 population) and then decreased with increasing age (Figure 6.15).

**Figure 6.15: Syphilis <2 years notification rate by age group and gender, 2011**

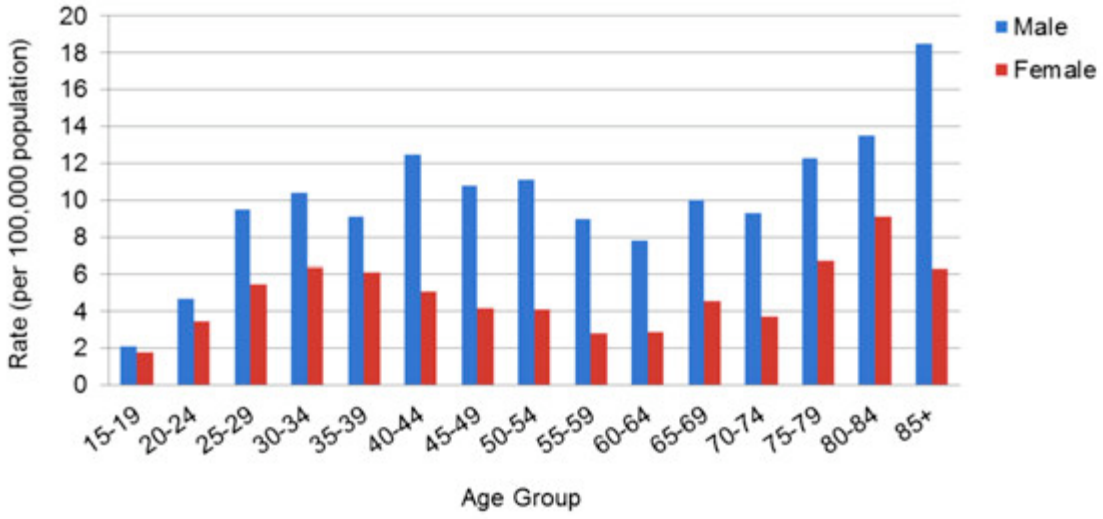



Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

**Syphilis greater than two years duration or unknown duration by age group and gender**

In 2011, notification rates of syphilis greater than two years or of unknown duration were higher in older age groups, with the 80-84 age group having the highest rate of 11 per 100,000 population.[47] Sixty six percent of all notifications were attributable to males.[47] The trends in age specific rates with increasing age were similar for males and females. The rates increased from the 15-19 age group to the 40-44 age group, and then decreased up to the 60-64 age group and increased again to the 80-84 age group (Figure 6.16). Despite the rates being highest in the older age groups, the absolute notification numbers are small with 49 notifications in the 80-84 age group in 2011, while the 40-44 age group had 141 notifications.[47]

**Figure 6.16: Syphilis >2 years notification rate by age group and gender, 2011**




Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

## 6.5.5 Syphilis infection among men who have sex with men (MSM)

Syphilis in MSM was nearly eliminated concomitant with widespread behavioural changes to control the AIDS epidemic in the 1980s and 1990s.[53] However, since the late 1990s infection has begun to re-establish, with increases in infection rates most notable in NSW and Victoria.[54]

Some increase in syphilis rates in MSM is attributed to the impact of more frequent testing, however, the increases have been shown to independently reflect increased transmission, with infection more prevalent in men with higher numbers of sexual partners and casual sexual partners, who were HIV positive or had higher rates of recreational drug use.[54,55] HIV positive MSM are over-represented in syphilis notifications, but the reasons for this are unclear and lower immunity owing to HIV infection does not seem to be the primary explanation.[53,54]

Alternatively, unsafe sex practices among identifying HIV positive men may increase the likelihood of syphilis transmission,[53] but a parallel concern is the effect of syphilis infection on HIV transmission. Syphilis may have the potential to increase the likelihood of HIV infection through tissue damage from syphilis ulcers and biochemical mechanisms.[56]

## 6.6 Hepatitis B

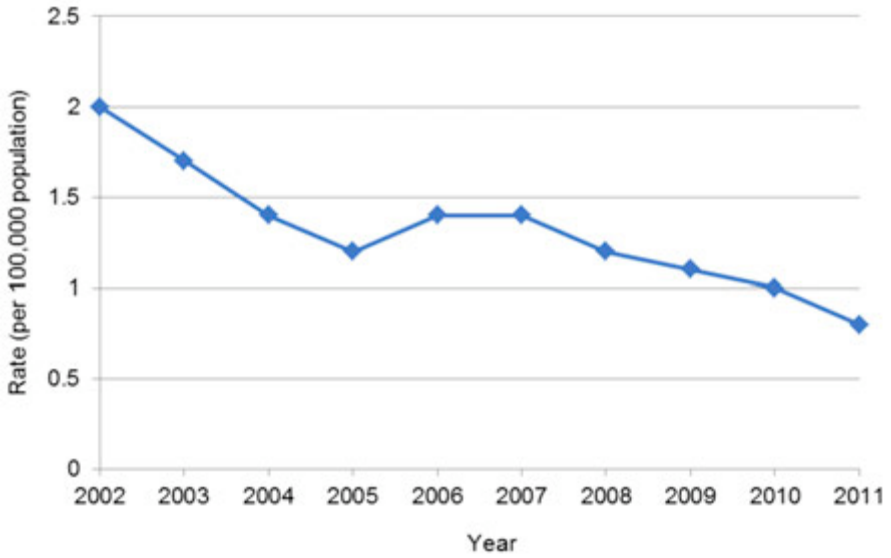
### 6.6.1 Hepatitis B in Australia

Hepatitis B cases are notified as either newly acquired or unspecified. Newly acquired cases require either that the patient was shown to be negative for the virus in the previous 24 months or the absence of prior evidence of hepatitis B infection. Unspecified infection is based on the detection of the virus that does not meet the criteria for newly acquired infection or where there is no evidence to suggest that the infection is recent (i.e. within the last 24 months). Notifications received from laboratories do not always distinguish between incident cases (newly infected), and those with a chronic infection (who carry the virus from a past infection but have only been recently diagnosed).[32]

Hepatitis B (newly acquired) notification rates from 2002 have decreased, from a rate of 2 notifications per 100,000 population (394 total notifications) in 2002 to 0.8 per 100,000 population (192 total notifications) in 2011 (Figure 6.17).

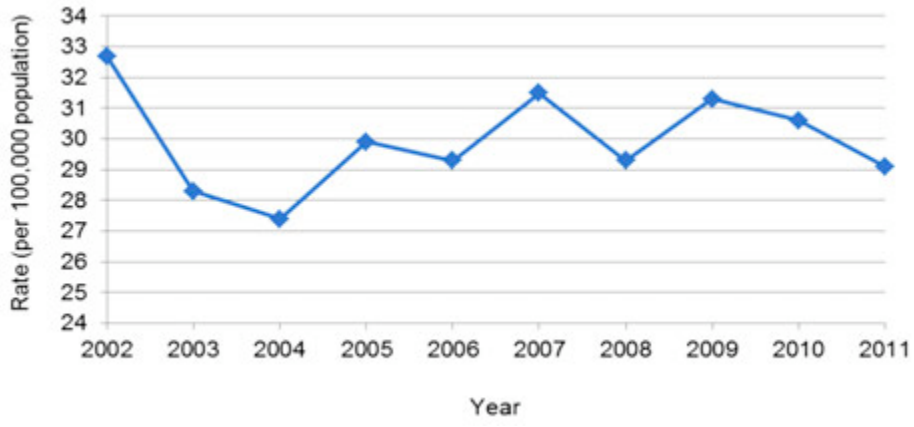
Hepatitis B (unspecified) notification rates from 2002 to 2004 exhibited a decrease from 33 per 100,000 population to 27 per 100,000 population. Since 2004 the rates have fluctuated between 29 per 100,000 population to 31 per 100,000 population and in 2011 a rate of 29 per 100,000 population was observed (Figure 6.18).

**Figure 6.17: Hepatitis B (newly acquired) notification rate in Australia, 2002 to 2011**




Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales. Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset.

**Figure 6.18: Hepatitis B (unspecified) notification rate in Australia, 2002 to 2011**



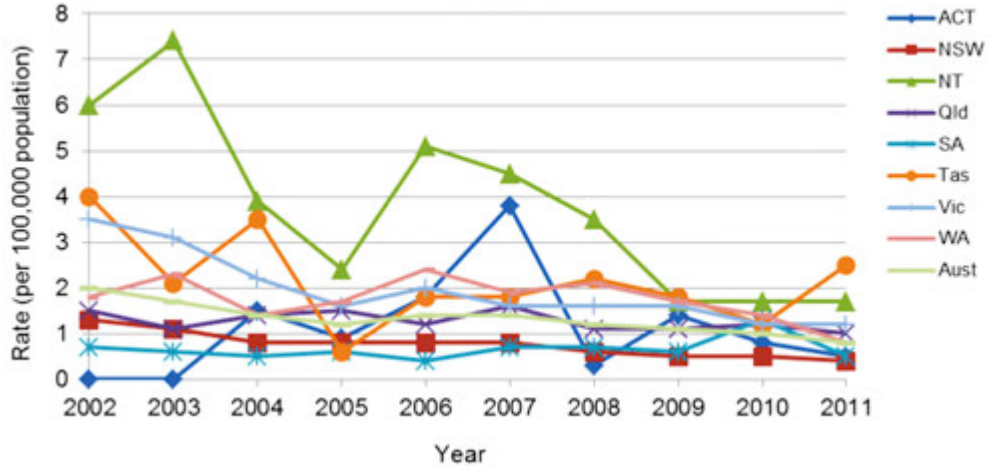

Note: Pre 2005 the NT did not report Hepatitis B (unspecified)
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.6.2 Hepatitis B by state and territory

### Hepatitis B (newly acquired) by state and territory

The notification rates of hepatitis B (newly acquired) in the NT were above the national rate for the period 2002 to 2011, with rates 3 times the national rate of 6 per 100,000 population in 2002 (Figure 6.19). The NT rate of hepatitis B (newly acquired) has decreased from 2006 and reached a rate of 1.7 per 100,000 population in 2011, whilst the national rate remained lower at 0.8 per 100,000 population.[47] VIC and TAS consistently exhibited rates of hepatitis B (newly acquired) above the national rate.[47]

**Figure 6.19: Hepatitis B (newly acquired) notification rate by state and territory, 2002 to 2011**

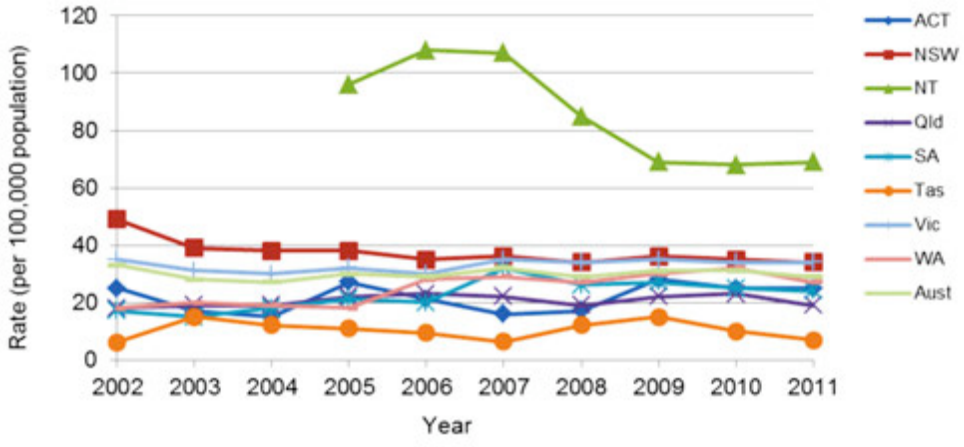



Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Hepatitis B (unspecified) by state and territory

The NT began recording hepatitis B (unspecified) notifications in 2005 and has exceeded the national rate since. In 2007, rates reached 108 per 100,000 population, and these rates have decreased to 69 per 100,000 population in 2011 (Figure 6.20). In addition to the NT, NSW and VIC are the only two states to be above the national rate for hepatitis B (unspecified) throughout 2002 to 2011.

**Figure 6.20: Hepatitis B (unspecified) notification rate by state and territory, 2002 to 2011**

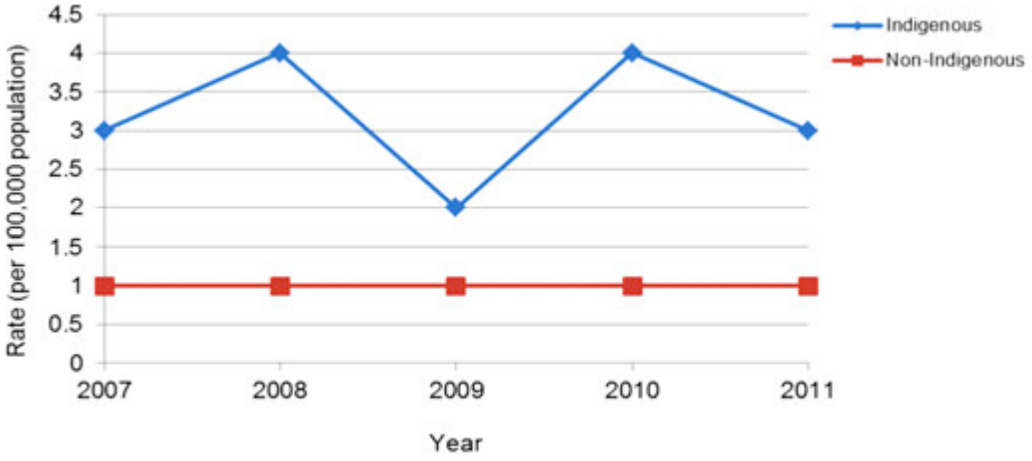



Notes: NT began reporting unspecified Hepatitis B in 2005
Australian rate began recording in 2005 due to the introduction of notifications from the NT
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales.
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.6.3 Hepatitis B by Indigenous status

Newly acquired hepatitis B rates in the Indigenous population remain higher than in the non-Indigenous population (Figure 6.21).

**Figure 6.21: Newly acquired hepatitis B notification rate by Indigenous status, 2007 to 2011**



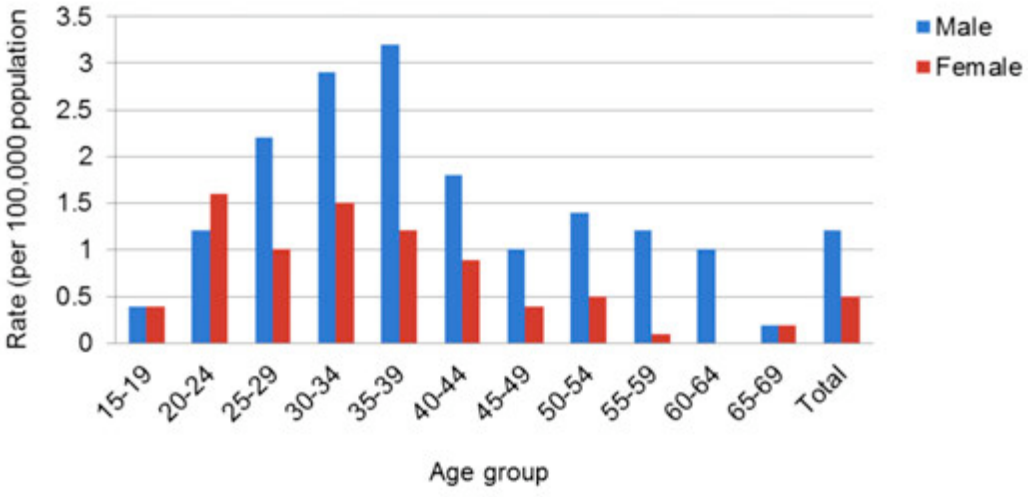

Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012 The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

## 6.6.4 Hepatitis B by age group and gender

### Hepatitis B (newly acquired) by age group and gender

People aged 30 to 39 had the highest hepatitis B (newly acquired) notification rate in 2011 with a rate of 2.2 per 100,000 population and among those aged 35-39, the rates among males was 2.7 times that of females (Figure 6.22). From 2002 to 2011 notification rates have decreased in all age groups under 50 with the 20-24 age group (5.5 to 1.4 per 100,000) and the 25-29 age group (5.3 to 1.6 per 100,000) showing the most dramatic decreases.[47] In all age groups other than 20-24, males had higher rates than females in 2011 and a male to female ratio of 1.9:1 was recorded in 2010.[30] This pattern has been consistent each year from 2002 to 2011.[47]

**Figure 6.22: Hepatitis B (newly acquired) notification rate by age group and gender, 2011**

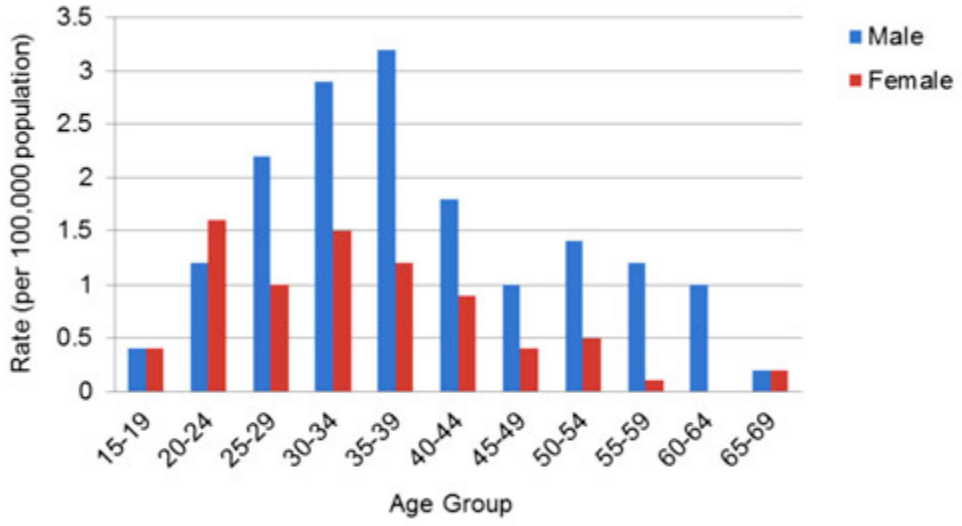



Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Hepatitis B (unspecified) by age group and gender

In 2011, the highest hepatitis B (unspecified) notification rate among males was in the 30-34 age group (66 per 100,000) (Figure 6.23). The highest rate among females was in the 25-29 age group (70.7 per 100,000 population).

**Figure 6.23: Hepatitis B (unspecified) notification rate by age group and gender, 2011**



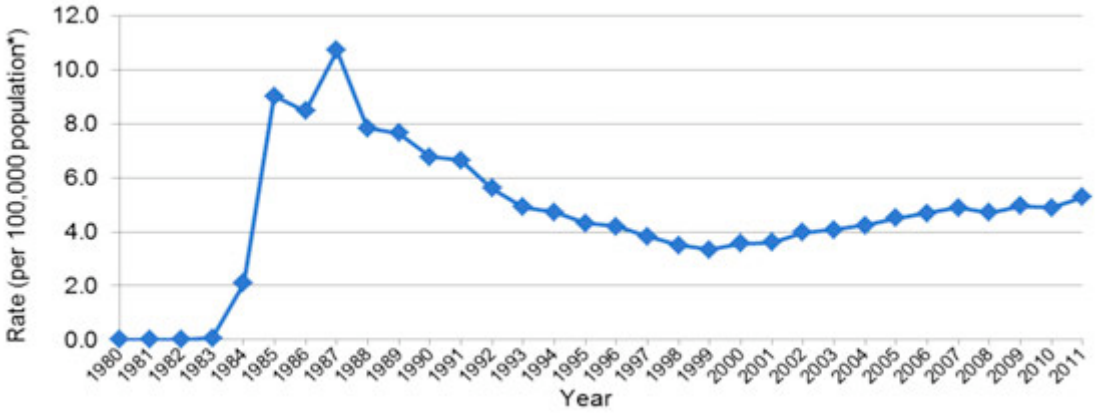

Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.7 HIV and AIDS

### 6.7.1 HIV in Australia

HIV has been relatively well controlled in Australia (Table 6.2) since its emergence in the early 1980s and at its peak in 1987 (2035 cases). From 1987 to 1999 HIV notifications have decreased from 11 to 3.3 per 100,000 population, but from 1999 there has been an increase reported in 2011 with 5.3 HIV notifications per 100,000 population (Figure 6.24).

**Figure 6.24: HIV notification rate in Australia, 1980 to 2011**



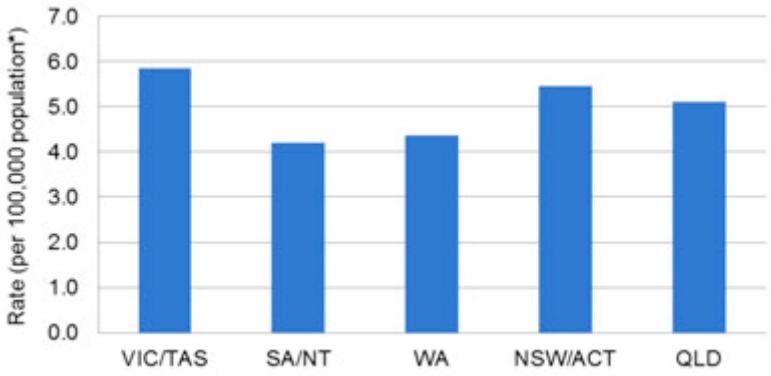

Note: Crude rate determined using ABS 2011 census
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### 6.7.2 HIV by state and territory

Fifty three percent of all HIV notifications from 1980 to 2011 were in NSW and the ACT (the ACT is grouped with NSW due to small numbers of notifications in the ACT).[10]

However, in 2011 VIC and TAS (TAS is grouped with VIC due to small numbers of notifications in TAS) had the highest rate of HIV notifications with a rate of 5.9 per 100,000 population (Figure 6.25).[7]

**Figure 6.25: HIV notification rate by state and territory, 2011**

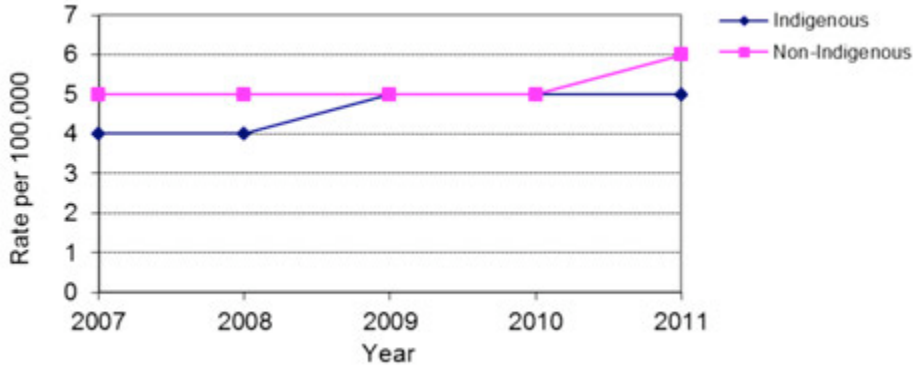



Notes: Crude rate determined using ABS 2011 census figures
Due to small number of diagnosis, Australian Capital Territory has been grouped with New South Wales, Tasmania has been grouped with Victoria and NT has been grouped with South Australia
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.7.3 HIV by Indigenous status

Notification rate of HIV among Indigenous people is very similar to that of non-Indigenous people (5 vs. 6 per 100,000 population in 2011 (Figure 6.26).

**Figure 6.26: HIV notification rate by Indigenous status, 2007 to 2011**



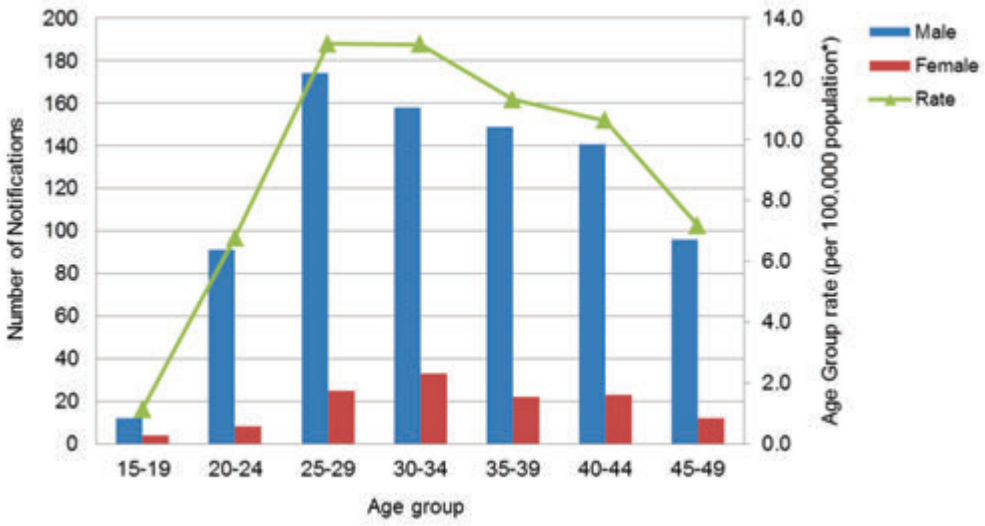

Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

## 6.7.4 HIV by age group and gender

In 2011, 87% of all HIV notifications were males, 12% were females and less than 1% were transgender.[10] The HIV rate was 9.3 per 100,000 males and 1.3 per 100,000 females.

HIV is most common among the age groups 25-29 years and 30-34 years (13 per 100,000 population). In all age groups, the majority of cases are men. For instance, among the 199 cases in the age group 25-29 years, 174 cases were males (87%) (Figure 6.27). The higher rate among males reflect the high rates of transmission in MSM.[7]

**Figure 6.27: HIV notifications by age group and gender, 2011**

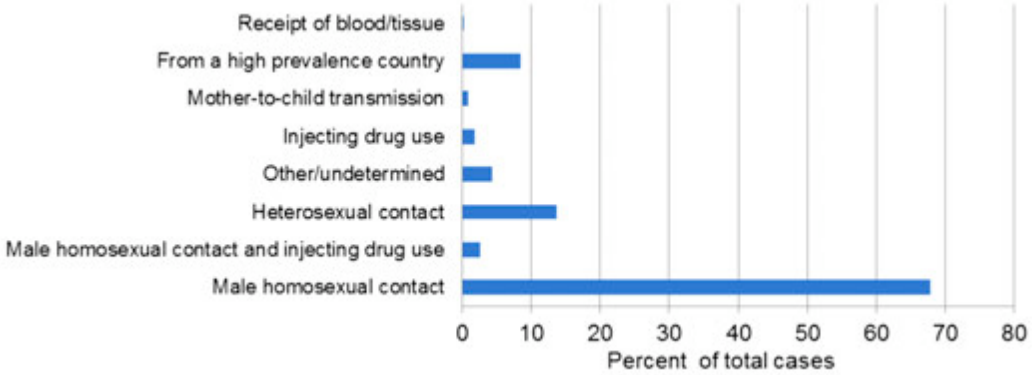



Note: Age specific rate using ABS 2011 Census
Source: Australian HIV Public Dataset from the Kirby Institute, University of New South Wales.
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.7.5 HIV and mode of transmission

The most common mode of HIV transmission reported in Australia during 1980 to 2011 was between MSM (65% of all notifications). The percentage of notifications reporting this form of transmission was 68% in 2011.[10] Heterosexual contact accounted for 14% of HIV notifications, an increase from 1980 to 2010, where heterosexual contact accounted for 9% of HIV notifications, consistent with the increases of heterosexual HIV transmission in Australia.[57] Australia has low mother to child transmission, with less than 1% of HIV notifications since 1980 (10 cases reported in 2011).[10] Injecting drug use accounted for 2% of HIV notifications in 2011 while male homosexual contact and injecting drug use category accounted for 3%. This was similar to the percentage attributable to the injecting drug use and male homosexual contact and injecting drug use categories from 1980 to 2010. The mode of transmission category from a high prevalence country accounted for 8% of HIV notifications in 2011 (Figure 6.28), a 100% increase from the 4% it was attributable for between 1980 to 2010.[10]

**Figure 6.28: HIV notifications by mode of transmission, 2011**

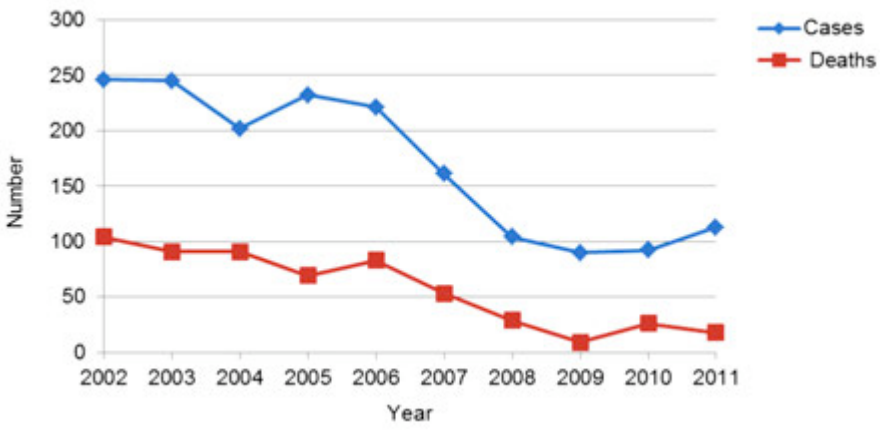



Source: Australian HIV Public Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## 6.7.6 AIDS cases and AIDS-related deaths in Australia

In 2002, there were 246 cases of AIDS diagnosed and 104 AIDS-related deaths.[58] Since 2002, there has been a decrease in both the number of AIDS cases and AIDS related deaths (Figure 6.29), with 113 cases and 18 AIDS - related deaths in 2011.[59-62] The most pronounced decrease occurred during 2006 to 2009 where levels fell from 161 cases and 53 deaths to 90 cases and 9 deaths. There has been a slight increase since 2009 with 113 cases and 18 deaths in 2011. The decrease that occurred has been attributed to an increase in access and use of antiretroviral treatment.[63]

**Figure 6.29: AIDS diagnoses and deaths, 2002 to 2011**




Note: From 2008 NSW AIDS cases and deaths are not included
Sources: Data from 2002 to 2007 the National Centre in HIV epidemiology and Clinical Research. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009. NCHER, The University of New South Wales, Sydney, NSW. Data post 2007 was accessed via the Kirby Institute Australian HIV Surveillance Reports (Quarterly), University of New South Wales, Sydney, NSW
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Surveillance-Reports-(Quarterly)

## 6.8 Genital herpes

In an Australia-wide, population-based study of HSV-1 and HSV-2, seroprevalence on 4,000 people,[64] 76% had antibodies to HSV-1 and the prevalence was highest in those aged 65 to 74 years (85%). Women also had significantly higher prevalence than men (80% compared to 71%). The estimate of adult seroprevalence of HSV-2 was 12%. Females had twice the rate of HSV-2 than males (16% compared to 8%), and the prevalence was highest among 35 to 44 year olds. HSV-2 rates were lower for adults living in rural and remote areas (9%) than those in metropolitan areas (15%). Indigenous people had higher seroprevalence than non-Indigenous people (18% compared to 12%).

While there have been no population-based studies conducted in younger people in Australia (e.g. under 25 year olds), international research indicates that while HSV-2 infection is uncommon in people younger than 15 years, seroprevalence increases rapidly from mid-teens to mid-twenties.[36] High rates of infection have been reported in MSM, with HIV-positive men having almost twice the prevalence of HSV-2 than HIV-negative men.[67]

## 6.9 Genital warts

The prevalence of people diagnosed with genital warts was around 1% and the incidence rate is 2.5 cases per 1,000 population.[65,66] In young people aged 20 - 29 years, the prevalence can be as high as 14% and the incidence rates are 6.8 per 1,000 in men and 6.5 per 1,000 in women.[64-67] The proportion of people ever being diagnosed with genital and/or anal warts was 4% for males and 4.4% for females.[68] Risk factors include having a greater number of sexual partners, smoking and living in a rural area.[69-71] Sustained condom use is significantly associated with reducing the incidence of genital warts.[72]

Human papillomavirus (HPV) types 6 and 11 cause 90% of all genital warts cases.[72] In 2007, a quadrivalent HPV vaccine was introduced in Australia which covers both HPV types 6 and 11 as well as HPV types 16 and 18, the most common cause of cervical cancer. Originally the HPV vaccine program included free vaccination to school age girls and a catch-up program for all women up to 27 years old. Australia's current coverage of HPV vaccine includes all females and males 12 - 13 years old receiving the vaccine at school, as well as a catch-up program for all 14 and 15 year olds. The Genital Warts Surveillance Network is currently tracking the progress of the HPV vaccine and has found that the national schools-based program had coverage rates of 66 to 73%[73,74] with a decrease in people presenting with genital warts to sexual health clinics from 12% in July to December 2007 to 5% in July to December 2009.[74] Immunisation with the quadrivalent HPV vaccine is expected to further reduce the incidence of genital warts.[39,66,75]

## 6.10 Discussion

### 6.10.1 International comparison

Australia has similar rates of chlamydia, gonorrhoea and HIV infection to other developed countries but much lower rates than the United States. The higher prevalence of chlamydia and gonorrhoea infections in the US could be attributed to its larger MSM population (3.9% to 6.4% of the adult male population)[76,77] than in Australia (1.6% of the adult male population).[78] MSM have been shown to have high risk sexual practices.[79]

In comparison to other high income countries (particularly North America), Australia has a higher seroprevalence of hepatitis B, likely due to the high levels of hepatitis B in Indigenous people as well as high levels in migrants from highly endemic countries, particularly China, Hong Kong, Fiji and Indonesia.[80]

### 6.10.2 Chlamydia

The chlamydia notification rate increased from 122 per 100,000 in 2002 to 242 per 100,000 population in 2007, when chlamydia testing was listed on the MBS, and to 358 per 100,000 population in 2011. MBS claims for chlamydia testing have increased from approximately 350,000 in 2007 to approximately 910,000 in 2011. The increase in notifications is mostly attributed to the increase in testing due to the impact of the National Sexually Transmissible Infections Strategy from 2005 to 2008.[4] This strategy has led to increased chlamydia testing, with a concomitant increase in detection. The actual increase in chlamydia infections has been modest.[81]

NT has a higher rate of chlamydia notifications than other states and territories. The high proportion of Indigenous population (30% of the jurisdiction; accounting for 12% of the entire Indigenous population in Australia)[82] is likely to be the reason for the higher rate not only for chlamydia but also other STIs. The Indigenous population is younger than the non-Indigenous population; 19% of the Indigenous population is aged 15 to 24 compared to 14% of the non-indigenous population.[82] Generally, younger age groups participate in higher risk sex compared to older age groups, and these practices have been increasing.[83]

In 2011, the chlamydia notification rate among Indigenous people was 3.6 times the rate among non-Indigenous people (1,342 vs. 378 per 100,000 population). Some of this difference was attributable to health interventions that have increased STI testing in Indigenous communities.[6,20,84]

The high chlamydia notification rate among young females may in part reflect the increased opportunity for screening in conjunction with Pap tests.

### 6.10.3 Gonorrhoea

The notification rates of gonorrhoea increased from 32 per 100,000 population in 2002 to 53 per 100,000 population in 2011. A rise in rectal gonorrhoea particularly in NSW[7] is a contributing factor to the increase in gonorrhoea since 2009. The NT has the highest notification rate due to the higher proportion of Indigenous people. Gonorrhoea prevalence fell among the Indigenous population between 2005 and 2008,[85] but has increased since 2009.[9] Although male to male sex is the main form of transmission of gonorrhoea in Australia,[7,30,49] this mode of transmission is less common among Indigenous men than among non-Indigenous men.[9]

A further element of gonorrhoea disease measurement is the assessment of isolates for resistance to antibiotic treatments. The potential for gonorrhoea to develop widespread antibiotic resistance may return the disease to the situation prior to the introduction of penicillin when the infection was not treatable.

### 6.10.4 Syphilis

Since the introduction of mandatory syphilis reporting by laboratories across Australia in 2006 there has been a large increase in syphilis notifications. Higher syphilis notification rates in both the NT and among Indigenous people have been well documented.[52,86] The majority of syphilis notifications are in males and it is estimated that 90% of transmission is due to MSM.[52] Evidence indicates that a high percentage of MSM are being tested for syphilis but are rarely followed-up to meet the Australian recommendation of retesting.[87]

Remote communities report particularly high rates of infection,[52,55] and the well documented experience of the Kimberley region in WA provides a model demonstrating how appropriate surveillance and response can minimise the effects of syphilis outbreaks.[88,89] Strategies such as wider screening, education for health staff, increased community knowledge and changes in health service delivery can reduce the risk of acute outbreaks of syphilis in remote Indigenous communities.[90] However, a wider clinical and community collaborative approach may be required to prevent recurring outbreaks and the issues around remoteness may also be interrelated with social disadvantage.[91] There are also strong links between HIV and syphilis with HIV positive individuals more likely to be infected with syphilis compared to HIV negative individuals,[53] and co-infection increasing the likelihood of HIV transmission.[92]

### 6.10.5 Hepatitis B

It is estimated that 50-60% of all chronic hepatitis B notifications are attributable to the notification in immigrants and refugees from highly endemic countries mainly in east Asia and Africa.[93,94] It is estimated that 92% of eligible individuals complete the hepatitis B vaccine schedule (NNDSS, 2012a). Since the introduction of the vaccine in 1993 there has been an overall decrease in hepatitis B notifications.[30] The introduction of postnatal hepatitis B Virus (HBV) vaccination in 2000 and a school-based catch-up program has also contributed to the reduction.

Common needle sharing practices among Indigenous intravenous drug users may contribute to the higher prevalence of hepatitis B among the Indigenous populations.[95] The lack of access to clean injecting equipment in prisons and the overrepresentation of Indigenous Australians in prison[96] creates an environment for transmission of blood borne diseases like hepatitis B.

### 6.10.6 HIV and AIDS

The majority of HIV cases (85%) are among men. This is because the main mode of transmission in Australia is through MSM (70% of all cases).[7,57] There has been an increase in the HIV rate since the year 2000. An increase in unprotected anal intercourse in MSM is likely to be the cause.[11]

The HIV rate among the Indigenous population is similar to that of the non-Indigenous population. However, the main mode of transmission in the Indigenous population is by intravenous injection and the main mode of transmission in the non-Indigenous population is MSM.[9] Efforts are required to maintain the emphasis on safe-sex practices, the use of clean drug injecting equipment and appropriate testing in high-risk communities.

AIDS is well controlled in Australia, primarily owing to effective public health campaigns, ongoing HIV surveillance and the availability of effective anti-retroviral therapy. In 2007 there were 161 new AIDS diagnoses and 53 AIDS-related deaths.

### 6.10.7 Genital herpes

Genital herpes has traditionally been associated with infection with HSV-2, while the related HSV-1 is the primary cause of oral cold sores. The primacy of HSV-2 in genital infections remains, however there is a growing proportion of genital HSV-1 infection resulting from oral sex. Infection with HSV-1 is widespread with estimates suggesting seroprevalence in more than three quarters of the population. HSV-2 seroprevalance estimates show infection to be rarer at approximately 12%, with a higher prevalence in females (16%) compared to 8% in males.

### 6.10.8 Genital warts

Genital wart infection rates may be declining concomitant with the introduction of HPV vaccination primarily aimed at oncogenic HPV variants. However the prevalence of infection is difficult to ascertain and estimates range from approximately 1 to 14% with rates highest in young adults.

### 6.10.9 Data development

The Communicable Diseases Surveillance Online Database often report incomplete or underestimated data on Indigenous people, due to less access to health services and under reporting of Indigenous status. Improvement in reporting Indigenous status is needed to improve data quality.

Because of different processes of disease notification, the quality and extent of information collected in the Communicable Diseases Surveillance Online Database may vary. A uniform process of disease notification is required to ensure consistency.

In the MBS data, except for Chlamydia, testing for other STIs do not have specific MBS item numbers. Testing for other STIs should be assigned specific MBS item numbers to allow monitoring.

## 6.11 References


1. Mak DB, Watkins RE. Improving the accuracy of Aboriginal and non-Aboriginal disease notification rates using data linkage. BMC Health Services Research 2008; 8:118.
2. NSW Department of Health. NSW sexually transmissible infections strategy 2006-2009. Sydney: NSW Department of Health, 2006.
3. NSW Department of Health. HIV/AIDS, STI and Hepatitis C strategies: Implementation plan for Aboriginal people 2006-2009. Sydney: NSW Department of Health, 2006.
4. Commonwealth of Australia. National sexually transmissible infections strategy 2005-2008. Canberra: Commonwealth of Australia, 2005.
5. NSW Department of Health. NSW Sexually Transmissible Infections Strategy: Environmental Scan 2006-2009. Sydney: NSW Department of Health, 2006.
6. NNDSS Annual Report Writing Group. Australia's notifiable disease status 2008: Annual report of the National Notifiable Diseases Suerveillance System. Commun Dis Intell 2010; 34:157-224.
7. Institute TK. HIV, viral hepatitis and sexually transmissible infecions in Australia Annual Surveillance Report. Sydney, NSW: The Univesity of New South Wales, 2012.
8. Chesson HW, Blandford JM, Gift TL, Tao G, Irwin KL. The estimated direct medical cost of sexually transmitted diseases among American youth, 2000. Perspect Sex Reprod Health 2004; 36(1):11-9.
9. Institute TK. Bloodborne viral and sexually transmitted infections in Aboriginal and Torres Strait Islander People: Surveillance and Evaluation Report. Sydney, NSW: The University of New South Wales, 2012.
10. Institute TK. Australian HIV Public Access Dataset. Sydney, NSW: University of New South Wales, 2013.
11. de Wit J, Holt M, Trelour C. HIV/AIDS, hepatitis and sexually transmissible infections in Australia: Annual report of trends in behaviour 2012. Sydney, NSW: National Centre in HIV Social Research, The University of New South Wales, 2012.
12. Peipert J. Genital chlamydia infections. N Engl J Med 2003; 349(25):2424-30.
13. Anschuetz GL, Asbel L, Spain CV, Salmon M, Lewis F, Newbern EC, et al. Association between enhanced screening for chlamydia trachomatis and Neisseria gonorrhoeae and reductions in sequelae among women. J Adolesc Health 2012; 51:80-5.
14. Chen M, Fairley C, Donovan B. Discordance between trends in chlamydia notifications and hospital admission rates for chlamydia diseases in New South Wales, Australia. Sex Transm Infect 2005; 81(4):318-22.
15. Korenromp EL, Sudaryo MK, de Vlas SJ, Gray RH, Sewankambo NK, Serwadda D, et al. What proportion of episodes of gonorrhoea and chlamydia becomes symptomatic? Int J STD AIDS 2002; 13:91-101.
16. Cecil JA, Howell MR, Tawes JJ, Gaydos JC, McKee KT Jr, Quinn TC, et al. Features of Chlamydia trachomatis and Neisseria gonorrhoeae infection in male Army reruits. J Infect Dis 2001; 184:1216-9.
17. Detels R, Green AM, Klausner JD, Katzenstein D, Gaydos C, Handsfield H, et al. The incidence and correlates of symptomatic and asymptomatic Chlamydia trachomatis and Neisseria gonorrhoeae infections in selected populations in five countries. Sex Transm Infect 2011; 38(6):503-9.
18. Stamm W. Chlamydia trachomatis infections of the adult. In: Holmes KK, Sparling PE, Mardah PA, Weisner PJ (editors) Sexually Transmitted Diseases. 3rd edition. New York: McGraw Hill, 1999:409-18.
19. Chen MY, Donovan B. Genital Chlamydia trachomatis infection in Australia: epidemiology and clinical implications. Sex Health 2004; 1:189-96.
20. Vajdic CM, Middleton M, Bowden FJ, Fairley CK, Kaldor JM. The prevalence of genital Chlamydia trachomatis in Australia 1997-2004: A systematic review. Sex Health 2005; 2:169-83.
21. Khan A, Hussain R, Plummer D, Minichiello V. Willingness to offer chlamydia testing in general practice in New South Wales. Aust N Z J Public Health 2006; 30:226-30.
22. Bateson D, Weisberg E, Lota H. Chlamydia trachomatis infection in the family planning clinical setting across New South Wales. Sex Health 2006; 3:15-20.

23. Burnett A, Anderson C, Zwank M. Laboratory-confirmed gonorrhea and/or chlamydia rates in clinically diagnosed pelvic inflammatory disease and cervitis. Am J Emerg Med 2011; 30:1114-6.
24. Stark AM HA. Aboriginal women's stories of sexually transmissible infection transmission and condom use in remote central Australia. Sex Health 2006; 4:237-42.
25. McDonagh P, Ryder N, McNulty AM, Freedman E. Neisseria gonorrhoeae infection in urban Sydney women: prevalence and predictors. Sex Health 2009; 6:241-4.
26. Public Health Laboratory Network. Gonorrhoea infection case definition summary. Available at: http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-phlncd-gonorrhoea.htm/$FILE/gono.pdf. Accessed on 23 May 2013.
27. Donovan B, Bodsworth NJ, Rohrsheim R, McNulty A, Tapsall JW. Characteristics of homosexually-active men with gonorrhoea during an epidemic in Sydney, Australia. Int J STD AIDS 2001; 12:437-43.
28. Jin F, Prestage GP, Zablotska I, Rawstorne P, Kippax SC, Donovan B, et al. High rates of sexually transmitted infections in HIV positive homosexual men: data from two community based cohorts. Sex Transm Infect 2006; 83:397-9.
29. Holmes K, Sparling F, Stamm W, et al. Sexually Transmitted Diseases. New York, USA: McGraw-Hill Professional Publishing, 2008.
30. NNDSS. Australia's Notifiable Disease Status, 2010: Annual Report of the National Notifiable Disease Surveillance System. CDI 2012; 36(1):1-69.
31. Liu B, Guthridge S, Li SQ, Markey P, Krause V, McIntyre P, et al. The end of the Australia antigen? An ecological study of the impact of universal newborn hepatitis B vaccination two decades on. Vaccine 2012; 30(50):7309-14.
32. Division. PH. The health of the people of New South Wales - Report of the Chief Health Officer. Summary Report. Sydney: NSW Department of Health, 2008.
33. UNAIDS. Global report: UNAIDS report of the global AIDS epidemic 2012. Geneva, 2012.
34. Xu F, Sternberg MR, Kottiri BJ, McQuillan GM, Lee FK, Nahmias AJ, et al. Trends in herpes simplex virus type 1 and type 2 seroprevalence in the United States. JAMA 2006; 23; 296(8):964-73.
35. Haddow LJ, Dave B, Mindel A, McPhie KA, Chung C, Marks C, et al. Increase in rates of herpes simplex virus type 1 as a cause of anogenital herpes in western Sydney, Australia, between 1979 and 2003. Sex Transm Infect 2006; 82(3):255-9.
36. Tran T, Druce JD, Catton MC, Kelly H, Birch CJ. Changing epidemiology of genital herpes simplex virus infection in Melbourne, Australia, between 1980 and 2003. Sex Transm Infect 2004; 80:277-9.
37. Wald A. Genital HSV-1 infections. Sex Transm Infect 2006; 82:189-90.
38. Ryder N, Jin F, McNulty AM, Grulich AE, Donovan B. Increasing role of herpes simplex virus type 1 in first-episode anogenital herpes in heterosexual women and younger men who have sex with men, 1992-2006. Sex Transm Infect 2009; 85(6):416-9.
39. Brotherton JM, Heywood A, Heley S. The incidence of genital warts in Australian women prior to the national vaccination program. Sex Health 2009; 6:178-84.
40. Patel H, Wagner M, Singhal P, Kothari S. Systematic review of the incidence and prevalence of genital warts. BMC Infect Dis 2013; 13(1):39.
41. Marra F, Ogilvie G, Colley L, Kliewer E, Marra CA. Epidemiology and costs associated with genital warts in Canada. Sex Transm Infect 2009; 85(2):111-5.
42. Desai S, Wetten S, Woodhall SC, Peters L, Hughes G, Soldan K. Genital warts and cost of care in England. Sex Transm Infect 2011; 87(6):464-8.
43. Lanitis T, Carroll S, O'Mahony C, Charman F, Khalid JM, Griffiths V et al. The cost of managing genital warts in the UK. Int J STD AIDS 2012; 23(3):189-94.
44. Australian government, Department of Health and Ageing. National Notifiable Diseases Surveillance System. 2013.
45. World Health Organization. Sexually transmitted infections fact sheet. Available at: http://www.who.int/mediacentre/factsheets/fs110/en/index.html. Accessed on 23 May 2013.
46. Ott JJ, Stevens GA, Groeger J, Wiersma ST. Global epidemiology of hepatitis B virus infection: new estimates of age-specific HBsAg seroprevalence and endemicity. Vaccine 2012; 30(12):2212-9.

47. National Notifiable Disease Surveillance System 2012 CDoHaA. Communicable Disease Surveillance Online Database. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm. Accessed on 23 May 2013.
48. Kong FYS, Guy RJ, Hocking JS, Merritt T, Pirotta M, Heal C, et al. Australian general practitioner chlamydia testing rates among young people. Med J Aust 2011; 194(5):249-52.
49. Wilkinson AL, Lim MS, Stoové M, Fairley CK, Chen M, El-Hayek C, et al. Is rectal gonorrhoea a lead indicator of HIV transmission among men who have sex with men in Victoria, Australia? Sex Health 2013; 10(2):188-9.
50. Lahra MM. Annual Report of the Australian Gonococcal Surveilllance Programme. Sydney, NSW: Australian Gonococcal Surveillance Programme, 2011.
51. Department of Health, Victoria, Australia. Infectious diseases epidemiology and surveillance, Gonorrhoea. 2006.
52. Ward JS, Guy RJ, Akre SP, Middleton MG, Giele CM, Su JY, et al. Epidemiology of syphilis in Australia: moving toward elimination of infectious syphilis from remote Aboriginal and Torres Strait Islander communities. Med J Aust 2011; 194(10):525-9.
53. Jin F, Prestage GP, Zablotska I, Rawstorne P, Imrie J, Kippax SC, High incidence of syphilis in HIV-positive homosexual men: data from two community-based cohort studies. Sex Health 2009; 6(4):281-4.
54. Allen K, Guy R, Leslie D, Goller J, Medland N, Roth N, et al. The rise of infectious syphilis in Victoria and the impact of enhanced clinical testing. Aust N Z J Public Health 2008; 32:38-2.
55. Su JY, Skov S. An assessment of the effectiveness of the Tiwi Sexual Health Program 2002-2005. Aust N Z J Public Health 2008; 32:554-8.
56. Jin F, Prestage GP, Kippax SC, Pell CM, Donovan BJ, Kaldor JM, et al. Epidemic syphilis among homosexually active men in Sydney. Med J Aust 2005; 183:179-83.
57. Wand H, Yan P, Wilson D, McDonald A, Middleton M, Kaldor J, et al. Increasing HIV transmission through male homosexual and heterosexual contact in Australia: results from an extended back-projection approach. HIV Med 2010; 11(6):395-403.
58. Institute TK. HIV, viral hepatitis and sexually transmissible infecions in Australia Annual Surveillance Report. Sydney, NSW: UNSW, 2009.
59. Institute TK. Australian HIV Surveillance Report January 2012, 2012.
60. Institute TK. Australian HIV Surveillance Report April 2012, 2012.
61. Institute TK. Australian HIV Surveillance Report July 2011, 2011.
62. Institute TK. Australian HIV Surveillance Report October 2011, 2011.
63. Wand H, Falster K, Wilson D, Law M, Maher L. Disproptionate impact of combination antiretroviral therapy on AIDS incidence in Australia: Results from a modified back-projection model. AIDS Behav 2012;16(2):360-66.
64. Cunningham A, Taylor R, J. T, Marks C, Shaw J, Mindel A. Prevalence of infection with herpes simplex virus types 1 and 2 in Australia: a nationwide population based survey. Sex Transm Infect 2006; 82:164-8.
65. Khan A, Hussain R, Schofield M. Correlates of sexually transmitted infections in young Australian women. Int J STD AIDS 2005; 16(7):482-6.
66. Pirotta M, Stein AN, Conway EL, Harrison C, Britt H, Garland S. Genital warts incidence and healthcare resource utilisation in Australia. Sex Transm Infect 2009; 86(3):181-6.
67. Russell DB, Tabrizi SN, Russell JM, Garland SM. Seroprevalence of herpes simplex virus types 1 and 2 in HIV-infected and uninfected homosexual men in a primary care setting. J Clin Virol 2001; 22: 305-13.
68. Grulich A, O.de Visser R, Smith A, Rissel C, Richters J. Sexually transmissible infection and blood-borne virus history in a representiative sample of adults. Aust N Z J Public Health 2003; 27:234-241.
69. Stretton C, Harris T. Treatment patterns for external genital warts in Australia. Melbourne: Centre for Health Program Evaluation, University of Melbourne, 1996.
70. Fraser IH, Howard J, Cox C, McFadyn S. Predictors of genital warts among women attending two family planning clinics. Venereology 2000; 13:157-62.
71. Wen LM, Estcourt CS, Simpson JM, Mindel A. Risk factors for the acquisition of genital warts: are condoms protective? Sex Transm Infect 1999; 75:312-6.

72. Garland SM, Steben M, Sings HL, James M, Lu S, Railkar R, et al. Natural history of genital warts: Analysis of placebo arm of 2 randomized phase III trials of a quadrivalent human papillomavirus (types 6, 11, 16 and 18) vaccine. J Infect Dis 2009; 199:805-14.
73. Quinn E, Donovan B, Sheppeard V. The early impact of the National HPV Vaccination Program. NSW Public Health Bulletin 2012; 23(9-10):207-8.
74. Donovan B, Franklin N, Guy R, Grulich AE, Regan DG, Ali H, et al. Quadrivalent Human papillomavirus vaccination and trends in genital warts in Australia: analysis of national sentinel surveillance data. Lancet Infect Dis 2011; 11(1):39-44.
75. Fairley CK, Hocking JS, Gurrin LC, Chen MY, Donovan B, Bradshaw CS. Rapid decline in presentations of genital warts after the implementation of a national quadrivalent human papillomavirus vaccinationprogramme for young women. Sex Transm Infect 2009; 85: 499-502.
76. Lieb S, Fallon SJ, Friedman SR, et al. Statewide estimation of racial/ethnic populations of men who have sex with men in the U.S. Public Health Rep 2011; 126(1):60-72.
77. Purcell DW, Johnson CH, Lansky A, et al. Estimating the population size of men who have sex with men in the United States to obtain HIV and syphilis rates. Open AIDS J 2012; 6:98-106.
78. Smith AM, Rissel CE, Richters J, Grulich AE, de Visser RO. Sex in Australia: sexual identity, sexual attraction and sexual experience among a representative sample of adults. Aust N Z J Public Health 2003; 27(2):138-45.
79. Koblin BA, Chesney MA, Husnik MJ, et al. High-risk behaviors among men who have sex with men in 6 US cities: baseline data from the EXPLORE Study. Am J Public Health 2003; 93(6):926-32.
80. Australia Co, Ageing DoHa. National Hepatitis B strategy 2010-2013. Canberra, 2010.
81. Ali H, Guy RJ, Fairley CK, Wand H, Chen MY, Dickson B, et al. Understanding trends in genital Chlamydia trachomatis can benefit from enhanced surveillance: findings from Australia. Sex Transm Infect 2012; 88(7):552-6.
82. Australia Co, ABS. A picture of the nation: the statistician's report on the 2006 census. Canberrra, 2006.
83. Lim MS, Bowring AL, Gold J, Aitken CK, Hellard ME. Trends in sexual behavior, testing, and knowledge in young people; 2006-2011. Sex Transm Dis 2012; 39(11):831-4.
84. Begg K, Roche P, Owen R, et al. Australia's Notifiable Disease Status 2006: Annual report of the National Notifiable Diseases Surveillance System. CDI 2008; 32:139-206.
85. Su JY, Condon JR. Trends in testing and notification for genital gonorrhoea in a northern Australian district, 2004-2008. Sex Health 2012; 9(4):384-8.
86. Fagan P, Cannon F. Syphilis in remote north Queensland. CDI 2007; 31(1):125-6.
87. Guy R, Wand H, Holt M, Mao L, Wilson DP, Bourne C, et al. High annual syphilis testing rates among gay men in Australia, but insufficient retesting. Sex Transm Dis 2012; 39(4):268-75.
88. Mak DB, Marshall LJ. Gonorrhoea, chlamydia and syphilis incidence in the Kimberly. CDI 2003; 27:370-2.
89. Mak DB, Johnson GH, Plant AJ. A syphillis outbreak in remote Australia: epidemiology and strategies for control. Epidemoil Infect 2004; 132:805-12.
90. Huang RL, Torzillo PJ, Hammond VA, Coulter ST, Kirby AC. Epidemiology of sexually transmitted infections on the Anangu Pitjantjatjara Yankunytjatjara Lands: results of a comprehensive control program. Med J Aust 2008; 189:442-5.
91. Fisher K, Hussain R, Jamieson M, Minichiello V. Syphilis and disadvantage in rural communities. Int J STD AIDS 2008; 19:215.
92. Lynn WA, Lightman S. Syphilis and HIV: a dangerous combination. Lancet Infect Dis 2004; 4(7):456-66.
93. Subramaniam K, Flexman J, Tarquino L, Tambiran A, Hopkins S, Cheng W. Hepatitis B stats in migrants and refugees: Increasing health burden in Western Australia. Internal Medicine Journal 2011; 42(8):880-6.
94. Butler J, Korda R, Watson K, Watson DA. The impact of chronic Hepatitis B in Australia: Projecting mortality and morbidity and economic impact Canberra: Australian Centre for Economic Research on health, 2009.
95. Paquette D, McEwan M, Bryant J. Risk practices among Aboriginal people who inject drugs in New South Wales, Australia. AIDS Behav 2012; Jun 19 [Epub ahead of print].
96. Kinner SA, Jenkinson R, Gouillou M, Milloy MJ. High-risk drug-use practices among a large sample of Australian prisoners. Drug Alcohol Depend 2012; 126(1-2):156-60.

## 6.12 Appendices

### 6.12.1 Appendix 1 – Data for figures presented in this chapter

#### Table A 6.1: Chlamydia notification rate in Australia, 2002 to 2011

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 122 | 151 | 177 | 200 | 225 | 242 | 266 | 283 | 329 | 358 |

Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

#### Table A 6.2: MBS claims for chlamydia testing in Australia, 2007 to 2011

| | MBS Items | | | |
|---|---|---|---|---|
| Year | 69316 | 69317 | 69319 | Total |
| 2007 | 161,550 | 164,528 | 29,845 | 355,923 |
| 2008 | 256,232 | 306,944 | 55,342 | 618,518 |
| 2009 | 287,232 | 376,473 | 61,715 | 725,420 |
| 2010 | 307,315 | 422,130 | 71,174 | 800,619 |
| 2011 | 329,696 | 474,667 | 110,713 | 915,076 |
| Total | 1,342,025 | 1,744,742 | 328,789 | 3,415,556 |

Note: MBS items 69316, 69317 and 69319
Source: Online Medicare Benefits Schedule Item Reports, Medicare Australia

#### Table A 6.3: Chlamydia notification rate by state and territory, 2002 to 2011

| Year | ACT | NSW | QLD | SA | TAS | VIC | NT | WA | AUST |
|---|---|---|---|---|---|---|---|---|---|
| 2002 | 143 | 87 | 170 | 117 | 99 | 99 | 722 | 156 | 122 |
| 2003 | 161 | 116 | 197 | 129 | 126 | 129 | 816 | 190 | 151 |
| 2004 | 189 | 148 | 222 | 156 | 127 | 152 | 782 | 215 | 177 |
| 2005 | 210 | 165 | 238 | 173 | 178 | 176 | 773 | 264 | 200 |
| 2006 | 241 | 174 | 292 | 197 | 213 | 191 | 958 | 290 | 225 |
| 2007 | 261 | 177 | 301 | 216 | 227 | 209 | 988 | 355 | 242 |
| 2008 | 280 | 196 | 343 | 225 | 294 | 224 | 1012 | 385 | 266 |
| 2009 | 263 | 207 | 371 | 229 | 288 | 251 | 1066 | 385 | 283 |
| 2010 | 318 | 250 | 420 | 262 | 393 | 293 | 1156 | 433 | 329 |
| 2011 | 345 | 281 | 407 | 310 | 349 | 342 | 1142 | 497 | 358 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

#### Table A 6.4: Chlamydia notification rate by Indigenous status, 2007 to 2011

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Indigenous | 1,056 | 1,120 | 1,050 | 1,282 | 1,343 |
| Non-Indigenous | 234 | 260 | 283 | 331 | 378 |

Rate per 100,000 population
Note: Includes data from jurisdictions where reporting of Aboriginal status was greater than 50% complete: Northern Territory, South Australia, Tasmania, Victoria, Western Australia
Source: NCHECR. HIV, viral hepatitis and sexually transmissible infections in Australia, Annual Surveillance Report 2012. National Centre in HIV Epidemiology and Clinical Research, The University of New South Wales, Sydney, NSW

### Table A 6.5: Chlamydia notification rate by age group and gender, Australia, 2011

| Age Group | Male | Female |
|---|---|---|
| 10-14 | 13 | 89 |
| 15-19 | 716 | 2231 |
| 20-24 | 1425 | 2184 |
| 25-29 | 823 | 862 |
| 30-34 | 405 | 363 |
| 35-39 | 238 | 177 |
| 40-44 | 167 | 98 |
| 45-49 | 119 | 51 |
| 50-54 | 78 | 23 |
| 55-59 | 48 | 14 |
| 60-64 | 29 | 5 |
| 65-69 | 20 | 2 |
| Total | 296 | 417 |

Rate per 100,000 population
Source: Communicable Disease Surveillance Online Dataset, National Notifiable Disease Surveillance System 2012, Commonwealth Department of Health and Ageing. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.6: Gonorrhoea notification rate in Australia, 2002 to 2011

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 32 | 34 | 35 | 39 | 41 | 36 | 35 | 37 | 45 | 53 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.7: Gonorrhoea notification rate by state and territory, 2002 to 2011

| Year | ACT | NSW | Qld | SA | TAS | VIC | NT | WA | AUST |
|---|---|---|---|---|---|---|---|---|---|
| 2002 | 4.6 | 23 | 25 | 14 | 2.9 | 17 | 760 | 70 | 32 |
| 2003 | 9.2 | 20 | 27 | 19 | 4.8 | 24 | 713 | 73 | 34 |
| 2004 | 11 | 21 | 30 | 24 | 5.8 | 22 | 765 | 70 | 35 |
| 2005 | 9.9 | 23 | 35 | 25 | 6.1 | 24 | 860 | 77 | 39 |
| 2006 | 9.7 | 25 | 37 | 32 | 3.6 | 25 | 827 | 79 | 41 |
| 2007 | 13 | 20 | 32 | 29 | 6.6 | 19 | 726 | 81 | 36 |
| 2008 | 6 | 19 | 37 | 30 | 5 | 17 | 685 | 75 | 35 |
| 2009 | 15 | 23 | 40 | 23 | 4.1 | 27 | 676 | 59 | 37 |
| 2010 | 15 | 32 | 50 | 29 | 3.9 | 31 | 840 | 60 | 45 |
| 2011 | 35 | 39 | 65 | 27 | 3.7 | 33 | 849 | 78 | 53 |

Rate per 100,000 population
Note: Y axis plotted on logarithmic scale
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm. Accessed 14/01/201

### Table A 6.8: Gonorrhoea notification rate by Indigenous status, 2007 to 2011

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Indigenous | 546 | 530 | 460 | 549 | 673 |
| Non-Indigenous | 13 | 14 | 16 | 19 | 22 |

Rate per 100,000 population
Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

### Table A 6.9: Gonorrhoea notification rate by age group and gender, 2011

| Age Group | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 134 | 213 | 184 | 137 | 94 | 80 | 66 | 42 | 28 | 16 | 8 | 72 |
| Female | 178 | 127 | 77 | 44 | 25 | 15 | 9 | 6 | 4 | 3 | 1 | 35 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database. Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.10: Gonorrhoea antibiotic resistance isolates, 2010

| Drug | % of isolates, exhibiting resistance |
|---|---|
| Penicillins | 25 |
| Quinolone antibiotics | 27 |
| Ceftriaxone | 3.2 |
| Strectinomycin | 0 |
| tetracycline | 18 |

Source: The Australian Gonococcal Surveillance Programme. Annual Report of the Australian Gonococcal Surveillance Programme, 2011 Commun Dis Intell 2012; 36:2 166-173 50

### Table A 6.11: Syphilis notification rate in Australia, 2002 to 2011

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| <2 years | 1.9 | 2.2 | 3.1 | 3.2 | 4.2 | 6.6 | 6.1 | 6 | 5 | 5.7 |
| >=2 years | 3.6 | 4.4 | 6.4 | 6.2 | 6.3 | 6.3 | 6.3 | 6.3 | 5.6 | 5.6 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.12: Syphilis <2 years notification rate by state and territory, 2002 to 2011

| Year | ACT | NSW | QLD | TAS | VIC | WA | AUST |
|---|---|---|---|---|---|---|---|
| 2002 | 0.0 | 1.9 | 3.4 | 0.0 | 0.6 | 2.9 | 1.9 |
| 2003 | 0.3 | 3.6 | 3.3 | 0.0 | 0.5 | 0.9 | 2.2 |
| 2004 | 0.9 | 4.4 | 2.9 | 0.4 | 1.7 | 2.5 | 3.1 |
| 2005 | 1.2 | 3.5 | 3.8 | 1.2 | 2.3 | 0.9 | 3.2 |
| 2006 | 0.6 | 3.3 | 4.2 | 1.0 | 4.4 | 2.4 | 4.2 |
| 2007 | 2.6 | 6.5 | 5.8 | 1.6 | 8.1 | 4.8 | 6.6 |
| 2008 | 1.1 | 6.0 | 4.6 | 1.6 | 6.0 | 6.8 | 6.1 |
| 2009 | 3.1 | 6.3 | 4.7 | 2.0 | 6.0 | 3.9 | 6.0 |
| 2010 | 3.8 | 5.8 | 5.4 | 1.2 | 5.3 | 3.6 | 5.0 |
| 2011 | 2.5 | 5.8 | 6.7 | 1.2 | 5.9 | 5.4 | 5.7 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at:http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.13: Syphilis >2 years notification rate by state and territory, 2002 to 2012

| Year | ACT | NSW | QLD | TAS | VIC | WA | AUST |
|---|---|---|---|---|---|---|---|
| 2002 | 0.0 | 4.9 | 5.2 | 0.0 | 0.9 | 6.1 | 3.6 |
| 2003 | 0.0 | 8.1 | 4.9 | 0.0 | 0.8 | 6.0 | 4.4 |
| 2004 | 2.1 | 6.8 | 5.6 | 2.3 | 6.7 | 8.0 | 6.4 |
| 2005 | 1.8 | 4.4 | 6.5 | 4.9 | 6.3 | 8.6 | 6.2 |
| 2006 | 2.9 | 5.5 | 6.0 | 3.4 | 6.9 | 6.2 | 6.3 |
| 2007 | 5.5 | 5.1 | 5.5 | 5.6 | 6.9 | 5.2 | 6.3 |
| 2008 | 8.8 | 5.8 | 4.9 | 2.6 | 6.5 | 5.1 | 6.2 |
| 2009 | 6.1 | 5.6 | 6.7 | 3.5 | 8.4 | 4.1 | 6.3 |
| 2010 | 4.1 | 4.8 | 4.2 | 2.9 | 9.4 | 2.9 | 5.6 |
| 2011 | 6.6 | 4.2 | 4.8 | 3.9 | 9.5 | 4.1 | 5.6 |

Rate per 100,000 population
Note: National rate does not include South Australia, as South Australia does not report on Syphilis >2yrs duration
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.14: Syphilis notification rate by Indigenous status, 2007 to 2011

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Indigenous | 32 | 30 | 22 | 25 | 32 |
| Non-Indigenous | 6 | 5 | 6 | 5 | 5 |

Rate per 100,000 population
Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

### Table A 6.15: Syphilis <2 years notification rate by age group and gender, 2011

| Age Group | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 0.3 | 5.4 | 14 | 17 | 19 | 19 | 23 | 19 | 10 | 6.7 | 4.5 | 2.5 |
| Female | 1 | 5.7 | 4.9 | 2.6 | 2 | 1.5 | 0.7 | 1.4 | 0.4 | 0.3 | 0.2 | 0.2 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.16: Syphilis >2 years notification rate by age group and gender, 2011

| Age Group | Male | Female |
|---|---|---|
| 15-19 | 2.1 | 1.8 |
| 20-24 | 4.7 | 3.5 |
| 25-29 | 9.5 | 5.5 |
| 30-34 | 10 | 6.4 |
| 35-39 | 9.1 | 6.1 |
| 40-44 | 13 | 5.1 |
| 45-49 | 11 | 4.2 |
| 50-54 | 11 | 4.1 |
| 55-59 | 9.0 | 2.8 |
| 60-64 | 6.8 | 2.9 |
| 65-69 | 10 | 4.6 |
| 70-74 | 9.3 | 3.7 |
| 75-79 | 12 | 6.7 |
| 80-84 | 14 | 9.1 |
| 85+ | 19 | 6.3 |

Rate per 100,000 population
Source: National Notifiable Disease Surveillance System (NNDSS), Department of Health and Ageing, Communicable Diseases Surveillance Online Database
Available at: http://www9.health.gov.au/cda/Source/CDA-index.cfm

### Table A 6.17: Hepatitis B (newly acquired) notification rate in Australia, 2002 to 2011

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 2 | 1.7 | 1.4 | 1.2 | 1.4 | 1.4 | 1.2 | 1.1 | 1 | 0.8 |

Rate per 100,000 population
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.18: Hepatitis B (unspecified) notification rate in Australia, 2002 to 2011

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| Rate | 33 | 28 | 27 | 30 | 29 | 32 | 29 | 31 | 31 | 29 |

Rate per 100,000 population
Note: Pre 2005 the NT did not report Hepatitis B (unspecified)
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.19: Hepatitis B (newly acquired) notification rate by state and territory, 2002 to 2011

| Year | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
|---|---|---|---|---|---|---|---|---|---|
| 2002 | 0.0 | 1.3 | 6.0 | 1.5 | 0.7 | 4.0 | 3.5 | 1.8 | 2.0 |
| 2003 | 0.0 | 1.1 | 6.4 | 1.1 | 0.6 | 2.1 | 3.1 | 2.3 | 1.7 |
| 2004 | 1.5 | 0.8 | 3.9 | 1.4 | 0.5 | 3.5 | 2.2 | 1.4 | 1.4 |
| 2005 | 0.9 | 0.8 | 2.4 | 1.5 | 0.6 | 0.6 | 1.6 | 1.7 | 1.2 |
| 2006 | 1.8 | 0.8 | 5.1 | 1.2 | 0.4 | 1.8 | 2.0 | 2.4 | 1.4 |
| 2007 | 3.8 | 0.8 | 4.5 | 1.6 | 0.7 | 1.8 | 1.6 | 1.9 | 1.4 |
| 2008 | 0.3 | 0.6 | 3.5 | 1.1 | 0.7 | 2.2 | 1.6 | 2.1 | 1.2 |
| 2009 | 1.4 | 0.5 | 1.7 | 1.1 | 0.6 | 1.8 | 1.6 | 1.7 | 1.1 |
| 2010 | 0.8 | 0.5 | 1.7 | 1.2 | 1.3 | 1.2 | 1.2 | 1.4 | 1.0 |
| 2011 | 0.5 | 0.4 | 1.7 | 1.0 | 0.5 | 2.5 | 1.2 | 0.8 | 0.8 |

Rate per 100,000 population
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.20: Hepatitis B (unspecified) notification rate by state and territory, 2002 to 2011

| Year | ACT | NSW | NT | Qld | SA | Tas | Vic | WA | Aust |
|---|---|---|---|---|---|---|---|---|---|
| 2002 | 25 | 49 | - | 18 | 17 | 6.1 | 35 | 18 | 33 |
| 2003 | 17 | 39 | - | 19 | 15 | 15 | 31 | 20 | 28 |
| 2004 | 15 | 38 | - | 19 | 18 | 12 | 30 | 19 | 27 |
| 2005 | 27 | 38 | 96 | 22 | 21 | 11 | 32 | 18 | 30 |
| 2006 | 21 | 35 | 108 | 23 | 20 | 9.3 | 30 | 28 | 29 |
| 2007 | 16 | 36 | 107 | 22 | 32 | 6.2 | 35 | 29 | 32 |
| 2008 | 17 | 34 | 85 | 19 | 26 | 12 | 34 | 27 | 29 |
| 2009 | 28 | 36 | 69 | 22 | 27 | 15 | 35 | 30 | 31 |
| 2010 | 25 | 35 | 68 | 23 | 25 | 10 | 34 | 32 | 31 |
| 2011 | 25 | 34 | 69 | 19 | 24 | 6.8 | 34 | 27 | 29 |

Rate per 100,000 population
Note: NT began reporting unspecified Hepatitis B in 2005. Australian rate began recording in 2005 due to the introduction of notifications from the NT
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales.
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.21: Newly acquired hepatitis B notification rate by Indigenous status, 2007 to 2011

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Indigenous | 3 | 4 | 2 | 4 | 3 |
| Non-Indigenous | 1 | 1 | 1 | 1 | 1 |

Rate per 100,000 population
Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

### Table A 6.22: Hepatitis B (newly acquired) notification rate by age group and gender, 2011

| Gender | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 0.4 | 1.2 | 2.2 | 2.9 | 3.2 | 1.8 | 1 | 1.4 | 1.2 | 1 | 0.2 | 1.2 |
| Female | 0.4 | 1.6 | 1 | 1.5 | 1.2 | 0.9 | 0.4 | 0.5 | 0.1 | 0 | 0.2 | 0.5 |

Rate per 100,000 population
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.23: Hepatitis B (unspecified) notification rate by age group and gender, 2011

| Gender | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | 18 | 40 | 64 | 66 | 53 | 48 | 45 | 40 | 34 | 25 | 18 | 32 |
| Female | 15 | 39 | 71 | 66 | 39 | 28 | 27 | 25 | 20 | 17 | 13 | 26 |

Rate per 100,000 population
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## Table A 6.24: HIV notifications in Australia, 1980 to 2011

| Year | Count | Rate per 100,000 population |
|---|---|---|
| 1980 | 1 | 0.0 |
| 1981 | 1 | 0.0 |
| 1982 | 0 | 0.0 |
| 1983 | 14 | 0.1 |
| 1984 | 448 | 2.1 |
| 1985 | 1942 | 9.0 |
| 1986 | 1824 | 8.5 |
| 1987 | 2307 | 11 |
| 1988 | 1687 | 6.8 |
| 1989 | 1646 | 6.7 |
| 1990 | 1456 | 6.8 |
| 1991 | 1429 | 6.6 |
| 1992 | 1208 | 5.6 |
| 1993 | 1057 | 4.9 |
| 1994 | 1019 | 4.7 |
| 1995 | 928 | 4.3 |
| 1996 | 903 | 4.2 |
| 1997 | 825 | 3.8 |
| 1998 | 754 | 3.5 |
| 1999 | 719 | 3.3 |
| 2000 | 765 | 3.6 |
| 2001 | 776 | 3.6 |
| 2002 | 855 | 4.0 |
| 2003 | 875 | 4.1 |
| 2004 | 913 | 4.2 |
| 2005 | 967 | 4.5 |
| 2006 | 1010 | 4.7 |
| 2007 | 1051 | 4.9 |
| 2008 | 1013 | 4.7 |
| 2009 | 1065 | 5.0 |
| 2010 | 1051 | 4.9 |
| 2011 | 1137 | 5.3 |

Note: Crude rate determined using ABS 2011 census
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

## Table A 6.25: HIV notification rate by state and territory, 2011

| | Rate per 100,000 population |
|---|---|
| VIC/TAS | 5.9 |
| SA/NT | 4.2 |
| WA | 4.4 |
| NSW/ACT | 5.5 |
| QLD | 5.1 |
| Total | 5.3 |

Notes: Crude rate determined using ABS 2011 census figures
Due to small number of diagnosis, Australian Capital Territory has been grouped with New South Wales, Tasmania has been grouped with Victoria and NT has been grouped with South Australia
Source: Australian HIV Public Access Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.26: HIV notification rate by Indigenous status, 2007 to 2011

| | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|
| Indigenous | 4 | 4 | 5 | 5 | 5 |
| Non-Indigenous | 5 | 5 | 5 | 5 | 6 |

Source: The Kirby Institute. HIV, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2012. The Kirby Institute, the University of New South Wales, Sydney, NSW 2052

### Table A 6.27: HIV notifications by age group and gender, 2011

| Age group at HIV diagnosis | Male | Female | Total | Rate |
|---|---|---|---|---|
| 15-19 | 12 | 4 | 16 | 1.1 |
| 20-24 | 91 | 8 | 99 | 6.8 |
| 25-29 | 174 | 25 | 199 | 13 |
| 30-34 | 158 | 33 | 191 | 13 |
| 35-39 | 149 | 22 | 171 | 11 |
| 40-44 | 141 | 23 | 164 | 11 |
| 45-49 | 96 | 12 | 108 | 6.2 |

Note: Age specific rate using ABS 2011 Census
Source: Australian HIV Public Dataset from the Kirby Institute, University of New South Wales.
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.28: HIV notifications by mode of transmission, 2011

| Exposure | Count | % |
|---|---|---|
| Male homosexual contact | 772 | 68 |
| Male homosexual contact and injecting drug use | 29 | 3 |
| Heterosexual contact | 156 | 14 |
| Other/undetermined | 50 | 4 |
| Injecting drug use | 21 | 2 |
| Mother-to-child transmission | 10 | 1 |
| From a high prevalence country | 97 | 9 |
| Receipt of blood/tissue | 2 | 0 |
| Total | 1137 | 100 |

Source: Australian HIV Public Dataset from the Kirby Institute, University of New South Wales
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Public-Access-Dataset

### Table A 6.29: AIDS diagnoses and deaths, 2002 to 2011

| | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|
| Cases* | 246 | 245 | 202 | 232 | 221 | 161 | 104 | 90 | 92 | 113 |
| Deaths* | 104 | 91 | 91 | 69 | 83 | 53 | 29 | 9 | 26 | 18 |

Note: *From 2008 NSW AIDS cases and deaths are not included
Source: Data from 2002 to 2007 the National Centre in HIV epidemiology and Clinical Research. HIV/AIDS, viral hepatitis and sexually transmissible infections in Australia Annual Surveillance Report 2009. NCHER, The University of New South Wales, Sydney, NSW. Data post 2007 was accessed via the Kirby Institute Australian HIV Surveillance Reports (Quarterly), University of New South Wales, Sydney, NSW
Available at: http://www.kirby.unsw.edu.au/surveillance/Australian-HIV-Surveillance-Reports-(Quarterly)

# Chapter 7:
# Cancers of the Reproductive Tract and Cervical Screening

Lieu Trinh, Kevin McGeechan

Chapter Outline

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## Key indicators

**Cervical, ovarian, uterine, prostate and testicular cancers**

Number of new cases and deaths

Age-standardised incidence and mortality rates

Mortality-to-incidence ratio

Five year relative survival rate

Risk to age 75 and 85 years

**Cervical screening**

Number and proportion of women who participate in cervical screening

**HPV vaccine**

Number and proportion of girls vaccinated

## Primary data sources

Australian Association of Cancer Registries, and Australian Institute of Health and Welfare, Australian Cancer Incidence and Mortality Books

Australian Association of Cancer Registries, and Australian Institute of Health and Welfare, Cancer in Australia reports

National Cervical Screening Program, and Australian Institute of Health and Welfare, Cervical Screening in Australia reports

National HPV Vaccination Program Register

International Agency for Research on Cancer, WHO GLOBOCAN 2008. Cancer Incidence and Mortality Worldwide in 2008

## Purpose of this chapter

To compare rates of cancers of the reproductive tract between Australia and other countries

To describe the trends in cancers of the reproductive tract in Australia from 1998 to the most up to date available data (2007 for mortality, 2008 for incidence)

To describe rates of cervical screening and HPV vaccination

To identify population sub-groups with higher rates of reproductive tract cancers

To identify areas of data development

## Terms and definitions

**Incidence or mortality rate:** The number of new cases or deaths during each year divided by the total number in the population at risk.

**Age standardised rate:** Age standardisation allows populations to be compared when the age profiles of the populations are different. Age standardised rates are calculated first by estimating the age-specific rates and then applying these rates to the reference population.

**Mortality-to-incidence ratio:** Prognostic or chance of dying from cancer once diagnosed, calculated as the age standardised mortality rate divided by the age standardised incidence rate.

**Risk to age 75 and 85 years:** The approximate risk of developing (or dying from) cancer before a given age, assuming that the risks at the time of estimation remained throughout life.

**Five-year absolute survival rate:** The proportion of patients who are alive five years after their disease is diagnosed.

**Five-year relative survival rate:** The five year survival rate for people diagnosed with cancer divided by the five year absolute survival rate of the general popuation for the corresponding sex and age.

**Remoteness areas:** The remoteness of an area is measured by the distance from the area to one of the metropolitan centres.

**Socioeconomic status:** The socioeconomic situation of the postal area in which a person lives is measured by income, educational attainment and employment in the area. The socioeconomic status is often divided into five categories (quintiles). The lowest quintile is the most disadvantaged and the highest quintile is the least disadvantaged.

**Cytology:** The examination of cells from the cervix (usually collected by a Pap test) through a microscope. Cytology is a screening test.

**Histology:** The examination of tissue from the cervix (usually collected by a biopsy) through a microscope. Histology is more accurate than cytology because it allows the examination of cells and other structures as they would appear in situ. Histology is a diagnostic test.

## Data sources and limitations

### Australian Association of Cancer Registries, AIHW

Cancer, except non-melanocytic skin cancer, is a notifiable disease in all states and territories in Australia. The state and territory cancer registries collect information about people with newly diagnosed cancer from hospitals, pathologists, radiation oncologists, cancer treatment centres and nursing homes. The National Cancer Statistics Clearing House Data was established at the AIHW and is supervised by the Australian Association of Cancer Registries to collect national data on cancer.

#### *Australian Cancer Incidence and Mortality (ACIM) books*

The National Cancer Statistics Clearing House produces the ACIM books to provide summary statistics, tables and graphs by age, year and sex for major cancers and all cancers combined. The ACIM books contain data on incidence from 1982 to 2008 and data on mortality from 1968 to 2007. Information on incidence has been assembled based on year of diagnosis.

Mortality data are sourced from the Australian Bureau of Statistics (ABS). Registration of deaths happen at the end of each calendar year, or deaths that require further examination by a coroner may be processed during the following year (less than 5% of deaths are held over from one year to the next for processing). Information on mortality has been assembled based on year of death, except for the most recent years where information on mortality has been assembled based on year of registration of death.

The population data used for calculation of rates are annual mid-year estimated resident populations, sourced from the Australian Bureau of Statistics.

#### *Cervical Cancer in Australia reports*

The National Cancer Statistics Clearing House produces Cancer in Australia reports. These reports present analyses of the latest available data and trends over time for all types of cancer combined as well as for selected individual types of cancers. Available information includes incidence, mortality, survival, prevalence, burden of cancer and hospitalisations. Data are presented by state and territory, remoteness area, socioeconomic status and Indigenous and Torres Strait Islander status.

### National Cervical Screening Program, AIHW

Cervical screening is one of the three organised national population screening programs (the other two being breast and bowel). The National Cervical Screening Program is a joint program of the Australian Government and state and territory governments, targeting women aged 20–69.[1] The Cervical Screening Reports are published annually. These reports include information on the participation of women in the screening program, the number of cytology tests and histology tests conducted. Data are presented in two-year periods to reflect compliance with the recommendation of having a screening test every two years. The national monitoring of cervical screening commenced in 1996 but data for QLD were not available until 1999.

VIC, the ACT and recently NSW report data based on place of residence. Data published by the AIHW may also be slightly different from data published by states because of different sources of hysterectomy fractions, the proportion of women with an intact uterus and cervix, which are used in adjusting the population denominator.[2] Prior to 2004, hysterectomy fractions were derived from the 2001 ABS National Health Survey. From 2004 onwards, hysterectomy fractions were derived from the AIHW National Hospitals Morbidity Database.[3]

Data on participation in cervical screening by Indigenous status are not available because pathology forms do not record Indigenous status.[1]

### National HPV Vaccination Program Register

The National HPV Vaccination Program Register monitors and evaluates the vaccination program. The Register is operated by the Victorian Cytology Service. Data on HPV vaccinations administered through general practice and in other community settings are notified to the Register but may be incomplete.

### International Agency for Research on Cancer, WHO

The International Agency for Research on Cancer (IARC) produced the Globocan report for 2008[5] to provide international comparisons of cancer incidence and mortality. As these data are collected and compiled under varying conditions of cancer registration, international comparisons against Australian data must be made cautiously. Moreover, although mortality data by cause are available for many countries, the degree of detail and quality of the data vary considerably, especially in establishing cancer as the cause of death.

Caution should also be exercised in comparing international age-standardised rates with those reported in Australia. The WHO 'world' population standard is heavily weighted to younger age groups compared to ageing populations such as in Australia. Hence age-standardised rates based on WHO world population denominators can vary significantly from those which are based on Australian census data as the standard population.

## Summary

Australia has lower rates of cancer of the female reproductive tract but higher rates of cancer of the male reproductive tract than the developed world average. In 2007, cancer of the reproductive tract in Australia accounted for about 24,000 new cases (22% of all cancers) and around 4,400 deaths (10% of all cancer deaths). Prostate cancer was the most common type of all cancers (about 19,500 new cases and over 2,900 deaths). Uterine cancer was the most common cancer of the female reproductive tract (about 2,000 new cases and 338 deaths), followed by ovarian cancer (nearly 1,300 new cases and 848 deaths) and cervical cancer (745 new cases and 208 deaths). Testicular cancer was less common (699 new cases and 26 deaths).

### Cervical cancer

The cervical cancer incidence rate decreased from 9.2 cases per 100,000 females in 1998 to 7 cases per 100,000 females in 2008. The mortality rate also fell from 2.7 deaths per 100,000 females in 1998 to 1.8 deaths per 100,000 females in 2007. The female mortality incidence ratio decreased slightly from 0.29 in 1998 to 0.26 in 2007. The five year relative survival rate between 1998 and 2004 was 72%.

In the two year period 2009 to 2010, over 3.6 million women aged 20-69 years had a Pap test (57%). In 2009, almost 324,000 doses of the HPV vaccine were administered to girls aged 15 years (71%).

### Ovarian cancer

The ovarian cancer incidence rate decreased from 11.8 new cases per 100,000 females in 1998 to 10.6 new cases per 100,000 females in 2008. The mortality rate also decreased from 7.7 deaths per 100,000 females in 1998 to 7 deaths per 100,000 females in 2007. The female mortality incidence ratio increased from 0.62 in 1999 and 2006, to 0.72 in 2007. The five year relative survival rate between 1998 and 2004 was 40%.

### Uterine cancer

The uterine cancer incidence rate increased from 15 new cases per 100,000 females in 1998 to 17 new cases per 100,000 females in 2008. The mortality rate increased from 2.5 deaths per 100,000 females in 1998 to 2.7 deaths per 100,000 females in 2007. The female mortality incidence ratio decreased slightly from 0.17 in 1998 to 0.16 in 2007. The five year relative survival rate between 1998 and 2004 was 82%.

### Prostate cancer

The prostate cancer incidence rate increased from 128 cases per 100,000 males in 1998 to 190 cases per 100,000 males in 2008. The mortality rate decreased from 37 deaths per 100,000 males in 1998 to 31 deaths per 100,000 males in 2007. The male mortality incidence ratio decreased from 0.29 in 1998 to 0.17 in 2007. The five year relative survival rate between 1998 and 2004 was 85%.

### Testicular cancer

The testicular cancer incidence rate increased from 5.9 cases per 100,000 males in 1998 to 6.6 cases per 100,000 males in 2008. The mortality rate varied between 0.1 and 0.3 deaths per 100,000 males. The male mortality incidence ratio was very low and ranged from 0.02 to 0.06. The five year relative survival rate between 1998 and 2004 was 97%.

## 7.1 Introduction

Cancers of the female reproductive tract include cervical, ovarian and uterine cancers; cancers of the male reproductive tract include prostate and testicular cancers.

### Cervical cancer

Human Papillomavirus (HPV) is a sexually transmitted virus. Most women with HPV infection are asymptomatic and are often cleared in a year. About 10% of women have persistent infections and a very small proportion of them develop cervical cancer. HPV types 16 and 18 account for up to 70% of cervical cancers.[6,7] Cervical cancer can be detected early through screening.

#### *Cervical screening*

The Papanicolaou smear, or 'Pap test' is the current screening tool used in Australia. A sample of cells is taken from the cervix for cytological examination to detect abnormalities. Women with high grade cervical abnormalities are referred for histology for confirmation of cervical cancer.

Organised cervical screening programs have been effective in reducing morbidity and mortality caused by cervical cancer.[2] Around 90% of cervical cancers can be detected by cervical screening and treated effectively.[8] Women who have never had a Pap test or have not been screened during the previous four years or longer have higher rates of cervical cancer.[9]

The National Cervical Screening Program in Australia was established in 1991. It is recommended that all women who have ever been sexually active should start having a Pap test between the ages of 18 and 20 years, or two years after first having sexual intercourse, whichever is later. Women are presently advised to have a repeat Pap test every two years. The target group for the National Cervical Screening Program is women aged between 20 and 69 years.[1]

#### *HPV vaccine*

The HPV vaccine is a prophylactic vaccine and, therefore, should be delivered to women prior to contact with HPV. The vaccines need to be administered in three doses over a 6 month period. As many as 78% of cervical cancers in Australia could be prevented by the HPV vaccine.[10]

In November 2006, the Australian Government announced funding for an HPV vaccination program. The ongoing school-based program was set up to administer the HPV vaccine to girls aged 12-13 years in the first year of secondary school. The catch-up program for 14 to 18 year old girls through schools and for 18 to 26 year old women through general practice and community-based programs was conducted between 2007 and 2009. The vaccination program is effective in reducing the prevalence of vaccine-targeted genotypes.[11] From 2013, boys in Year 7 will be offered the vaccine in a school based program. In 2013 and 2014, boys in Year 9 will be offered the vaccine as part of the national 'catch up'.[12]

### Ovarian cancer

More than 90% of ovarian cancers arise from the surface of the ovary and are called "epithelial". Other types of ovarian cancers are germ cell, sex-cord stromal cell and borderline tumours.[13] In Australia, the majority of ovarian cancers (60%) occur in post-menopausal women.[14] There is no current screening program or tool recommended for ovarian cancer.

### Uterine cancer

Uterine cancer usually starts in the endometrium while the remainder mostly develop in the muscle layers of the uterus. Uterine cancer is the most common gynaecological cancer in Australia.[15] There is no screening program for uterine cancer. It is diagnosed on the basis of symptoms.

### Prostate cancer

Prostate cancer is more common in men older than 50 years. Although prostate cancer is one of the most common types of cancer, two thirds develop slowly and many men may remain asymptomatic and die from other causes such as heart or circulatory disease. However, one-third of prostate cancers take an aggressive course.[16,17]

The prostate-specific antigen test can be used to screen for prostate cancer. Screening for prostate cancer is controversial and may lead to unnecessary, even harmful consequences in some patients.[18-21]

There is no national screening program in Australia.

Diagnosis of prostate cancer is confirmed by biopsy. Because many prostate cancers are asymptomatic, the decision whether or not to treat localised prostate cancer depends on factors such as a patient's age and quality of life.

### Testicular cancer

Testicular cancer is the most common cancer among men aged 20-39 years.[22] The risk of developing testicular cancer for a man over his lifetime is one in 250. Testicular cancer has a better prognosis compared to many other types of cancer. Overall, 90% of all testicular cancer cases are curable; 100% if the cancer is localised, and 80% if the cancer has metastasised.[23]

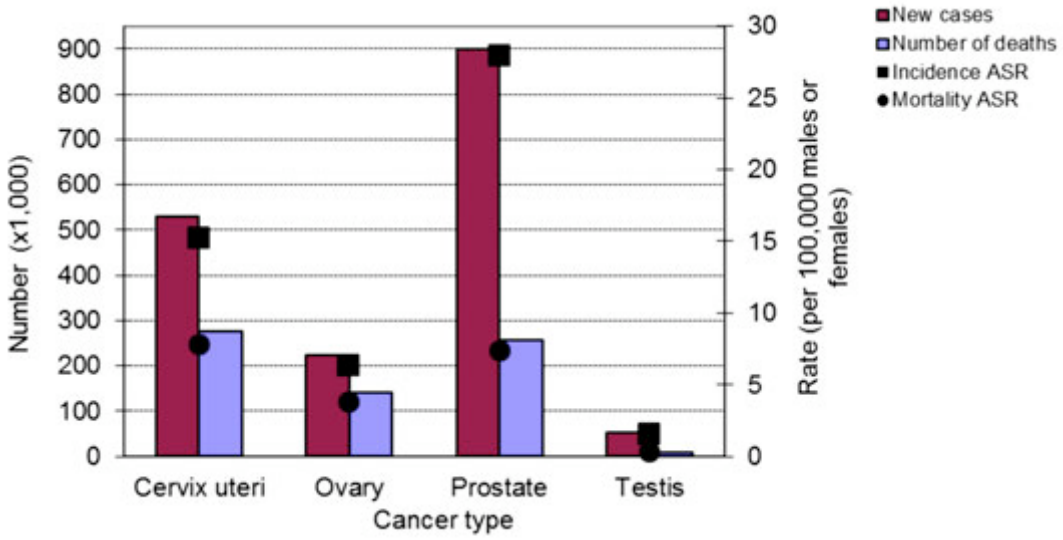
## 7.2 Cancers of the reproductive tract: International comparison

### 7.2.1 Cancers of the reproductive tract worldwide

In 2008, there were over 12.7 million new cases of cancer and almost 7.6 million deaths from cancer worldwide.[5] Cancer of the reproductive tract, including cervical, ovarian, uterine, prostate and testicular cancers, accounted for 1.7 million new cases (13% of all cancers) and over 683,000 deaths (9% of all deaths caused by cancer).

Prostate cancer was one of the most common cancers for males and the most common cancer of the reproductive tract. Almost 899,000 new cases and just over 258,000 deaths were caused by prostate cancer. Prostate cancer had the highest age standardised incidence rate (28 new cases per 100,000 males). Cancers of the cervix and uterus were among the most common cancers for females, accounting for over 530,000 new cases and 275,000 deaths. Cancer of the cervix and uterus had the highest age standardised mortality rate (7.8 deaths per 100,000 females) (Figure 7.1).

**Figure 7.1: Cancers of the reproductive tract worldwide, 2008**




Note: ASR = Age standardised rate
Source: GLOBOCAN 2008. Fast stats. World
http://globocan.iarc.fr/factsheets/populations/factsheet.asp?uno=900#KEY

### 7.2.2 Comparison of cancers of the reproductive tract between Australia and other countries

**Incidence**

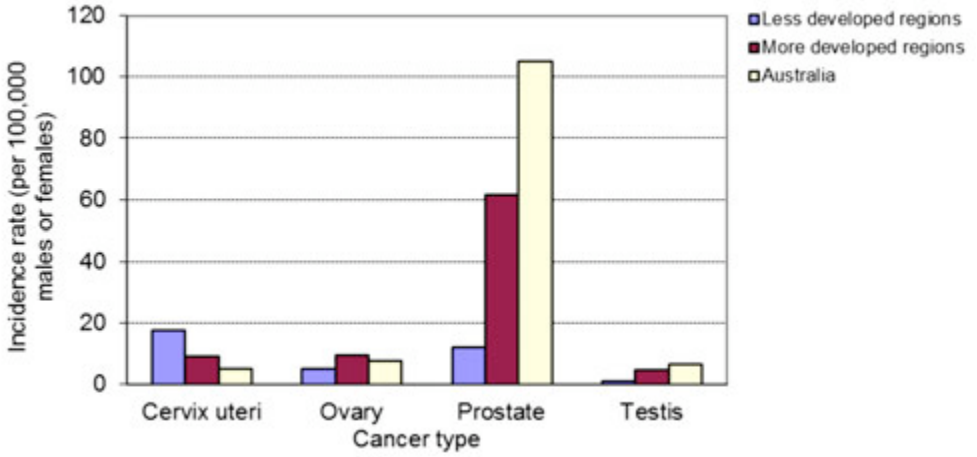
According to the WHO, Australia had a lower incidence rate of cervical and uterine cancer (4.9 new cases per 100,000 females) than the average of the more developed countries (9.1 new cases per 100,000 females) and much lower than the average of the less developed countries (17.7 new cases per 100,000 females) (Refer to Appendix 1 for country classification).

For ovarian cancer, Australia had a slightly lower incidence rate than the average of the more developed countries (7.7 new cases per 100,000 females compared to 9.3 new cases per 100,000 females) but higher than the average of the less developed countries (4.9 new cases respectively per 100,000 females).

In contrast, the incidence rate of prostate cancer in Australia (105 new cases per 100,000 males) was much higher than the average of the more developed countries (62 new cases per 100,000 males) and of the less developed countries (12 new cases per 100,000 males).

The incidence rate of testicular cancer in Australia (6.5 new cases per 100,000 males) was higher than the average of the more developed countries (4.6 new cases per 100,000 males) and the less developed countries (0.8 new cases per 100,000 males) (Figure 7.2).

**Figure 7.2: Incidence rate for cancers of the reproductive tract, international comparison, 2008**




Note: Refer to Appendix 1 for country classification. Age standardised rate
Source: GLOBOCAN 2008. Cancer Incidence, Mortality and Prevalence Worldwide in 2008
http://globocan.iarc.fr/

### Mortality

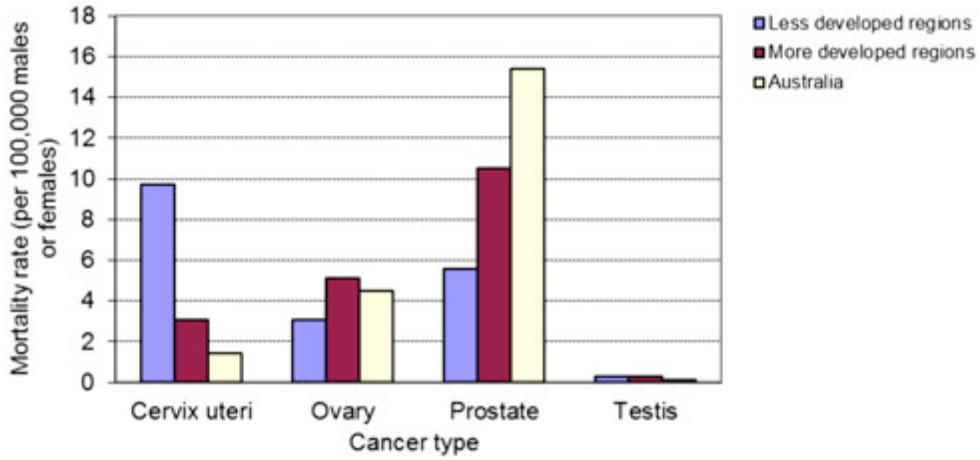
The mortality rates reflected the pattern of the incidence rates. Australia had lower mortality rates for cervical and uterine cancer (1.4 deaths per 100,000 females) than the average of the more developed countries (3.1 deaths per 100,000 females) and much lower than the average of the less developed countries (9.7 deaths per 100,000 females).

For ovarian cancer, Australia had a slightly lower mortality rate (4.5 deaths per 100,000 females) than the average of the more developed countries (5.1 deaths per 100,000 females) but higher than the average of the less developed countries (3.1 deaths per 100,000 females).

The mortality rate of prostate cancer in Australia (15 deaths per 100,000 males) was higher than the average of the more developed countries (11 deaths per 100,000 males) and the average of the less developed countries (5.6 deaths per 100,000 males).

The mortality rate of testicular cancer in Australia of 0.1 deaths per 100,000 males was lower than the average of the more developed countries and the less developed countries (both were 0.3 deaths per 100,000 males). However, the difference of 0.2 deaths per 100,000 males was very small (Figure 7.3).

**Figure 7.3: Mortality rate for cancers of the reproductive tract, international comparison, 2008**




Note: Age standardised rate
Source: GLOBOCAN 2008. Cancer Incidence, Mortality and Prevalence Worldwide in 2008
http://globocan.iarc.fr/

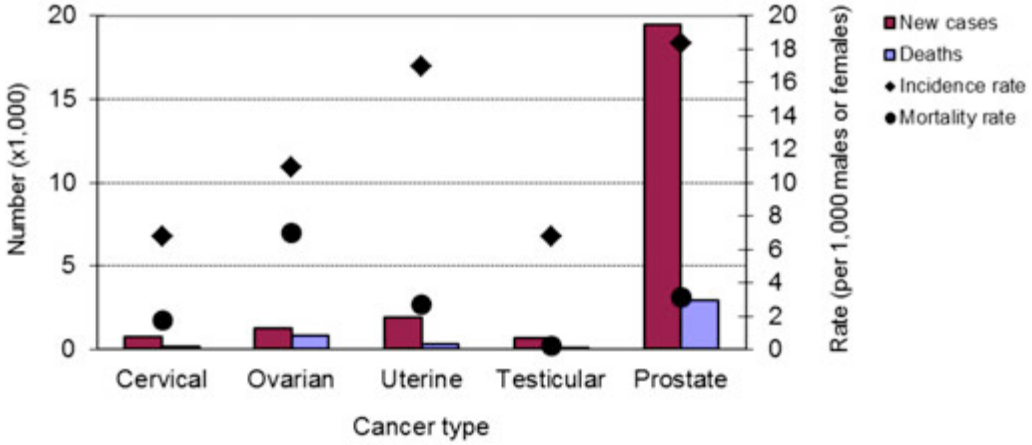
## 7.3 Overview of cancers of the reproductive tract in Australia

In 2007, over 109,000 new cases and almost 39,900 deaths were caused by all types of cancer in Australia. Cancer of the reproductive tract accounted for over 24,000 new cases (22%) and around 4,400 deaths (10%).

Prostate cancer was the most common type of cancer in Australia.[15] In 2007, prostate cancer accounted for about 19,500 new cases and over 2,900 deaths (Figure 7.4). Incidence and mortality rates for prostate cancer were also the highest of all cancers (184 new cases and 31 deaths per 100,000 males).

Uterine cancer was the most common cancer of the female reproductive tract (almost 2,000 new cases in 2007), followed by ovarian cancer (nearly 1,300 new cases) and cervical cancer (745 new cases). There were fewer cases of ovarian cancer than uterine cancer, but ovarian cancer resulted in more deaths (848 vs. 338). A smaller number of new cases and very few deaths were reported for testicular cancer (699 and 26 respectively).

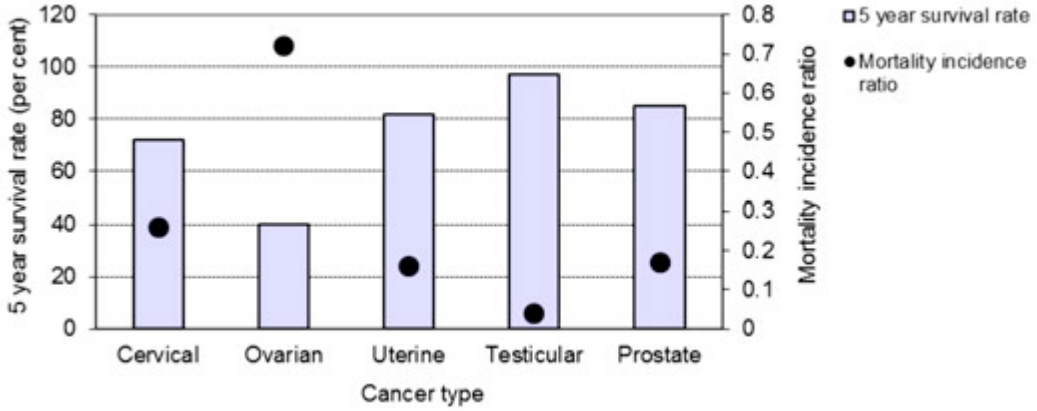
**Figure 7.4: Incidence and mortality for cancers of the reproductive tract in Australia, 2007**




Source: Australian Cancer Incidence and Mortality (ACIM) books

Testicular cancer has the best prognosis of the reproductive cancers with a 97% five year relative survival rate and a mortality incidence ratio of 0.04. Ovarian cancer has the worst prognosis with a 40% five year relative survival rate and a mortality incidence ratio of 0.72 (Figure 7.5).

**Figure 7.5: Mortality incidence ratio and 5 year relative survival rate for cancers of the reproductive tract in Australia**




Note: Mortality incidence ratio in 2007, five year relative survival rate 1998-2004
Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.4 Cervical Cancer

### 7.4.1 Cervical cancer in Australia

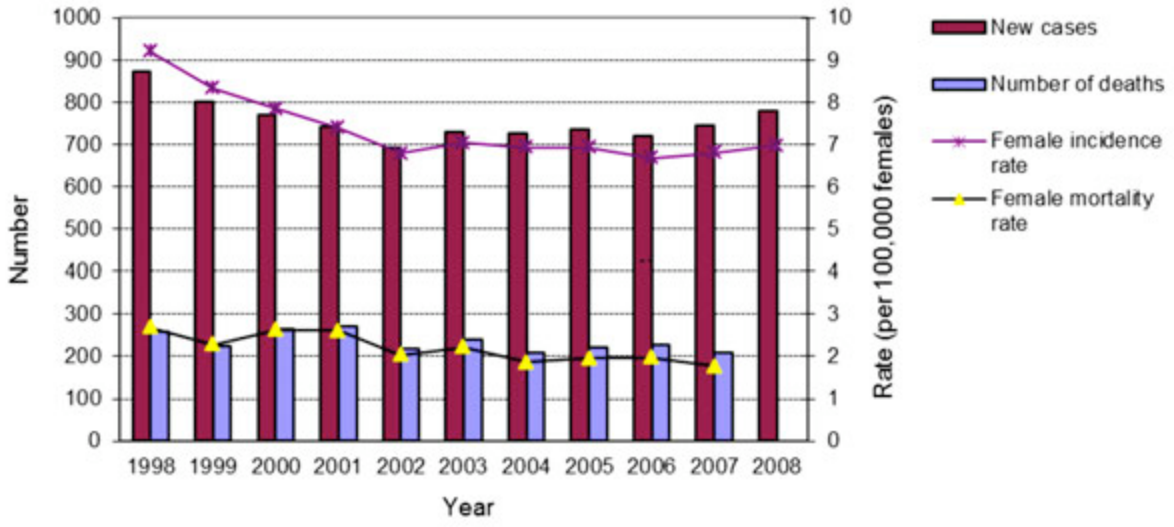
At the time of writing this report, incidence data for cervical cancer were available up to 2008 but mortality data were only available up to 2007.

The number of newly detected cervical cancer cases in Australia decreased from 873 cases in 1998 to 778 cases in 2008 (Figure 7.6). The incidence rate decreased from 9.2 cases per 100,000 females in 1998 to 7 cases per 100,000 females in 2008.

The number of cervical cancer deaths decreased from 260 in 1998 to 208 in 2007. The mortality rate decreased from 2.7 deaths per 100,000 females in 1998 to 1.8 deaths per 100,000 females in 2007.

The female mortality incidence ratio decreased slightly from 0.29 in 1998 to 0.26 in 2007.[24] The five year relative survival rate for women diagnosed with cervical cancer between 1998 and 2004 was 72%.[25]

**Figure 7.6: Cervical cancer in Australia, 1998 to 2008**




Note: The rates shown are age-standardised, based on Australian population as at 30 June 2001
Source: Australian Cancer Incidence and Mortality (ACIM) books

### 7.4.2 Cervical cancer by age group

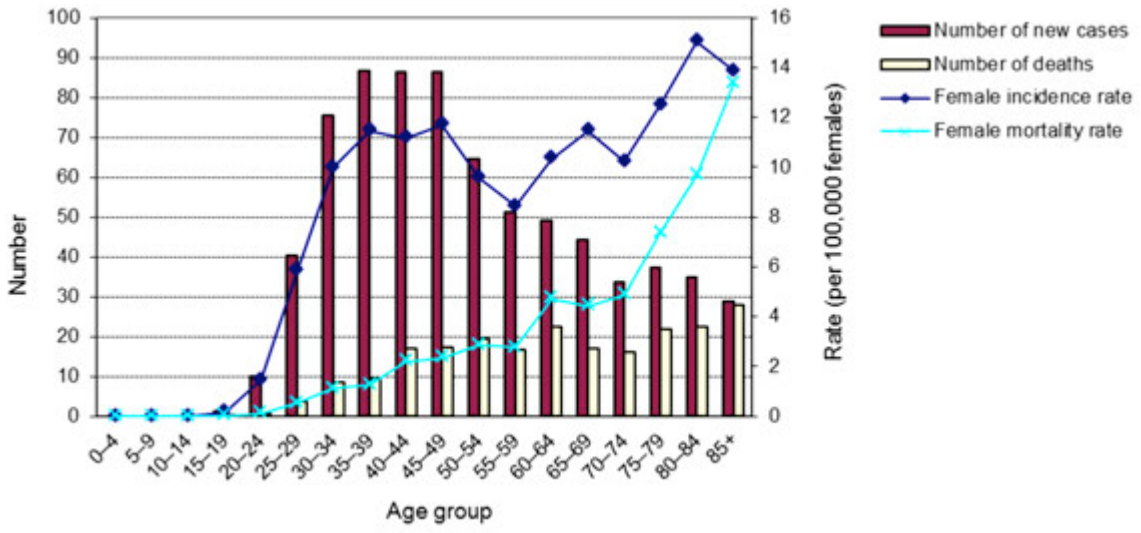
During the period 2003 to 2007, the annual average number of new cases of cervical cancer per age group increased from close to zero in the age group younger than 20 years to 87 new cases in the age group 35-49 years and decreased after age 50 years (Figure 7.7). The incidence rate increased sharply to 11 new cases per 100,000 females in the age group 35-49, then decreased slightly to 8.4 new cases per 100,000 females in the age group 55-59 and increased again up to 15 new cases per 100,000 females in the age group 80-84.

The annual average number of deaths from cervical cancer increased as age increased, up to 28 deaths in the age group 85 or older. Similarly, the mortality rate increased up to 13 deaths per 100,000 females in the age group 85 or older.

The female mortality incidence ratio increased up to 0.64 in the age group 80-84 and almost one in the age group 85 or older.

In 2007, the average age at diagnosis of cervical cancer was 51 years and the average age at death was 63 years. The risk of developing cervical cancer was 1 in 197 before the age of 75 and 1 in 158 before the age of 85. The risk of dying from cervical cancer was 1 in 817 before the age of 75 and 1 in 502 before the age of 85.[15]

**Figure 7.7: Cervical cancer by age group, annual average of 2003 to 2007**

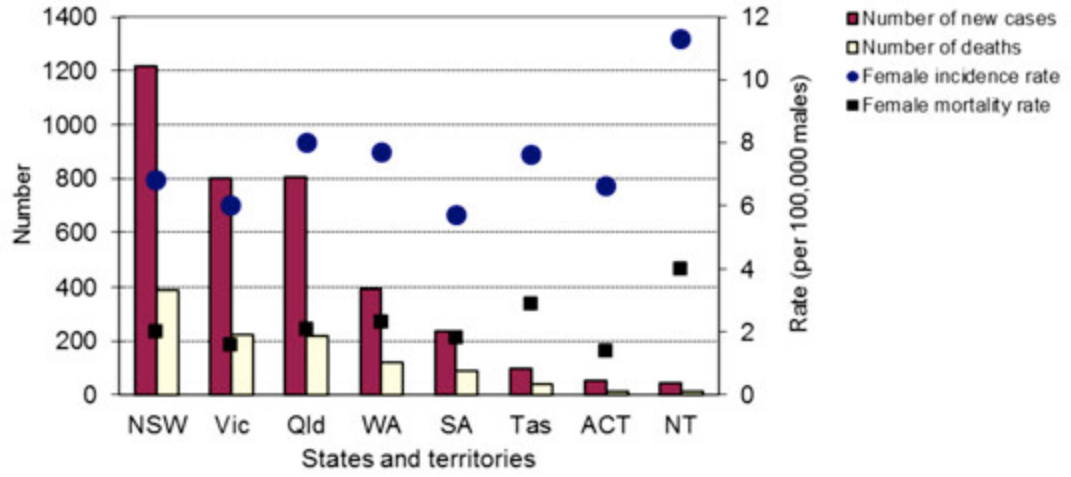



Note: The rates shown are age-standardised
Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.4.3 Cervical cancer by state

Between 2003 and 2007, NT had the highest incidence rate of cervical cancer at 11 new cases per 100,000 females and the highest mortality rate at 4 deaths per 100,000 females (Figure 7.8). The female mortality incidence ratio increased from 0.21 in the ACT to 0.35 in the NT and to 0.38 in TAS.

**Figure 7.8: Cervical cancer by state and territory, annual average of 2003 to 2007**

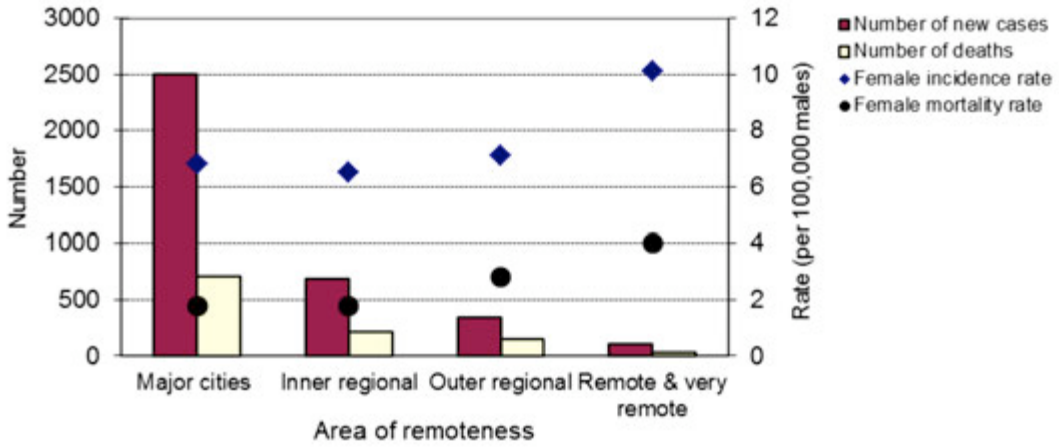



Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.4.4 Cervical cancer by remoteness

Between 2003 and 2007, the incidence rate of cervical cancer ranged from 6.8 cases per 100,000 females in major cities to 10 cases per 100,000 females in remote and very remote areas. The mortality rate ranged from 1.8 deaths per 100,000 females in major cities to 4 deaths per 100,000 females in remote and very remote areas (Figure 7.9). The female mortality incidence ratio varied between 0.26 in the major cities and 0.40 in remote and very remote areas.

**Figure 7.9: Cervical cancer by remoteness, 2003 to 2007**

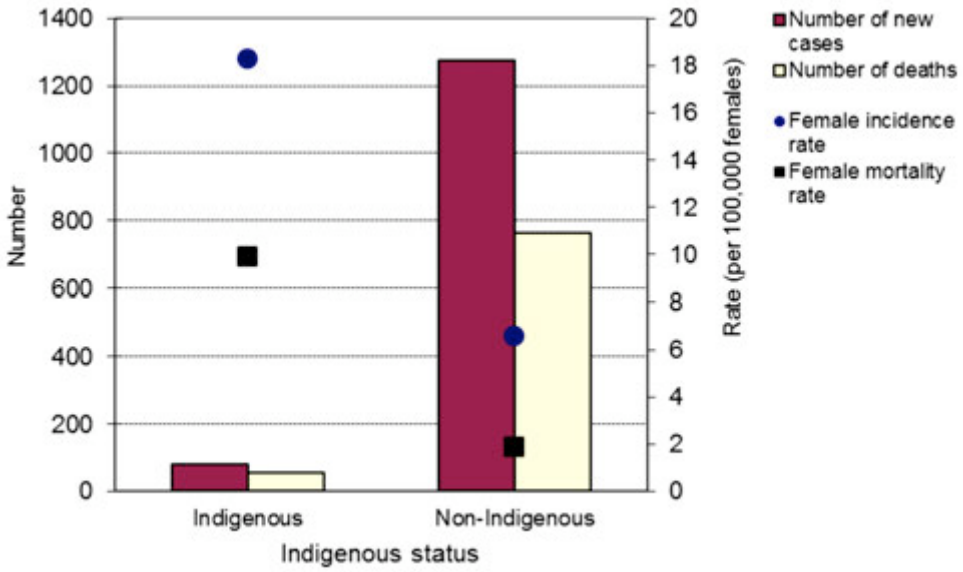



Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Remoteness are classified according to the Australian standard geographic classification (ASGC) remoteness areas
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.4.5 Cervical cancer by Indigenous status

Between 2003 and 2007, the incidence rate of cervical cancer among Indigenous women was almost three times higher than among non-Indigenous women (18 new cases per 100,000 females vs. 6.6 new cases per 100,000 females). The mortality rate was also much higher among Indigenous women than among non-Indigenous women (9.9 deaths per 100,000 females vs. 1.9 deaths per 100,000 females) (Figure 7.10). The female mortality incidence ratio among Indigenous women was 0.54, almost double the ratio among non-Indigenous women of 0.28.

**Figure 7.10: Cervical cancer by Indigenous status, annual average of 2003 to 2007**




Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.4.6 Cervical cancer by socioeconomic status

Between 2003 and 2007, the incidence rate of cervical cancer ranged from 7.7 cases per 100,000 females among the most disadvantaged areas to 5.8 cases per 100,000 females among the least disadvantaged areas. The mortality rate decreased from 2.5 deaths per 100,000 females among the most disadvantaged areas to 1.5 deaths per 100,000 females among the least disadvantaged areas (Table 7.1). The female mortality incidence ratio decreased from 0.32 among the most disadvantaged areas to 0.22 among the least disadvantaged areas.

**Table 7.1: Incidence of cervical cancer by socioeconomic status, annual average of 2003 to 2007**

| Socio economic status | Number of new cases | Female incidence rate | Number of deaths | Female mortality rate |
|---|---|---|---|---|
| 1 (lowest) | 795 | 7.7 | 274 | 2.5 |
| 2 | 756 | 7.2 | 249 | 2.1 |
| 3 | 726 | 6.9 | 221 | 2 |
| 4 | 708 | 6.6 | 204 | 1.9 |
| 5 (highest) | 642 | 5.8 | 149 | 1.3 |

Notes: The rates shown are age-standardised
Socio economic status was classified using the ABS index of relative socio economic disadvantage
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.4.7 Cervical screening

In the two year period 2009 to 2010, over 3.6 million women aged 20-69 had a Pap test in Australia[1]. The age standardised screening rate for women aged 20-69 with an intact cervix (target population) was 57%. There were over 4.4 million women who had a Pap test in the 3-year period 2008 to 2010 (70%) and almost 5.5 million women who had a Pap test in a 5-year period 2006 to 2010 (83%).

In 2010 alone, over 2 million cytology tests, both conventional cytology and liquid-based cytology, were performed for women aged 20-69 years.

Ninety three percent of these tests were negative, 2.1% were technically unsatisfactory and 5.3% were abnormal.

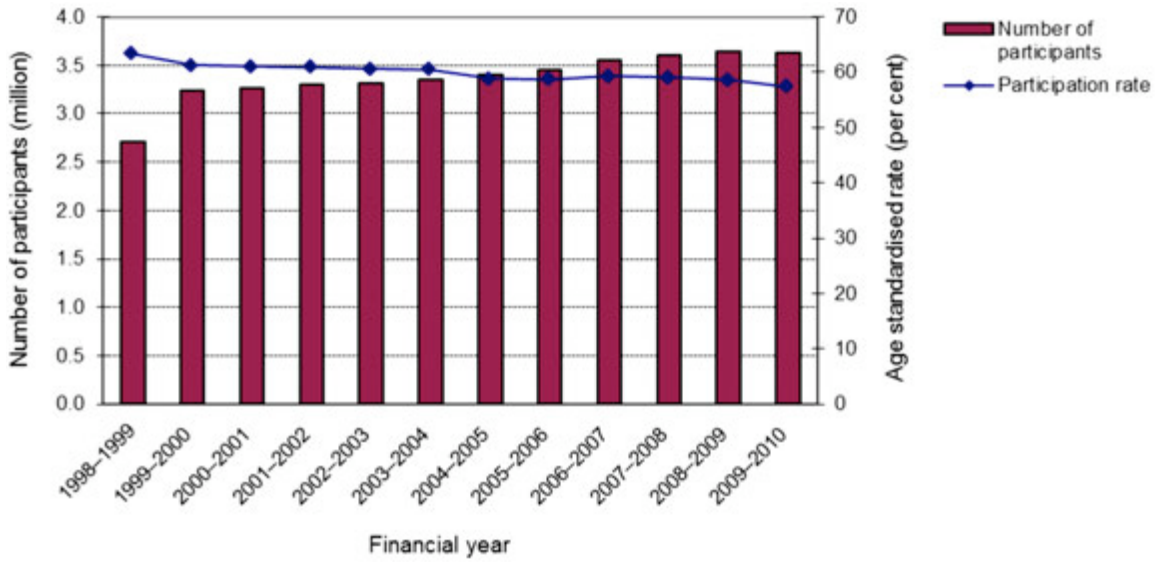
While cervical cytology is a screening test to identify women with abnormal cells, histology is a diagnostic test to confirm if a woman has cancer. Over 72,000 histology tests were performed in 2010 and over 51% of the tests detected an abnormality. For every 1,000 women aged 20-69 screened, 8.4 women had a high-grade abnormality detected by histology. Over 70% of abnormalities detected by cytology were confirmed by histology.

**Participation in cervical screening in Australia**

Data on cervical screening were available up to 2010. To be consistent with the incidence and mortality data presented for cervical cancer, the data are presented from 1998 onwards.

In 1998 to 1999, data for QLD were not available; therefore the reported number of women who had a Pap test in this period was lower than in later periods. From 1999 to 2000 (when data for QLD were included) to 2003 to 2004, the participation rates were steady at around 61%. From 2004 to 2005 to 2008 to 2009, the participation rates were around 59%, 2% less than during previous periods. This might partly due to the use of different sources of hysterectomy fractions in adjusting the population as explained earlier[3]. In 2009 to 2010, the participation rate decreased to 57% (Figure 7.11).

**Figure 7.11: Participation in cervical screening in Australia, 1998 to 2010**

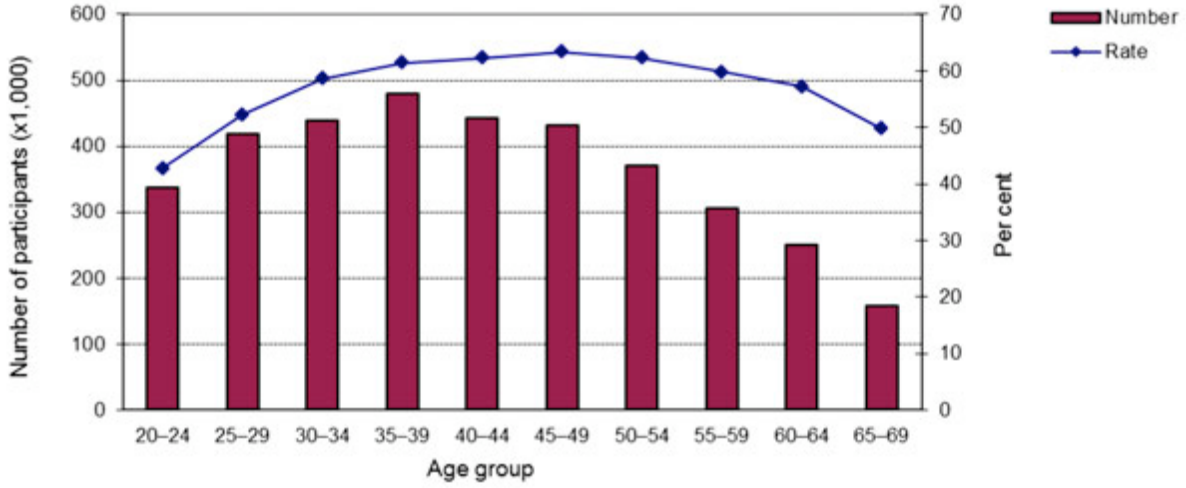



Notes: Data are for each two year reporting period
Data for Queensland are not included in the 1998-1999 period
The rates shown are age-standardised for women aged 20-69
Source: Australian Institute of Health and Welfare 2012. Cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Participation in cervical screening by age group

In 2009 to 2010, the number of women who had a Pap test was highest among those aged 35-39 years old (over 480,000) but the rate was highest among those aged 45-49 years old (63%). Women aged 20-24 years old had the lowest screening rate (43%) (Figure 7.12).

**Figure 7.12: Participation in cervical screening by age group, 2009 to 2010**

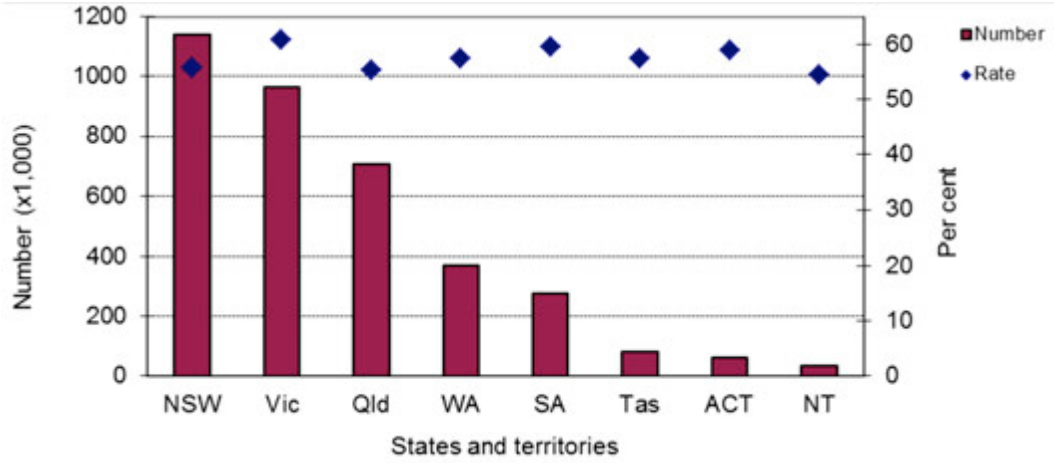



Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Participation in cervical screening by state

Between 2009 and 2010, VIC had the highest cervical screening rate (61%) and NT had the lowest screening rate (54%) (Figure 7.13).

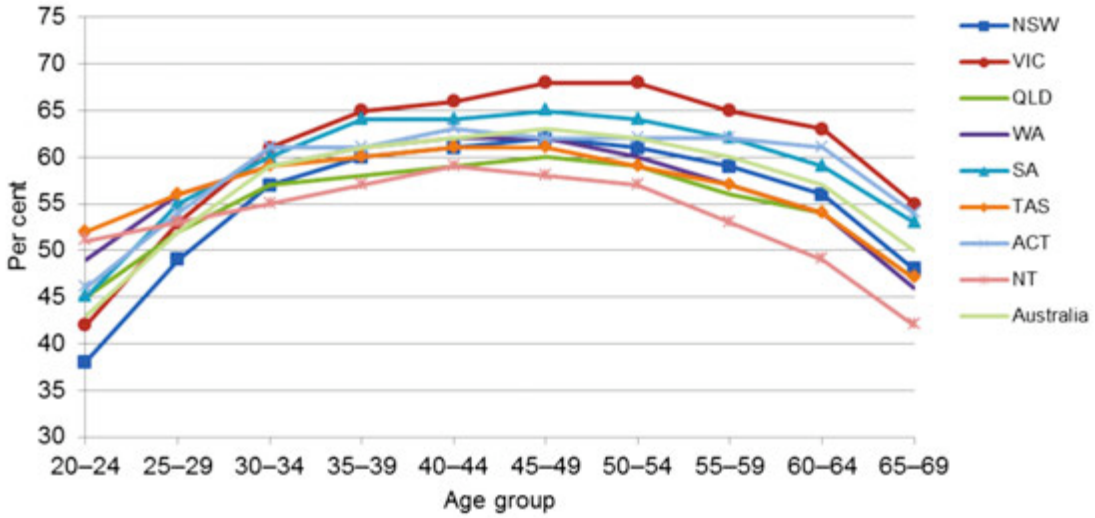
**Figure 7.13: Participation in cervical screening by state and territory, 2009 to 2010**




Note: Data are for a two year reporting period
The rates shown are age standardised rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

Young women in NT had a higher cervical screening rate (51% for women aged 20-24 years, compared to the national average for the same age group of 43%) but older women in NT had the lowest screening rate (42% for women aged 65-69 years, compared to the national average for same the age group of 50%) (Figure 7.14).

**Figure 7.14: Percentage of participation in cervical screening by state and territory and age group, 2009 to 2010**

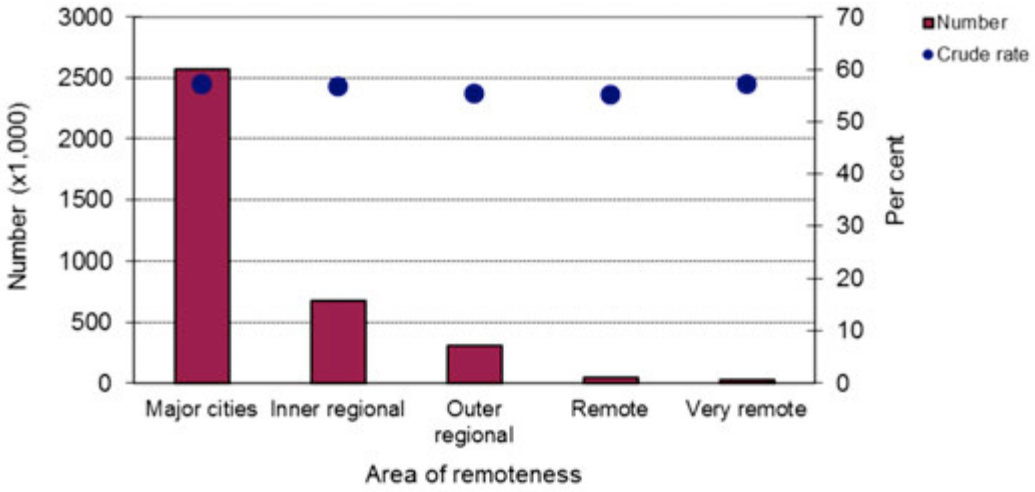



Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Participation in cervical screening by remoteness

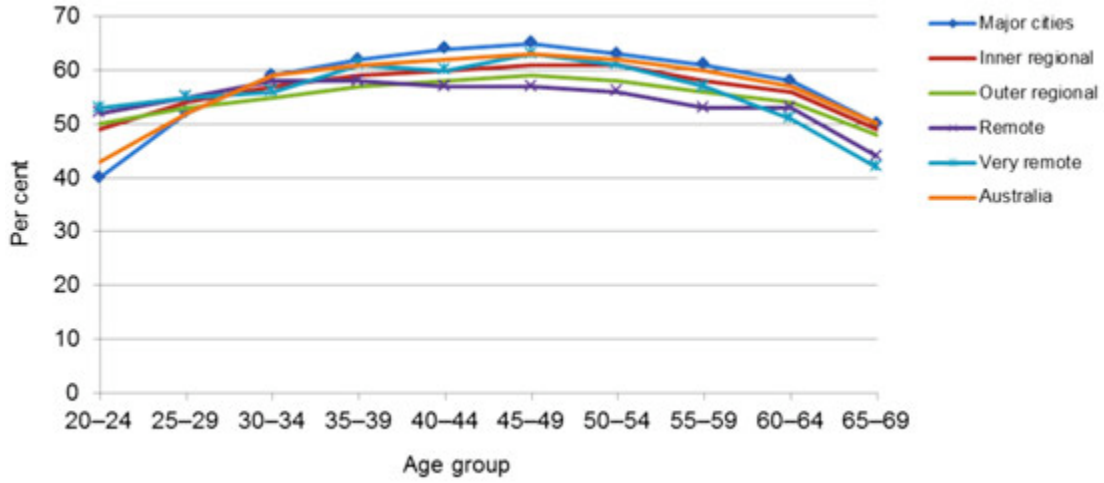
The cervical screening rate ranged from 55% in outer regional and remote areas to 57% in other areas (Figure 7.15). Women in major cities had the lowest screening rates among younger age groups (e.g. 40% among women aged 20-24 years) but had the highest screening rates among older age groups (e.g. 50% in the age group 65-69 years). In contrast, women in very remote areas had the highest screening rates among younger age groups (e.g. 53% among women aged 20-24 years) but had the lowest screening rates among older age groups (e.g. 42% in the age group 65-69 years) (Figure 7.16).

**Figure 7.15: Participation in cervical screening by remoteness, 2009 to 2010**




Notes: Data are for a two year reporting period
The rates shown are crude rates
Remoteness areas were assigned using the women's residential postcode acccording to the Australian Standard Geographic classification for 2006
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

**Figure 7.16: Percentage of participation in cervical screening by remoteness and age group, 2009 to 2010**



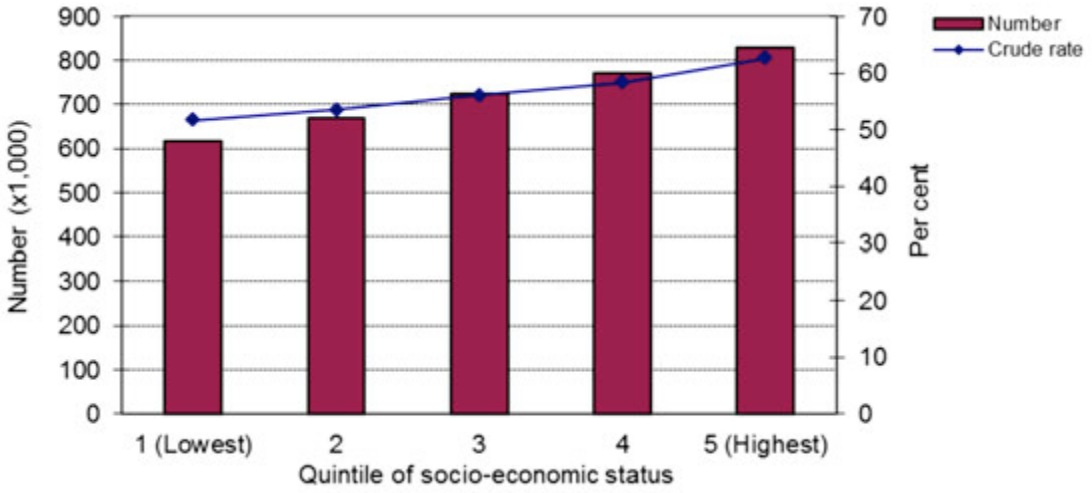

Notes: Data are for a two year reporting period
The rates shown are crude rates
Remoteness areas were assigned using the women's residential postcode acccording to the Australian Standard Geographic classification for 2006
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Participation in cervical screening by socioeconomic status

The cervical screening rate ranged from 52% among women living in the most disadvantaged areas to 63% among women living in the least disadvantaged areas (Figure 7.17).

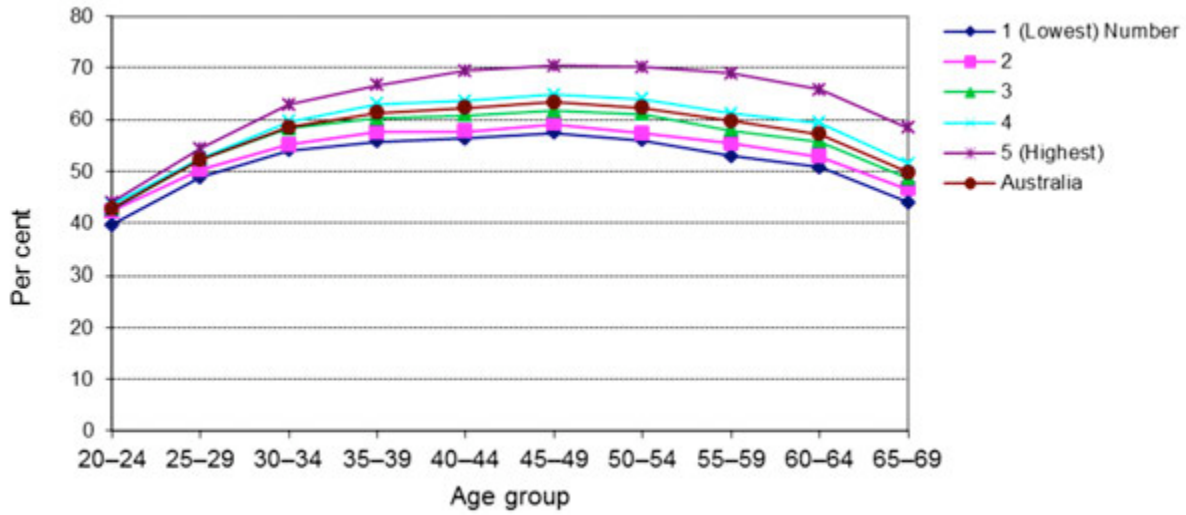
The cervical screening rate in the age group 65-69 years ranged from 44% for the most disadvantaged areas to 58% for the least disadvantaged areas (Figure 7.18).

**Figure 7.17: Participation in cervical screening by socioeconomic status, 2009 to 2010**




Notes: Data are for a two year reporting period
The rates shown are crude rates
Socio economic status is measured using the Australian Bereau of Statistics Index of Relative Social Disadvantage
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

**Figure 7.18: Percentage of participation in cervical screening by socioeconomic status and age group, 2009 to 2010**




Notes: Data are for a two year reporting period
The rates shown are crude rates
Socio economic status is measured using the Australian Bereau of Statistics Index of Relative Social Disadvantage
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

## 7.4.8 HPV vaccine

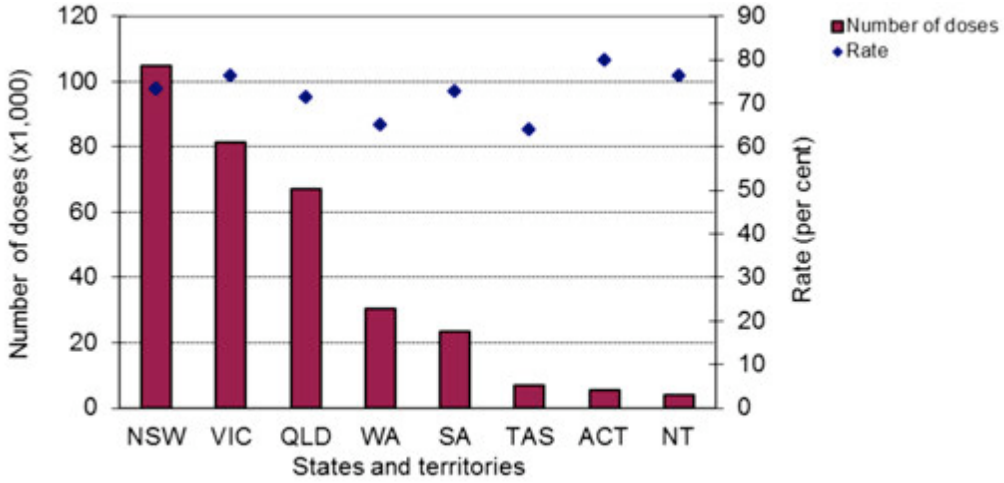
### HPV vaccination by state

In 2009, almost 324,000 doses of HPV vaccine were administered to girls aged 15 years (71%). The rate was highest in the ACT (80%) and was lowest in Tasmania (64%) (Figure 7.19).

### HPV vaccination by age

Between April 2007 and December 2009, the proportion of females receiving three doses were highest among females aged 12-13 years (73%) (Table 7.2).

**Figure 7.19: HPV vaccination coverage for girls aged 15 years by state and territory, 2009**




Source: Department of Health and Ageing, Human Papillomavirus (HPV)
http://www.health.gov.au/internet/immunise/publishing.nsf/Content/immunise-hpv#register#register

**Table 7.2: HPV Vaccination Coverage by age group and place of vaccination, between April 2007 and December 2009**

| Place of Vaccination | | School Program | School Catch Up | School Catch Up | GP/ community | GP/ community |
|---|---|---|---|---|---|---|
| Age | | 12-13 | 14-15 | 16-17 | 18-19 | 20-26 |
| Population | | 275,597 | 277,689 | 282,408 | 281,065 | 1,031,500 |
| Total no. of doses notified | | 649,310 | 652,014 | 624,410 | 433,856 | 1,278,678 |
| Coverage rate | | | | | | |
| as at 21 Mar 2011 | Dose 1 | 83% | 84% | 81% | 64% | 52% |
| | Dose 2 | 80% | 79% | 75% | 53% | 42% |
| | Dose 3 | 73% | 72% | 66% | 38% | 30% |

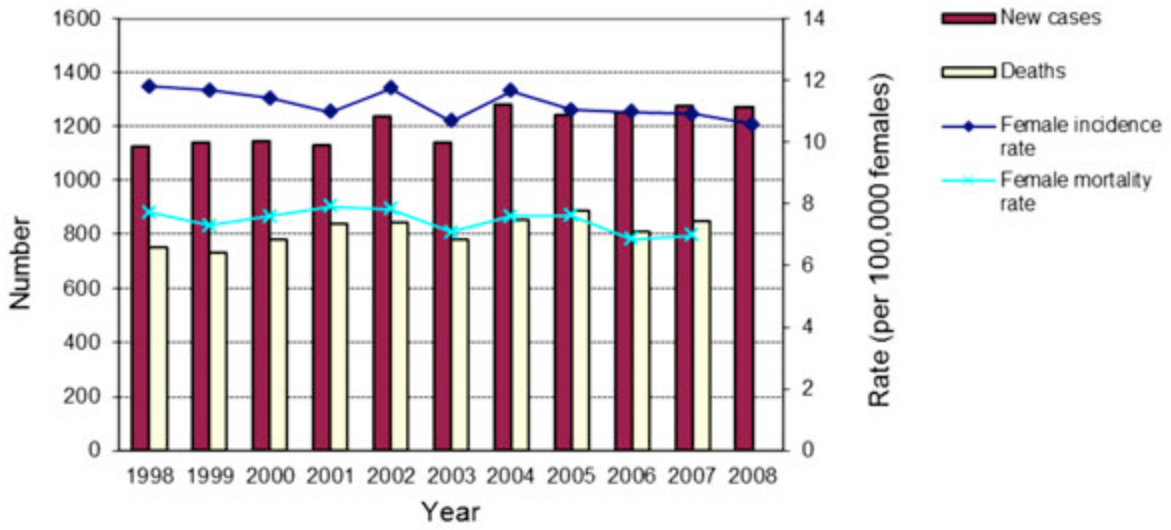
Note: Age and population at mid 2007
Source: Department of Health and Ageing, Human Papillomavirus (HPV)
http://www.health.gov.au/internet/immunise/publishing.nsf/Content/immunise-hpv#register#register

## 7.5 Ovarian cancer

### 7.5.1 Ovarian cancer in Australia

The number of new ovarian cancer cases increased from 1,125 cases in 1998 to 1,275 cases in 2008. The number of deaths also increased from 750 cases in 1998 to 848 in 2007. The incidence rate, on the other hand, decreased from 11.8 new cases per 100,000 females in 1998 to 10.6 new cases per 100,000 females in 2008. The mortality rate also decreased from 7.7 deaths per 100,000 females in 1998 to 7 deaths per 100,000 females in 2007 (Figure 7.20). Between 1998 and 2007, the female mortality incidence ratio ranged from 0.62 to 0.72.[24] The five year relative survival rate between 1998 and 2004 was 40%.[25]

**Figure 7.20: Ovarian cancer in Australia, 1998 to 2008**



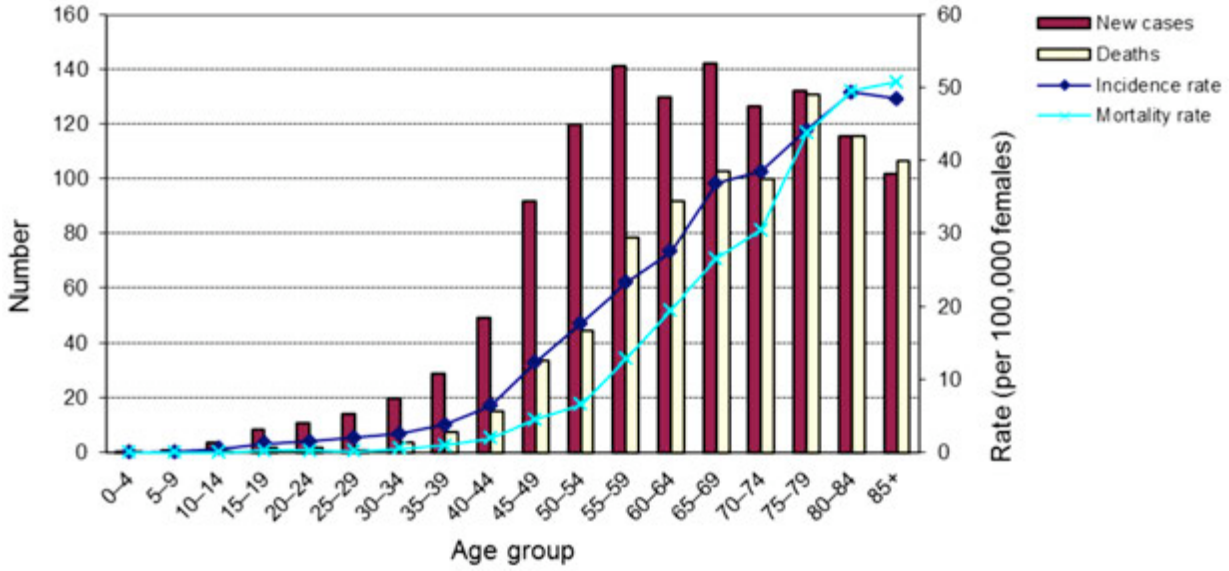

Note: The rates shown are age-standardised
Source: Australian Cancer Incidence and Mortality (ACIM) books

### 7.5.2 Ovarian cancer by age group

Between 2003 and 2007, the annual average number of new ovarian cancer cases was highest in the age group 65-69 years (142). The annual average number of deaths from ovarian cancer was highest in the age group 75-79 years (131). The incidence and mortality rates increased as age increased, up to 49 new cases per 100,000 females and 51 deaths per 100,000 females in the age group 85 or older (Figure 7.21).

The female mortality incidence ratio was also highest in the age group 85 or older (0.48). In 2007, the average age at diagnosis was 63 years and at death was 69 years. The risk of developing ovarian cancer was 1 in 121 before the age of 75 and 1 in 78 before the age of 85. The risk of dying from ovarian cancer was 1 in 195 before the age of 75 and one in 106 before the age of 85.[15]

**Figure 7.21: Ovarian cancer by age group, annual average for 2003 to 2007**

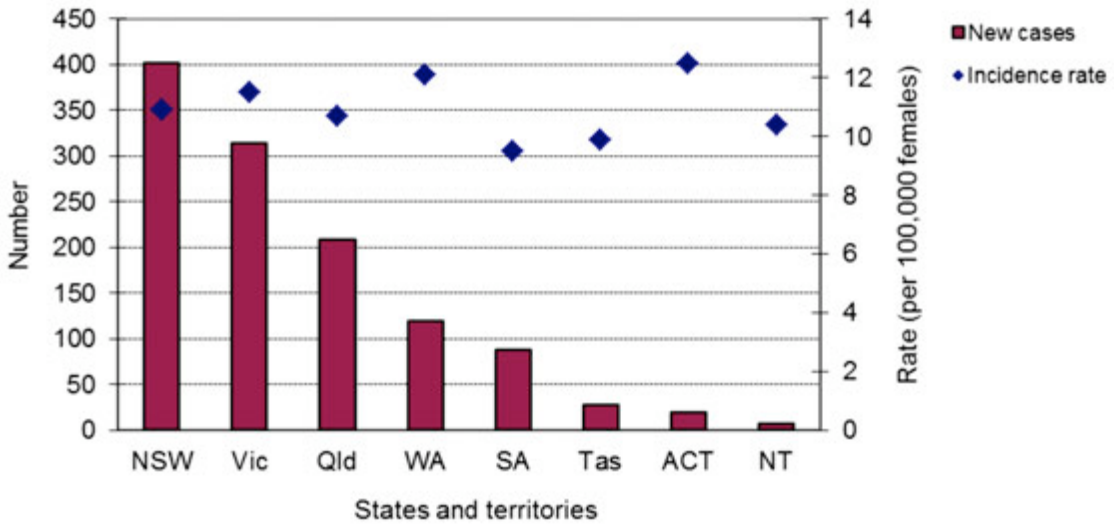



Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.5.3 Ovarian cancer by state

Between 2001 and 2005, NSW had the highest annual average number of new ovarian cancer cases (402) and NT had the lowest annual average number of new cases (7). The incidence rate was highest in the ACT (12.5 cases per 100,000 females) and lowest in SA (9.5 cases per 100,000 females) (Figure 7.22).

**Figure 7.22: Incidence of ovarian cancer by state and territory, average for 2001 to 2005**




Note: The rates shown are age-standardised

Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008 Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW

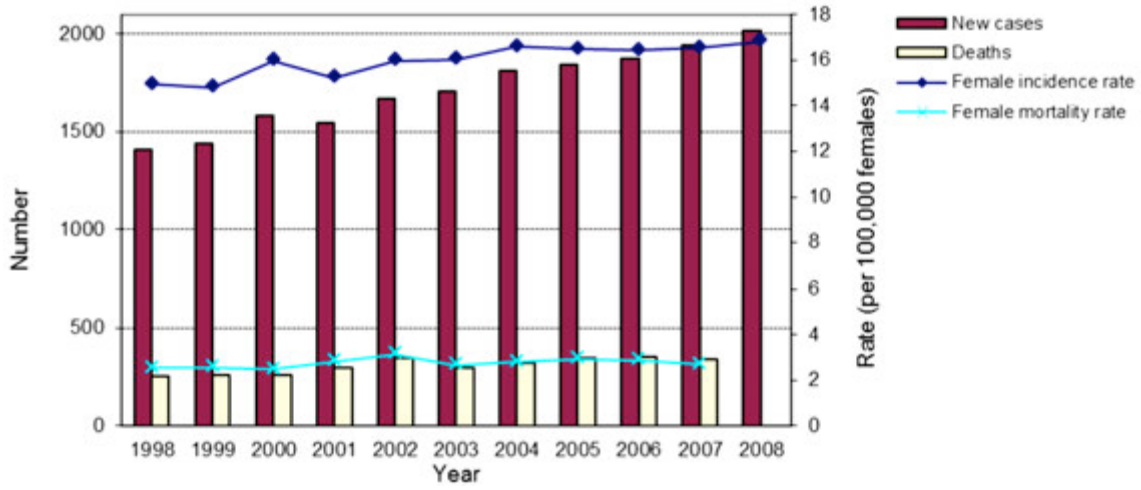
## 7.6 Uterine cancer

### 7.6.1 Uterine cancer in Australia

The number of new cases of uterine cancer increased from around 1,400 in 1998 to around 2,000 in 2008. The incidence rate also increased from 15 new cases per 100,000 females in 1998 to 17 new cases per 100,000 females in 2008. The number of deaths increased from 255 in 1998 to 338 in 2007. The mortality rate increased from 2.5 deaths per 100,000 females in 1998 to 2.7 deaths per 100,000 females in 2007 (Figure 7.23).

The female mortality incidence ratio decreased slightly from 0.17 in 1998 to 0.16 in 2007.[24] The five year relative survival rate between 1998 and 2004 was 82%.[25]

**Figure 7.23: Uterine cancer in Australia, 1998 to 2008**



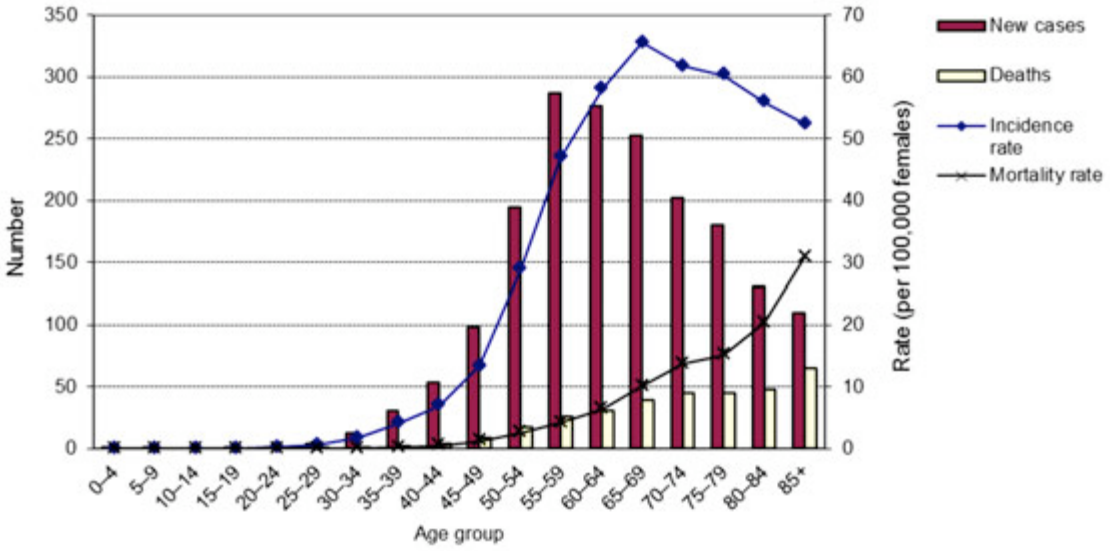

Note: Rates were age standardised
Source: Australian Cancer Incidence and Mortality (ACIM) books

### 7.6.2 Uterine cancer by age group

Between 2003 and 2007, the incidence rate for uterine cancer was highest in the age group 65-69 years (66 new cases per 100,000 females). The oldest group of 85 years or older had the highest mortality rate (31 deaths per 100,000 females) (Figure 7.24).

The female mortality incidence ratio for uterine cancer was 0.36 in the age group 80-84 years and increased sharply to 0.59 in the age group 85 or older. In 2007, the average age at diagnosis was 64 years and the average age at death was 74 years. The risk of developing uterine cancer was 1 in 69 before the age of 75 and 1 in 50 before the age of 85. The risk of dying from uterine cancer was 1 in 556 before the age of 75 and one in 275 before the age of 85.[15]

**Figure 7.24: Uterine cancer by age group, annual average for 2003 to 2007**

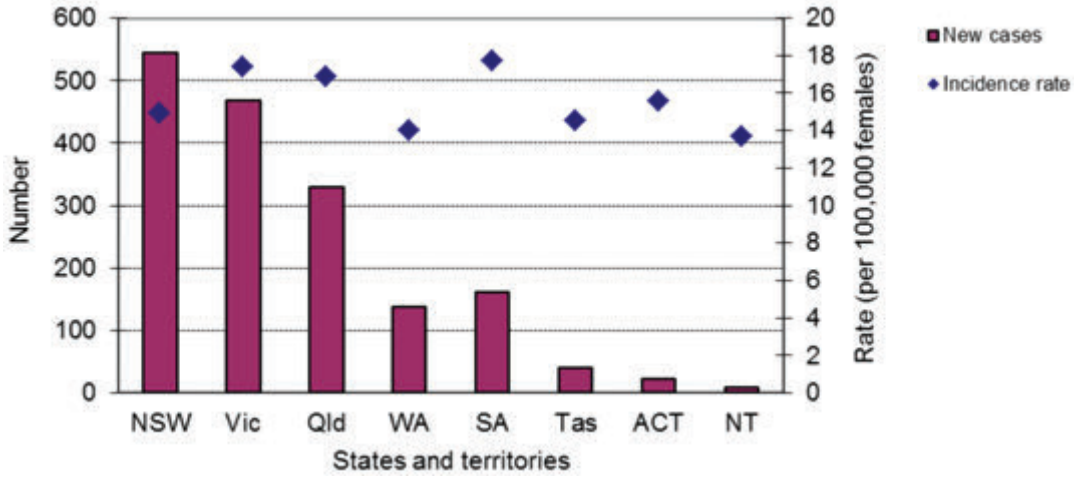



Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.6.3 Uterine cancer by state

Between 2001 and 2005, the incidence rate for uterine cancer was highest in SA (17.7 cases per 100,000 females) and lowest in NT (13.7 cases per 100,000 females) (Figure 7.25).

**Figure 7.25: Incidence of uterine cancer by state and territory, average for 2001 to 2005**




Note: The rates shown are age-standardised
Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008 Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW

## 7.7 Prostate cancer

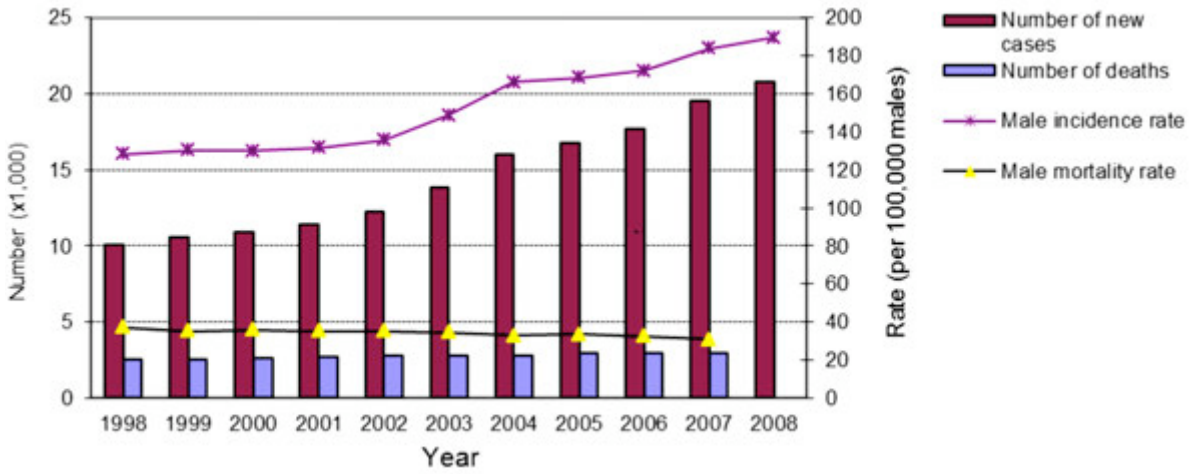
### 7.7.1 Prostate cancer in Australia

Between 1998 and 2008, the number of newly detected prostate cancer cases in Australia doubled, from around 10,100 cases in 1998 to 20,800 cases in 2008. The incidence rate increased from 128 cases per 100,000 males in 1998 to 190 cases per 100,000 males in 2008.

The number of prostate cancer deaths increased from around 2,600 in 1998 to around 2,900 in 2007. The mortality rate, on the other hand decreased from 37 deaths per 100,000 males in 1998 to 31 deaths per 100,000 males in 2007 (Figure 7.26).

The male mortality incidence ratio decreased from 0.29 in 1998 to 0.17 in 2007.[24] The five year relative survival rate between 1998 and 2004 was 85%.[25]

**Figure 7.26: Prostate cancer in Australia, 1998 to 2008**




Note: The rates shown are age-standardised, based on Australian population as at 30 June 2001
Source: Australian Cancer Incidence and Mortality (ACIM) books

### 7.7.2 Prostate cancer by age group

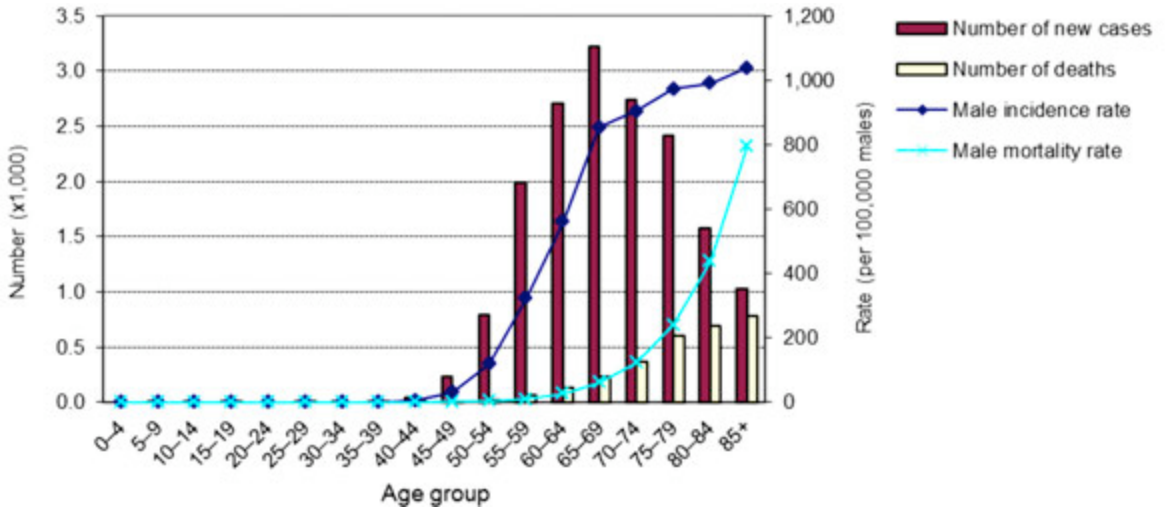
In the five year period between 2003 and 2007, the annual average number of new prostate cancer cases was highest in the age group 65-69 years (around 3,200 cases).

On the other hand, the incidence rate, the annual average number of deaths and mortality rate from prostate cancer increased as age increased. The age group 85 or older had the highest incidence rate (around 1,000 cases per 100,000 males), highest annual average number of deaths (784) and highest mortality rate (796 deaths per 100,000 males) (Figure 7.27).

The male mortality incidence ratio increased sharply from 0.13 for the age group 70-74 years to 0.77 in the age group 85 or older.

In 2007, the average age at diagnosis of prostate cancer was 68 years and the average age at death was 79 years. The risk of developing prostate cancer was 1 in 7 before the age of 75 and 1 in 4 before the age of 85. The risk of dying from prostate cancer was 1 in 104 before the age of 75 and 1 in 25 before the age of 85.[15]

**Figure 7.27: Prostate cancer by age group, annual average for 2003 to 2007**



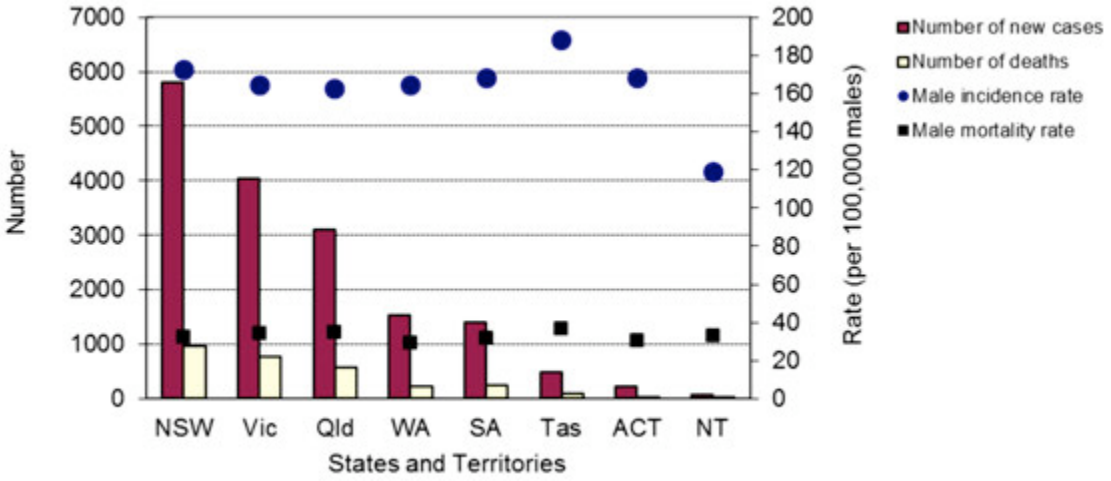

Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.7.3 Prostate cancer by state

Between 2003 and 2007, the incidence rates for prostate cancer ranged from 119 new cases per 100,000 males in the NT to 188 new cases per 100,000 males in TAS. The mortality rates ranged from 29 deaths per 100,000 males in WA to 37 deaths per 100,000 males in TAS (Figure 7.28).

The male mortality incidence ratio ranged from 0.18 in the ACT and WA to 0.28 in the NT.

**Figure 7.28: Prostate cancer by state and territory, annual average for 2003 to 2007**



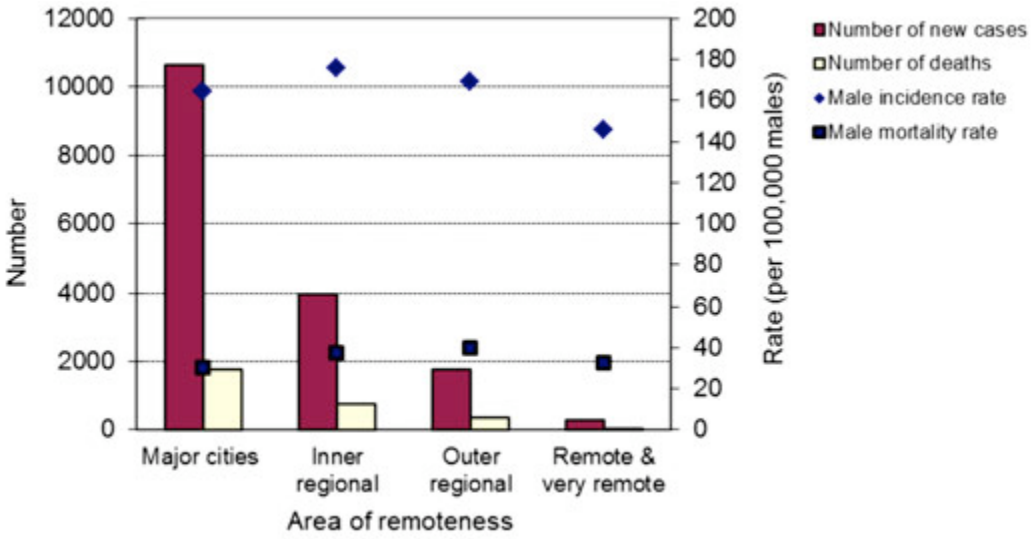

Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007

Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.7.4 Prostate cancer by remoteness

Between 2003 and 2007, the incidence rate for prostate cancer was highest in the inner regional areas (176 new cases per 100,000 males) and was lowest in the very remote areas (146 new cases per 100,000 males). The mortality rate was highest in the outer regional areas (40 deaths per 100,000 males) and was lowest in the major cities (30 deaths per 100,000 males) (Figure 7.29). The male mortality incidence ratio ranged from 0.18 in the major cities to 0.24 in the outer regional areas.

**Figure 7.29: Prostate cancer by remoteness, 2003 to 2007**



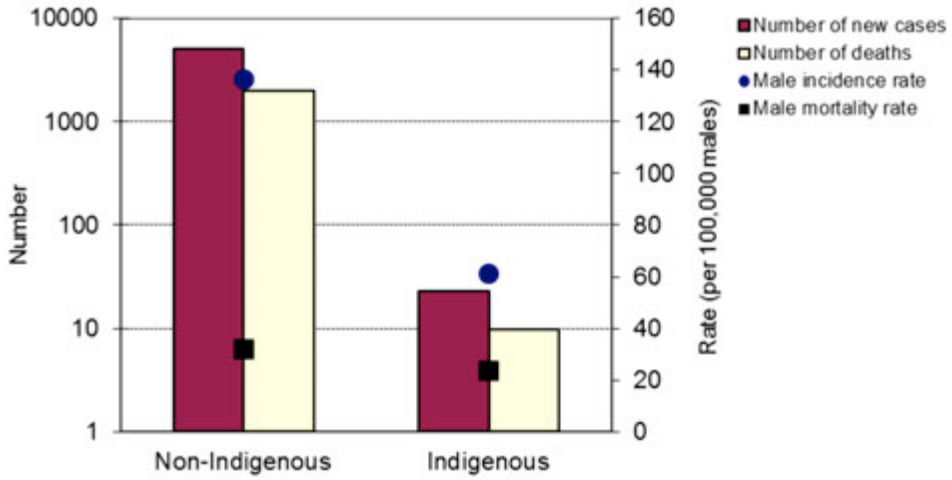

Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Remoteness are classified according to the Australian standard geographic classification (ASGC) remoteness areas
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.7.5 Prostate cancer by Indigenous status

Between 2003 and 2007, the incidence rate for prostate cancer was much lower among Indigenous men than among non-Indigenous men (61 new cases per 100,000 males vs. 137 new cases per 100,000 males). The mortality rate was also much lower among Indigenous men than among non-Indigenous men (24 deaths per 100,000 males vs. 32 deaths per 100,000 males) (Figure 7.30). The lower rates among Indigenous men suggest under reporting of Indigenous status or under detection of prostate cancer. It is also possible that Indigenous men do not live until very old age when most prostate cancer cases develop.

Despite lower incidence and mortality, the male mortality incidence ratio among Indigenous men was higher than among non-Indigenous men (0.39 vs. 0.23).

**Figure 7.30: Prostate cancer by Indigenous status, 2003 to 2007**

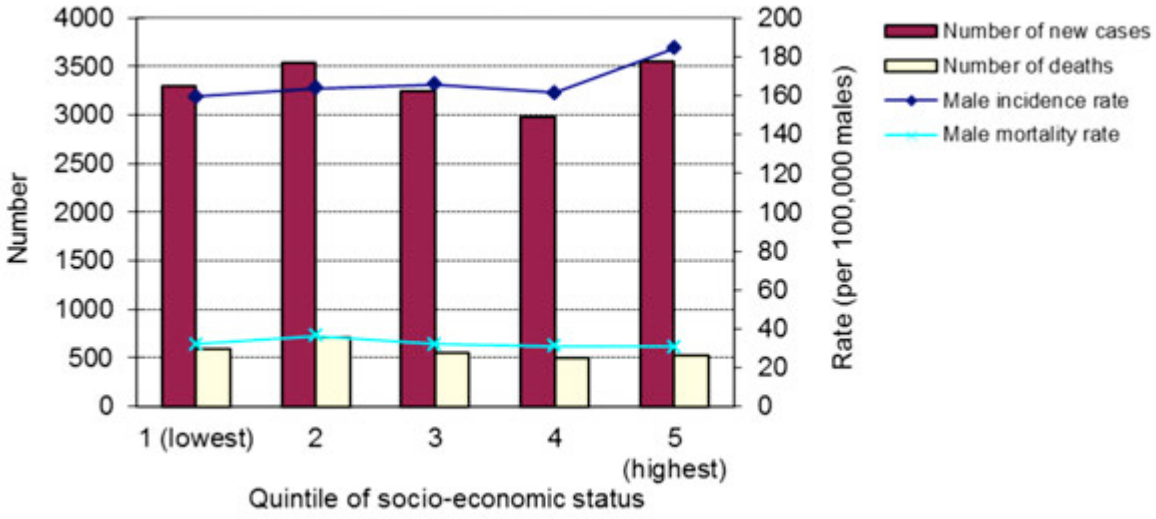



Notes: The rates shown are age-standardised. Primary y axis is on logarithmic scale
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

## 7.7.6 Prostate cancer by socioeconomic status

Between 2003 and 2007, the incidence rate for prostate cancer increased from 160 cases per 100,000 males among the most disadvantaged areas to 185 cases per 100,000 males among the least disadvantaged areas. The mortality rate was highest among the second most disadvantaged areas (37 deaths per 100,000 males) and was lowest among the most and second most advantaged areas (31 deaths per 100,000 males) (Figure 7.31). The male mortality incidence ratio ranged between 0.17 and 0.22.

**Figure 7.31: Incidence of prostate cancer by socioeconomic status, 2003 to 2007**




Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007

Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

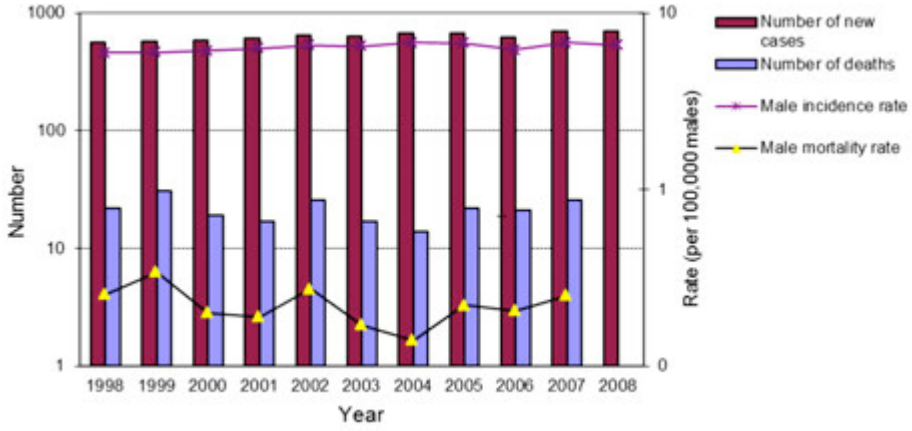
## 7.8 Testicular cancer

### 7.8.1 Testicular cancer in Australia

Between 1998 and 2008, the number of newly detected testicular cancer cases in Australia increased from 562 cases in 1998 to 696 cases in 2008. The incidence rate also increased from 5.9 cases per 100,000 males in 1998 to 6.6 cases per 100,000 males in 2008. The number of testicular cancer deaths was very low and increased slightly from 22 in 1998 to 26 in 2007. The mortality rate ranged from 0.1 to 0.3 deaths per 100,000 males (Figure 7.32).

The male mortality incidence ratio was very low and ranged from 0.02 to 0.06.[24] The five year relative survival rate between 1998 and 2004 was very high (97%).[25]

**Figure 7.32: Testicular cancer in Australia, 1998 to 2008**



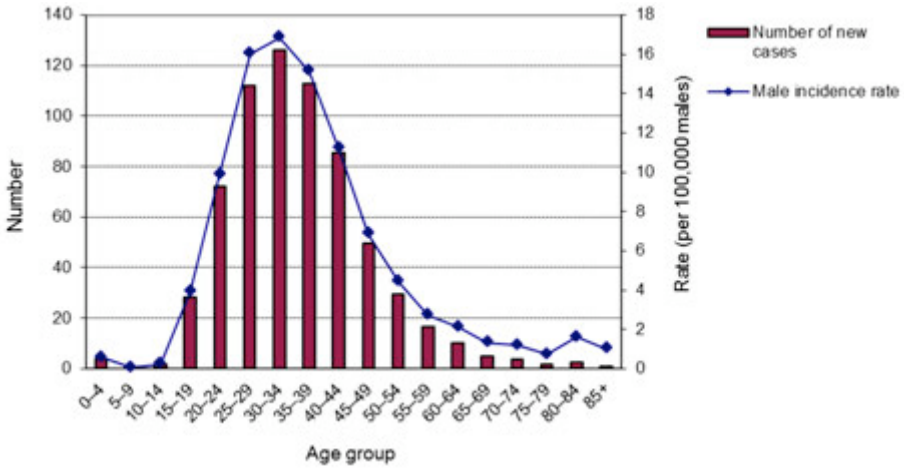

Note: The rates shown are age-standardised. Both y axes are on logarithmic scale
Source: Australian Cancer Incidence and Mortality (ACIM) books

### 7.8.2 Testicular cancer by age group

In the five year period between 2003 and 2007, the age group 30-34 years had the highest incidence rate for testicular cancer (17 new cases per 100,000 males). The mortality rate was highest in the age group 80-84 (0.61 deaths per 100,000 males) (Figure 7.33 & Figure 7.34). The male mortality incidence ratio was up to 0.61 in the age group 80-84 years.

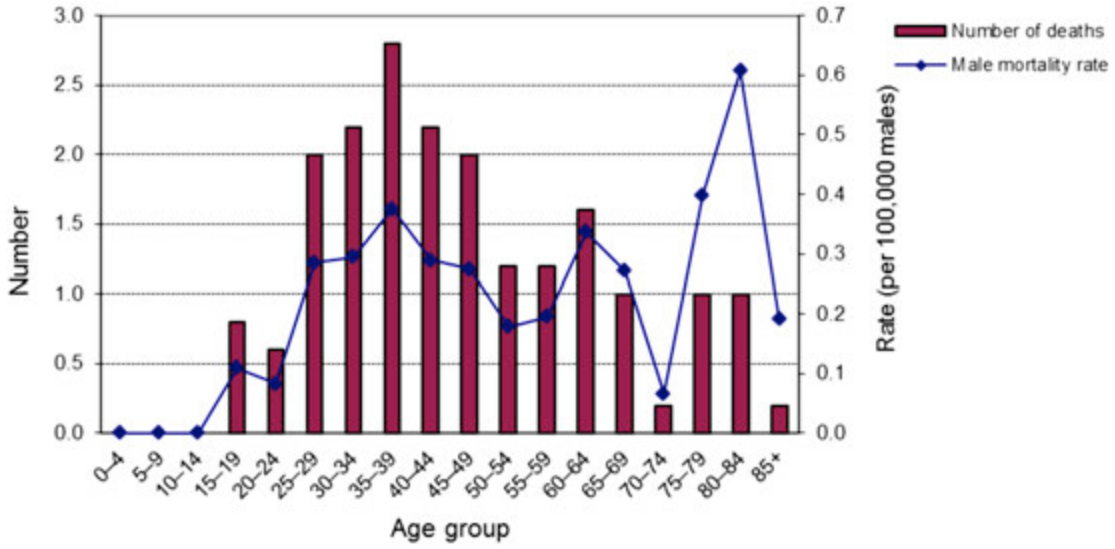
In 2007, the average age at diagnosis was 35 years and at death was 48 years. The risk of developing testicular cancer was 1 in 213 before the age of 75 and 1 in 207 before the age of 85. The risk of dying was 1 in 6,563 before the age of 75 and 1 in 3,712 before the age of 85.[15]

**Figure 7.33: Incidence of testicular cancer by age group, annual average for 2003 to 2007**




Source: Australian Cancer Incidence and Mortality (ACIM) books

**Figure 7.34: Mortality from testicular cancer by age group, annual average for 2003 to 2007**

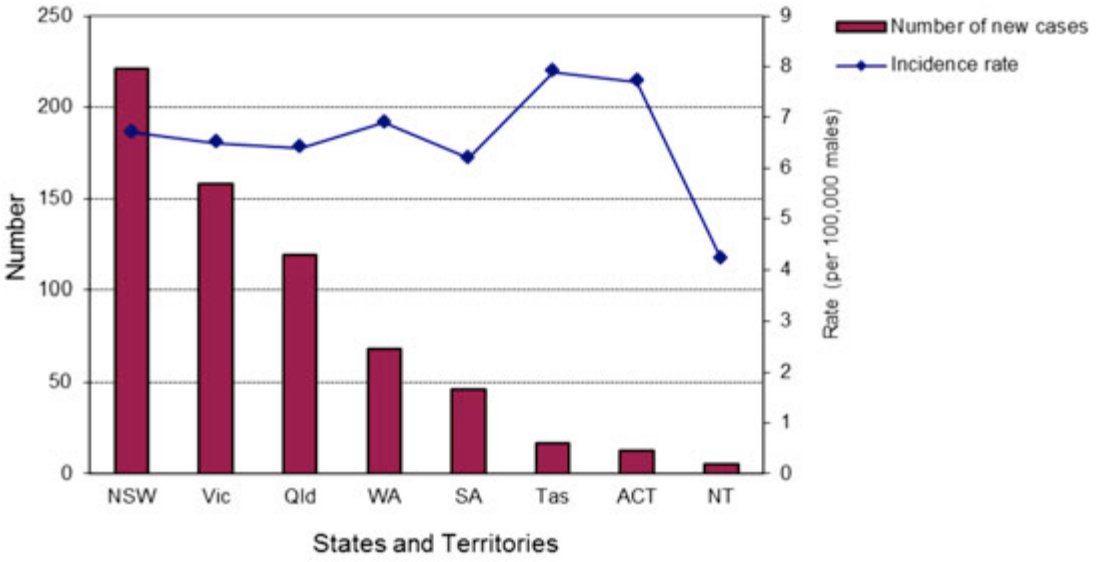



Source: Australian Cancer Incidence and Mortality (ACIM) books

## 7.8.3 Testicular cancer by state

Between 2001 and 2005, TAS had the highest incidence rate of testicular cancer of 7.9 new cases per 100,000 males and NT had the lowest incidence rate of 4.2 new cases per 100,000 males (Figure 7.35).

**Figure 7.35: Testicular cancer by state and territory, annual average for 2001 to 2005**




Note: The rates shown are age-standardised
Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42.Canberra: AIHW

## 7.9 Discussion

### 7.9.1 International comparison

Australia has lower incidence and mortality rates from cancer of the female reproductive tract than the average of the more developed countries. The difference was most notable for cervical and uterine cancers. The incidence rate of cervical and uterine cancer combined in Australia was 4.9 new cases per 100,000 females, compared to the average rate of 9.1 new cases per 100,000 females for the more developed countries.

The lower rate of cervical cancer in Australia may be attributable to the high rate of cervical screening. In Australia, 70% of women were screened every three years, higher than in New Zealand (64%), Ireland (29%) and Italy (up to 57%). About 83% of Australian women were screened every five years,[3] higher than in the UK (79%).[26]

Although Australia has a lower rate of cancer of the female reproductive tract compared to the average of the developed world, it has a higher rate of cancer of the male reproductive tract. The difference was most notable for prostate cancer. The incidence and mortality rates of prostate cancer in Australia (105 new cases and 15 deaths per 100,000 males), were much higher than the average of the more developed countries (62 new cases and 11 deaths per 100,000 males). Prostate cancer is mostly prevalent among men older than 50 years old. Australian men have a life expectancy of 80 years, three years higher than the average life expectancy of men in developed countries of 77 years.[27] Longer life expectancy in Australia may be associated with the higher rates of prostate cancer. A high quality health care system and easy access to health care due to universal health insurance, Medicare,[28] may also account for an increased detection rate of prostate cancer in Australia.

### 7.9.2 Cancers of the reproductive tract in Australia

Cancers of the reproductive tract accounted for a large proportion of all cancer morbidity (22%) and mortality (10%) in Australia. Among the cancers of the female reproductive tract, uterine cancer was most common (about 2,000 new cases in 2008); however, uterine cancer causes less mortality as it is easier to detect at early stages and easier to treat than ovarian cancer.

Ovarian cancer accounted for the highest number of deaths (848 deaths), mainly because the disease is mostly asymptomatic and patients are often diagnosed at an advanced stage. Cervical cancer caused the least amount of morbidity and mortality (745 new cases and 208 deaths). Cervical cancer also had the largest reduction in incidence rate, from 9.2 cases per 100,000 females in 1998 to 7 cases per 100,000 females in 2008. This has been attributed to the continued success of the cervical screening program since first introduction in 1991.[29,30] The proportion of women who have had a screening test within two years in 2010 was 57%. With the introduction of the HPV vaccination program in 2007, it is expected that cervical cancer rates will further reduce.

Prostate cancer was the most common cancer of the male reproductive tract. The incidence rate of prostate cancer in Australia had increased sharply, from 128 cases per 100,000 males in 1998 to 190 cases per 100,000 males in 2008. In 1988, the prostate-specific antigen (PSA) test was listed on Australia's Medicare Benefits Schedule (MBS) and attracted government subsidy. The number of PSA tests increased massively. In NSW, the rate of PSA testing increased from 1,284 per 100,000 men in 1989 to 12,119 per 100,000 men in 2006. Between 1989 and 2005, after PSA testing was introduced, about 43% more men than expected were diagnosed with prostate cancer in NSW.[31] PSA testing also contributed to 27% to 56% more prostate cancer cases in European countries[32] and 23% to 34% cases in America.[33] The advantages and disadvantages of whether or not to screen for prostate cancer using the PSA test have been contentiously debated in recent years.[18]

### 7.9.3 High risk groups

Indigenous people, people living in the NT, people living in remote areas, and people living in disadvantaged areas have higher rates of detected cervical cancer. For example, the cervical cancer incidence rate among Indigenous women was three times higher than that among non-Indigenous women (18 new cases per 100,000 females vs. 6.6 new cases per 100,000 females, respectively for a five year period, 2003-2007). NT had the highest rate of 11 new cases per 100,000 females compared to the national average of 7 new cases per 100,000 females.

NT has a high proportion of Indigenous people (30% compared to the national average of 2.5%)[34] and the majority of Indigenous people in NT live in remote or very remote areas (18% in remote areas and 63% in very remote areas compared to the national average of 8% and 16% respectively).[35] The risk of dying from cervical cancer for Indigenous women increased if they lived in remote areas.[36] In a national study, Indigenous women living in metropolitan areas had a 4.3 fold risk of mortality from cervical cancer compared with non-Indigenous women. This risk increased to 9.7 fold for rural areas and 18.3 fold for remote areas. Access to services for prevention and early diagnosis may play an important role in the higher risk of cervical cancer among Indigenous women. Compared to non-Indigenous women, Indigenous women with cancer are diagnosed at a later stage, are less likely to receive adequate treatment, and are more likely to practice high risk behaviour such as smoking and alcohol consumption.[37]

The lower rate of cervical screening may be the main reason for higher rates of cervical cancer among Indigenous people, people living in the NT, people living in remote areas, and people living in disadvantaged areas. NT had the lowest screening rate (54% compared to the national average of 57%). The cervical screening rate among women living in the most disadvantaged areas was 52% compared to 63% among women living in the least disadvantaged areas. National data on cervical screening rates among Indigenous women are not available but some studies suggested that Indigenous women are significantly under-screened[38,39]. In a study in Queensland, the proportion of women who had a screening test in biennial periods in Indigenous communities was 41%, 30% lower than the rest of Queensland.[38] In NT, the proportion of women who had a screening test in biennial periods among Indigenous women was 34%, half of the national rate of 64%.[39] Cultural and linguistic barriers may play an important part in the low cervical screening rate among Indigenous women, and the government has developed guidelines for health care professionals to break down these barriers when providing cervical screening services to Indigenous women.[40]

Although Indigenous people, people living in the NT and in remote areas, and people with low socioeconomic status had higher rates of cervical cancer, they had lower rates of prostate cancers. For example, the incidence rate for prostate cancer among Indigenous men was 61 new cases per 100,000 males for the 5 year period, 2003-2007; half the rate of 137 new cases per 100,000 males among non-Indigenous men. The lower rates of prostate cancer among disadvantaged groups may suggest under detection of prostate cancer among these groups and under reporting of Indigenous status rather than true lower magnitudes of the disease. Men from disadvantaged groups may also die from other causes before prostate cancer is detected. For example, life expectancy for Indigenous men is 67 years [41] while the average age at death caused by prostate cancer is 79 years.

Despite the lower incidence rates observed in the groups there was a higher mortality incidence ratio. For instance, the male mortality incidence ratios were 0.39 among Indigenous men compared to 0.23 among non-Indigenous men.

### 7.9.4 Data development

Data regarding cancer in Australia are easily accessible online. However, data on subpopulation groups are insufficient. Data on CALD populations is not available for all types of cancers. Data on Indigenous status, socioeconomic status and remoteness are only available for cervical cancer and prostate cancer.

For the cervical screening program, the NSW Pap Test Register collects information on Indigenous status.[42] However, information on Indigenous status is currently not available at a national level.[1] It is therefore not possible to monitor either the rate of cervical screening or the impact of any initiatives to increase screening among Indigenous women.

Up to the present, notification of the HPV vaccinations administered by general practice and in other community settings to the National HPV Vaccination Program Register is incomplete.[4] Measures should be undertaken to improve notification from these providers.

## 7.10 References


1. Australian Institute of Health and Welfare. Cervical screening in Australia 2009-2010. Cancer series no. 67. Cat. no. CAN 63. Canberra: AIHW, 2012.
2. Australian Institute of Health and Welfare. Cervical screening in Australia 2006-2007. Cancer series no. 47. AIHW Cat. no. CAN 43. Canberra: AIHW, 2009.
3. Australian Institute of Health and Welfare. Participation in cervical screening in Australia 2009-2010. Cancer series no. 67. AIHW Cat. no. CAN 63. Canberra: AIHW, 2012.
4. Victorian Cytology Service Inc. The National Human Papillomavirus (HPV) Vaccination Program Register. Available at: http://www.hpvregister.org.au/. Accessed on 8 April 2013.
5. International Agency for Research on Cancer. Cancer incidence, prevalence and mortality worldwide. IARC Cancerbase. Available at: http://www-dep.iarc.fr/. Accessed on 8 April 2013.
6. Lu B, Kumar A, Castellsague X, Giuliano AR. Efficacy and safety of prophylactic vaccines against cervical HPV infection and diseases among women: A systematic review & meta-analysis. BMC Infectious Diseases 2011; 11:13.
7. Department of Health and Ageing. The Australian immunisation handbook. 9th ed. Canberra: Department of Health and Ageing, 2008.
8. International Agency for Research on Cancer. IARC handbook of cancer prevention, volume 10: Cervix cancer screening. Lyon: IARC Press, 2005.
9. Morrell S, Perez DA, Hardy M, Cotter T, Bishop JF. Outcomes from a mass media campaign to promote cervical screening in NSW, Australia. J Epidemiol Community Health 2010; 64:777-83.
10. Brotherton JM. How much cervical cancer in Australia is vaccine preventable? A meta-analysis. Vaccine 2008; 26(2):250-6.
11. Tabrizi SN, Brotherton JM, Kaldor JM, Skinner SR, Cummins E, Liu B, et al. Fall in human papillomavirus prevalence following a national vaccination program. Journal of Infectious Diseases 2012; 206(11): 1645-51.
12. NSW Government. NSW School-based immunisation program 2013. Available at: http://www.health.nsw.gov.au/immunisation/Pages/schoolvaccination.aspx. Accessed on 8 April 2013.
13. Piek JM, van Diest DJ, Verheijen RH. Ovarian carcinogenesis: an alternative hypothesis. Adv Exp Med Biol 2008; 622:79-87.
14. Australian Institute of Health and Welfare. Ovarian cancer in Australia: an overview, 2010. Cancer series no. 52. AIHW Cat. no. CAN 48. Canberra: AIHW, 2010.
15. Australian Institute of Health and Welfare. Cancer in Australia: an overview, 2010. Cancer series no 60. AIHW Cat. no. CAN 56. Canberra: AIHW, 2010.
16. Sam Lister. Urine test could speed treatment of prostate cancer. London: The Times, 2009.
17. Siegel R, Ward E, Brawley O, Jemal A. Cancer statistics, 2011: the impact of eliminating socioeconomic and racial disparities on premature cancer deaths. CA Cancer J Clin 2011; 61(4):212-36.
18. Djulbegovic M, Beyth RJ, Neuberger MM, Stoffs TL, Vieweg J, Djulbegovic B, et al. Screening for prostate cancer: systematic review and meta-analysis of randomised controlled trials. BMJ 2010; 341:c4543.
19. Gardiner H. U.S. panel says no to prostate screening for healthy men. New York: New York Times, 2011.
20. Marchione M. Prostate testing's dark side: Men who were harmed. USA: Associated Press, 2011.
21. Tin J. Row rages over prostate cancer test. Australia: The Courier Mail, 2012.
22. Hayes-Lattin B, Nichols CR. Testicular cancer: a prototypic tumor of young adults. Semin Oncol 2009; 36(5):432-438.
23. Feldman DR, Bosl GJ, Sheinfeld J, Motzer RJ. Medical treatment of advanced testicular cancer. JAMA 2008; 299(6):672-684.

24. Australian Institute of Health and Welfare. Australian Cancer Incidence and Mortality (ACIM) Books. Canberra: AIHW, 2011.

25. Australian Institute of Health and Welfare. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW, 2008.

26. World Health Organization. What is the impact of cervical cancer in your country? Available at: http://apps.who.int/hpvcentre/statistics/dynamic/ico/SummaryReportsSelect.cfm. Accessed on 8 April 2013.

27. World Health Organisation. World Health Statistics 2011. Available at: http://www.who.int/whosis/whostat/2011/en/. Accessed on 8 April 2013.

28. Davis K, Schoen C, Schoenbaum SC, Doty MM, Holmgren AL, Kriss JL, et al. Mirror, mirror on the wall: An international update on the comparative performance of American health care. Available at: http://faculty.law.miami.edu/mcoombs/documents/CommFund_mirrormirrorinternationalpdate_1027.pdf. Accessed on 8 April 2013.

29. National Health and Medical Research Council. Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen detected abnormalities. Canberra: Commonwealth of Australia, 2005.

30. Department of Health and Ageing. National Cervical Cancer Screening Program: About the program. Available at: http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/cervical-about. Accessed on 8 April 2013.

31. Smith DP, Supramaniam R, Marshall VR, Armstrong BK. Prostate cancer and prostate-specific antigen testing in New South Wales. Med J Aust 2008; 189(6):315-18.

32. Draisma G, Boer R, Otto SJ, van der Cruijsen IW, Damhuis RA, Schröder FH, et al. Lead times and overdetection due to prostate-specific antigen screening: estimates from the European Randomized Study of Screening for Prostate Cancer. J Natl Cancer Inst 2003; 95(12):868-78.

33. Telesca D, Etzioni R, Gulati R. Estimating lead time and overdiagnosis associated with PSA screening from prostate cancer incidence trends. Biometrics 2008; 64(1):10.

34. Australian Bureau of Statistics. The health and welfare of Australia's Aboriginal and Torres Strait Islander Peoples, Oct 2010. ABS Cat. no. 4704.0. Canberra: ABS, 2012. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/4704.0/. Accessed on 8 April 2013.

35. Australian Bureau of Statistics. Population distribution, Aboriginal and Torres Strait Islander Australians, 2006. ABS Cat. no. 4705.0. Canberra: ABS, 2006. Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4705.0Main+Features12006?OpenDocument. Accessed on 8 April 2013.

36. O'Brien ED, Bailie RS, Jelfs PL. Cervical cancer mortality in Australia: contrasting risk by Aboriginality, age and rurality. Int J Epidemiol 2000; 29(5):813-6.

37. Cunningham J, Rumbold AR, Zhang X, Condon JR. Incidence, aetiology, and outcomes of cancer in Indigenous peoples in Australia. Lancet Oncol 2008; 9(6):585-95.

38. Coory MD, Muller JM, Dunn MAN, Fagan PS. Participation in cervical screening by women in rural and remote Aboriginal and Torres Strait Islander communities in Queensland. Med J Aust 2002; 177(10):544-7.

39. Binns PL, Condon JR. Participation in cervical screening by Indigenous women in the Northern Territory: a longitudinal study. Med J Aust 2006; 185(9):490-94.

40. Department of Health and Ageing. Principles of practice, standards and guidelines for providers of cervical screening services for Indigenous women. Canberra: Commonwealth of Australia, 2004.

41. Australian Bureau of Statistics. Experimental life tables for Aboriginal and Torres Strait Islander Australians, 2005-2007. ABS Cat. no. 3302.0.55.003. Canberra: ABS, 2009.

42. Cancer Institute NSW. The NSW Cervical Screening Program and NSW Pap Test Register. Available at: http://www.cancerinstitute.org.au/data-and-statistics/cancer-registries/nsw-pap-test-register. Accessed on 8 April 2013.

## 7.11 Appendices

### 7.11.1 Appendix 1: Country classification

(Source: United Nations DoEaSA, Population Division. World Contraceptive Use 2010 (POP/DB/CP/Rev2010). http://wwwunorg/esa/population/publications/wcu2010/Metadata/CPRhtml. 2011.)

**More developed regions:** comprise all regions of Europe plus Northern America, Australia, New Zealand and Japan. Developed countries are those in the more developed regions.

**Less developed regions:** comprise all regions of Africa, Asia (excluding Japan) and Latin America and the Caribbean, as well as Melanesia, Micronesia and Polynesia.

**Least developed countries:** includes 49 countries
Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina, Burundi, Cambodia, Central, Chad, Comoros, Dem., Djibouti, Equatorial, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao, Lesotho, Liberia, Madagascar, Malawi, Maldives1, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao, Senegal, Sierra, Solomon, Somalia, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, United, Vanuatu, Yemen, Zambia.

**Other less developed countries:** comprise the less developed regions excluding the least developed countries.

## 7.11.2 Appendix 2 - Data for figures presented in this chapter

### Table A 7.1: Cancers of the reproductive tract worldwide, 2008

| | Cervix uteri | Ovary | Prostate | Testis |
|---|---|---|---|---|
| Number of new cases | 530,232 | 224,747 | 899,102 | 52,322 |
| Number of deaths | 275,008 | 140,163 | 258,133 | 9,874 |
| Incidence ASR | 15 | 6.3 | 28 | 1.5 |
| Mortality ASR | 7.8 | 3.8 | 7.4 | 0.3 |

Notes: The rates shown are age-standardised
The total number of cases or deaths over the five year period from 2003 to 2007. Rates are based on the total number of case or deaths over the five year period 2003 to 2007
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.2: Incidence rate for cancers of the reproductive tract, international comparison, 2008

| | Cervix uteri | Ovary | Prostate | Testis |
|---|---|---|---|---|
| Less developed countries | 18 | 4.9 | 12 | 0.8 |
| More developed countries | 9.1 | 9.3 | 62 | 4.6 |
| Australia | 4.9 | 7.7 | 105 | 6.5 |

Note: Refer to Appendix 1 for country classification. Rate per 100,000 males or females
Source: GLOBOCAN 2008. Cancer Incidence, Mortality and Prevalence Worldwide in 2008
http://globocan.iarc.fr/

### Table A 7.3: Mortality rate for cancers of the reproductive tract, international comparison, 2008

| | Cervix uteri | Ovary | Prostate | Testis |
|---|---|---|---|---|
| Less developed countries | 9.7 | 3.1 | 5.6 | 0.3 |
| More developed countries | 3.1 | 5.1 | 11 | 0.3 |
| Australia | 1.4 | 4.5 | 15 | 0.1 |

Source: GLOBOCAN 2008. Cancer Incidence, Mortality and Prevalence Worldwide in 2008. Rate per 100,000 males or females
http://globocan.iarc.fr/

### Table A 7.4: Incidence and mortality for cancers of the reproductive tract in Australia, 2007

| | Cervical | Ovarian | Uterine | Testicular | Prostate |
|---|---|---|---|---|---|
| New cases | 745 | 1,276 | 1,946 | 699 | 19,500 |
| Deaths | 208 | 848 | 338 | 26 | 2,938 |
| Incidence rate | 6.8 | 11 | 17 | 6.8 | 18 |
| Mortality rate | 1.8 | 7 | 2.7 | 0.3 | 3.1 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 males or females

### Table A 7.5: Mortality incidence ratio and 5 year relative survival rate for the cancers of reproductive tract in Australia

| | Cervical | Ovarian | Uterine | Testicular | Prostate |
|---|---|---|---|---|---|
| Mortality incidence ratio | 0.26 | 0.72 | 0.16 | 0.04 | 0.17 |
| 5 year relative survival rate (%) | 72 | 40 | 82 | 97 | 85 |

Note: Mortality incidence ratio in 2007, five year relative survival rate 1998-2004
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.6: Cervical cancer in Australia, 1998 to 2008

| Year | Number of new cases | Number of deaths | Female incidence rate | Female mortality rate |
|---|---|---|---|---|
| 1998 | 873 | 260 | 9.2 | 2.7 |
| 1999 | 801 | 226 | 8.3 | 2.3 |
| 2000 | 770 | 265 | 7.8 | 2.6 |
| 2001 | 741 | 271 | 7.4 | 2.6 |
| 2002 | 691 | 217 | 6.8 | 2 |
| 2003 | 728 | 239 | 7 | 2.2 |
| 2004 | 726 | 210 | 6.9 | 1.9 |
| 2005 | 736 | 221 | 6.9 | 2 |
| 2006 | 720 | 227 | 6.7 | 2 |
| 2007 | 745 | 208 | 6.8 | 1.8 |
| 2008 | 778 | - | 7 | - |

Note: The rates shown are age-standardised, based on Australian population as at 30 June 2001. Rate per 100,000 females
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.7: Cervical cancer by age group, annual average for 2003 to 2007

| Age Group | New cases | Deaths | Female incidence rate | Female mortality rate |
|---|---|---|---|---|
| 15-19 | 1.2 | 0.2 | 0.2 | 0 |
| 20-24 | 10 | 0.8 | 1.5 | 0.1 |
| 25-29 | 40 | 3.6 | 5.8 | 0.5 |
| 30-34 | 76 | 8.4 | 10 | 1.1 |
| 35-39 | 87 | 9.6 | 11 | 1.3 |
| 40-44 | 86 | 17 | 11 | 2.2 |
| 45-49 | 86 | 17 | 12 | 2.3 |
| 50-54 | 65 | 19 | 9.6 | 2.9 |
| 55-59 | 51 | 17 | 8.4 | 2.8 |
| 60-64 | 49 | 23 | 10 | 4.7 |
| 65-69 | 44 | 17 | 11 | 4.4 |
| 70-74 | 34 | 16 | 10 | 4.9 |
| 75-79 | 37 | 22 | 13 | 7.4 |
| 80-84 | 35 | 23 | 15 | 9.7 |
| 85+ | 29 | 28 | 14 | 13 |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.8: Cervical cancer by state and territory, 2003 to 2007

| | NSW | Vic | Qld | WA | SA | Tas | ACT | NT | Total |
|---|---|---|---|---|---|---|---|---|---|
| Number of new cases | 1,219 | 799 | 806 | 392 | 236 | 98 | 55 | 44 | 3,649 |
| Number of deaths | 391 | 225 | 217 | 121 | 87 | 41 | 12 | 11 | 1,105 |
| Female incidence rate | 6.8 | 6 | 8 | 7.7 | 5.7 | 7.6 | 6.6 | 11 | 6.9 |
| Female mortality rate | 2 | 1.6 | 2.1 | 2.3 | 1.8 | 2.9 | 1.4 | 4 | 2 |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.9: Cervical cancer by area remoteness, 2003 to 2007

| | Number of new cases | Number of deaths | Female incidence rate | Female mortality rate |
|---|---|---|---|---|
| Major cities | 2,503 | 710 | 6.8 | 1.8 |
| Inner regional | 682 | 212 | 6.5 | 1.8 |
| Outer regional | 346 | 145 | 7.1 | 2.8 |
| Remote & very remote | 102 | 37 | 10.1 | 4 |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.10: Cervical cancer by Indigenous status, 2003 to 2007

| | Number of new cases | Female incidence rate | Number of deaths | Female mortality rate |
|---|---|---|---|---|
| Indigenous | 80 | 18.3 | 56 | 9.9 |
| Non-Indigenous | 1,274 | 6.6 | 764 | 1.9 |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.11: Participation in cervical screening in Australia, 1998 to 2010

| | 1998-1999 | 1999-2000 | 2000-2001 | 2001-2002 | 2002-2003 | 2003-2004 | 2004-2005 | 2005-2006 | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of participants | 2,716,364 | 3,244,329 | 3,262,931 | 3,296,409 | 3,318,354 | 3,354,519 | 3,407,219 | 3,452,092 | 3,549,524 | 3,599,919 | 3,638,941 | 3,635,929 |
| Participation rate (%) | 63 | 61 | 61 | 61 | 61 | 61 | 59 | 59 | 59 | 59 | 59 | 57 |

Notes: Data are for each two year reporting period
Data for Queensland are not included in the 1998-1999 period
The rates shown are age-standardised for women aged 20-69
Source: Australian Institute of Health and Welfare 2012. Cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.12: Participation in cervical screening by age group, 2009 to 2010

| | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 |
|---|---|---|---|---|---|---|---|---|---|---|
| Number | 337,779 | 418,495 | 438,861 | 480,342 | 442,089 | 432,082 | 370,765 | 306,598 | 251,215 | 157,703 |
| Rate (%) | 43 | 52 | 59 | 61 | 62 | 63 | 62 | 60 | 57 | 50 |

Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.13: Participation in cervical screening by state and territory, 2009 to 2010

| | NSW | VIC | QLD | WA | SA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| Number | 1,141,633 | 963,987 | 704,776 | 370,361 | 275,088 | 80,887 | 63,117 | 36,080 |
| Rate (%) | 56 | 61 | 55 | 57 | 60 | 57 | 59 | 54 |

Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.14: Percentage of participation in cervical screening by state and territory and age group, 2009 to 2010

| | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 |
|---|---|---|---|---|---|---|---|---|---|---|
| NSW | 38 | 49 | 57 | 60 | 61 | 62 | 61 | 59 | 56 | 48 |
| VIC | 42 | 53 | 61 | 65 | 66 | 68 | 68 | 65 | 63 | 55 |
| QLD | 45 | 52 | 57 | 58 | 59 | 60 | 59 | 56 | 54 | 47 |
| WA | 49 | 56 | 59 | 61 | 62 | 62 | 60 | 57 | 54 | 46 |
| SA | 45 | 55 | 60 | 64 | 64 | 65 | 64 | 62 | 59 | 53 |
| TAS | 52 | 56 | 59 | 60 | 61 | 61 | 59 | 57 | 54 | 47 |
| ACT | 46 | 54 | 61 | 61 | 63 | 62 | 62 | 62 | 61 | 54 |
| NT | 51 | 53 | 55 | 57 | 59 | 58 | 57 | 53 | 49 | 42 |
| Australia | 43 | 52 | 59 | 61 | 62 | 63 | 62 | 60 | 57 | 50 |

Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.15: Participation in cervical screening by remoteness, 2009 to 2010

| | Major cities | Inner regional | Outer regional | Remote | Very remote |
|---|---|---|---|---|---|
| Number | 2,568,785 | 678,299 | 309,567 | 49,415 | 27,126 |
| Crude rate (%) | 57 | 57 | 55 | 55 | 57 |

Note: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.16: Percentage of participation in cervical screening by remoteness and age group, 2009 to 2010

| | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 |
|---|---|---|---|---|---|---|---|---|---|---|
| Major cities | 40 | 52 | 59 | 62 | 64 | 65 | 63 | 61 | 58 | 50 |
| Inner regional | 49 | 54 | 57 | 59 | 60 | 61 | 61 | 58 | 56 | 49 |
| Outer regional | 50 | 53 | 55 | 57 | 58 | 59 | 58 | 56 | 54 | 48 |
| Remote | 52 | 55 | 58 | 58 | 57 | 57 | 56 | 53 | 53 | 44 |
| Very remote | 53 | 55 | 56 | 61 | 60 | 63 | 61 | 57 | 51 | 42 |
| Australia | 43 | 52 | 59 | 61 | 62 | 63 | 62 | 60 | 57 | 50 |

Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.17: Participation in cervical screening by socioeconomic status, 2009 to 2010

| Status | Number | Crude rate (%) |
|---|---|---|
| 1 (Lowest) | 616,641 | 52 |
| 2 | 668,585 | 54 |
| 3 | 723,425 | 56 |
| 4 | 772,590 | 58 |
| 5 (Highest) | 828,701 | 63 |

Note: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.18: Percentage of participation in cervical screening by socioeconomic status and age group, 2009 to 2010

| Status | 20–24 | 25–29 | 30–34 | 35–39 | 40–44 | 45–49 | 50–54 | 55–59 | 60–64 | 65–69 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 (Lowest) | 40 | 49 | 54 | 56 | 56 | 57 | 56 | 53 | 51 | 44 |
| 2 | 42 | 50 | 55 | 58 | 58 | 59 | 57 | 55 | 53 | 47 |
| 3 | 43 | 52 | 58 | 60 | 61 | 62 | 61 | 58 | 56 | 49 |
| 4 | 44 | 53 | 60 | 63 | 64 | 65 | 64 | 61 | 59 | 52 |
| 5 (Highest) | 44 | 54 | 63 | 67 | 69 | 70 | 70 | 69 | 66 | 58 |
| Australia | 43 | 52 | 59 | 61 | 62 | 63 | 62 | 60 | 57 | 50 |

Notes: Data are for a two year reporting period
The rates shown are crude rates
Source: Australian Institute of Health and Welfare 2012. Participation in cervical screening in Australia 2009–2010. Cancer series 67. Cat. no. CAN 63. Canberra: AIHW

### Table A 7.19: HPV vaccination coverage for girls aged 15 years by state and territory, 2009

| | NSW | Vic | Qld | WA | SA | Tas | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| Number of doses | 104,738 | 81,283 | 66,992 | 30,490 | 23,571 | 7,047 | 5,508 | 3,985 |
| Rate (%) | 73 | 76 | 71 | 65 | 72 | 64 | 80 | 76 |

Source: Department of Health and Ageing, Human Papillomavirus (HPV)
http://www.health.gov.au/internet/immunise/publishing.nsf/Content/immunise-hpv#register#register

### Table A 7.20: Ovarian cancer in Australia, 1998 to 2008

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| New cases | 1,125 | 1,139 | 1,147 | 1,131 | 1,237 | 1,140 | 1,279 | 1,240 | 1,254 | 1,276 | 1,272 |
| Female incidence rate | 12 | 12 | 11 | 11 | 12 | 11 | 12 | 11 | 11 | 11 | 11 |
| Deaths | 750 | 731 | 780 | 837 | 842 | 781 | 852 | 888 | 810 | 848 | - |
| Female mortality rate | 7.7 | 7.3 | 7.6 | 7.9 | 7.8 | 7.1 | 7.6 | 7.6 | 6.8 | 7 | - |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.21: Ovarian cancer by age group, annual average for 2003 to 2007

| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New cases | 0 | 1 | 4 | 9 | 11 | 14 | 20 | 29 | 49 | 92 | 120 | 142 | 130 | 142 | 126 | 132 | 116 | 102 |
| Deaths | 0 | 0 | 0 | 2 | 2 | 1 | 4 | 8 | 15 | 34 | 45 | 78 | 92 | 103 | 100 | 131 | 116 | 107 |
| Incidence rate | 0 | 0.1 | 0.6 | 1.3 | 1.5 | 2 | 2.6 | 3.8 | 6.4 | 12.4 | 17.7 | 23.2 | 27.5 | 36.9 | 38.5 | 44.2 | 49.4 | 48.5 |
| Mortality rate | 0 | 0 | 0 | 0.2 | 0.3 | 0.1 | 0.5 | 1 | 2 | 4.6 | 6.6 | 12.8 | 19.5 | 26.5 | 30.4 | 43.8 | 49.6 | 50.8 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 females

### Table A 7.22: Incidence of ovarian cancer by state and territory, average for 2001 to 2005

| | NSW | VIC | QLD | WA | SA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| New cases | 402 | 314 | 209 | 119 | 88 | 28 | 19 | 7 |
| Incidence rate | 10.9 | 11.5 | 10.7 | 12.1 | 9.5 | 9.9 | 12.5 | 10.4 |

Note: The rates shown are age-standardised. Reate per 100,000 females
Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW

### Table A 7.23: Uterine cancer in Australia, 1998 to 2008

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| New cases | 1,408 | 1,440 | 1,586 | 1,545 | 1,668 | 1,706 | 1,815 | 1,843 | 1,874 | 1,946 | 2,016 |
| Deaths | 255 | 262 | 261 | 299 | 349 | 297 | 323 | 346 | 351 | 338 | - |
| Female incidence rate | 15 | 15 | 16 | 15 | 16 | 16 | 17 | 16 | 16 | 17 | 17 |
| Female mortality rate | 2.5 | 2.6 | 2.5 | 2.8 | 3.2 | 2.7 | 2.8 | 2.9 | 2.9 | 2.7 | - |

Note: Rates were age standardised. Rate per 100,000 females
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.24: Uterine cancer by age group, annual average for 2003 to 2007

| | 0-4 | 5-9 | 10-14 | 15-19 | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 | 65-69 | 70-74 | 75-79 | 80-84 | 85+ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| New cases | 0.2 | 0.2 | 0 | 0.2 | 1.6 | 4.2 | 13 | 31 | 54 | 99 | 195 | 287 | 276 | 253 | 203 | 180 | 131 | 110 |
| Deaths | 0 | 0 | 0 | 0 | 0 | 0.2 | 0.4 | 1.8 | 4 | 9.2 | 17 | 26 | 30 | 39 | 45 | 45 | 48 | 65 |
| Incidence rate | 0 | 0 | 0 | 0 | 0.2 | 0.6 | 1.7 | 4.1 | 7 | 13 | 29 | 47 | 58 | 66 | 62 | 60 | 56 | 52 |
| Mortality rate | 0 | 0 | 0 | 0 | 0 | 0 | 0.1 | 0.2 | 0.5 | 1.3 | 2.6 | 4.2 | 6.4 | 10 | 14 | 15 | 20 | 31 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 females

### Table A 7.25: Incidence of uterine cancer by state and territory, average for 2001 to 2005

| | NSW | VIC | QLD | WA | SA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| New cases | 544 | 468 | 329 | 137 | 161 | 40 | 22 | 8 |
| Incidence rate | 14.9 | 17.4 | 16.9 | 14 | 17.7 | 14.5 | 15.6 | 13.7 |

Note: The rates shown are age-standardised. Rate per 100,000 females
Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42. Canberra: AIHW

### Table A 7.26: Prostate cancer in Australia, 1998 to 2008

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of new cases | 10,113 | 10,616 | 10,916 | 11,448 | 12,234 | 13,838 | 16,001 | 16,734 | 17,662 | 19,500 | 20,750 |
| Number of deaths | 2,570 | 2,513 | 2,666 | 2,718 | 2,820 | 2,837 | 2,793 | 2,950 | 2,971 | 2,938 | - |
| Male incidence rate | 128.4 | 130.4 | 129.9 | 131.6 | 135.7 | 148.7 | 166 | 168.5 | 172.3 | 183.9 | 189.5 |
| Male mortality rate | 37.2 | 35.2 | 35.9 | 35.2 | 35.3 | 34.5 | 32.9 | 33.5 | 32.5 | 31 | - |

Note: The rates shown are age-standardised, based on Australian population as at 30 June 2001. Rate per 100,000 males
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.27: Prostate cancer by age group, 2003 to 2007

| | Number of new cases | Number of deaths | Male incidence rate | Male mortality rate |
|---|---|---|---|---|
| 0–4 | - | 0 | 0 | 0 |
| 5–9 | 0.2 | 0 | 0 | 0 |
| 10–14 | 0.2 | 0 | 0 | 0 |
| 15–19 | 0.2 | 0.2 | 0 | 0 |
| 20–24 | 0 | 0 | 0 | 0 |
| 25–29 | 0.4 | 0.4 | 0.1 | 0.1 |
| 30–34 | 0.6 | 0 | 0.1 | 0 |
| 35–39 | 5 | 0.2 | 0.7 | 0 |
| 40–44 | 43 | 1.8 | 5.6 | 0.2 |
| 45–49 | 230 | 6.4 | 31 | 0.9 |
| 50–54 | 796 | 21 | 119 | 3.2 |
| 55–59 | 1,988 | 63 | 322 | 10 |
| 60–64 | 2,701 | 129 | 560 | 27 |
| 65–69 | 3,224 | 230 | 854 | 61 |
| 70–74 | 2,744 | 369 | 904 | 122 |
| 75–79 | 2,416 | 597 | 973 | 241 |
| 80–84 | 1,576 | 696 | 990 | 437 |
| 85+ | 1,022 | 784 | 1,039 | 796 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 males

### Table A 7.28: Prostate cancer by state and territory, 2003 to 2007

| | NSW | VIC | Qld | WA | SA | TAS | ACT | NT | Total |
|---|---|---|---|---|---|---|---|---|---|
| Number of new cases | 5,807 | 4,046 | 3,103 | 1,543 | 1,407 | 491 | 218 | 63 | 16,678 |
| Number of deaths | 969 | 762 | 566 | 228 | 248 | 85 | 31 | 10 | 2,898 |
| Male incidence rate | 172 | 164 | 162 | 165 | 168 | 188 | 168 | 119 | 168 |
| Male mortality rate | 32 | 34 | 35 | 29 | 32 | 37 | 31 | 33 | 33 |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIH

### Table A 7.29: Prostate cancer by remoteness, 2003 to 2007

| | Number of new cases | Number of deaths | Male incidence rate | Male mortality rate |
|---|---|---|---|---|
| Major cities | 10,646 | 1,752 | 165 | 30 |
| Inner regional | 3,969 | 750 | 176 | 38 |
| Outer regional | 1,768 | 348 | 169 | 40 |
| Remote & very remote | 271 | 46 | 146 | 33 |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.30: Prostate cancer by Indigenous status, 2003 to 2007

| | Number of new cases | Number of deaths | Male incidence rate | Male mortality rate |
|---|---|---|---|---|
| Non-Indigenous | 5,021 | 1,992 | 137 | 32 |
| Indigenous | 23 | 10 | 61 | 24 |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.31: Incidence of prostate cancer by socioeconomic status, 2003 to 2007

| Status | Number of new cases | Number of deaths | Male incidence rate | Male mortality rate |
|---|---|---|---|---|
| 1 (lowest) | 3,301 | 588 | 160 | 32 |
| 2 | 3,546 | 714 | 164 | 37 |
| 3 | 3,242 | 556 | 166 | 32 |
| 4 | 2,986 | 500 | 161 | 31 |
| 5 (highest) | 3,552 | 526 | 185 | 31 |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: AIHW & AACR 2010. Cancer in Australia: an overview, 2010. Cancer series no. 60. Cat. no. CAN 56. Canberra: AIHW

### Table A 7.32: Testicular cancer in Australia, 1998 to 2008

| | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of new cases | 562 | 571 | 587 | 611 | 642 | 636 | 673 | 679 | 628 | 699 | 696 |
| Number of deaths | 22 | 31 | 19 | 17 | 26 | 17 | 14 | 22 | 21 | 26 | - |
| Male incidence rate | 5.9 | 6 | 6.1 | 6.3 | 6.6 | 6.5 | 6.8 | 6.8 | 6.2 | 6.8 | 6.6 |
| Male mortality rate | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | - |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: Australian Cancer Incidence and Mortality (ACIM) books

### Table A 7.33: Incidence of testicular cancer by age group, annual average for 2003 to 2007

| | Number of new cases | Male incidence rate |
|---|---|---|
| 0-4 | 3.8 | 0.6 |
| 5-9 | 0.4 | 0.1 |
| 10-14 | 1.8 | 0.3 |
| 15-19 | 28 | 3.9 |
| 20-24 | 72 | 10 |
| 25-29 | 112 | 16 |
| 30-34 | 126 | 17 |
| 35-39 | 113 | 15 |
| 40-44 | 85 | 11 |
| 45-49 | 50 | 6.9 |
| 50-54 | 30 | 4.4 |
| 55-59 | 17 | 2.7 |
| 60-64 | 10 | 2.1 |
| 65-69 | 5 | 1.3 |
| 70-74 | 3.6 | 1.2 |
| 75-79 | 1.8 | 0.7 |
| 80-84 | 2.6 | 1.6 |
| 85+ | 1 | 1 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 males

### Table A 7.34: Mortality from testicular cancer by age group, annual average of 2003 to 2007

| Age Group | Number of deaths | Male mortality rate |
|---|---|---|
| 0–4 | 0 | 0 |
| 5–9 | 0 | 0 |
| 10–14 | 0 | 0 |
| 15–19 | 0.8 | 0.11 |
| 20–24 | 0.6 | 0.08 |
| 25–29 | 2 | 0.28 |
| 30–34 | 2.2 | 0.29 |
| 35–39 | 2.8 | 0.38 |
| 40–44 | 2.2 | 0.29 |
| 45–49 | 2 | 0.27 |
| 50–54 | 1.2 | 0.18 |
| 55–59 | 1.2 | 0.2 |
| 60–64 | 1.6 | 0.34 |
| 65–69 | 1 | 0.27 |
| 70–74 | 0.2 | 0.07 |
| 75–79 | 1 | 0.4 |
| 80–84 | 1 | 0.61 |
| 85+ | 0.2 | 0.19 |

Source: Australian Cancer Incidence and Mortality (ACIM) books. Rate per 100,000 males

### Table A 7.35: Testicular cancer by state and territory, annual average for 2001 to 2005

| | NSW | VIC | QLD | WA | SA | TAS | ACT | NT |
|---|---|---|---|---|---|---|---|---|
| Number of new cases | 221 | 158 | 119 | 68 | 46 | 17 | 13 | 5 |
| Incidence rate | 6.7 | 6.5 | 6.4 | 6.9 | 6.2 | 7.9 | 7.7 | 4.2 |

Note: The rates shown are age-standardised. Rate per 100,000 males
Source: AIHW (Australian Institute of Health and Welfare) & AACR (Australasian Association of Cancer Registries) 2008. Cancer in Australia: an overview, 2008. Cancer series no. 46. Cat. no. CAN 42.Canberra: AIHW

# Chapter 8:
# Non-directive Pregnancy Counselling

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Chapter Outline

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## Key indicators

Number of Medicare claims for non-directive pregnancy counselling

Cost of Medicare claims for non-directive pregnancy counselling

Number of non-directive pregnancy counselling calls to the National Pregnancy, Birth and Baby Helpline

## Primary data sources

Online Medicare Benefits Schedule (MBS data), 2007 to 2011

Pregnancy, Birth and Baby Helpline, National Health Call Centre Network, November 2010 to August 2012

## Purpose of this chapter

To examine utilisation of pregnancy counselling services in Australia

To identify areas of data development

## Terms and definitions

**Non-directive pregnancy counselling:** a form of counselling based on the understanding that, in many situations, people can resolve their own problems without being provided with a solution by the counsellor. The service involves the counsellor undertaking a safe, confidential process that helps the patient explore concerns they have about a pregnancy. This includes providing unbiased, evidence-based information about all options and services available to the patient, where requested.

## Data sources and limitations

**Medicare Benefits Schedule (MBS)**

Non-directive pregnancy counselling services can be tracked through MBS data using the following four MBS items:

**Item 4001:** Professional attendance for the purpose of providing non-directive pregnancy support counselling to a woman who is concerned about a current pregnancy or a pregnancy that occurred in the preceding 12 months, by a medical practitioner registered with Medicare Australia as meeting the credentialing requirements for provision of this service, and lasting at least 20 minutes. The service may be used to address any pregnancy related issues for which non-directive counselling is appropriate.

**Item 81000:** Provision of a non-directive pregnancy support counselling service to a woman who is concerned about a current pregnancy or a pregnancy that occurred in the preceding 12 months, by an eligible psychologist, where the patient is referred to the psychologist by a medical practitioner (including a general practitioner, but not a specialist or consultant physician), and lasting at least 30 minutes. The service may be used to address any pregnancy related issues for which non-directive counselling is appropriate.

**Item 81005:** Provision of a non-directive pregnancy support counselling service to a woman who is concerned about a current pregnancy or a pregnancy that occurred in the preceding 12 months, by an eligible social worker, where the patient is referred to the social worker by a medical practitioner (including a general practitioner, but not a specialist or consultant physician), and lasting at least 30 minutes. The service may be used to address any pregnancy related issues for which non-directive counselling is appropriate.

**Item 81010:** Provision of a non-directive pregnancy support counselling service to a woman who is concerned about a current pregnancy or a pregnancy that occurred in the preceding 12 months, by an eligible mental health nurse, where the patient is referred to the mental health nurse by a medical practitioner (including a general practitioner, but not a specialist or consultant physician), and lasting at least 30 minutes. The service may be used to address any pregnancy related issues for which non-directive counselling is appropriate.

*Limitations*

The four new items relating to non-directive pregnancy counselling were included in the Medicare Benefits Schedule in November 2006. Counselling services that were claimed through Medicare in 2006 are excluded in this chapter.

Health professionals need to complete an accredited training course to be able to use the specific item number.

Relevant counselling may occur as part of a more general consultation with medical practitioners or may be claimed as a standard or long consultation and may not be claimed under the specific MBS item for pregnancy counselling.

Services provided in public hospitals or outpatient departments, by abortion clinics, or where the cost is borne by patients are not captured by Medicare.

**Pregnancy, Birth and Baby Helpline**

The National Health Call Centre Network operates the Pregnancy, Birth and Baby Helpline which routinely records limited information about callers, including the number of calls received, the length of each call, and the age and gender of callers.

*Limitations*

The Helpline data are not available online. At the time when the data regarding the Pregnancy, Birth and Baby Helpline were requested, data from November 2010 to August 2012 were available.

There are other organisations that offer pregnancy counselling by telephone, however, relevant data are not available online and are not included in this report.

## Summary

Since November 2006, Medicare has specifically funded non-directive pregnancy counselling provided by medical practitioners, psychologists, social workers, and mental health nurses. From January 2007 to December 2011, a total of 20,610 Medicare claims (i.e. approximately 4,000 per year, and approximately 18 per 100,000 population per year) for non-directive pregnancy counselling were processed, 96% of which related to counselling provided by medical practitioners. The total cost to Medicare for the specific Medicare items over that five year period was $1.37 million for the non-directive pregnancy counselling provided by medical practitioners and $63,000 for counselling by other health professionals. Women aged under 25 years accounted for 30% of claims for non-directive pregnancy counselling provided by medical practitioners and 17% of claims provided by the other types of health professionals.

The Australian Government's Pregnancy, Birth and Baby telephone helpline has operated since July 2010 and is available 24 hours per day. Between November 2010 and August 2012 the helpline received a total of 1,147 calls, an average of 52 per month, requesting non-directive advice and counselling regarding unintended pregnancies. More than half of the calls originated in New South Wales and Victoria.

No outcome data regarding any of these government-funded services have been published.

## 8.1 Introduction

Pregnancy counselling is available from a variety of sources in Australia, including generalist counselling services, medical practitioners, family planning services, psychologists, social workers and clinics that provide abortion services. The Commonwealth Government has implemented two initiatives to support pregnancy counselling services nationwide.

Since November 2006, women who are concerned about a current pregnancy or a pregnancy that occurred in the preceding 12 months have been able to claim Medicare rebates for up to three non-directive pregnancy support counselling services for each pregnancy. These services include providing unbiased, evidence-based information about all options and services that are available to the patient. The services can be provided by a General Practitioner (GP) who has completed non-directive pregnancy counselling training or, with a written referral from any GP, by eligible private psychologists, social workers and mental health nurses who have completed appropriate non-directive pregnancy counselling training. These services are covered by four specific Medicare Benefits Schedule items.

The Pregnancy, Birth and Baby Helpline has been providing telephone support since July 2010. This helpline provides free, non-judgmental advice, counselling and referral services regarding pregnancy, childbirth and infant health 24 hours per day. Callers who want more than basic information can be transferred to speak to qualified counsellors who are available every day between 7 am and midnight, or can be referred to other relevant services.

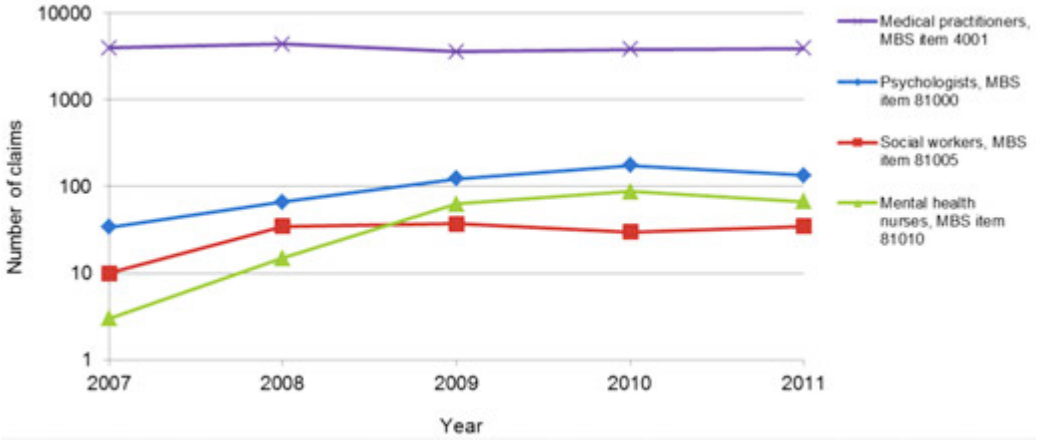
The services provided under the four Medicare items, and by the Helpline, support women across all pregnancy related issues, including unintended pregnancy. No reliable, recent estimates of the number of unintended pregnancies that occur in Australia have been published. In January 2008, Marie Stopes International Australia reported that 51% of women of reproductive age had experienced an unplanned pregnancy.[1] In comparison, the Household Income and Labour Dynamics in Australia (HILDA) study from 2005 found that 65% of survey respondents' most recent pregnancies that led to a birth were intended, 18% were unintended-mistimed and 17% were unintended-unwanted.[2] An earlier study, based on data collected in 2003 from women aged 52-57 years who participated in the Australian Longitudinal Study on Women's Health found that 32% of women's first pregnancies, and 15-17% of their second, third and fourth pregnancies were unplanned.[3] However, differences in the definitions of unintended and unplanned pregnancies between studies make direct comparisons difficult.

## 8.2 Pregnancy services funded by Medicare

The number of Medicare claims lodged for non-directive pregnancy counselling provided by medical practitioners has been relatively stable since 2007 at around 4,000 claims per year (Figure 8.1). Ninety-six percent of all Medicare claims for non-directive pregnancy counselling in 2011 were for services provided by medical practitioners. The number of services provided by other types of health professionals increased over time in the first three years after the introduction of the Medicare Benefits Schedule items but have been stable since 2009.

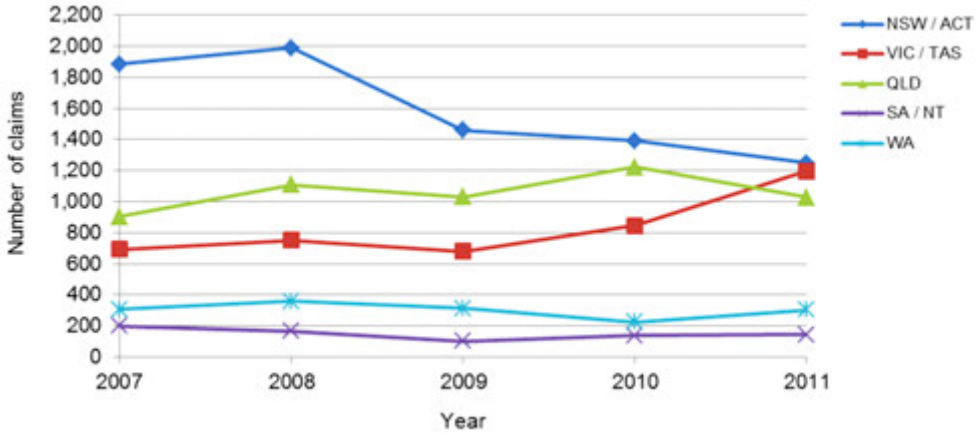
In recent years, the number of Medicare claims lodged for non-directive pregnancy counselling that were provided by medical practitioners has increased in VIC/TAS, has been stable in WA and SA/NT, and has decreased in NSW/ACT (Figure 8.2). The trend in the number of claims for each state and territory is reflected in similar trends for the rate of claims per 100,000 population (Figure 8.3). In 2011, QLD had the highest rate of claims per 100,000 population despite having had the third highest number of claims. SA/NT had the lowest number of claims in 2011, and also the lowest rate of claims per 100,000 population.

**Figure 8.1: Number of Medicare claims for non-directive pregnancy counselling items by type of health professional, 2007 to 2011**



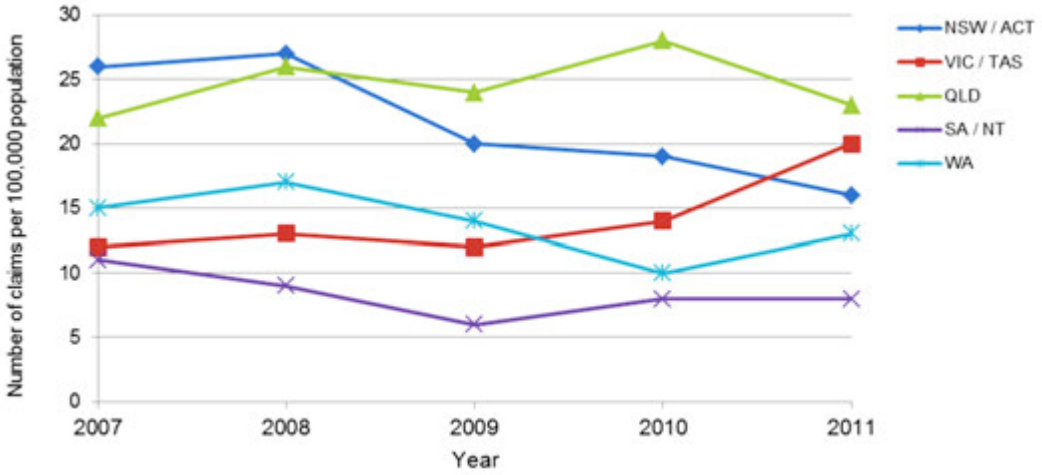

Note: y-axis is on a logarithmic scale
Source: Medicare Australia online statistics

**Figure 8.2: Number of Medicare claims for non-directive pregnancy counselling provided by medical practitioners by state and territory, 2007 to 2011**




Source: Medicare Australia online statistics

**Figure 8.3: Number of Medicare claims for non-directive pregnancy counselling services provided by medical practitioners per 100,000 population by state and territory, 2007 to 2011**




Source: Medicare Australia online statistics

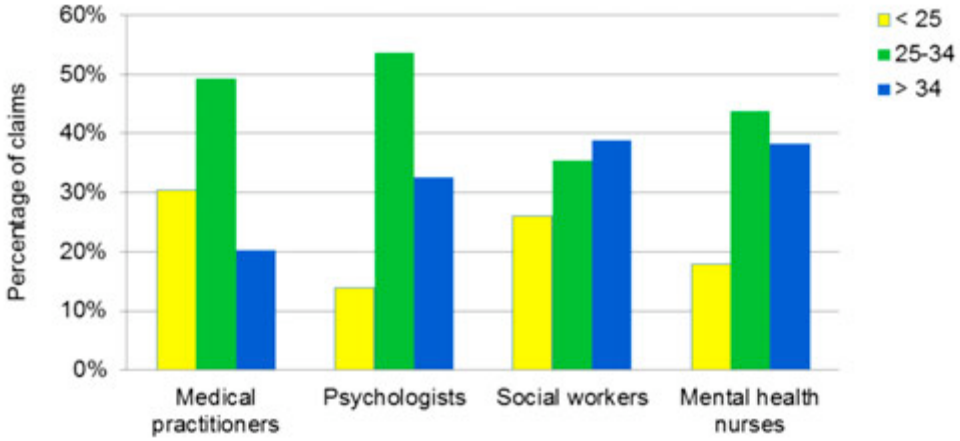
Of the 20,610 Medicare claims for non-directive pregnancy counselling, 49% (10,151) were from women aged 25-34 years. Women aged less than 25 years and those aged more than 35 years claimed for 30% (6,115) and 21% (4,344), respectively.

Women aged 25-34 years most often sought non-directive pregnancy counselling from medical practitioners (49%) followed by psychologists (3%), social workers (1%) and mental health nurses (1%) (Figure 8.4).

Women who were less than 25 years of age most often sought non-directive pregnancy counselling from medical practitioners (30%) followed by social workers (26%), mental health nurses (18%) and psychologists (14%).

In contrast, women aged 35 years and over most often sought non-directive pregnancy counselling from social workers (39%) followed by mental health nurses (38%), psychologists (33%) and medical practitioners (20%).

**Figure 8.4: Age group distribution of patients who claimed Medicare rebates for non-directive pregnancy counselling by type of health professional, 2007 to 2011**

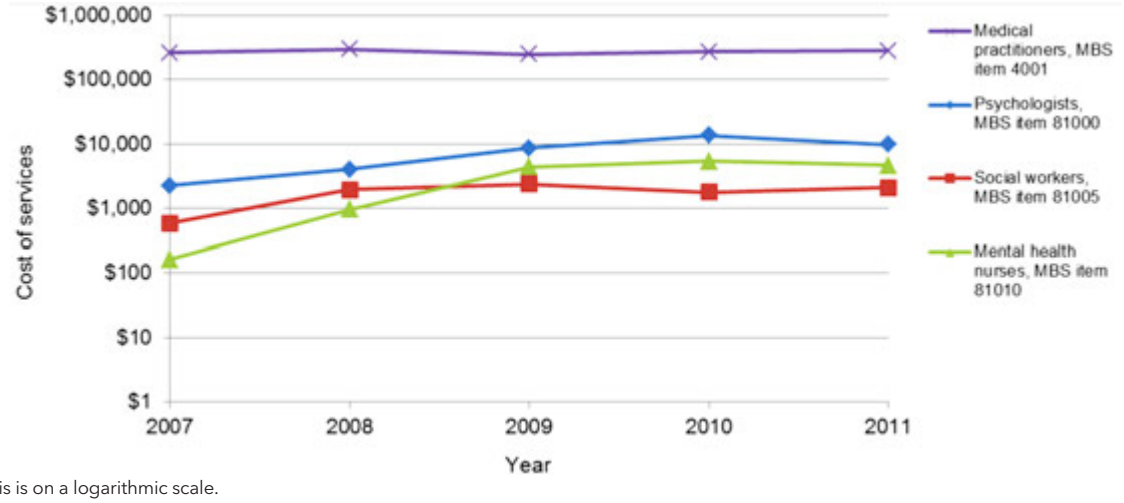



Source: Medicare Australia online statistics

The total cost of Medicare-funded non-directive pregnancy counselling between 2007 and 2011 was $1.43 million. The annual cost, Australia-wide, has been fairly stable over time (Figure 8.5). Most (94%) of the cost of the services provided was for counselling provided by medical practitioners. The total cost to Medicare for counselling provided by other health professionals in 2007-2011 was $63,000.

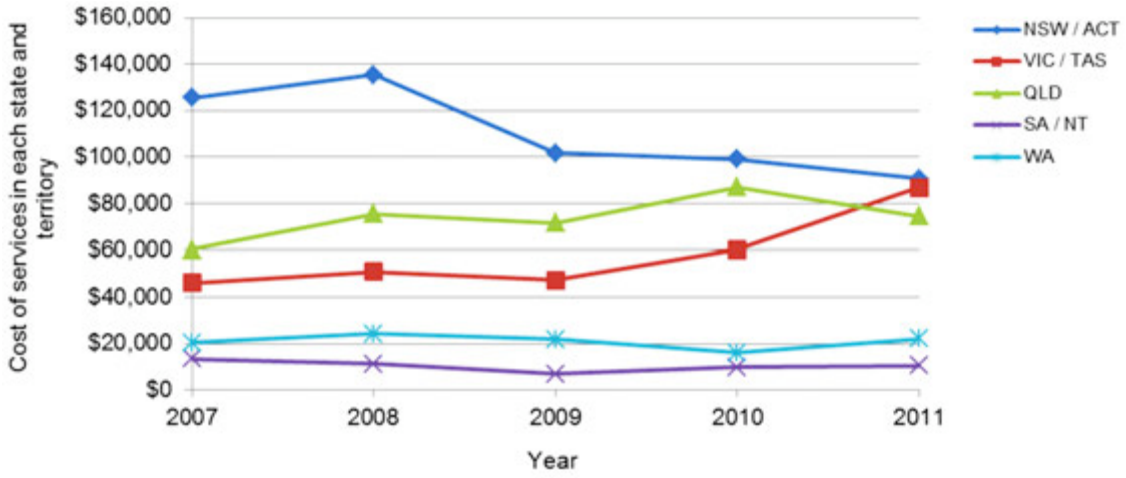
The total cost of Medicare-funded non-directive pregnancy counselling provided by medical practitioners in 2007-2011 was $1.37 million, nearly half ($552,000) of which was due to claims that were lodged in NSW and the ACT (Figure 8.6).

**Figure 8.5: Cost of Medicare-funded non-directive pregnancy counselling services provided by type of health professional, 2007 to 2011**




Note: y-axis is on a logarithmic scale.
Source: Medicare Australia online statistics

**Figure 8.6: Cost of Medicare-funded non-directive pregnancy counselling services provided by medical practitioners by state and territory, 2007 to 2011**



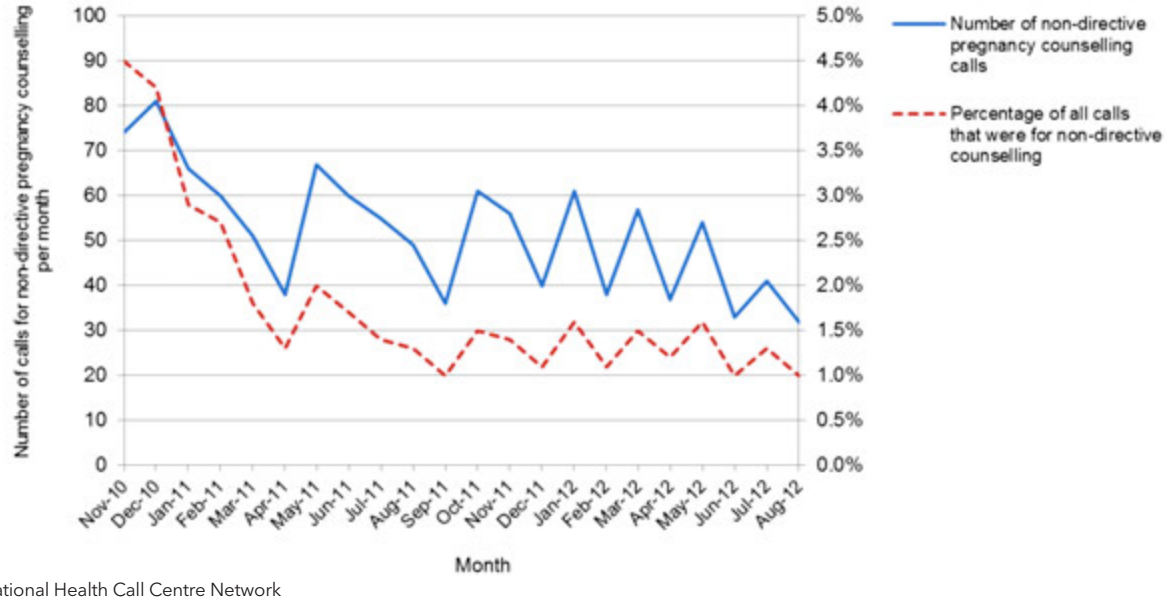

Source: Medicare Australia online statistics

## 8.3 Non-directive pregnancy counselling services provided by the Pregnancy, Birth and Baby Helpline

The Pregnancy, Birth and Baby Helpline (PBBH) received a total of 70,809 calls between November 2010 and August 2012 inclusive. These included 1,147 calls (1.6%) that were recorded as being about non-directive advice regarding pregnancy options. The number of calls per month to the Helpline regarding pregnancy options declined from an initial peak of about 80 in December 2010 to around 40 in July 2012. The percentage of all calls to the PBBH that were specifically about non-directive pregnancy counselling also declined over time, from an initial 4.5% in November 2010 to 1% in August 2012 (Figure 8.7).

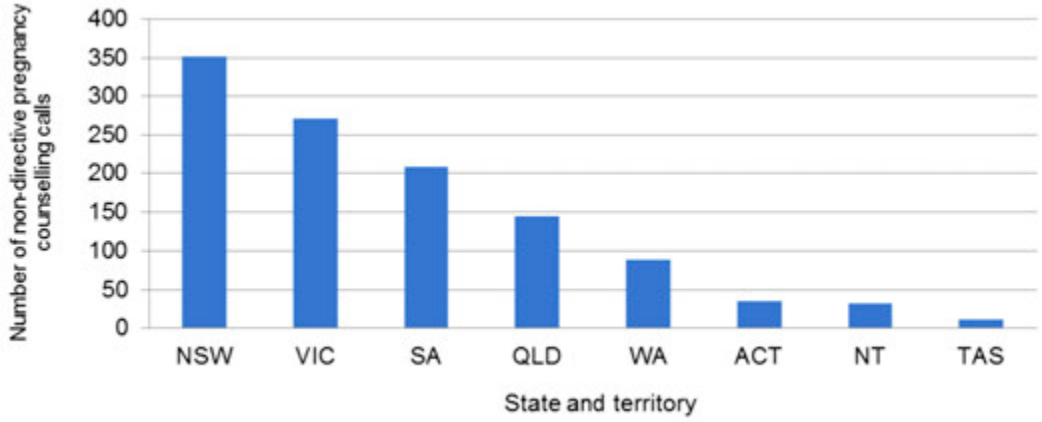
Over the period November 2010 to August 2012 the largest number of calls to the PBBH for non-directive pregnancy counselling originated in NSW (31%) followed by VIC (24%) and SA (18%) (Figure 8.8). The average call handling time in the initial contact with customer service representatives was 10 minutes, and the average time spent talking with counsellors was 27 minutes.

**Figure 8.7: Number of calls for non-directive pregnancy counselling handled by the National Pregnancy, Birth and Baby Helpline, November 2010 to August 2012**




Source: National Health Call Centre Network

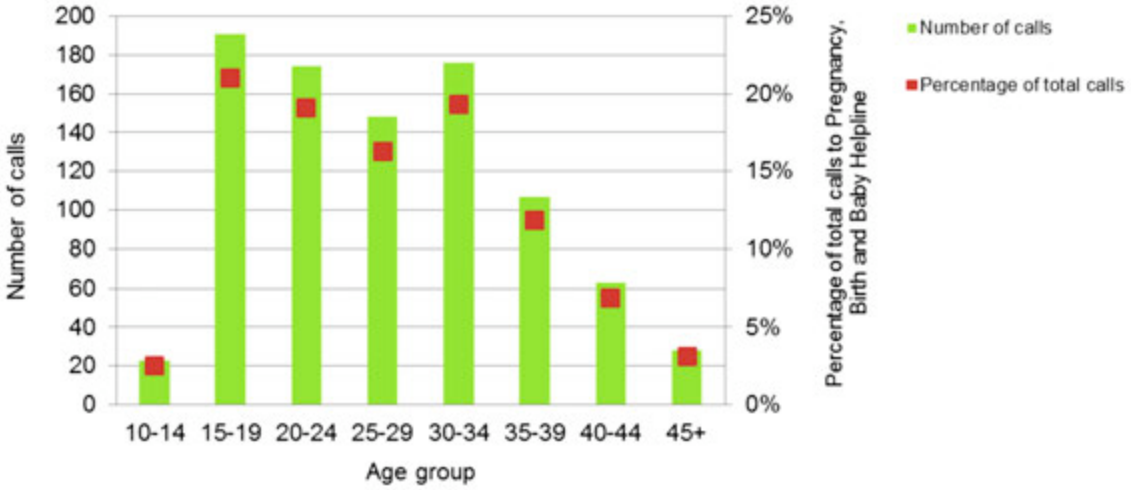
**Figure 8.8: Number of calls for non-directive pregnancy counselling handled by the National Pregnancy, Birth and Baby Helpline by state and territory, November 2010 to August 2012**




Source: National Health Call Centre Network

Women aged under 25 made up the largest proportion (43%) of callers who sought non-directive advice regarding pregnancy options from the PBBH. Thirty-six percent of callers were aged 25-34, and 22% were aged 35 years or more (Figure 8.9). In contrast, women aged 25-34 years made up the largest proportion (49%) of claims for Medicare funded non-directive pregnancy counselling services.

**Figure 8.9: Age group of callers for non-directive pregnancy counselling to the National Pregnancy, Birth and Baby Helpline, November 2010 to August 2012**




Note: The ages of 234 callers were not recorded
Source: National Health Call Centre Network

## 8.4 Discussion

In November 2006, four specific Medicare items were introduced to provide rebates for non-directive pregnancy counselling by medical practitioners and other health professionals. Medical practitioners annually provided an average of approximately 4,000 non-directive counselling sessions, with other health professionals having provided approximately 260 sessions per year.

The National Pregnancy, Birth and Baby Helpline (PBBH) was established in July 2010. Between 2010 and August 2012 the PBBH received 1,147 calls Australia-wide (i.e. about 1.6% of the total number of calls received) that were specifically for non-directive pregnancy counselling. Utilisation of the PBBH has varied by state and territory, with the majority of calls having originated in NSW, VIC and SA. The percentage of calls to the PBBH that were specifically about non-directive pregnancy counselling declined over time, from 4.5% in November 2010 to 1% in August 2012.

Women aged under 25 years accounted for 43% of the calls to the PBBH and accounted for 30% of claims for Medicare-funded face-to-face pregnancy counselling services.

There are no recently published, reliable estimates of the number of unintended pregnancies that occur in Australia. This makes it difficult to assess whether current service provision is meeting the community's need for this type of counselling. No evaluations of the non-directive pregnancy counselling services that are funded by Medicare or provided by the PBBH have been published. It is therefore also difficult to assess the outcomes that may be resulting from these services and the benefits that they may be providing.

### 8.4.1 Data development

Accurate, reliable estimates of the incidence of pregnancy and unintended pregnancy in Australia are required to inform health policies and programs in this area.

Processes and outcomes of non-directive pregnancy advice and counselling services should be evaluated.

## 8.5 References


1. Marie Stopes International Australia. Real choices: women, contraception and unplanned pregnancy. Melbourne: MSIA, 2008. http://www.mariestopes.org.au/research/australia/australia-real-choices-key-findings
2. Hewitt B, England P, Baxter J, Shafer EF. Education and unintended pregnancies in Australia: do differences in relationship status and age at birth explain the education gradient? Population Review 2010; 49:36-52.
3. Weisberg E, Bateson D, Read C, Estoesta J, Lee C. Fertility control? Middle-aged Australian women's retrospective reports of their pregnancies. Aust N Z J Public Health 2008; 32:390-92.

## 8.6 Appendices

### 8.6.1 Appendix 1 – Data for figures presented in this chapter

**Table A 8.1: Number of Medicare claims for non-directive pregnancy counselling by type of health professional, 2007 to 2011**

| Year | Medical practitioners | Psychologists | Social workers | Mental health nurses | Total |
|---|---|---|---|---|---|
| 2007 | 3,988 | 34 | 10 | 3 | 4,035 |
| 2008 | 4,374 | 66 | 35 | 15 | 4,490 |
| 2009 | 3,582 | 123 | 37 | 63 | 3,805 |
| 2010 | 3,829 | 176 | 30 | 87 | 4,122 |
| 2011 | 3,921 | 135 | 35 | 67 | 4,158 |
| Total | 19,711 | 534 | 147 | 235 | 20,627 |

Source: Medicare Australia online statistics

**Table A 8.2: Number of Medicare claims for non-directive pregnancy counselling provided by medical practitioners by state and territory, 2007 to 2011**

| Year | NSW / ACT | VIC / TAS | QLD | SA / NT | WA | Total |
|---|---|---|---|---|---|---|
| 2007 | 1,885 | 692 | 905 | 200 | 306 | 3,988 |
| 2008 | 1,988 | 751 | 1,110 | 167 | 358 | 4,374 |
| 2009 | 1,459 | 679 | 1,030 | 101 | 313 | 3,582 |
| 2010 | 1,393 | 846 | 1,224 | 139 | 227 | 3,829 |
| 2011 | 1,249 | 1,195 | 1,028 | 145 | 304 | 3,921 |
| Total | 7,980 | 4,164 | 5,307 | 752 | 1,508 | 19,711 |

Source: Medicare Australia online statistics

**Table A 8.3: Number of Medicare claims for non-directive pregnancy counselling services provided by medical practitioners per 100,000 population by state and territory, 2007 to 2011**

| Year | NSW / ACT | VIC / TAS | QLD | SA / NT | WA | Total |
|---|---|---|---|---|---|---|
| 2007 | 26 | 12 | 22 | 11 | 15 | 19 |
| 2008 | 27 | 13 | 26 | 9 | 17 | 20 |
| 2009 | 20 | 12 | 24 | 6 | 14 | 16 |
| 2010 | 19 | 14 | 28 | 8 | 10 | 18 |
| 2011 | 16 | 20 | 23 | 8 | 13 | 17 |

Source: Medicare Australia online statistics

**Table A 8.4: Age group distribution of patients who claimed Medicare rebates for non-directive pregnancy counselling by type of health professional, 2007 to 2011**

| Age group | Number of claims (%) for services by Medical practitioners | Number of claims (%) for services by Psychologists | Number of claims (%) for services by Social workers | Number of claims (%) for services by Mental health nurses |
|---|---|---|---|---|
| < 25 | 5,961 (30%) | 74 (14%) | 38 (26%) | 42 (18%) |
| 25-34 | 9,710 (49%) | 286 (54%) | 52 (35%) | 103 (44%) |
| > 34 | 4,023 (20%) | 174 (33%) | 57 (39%) | 90 (38%) |

Source: Medicare Australia online statistics

**Table A 8.5: Cost of Medicare-funded non-directive pregnancy counselling services provided by type of health professional, 2007 to 2011**

| Year | Medical practitioners | Psychologists | Social workers | Mental health nurses |
|---|---|---|---|---|
| 2007 | $265,765 | $2,267 | $591 | $165 |
| 2008 | $297,606 | $4,011 | $1,964 | $958 |
| 2009 | $249,609 | $8,689 | $2,382 | $4,418 |
| 2010 | $272,568 | $13,641 | $1,766 | $5,361 |
| 2011 | $284,278 | $9,878 | $2,108 | $4,621 |
| Total | $1,369,826 | $38,486 | $8,810 | $15,523 |

Source: Medicare Australia online statistics

**Table A 8.6: Cost of Medicare-funded non-directive pregnancy counselling services provided by medical practitioners by state and territory, 2007 to 2011**

| Year | NSW / ACT | VIC / TAS | QLD | SA / NT | WA | Total |
|---|---|---|---|---|---|---|
| 2007 | $125,543 | $46,097 | $60,366 | $13,325 | $20,433 | $265,765 |
| 2008 | $135,278 | $51,026 | $75,586 | $11,356 | $24,359 | $297,606 |
| 2009 | $101,637 | $47,358 | $71,724 | $7,051 | $21,839 | $249,609 |
| 2010 | $99,147 | $60,316 | $87,051 | $9,885 | $16,170 | $272,568 |
| 2011 | $90,533 | $86,726 | $74,498 | $10,501 | $22,020 | $284,278 |
| Total | $552,138 | $291,524 | $369,225 | $52,118 | $104,821 | $1,369,826 |

Source: Medicare Australia online statistics

**Table A 8.7: Number of calls for non-directive pregnancy counselling handled by the National Pregnancy, Birth and Baby Helpline, November 2010 to August 2012**

| Month | Total number of calls of all types | Number of non-directive pregnancy counselling calls | Percentage of all calls that were for non-directive counselling |
|---|---|---|---|
| Nov 2010 | 1,662 | 74 | 4.5% |
| Dec 2010 | 1,946 | 81 | 4.2% |
| Jan 2011 | 2,251 | 66 | 2.9% |
| Feb 2011 | 2,250 | 60 | 2.7% |
| Mar 2011 | 2,781 | 51 | 1.8% |
| Apr 2011 | 2,859 | 38 | 1.3% |
| May 2011 | 3,396 | 67 | 2.0% |
| Jun 2011 | 3,531 | 60 | 1.7% |
| Jul 2011 | 3,873 | 55 | 1.4% |
| Aug 2011 | 3,847 | 49 | 1.3% |
| Sep 2011 | 3,781 | 36 | 1.0% |
| Oct 2011 | 3,953 | 61 | 1.5% |
| Nov 2011 | 3,864 | 56 | 1.4% |
| Dec 2011 | 3,683 | 40 | 1.1% |
| Jan 2012 | 3,785 | 61 | 1.6% |
| Feb 2012 | 3,476 | 38 | 1.1% |
| Mar 2012 | 3,713 | 57 | 1.5% |
| Apr 2012 | 3,177 | 37 | 1.2% |
| May 2012 | 3,338 | 54 | 1.6% |
| Jun 2012 | 3,277 | 33 | 1.0% |
| Jul 2012 | 3,196 | 41 | 1.3% |
| Aug 2012 | 3,170 | 32 | 1.0% |
| TOTAL | 70,809 | 1,147 | 1.6% |

Source: The National Health Call Centre Network

**Table A 8.8: Number of calls for non-directive pregnancy counselling to the National Pregnancy, Birth and Baby Helpline by state and territory, November 2010 to August 2012**

| State and territory | Number of calls (% of total) |
|---|---|
| NSW | 352 (30.7%) |
| VIC | 272 (23.7%) |
| SA | 209 (18.2%) |
| QLD | 145 (12.6%) |
| WA | 89 (7.8%) |
| ACT | 35 (3.1%) |
| NT | 33 (2.9%) |
| TAS | 12 (1.0%) |

Source: The National Health Call Centre Network

**Table A 8.9: Age group of callers for non-directive pregnancy counselling to the National Pregnancy, Birth and Baby Helpline, November 2010 to August 2012**

| Age group | Number of calls (%) |
|---|---|
| 10-14 | 23 (2.5%) |
| 15-19 | 191 (21%) |
| 20-24 | 174 (19%) |
| 25-29 | 148 (16%) |
| 30-34 | 176 (19%) |
| 35-39 | 107 (12%) |
| 40-44 | 63 (6.9%) |
| 45+ | 28 (3.1%) |

Note: The ages of 234 callers were not recorded
Source: The National Health Call Centre Network

# Chapter 9:
# Family Planning Organisations in Australia

Catherine Bernasconi

Chapter Outline

# List of Figures

## Key indicators

Targeted populations attending Family Planning Organisation (FPO) Clinics

Principal service provided at clinical visit

Profession of participants attending workforce development activities

Number of health promotion activity participants

## Primary data sources

Family Planning Organisations:

- Family Planning New South Wales
- Family Planning Victoria
- Family Planning Queensland
- Family Planning Tasmania
- Family Planning Welfare Association of Northern Territory Inc.
- Family Planning Association of Western Australia Inc.
- Sexual Health and Family Planning ACT (SHFPACT)
- Sexual Health Information Network and Education South Australia Inc (SHine SA)

## Purpose of this chapter

To outline the programs and services offered by FPOs in Australia

To identify areas of data development

## Terms and definitions

**Clinical services:** Services provided in a clinical setting by doctors, nurses and other health professionals.

**Health promotion:** The process of enabling people to increase control over their health and its determinants and thereby improve their health.

**Workforce development:** Includes courses, seminars, presentations at conferences and provision of information and support for service providers in reproductive and sexual health.

**Aboriginal and Torres Strait Islander:** A person of Aboriginal and Torres Strait Islander descent who identifies as an Aboriginal and Torres Strait Islander and is accepted as such by the community in which they live. People who identify as Aboriginal and Torres Strait Islander are also referred to as Indigenous.

**Accessibility Remoteness Index of Australia (ARIA) rurality scale:** The delimitation criteria for rurality which uses road distances to population centres as the basis for quantifying service access and hence remoteness[1]. Residential and work postcodes are assigned to 5 ARIA classifications from 1 to 5, with 5 being the most remote.

**Culturally and linguistically diverse (CALD):** All of Australia's non-Indigenous ethnic groups other than the English-speaking Anglo-Saxon majority. Indigenous Australians are not considered CALD.

**Country of birth:** The country in which a person was born.

**Preferred language:** Language most preferred by the client for communication. When a client nominates a language other than English they are considered non-English speaking.

**Principal service provided:** The main issue or problem which, from the clinician's perspective, accounts for the majority of the time spent in the consultation.

**Years in Australia:** Number of years (from clinic visit date) since the overseas-born client first arrived in Australia to live, from another country, with the intention of staying for more than one year.

**LGBTI:** A recognisable acronym to collectively refer to a group of identities that includes lesbian, gay, bisexual, trans/transgender and intersex people and other sexuality and gender diverse people, regardless of their term of self-identification.

**Health care pension card holders:** Clients who held a current health care concession card during at least one visit in the reference period. This card is available to low income earners (who meet certain criteria) to assist with the cost of medicines and a range of additional health-related subsidies and concessions. Data is used to determine service access by people facing financial hardship.

**People with disability:** People who live with a condition which may restrict their mental, sensory, or mobility functions and ability to undertake or perform a task in the same way as a person who does not have a disability.

**Registered training organisation (RTO):** An organisation that provides students with training that results in qualifications and statements of attainment recognised and accepted by industry and other educational institutions throughout Australia.

**Royal Australian College of General Practitioners (RACGP):** A national organisation representing urban and rural medical practitioners in general practice, that is responsible for maintaining standards for quality education and training, clinical practice and research in Australian general practice.

**Sexual Health and Family Planning Australia (SH&FPA):** The national peak body for the six state and two territory family planning organisations.

**Sexual Health and Family Planning Australia Data Dictionary:** Central repository of information containing agreed data items collected by Australian FPOs for the purposes of national reporting. The document was last reviewed in 2004.

## Data sources and limitations

Data in this report is limited to the agreed national data items provided by state and territory FPOs, which are defined in the SH&FPA data dictionary and were last reviewed in 2004. Additional data are collected by member organisations but not provided in this report.

### Preferred language

Some states have altered their data collection to align with the ABS definition 'language spoken at home'.

### Principal service provided

Some states have recorded all services provided during each visit, rather than one main service.

### Disability

Data on clients with disabilities attending clinical services was not available for this report.

### Accessibility Remoteness Index of Australia (ARIA) rurality scale

Residential or work postcode is used to assign clients and activities to ARIA classes in order to determine rurality. The ARIA rurality scale[1] is based on ARIA, which was developed in 2001. In 2006, 'ARIA+' replaced 'ARIA' and is currently used by ABS.

### Telephone and email information and referral services

Telephone and email information and referral occasions of service were not included in this report.

### Unknown status data

When calculating proportions, the denominator did not include 'unknown' data or data from clients who did not provide a response.

### Clinical demographic data

Some states provided demographic data per visit, rather than per client, which may impact on relative proportion of each parameter.

### Health promotion data activity

FPO activities reported under 'health promotion' were not in accordance with the agreed data items and definitions therefore only total health promotion participant figures have been included in this report. See section 9.3, Health Promotion.

## 9.1 Introduction

Each Australian state and territory is serviced by their constituent Family Planning Organisation (FPO). FPOs provide a range of reproductive and sexual health services and programs for populations in Australia and in selected countries within the Asia Pacific region.

**Range of services**

FPOs provide expert reproductive and sexual health services to the community through clinical care, health promotion, community education and information services. They also provide services for professionals working with communities through best practice education, training, workforce development and information service provision. As well as providing clinical care, FPO clinics are used to train health professionals in reproductive and sexual health techniques. Additionally, FPOs advocate and provide evidence based advice to guide government and other decision making bodies on policies and practices that are relevant to their areas of expertise.

**Range of expertise**

FPOs provide expertise in a range of areas including contraception, gynaecological health, pregnancy related issues and options, sub-fertility, menopause, cervical cancer screening, breast health, sexually transmissible infections (STIs), men's sexual health, sexual function and sexuality.

**Populations served**

FPOs provide services to the broad community in each state. A key feature of their work is to provide services to marginalised communities including people from culturally and linguistically diverse and Aboriginal and Torres Strait Islander backgrounds, people with disability, young people, people from rural and remote communities and LGBTI people.

**Research**

FPOs use evidence-based research to inform all aspects of their work in clinical practice, education and training and health promotion from assessment of need through to project evaluation. Information is disseminated to other reproductive and sexual health service providers through education and training courses and activities, as well as publications and conference presentations.

FPOs undertake both independent and collaborative research and participate in clinical trials that are at the forefront of reproductive and sexual health knowledge. In addition to translating research findings into work practice, FPOs use research findings to guide medical, professional, government and other decision making bodies on best practice reproductive and sexual health service delivery.

**International programs**

FPO international programs work in partnership with some FPOs at national and international levels to promote the rights of all people to achieve reproductive and sexual health and wellbeing in the context of a sustainable environment. The AusAID Family Planning Guidelines recognise that access to family planning is one of the most cost-effective approaches to reducing maternal and child mortality. FPOs are working to assist poor and disadvantaged communities in the Asia Pacific region to improve access to comprehensive family planning and reproductive health services with funding from the Australian Agency for International Development and private donors.

## 9.2 Clinical Services

During the 2011/12 financial year, 66,949 clients attended 127,671 visits for clinical services at FPO clinics nationally, of which 94% were female and 6% were male. About one third (34%) of clients were aged under 25 at the time of their visit and 15% were less than 20 years of age (Figure 9.1).

Of the people who accessed clinical services 2.4% of clients identified as Aboriginal and Torres Strait Islander. Twenty six percent of clinic clients were born outside Australia. Of those clients born outside Australia, 25% arrived less than 5 years ago.

Eight percent of clinic clients preferred to use a language other than English.

FPOs are committed to removing financial barriers to reproductive and sexual health. Of total clients receiving clinical services in 2011/12, 19% were health care or pension card holders.

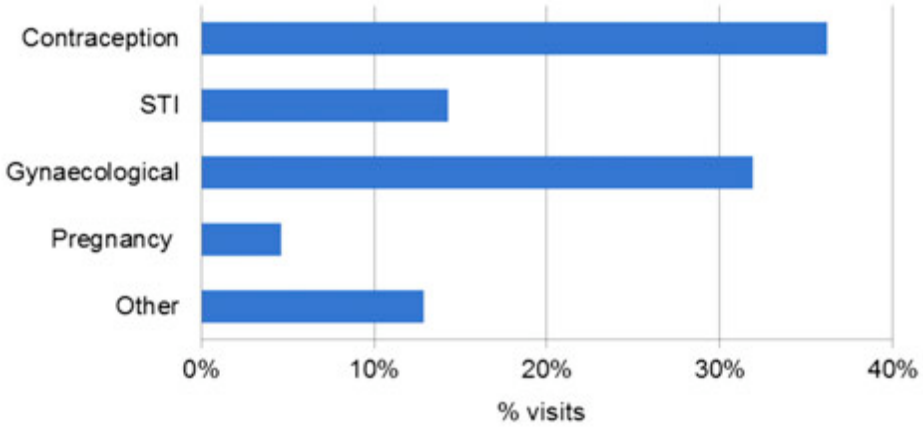
FPOs provide services to geographically isolated populations. Thirty three percent of clients were from rural and remote areas (residential suburb located in ARIA 2 to 5).

**Figure 9.1: Proportion of clients attending FPO clinics by selected characteristics, July 2011 to June 2012**


Contraceptive services were the most common principal service provided at FPO clinical visits (36%), followed by gynaecological services (32%) and Sexually Transmissible Infection services (14%) (Figure 9.2). Five percent of people attended visits for pregnancy services and the remainder (13%) for other reproductive and sexual health services.

The majority of family planning clinical services were provided by doctors (49%) and nurses (49%). The remaining clinical services were provided by counsellors (2%), with a small number of services provided by other staff.

**Figure 9.2: Proportion of client visits to FPO clinics by principal service provided, July 2011 to June 2012**




## 9.3 Health Promotion

The objective of health promotion services delivered by FPOs is to enable people to increase control over, and improve their reproductive and sexual health. Health promotion programs and activities are developed within the framework of the World Health Organisation's Ottowa Charter for Health Promotion (1986); strengthening community action, developing personal skills, creating supportive environments, reorienting health services and building healthy public policy. Programs and activities are designed to address identified reproductive and sexual health needs both in targeted communities and in the general population. The delivery of such programs relies heavily on strong relationships with community groups, government agencies and non-government agencies.

Reproductive and sexual health promotion activities conducted by FPOs include projects, campaigns, creating resources and delivery of community education. Additionally, FPOs provide information and advice to targeted communities as well as telephone and email services providing reproductive and sexual health information and referrals.

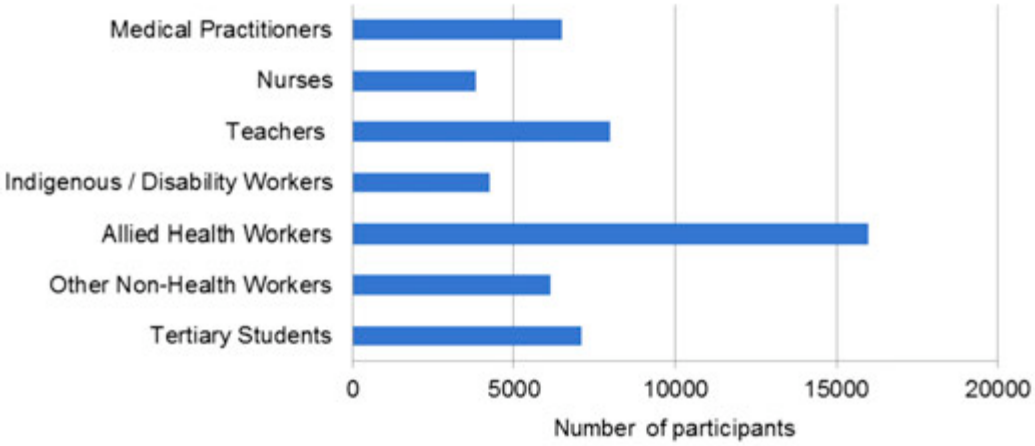
In 2011/12, 120,000 people participated in a range of FPO health promotion activities nationally. Participants of health promotion activities included people from a range of targeted groups as well as people from the general community. Targeted groups included people identifying as Aboriginal and Torres Strait Islander, people from CALD backgrounds, people with disability, young people (aged under 25 years), LGBTI people and rural and remote populations.

Differences between state and territory demographic profiles, service orientation and funded activities have resulted in a shift towards community education activities and away from more broadly based health promotion programs. This has led to the adaption of health promotion indicators at a local level which generally precludes the aggregation of this data nationally. It is essential that FPO health promotion indicators are reviewed and updated in line with the complexity of service provision and that standardised data is collected by Australian FPOs.

## 9.4 Workforce Development

FPOs provide a range of reproductive and sexual health services to health and other professionals. These services include provision of nationally recognised training, workshops and seminars, supervised practicums, advice and information and dissemination of information at conferences. FPOs deliver programs that increase the skills and knowledge of medical practitioners, nurses, allied health workers, teachers, Indigenous workers, disability workers and tertiary students. In 2011/12, FPOs provided reproductive and sexual health education and training to almost 52,000 professionals, many of whom work in areas or with communities that have an identified reproductive and sexual health need (Figure 9.3).

**Figure 9.3: Participants attending FPO workforce development activities by type of profession, July 2011 to June 2012**




Over 4,000 medical practitioners attended courses, workshops and seminars and more than 450 medical practitioners attended clinical training and observation clinics. The RACGP accredited Sexual Health and Family Planning Australia (SH&FPA) Certificate in Sexual & Reproductive Health which equips medical practitioners with the theoretical and clinical skills to provide up-to-date, evidence-based, reproductive and sexual health services. A further 2,000 medical practitioners received FPO advice and information services or attended conference presentations by FPO staff.

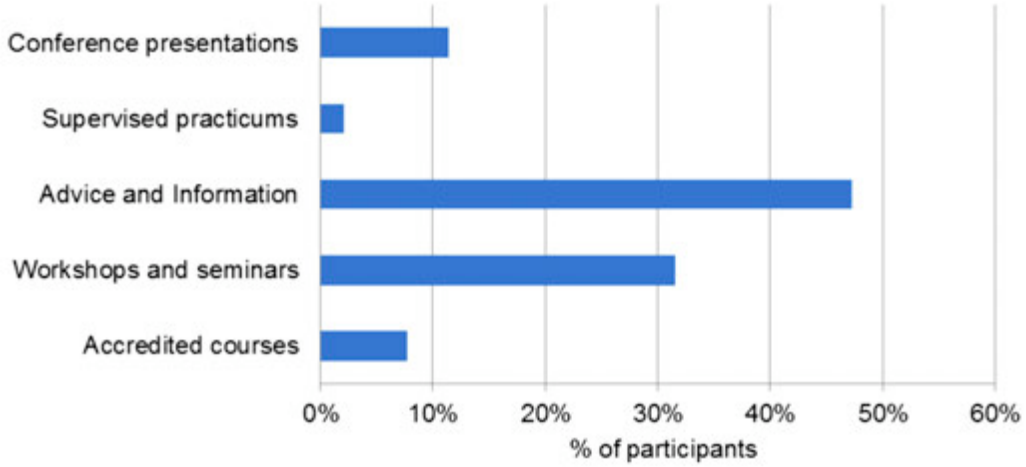
Nursing professionals make a significant contribution to the provision of reproductive and sexual health services to the community, particularly in areas underserviced by medical practitioners. Through courses endorsed by the Australian College of Nursing (formally Royal College of Nursing, Australia), FPOs equip nurses to undertake cervical cancer screening and other reproductive and sexual health services. In 2011/12, over 2,000 nurses attended courses, workshops and seminars and 450 nurses attended clinical training. Information services and conference presentations were attended by an additional 1,300 nursing professionals.

FPOs provide training programs for teachers and educators, to assist in delivering curricula that meet the reproductive and sexual health needs of students, including the specific needs of young people with disabilities, those from CALD backgrounds, LGBTI people who identify as Aboriginal and Torres Strait Islanders. In 2011/12, 4,600 teachers attended courses, workshops and seminars delivered by FPOs around Australia. FPOs provided information services to 1,250 teachers and over 2,100 teachers attended FPO conference presentations.

Training programs delivered by FPOs for disability workers provide skills in planning and delivering sexuality education programs, designed to meet the special needs of people with disabilities and their carers. FPOs trained 1,500 disability workers through courses, workshops and seminars some of which lead to nationally recognised qualifications. Other support services included the provision of information and advice to over 1,900 disability workers. Almost five thousand allied health and community workers attended courses, workshops and seminars and a further 14,900 were supported with information and advice services. Over 2,300 allied health and community workers attended conference presentations by FPO staff.

Tertiary students are supported in their learning through the provision of courses, workshops and seminars, supervised practicums, as well information and advice services. In 2011/12, 2,900 tertiary students attended courses, workshops and seminars, including over 1,200 medical students, 380 nursing students and 250 teaching students. Additionally, 200 medical and nursing students attended supervised practicums and over 3,900 tertiary students were supported through information and advice services.

**Figure 9.4: Proportion of participants by type of FPO workforce development activity, July 2011 to June 2012**




Over 4,000 (8%) of all workforce development participants attended accredited courses (Figure 9.4). These courses undergo a rigorous external accreditation process and often contribute towards the continuing professional development requirements of participants. Supervised practicums, including clinical observations, clinical training for doctors and nurses completing courses and non-clinical work placements, provide confidence and competence in applying knowledge in the workplace. Supervised practicums were undertaken by a total of 1,100 (2%) health and non-health professionals in 2011/12. Thirty-two percent (16,500) of participants attended FPO workshops and seminars and 11% (6,000) attended conference presentations. Advice and information services were provided to 24,500 (47%) individuals. Through these activities, FPOs aim to increase the skills and knowledge of service providers and increase the community's access to high quality health care services.

## 9.5 Discussion

FPOs provide reproductive and sexual health services to people across Australia through the provision of integrated clinical services, health promotion programs, workforce development programs and information services in individual states and territories. Programs and services aim to improve the reproductive and sexual health outcomes of the whole community, including people from culturally and linguistically diverse and Aboriginal and Torres Strait Islander backgrounds, people with disability, young people, people from rural and remote communities and LBGTI people. The challenges in meeting the reproductive and sexual health care needs of all Australians are in delivering appropriate and accessible services and in meeting the often higher costs involved in the provision of specialised services to targeted communities.

### 9.5.1 Clinical services

The challenges in providing reproductive and sexual health services to rural and remote communities include a geographically dispersed population, higher proportions of target groups and a shortage of health care professionals. In 2011/12, 33% of clients attending FPO clinics were from rural and remote areas. The number of rural and remote clients accessing FPO clinical services are impacted by the population characteristics and funding availability of each state and territory. FPOs supplement traditional clinical services to rural and remote communities by providing outreach clinics, fly in/ fly out services and by co-locating clinics with other organisations.

For Aboriginal and Torres Strait Islander people the social and financial barriers to accessing health services combined with higher proportions of young people, rural and remote dwellers and people with disability within the Aboriginal and Torres Strait Islander population, all provide challenges to clinical service delivery.[2,3] In 2011/12 the proportion of people identifying as Aboriginal and Torres Strait Islander attending FPO clinics was similar to the proportion in the Australian population (2.4% and 2.5%[4] respectively). FPO data on Indigenous clinic attendees is impacted by the willingness of clients to self-identify as Aboriginal and Torres Strait Islander, the availability of FPO rural and remote clinical services and the proportion and distribution of the Indigenous population in each state and territory. In order to extend the reach of reproductive and sexual health clinical services, FPOs up-skill professionals, develop partnerships and implement programs that link Indigenous communities to FPO health services and information.

Data on clients born outside Australia (overseas born clients) can assist in building a cultural profile when combined with year of arrival and language data. Twenty six percent of clients attending FPO clinics were born outside Australia which is comparable to 24.6%[5] of the Australian population. Twenty five percent of overseas-born clients arrived in Australia less than five years ago. Year of arrival in Australia and country of birth data can be valuable tools in assessing the needs of clinic attendees who are new to Australia. Eight percent of clients at FPO clinics preferred a language other than English. Preferred language can be used with other parameters to build a profile of CALD clients attending FPO clinics and assess the need for multicultural services such as interpreters and multilingual resources.

Those clients under 25 years have unique clinical care needs and are often reluctant to access mainstream health services for reproductive and sexual health issues.[6] Thirty four percent of FPO clinic attendees were under 25 years in 2011/12. Health promotion programs assist in informing young people about youth-friendly services and information.

The proportion of nurses providing services is similar to that of medical practitioners reflecting the important role of nurses in FPO clinics. Counsellors account for a small number of staff providing services to clients. FPOs also offer information, advice and referrals to clients, where appropriate.

FPOs deliver expert contraceptive health care to clients (36% of visits) and provide guidance for other practitioners through clinical training and publications such as 'Contraception: An Australian Clinical Practice Handbook'.[7] This handbook, published by SH&FPA, was co-authored by medical experts from Australian FPOs and provides health professionals with an up to date review of all methods of contraception. Gynaecological (32%), STI (14%) and pregnancy (5%) services also account for a significant proportion of services provided in FPO clinics.

FPOs have well-established mechanisms for the collection of clinical data. Demographic data is completed by the client and hence, the willingness of the client to provide accurate information can impact on data collection. The challenge in collecting national FPO clinical data is in establishing consistent data definitions while allowing individual states and territories to continue to meet the needs of their clients and funding obligations.

### 9.5.2 Health promotion

FPO health promotion programs are developed to address identified reproductive and sexual health needs. Types of health promotion activities conducted by FPOs, range from structured skills and health education sessions to information and advice and community interventions. Health promotion programs can also provide information about reproductive and sexual health and support services available in the community. While health promotion programs support the wider community many are tailored to address specific needs in targeted communities including people identifying as Aboriginal and Torres Strait Islander, people from CALD backgrounds, people with disability, young people (aged under 25 years), LGBTI and rural and remote populations.

FPOs also partner with other organisations to provide services to targeted communities as well as offering training and information services for professionals. A review of data collection, redefining the diverse range of health promotion activities conducted by FPOs, will improve the ability of FPOs to report on this data nationally.

### 9.5.3 Workforce development

Developing the knowledge and skills of professionals can extend the reach of reproductive and sexual health services in the community. Education and training programs have been developed by FPOs to enable professionals to meet the needs of the communities in which they work, including those working with target groups who may face barriers in accessing information and services. Information and advice to support service providers accounted for the highest proportion of workforce development activities, 47% in 2011/12. These activities are usually short one-on-one professional exchanges by phone, email or mail thus accounting for the high proportion of activities.

FPO accredited courses provide recognition towards continuing professional development programs for doctors, nurses, teachers and other professionals (8% of total workforce development activities). Theoretical instruction is supplemented by supervised practicums (2% of activities) to increase competence and confidence when applying skills and knowledge in work practice.

Conference presentations provide an opportunity for FPOs to disseminate knowledge acquired through research or evaluation of programs and services, to colleagues. Eleven percent of activities were attendances at conference presentations by FPO staff.

Rural and remote areas often face challenges in attracting health professionals and contain higher proportions of Aboriginal and Torres Strait Islander and young people than metropolitan populations. In 2011/12, 14% of all course and seminar participants were from rural and remote areas, although some rural service providers may have travelled to urban locations to attend training.

FPOs provide specialised training for teachers and educators in relation to the needs of young Indigenous people, CALD people and people with disability. In 2011/12 over 8000 teachers took part in workforce development activities conducted by FPOs, representing 15% of all participants. Indigenous and disability workers accounted for 8% of attendees, complementing health promotion programs delivered by FPOs to Indigenous communities and people with disability and their carers. Workforce development participants who work with Indigenous communities and people with disability may also work with other population groups and may not specifically identify as Indigenous or disability workers. This can affect data on the proportion of these workers attending workforce development activities.

Some FPOs have developed courses in reproductive and sexual health techniques to support International Medical Graduates working in rural areas.

### 9.5.4 Integrated services

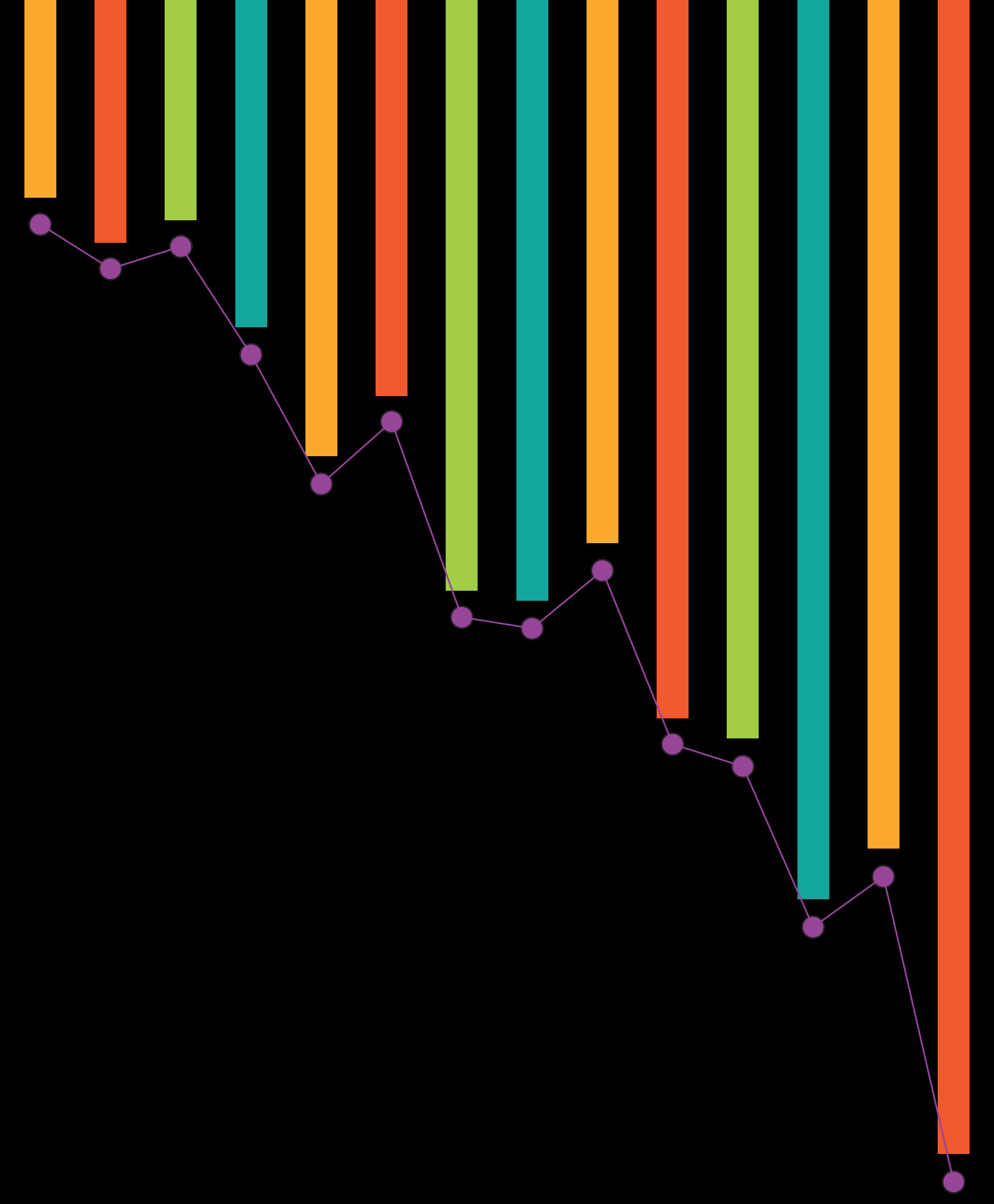
FPOs provide reproductive and sexual health services directly to the community through clinical services and health promotion programs. In order to extend the reach of these programs, particularly to communities that face barriers in accessing mainstream health services, FPOs have developed education and training programs for doctors, nurses, teachers and other professionals working in the community. FPO clinics provide both clinical services and an opportunity for doctors and nurses attending courses to receive clinical training. Information and advice services provide support for staff, workforce development attendees, external service providers and the community. In particular, the publications 'Reproductive & Sexual Health: An Australian Clinical Practice Handbook'[8] and 'Contraception: An Australian Clinical Practice Handbook'[7] guide reproductive and sexual health programs and service provision.

### 9.5.5 Data development

The data items collected and published in this report were last reviewed collectively by FPOs in 2004 and reflect the funding requirements and areas of need that were identified at that time. Since then the role of FPOs has expanded. Many states and territories collect additional data as part of their funding agreement that is not reported nationally. The challenge in developing and reviewing the national data set is that each FPO is driven by unique population demographics, operational needs and funding obligations. A review of FPO national data definitions would allow FPO data collection to align with ABS and other nationally recognised definitions and enable more accurate comparisons with other relevant data.

## 9.6 References


1. Sexual Health and Family Planning Australia. Data Dictionary. ACT: SHFPA, 2004.
2. Australian Institute of Health and Welfare. Aboriginal and Torres Strait Islander people with disability. Available at: http://www.aihw.gov.au/indigenous-observatory-disability/. Accessed on 30 May 2013.
3. Australian Bureau of Statistics. National Aboriginal and Torres Strait Islander Social Survey, 2008. ABS Cat. no. 4714.0. Canberra: ABS, 2009.
4. Australian Bureau of Statistics. Census of population and housing - counts of Aboriginal and Torres Strait Islander Australians, 2011. ABS Cat. no. 2075.0. Canberra: ABS, 2012. Available at: http://www.abs.gov.au/ausstats/abs@.nsf/mf/2075.0. Accessed on 28 May 2013.
5. Australian Bureau of Statistics. 2011 Census of population and housing - country of birth. Canberra: ABS. Available at: http://www.abs.gov.au/websitedbs/censushome.nsf/home/census. Accessed on 28 May 2013.
6. Australian Institute of Health and Welfare. Young Australians: their health and wellbeing 2011. Cat. no. PHE 140 Canberra: AIHW, 2011.
7. Family Planning NSW, Family Planning QLD, Family Planning VIC. Contraception: an Australian clinical practice handbook. 3rd ed. Queensland: FPQ, 2012.
8. Reproductive and sexual health: an Australian clinical practice handbook. 2nd ed. Ashfield, Sydney: FPNSW, 2011.



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