



**Australian Government**

**Australian Institute of  
Health and Welfare**

# **Cervical screening in Australia 2013–2014**

**National Cervical  
Screening Program**

A joint Australian, State and Territory Government initiative

CANCER SERIES NO. 97





**Australian Government**

**Australian Institute of  
Health and Welfare**

*Authoritative information and statistics  
to promote better health and wellbeing*

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Number 97

# **Cervical screening in Australia 2013–2014**

Australian Institute of Health and Welfare  
Canberra

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# Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
CIN	cervical intraepithelial neoplasia
HPV	human papillomavirus
NCSP	National Cervical Screening Program
NHMRC	National Health and Medical Research Council
NPAAC	National Pathology Accreditation Advisory Council
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
Tas	Tasmania
Vic	Victoria
WA	Western Australia

# Summary

The National Cervical Screening Program (NCSP) aims to reduce cervical cancer cases, as well as illness and death from cervical cancer in Australia, through an organised approach to cervical screening aimed at detecting and treating high-grade abnormalities before possible progression to cervical cancer. The target group is women aged 20–69.

This report is the latest in the *Cervical screening in Australia* series, which is published annually to provide regular monitoring of NCSP participation and performance.

The following statistics are the latest data available for women aged 20–69.

## **Cervical cancer cases and deaths are low by international standards**

In 2016, it is estimated that there will be 750 women aged 20–69 diagnosed with cervical cancer and that 163 women will die from cervical cancer. This is equivalent to between 9 and 10 new cases of cervical cancer diagnosed per 100,000 women and 2 deaths from cervical cancer per 100,000 women. These rates are similar to those in previous years.

Both incidence and mortality halved between the introduction of the NCSP in 1991 and the year 2002, and have since remained at 9 to 10 new cases and 2 deaths, per 100,000 women.

Incidence of cervical cancer in Aboriginal and Torres Strait Islander women was more than twice that of non-Indigenous women, and mortality was 4 times the non-Indigenous rate.

## **Around 6 in 10 women participate in the National Cervical Screening Program**

In 2013–2014, more than 3.8 million women participated in cervical screening. This was 57% of women aged 20–69. The age-standardised participation of 58% has not changed over the past few years, with age-standardised participation in 2011–2012 and 2012–2013 also at 58%.

Participation varied across remoteness areas, ranging from 52% for *Very remote* areas to 59% for *Inner regional* areas; further, there was a clear trend of increasing participation with increasing socioeconomic group, from 52% for women in the lowest socioeconomic group to 64% for those in the highest socioeconomic group (all age-standardised rates).

National participation rates for Aboriginal and Torres Strait Islander women are not available due to Indigenous status information not being collected on pathology forms in all jurisdictions, although there is evidence that this population group is under-screened.

## **Relatively few women rescreen early, and a third respond to a reminder letter**

Only 12% of women with a negative Pap test in 2013 rescreened earlier than the recommended 2 years. Of the women sent a 27-month reminder letter by a cervical screening register in 2013, 33% rescreened within 3 months. These are both very similar to 2012 data.

## **High-grade abnormality detection rates similar, despite decreases in ages <25**

In 2014, for every 1,000 women screened, 8 women had a high-grade abnormality detected by histology, providing an opportunity for treatment before possible progression to cancer. The age-standardised rate of 8 is similar to 2013, for which the rate was between 8 and 9.

The detection of high-grade abnormalities is now highest for women aged 25–29, with detection rates in women aged under 20 and 20–24 at historic lows. A decrease in high-grade abnormality detection rates in younger women is likely due to girls being vaccinated against HPV through the national program, who are expected to experience fewer abnormalities.

# Report card

	What indicates a good finding?	Previous data	Latest data	Recent trend	
<b>Participation in 2013–2014</b>	Higher is better	58.2%	57.8%	Steady at 57–58%	
<b>Early rescreening</b>	Lower is better	12.6%	11.8%	Falling from 15 to 12%	
<b>Rescreening after reminder letter</b>	Higher is better	32.7%	33.2%	Steady at 33%	
<b>Pap tests not of satisfactory quality</b>	Lower is better	2.2%	2.3%	Steady at 2%	
<b>Pap tests negative for abnormalities</b>	..	91.9%	92.0%	Steady at 92%	
<b>Pap tests with no endocervical component</b>	< 20% is better	22.5%	22.9%	Rising from 20 to 23%	
<b>High-grade abnormality detection in 2014</b>	..	8.5	8.1	Steady at 8.1–8.5	
<b>PPV of high-grade squamous cytology</b>	Higher is better	68.3%	68.1%	Steady at 68–70%	
<b>PPV of high-grade endocervical cytology</b>	Higher is better	73.0%	70.8%	Steady at 71–73%	
<b>Incidence in 2012</b>	Lower is better	9.5	9.9	Steady at 9–10	
<b>Mortality in 2013</b>	Lower is better	1.8	1.9	Steady at around 2	

Report card uses age-standardised rates where available to aid in comparison of trends. Incidence and mortality are 'true' rates, not projected rates that appear elsewhere; 'Recent trend' refers to the past 3–5 years. All data shown are for women aged 20–69; .. = not applicable; PPV = positive predictive value.



Green light: positive trend—all is well.



Amber light: trend slipping in an unfavourable direction—keep an eye on this.



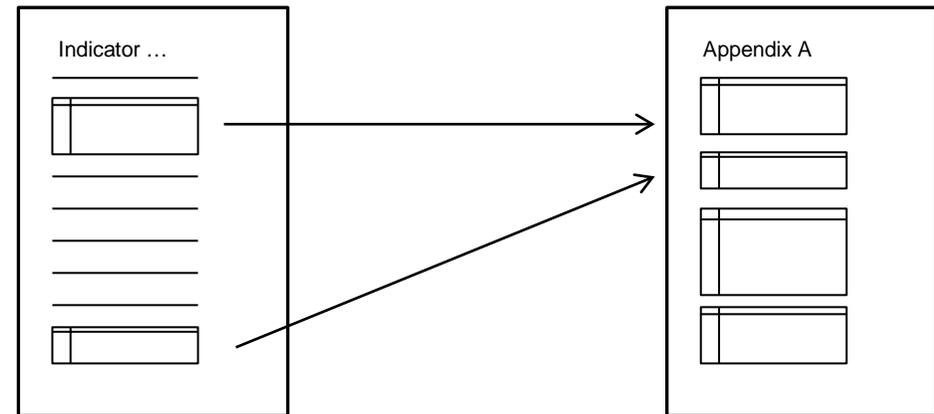
Red light: unfavourable trend—may be cause for concern.

# Navigating changes in this report

Regular users of this annual monitoring report will notice that *Cervical screening in Australia 2013–2014* and the previous *Cervical screening in Australia 2012–2013* look a little different to earlier reports. The same data have been provided, along with much of the same information, but the structure and format have changed. Therefore this ‘map’ has been provided to aid regular users in the navigation of this report to ensure they are still able to find the data and information they require.

## Where are all the data tables?

All the data tables that used to be interspersed among the text of each performance indicator section now appear together in Appendix A. These tables appear in the same order, and are numbered according to the performance indicator (for example, participation data tables, being indicator 1, are numbered from A1.1 to A1.7, and rescreening tables are numbered from A2.1 to A2.3), so that regular users can still access the detailed data as usual.



## Why are fewer data being reported?

Regular users will also notice that the sections that report on data are shorter and described differently. Whereas there used to be a section for each performance indicator, with every result for every disaggregation reported, only selected results appear in this report, with a focus on the most important findings – the ‘story’ of what occurred in cervical screening in 2013–2014. Further, data from different performance indicators have been incorporated into a single section so that data can be discussed in context, rather than isolation. This means that participation and rescreening data are reported together in a section called *Screening behaviour*, cytology and cytology–histology correlation data are reported together in a section called *Characteristics of the screening test* and selected histology data are reported in a section called *Detection of high-grade abnormalities*. The overall aim of these changes is to have key information easy to find while removing any repetition or redundancy in the text that might mask key findings.

Note that the fact that some data are not reported does not imply these are not important to monitor; all data are analysed and monitored.

## Where has the information from the introduction gone?

In response to feedback, the introductory section is now much shorter, but key information has been retained, and, rather than appearing in one solid block at the beginning of the report, is now dispersed within the relevant sections of the text, glossary and appendices.



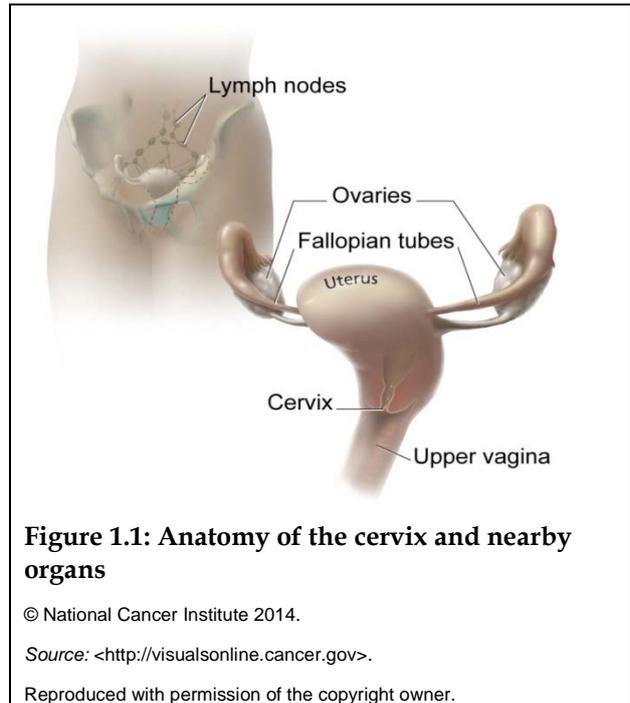
# 1 Introduction

## 1.1 Cervical cancer

Cancer is a group of several hundred diseases in which abnormal cells are not destroyed naturally by the body but instead multiply and spread out of control. Cancers are distinguished from each other by the specific type of cell involved and the place in the body in which the disease began.

Cervical cancer affects the cells of the uterine cervix, which is the lower part (or 'neck') of the uterus where it joins the inner end of the vagina (see Figure 1.1). Cervical cancer develops when abnormal cells in the lining of the cervix begin to multiply out of control and form precancerous lesions. If undetected, these lesions can develop into tumours and spread into the surrounding tissue.

Worldwide, cervical cancer is the fourth most common cancer affecting women and the seventh most common cancer overall; however, the burden of cervical cancer is not equal globally – around 85% of the global burden occurs in the less developed regions, where cervical cancer accounts for almost 12% of all female cancers (IARC 2014). In contrast, in Australia cervical cancer accounts for less than 2% of all female cancers, with a relatively low incidence of 7 new cases per 100,000 women (AIHW 2014a).

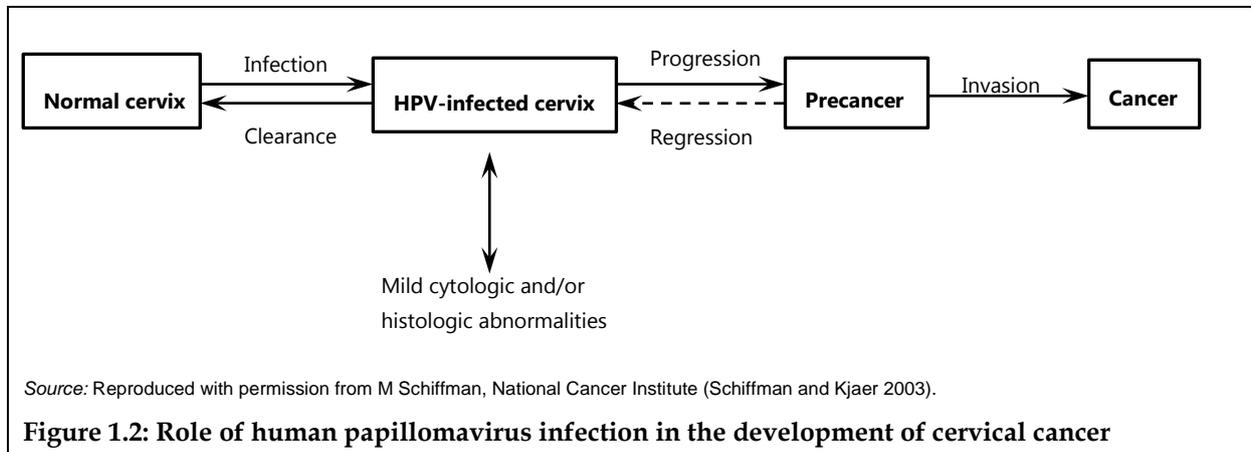


## 1.2 The primary cause of cervical cancer is HPV

It has been recognised for some time that cervical cancer is a rare outcome of persistent infection with one or more oncogenic (cancer-causing) types of human papillomavirus (HPV) (Bosch et al. 2002; Walboomers et al. 1999). These oncogenic types of HPV are known as 'high-risk' HPV, and infection with one or more of these is the underlying cause of almost all cases of cervical cancer. Currently 15 high-risk types of HPV are recognised. HPV types 16, 18 and 45 are most predominantly associated with cervical cancer, with HPV types 16 and 18 detected in 70–80% of cases of cervical cancer in Australia (Brotherton 2008).

However, infection with one or more of the 40 genital HPV types is extremely common, with infection rates of this sexually transmitted infection peaking in women in young adulthood (the period following sexual debut). Most HPV infection is asymptomatic and cleared by the immune system within a year; however, in up to 10% of women the infection can persist, and in a very small number of women, persistent infection with high-risk HPV may eventually lead to cervical cancer.

The 4 major steps in cervical cancer development are infection with HPV (from sexual activity), viral persistence (most HPV infections clear with no treatment), progression to precancerous abnormalities (many of which will also regress with no treatment) and invasive cervical cancer (Schiffman et al. 2007) (Figure 1.2). Note that this is not unidirectional, and that most HPV-infected cells return to normal and a large proportion of precancerous abnormalities do not progress to cervical cancer, even in the absence of treatment.



Infection of cervical cells with high-risk HPV interferes with the normal functioning of these cells, leading to abnormalities in the cells that we recognise as precancerous changes.

However, while the cell changes caused by persistent infection with HPV are necessary for the development of precancerous changes to the cervix, there are a range of other factors that will influence whether precancerous changes will progress to cervical cancer, including: smoking; multiparity (specifically, more than 5 full-term pregnancies); a young age at first full-term pregnancy; oral contraceptive use; and immunosuppression (Cancer Council Australia 2014).

### 1.3 Cervical cancer is a largely preventable disease

The role HPV plays in the development of cervical cancer allows for the implementation of both primary and secondary strategies for the prevention of cervical cancer, in those countries that have available resources to make cervical cancer prevention a priority.

In Australia, primary prevention of cervical cancer is through vaccination against HPV through the National HPV Vaccination Program to prevent women being infected with high-risk HPV types 16 and 18. Secondary prevention of cervical cancer is through cervical screening through the National Cervical Screening Program (NCSP) to detect and treat abnormalities while they are in the precancerous stage, before any possible progression to cervical cancer. This is possible because cervical cancer is one of the few cancers that has a precancerous stage that lasts for many years prior to the development of invasive disease, which provides an opportunity for detection and treatment (WHO 2014).

Detection of precancerous abnormalities through cervical screening uses cytology from the Papanicolaou smear, or 'Pap test', as the screening tool. During a Pap test, cells are collected from the transformation zone of the cervix – the area of the cervix where the squamous cells from the outer opening of the cervix and glandular cells from the endocervical canal meet. This is the site where most cervical abnormalities and cancers are detected.

While cervical cytology – the examination of the cells collected from the cervix – is a very useful tool, it is not diagnostic. As a screening tool, the aim of cervical cytology is to identify those individuals who may have a cervical abnormality (as indicated by the presence of abnormal cells in the specimen collected) and therefore require further diagnostic testing. Since the Pap test collects an arbitrary sample of cells from the surface of the cervix at an arbitrary point in time, and requires a level of judgment in the interpretation of sampled cells, cervical cytology cannot accurately reveal all abnormalities that may exist in the cervical tissue in situ.

The strength of cervical screening comes from repeating the cervical cytology test at agreed rescreening intervals, which allows the accurate detection of precancerous abnormalities over the long preinvasive stage of squamous cervical cancers. Recognition of cervical screening as a program of rescreening at regular intervals rather than as a single opportunistic test was important in the establishment of the NCSP (Dickinson 2002).

Detecting precancerous changes to cells allows for intervention before cervical cancer develops, so high participation in cervical screening reduces both an individual's risk and the incidence and burden of cervical cancer in Australia overall.

It is also important to recognise that some cervical cancers do not have a precancerous stage, and therefore are simply unable to be detected by cervical screening. These tend to be rare but aggressive cancers, such as neuroendocrine cancer of the cervix; the two most aggressive types being small cell neuroendocrine carcinoma and large cell neuroendocrine carcinoma, neither of which appear to possess a preinvasive stage (Necervix.com 2014).

#### **Box 1.1: Key messages**

##### **Cervical cancer is a rare outcome of persistent infection with high-risk HPV**

Oncogenic types of HPV are known as 'high-risk' HPV, and infection with one or more of these is the underlying cause of almost all cases of cervical cancer.

Infection with HPV is very common, and most infections will resolve spontaneously. It is only in a very small number of women that infection with a high-risk HPV persists, which may lead to precancerous abnormalities and – if not detected by cervical screening and treated – may progress to cervical cancer in around 10–20 years.

##### **Cervical cancer is a largely preventable disease**

In Australia, primary prevention of cervical cancer is through vaccination against HPV, through the National HPV Vaccination Program, to prevent women being infected with high-risk HPV types 16 and 18. Secondary prevention of cervical cancer is through cervical screening, through the NCSP, to detect and treat abnormalities while they are in the precancerous stage, before any possible progression to cervical cancer.

Cervical screening is possible because cervical cancer is one of the few cancers that has a precancerous stage that lasts for many years prior to the development of invasive disease, which provides an opportunity for detection and treatment. Note, however, that some rare (and often aggressive) cervical cancers do not have a precancerous stage, and therefore are unable to be detected by cervical screening.

## 2 The current state of cervical screening in Australia: on the cusp of change

Cervical screening in Australia will be undergoing a major change in the next few years.

Ever since cervical screening began, women have been screened for cervical abnormalities and cancer using the Pap test – whether on an ad hoc basis before the introduction of the NCSP, or every 2 years as has been recommended by the NCSP since its inception in 1991.

However, there have been many developments over the past 2 decades that mean that the environment in which the NCSP operates is very different from what existed in 1991. The main driver has been a greater understanding of the natural history of cervical cancer and the role HPV infection plays in this disease, as this has led to an examination of the optimal screening age range and interval internationally; the development of methods to test for the presence of HPV; and subsequently, a vaccine against HPV and the introduction of the National HPV Vaccination Program in 2007. By protecting vaccinated women from infection with the high-risk HPV types 16 and 18, the vaccination program will reduce the number of cervical abnormalities and eventually the incidence of cervical cancer, which will affect both the effectiveness and cost-effectiveness of the current NCSP. Thus, it was recognised that the NCSP would need to change to adapt to this different environment, while continuing to operate according to current evidence and best practice.

In light of this, in 2011, the former Australian Population Health Development Principal Committee of the Australian Health Ministers' Advisory Council (AHMAC) endorsed a plan to renew the NCSP ('the Renewal'), which commenced in 2011, undertaken by the Standing Committee on Screening and supported by the Department of Health. The aim of the Renewal was to ensure that all Australian women, HPV-vaccinated and unvaccinated, have access to a cervical screening program that is safe, acceptable, effective, efficient and based on current evidence (MSAC 2014).

On 28 April 2014, the Medical Services Advisory Committee (MSAC) announced its recommendations for a renewed NCSP. These recommendations include 5-yearly cervical screening of HPV-vaccinated and unvaccinated women 25 to 69 years of age, using a primary HPV test with partial HPV genotyping and reflex liquid-based cytology (LBC) triage, followed by exit testing of women 70 to 74 years of age (MSAC 2014). This is a major change from the current program, which recommends 2-yearly cervical screening using Pap tests for HPV-vaccinated and unvaccinated women from 18 to 20 years (or 1 or 2 years after first having sexual intercourse, whichever is later) to 69 years.

These recommendations were accepted, with a new NCSP set to commence on 1 May 2017.

This means that Australia continues to lead the way in the prevention of cervical cancer, being the first to introduce a national school-based HPV vaccination program and one of the first to have a national cervical screening program that uses an HPV test as its screening test.

So, while this report monitors the NCSP as it currently exists and according to current policy and recommendations, it does so in the context of a shifting environment, and with the knowledge that these data will also serve the dual purpose of setting benchmarks prior to a major change in cervical screening in Australia.

# 3 Monitoring cervical screening in Australia using NCSP data

## 3.1 Screening behaviour

Cervical screening in Australia is not provided by a dedicated service, but is part of primary health care. Therefore all women who choose to have a cervical screening test (currently the Pap test) through any health-care provider are considered to be part of the NCSP. For women participating in cervical screening, being part of the NCSP means that there are standards for laboratories that interpret Pap test results, evidence-driven guidelines to aid in the management of women after they receive Pap test results, and dedicated cervical screening registers that act as a 'safety net' for participating women as well as encouraging regular Pap tests.

One indicator of the performance of the NCSP is the proportion of women in the population who participate in cervical screening – measured as the percentage of women in the population aged 20–69 who had at least 1 Pap test in a 2-year period (to align with the 2-year recommended screening interval). High participation in screening is required for the NCSP to achieve its major objective of reducing cervical cancer incidence, morbidity and mortality, as more cervical abnormalities can be detected and treated that could otherwise develop into cervical cancer.

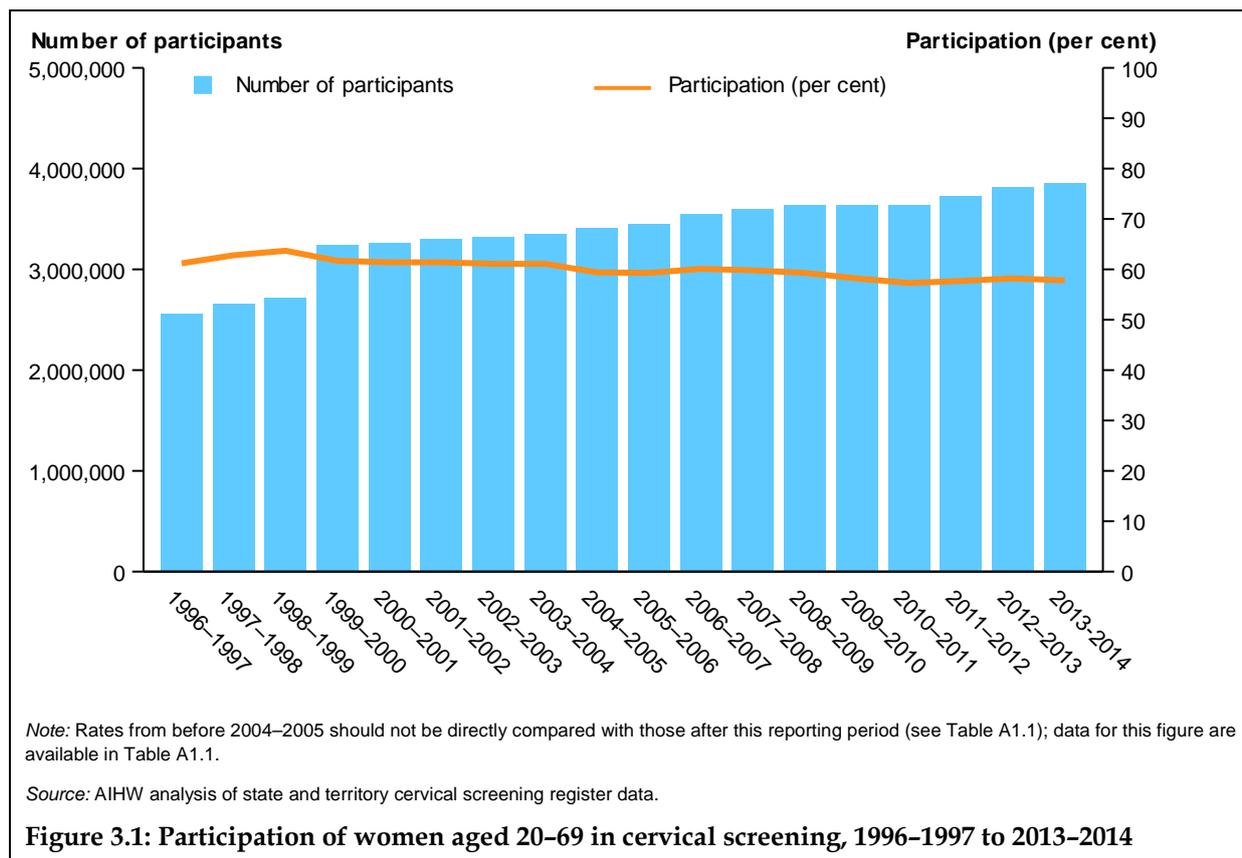
### Box 3.1: Crude versus age-standardised rates

This report presents crude and age-standardised rates. Crude is the 'true' proportion or rate, and is appropriate when a single year or reporting period is reported (for example, crude participation in 2013–2014 was 57.3%). However, comparisons over time or across states/territories or population subgroups require that crude rates are age-standardised to remove the underlying differences in age structure over time or between groups. These allow analysis of trends and differentials, and are therefore preferentially reported in these situations (for example, the age-standardised participation rate in 2013–2014 was 57.8%).

In 2013–2014, the latest 2-year period, 3,853,170 women aged 20–69 participated, which is 57.3% of the population who should have had a Pap test over this time.

Participation for 2013–2014 has been age-standardised to 57.8%, which is the rate used when comparing participation (and other measures of performance) over time or across population subgroups, such as state and territory, remoteness area and socioeconomic groups. Using the age-standardised rate allows us to see that participation in 2013–2014 was similar to the participation of previous 2-year periods, as indicated by the orange line in Figure 3.1.

Figure 3.1 also shows that the number of women screened in each 2-year period, indicated by the light blue columns, increased steadily from year to year.



Although not aligning with the recommended screening interval, participation in the NCSP is also measured over 3-year and 5-year periods. The latest data shown that participation over the 3 years 2012–2014 was 70.2%, and participation over the 5 years 2010–2014 was 82.7%, indicating that women are screening well, just not as frequently as recommended.

Three-year participation is particularly relevant, as this may provide a more accurate indication of the proportion of women who participate regularly in cervical screening than 2-year data. This is because women are only reminded to screen after they have missed their next Pap test, not before their next Pap test is due.

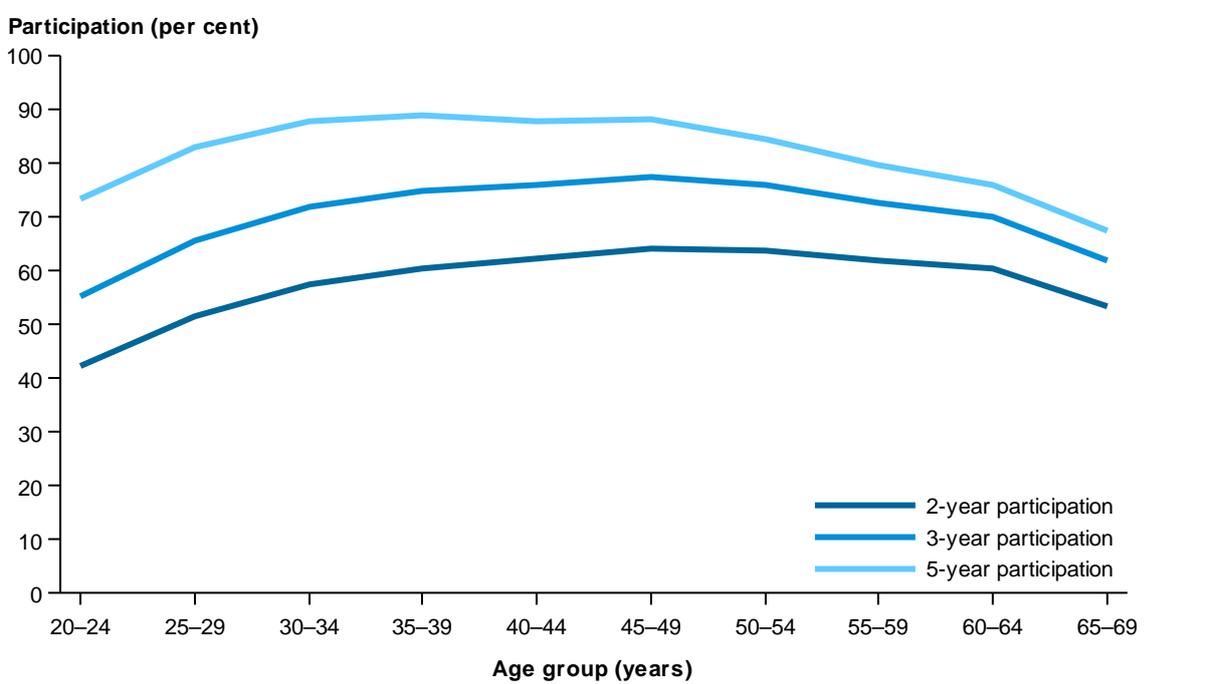
This reminder to screen, in the form of a letter sent by a cervical screening register 27 months after a previous negative Pap test, can act as a ‘prompt’ for women to have their next Pap test. This is supported by rescreening data, which show that 33.2% of women who were sent this reminder letter in 2013 screened within 3 months.

From these analyses, it is clear that regular screeners comprise 58–70% of the population, but this alone does not tell us which women are participating well and thus reaping the benefits of cervical screening, and which are participating less frequently, or not at all. For this, we need to look at different characteristics of women who participate in cervical screening.

## Screening behaviour across ages

Age is a major determinant of screening behaviour. The effect of age on participation in cervical screening is very similar for 2-year and 3-year participation, with peak participation in women aged 45–49 for both, being 64.1% for 2-year participation and 77.4% for 3-year participation for this age group (Figure 3.2).

The age structure changes when participation is measured over 5 years. The age group with the highest participation shifts to women aged 35–39 for 5-year participation, and the age group with the lowest participation changes from women aged 20–24 for 2-year and 3-year participation to women aged 65–69 for 5-year participation (Figure 3.2).



Source: AIHW analysis of state and territory cervical screening register data. Data for this figure are available in tables A1.2 and A1.6.

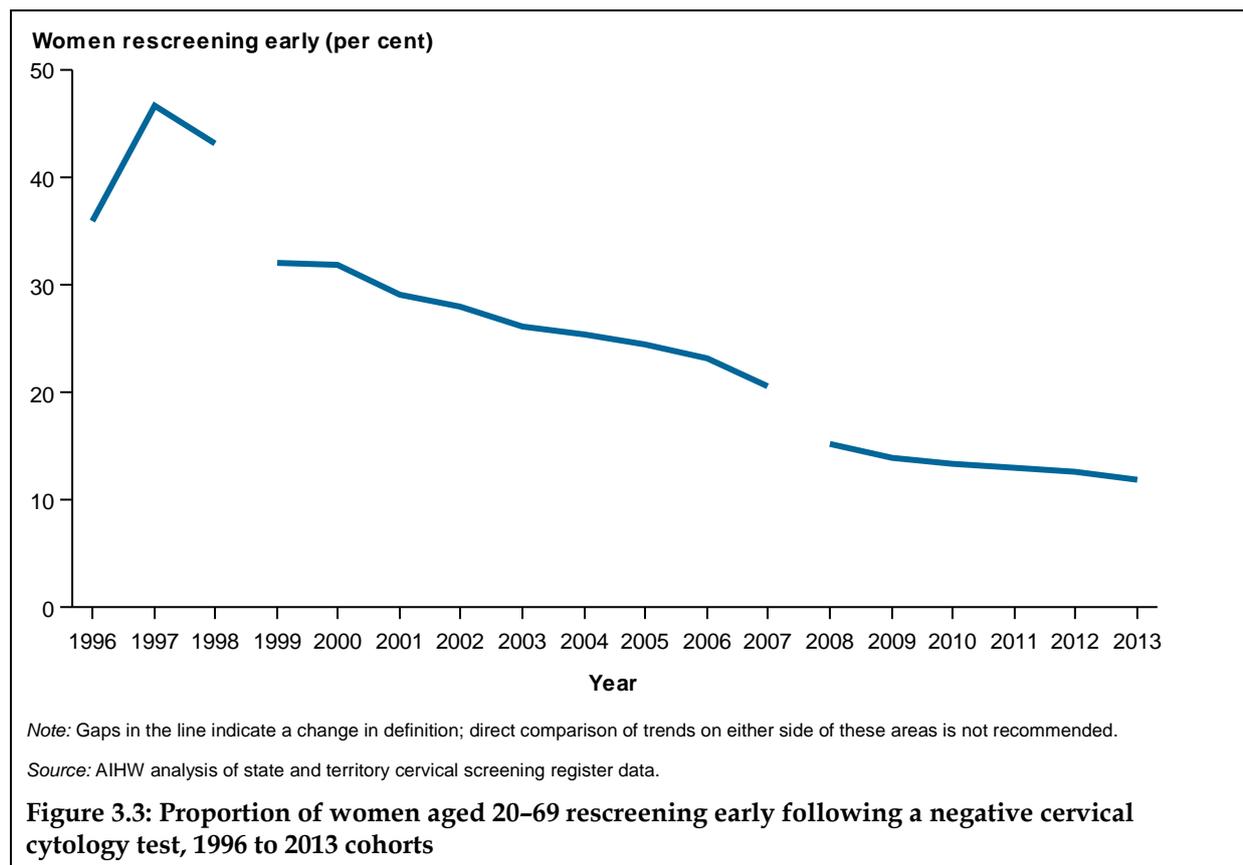
**Figure 3.2: Participation of women aged 20-69, by age, over 2 years (2013-2014), 3 years (2012-2014) and 5 years (2010-2014)**

The relatively low (and falling) level of screening in women aged 20–24 is not considered to be a cause for concern, as evidence shows screening women aged 20–24 years does not prevent any cervical cancers in women under the age of 25 years (Landy et al. 2014). Australia is one of the few countries that still screens women younger than 25, and, as outlined in the introductory material, Medical Services Advisory Committee (MSAC) recommendations include a starting age of 25 to be adopted as part of a renewed NCSP.

While participation data show that many women screen less often than recommended, there are some women who screen more often than required – 11.8% of women with no history of disease in 2013. A low proportion of women rescreening early is desirable, since modelling has shown that a decrease in early rescreening reduces the cost of a screening program without changing its effectiveness (Creighton et al. 2010).

This relatively low number continues a falling trend. It represents a substantial decrease from 46.7 in 1997, which was not long after the program commenced with a recommendation of 2-yearly rather than annual Pap tests. Even with 2 changes to the definition of early rescreening that affect direct comparisons, the overall trend shows a change in screening behaviour over time towards compliance with the recommended screening interval.

More recently (and directly comparable since the same definition of early rescreening applied), the proportion of women rescreening early decreased from 15.1% in 2008 to 11.8% in 2013 (Figure 3.3), indicating continued increase in compliance with 2-yearly screening.



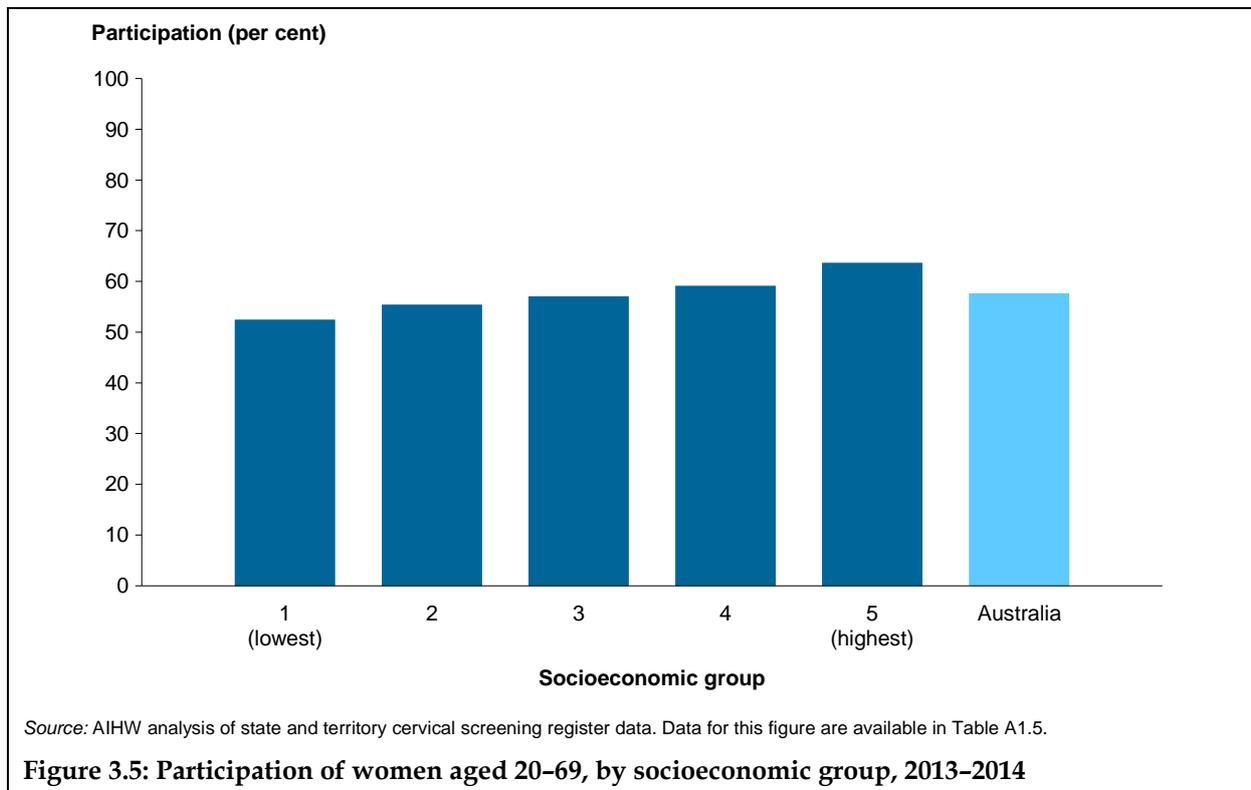
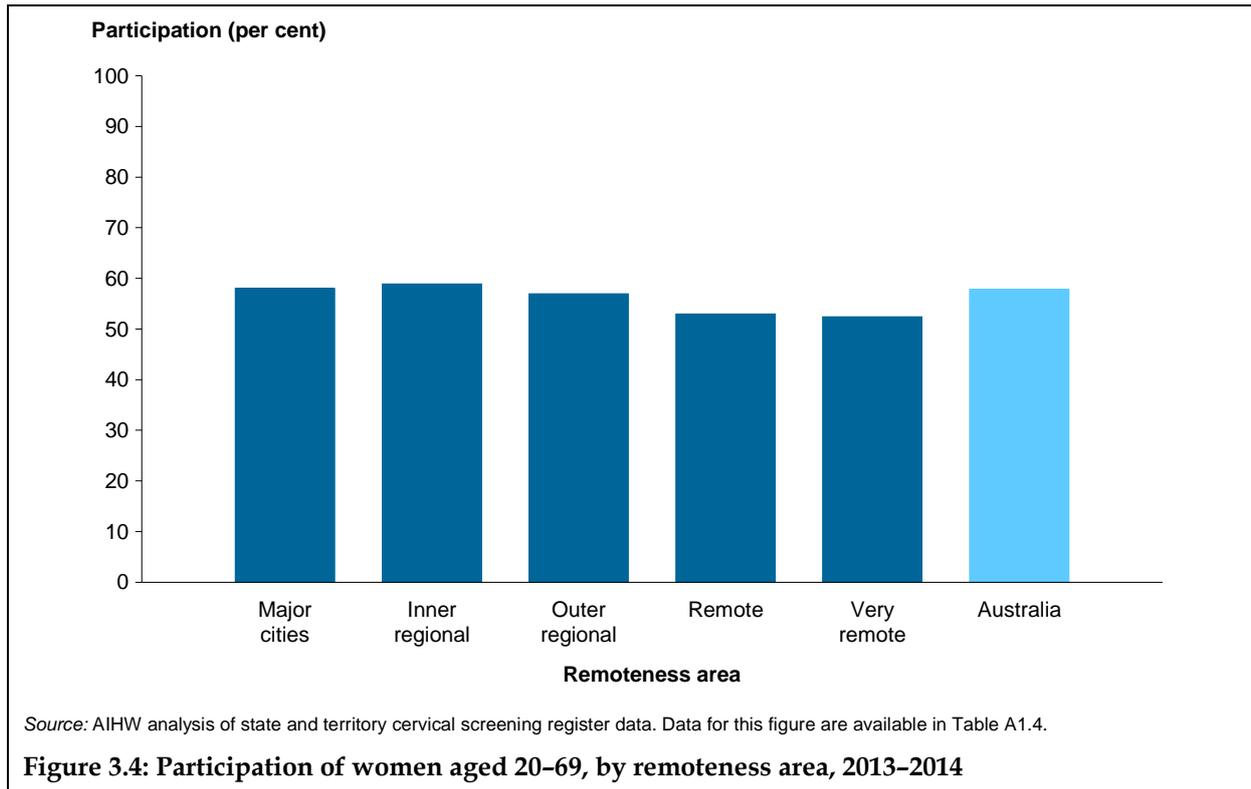
## Screening behaviour across groups

Participation in cervical screening not only reduces an individual’s risk of cervical cancer, but a high proportion of women participating also reduces the overall incidence and burden of the disease in Australia. However, if some population groups participate more or less than others, then the benefits from a reduced cervical cancer burden are not shared by all.

Participation is similar across remoteness areas, with the highest participation of 58.9% in *Inner regional* areas and lowest (although still relatively high) participation of 52.4% in *Very remote* locations (Figure 3.4). However, participation in cervical screening shows a clear trend of increasing participation with increasing socioeconomic group (Figure 3.5). Participation ranged from 52.3% for women in the lowest socioeconomic group to 63.5% for those in the highest socioeconomic group.

Participation in cervical screening cannot be measured nationally for Aboriginal and Torres Strait Islander women as Indigenous status is not included on all pathology forms in all states and territories, which is the only source that provides information to cervical screening registers. Evidence that is available on the participation in cervical screening by Indigenous women suggests that Aboriginal and Torres Strait Islander women are under-screened.

Coory and others (2002) and Binns & Condon (2006) estimated participation in communities with high proportions of Aboriginal and Torres Strait Islander women in Queensland and the Northern Territory, respectively. These researchers found that, on average, participation by Aboriginal and Torres Strait Islander women was close to 18 percentage points below that for the respective jurisdiction as a whole, with both studies showing considerable variation between communities or regions.



It has been recognised that Indigenous women face cultural, linguistic and physical barriers to cervical screening (DoHA 2004), and state and territory cervical screening programs have developed initiatives to increase participation in cervical screening by Indigenous women. These include the employment of Aboriginal and Torres Strait Islander Health Workers, with the Australian Government component of the NCSP supporting these through funding the development of principles, standards and guidelines for screening Aboriginal and Torres Strait Islander women (DoHA 2004). However, without being able to measure participation in cervical screening by Indigenous status, it is not known to what extent initiatives are reaching their desired aim.

Progress in this area is being achieved through the Indigenous primary health-care national key performance indicators (nKPIs) data collection. Data for this collection are provided to the AIHW by primary health-care organisations who receive funding from the Department of Health to provide services to Aboriginal and Torres Strait Islander people.

The purpose of the nKPIs is to improve the delivery of primary health-care services by supporting continuous quality improvement activity among service providers. The nKPIs also support policy and planning at the national and state and territory level by monitoring progress and highlighting areas for improvement.

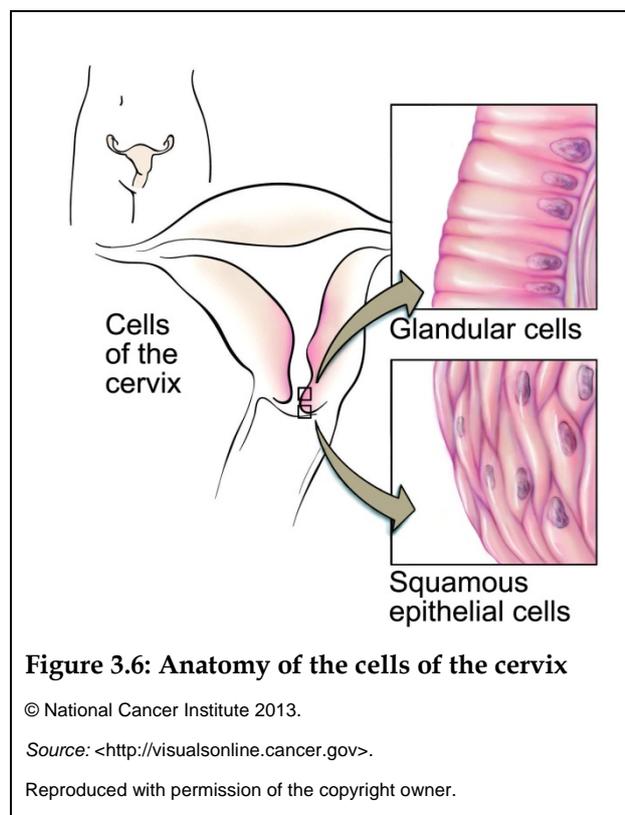
The nKPI data collection includes an indicator on women having a cervical screening test at 2-, 3- and 5-year intervals from primary health-care services providing care for Indigenous women. As this data set matures, it will become increasingly useful for understanding the extent of participation by Indigenous women attending these services.

The nKPI data presented in a recent national report shows that 31% of regular female Indigenous clients had a cervical screening test in the 2 years prior to December 2014; 40% had a cervical screening test in the previous 3 years; and 48% had a screening test in the previous 5 years (AIHW 2015).

Research is also underway to look at whether linkage of cervical screening data to another data source that includes Indigenous status (such as hospital data) may allow participation of Indigenous women in cervical screening to be estimated (Whop et al. 2014).

Disparities in participation in cervical screening in women in lower socioeconomic groups and Indigenous status are likely to have downstream effects on cancer incidence. This is explored more fully in Chapter 4.

## 3.2 Characteristics of the screening test



The screening test of the NCSP is currently the Pap test. The objective of a Pap test is to sample cells from the transformation zone of the cervix (CDHSH 1993) – the site where cervical abnormalities and cancer are usually found. This is the area between the ‘original’ and ‘current’ squamocolumnar junctions of the cervix, in which the squamous cells meet the endocervical cells (also known as glandular cells) (Figure 3.6).

The NCSP developed the National Cervical Cytology Coding Sheet based on the Australian Modified Bethesda System 2004 for reporting cervical cytology (NHMRC 2005). This coding sheet allows pathologists to report on both the squamous and endocervical components of the cervical cytology sample, which together give an overall cervical cytology result. This overall cytology result may indicate a squamous abnormality, an endocervical abnormality or (more rarely) concurrent squamous and endocervical abnormalities.

The squamous cell and endocervical component reporting categories of the National Cervical Cytology Coding Sheet are shown in Table 3.1.

**Table 3.1: Cytology reporting categories of the National Cervical Screening Program**

Squamous cell	Endocervical component
SU Unsatisfactory	EU Unsatisfactory
	E0 No endocervical component
S1 Negative	E1 Negative
S2 Possible low-grade squamous intraepithelial lesion	E2 Atypical endocervical cells of uncertain significance
S3 Low-grade squamous intraepithelial lesion	
S4 Possible high-grade squamous intraepithelial lesion	E3 Possible high-grade endocervical glandular lesion
S5 High-grade squamous intraepithelial lesion	E4 Adenocarcinoma in situ
S6 High-grade squamous intraepithelial lesion with possible microinvasion/invasion	E5 Adenocarcinoma in situ with possible microinvasion/invasion
S7 Squamous cell carcinoma	E6 Adenocarcinoma

*Note:* There is a further endocervical component result of E- that has been omitted since this code indicates a vaginal vault smear, which is not included in the cervical cytology results presented.

Under the current NCSP, most Pap tests will disclose a negative cervical cytology result, meaning that no abnormality is present. This continued to be the case in 2014, with 92.1% of the more than 2.1 million tests performed that year for women aged 20–69 being negative for abnormalities. The age distribution of this and other cytology results are shown in Figure 3.7.

A certain proportion of Pap tests contain abnormal cells, this being influenced by the underlying prevalence of disease in the population. In 2014, for every 100 Pap tests there were 5.7 abnormalities detected – 4.3 low-grade and 1.4 high-grade. The delivery of the HPV vaccination during school years is expected to reduce the number of abnormalities as these girls move into the screening cohort.

An indication of quality is the proportion of Pap tests that are unsatisfactory – those from which the pathologist is unable to determine a clear result. This may be due to too few or too many cells, or to the presence of blood or other factors obscuring the cells, or to poor staining or preservation (note that the absence of an endocervical component is not considered sufficient grounds to deem a cervical cytology sample unsatisfactory (NPAAC 2006)). An unsatisfactory Pap test needs to be repeated, so it is desirable that these be minimised. In 2014, the proportion of Pap tests that were unsatisfactory remained at the low level of 2.3%.

High-quality cytology is of such importance to the NCSP that there are standards to monitor the quality of all laboratories in Australia that report cervical cytology. The National Pathology Accreditation Advisory Council (NPAAC) *Performance measures for Australian laboratories reporting cervical cytology* (NPAAC 2006) include standards for unsatisfactory cytology and for the detection of abnormalities. These performance measures have been calculated as crude rates using data supplied for this report, and are shown in Table 3.2.

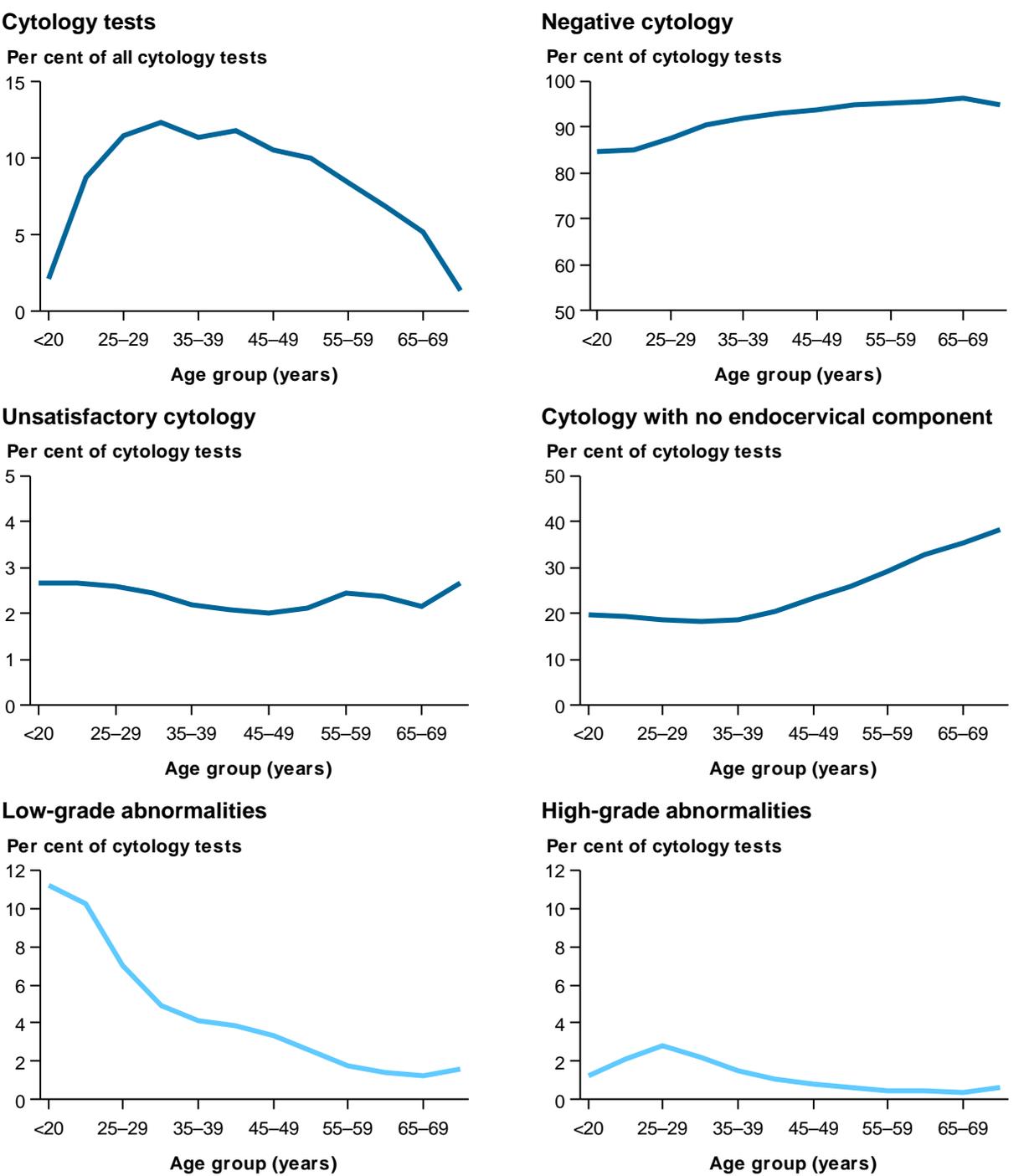
**Table 3.2: NPAAC performance measures calculated using NCSP data supplied for *Cervical screening in Australia 2013–2014***

NPAAC measure	Definition	Recommended standard	Calculated value
Performance measure 1	Proportion of specimens reported as unsatisfactory	Between 0.5% and 5.0% of all specimens reported as unsatisfactory	2.3%
Performance measure 2b	(i) Proportion of specimens reported as definite and possible high-grade abnormality	(i) Not less than 0.7% reported as definite or possible high-grade abnormality	(i) 1.4%
	(ii) Proportion of specimens reported as abnormal	(ii) Not more than 14.0% reported as abnormal	(ii) 5.7%
Performance measure 3a	Proportion of cytology specimens reported as a definite high-grade intraepithelial abnormality where cervical histology, taken within 6 months, confirms the abnormality as high-grade intraepithelial abnormality or malignancy	Not less than 65% of cytology specimens with a definite cytological prediction of a high-grade intraepithelial abnormality are confirmed on cervical histology, performed within 6 months, as having a high-grade intraepithelial abnormality or malignancy	Squamous cytology and histology = 79.9% (10,835/13,567) Endocervical cytology and histology = 85.6% (226/264)
Performance measure 3b	Proportion of cytology specimens reported as a possible high-grade intraepithelial abnormality where cervical histology, taken within 6 months, confirms the abnormality as high-grade intraepithelial abnormality or malignancy	Not less than 33% of cytology specimens with a cytological prediction of a possible high-grade intraepithelial abnormality are confirmed on cervical histology, which is performed within 6 months, as having a high-grade intraepithelial abnormality or malignancy	Squamous cytology and histology = 51.5% (5,124/9,959) Endocervical cytology and histology = 55.9% (157/281)

Source: AIHW analysis of state and territory cervical screening register data.

A trend of potential concern is the number of Pap tests for which no endocervical component was collected, which continues to increase disproportionately to the increase in the number of cytology tests. Between 2004 and 2014, there was a 8.0% increase in the number of cytology tests for women aged 20–69 and a 42.8% increase in the number of cytology tests with no endocervical component over the same period (from 350,670 to 500,868). This is reflected in the steady increase in the proportion of cytology tests with no endocervical

component, from 17.4% in 2004 to 23.0% in 2014 for women aged 20–69. These trends hold after age-standardisation – from 17.9% in 2004 to 22.9% of cytology tests in 2014 (data from 2004 to 2014 are available in supplementary online data tables at <www.aihw.gov.au>).



Source: AIHW analysis of state and territory cervical screening register data. Data for this figure are available in tables A3.2, A3.4, A3.7, A3.10, A3.13 and A3.14.

**Figure 3.7: Age-distribution of cervical cytology (all cytology, negative cytology, unsatisfactory cytology, cytology with no endocervical component, low-grade abnormalities detected by cytology and high-grade abnormalities detected by cytology), 2014**

The National Cancer Prevention Policy 2007–09 of Cancer Council Australia (Cancer Council Australia 2007) states that ‘presence of an endocervical component in 80% of Pap tests is generally considered acceptable’. In this context, the 2014 rate of 22.9%, which indicates the presence of an endocervical component in 77.1% of cytology tests, is outside this desired range.

It is recognised that an endocervical component can be difficult to collect in older women – just 2% of women older than 64 have a transformation zone located on the ectocervix (Autier et al. 1996) due to the movement of the transformation zone with age. As sampling of the transformation zone is required for endocervical cells to be present in a cervical cytology sample, a transformation zone high up in the endocervical canal is likely to be more difficult to sample than a transformation zone on the ectocervix. This does not explain, however, the increase in the proportion of cytology with no endocervical component across all age groups, including younger women who are likely to have a transformation zone located on the ectocervix.

## **The accuracy of cytology**

Much about the screening test of the NCSP can be learned by examining how well the cytology ‘prediction’ matches the histology finding or ‘truth’. Cervical cytology can only be seen as a prediction, as a screening test is not intended to be diagnostic, but aims to identify people who are more likely to have a cervical abnormality or cervical cancer, and therefore require further investigation from diagnostic tests. With this in mind, where cytology is followed by histology (either to confirm the presence or absence of disease as predicted by the cytology sample, or for other clinical reasons such as to investigate symptoms even in the absence of predicted disease), correlation between the cytology prediction and the histology finding allows the accuracy of cytological predictions to be assessed. This allows a better understanding of the characteristics of the NCSP screening test.

Follow-up of cytology tests should be in accordance with the National Health and Medical Research Council’s (NHMRC’s) *Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen-detected abnormalities* (NHMRC 2005), which means that most histology will occur after a cytology result of ‘high-grade’ or ‘cancer’. There will be exceptions, however, and these guidelines do not cover management of symptomatic women.

A complete assessment of cytology would require all cytology results (including negative) to be followed up by histology, but this is neither feasible nor desirable (it would be unethical to require all women who have a Pap test to also undergo a more invasive biopsy). Rather, this assessment is restricted to cytology and histology results available on cervical screening registers, and is intended to provide key measures that can be monitored annually to inform the NCSP of any early indications of alterations to the predictive ability of cervical cytology.

Correlation data relate to cytology tests performed in 2013; correlation between squamous cytology results and any squamous histology that was performed within 6 months is shown in Figure 3.8 and correlation between endocervical cytology results and any endocervical histology performed within 6 months is shown in Figure 3.9. These data do not include cytology tests not followed by histology, for which we cannot know the true disease state, or for cytology tests followed by histology more than 6 months after the cytology test.

The commentary below focuses on cytological predictions that were followed by histology within 6 months; however, in some places, data are provided as a proportion of all cytology

predictions (regardless of whether or not histology was performed) to provide additional contextual information, and to aid in comparisons with other data of this type. For clarity, the text around the results will clearly state which calculation has been used.

From Figure 3.8 it can be seen that squamous cytology is generally a good predictor of the histology finding; possible high-grade cytology is usually found to be high-grade, and high-grade cytology almost always found to be high-grade, with squamous cell carcinoma cytology usually found to be squamous cell carcinoma. This makes the positive predictive value quite high—68.1% of high-grade squamous abnormalities predicted by cytology that were biopsied within 6 months were found to be either a true high-grade squamous abnormality or squamous cell carcinoma (Table A5.3).

Negative and low-grade abnormalities are not usually followed up with histology, so these results should not be considered indicative of all negative and low-grade cytology. Of note, almost no predictions of possible low-grade or low-grade cytology, for which there was histology performed within 6 months, were found to be cancer.

Possible and definite high-grade squamous abnormalities are usually followed up by colposcopy, and often histology; 50.9% of cytology predictions of possible high-grade squamous intraepithelial lesions (HSIL) in 2013 that were biopsied within 6 months were histologically confirmed as HSIL and 0.6% of those biopsied within 6 months were confirmed as squamous cell carcinoma (Table A5.2). This was 38.0% and 0.4% of all possible HSIL predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively. Definite HSIL predictions were more accurate—78.3% of cytology predictions of HSIL in 2013 that were biopsied within 6 months were histologically confirmed as HSIL and 1.6% of those biopsied within 6 months were confirmed as squamous cell carcinoma (Table A5.2). This was 67.3% and 1.3% of all HSIL predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.

Almost all predictions of squamous cell carcinoma were confirmed as such; 23.4% of cytology predictions of squamous cell carcinoma in 2013 that were biopsied within 6 months were found to be HSIL on histology, and 70.1% of those biopsied within 6 months were confirmed as squamous cell carcinoma (Table A5.2). This was 17.6% and 52.8% of all squamous cell carcinoma predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.

Figure 3.9 shows that endocervical cytology is also a reasonable predictor of the true disease state. This is despite abnormalities preceding adenocarcinoma being less well understood than are the abnormalities preceding squamous cell carcinoma, and interpretation of endocervical cells more difficult (as can be the adequate sampling of these cells). These factors all affect the correlation between endocervical cytology and endocervical histology.

Possible high-grade glandular abnormality cytology was frequently found to be adenocarcinoma in situ (AIS), a cytology prediction of AIS was usually found to be AIS and a cytology prediction of adenocarcinoma was usually found to be adenocarcinoma. This makes the positive predictive value also quite high—70.8% of high-grade endocervical abnormalities predicted by cytology that were biopsied within 6 months were found to be a true high-grade endocervical abnormality or adenocarcinoma on histology (Table A5.6)

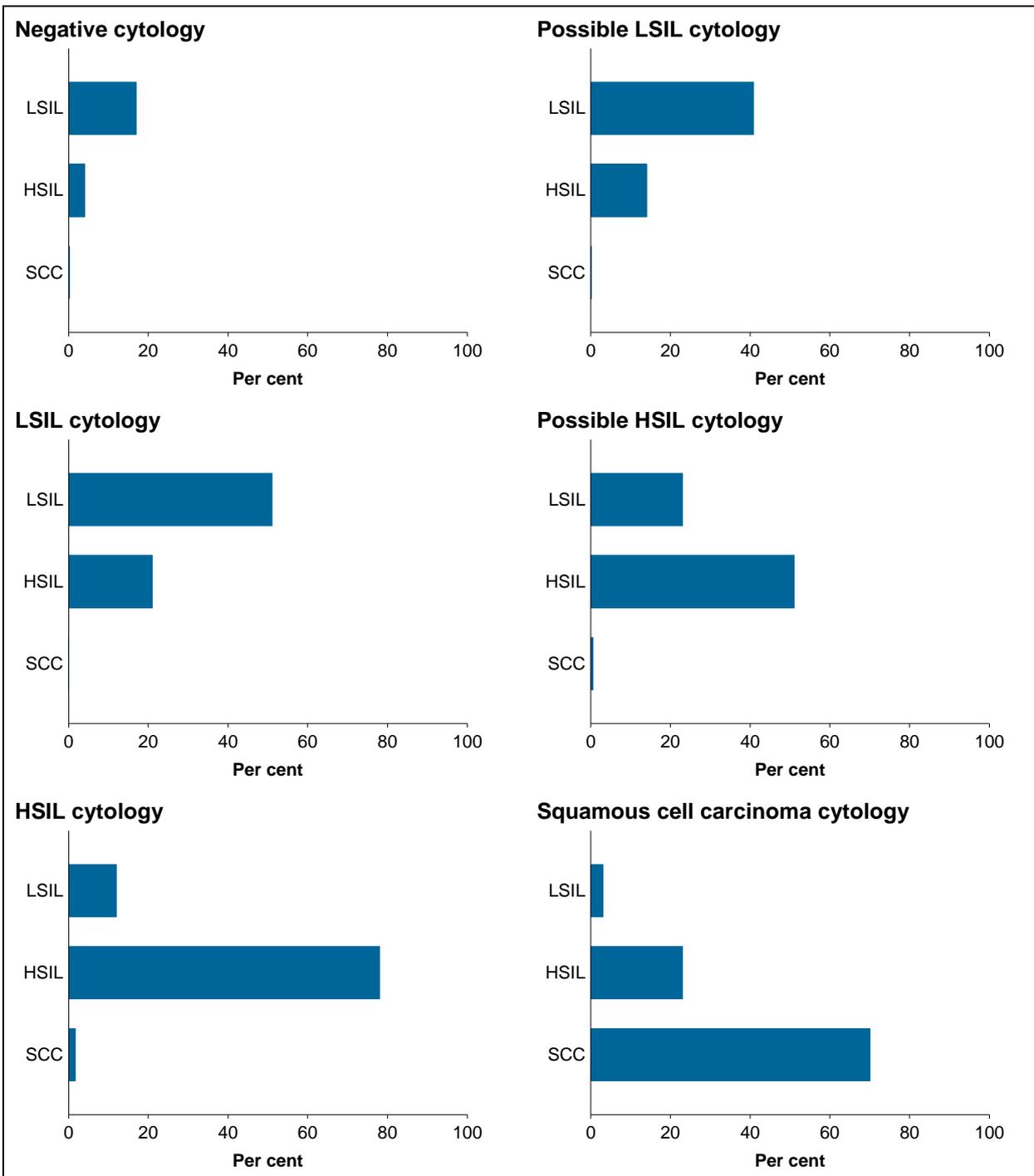
The cytology category 'atypical endocervical cells of uncertain significance' is used to indicate that abnormal endocervical cells were identified in the sample but that the significance of these is uncertain (meaning that these could be indicative of a serious

abnormality, or could be associated with a benign change such as inflammation). This means that biopsy will not be the outcome for many women with this result. In the correlation for cases that were followed by histology, these atypical cells were sometimes found to be a serious abnormality, but often found to not be associated with any abnormality. For example, 20.0% of cases of atypical endocervical cells of uncertain significance predicted by cytology in 2013 that were biopsied within 6 months were histologically confirmed as AIS and 3.7% of those biopsied were confirmed as adenocarcinoma (Table A5.5). This was 7.1% and 1.3% of all cases of atypical endocervical cells of uncertain significance predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.

A cytology prediction of possible high-grade endocervical abnormality was frequently found to be AIS or worse; 44.1% of cytology predictions of possible high-grade endocervical glandular lesion in 2013 that were biopsied within 6 months were histologically confirmed as AIS and 11.7% of those biopsied within 6 months were confirmed as adenocarcinoma (Table A5.5). This was 23.0% and 6.1% of all possible high-grade endocervical glandular lesions predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.

Predictions of AIS were often found to be AIS or adenocarcinoma; 64.4% of cytology predictions of AIS in 2013 that were biopsied within 6 months were histologically confirmed as AIS and 21.2% of those biopsied within 6 months were confirmed as adenocarcinoma (Table A5.5). This was 55.4% and 18.2% of all possible high-grade endocervical glandular lesions predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.

Almost all predictions of adenocarcinoma were confirmed as such; 11.1% of cytology predictions of adenocarcinoma in 2013 that were biopsied within 6 months were found to be AIS on histology, and 75.6% of those biopsied within 6 months were confirmed as adenocarcinoma (Table A5.5). This was 6.4% and 43.6% of all adenocarcinoma predicted by cytology in 2013 (including cytology where there was no histology performed within 6 months), respectively.



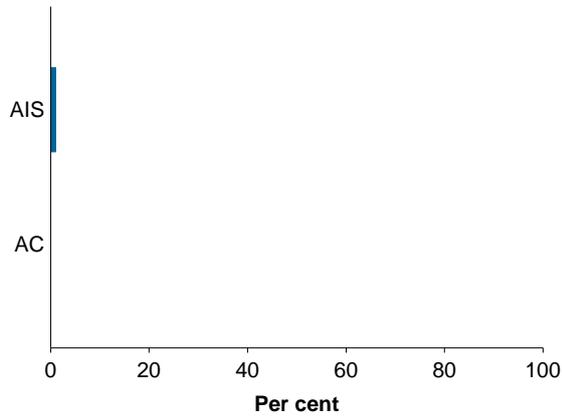
LSIL = low-grade intraepithelial lesion (low-grade abnormality); HSIL = high-grade intraepithelial lesion (high-grade abnormality); SCC = squamous cell carcinoma.

Note: Data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.

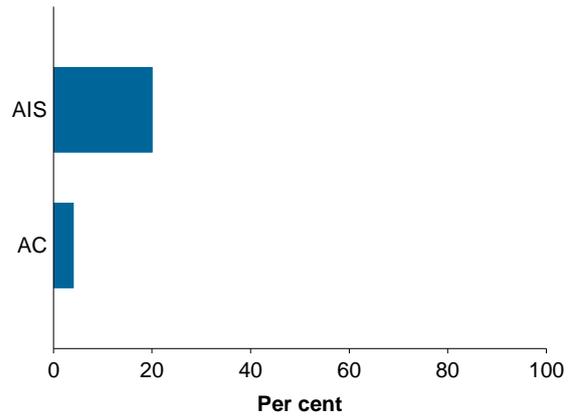
Source: AIHW analysis of state and territory cervical screening register data. Data for this figure are available in Table A5.2.

**Figure 3.8: Correlation of squamous cytology prediction with squamous histology finding for women aged 20–69, cytology performed in 2013**

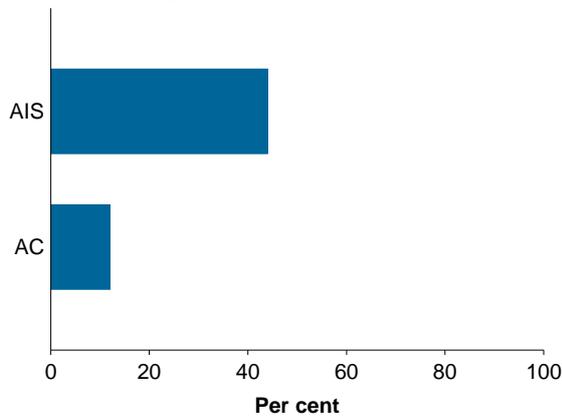
### Negative cytology



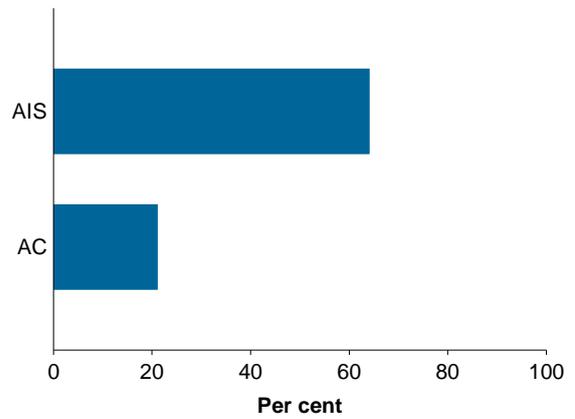
### Atypical endocervical cells of uncertain significance cytology



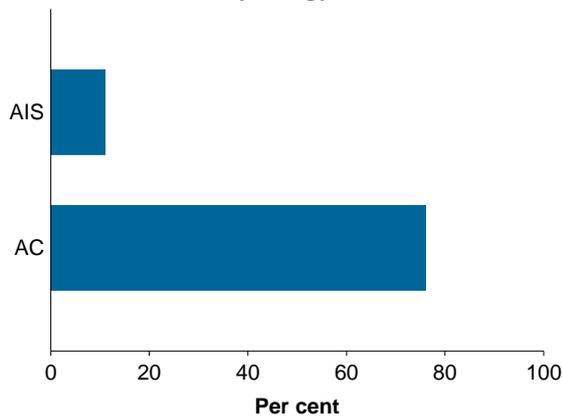
### Possible high-grade endocervical glandular lesion cytology



### Adenocarcinoma in situ cytology



### Adenocarcinoma cytology



AIS = adenocarcinoma in situ; AC = adenocarcinoma.

Note: Data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.

Source: AIHW analysis of state and territory cervical screening register data. Data for this figure are available in Table A5.5.

**Figure 3.9: Correlation of endocervical cytology prediction with endocervical histology finding for women aged 20–69, cytology performed in 2013**

### 3.3 Detection of high-grade abnormalities

It was previously thought that the development of cervical cancer involved progression from low-grade to moderate-grade to high-grade abnormalities, but it is now understood that low-grade and high-grade abnormalities represent different HPV processes. Low-grade abnormalities occur as a result of acute HPV infection, most of which will resolve spontaneously. High-grade abnormalities are the result of persistent infection with a high-risk HPV type. Most high-grade abnormalities also regress over time (Raffle et al. 2003), but regression takes longer (Cancer Council Australia 2014). A major difference between low-risk and high-risk HPV types is that high-risk HPV types integrate their DNA into the host genome, which is why these are associated with oncogenic (cancer-causing) changes to the cells of the cervix, whereas low-risk HPV types are unable to integrate their DNA into the host genome and therefore can only cause low-grade changes to cells (Chhieng & Hui 2011).

As potential precursors to cervical cancer, detection of high-grade abnormalities through cervical screening provides an opportunity for treatment before cancer can develop, thus the NCSP aims to detect high-grade abnormalities in line with its broader aim to reduce the incidence of cervical cancer. Detection of high-grade abnormalities in this context is by histology, not by cytology. This is because cytology is not diagnostic, and may under-call or over-call true disease (as visible in the cytology–histology correlation data in Section 3.2).

Histology is the primary diagnostic tool of the NCSP, and confirmation of disease is required before any treatment is initiated, both to ensure treatment is appropriate and to avoid unnecessary treatment in women where the cytology has predicted disease that is not present. While colposcopy (examination of the cervix using a magnifying instrument called a colposcope) is used as part of this process, in Australia it is considered best practice to confirm high-grade disease with histology before treatment (NHMRC 2005).

Unlike cytology, which has nationally consistent reporting through the Australian Modified Bethesda System (AMBS) 2004, state and territory cervical screening registers have different coding systems for histology that have been mapped to a national histology coding system. The squamous and endocervical reporting categories of the NCSP national histology coding system are shown in Table 3.3.

**Table 3.3: Histology reporting categories of the National Cervical Screening Program**

Squamous	Endocervical
HSU Unsatisfactory	HEU Unsatisfactory
HS01 Negative	HE1 Negative
HS02 Low-grade squamous abnormality	HE02 Endocervical atypia
HS03.1 High-grade squamous abnormality, cervical intraepithelial neoplasia (CIN) not otherwise specified (NOS)	HE03.1 High-grade endocervical abnormality, endocervical dysplasia
HS03.2 High-grade squamous abnormality, CIN II	HE03.2 High-grade endocervical abnormality, adenocarcinoma in situ
HS03.3 High-grade squamous abnormality, CIN III	
HS04.1 Squamous cell carcinoma, microinvasive	HE04.1 Adenocarcinoma, microinvasive
HS04.2 Squamous cell carcinoma, invasive	HE04.2 Adenocarcinoma, invasive
	HE04.3 Adenosquamous carcinoma
	HE04.4 Carcinoma of the cervix (other)

*Note:* There is a further result of HE03.3 to allow the collection of mixed high-grade histology (carcinoma in situ/adenocarcinoma in situ) that has been omitted since this category is not included in the cervical histology results presented.

The high-grade abnormality detection rate of the NCSP is the number of women with a high-grade abnormality detected by histology per 1,000 women screened. High-grade abnormalities of the cervix include cervical intraepithelial neoplasia (CIN) that have been graded as moderate (CIN II) or severe (CIN III), or for which the grade has not been specified, as well as endocervical dysplasia and adenocarcinoma in situ.

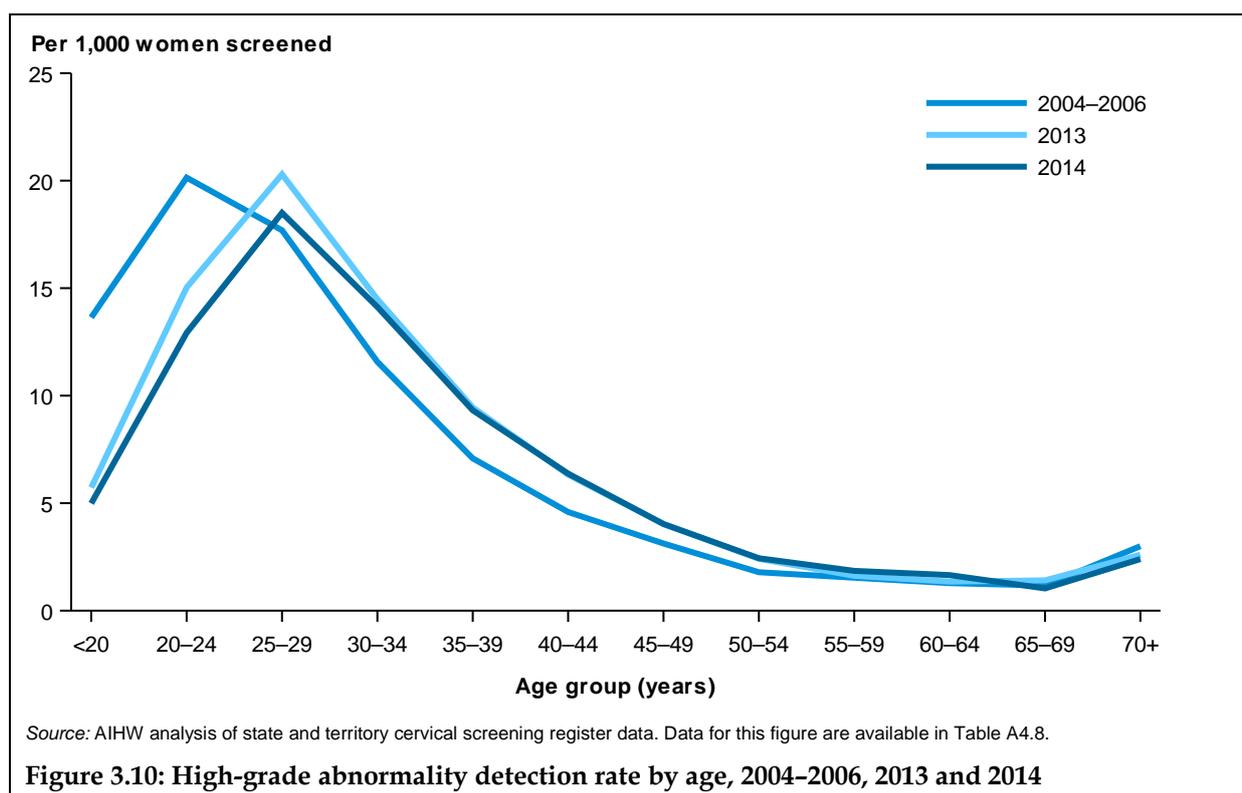
In 2014, there were 16,505 women with a high-grade abnormality detected by histology, which equates to 8.0 women with a high-grade abnormality detected by histology per 1,000 women screened for women aged 20–69. This means that, for every 1,000 women screened, 8 had a high-grade abnormality found, providing an opportunity for treatment before possible progression to cervical cancer.

The number of women aged 20–69 with a high-grade abnormality detected by histology per 1,000 women screened, after remaining at between 7 and 8 for all years from 2005 to 2007, increased to above 8 from 2008, where it remained from 2008 to 2014, being 8 per 1,000 women screened in 2014. It is not clear why there has been an increase in high-grade abnormality detection, and there may be various contributing factors. These may include a change in classification of abnormalities as a result of the change in management guidelines in 2006 (for instance, if a pathologist is uncertain, they may be more inclined to classify an abnormality as high-grade because these are monitored more conservatively) or the increased use of immunohistochemistry which can assist in the confirmation of high-grade abnormalities, or other as-yet unidentified factors.

In contrast with the overall trend of increasing detection over time, there has been a steady decline in high-grade abnormality detection in younger women. In those under 20, this decrease commenced from 2007, falling from 11.6 in that year to 5.0 women with high-grade histology per 1,000 women screened in 2014. More recently, between 2010 and 2014, there has also been a decline for women aged 20–24, from 19.7 in 2010 to 12.9 women in 2014. This latter trend notably changed the historical peak age of high-grade histological abnormalities from women aged 20–24, to women aged 25–29. For the first time, in 2014 there has also been a decrease in high-grade abnormality detection in women aged 25–29, from 20.3 in 2013 to 18.5 in 2014, which is the lowest detection rate for this age group since it rose to 19–20 for all years from 2008 to 2013.

The decrease in high-grade abnormalities in younger women is likely to be due to younger girls being vaccinated against HPV under the National HPV Vaccination Program, during either the ‘school-based’ or ‘catch-up’ program, as these women are expected to experience fewer abnormalities (a trend noted by Brotherton et al. (2011) and Gertig et al. (2013)). Visible in the under-20 age group several years ago, this is now clearly contributing to the 20–24 age group, and started contributing to the 25–29 age group in 2014.

This change in age structure is illustrated in Figure 3.10, which shows detection of high-grade abnormalities by age over the period 2004–2006, which is before the introduction of the National HPV Vaccination Program, and in 2013 and 2014, which both demonstrate this shift in peak age of detection from 20–24 to 25–29.



Looking in more detail at the change in the high-grade detection rate by age, using the 3 years 2004–2006 as the pre-vaccination comparator, the decrease in women aged under 20 was small but perceptible from 2007, the first year of the National HPV Vaccination Program (although the decrease in 2007 could be just natural variation). It has become larger with each passing year, to reach a decrease of 8.6 women with a high-grade abnormality detected per 1,000 women screened by 2014, the latest data available (Table 3.4).

For women aged 20–24, a notable decrease begins in 2011, falling further to reach a decrease of 7.2 in 2014 (Table 3.4). Older age groups are unaffected, as sufficient time has not yet passed for girls vaccinated from 2007 to have moved into age groups beyond 25–29 (women aged 25–29 show no difference in Table 3.4 as this compares 2014 data to 2004–2006 data, when this age group had a detection rate of 17.7 per 1,000 women screened).

This trend is illustrated in Figure 3.11.

**Table 3.4: Change in high-grade abnormality detection per 1,000 women screened since 2004–2006**

Age group	2004–2006	2007	2008	2009	2010	2011	2012	2013	2014
<20	13.6	-2.0	-2.8	-4.7	-5.8	-6.5	-7.3	-7.9	-8.6
20–24	20.1	-1.2	1.2	-0.2	-0.5	-2.7	-4.3	-5.1	-7.2
25–29	17.7	0.1	1.6	1.3	2.2	1.8	2.3	2.6	0.8
30–34	11.6	-0.1	1.1	1.2	2.1	2.4	2.2	2.9	2.6

Note: Change from the 2004–2006 data is shown for age groups <20 to 30–34 from 2007 to 2014. A negative symbol indicates that the change is a decrease; no symbol indicates that the change is an increase.

Source: AIHW analysis of state and territory cervical screening register data.

To gain further information as to which abnormalities are contributing to this trend in young women, the most common high-grade abnormalities, cervical intraepithelial neoplasia graded as moderate (CIN II) and severe (CIN III), which are usually presented per 100 histology tests, have been further analysed as the number of these abnormalities per 1,000 women screened, and the results shown in the smaller graphs in Figure 3.11.

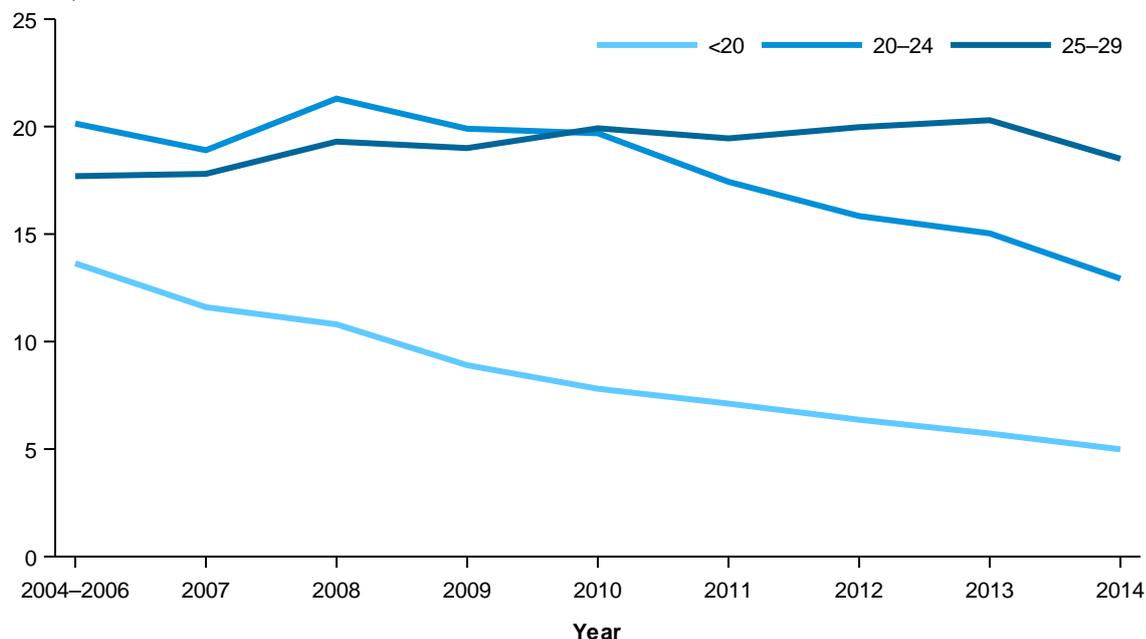
From these graphs it can be seen that decreases in both CIN II and CIN III in women under the age of 20 have contributed to the overall decrease in high-grade abnormalities detected in this age group. In women aged 20–24, the decrease in CIN III from 2012 mirrors the trend in high-grade detection in this age group. In women aged 25–29, CIN II remains relatively stable over these years, while CIN III has increased (Figure 3.11).

Of particular note is that, since 2004–2006, the pattern of CIN II has changed – historically CIN II was most frequent in women aged 20–24, but in 2014, the decrease in this age group has meant that, for the first time, CIN II was most common in women aged 25–29 when measured per 1,000 women screened (although CIN II is still most common in women aged 20–24 when measured per 100 histology tests, as shown in Table A4.12).

In contrast, CIN III has always occurred most frequently in women aged 25–29, and recent trends have not altered this (Figure 3.11).

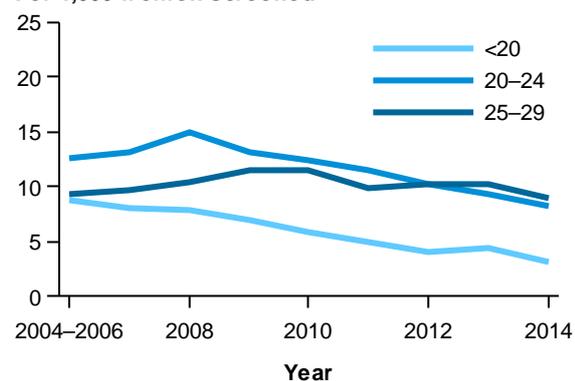
### Women with high-grade abnormality detected by histology

Per 1,000 women screened



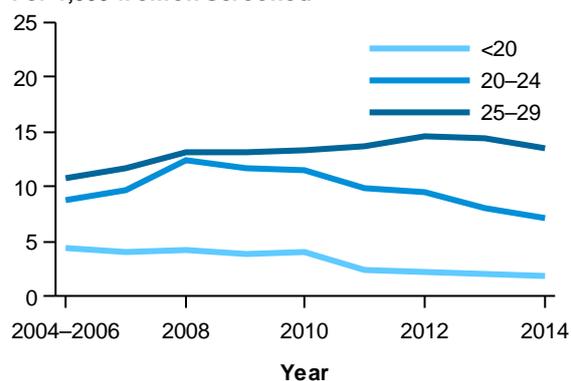
### CIN II histology

Per 1,000 women screened



### CIN III histology

Per 1,000 women screened



Note: As some states and territories receive data in a format that does not allow them to distinguish between the histology results of CIN II and CIN III, these data are only from those states and territories where CIN II and CIN III can be distinguished.

Source: AIHW analysis of state and territory cervical screening register data.

**Figure 3.11: High-grade abnormality detection rate, CIN II per 1,000 women screened, and CIN III per 1,000 women screened, age groups under 30, 2004–2006 to 2014**

# 4 Monitoring cervical screening in Australia using AIHW data

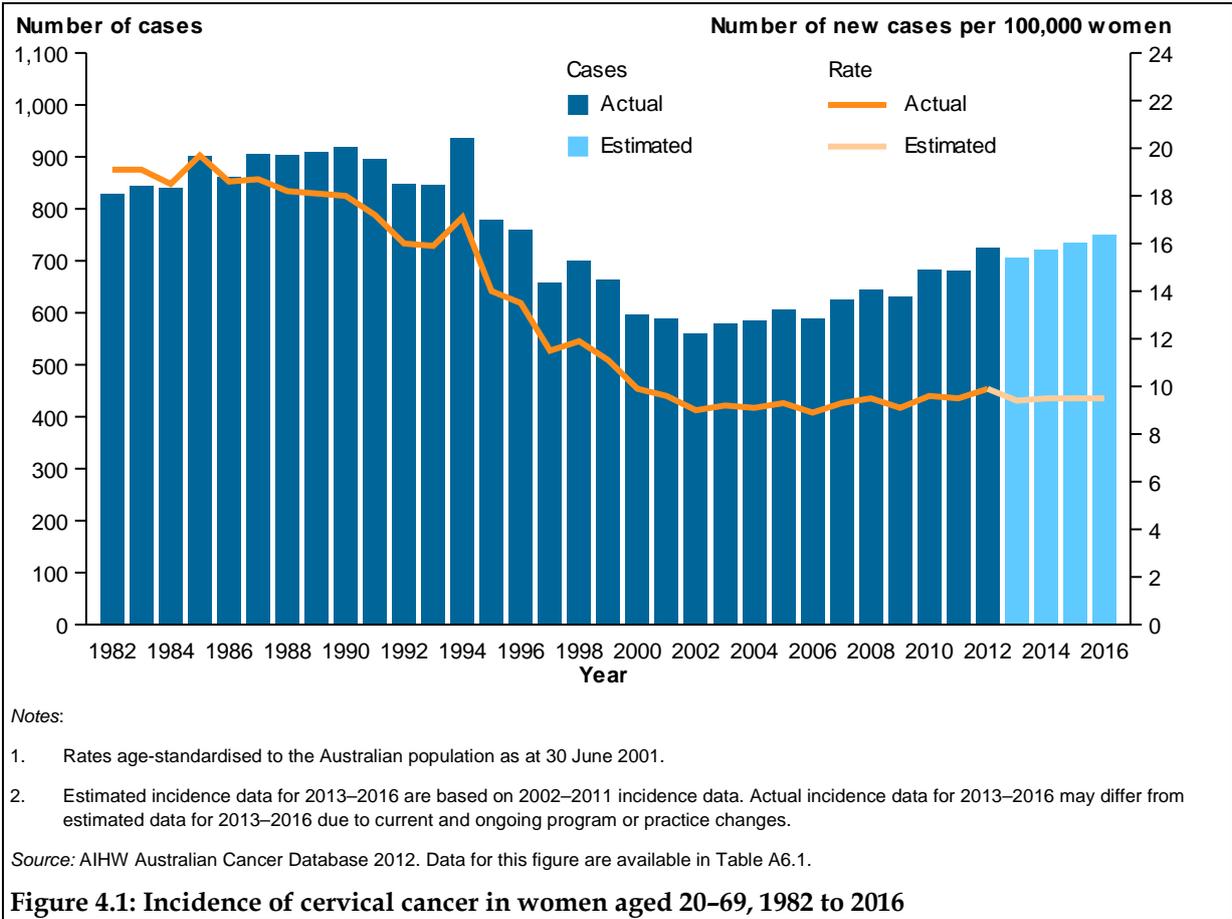
## 4.1 Incidence of cervical cancer

Australia has high-quality and virtually complete cancer incidence data. Collected by state and territory cancer registries, clinical and demographic data for all cancer cases are provided to the AIHW and compiled into the Australian Cancer Database. Data in this section are sourced from the 2011 and 2012 versions of the Australian Cancer Database. The latest national data available are for new cases in 2012, with estimates to 2016.

In 2016, it is projected that there will be 903 new cases of cervical cancer in Australian women. It is projected that this will be equivalent to 7.6 new cases for every 100,000 women in the population, which, when age-standardised to allow analysis of trends and differentials, will equate to an incidence rate of 7.0 for 2016.

Of the 903 new cases, it is projected that 750 women aged 20–69 (the target population of the NCSP) will be diagnosed with cervical cancer. It is projected that this will be equivalent to 9.5 new cases for every 100,000 women in the population (crude and age-standardised).

### Cervical cancer over time

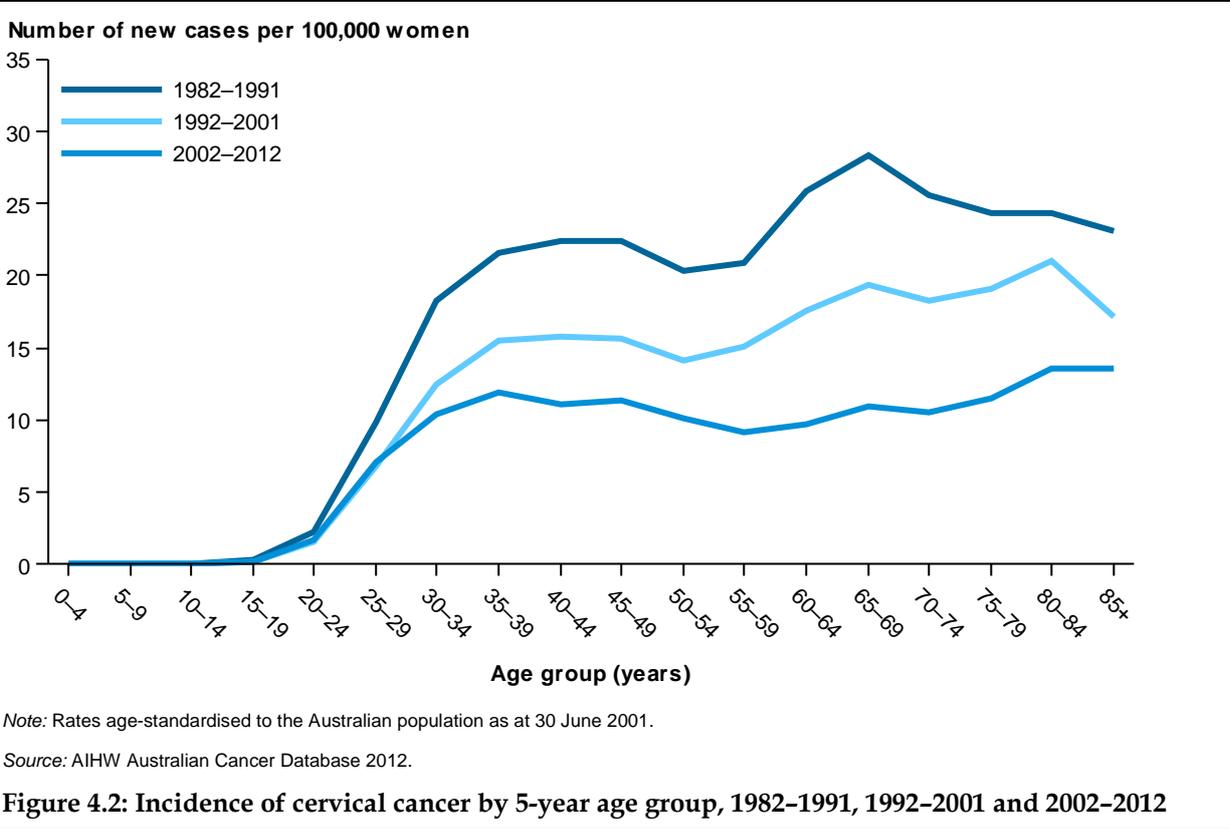


For women aged 20–69, the age-standardised incidence rate has remained steady since 2002, at between 9 and 10 new cases per 100,000, after falling from the previous figure of around 18 new cases per year prior to the introduction of the NCSP in 1991 (Figure 4.1).

This decrease in incidence has been accompanied by a decrease in the ranking of cervical cancer, from the 6th most common cancer in women in 1982, to the 12th in recent years.

This decrease is attributed to the success of the NCSP. However, it would be expected that some decreases in cervical cancer incidence would be apparent before the commencement of the NCSP in 1991, particularly from the late 1980s onwards, as opportunistic cervical screening has occurred in Australia since the 1960s, and some states trialled organised screening in the years leading up to 1991.

Examining this decrease in incidence over time by age group, it is apparent that, prior to the introduction of the NCSP (1982–1991), there was a clear second (and higher) peak in incidence in women from 60 years onwards, which has reduced substantially over time (Figure 4.2), which is presumably due to cervical screening either detecting these earlier or preventing their occurrence.



### Cervical cancer types

While all cervical cancers share the same site code (C53 under the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)), there are several histological subtypes within the category of cervical cancer, with clear differences in clinical behaviour (Blomfield & Saville 2008). Histology codes for cancers are collected in the Australian Cancer Database, which allows the analysis of trends in cervical cancer incidence for different histological types. The histological types presented are based on the histological groupings for cervical cancer set out in Chapter 4 of *Cancer incidence in five continents vol. IX*

(Curado et al. 2007), with histological types characterised by the type of cell in which the cancer originates. Thus, cervical cancer has been disaggregated into the broad histological types of carcinoma (cancers of epithelial origin), sarcoma (cancers originating in connective tissue such as bone, muscle and fat) and other specified and unknown malignant neoplasms (unusual cancers and cancers too poorly differentiated to be classified). Carcinoma has been further split into squamous cell carcinoma (which arises from the squamous cells that cover the outer surface of the cervix), adenocarcinoma (which arises from the glandular (columnar) cells in the endocervical canal), adenosquamous carcinoma (which contains malignant squamous and glandular cells) and other carcinoma.

Table 4.1 differs slightly from that presented in *Cancer incidence in five continents vol. IX* (Curado et al. 2007), with other specified and unspecified carcinomas grouped together, as are other specified and unspecified malignant neoplasms. Further, adenosquamous carcinoma has been listed as a separate group under 'Carcinoma' rather than included in 'Other specified carcinoma', as specified in Curado and others (2007). The latter change is to allow the carcinoma histological groupings to match the cervical cancer types collected by the cervical cytology registries and reported under the 'Histology' performance indicator.

**Table 4.1: Incidence of cervical cancer in women aged 20–69, by histological type, 2012**

Type of cervical cancer	New cases	AS rate	% of cervical cancers	% of carcinomas
1: Carcinoma	714	9.8	98.5	100.0
1.1: Squamous cell carcinoma	495	6.8	68.3	69.3
1.2: Adenocarcinoma	158	2.2	21.8	22.1
1.3: Adenosquamous carcinoma	23	0.3	3.2	3.2
1.4: Other specified and unspecified carcinoma	38	0.5	5.2	5.3
2: Sarcoma	2	0.0	0.3	..
3: Other specified and unspecified malignant neoplasm	9	0.1	1.2	..
<b>Total</b>	<b>725</b>	<b>9.9</b>	<b>100.0</b>	<b>..</b>

'Carcinoma' = ICD-O-3 codes 8010–8380, 8382–8576

'Squamous cell carcinoma' = ICD-O-3 codes 8050–8078, 8083–8084

'Adenocarcinoma' = ICD-O-3 codes 8140–8141, 8190–8211, 8230–8231, 8260–8263, 8382–8384, 8440–8490, 8570–8574, 8310, 8380, 8576

'Adenosquamous carcinoma' = ICD-O-3 code 8560

'Other specified and unspecified carcinoma' = ICD-O-3 codes for carcinoma excluding those for squamous cell carcinoma, adenocarcinoma and adenosquamous carcinoma

'Sarcoma' = ICD-O-3 codes 8800–8811, 8840–8921, 8990–8991, 9040–9044, 9120–9133, 9540–9581, 8830, 9150

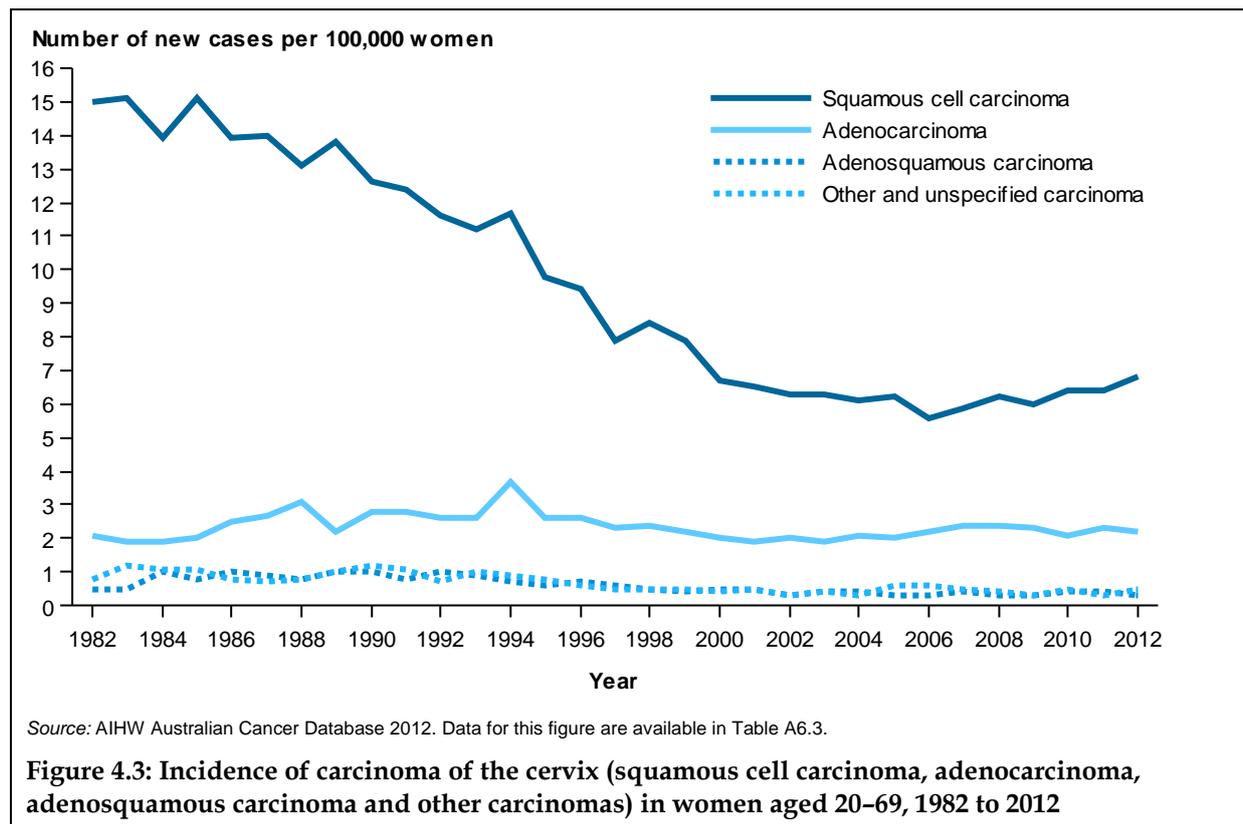
'Other specified and unspecified malignant neoplasm' = ICD-O-3 codes for cervical cancer excluding those for carcinoma and sarcoma

Note: Age-standardised (AS) rate is the number of new cases per 100,000 women, age-standardised to the Australian population at 30 June 2001. Rates based on less than 20 new cases should be interpreted with caution.

Source: AIHW Australian Cancer Database 2012.

In 2012, of the 725 cervical cancers diagnosed in women aged 20–69, 714 (98.5%) were carcinomas, 2 (0.3%) were sarcomas and 9 (1.2%) were classified as 'Other specified and unspecified malignant neoplasms' (Table 4.1). Within the carcinomas, squamous cell carcinoma comprised the greatest proportion at 69.3% of all cervical carcinomas, followed by adenocarcinomas at 22.1% of cervical carcinomas and adenosquamous carcinomas at 3.2%, with 'Other specified and unspecified carcinomas' comprising 5.3% (Table 4.1).

Trends in age-standardised incidence for women aged 20–69 for squamous cell carcinoma, adenocarcinoma, adenosquamous carcinoma and other carcinomas are shown in Figure 4.3.



Squamous cell carcinoma has shown the most substantial change over this time, decreasing from 15.0 new cases per 100,000 women aged 20–69 in 1982 to 12.4 in 1991, thereafter halving to 6 new cases per 100,000 women in 2002, where it remained until 2012 when it rose slightly to 6.8 new cases per 100,000 women (Figure 4.3).

In contrast, after an initial decrease from 2.8 new cases per 100,000 women in 1991, the incidence of adenocarcinoma has remained at around 2 new cases per 100,000 women thereafter (Figure 4.3). The peak of 3.7 new cases per 100,000 women in 1994 is consistent with documented trends in Canada, the United States and the United Kingdom, and is thought to represent a cohort effect as a result of increased risk of adenocarcinoma for women born in the early 1960s (Blomfield & Saville 2008). Incidence trends of adenosquamous and other carcinomas are more difficult to ascertain due to small numbers.

From these data, it is clear that the observed decrease in cervical cancer incidence since the introduction of the NCS in 1991 does not apply equally to all histological types of cervical cancer. The trend in squamous cell carcinomas illustrates the success of the NCS in preventing these histological subtypes of cervical cancer through the detection of high-grade squamous abnormalities, with these readily identified by repeated cervical cytology (Blomfield & Saville 2008). As a result, squamous cell carcinomas now comprise 68.3% of cervical cancers, much reduced from its historical proportion of 95% (Blomfield & Saville 2008).

In contrast, adenocarcinomas have not been reduced to the same degree as squamous cell carcinomas by cervical screening, with these glandular carcinomas now comprising 21.8% of all cervical cancers—previously this was proportionately a rarer disease. The inability of cervical screening to reduce glandular cancers below the level reached a decade ago is recognised as a reflection of the difficulties in sampling glandular cells (Sasieni et al. 2009), with cervical cytology less effective at identifying glandular abnormalities (Blomfield &

Saville 2008). Further, the cytological interpretation of abnormal glandular cells that are sampled (which occur much more infrequently than squamous abnormalities) is more difficult, and the progression from glandular abnormality to adenocarcinoma is not well characterised (Sasieni et al. 2009; Wang et al. 2006).

It is also important to realise that some cervical cancers do not have a precancerous stage, and therefore are simply unable to be detected – so their incidence is not affected by cervical screening. These tend to be rare but aggressive cancers, such as neuroendocrine carcinoma of the cervix; the two most aggressive types being small cell neuroendocrine carcinoma and large cell neuroendocrine carcinoma, neither of which appear to possess a preinvasive stage (Necervix.com 2014).

## **Cervical cancer across groups**

Incidence for population groups is presented for 2006–2010 rather than for 2008–2012, due to the projection of 2011 and 2012 data for New South Wales and the Australian Capital Territory in the 2012 Australian Cancer Database (see Appendix C for further information).

Incidence of cervical cancer in 2006–2010 was relatively similar across *Major cities, Inner regional and Outer regional* areas, ranging between 9 and 10 new cases per 100,000 women. However, incidence in *Remote* and *Very remote* areas was higher at 13.1 and 15.1, respectively (Figure 4.4).

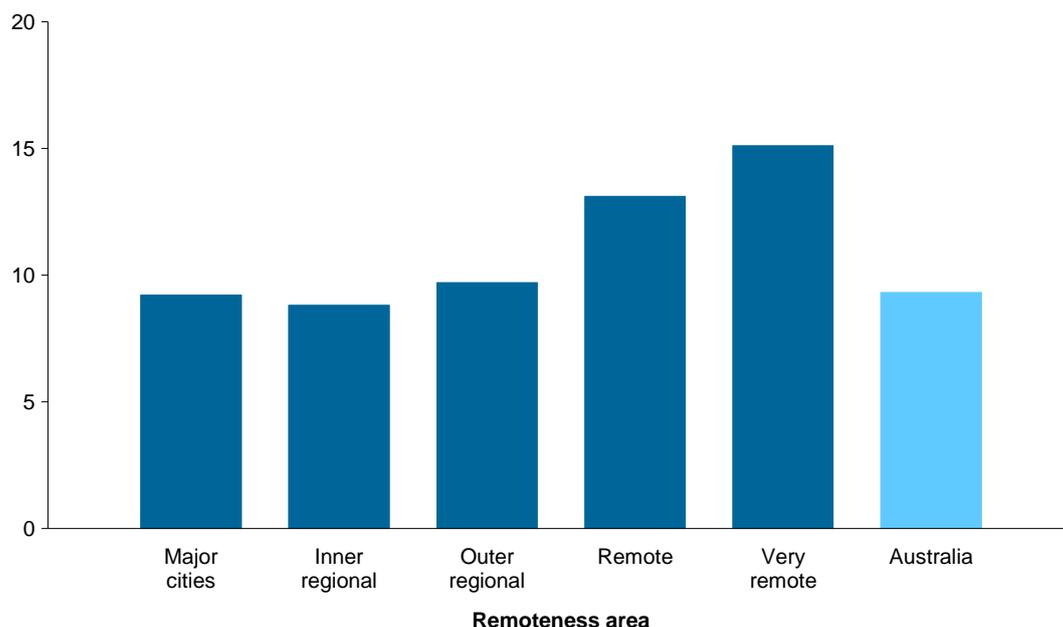
Higher incidence in *Remote* and *Very remote* areas is likely to be related to the proportionately high number of Indigenous women living in these areas, since Indigenous women have more than twice the incidence of cervical cancer (see Figure 4.5).

In 2006–2010, incidence was relatively similar across the 4 lower socioeconomic groups, ranging between 9 and 11 new cases per 100,000 women, but was lower for women residing in the highest socioeconomic areas at 7.6 new cases per 100,000 women (Figure 4.4).

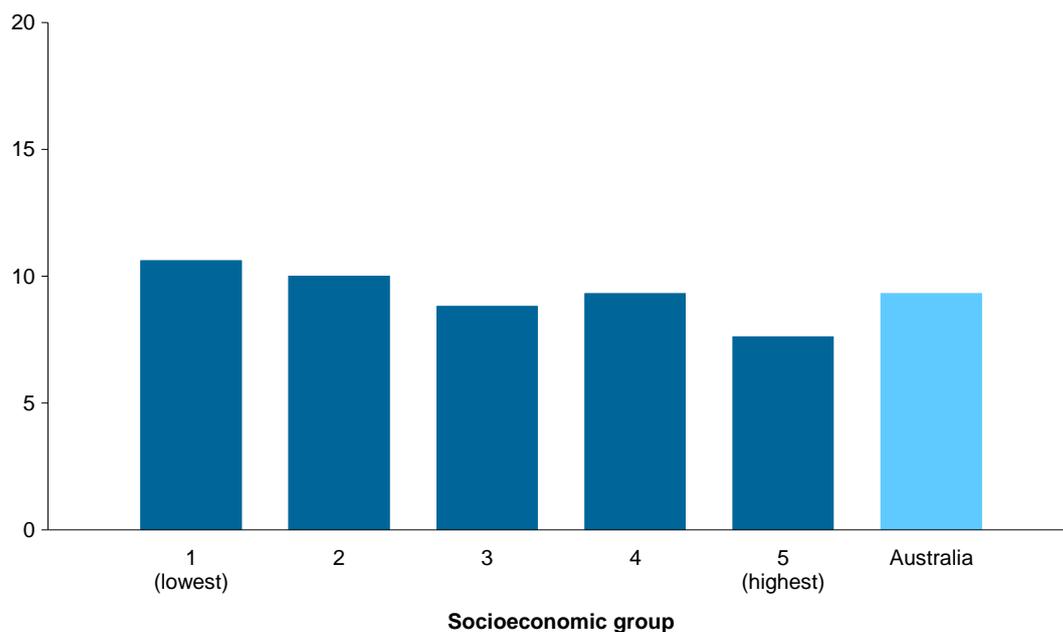
An estimated 50% of cervical cancers occur in women who have never been screened, with a further 28% in women who are lapsed screeners (that is, hadn't had a Pap test in the 2.5 years prior to their cancer diagnosis) (VCCR 2012). Therefore, it is reasonable to expect that cervical cancer incidence patterns may, to some degree, follow participation patterns.

This appears to be true to some degree, with a tendency for incidence rates to be higher in both *Very remote* areas and lower socioeconomic groups, identified in analyses of screening behaviour earlier in this report as having lower rates of participation in cervical screening.

Number of new cases per 100,000 women



Number of new cases per 100,000 women



Note: Rates age-standardised to the Australian population as at 30 June 2001.

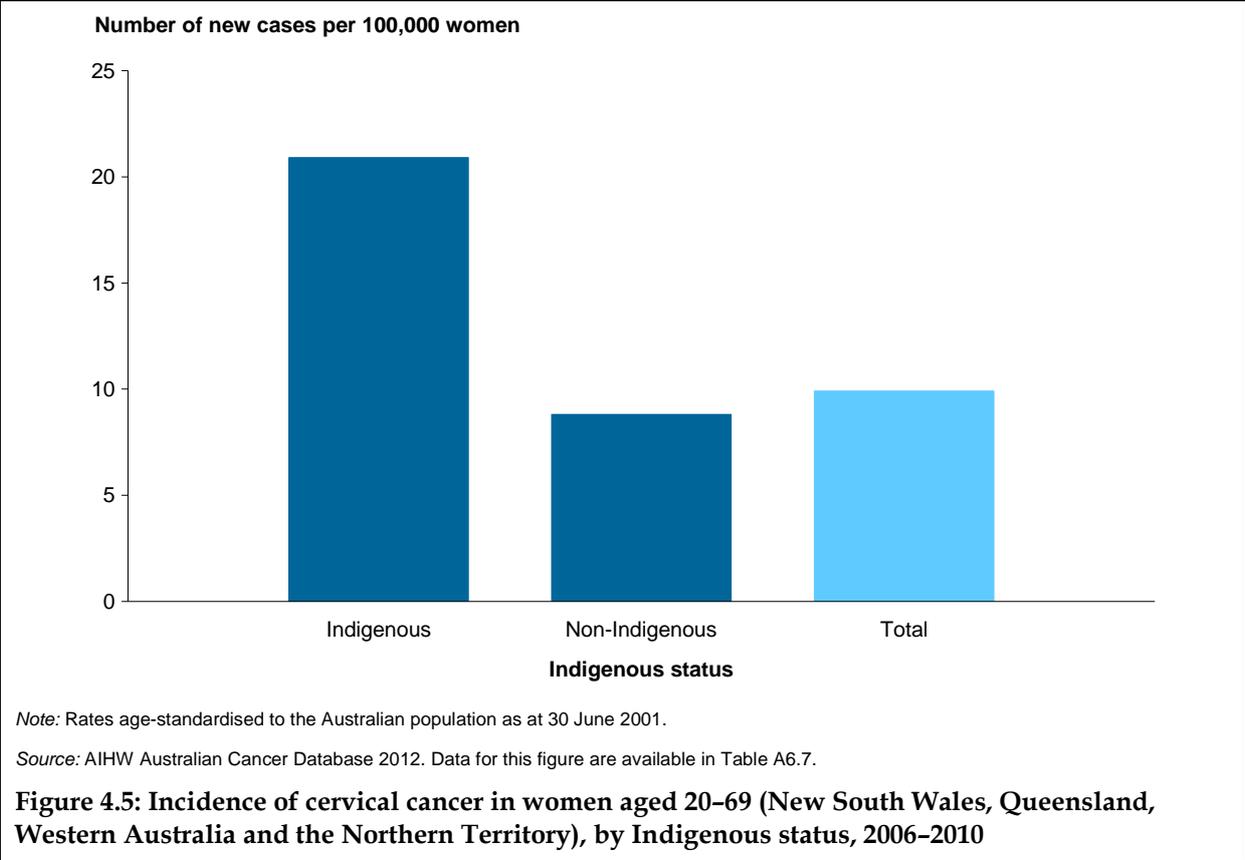
Source: AIHW Australian Cancer Database 2012. Data for this figure are available in tables A6.5 and A6.6.

**Figure 4.4: Incidence of cervical cancer in women aged 20–69, by remoteness area, and by socioeconomic group, 2006–2010**

The collection of reliable information by the state and territory cancer registries on the Indigenous status of individuals diagnosed with cancer is problematic. This is because primary cancer diagnosis information is sourced from pathology forms which currently do not record information on Indigenous status in most states and territories. The registries therefore collect information on the Indigenous status of individuals from additional sources, such as hospital records and death records, which affects the completeness of these data.

This means that reliable national data on the incidence of cancer for Aboriginal and Torres Strait Islander Australians are not available, because in some jurisdictions the level of identification of Indigenous status is not considered sufficient to enable analysis. In this report, data for 4 states and territories – New South Wales, Queensland, Western Australia and the Northern Territory – are considered of sufficient quality, and were used to examine the incidence of cervical cancer by Indigenous status. While the majority (around 85%) of Australian Aboriginal and Torres Strait Islander people reside in these 4 jurisdictions, the degree to which data for these jurisdictions are representative of all Aboriginal and Torres Strait Islander people is unknown.

It was found that, over the 5-year period 2006–2010, Aboriginal and Torres Strait Islander women aged 20–69 in New South Wales, Queensland, Western Australia and the Northern Territory had a higher incidence rate of cervical cancer compared with non-Indigenous women, at 20.9 new cases compared with 8.8 new cases per 100,000 women, respectively (Figure 4.5).



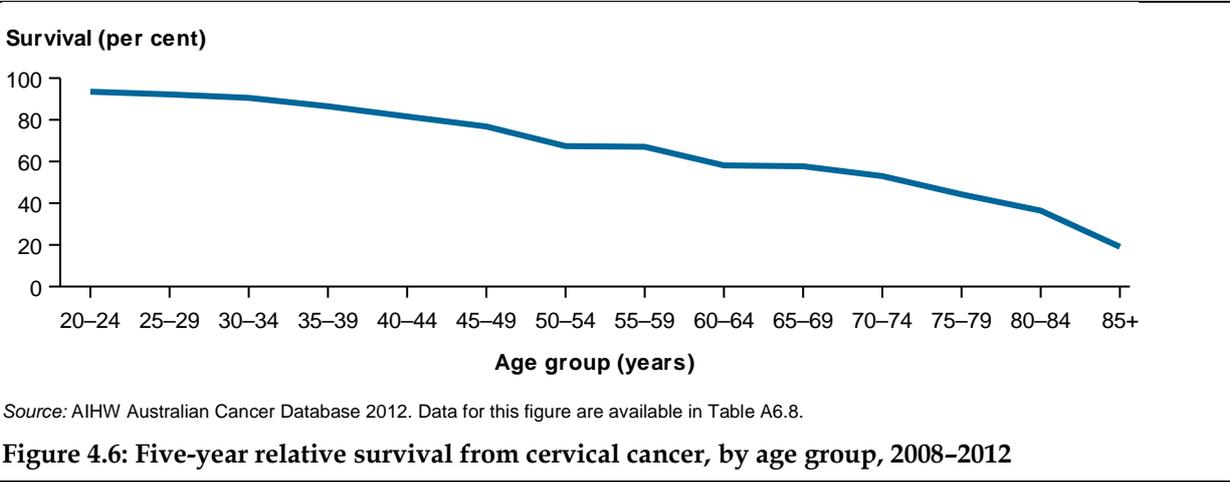
## 4.2 Survival after a diagnosis of cervical cancer

Survival in this report refers to ‘relative survival’, which means that the survival figures presented are the probability of being alive for a given amount of time after diagnosis compared with the general population, and reflects the impact of a cancer diagnosis.

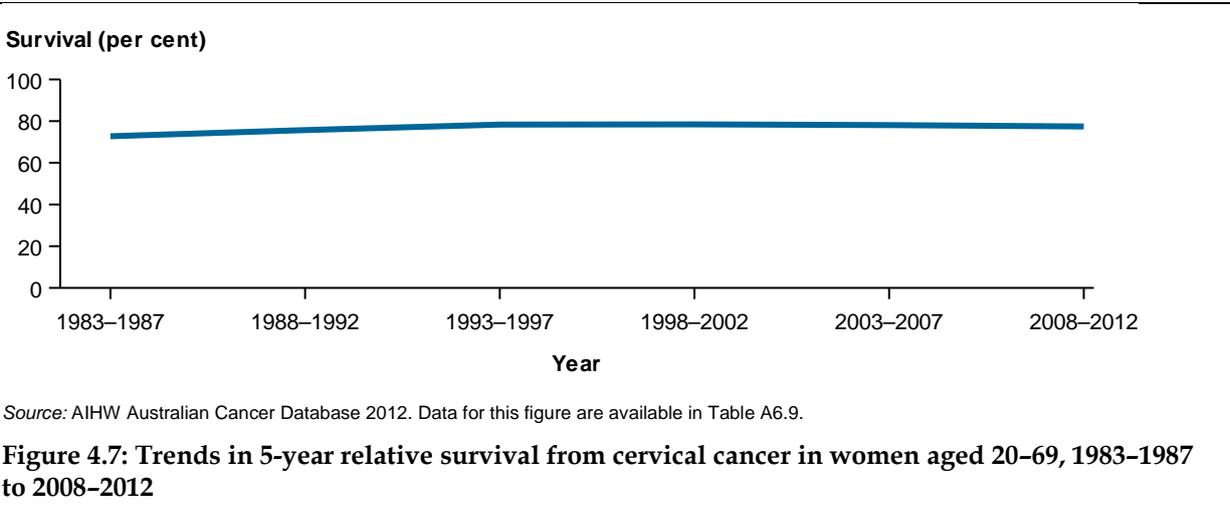
The source of survival data is the 2012 Australian Cancer Database which includes data from the National Death Index on deaths (from any cause) that occurred up to 31 December 2012, which were used to determine which people with cancer had died and when this occurred.

In 2008–2012, women diagnosed with cervical cancer in Australia had a 71.8% chance of surviving for 5 years compared with their counterparts in the general population. For the target age group (20–69), 5-year relative survival was 77.4%.

In 2008–2012, 5-year survival from cervical cancer decreased with age; women aged 20–24 diagnosed with cervical cancer had a 93.5% chance of surviving for 5 years, whereas women aged 80–84 diagnosed with cervical cancer had only a 36.4% chance of surviving for 5 years (Figure 4.6) (survival for women aged 85+ is not published due to small numbers).



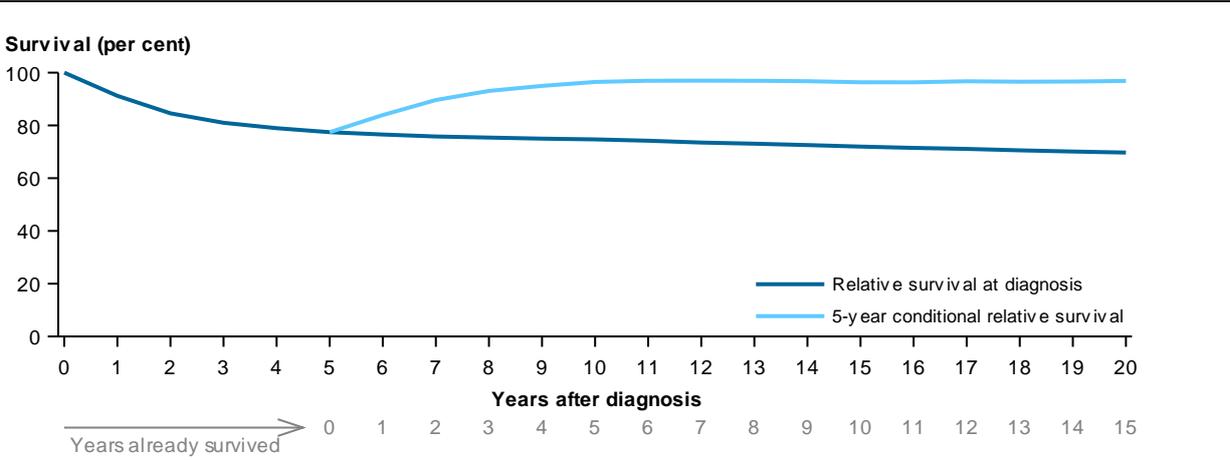
Survival from cervical cancer has improved over time; between 1983–1987 and 2008–2012, the 5-year relative survival rate increased from 72.8% to 77.4%, respectively (Figure 4.7).



Conditional survival is the probability of surviving a given number of years provided that an individual has already survived a specified amount of time after diagnosis.

Conditional survival for cervical cancer for women aged 20–69 is illustrated in Figure 4.8. In this graph, the darker blue line shows relative survival for each year after diagnosis (as shown by the numbers in black on the x-axis), whereas the lighter blue line shows relative survival for each year once an individual has already survived a certain number of years (as shown by the numbers in grey on the x-axis).

For cervical cancer, the prospect of surviving for at least 5 more years after having already survived for 5, 10 or 15 years was much higher than relative survival, at around 96 or 97% (Figure 4.8), indicating that if an individual survives for at least 5 years after diagnosis, their survival is almost the same as an individual not diagnosed with cervical cancer.



Source: AIHW Australian Cancer Database 2012. Data for this figure are available in Table A6.10.

**Figure 4.8: Relative survival at diagnosis and 5-year conditional survival from cervical cancer in women aged 20–69, 2008–2012**

### 4.3 Prevalence of cervical cancer

Prevalence is the number people alive after a diagnosis of cancer. It is related to incidence and survival; if incidence and survival are both high, prevalence will be high, whereas if incidence and survival are both low, prevalence will be low.

The source of prevalence data is the 2012 Australian Cancer Database which includes data from the National Death Index on deaths (from any cause) that occurred up to 31 December 2012, which were used to determine which people with cancer had died and when this occurred. Individuals who have been diagnosed with cancer and are still alive contribute to prevalence data.

At the end of 2010, there were 2,575 women aged 20–69 alive who had been diagnosed with cervical cancer in the previous 5 years and 4,573 who had been diagnosed in the previous 10 years (Table 4.2).

**Table 4.2: Prevalence of cervical cancer, by age group, Australia, end of 2010**

Age group	5-year prevalence	10-year prevalence
<20	4	4
20–24	31	31
25–29	147	176
30–34	310	419
35–39	426	680
40–44	376	705
45–49	363	727
50–54	297	594
55–59	246	524
60–64	219	427
65–69	160	296
70–74	151	281
75–79	99	173
80–84	83	161
85+	66	140
<b>All ages</b>	<b>2,978</b>	<b>5,338</b>
<b>Ages 20–69 years</b>	<b>2,575</b>	<b>4,573</b>

*Note:* Prevalence refers to the number of living people previously diagnosed with cancer, not the number of cancer cases.

*Source:* AIHW Australian Cancer Database 2012.

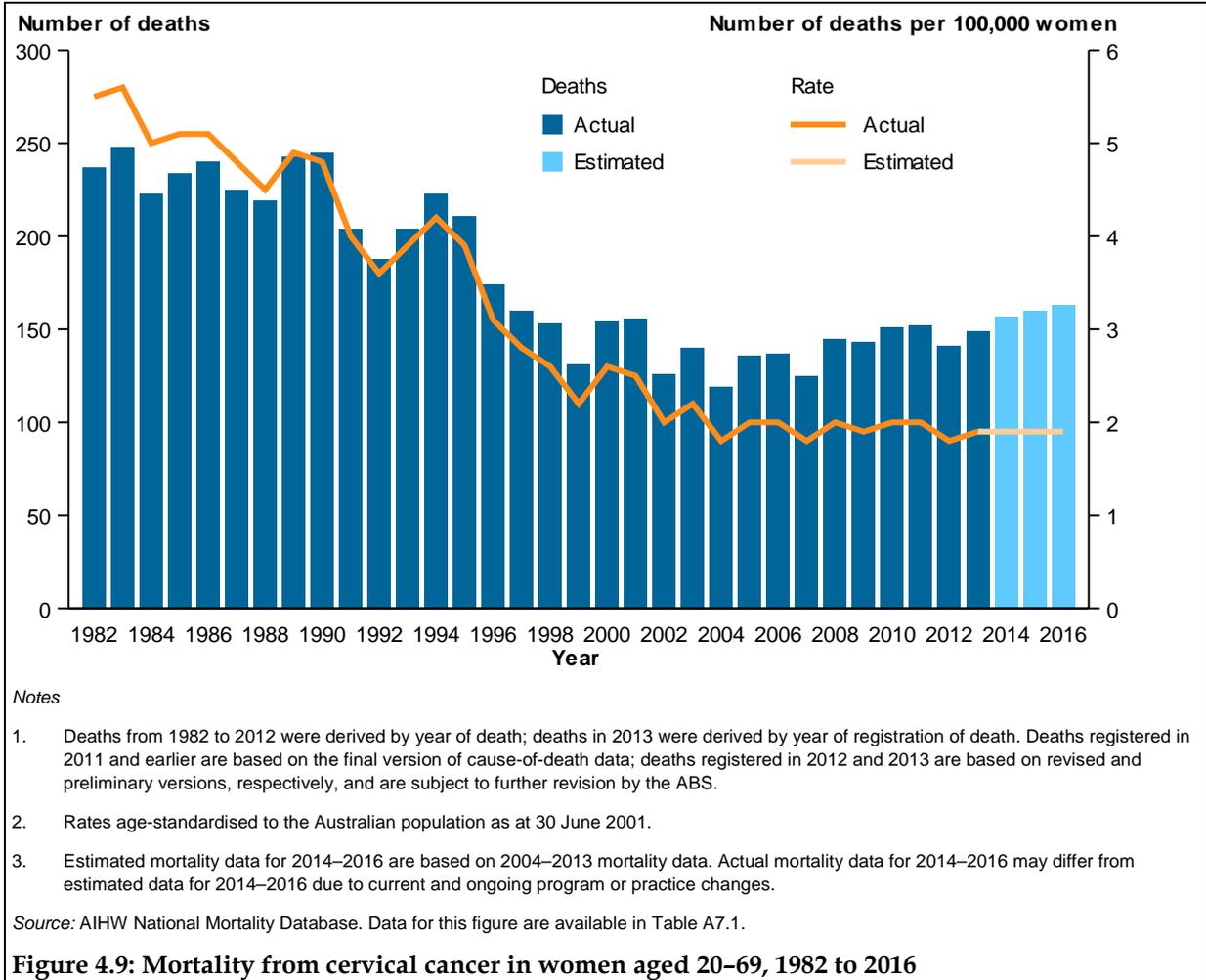
## 4.4 Mortality from cervical cancer

Similar to incidence data, Australia has high-quality and virtually complete mortality data. The mortality data used here were provided by the Registries of Births, Deaths and Marriages and the National Coronial Information System and coded by the Australian Bureau of Statistics (ABS). These data are maintained at the AIHW in the National Mortality Database. The latest national data available are for deaths in 2013, with estimates to 2016.

In 2016, it is estimated that there will be 250 deaths from cervical cancer in Australian women. This is equivalent to 2.0 deaths for every 100,000 women in the population, which, when age-standardised to allow analysis of trends and differentials, equates to a mortality rate of 1.8 for 2016.

Of the 250 deaths, it is estimated that 163 will be in women aged 20–69, the target population of the NCSP. These 163 deaths are equivalent to 2.1 deaths for every 100,000 women in the population, or 1.9 per 100,000 women aged 20–69 when age-standardised.

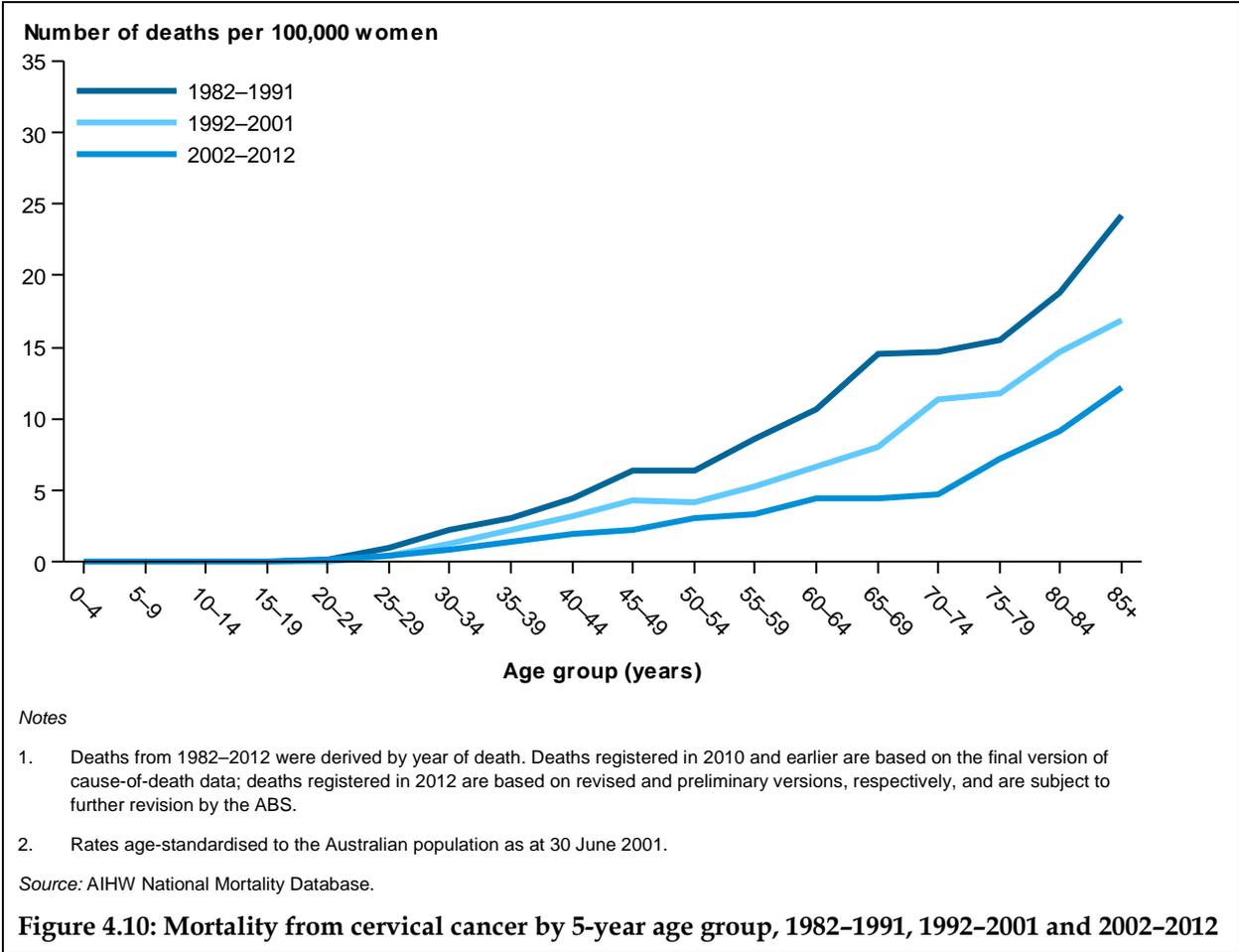
### Cervical cancer deaths over time



Mortality from cervical cancer has decreased over time, with this decrease evident prior to the introduction of the NCSP in 1991 (from 5.5 deaths per 100,000 women in 1982 to 4.8 deaths in 1990). With opportunistic cervical screening occurring in Australia since the 1960s, some decreases in mortality are to be expected prior to the commencement of the NCSP.

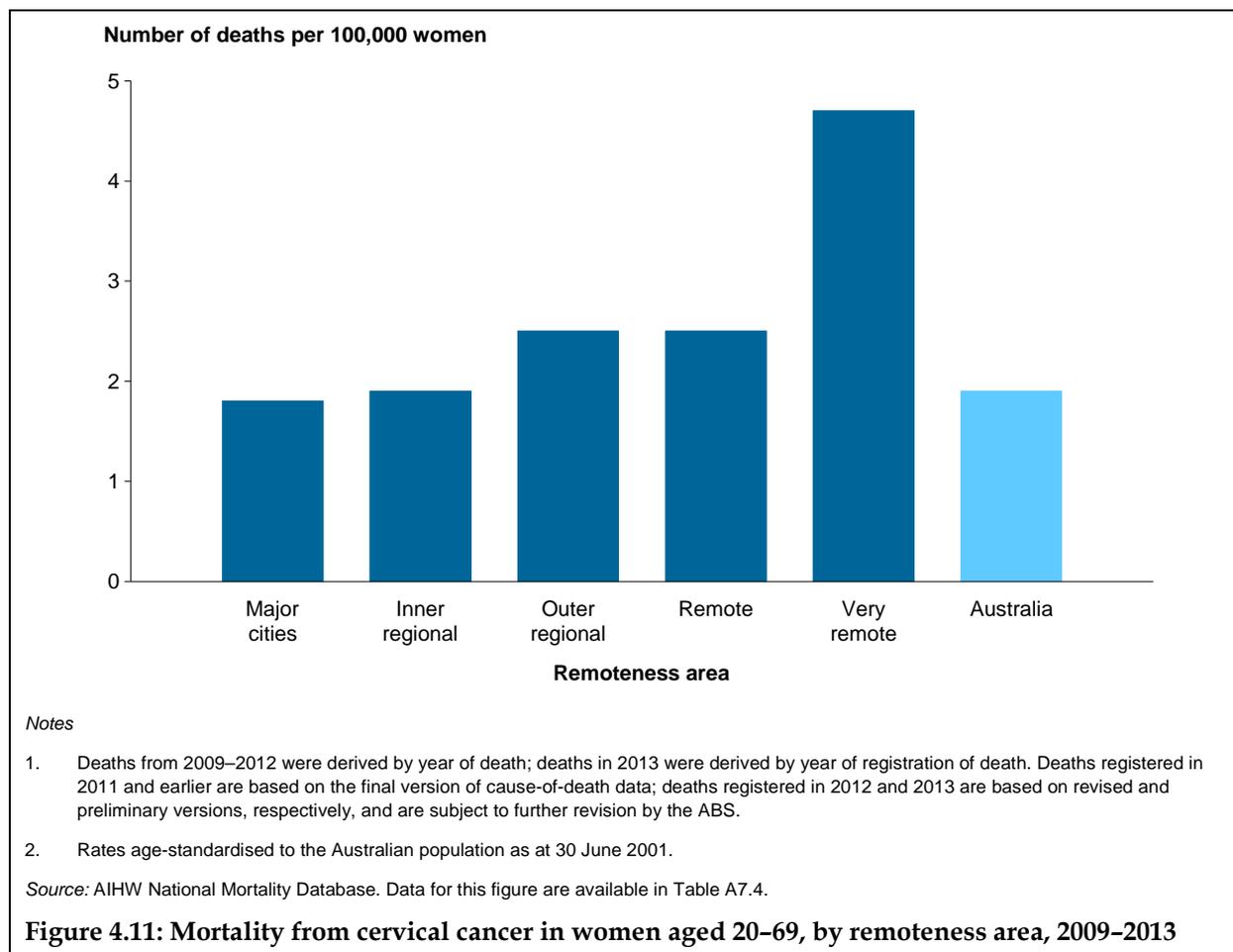
Mortality halved between 1991 and 2013, from 4.0 to 1.9 deaths per 100,000 women for women aged 20–69, respectively. This historic low of around 2 deaths per 100,000 women has been stable since 2002 (Figure 4.9).

Examining this decrease in mortality by age group reveals that the major reduction in mortality occurred after the introduction of the organised approach to cervical screening in 1991, with the greatest reduction in older women. This is most notable in the period 2002–2012, which does not have the small rise in mortality for women around the age of 65–69 that is apparent in both 1982–1991 and 1992–2001 (Figure 4.10).



### Cervical cancer deaths across groups

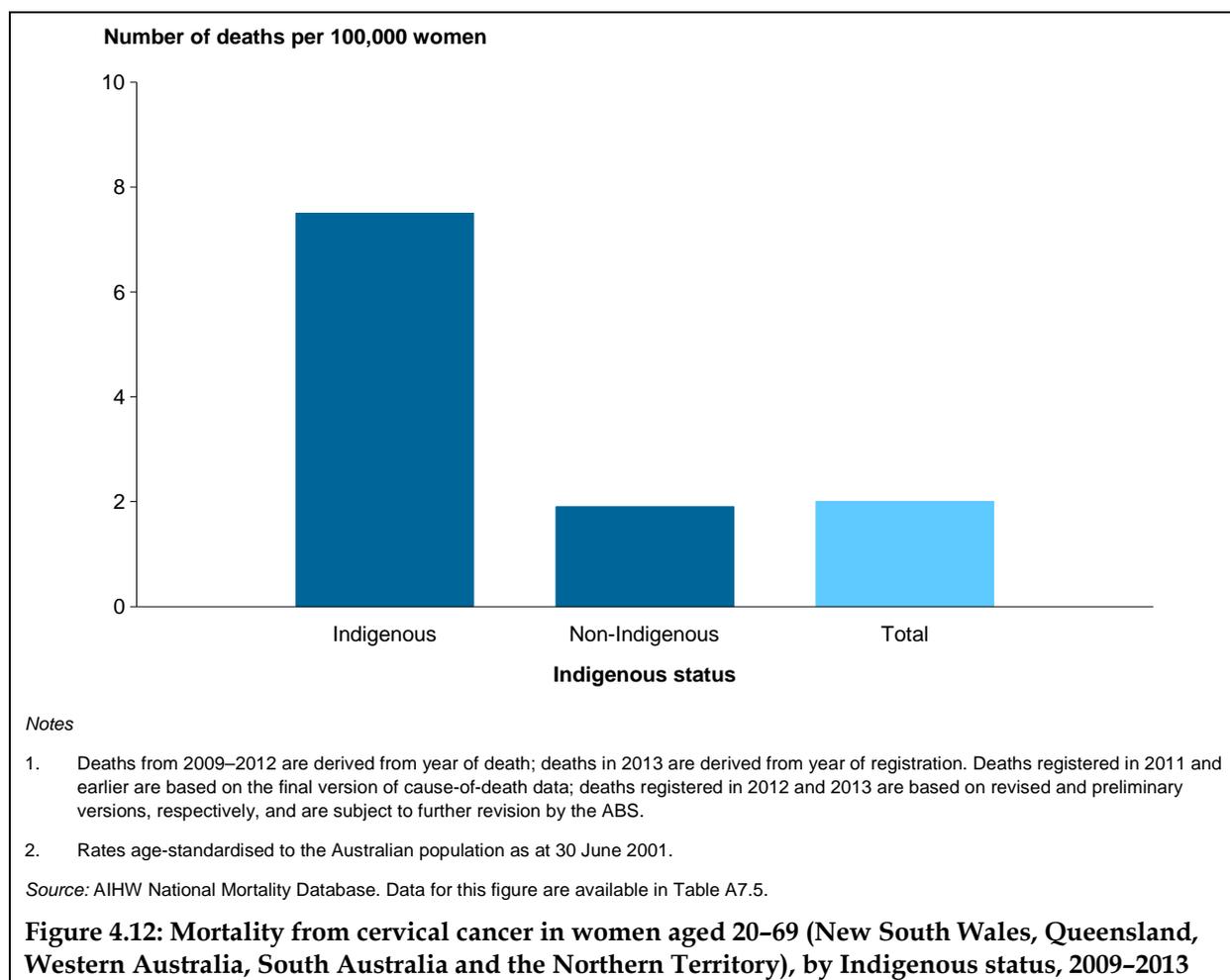
Mortality in 2009–2013 was lowest in *Major cities* and *Inner regional* areas at 1.8 and 1.9 deaths per 100,000 women, respectively, followed by *Outer regional* and *Remote* areas at 2.5 deaths per 100,000 women. Mortality in *Very remote* areas was highest at 4.7 deaths per 100,000 women (Figure 4.11), although it should be noted that mortality rates in *Remote* and *Very remote* areas are both based on just 13 and 12 deaths, respectively.



Similar to incidence, higher mortality in *Very remote* areas is likely to be related to the proportionately high number of Indigenous women living in these areas, since Indigenous women experience greater mortality from cervical cancer (see Figure 4.12).

Information on Indigenous status in the AIHW National Mortality Database is considered to be adequate for reporting for 5 jurisdictions – New South Wales, Queensland, Western Australia, South Australia and the Northern Territory. The majority (around 90%) of Aboriginal and Torres Strait Islander people reside in these 5 jurisdictions.

In 2009–2013, the mortality rate from cervical cancer was higher in Aboriginal and Torres Strait Islander women aged 20–69 in New South Wales, Queensland, Western Australia, South Australia and the Northern Territory combined at 7.5 deaths per 100,000 women compared with non-Indigenous women from these states and territories of 1.9 deaths per 100,000 women (Figure 4.12). This mirrors the incidence results for Aboriginal and Torres Strait Islander women (Figure 4.5).



While participation in cervical screening has a direct effect on the incidence of cervical cancer, additional factors come into play for mortality from cervical cancer, such as stage of cancer at diagnosis, and treatment.

Therefore, while it is true that the population groups with the lowest rates of participation in cervical screening also have the highest mortality rates, and that this is in part because these groups experience higher cervical cancer incidence rates, these trends are confounded by the potential issues around access to medical treatment in the more remote areas of Australia, and for Aboriginal and Torres Strait Islander women.

# 5 Monitoring other aspects of cervical screening in Australia

## 5.1 Monitoring the safety of cervical screening management guidelines

The NHMRC's *Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen-detected abnormalities* (NHMRC 2005) provides recommendations for the management of women with an abnormal Pap test result. They enable practitioners and clinicians to manage the 110,000 abnormalities detected each year according to evidence-based information which guides best practice.

The latest guidelines were approved in June 2005 and implemented from 3 July 2006, and replaced the previous 1994 guidelines. Formulated in line with the NHMRC standards for clinical practice guidelines available at that time, these guidelines are based on epidemiological and scientific evidence and a new understanding of the role of HPV in cervical cancer.

The 2005 NHMRC guidelines included management recommendations that were significantly different to the previous 1994 guidelines. They included:

- changed recommendations for the management of women with a low-grade squamous abnormality (possible or definite low-grade squamous intraepithelial lesion) on cytology, with most women with this result recommended to have a repeat Pap test in 12 months
- a new management approach for women treated for high-grade intraepithelial disease, recommending that they now undergo a 'test of cure' process, whereby cervical cytology and HPV tests are conducted at 12-month intervals and if both are negative on 2 consecutive occasions, the woman is returned to 2-yearly screening.

As these were significant changes to the way women were managed, in late 2005, a Safety Monitoring Committee (SMC) was established to monitor the safety of these recommendations and provide timely review of policy as needed.

In 2013, the *Report on monitoring activities of the National Cervical Screening Program Safety Monitoring Committee* (AIHW 2013b) was published. It demonstrated that the change in management for women with a low-grade Pap test result had not led to an increase in cervical cancer and that women who completed 'test of cure' after being treated for a high-grade cervical biopsy result had a very low rate of subsequent high-grade biopsy results, and no incidents of subsequent cervical cancer. These, along with other evidence, led the SMC to conclude that the new guidelines had not led to an increase in cervical cancer in the 7 years since they were introduced.

The SMC was disbanded in 2014, but the safety monitoring of the guidelines is ongoing and is currently being reviewed by the Quality and Safety Monitoring Committee (QSMC).

The following results are based on data to 31 December 2014. Detailed methodology is described in the 2013 report on monitoring activities of the SMC (AIHW 2013b).

The proportional hazard ratio calculated between the baseline and ongoing low-grade cytology cohorts with 2 years follow-up was 0.96 (95% confidence interval (CI) 0.78–1.18). This is not statistically significantly different to 1, indicating no statistically significant

change in the risk of cancer after a low-grade squamous cytology under the current guidelines, compared with the previous guidelines. These data are shown in Table 5.1.

**Table 5.1: Summary of low-grade cohort data, baseline and ongoing, 2 years follow-up**

	Baseline	Ongoing
<b>Characteristics of cohort</b>		
Low-grade abnormalities	544,120	647,353
Total person-time in cohort (years)	721,548	962,497
Cancers in cohort	172	210
<b>Hazard ratio</b>	0.96 (95% CI 0.78–1.18)	

Source: AIHW analysis of state and territory cervical screening register data.

Two additional analyses were undertaken to look at incidence of cervical cancer after a histologically confirmed high-grade abnormality.

First, a comparison of cervical cancers that occurred in the 5 years following a 12-month clinical management period, immediately following a histologically confirmed high-grade abnormality was made. The numbers were small, with 39 cancers found for the baseline period and 84 following introduction of the new guidelines. Proportional hazards regression did not reveal this to be a statistically significant increase, and, as there are no management changes between the previous guidelines and the new guidelines, this analysis does not address the safety of new management practices.

The second analysis assessed subsequent high-grade abnormalities and cervical cancer incidence after women had completed ‘test of cure’ after a high-grade abnormality detected from 2007 onwards (noting that this will not include women who completed ‘test of cure’ after a high-grade abnormality detected before this time).

High-grade histology outcomes are very rare in women who have been deemed to have completed test of cure (‘both negative’ for first co-test and second co-test), with just 8 high-grade abnormalities from 12,087 who completed test of cure – equivalent to 0.7 high-grade abnormalities per 1,000 women (Table 5.2). Further, of these more than 12,000 women aged 20–69 who are known to have completed test of cure after a treated, histologically confirmed high-grade abnormality, none were found to have developed cervical cancer.

**Table 5.2: High-grade abnormalities following different consecutive co-test outcomes, women aged 20–69**

		Second co-test			
		Both negative	Positive cytology only	Positive HPV only	Both positive
<b>First co-test</b>	<b>Both negative</b>	0.7	11.7	9.8	56.9
	<b>Positive cytology only</b>	1.4	33.1	0.0	75.5
	<b>Positive HPV only</b>	0.0	47.6	7.2	101.3
	<b>Both positive</b>	1.8	22.2	15.6	92.2

Note: Shown are the number of consecutive co-tests with an outcome of high-grade abnormality per 1,000 (crude rates).

Source: AIHW analysis of state and territory cervical cytology register data

## 5.2 Expenditure on cervical screening

### Expenditure on Australia's cancer screening programs

In Australia, there are three cancers for which screening is recommended – breast, cervical and bowel. Each cancer has a national screening program, with both Australian Government and state and territory government components.

The Australian Government provides funding to the states and territories for public health services through National Health Reform Payments (known as National Specific Purpose Payments prior to 1 July 2012) and National Partnership Payments. State and territory governments have full discretion over the application of National Health Reform Payments for public health funding, including the amount expended on BreastScreen Australia and the NCSP. The funding for the National Bowel Cancer Screening Program is through a specific National Partnership Payment.

Table 5.3 shows expenditure for the three national cancer screening programs (expenditure by Australian and state and territory governments combined), as well as total expenditure on cancer screening for the 2013–14 financial year.

**Table 5.3: Government funding for cancer screening programs, 2013–14, \$ million**

Screening program	Expenditure 2013–14
BreastScreen Australia <sup>(a)</sup>	235.2
National Cervical Screening Program <sup>(b)</sup>	82.6
National Bowel Cancer Screening Program <sup>(c)</sup>	45.7
<b>Total</b>	<b>363.5</b>

(a) Excludes mammography for breast cancer screening that occurs outside BreastScreen Australia.

(b) Excludes the proportion of the costs associated with general practitioner (GP), specialist and nurse attendances that would have been for Pap smears.

(c) Excludes Medicare Benefits Schedule (MBS) flow-on costs as well as bowel screening that occurs outside the National Bowel Cancer Screening Program.

*Note:* These expenditure data only include recurrent expenditure; health infrastructure payments for cancer have been excluded as well as any health workforce expenditure.

*Sources:* AIHW Health expenditure database; Medicare Australia Statistics.

### Expenditure on cervical screening

In 2013–14, an estimated \$82.6 million was spent on cervical screening in Australia.

This cannot be compared with the expenditure of \$125.2 million reported for cervical screening for 2008–09, as this latter figure included an estimate for the proportion of the costs associated with general practitioner (GP), specialist and nurse attendances for Pap tests (AIHW 2013b) – an estimate no longer included in the expenditure data. This limits the comparability of data.

Of the \$82.6 million spent on cervical screening, \$36 million – more than a third – was spent on Medicare Benefits Schedule (MBS) items for cervical screening (MBS items 73053 and 73922). Other cervical screening expenditure by the Australian Government included Practice Incentives Program (PIP) incentive payments totalling \$5.0 million, and \$8.5 million to assist Victoria in funding the Victorian Cytology Service (which processes smears taken by health professionals other than GPs, such as Aboriginal health workers and nurse Pap test providers, which are not eligible for funding under the MBS).

# Appendix A: Supporting data tables

## A1 Participation

**Table A1.1: Number and age-standardised rate of women aged 20–69 participating in the National Cervical Screening Program, 1996–1997 to 2013–2014**

Reporting period	Participants <sup>(a)</sup>	Adjusted population <sup>(b)</sup>	AS rate <sup>(c)</sup>
1996–1997 <sup>(d)</sup>	2,563,107	4,171,326	61.2
1997–1998 <sup>(d)</sup>	2,653,504	4,210,148	62.8
1998–1999 <sup>(d)</sup>	2,716,364	4,246,280	63.7
1999–2000	3,244,329	5,245,032	61.7
2000–2001	3,262,931	5,302,865	61.4
2001–2002	3,296,409	5,365,549	61.4
2002–2003	3,318,354	5,432,781	61.1
2003–2004	3,354,519	5,501,337	61.1
2004–2005	3,407,219	5,738,149	59.4
2005–2006	3,452,093	5,822,719	59.3
2006–2007	3,549,524	5,920,032	60.1
2007–2008	3,599,919	6,035,760	59.8
2008–2009	3,638,941	6,167,170	59.3
2009–2010	3,635,929	6,291,062	58.2
2010–2011	3,641,198	6,396,134	57.3
2011–2012	3,723,738	6,499,742	57.7
2012–2013	3,815,705	6,614,886	58.2
2013–2014	3,853,170	6,722,326	57.8

- (a) 'Participants' are the number of women aged 20–69 screened in each 2-year reporting period. Number of women screened includes all women screened in each jurisdiction, not just those women resident in each jurisdiction, with the exception of Victoria and the Australian Capital Territory, for which only residents of the jurisdiction (and immediate border residents) are included.
- (b) 'Adjusted population' is the average of the Australian Bureau of Statistics (ABS) estimated resident population for women aged 20–69 for the 2 years, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions. Reporting periods 1996–1997 to 2003–2004 use hysterectomy fractions derived from the 2001 ABS National Health Survey; reporting periods 2004–2005 to 2013–2014 use hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database.
- (c) 'Age-standardised (AS) rate' is the number of women aged 20–69 screened in each 2-year reporting period as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix as described above, age-standardised to the Australian population at 30 June 2001.
- (d) Since the Queensland Health Pap Smear Register began operations in February 1999, Queensland data are excluded from both the participant and population data for the 1996–1997, 1997–1998 and 1998–1999 reporting periods.

*Note:* Rates from 1996–1997 to 2003–2004 cannot be directly compared with rates from 2004–2005 onwards, due to a different source of hysterectomy fractions used to adjust the population.

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A1.2: Participation, by age, 2013–2014**

	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69
Number	340,444	441,156	475,572	453,587	477,446	426,542	406,588	340,874	281,331	209,630
Crude rate	42.3	51.4	57.4	60.4	62.1	64.1	63.9	61.8	60.3	53.5

Note: 'Crude rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A1.3: Participation of women aged 20–69, by state and territory, 2013–2014**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number	1,210,610	1,011,664	753,374	409,261	281,161	81,781	66,749	38,570	3,853,170
Crude rate	56.6	59.6	56.0	55.7	59.1	57.6	56.9	55.4	57.3
AS rate	57.0	60.3	56.4	56.1	59.4	57.9	57.9	55.2	57.8

*Notes*

1. Direct comparisons between the states and territories of Australia are not advised due to the substantial differences that exist between the jurisdictions, including population, area, geographical structure, policies and other factors.
2. 'Crude rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69; 'age-standardised (AS) rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A1.4: Participation of women aged 20–69, by remoteness area, 2013–2014**

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
Number	2,784,854	674,791	318,776	45,914	27,768	3,853,170
Crude rate	57.1	58.8	56.9	52.9	52.0	57.3
AS rate	58.0	58.9	56.9	53.0	52.4	57.8

*Notes*

1. Women were allocated to a remoteness area using their residential postcode according to the Australian Statistical Geography Standard (ASGS) for 2011. Caution is required when examining differences across remoteness areas (see Appendix E).
2. 'Australia' does not match the total due to some women not being allocated to a remoteness area.
3. 'Crude rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69; 'age-standardised (AS) rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A1.5: Participation of women aged 20–69, by socioeconomic group, 2013–2014**

	1 (lowest)	2	3	4	5 (highest)	Australia
Number	654,502	707,880	773,199	812,957	885,677	3,853,170
Crude rate	51.8	54.9	56.4	58.5	63.0	57.3
AS rate	52.3	55.3	56.9	59.0	63.5	57.8

*Notes*

1. Women were allocated to a socioeconomic group using their residential postcode according to the Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-Economic Disadvantage for 2011. Caution is required when examining differences across socioeconomic groups (see Appendix E).
2. 'Australia' does not match the total due to some women not being allocated to a socioeconomic group.
3. 'Crude rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69; 'age-standardised (AS) rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A1.6: Participation, by age, over 3 years and 5 years**

	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69
<b>3 years, 2012–2014</b>										
Number	443,167	558,526	585,669	561,498	581,092	514,823	480,375	395,364	322,963	236,623
Crude rate	55.3	65.7	72.0	74.8	76.0	77.4	76.0	72.5	69.9	61.9
<b>5 years, 2010–2014</b>										
Number	583,799	691,467	691,590	675,027	655,703	589,097	524,966	425,150	346,517	244,323
Crude rate	73.5	83.0	87.8	89.0	87.7	88.3	84.5	79.8	76.1	67.5

Note: 'Crude rate' is the number of women screened as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A1.7: Participation of women aged 20–69, by state and territory, over 3 years and 5 years**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
<b>3 years, 2012–2014</b>									
Crude rate	69.5	73.1	68.4	67.5	71.8	70.1	71.1	70.0	70.2
AS rate	70.0	73.8	68.8	67.7	72.3	70.7	72.0	69.5	70.7
<b>5 years, 2010–2014</b>									
Crude rate	82.6	84.8	81.5	79.5	83.7	81.1	86.9	87.6	82.7
AS rate	83.0	85.1	81.5	79.2	84.3	82.1	86.9	85.7	83.0

*Notes*

1. Direct comparisons between the states and territories of Australia are not advised due to the substantial differences that exist between the jurisdictions, including population, area, geographical structure, policies and other factors.
2. 'Crude rate' is the number of women screened in 2013–2014 as a percentage of the ABS estimated resident population for women aged 20–69; 'age-standardised (AS) rate' is the number of women screened as a percentage of the ABS estimated resident population for women aged 20–69, adjusted to include only women with an intact cervix using age-specific hysterectomy fractions derived from the AIHW National Hospitals Morbidity Database, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

## A2 Rescreening

**Table A2.1: Number and proportion of women aged 20–69 rescreening early following a negative cervical cytology test, by number of early rescreens, 2013 cohort**

Early rescreens	Number of women	% of women
0	143,627	88.2
1	18,510	11.4
2	659	0.4
3+	57	0.0

*Note:* Women with a cytological or histological abnormality in the preceding 36 months are excluded from the cohort; repeat cytology tests that are a valid repeat of an unsatisfactory cytology test are excluded from this count.

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A2.2: Proportion of women aged 20–69 rescreening early following a negative cervical cytology test, by state and territory, 2013 cohort**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
%	12.4	11.5	12.5	11.6	10.5	9.5	8.8	10.3	11.8

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A2.3: Women aged 20–69 rescreening within 3 months of 27-month cervical screening register reminder letter, by state and territory, letters sent in 2013**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
No. sent letter	298,862	236,109	204,233	93,484	..	20,950	20,718	10,984	885,340
No. rescreened	98,243	78,087	71,670	29,144	..	8,140	6,337	2,180	293,801
%	32.9	33.1	35.1	31.2	..	38.9	30.6	19.8	33.2

*Note:* Data are not available for South Australia, which at present does not have a 27-month cervical screening register reminder letter sent to women. (These are sent to practitioners, with a 30-month reminder letter sent to women, neither of which are directly comparable.)

*Source:* AIHW analysis of state and territory cervical screening register data.

## A3 Cytology

**Table A3.1: Number of cytology tests, by age, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<20	67,861	63,668	60,813	55,511	56,159	53,323	51,549	47,500
20–24	215,454	203,540	202,951	192,175	195,602	195,502	196,907	197,074
25–29	249,461	242,116	249,852	240,510	247,362	251,896	257,726	258,480
30–34	268,829	258,449	259,995	246,489	253,185	260,357	271,579	278,130
35–39	283,760	281,047	281,300	264,471	260,198	256,294	259,395	255,998
40–44	259,723	250,963	252,387	245,041	252,666	261,413	270,965	265,964
45–49	248,203	243,146	246,688	236,829	235,860	235,597	238,943	237,467
50–54	201,663	202,073	206,118	205,915	211,883	218,708	225,342	225,445
55–59	166,087	165,893	168,806	168,579	172,415	179,296	184,872	189,415
60–64	122,356	129,177	134,622	139,035	144,153	146,935	151,208	154,128
65–69	77,881	79,390	83,835	86,816	92,294	102,229	109,584	116,502
70+	29,925	28,353	28,005	27,750	28,014	28,402	29,752	30,301
<b>All ages</b>	<b>2,191,238</b>	<b>2,147,848</b>	<b>2,175,383</b>	<b>2,109,131</b>	<b>2,149,798</b>	<b>2,189,960</b>	<b>2,247,835</b>	<b>2,256,416</b>
<b>Agnes 20–69</b>	<b>2,093,417</b>	<b>2,055,794</b>	<b>2,086,554</b>	<b>2,025,860</b>	<b>2,065,618</b>	<b>2,108,227</b>	<b>2,166,521</b>	<b>2,178,603</b>

Note: 'All ages' may not equal the sum of the age groups due to the inclusion of women for whom the age group was not stated.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.2: Proportion of cytology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Crude rate	2.1	8.7	11.5	12.3	11.3	11.8	10.5	10.0	8.4	6.8	5.2	1.3

Note: 'Crude rate' is the number of cytology tests as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.3: Unsatisfactory cytology tests in women aged 20–69, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
Number	44,912	43,223	43,104	42,096	42,760	46,192	48,148	50,127
Crude rate	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3
AS rate	2.2	2.1	2.1	2.1	2.1	2.2	2.2	2.3

Note: 'Crude rate' is the number of unsatisfactory cytology tests as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of unsatisfactory cytology tests as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.4: Unsatisfactory cytology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	1,269	5,243	6,724	6,763	5,580	5,555	4,736	4,746	4,623	3,650	2,507	807
Crude rate	2.7	2.7	2.6	2.4	2.2	2.1	2.0	2.1	2.4	2.4	2.2	2.7

Note: 'Crude rate' is the number of unsatisfactory cytology tests as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.5: Unsatisfactory cytology tests in women aged 20–69, by state and territory, 2014**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number	14,293	14,958	8,008	6,134	3,528	1,522	1,413	271	50,127
Crude rate	2.1	2.6	1.9	2.6	2.3	3.4	1.9	1.3	2.3
AS rate	2.1	2.6	1.9	2.6	2.3	3.3	1.9	1.3	2.3

Note: 'Crude rate' is the number of unsatisfactory cytology tests as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of unsatisfactory cytology tests as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.6: Negative cytology tests in women aged 20–69, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
Number	1,922,592	1,891,705	1,931,682	1,876,881	1,908,291	1,943,563	1,992,544	2,005,520
Crude rate	91.8	92.0	92.6	92.6	92.4	92.2	92.0	92.1
AS rate	91.9	92.1	92.6	92.6	92.3	92.1	91.9	92.0

Note: 'Crude rate' is the number of negative cytology tests as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of negative cytology tests as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.7: Negative cytology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	40,305	167,505	226,469	251,724	235,897	247,267	222,856	213,614	180,429	147,634	112,125	28,746
Crude rate	84.9	85.0	87.6	90.5	92.1	93.0	93.8	94.8	95.3	95.8	96.2	94.9

Note: 'Crude rate' is the number of negative cytology tests as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.8: Negative cytology tests in women aged 20–69, by state and territory, 2014**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number	617,379	515,271	387,832	209,602	146,610	41,650	68,029	19,147	2,005,520
Crude rate	92.5	90.9	93.1	90.1	93.8	91.7	93.5	90.8	92.1
AS rate	92.3	90.7	93.1	90.4	93.6	91.4	93.7	91.5	92.0

Note: 'Crude rate' is the number of negative cytology tests as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of negative cytology tests as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.9: Cytology tests with no endocervical component in women aged 20–69, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
Number	406,736	407,942	418,527	424,077	440,411	461,425	487,633	500,868
Crude rate	19.4	19.8	20.1	20.9	21.3	21.9	22.5	23.0
AS rate	19.8	20.2	20.3	21.1	21.4	21.9	22.5	22.9

Note: 'Crude rate' is the number of cytology tests with no endocervical component as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of cytology tests with no endocervical component as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.10: Cytology tests with no endocervical component, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	9,377	38,090	48,287	51,301	47,845	54,903	55,284	58,153	55,165	50,643	41,197	11,656
Crude rate	19.7	19.3	18.7	18.4	18.7	20.6	23.3	25.8	29.1	32.9	35.4	38.5

Note: 'Crude rate' is the number of cytology tests with no endocervical component as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.11: Cytology tests with no endocervical component in women aged 20–69, by state and territory, 2014**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number	133,569	152,797	82,477	58,318	37,632	14,246	16,351	5,478	500,868
Crude rate	20.0	27.0	19.8	25.1	24.1	31.4	22.5	26.0	23.0
AS rate	19.9	26.8	19.9	25.6	23.6	30.7	22.8	27.3	22.9

Note: 'Crude rate' is the number of cytology tests with no endocervical component as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of cytology tests with no endocervical component as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.12: Abnormalities detected by cytology in women aged 20–69, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<b>Low-grade abnormalities</b>								
Number	97,916	92,013	83,933	78,510	84,540	88,845	95,804	93,641
Crude rate	4.7	4.5	4.0	3.9	4.1	4.3	4.4	4.3
AS rate	4.6	4.5	4.0	3.9	4.1	4.3	4.5	4.4
<b>High-grade abnormalities</b>								
Number	28,297	29,176	28,054	28,491	30,253	29,875	30,320	29,642
Crude rate	1.4	1.4	1.3	1.4	1.5	1.4	1.4	1.4
AS rate	1.3	1.4	1.3	1.4	1.5	1.4	1.4	1.4
<b>All abnormalities (low-grade, high-grade and cancer)</b>								
Number	126,442	121,400	112,188	107,261	115,026	118,953	126,344	123,514
Crude rate	6.0	5.9	5.4	5.3	5.6	5.8	5.8	5.7
AS rate	5.9	5.9	5.4	5.3	5.6	5.8	5.9	5.8

*Notes*

1. 'Low-grade abnormalities' are cytology test results S2, S3 and E2; 'high-grade abnormalities' are cytology results S4, S5, S6, E3, E4 and E5. All abnormalities are cytology results S2, S3, S4, S5, S6, S7, E2, E3, E4, E5 and E6 (see Table 3.1).
2. 'Crude rate' is the number of low-grade, high-grade or all abnormalities detected by cytology as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of low-grade, high-grade or all abnormalities detected by cytology as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.
3. This is the number of abnormalities detected, not the number of abnormal cytology tests—in a small proportion of cytology tests there may be more than one abnormality detected, both of which will be counted.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.13: Low-grade abnormalities detected by cytology, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	5,342	20,179	18,151	13,760	10,611	10,229	7,957	5,728	3,427	2,156	1,443	484
Crude rate	11.2	10.2	7.0	4.9	4.1	3.8	3.4	2.5	1.8	1.4	1.2	1.6

Note: 'Crude rate' is the number low-grade abnormalities detected by cytology as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.14: High-grade abnormalities detected by cytology, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	585	4,167	7,231	6,017	3,962	2,957	1,950	1,357	933	660	408	203
Crude rate	1.2	2.1	2.8	2.2	1.5	1.1	0.8	0.6	0.5	0.4	0.4	0.7

Note: 'Crude rate' is the number of high-grade abnormalities detected by cytology as a proportion of the total number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A3.15: Squamous abnormalities detected by cytology in women aged 20–69, by squamous category, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<b>S2 Possible low-grade squamous intraepithelial lesion</b>								
Number	54,262	51,147	47,290	43,485	49,443	52,007	57,748	55,201
Per 100 cytology tests	2.6	2.5	2.3	2.1	2.4	2.5	2.7	2.5
% of squamous abnormalities	43.6	42.8	42.8	41.1	43.6	44.4	46.4	45.4
<b>S3 Low-grade squamous intraepithelial lesion</b>								
Number	42,502	39,846	35,897	34,311	34,276	36,047	37,136	37,562
Per 100 cytology tests	2.0	1.9	1.7	1.7	1.7	1.7	1.7	1.7
% of squamous abnormalities	34.2	33.4	32.5	32.5	30.2	30.7	29.8	30.9
<b>S4 Possible high-grade squamous intraepithelial lesion</b>								
Number	10,727	11,500	11,494	12,088	13,020	12,848	13,334	12,869
Per 100 cytology tests	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6
% of squamous abnormalities	8.6	9.6	10.4	11.4	11.5	11.0	10.7	10.6
<b>S5 High-grade squamous intraepithelial lesion</b>								
Number	16,438	16,491	15,505	15,317	16,117	15,863	15,791	15,547
Per 100 cytology tests	0.8	0.8	0.7	0.8	0.8	0.8	0.7	0.7
% of squamous abnormalities	13.2	13.8	14.0	14.5	14.2	13.5	12.7	12.8
<b>S6 High-grade squamous intraepithelial lesion with possible microinvasion/invasion</b>								
Number	316	290	287	313	310	346	317	340
Per 100 cytology tests	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% of squamous abnormalities	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
<b>S7 Squamous cell carcinoma</b>								
Number	154	126	141	178	155	153	142	141
Per 100 cytology tests	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% of squamous abnormalities	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
<b>All squamous abnormalities</b>								
Number	124,399	119,400	110,614	105,692	113,321	117,264	124,468	121,660
Crude rate	5.9	5.8	5.3	5.2	5.5	5.6	5.7	5.6
AS rate	5.8	5.8	5.3	5.3	5.5	5.6	5.8	5.7

*Note:* 'Crude rate' is the number of each squamous abnormality or of all squamous abnormalities combined detected by cytology as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of all squamous abnormalities combined detected by cytology as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A3.16: Endocervical abnormalities detected by cytology in women aged 20–69, by endocervical category, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<b>E2 Atypical endocervical cells of uncertain significance</b>								
Number	1,152	1,020	746	714	821	791	920	878
% of cytology tests	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04
% of endocervical abnormalities	56.4	51.0	47.4	45.5	48.2	46.8	49.0	47.4
<b>E3 Possible high-grade endocervical glandular lesion</b>								
Number	510	562	461	435	500	531	540	552
% of cytology tests	0.02	0.03	0.02	0.02	0.02	0.03	0.02	0.03
% of endocervical abnormalities	25.0	28.1	29.3	27.7	29.3	31.4	28.8	29.8
<b>E4 Adenocarcinoma in situ</b>								
Number	277	299	283	305	283	266	307	301
% of cytology tests	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01
% of endocervical abnormalities	13.6	15.0	18.0	19.4	16.6	15.7	16.4	16.2
<b>E5 Adenocarcinoma in situ with possible microinvasion/invasion</b>								
Number	29	34	24	33	23	21	31	33
% of cytology tests	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% of endocervical abnormalities	1.4	1.7	1.5	2.1	1.3	1.2	1.7	1.8
<b>E6 Adenocarcinoma</b>								
Number	75	85	60	82	78	80	78	90
% of cytology tests	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
% of endocervical abnormalities	3.7	4.3	3.8	5.2	4.6	4.7	4.2	4.9
<b>All endocervical abnormalities</b>								
Number	2,043	2,000	1,574	1,569	1,705	1,689	1,876	1,854
Crude rate	0.10	0.10	0.08	0.08	0.08	0.08	0.09	0.09
AS rate	0.10	0.10	0.07	0.08	0.08	0.08	0.09	0.08

Note: 'Crude rate' is the number of each endocervical abnormality or of all endocervical abnormalities combined detected by cytology as a proportion of the total number of cytology tests; 'age-standardised (AS) rate' is the number of all endocervical abnormalities combined detected by cytology as a proportion of the total number of cytology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

## A4 Histology

**Table A4.1: Number of histology tests, by age, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<20	2,296	2,089	1,689	1,454	1,380	1,257	1,177	991
20–24	11,967	12,136	11,187	10,519	10,089	9,636	9,229	8,631
25–29	12,364	12,621	12,625	12,690	12,940	13,517	14,097	13,380
30–34	9,975	9,989	10,009	9,839	10,635	10,908	11,752	12,117
35–39	8,819	9,037	8,985	8,753	9,259	9,703	9,885	9,937
40–44	8,309	8,249	8,280	8,265	9,218	9,920	10,637	10,954
45–49	8,107	8,202	8,348	8,584	8,681	8,985	9,657	9,758
50–54	5,290	5,382	5,623	5,742	6,259	6,637	7,105	7,471
55–59	3,271	3,374	3,441	3,562	3,892	4,041	4,441	4,654
60–64	2,102	2,324	2,395	2,600	2,802	2,964	3,135	3,313
65–69	1,397	1,478	1,501	1,680	1,814	2,018	2,220	2,417
70+	1,523	1,728	1,817	1,915	2,057	2,154	2,300	2,200
<b>All ages</b>	<b>75,423</b>	<b>76,612</b>	<b>75,904</b>	<b>75,611</b>	<b>79,026</b>	<b>81,740</b>	<b>85,636</b>	<b>85,823</b>
<b>Ages 20–69</b>	<b>71,601</b>	<b>72,792</b>	<b>72,394</b>	<b>72,234</b>	<b>75,589</b>	<b>78,329</b>	<b>82,158</b>	<b>82,632</b>

Note: 'All ages' may not equal the sum of the age groups due to the inclusion of women for whom the age group was not stated.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.2: Proportion of histology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Crude rate	1.2	10.1	15.6	14.1	11.6	12.8	11.4	8.7	5.4	3.9	2.8	2.6

Note: 'Crude rate' is the number of histology tests as a proportion of the total number of histology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.3: Histology tests as a proportion of cytology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Crude rate	2.1	4.4	5.2	4.4	3.9	4.1	4.1	3.3	2.5	2.1	2.1	7.3

Note: 'Crude rate' is the number of histology tests as a proportion of the number of cytology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.4: Negative histology tests, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	292	2,530	3,564	4,095	4,586	6,651	6,981	5,651	3,522	2,512	1,859	1,791
Crude rate	29.5	29.3	26.6	33.8	46.2	60.7	71.5	75.6	75.7	75.8	76.9	81.4

Note: 'Crude rate' is the number of negative histology tests as a proportion of the total number of histology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.5: Abnormalities detected by histology in women aged 20–69, 2007 to 2014**

	2007	2008	2009	2010	2011	2012	2013	2014
<b>Low-grade abnormalities</b>								
Number	16,602	15,347	14,576	14,018	14,566	14,856	15,318	15,165
Crude rate	23.2	21.1	20.1	19.4	19.3	19.0	18.6	18.4
AS rate	20.2	18.4	17.6	17.2	17.4	17.2	17.1	17.2
<b>High-grade abnormalities</b>								
Number	21,067	22,102	22,031	22,104	22,676	23,149	23,734	22,947
Crude rate	29.4	30.4	30.4	30.6	30.0	29.6	28.9	27.8
AS rate	24.4	25.2	25.4	25.9	25.9	25.7	25.4	24.8
<b>All abnormalities (low-grade, high-grade and cancer)</b>								
Number	38,476	38,325	37,380	36,940	38,122	38,984	40,038	39,109
Crude rate	53.7	52.7	51.6	51.1	50.4	49.8	48.7	47.3
AS rate	46.2	45.1	44.4	44.4	44.6	44.4	44.0	43.3

*Notes*

1. 'Low-grade abnormalities' are histology test results HS02 and HE02; 'high-grade abnormalities' are histology results HS03 and HE03. All abnormalities are histology test results HS02, HS03, HS04, HE02, HE03 and HE04 (see Table 3.3).
2. Crude rate is the number of low-grade, high-grade or all abnormalities detected by histology as a proportion of the total number of histology tests; 'age-standardised (AS) rate' is the number of low-grade, high-grade or all abnormalities detected by histology as a proportion of the total number of histology tests age-standardised to the Australian population at 30 June 2001.
3. This is the number of abnormalities detected, not the number of abnormal histology tests—in a small proportion of histology tests there may be more than one abnormality detected, both of which will be counted.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.6: Low-grade abnormalities detected by histology, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	407	2,717	3,323	2,593	1,925	1,712	1,207	801	451	260	176	77
Crude rate	41.1	31.5	24.8	21.4	19.4	15.6	12.4	10.7	9.7	7.8	7.3	3.5

Note: 'Crude rate' is the number low-grade abnormalities detected by histology as a proportion of the total number of histology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.7: High-grade abnormalities detected by histology, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
Number	275	3,245	6,319	5,222	3,174	2,192	1,221	700	424	295	155	77
Crude rate	27.7	37.6	47.2	43.1	31.9	20.0	12.5	9.4	9.1	8.9	6.4	3.5

Note: 'Crude rate' is the number of high-grade abnormalities detected by histology as a proportion of the total number of histology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.8: High-grade abnormality detection rate, by age, 2007 to 2014**

	2004–2006	2007	2008	2009	2010	2011	2012	2013	2014
<20	13.6	11.6	10.8	8.9	7.8	7.1	6.4	5.7	5.0
20–24	20.1	18.9	21.3	19.9	19.7	17.4	15.8	15.0	12.9
25–29	17.7	17.8	19.3	19.0	19.9	19.4	20.0	20.3	18.5
30–34	11.6	11.5	12.7	12.8	13.6	14.0	13.8	14.5	14.1
35–39	7.1	7.3	7.8	7.6	8.3	9.0	9.2	9.4	9.3
40–44	4.6	4.7	4.8	4.7	4.9	5.5	6.0	6.3	6.4
45–49	3.1	3.2	3.3	3.3	3.5	3.8	3.7	4.0	4.0
50–54	1.8	1.9	2.0	1.9	2.1	2.2	2.4	2.4	2.4
55–59	1.5	1.4	1.3	1.3	1.7	1.7	1.6	1.6	1.9
60–64	1.3	1.2	1.3	1.2	1.2	1.4	1.5	1.4	1.7
65–69	1.2	1.3	1.3	1.1	1.1	1.1	1.1	1.4	1.0
70+	3.0	2.4	2.6	2.6	3.4	2.7	2.8	2.6	2.4
<b>Ages 20–69</b>									
Number	..	15,671	16,457	16,257	16,291	16,641	16,808	17,609	16,505
Crude rate	7.9	7.8	8.4	8.1	8.4	8.4	8.3	8.5	8.0
AS rate	7.7	7.7	8.3	8.1	8.5	8.4	8.4	8.5	8.1

Note: 'Crude rate' is the number of women with a high-grade abnormality detected by histology per 1,000 women screened; 'age-standardised (AS) rate' is the number of women with a high-grade abnormality detected by histology per 1,000 women screened, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.9: High-grade abnormality detection rate in women aged 20–69, by state and territory, 2014**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number	5,166	3,747	3,691	2,092	952	395	230	232	16,505
Crude rate	8.0	6.9	9.2	9.3	6.3	9.1	6.6	11.4	8.0
AS rate	8.3	7.0	9.1	8.8	6.6	9.7	6.3	10.0	8.1

Note: 'Crude rate' is the number of women with a high-grade abnormality detected by histology per 1,000 women screened; 'age-standardised (AS) rate' is the number of women with a high-grade abnormality detected by histology per 1,000 women screened, age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.10: Squamous abnormalities detected by histology in women aged 20–69, by squamous category, 2007 to 2014**

	Year							
	2007	2008	2009	2010	2011	2012	2013	2014
<b>HS02 Low-grade squamous abnormality</b>								
Number	16,540	15,292	14,538	13,964	14,504	14,802	15,269	15,127
Per 100 histology tests	23.1	21.0	20.0	19.3	19.2	18.9	18.6	18.3
% of squamous abnormalities	44.1	41.1	39.9	38.9	39.2	39.2	39.3	39.9
<b>HS03 High-grade squamous abnormality</b>								
Number	20,437	21,411	21,379	21,389	21,941	22,365	22,946	22,139
Per 100 histology tests	28.5	29.4	29.5	29.6	29.0	28.6	27.9	26.8
% of squamous abnormalities	54.5	57.5	58.7	59.6	59.3	59.2	59.0	58.4
<b>HS04 Squamous cell carcinoma</b>								
Number	516	530	474	528	551	641	651	631
Per 100 histology tests	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8
% of squamous abnormalities	1.4	1.4	1.3	1.5	1.5	1.7	1.7	1.7
<b>All squamous abnormalities</b>								
Number	37,493	37,233	36,391	35,881	36,996	37,808	38,866	37,897
Crude rate	52.4	51.1	50.3	49.7	48.9	48.3	47.3	45.9
AS rate	44.7	43.5	43.0	43.0	43.1	42.9	42.6	41.9

*Notes*

1. 'HS03 High-grade squamous abnormality' combines cervical intraepithelial neoplasia (CIN) not otherwise specified (NOS), CIN II and CIN III.
2. 'Crude rate' is the number of each squamous abnormality or all squamous abnormalities combined detected by histology as a proportion of the total number of histology tests; 'age-standardised (AS) rate' is the number of all squamous abnormalities combined detected by histology as a proportion of the total number of histology tests age-standardised to the Australian population at 30 June 2001.

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A4.11: CIN II and CIN III in women aged 20–69, 2007 to 2014**

	Year							
	2007	2008	2009	2010	2011	2012	2013	2014
<b>HS03.2 CIN II</b>								
Number	4,104	4,377	4,574	4,338	4,157	4,236	4,293	3,951
Per 100 histology tests (crude rate)	12.1	12.5	12.7	12.2	11.2	10.8	10.5	9.6
Per 100 histology tests (AS rate)	9.8	10.2	10.4	10.1	9.6	9.5	9.3	8.7
% of squamous abnormalities	25.5	25.9	26.7	26.6	25.5	25.0	24.9	23.8
<b>HS03.3 CIN III</b>								
Number	4,753	5,340	5,373	5,127	5,293	5,868	5,896	5,806
Per 100 histology tests (crude rate)	14.0	15.3	14.9	14.4	14.2	15.0	14.4	14.0
Per 100 histology tests (AS rate)	12.0	13.0	12.6	12.4	12.4	13.2	12.8	12.7
% of squamous abnormalities	29.6	31.6	31.3	31.5	32.4	34.7	34.2	34.9

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.12: CIN II and CIN III, by age, 2014**

	<20	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69	70+
<b>CIN II</b>												
Number	66	751	1,085	803	484	357	210	129	68	50	14	16
Crude rate	16.1	17.9	16.9	13.9	10.1	6.3	4.1	3.3	2.8	2.9	1.1	1.4
<b>CIN III</b>												
Number	38	654	1,632	1,383	860	586	318	167	97	65	44	12
Crude rate	9.3	15.6	25.4	23.9	18.0	10.3	6.2	4.3	4.0	3.8	3.5	1.0

Note: 'Crude rate' is the number of high-grade abnormalities detected by histology as a proportion of the total number of histology tests.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A4.13: Endocervical abnormalities detected by histology in women aged 20–69, by endocervical category, 2007 to 2014**

Endocervical category	Year							
	2007	2008	2009	2010	2011	2012	2013	2014
<b>HE02 Endocervical atypia</b>								
Number	62	55	38	54	62	54	49	38
% of cytology tests	0.09	0.08	0.05	0.07	0.08	0.07	0.06	0.05
% of endocervical abnormalities	6.3	5.0	3.8	5.1	5.5	4.6	4.2	3.1
<b>HE03 High-grade endocervical abnormality</b>								
Number	630	691	652	715	735	784	788	808
% of cytology tests	0.88	0.95	0.90	0.99	0.97	1.00	0.96	0.98
% of endocervical abnormalities	64.1	63.3	65.9	67.5	65.3	66.7	67.2	66.7
<b>HE04.1 &amp; HE04.2 Adenocarcinoma</b>								
Number	245	311	263	248	283	284	275	296
% of cytology tests	0.34	0.43	0.36	0.34	0.37	0.36	0.33	0.36
% of endocervical abnormalities	24.9	28.5	26.6	23.4	25.1	24.1	23.5	24.4
<b>HE04.3 Adenosquamous carcinoma</b>								
Number	25	21	20	21	33	23	32	42
% of cytology tests	0.03	0.03	0.03	0.03	0.04	0.03	0.04	0.05
% of endocervical abnormalities	2.5	1.9	2.0	2.0	2.9	2.0	2.8	3.5
<b>HE04.4 Carcinoma of the cervix (other)</b>								
Number	21	14	16	21	13	31	28	28
% of cytology tests	0.03	0.02	0.02	0.03	0.02	0.04	0.03	0.03
% of endocervical abnormalities	2.1	1.3	1.6	2.0	1.2	2.6	2.4	2.3
<b>All endocervical abnormalities</b>								
Number	983	1,092	989	1,059	1,126	1,176	1,172	1,212
Crude rate	1.37	1.50	1.37	1.47	1.49	1.50	1.43	1.47
AS rate	1.46	1.59	1.41	1.50	1.48	1.48	1.41	1.40

*Notes*

1. 'HE03 High-grade endocervical abnormality' combines endocervical dysplasia and adenocarcinoma in situ.
2. 'Crude rate' is the number of each endocervical abnormality or of all endocervical abnormalities combined detected by histology as a proportion of the total number of histology tests; 'age-standardised (AS) rate' is the number of all endocervical abnormalities combined detected by histology as a proportion of the total number of histology tests age-standardised to the Australian population at 30 June 2001.

Source: AIHW analysis of state and territory cervical screening register data.

## A5 Cytology–histology correlation

**Table A5.1: Number of squamous abnormalities detected by cytology in 2013, and proportion followed by squamous histology within 6 months, for women aged 20–69**

Cytology prediction	Number detected by cytology	Number followed by squamous histology	Proportion followed by squamous histology (%)
S2 Possible low-grade	57,748	9,589	16.6
S3 Low-grade	37,136	8,525	23.0
S4 Possible high-grade	13,334	9,959	74.7
S5 High-grade	15,791	13,567	85.9
S6 High-grade plus	317	276	87.1
S7 Squamous cell carcinoma	142	107	75.4

Source: AIHW analysis of state and territory cervical screening register data.

**Table A5.2: Correlation between squamous cytology and the most serious squamous histology within 6 months in women aged 20–69, cytology tests performed in 2013**

Cytology prediction	Histology finding		
	HS02 Low-grade	HS03 High-grade	HS04 squamous cell carcinoma
S1 Negative	3,695 (16.9%)	951 (4.4%)	52 (0.2%)
S2 Possible low-grade	3,900 (40.7%)	1,344 (14.0%)	4 (0.0%)
S3 Low-grade	4,328 (50.8%)	1,808 (21.2%)	6 (0.1%)
S4 Possible high-grade	2,310 (23.2%)	5,065 (50.9%)	59 (0.6%)
S5 High-grade	1,558 (11.5%)	10,623 (78.3%)	212 (1.6%)
S6 High-grade plus	6 (2.2%)	184 (66.7%)	75 (27.2%)
S7 Squamous cell carcinoma	3 (2.8%)	25 (23.4%)	75 (70.1%)

### Notes

1. Numbers and percentage of each squamous cytology result category are shown; data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.
2. For national consistency, the histology results of cervical intraepithelial (CIN) not otherwise specified (NOS), CIN II and CIN III are grouped together to form a broad high-grade abnormality category, and those of microinvasive and invasive squamous cell carcinoma are grouped together to form a broad squamous cell carcinoma category.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A5.3: Positive predictive value (PPV) of high-grade squamous cytological abnormalities in women aged 20–69, most serious histology within 6 months of cytology performed in 2009 to 2013**

Year	Cytology prediction			
	Possible high-grade S4	High-grade S5	High-grade plus S6	High-grade
2009	55.2% (4,748/8,607)	78.9% (10,935/13,859)	90.5% (228/252)	70.0% (15,911/22,718)
2010	54.8% (4,810/8,782)	79.2% (10,517/13,279)	92.4% (255/276)	69.8% (15,582/22,337)
2011	51.6% (4,999/9,688)	79.3% (11,129/14,033)	90.3% (250/277)	68.2% (16,378/23,998)
2012	52.5% (4,986/9,504)	78.8% (10,648/13,506)	92.5% (282/305)	68.3% (15,916/23,315)
2013	51.5% (5,124/9,959)	79.9% (10,835/13,567)	93.8% (259/276)	68.1% (16,218/23,802)

Note: The positive predictive value is calculated as the proportion of squamous cytology results of possible or definite high-grade abnormality that were confirmed on histology to be a high-grade squamous abnormality or squamous cell carcinoma; data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A5.4: Number of endocervical abnormalities detected by cytology in 2013, and proportion followed by endocervical histology within 6 months, for women aged 20–69**

Cytology prediction	Number detected by cytology	Number followed by histology	Proportion followed by histology (%)
E2 Atypical endocervical cells of uncertain significance	920	325	35.3
E3 Possible high-grade	540	281	52.0
E4 Adenocarcinoma in situ	307	264	86.0
E5 Adenocarcinoma in situ plus	31	17	54.8
E6 Adenocarcinoma	78	45	57.7

Source: AIHW analysis of state and territory cervical screening register data.

**Table A5.5: Correlation between endocervical cytology and the most serious endocervical histology within 6 months, for women aged 20–69, cytology tests performed in 2013**

Cytology prediction	Histology finding		
	HE02 Endocervical atypia	HE03 High-grade	HE04.1 & HE04.2 Adenocarcinoma
E1 Negative	21 (0.1%)	326 (1.4%)	75 (0.3%)
E2 Atypical endocervical cells of uncertain significance	4 (1.2%)	65 (20.0%)	12 (3.7%)
E3 Possible high-grade	1 (0.4%)	124 (44.1%)	33 (11.7%)
E4 Adenocarcinoma in situ	1 (0.4%)	170 (64.4%)	56 (21.2%)
E5 Adenocarcinoma in situ plus	0 (0.0%)	8 (47.1%)	7 (41.2%)
E6 Adenocarcinoma	0 (0.0%)	5 (11.1%)	34 (75.6%)

Notes

1. Numbers and percentage of each endocervical cytology result category shown; data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.
2. For national consistency, the histology results of endocervical dysplasia and adenocarcinoma in situ are grouped together to form a broad high-grade abnormality category, and microinvasive and invasive adenocarcinoma are grouped to form a broad adenocarcinoma category.
3. The histology results of adenosquamous carcinoma and carcinoma of the cervix (other) are excluded, since these are not solely squamous or endocervical in origin, and thus would not necessarily be expected to correlate with cytology results of either cell type.

Source: AIHW analysis of state and territory cervical screening register data.

**Table A5.6: Positive predictive value (PPV) of high-grade endocervical cytological abnormalities in women aged 20–69, most serious histology within 6 months of cytology performed in 2009 to 2013**

Year	Cytology prediction			
	Possible high-grade E3	Adenocarcinoma in situ E4	Adenocarcinoma in situ plus E5	High-grade
2009	54.1% (139/257)	89.2% (214/240)	78.6% (11/14)	71.2% (364/511)
2010	56.3% (120/213)	88.7% (212/239)	73.9% (17/23)	73.5% (349/475)
2011	55.6% (154/277)	86.0% (228/265)	100.0% (17/17)	71.4% (399/559)
2012	56.1% (143/255)	90.0% (216/240)	92.3% (12/13)	73.0% (371/508)
2013	55.9% (157/281)	85.6% (226/264)	88.2% (15/17)	70.8% (398/562)

*Note:* The positive predictive value is calculated as the proportion of endocervical cytology results of possible or definite high-grade that were confirmed on histology to be a high-grade endocervical abnormality or adenocarcinoma. These are prone to variability due to small numbers; data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A5.7: Cytology prediction preceding a histology finding of adenosquamous carcinoma or other carcinoma of the cervix in women aged 20–69, cytology performed in 2013**

Cytology prediction	Adenosquamous carcinoma	Carcinoma of the cervix (other)
S1 Negative	9	7
S2 Possible low-grade	1	0
S3 Low-grade	0	0
S4 Possible high-grade	7	2
S5 High-grade	5	2
S6 High-grade with possible invasion	0	1
S7 Squamous cell carcinoma	7	3
E1 Negative	14	7
E2 Atypical endocervical cells of uncertain significance	1	0
E3 Possible high-grade	1	0
E4 Adenocarcinoma in situ	3	0
E5 Adenocarcinoma with possible invasion	2	0
E6 Adenocarcinoma	2	3

*Source:* AIHW analysis of state and territory cervical screening register data.

**Table A5.8: Correlation between squamous cytology and the most serious squamous histology within 6 months in women aged 20–69 showing CIN II and CIN III, cytology tests performed in 2013**

Cytology prediction	Histology finding			
	HS02 Low-grade	HS03.2 CIN II	HS03.3 CIN III	HS04 Squamous cell carcinoma
S1 Negative	1,470 (14.9%)	207 (2.1%)	231 (2.3%)	14 (0.1%)
S2 Possible low-grade	2,110 (36.4%)	436 (7.5%)	287 (5.0%)	1 (0.0%)
S3 Low-grade	1,972 (48.8%)	532 (13.2%)	267 (6.6%)	3 (0.1%)
S4 Possible high-grade	1,159 (21.3%)	1,033 (19.0 %)	1,559 (28.7%)	21 (0.4%)
S5 High-grade	721 (10.3%)	1,481 (21.2%)	3,917 (56.2%)	107 (1.5%)
S6 High-grade plus	2 (1.4%)	6 (4.2%)	87 (60.8%)	40 (28.0%)
S7 Squamous cell carcinoma	1 (2.0%)	0 (0.0%)	11 (22.4%)	34 (69.4%)

*Notes*

1. Numbers and percentage of each squamous cytology result category shown; data only include cytology where histology was performed within 6 months; cytology not followed by histology or followed by histology more than 6 months after cytology are not included in the calculations.
2. States and territories unable to distinguish between CIN II and CIN III were excluded from all data and calculations in this table.
3. The high-grade category CIN NOS has been excluded from this table, but is a rare histology finding.

Source: AIHW analysis of state and territory cervical screening register data.

## A6 Incidence of cervical cancer

Table A6.1: Incidence of cervical cancer, 1982 to 2016

Year of diagnosis	New cases		AS rate	
	20–69	All ages	20–69	All ages
1982	828	965	19.1	14.2
1983	843	996	19.1	14.4
1984	840	1,013	18.5	14.2
1985	902	1,064	19.7	14.7
1986	860	1,020	18.6	14.0
1987	905	1,099	18.7	14.4
1988	903	1,068	18.2	13.6
1989	909	1,073	18.1	13.5
1990	918	1,088	18.0	13.5
1991	896	1,095	17.2	13.3
1992	848	1,026	16.0	12.2
1993	846	1,014	15.9	11.9
1994	935	1,142	17.1	13.1
1995	779	964	14.0	10.8
1996	760	940	13.5	10.4
1997	658	810	11.5	8.8
1998	699	872	11.9	9.2
1999	663	802	11.1	8.4
2000	597	767	9.9	7.9
2001	588	741	9.6	7.4
2002	559	691	9.0	6.8
2003	579	729	9.2	7.1
2004	584	727	9.1	7.0
2005	605	736	9.3	7.0
2006	589	719	8.9	6.7
2007	625	752	9.3	7.0
2008	644	786	9.5	7.1
2009	631	761	9.1	6.8
2010	683	820	9.6	7.1
2011	681	798	9.5	6.9
2012	725	869	9.9	7.4
2013	706	849	9.4	7.0
2014	720	866	9.5	7.0
2015	735	885	9.5	7.0
2016	750	903	9.5	7.0

### Notes

1. 'Age-standardised (AS) rate' is the number of new cases of cervical cancer per 100,000 women, age-standardised to the Australian population at 30 June 2001.
2. Estimated incidence data for 2013–2016 are based on 2002–2011 incidence data. Actual incidence data for 2013–2016 may differ from estimated data for 2013–2016 due to current and ongoing program or practice changes

Source: AIHW Australian Cancer Database 2011; AIHW Australian Cancer Database 2012.

**Table A6.2: Incidence of cervical cancer, by age, 2016**

	Age group (years)									
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69
New cases	13	82	94	96	91	94	79	68	66	67
Crude rate	1.6	9.2	10.4	11.7	10.9	11.4	10.0	9.0	9.9	11.1

*Notes*

1. 'Crude rate' is the number of new cases of cervical cancer per 100,000 women; rates based on fewer than 20 new cases should be interpreted with caution.
2. The 2016 estimates are based on 2002–2011 incidence data.

Source: AIHW Australian Cancer Database 2011.

**Table A6.3: Incidence of carcinoma of the cervix (squamous cell carcinoma, adenocarcinoma, adenosquamous carcinoma and other carcinoma) in women aged 20–69, 1982 to 2012**

Year of diagnosis	New cases				AS rate			
	SCC	AC	ASC	Other	SCC	AC	ASC	Other
1982	655	92	22	35	15.0	2.1	0.5	0.8
1983	661	83	23	57	15.1	1.9	0.5	1.2
1984	634	87	45	51	13.9	1.9	1.0	1.1
1985	690	95	35	55	15.1	2.0	0.8	1.1
1986	644	117	42	39	13.9	2.5	1.0	0.8
1987	681	132	41	33	14.0	2.7	0.9	0.7
1988	650	157	40	42	13.1	3.1	0.8	0.8
1989	691	111	50	48	13.8	2.2	1.0	1.0
1990	642	146	49	61	12.6	2.8	1.0	1.2
1991	645	145	41	56	12.4	2.8	0.8	1.1
1992	613	136	50	37	11.6	2.6	1.0	0.7
1993	594	143	48	52	11.2	2.6	0.9	1.0
1994	640	202	40	47	11.7	3.7	0.7	0.9
1995	546	145	34	42	9.8	2.6	0.6	0.8
1996	528	148	40	33	9.4	2.6	0.7	0.6
1997	454	130	33	31	7.9	2.3	0.6	0.5
1998	491	141	30	29	8.4	2.4	0.5	0.5
1999	471	132	24	27	7.9	2.2	0.4	0.5
2000	401	118	30	27	6.7	2.0	0.5	0.4
2001	400	115	32	28	6.5	1.9	0.5	0.5
2002	389	126	17	20	6.3	2.0	0.3	0.3
2003	395	122	25	26	6.3	1.9	0.4	0.4
2004	391	133	27	22	6.1	2.1	0.4	0.3
2005	399	128	21	40	6.2	2.0	0.3	0.6
2006	365	143	22	38	5.6	2.2	0.3	0.6
2007	397	159	24	36	5.9	2.4	0.4	0.5
2008	422	166	20	25	6.2	2.4	0.3	0.4
2009	412	162	23	19	6.0	2.3	0.3	0.3
2010	456	146	29	36	6.4	2.1	0.4	0.5
2011	457	166	26	22	6.4	2.3	0.4	0.3
2012	495	158	23	38	6.8	2.2	0.3	0.5

SCC = squamous cell carcinoma. (ICD-O-3 codes 8050–8078, 8083–8084).

AC = adenocarcinoma. (ICD-O-3 codes 8140–8141, 8190–8211, 8230–8231, 8260–8263, 8382–8384, 8440–8490, 8570–8574, 8310, 8380, 8576).

ASC = adenosquamous carcinoma. (ICD-O-3 code 8560).

Other = other and unspecified carcinoma. (ICD-O-3 codes 8010–8380, 8382–8576, excluding those in SCC, AC and ASC).

Note: 'Age-standardised (AS) rate' is the number of new cases of squamous cell carcinoma, adenocarcinoma, adenosquamous carcinoma and other carcinomas per 100,000 women age-standardised to the Australian population at 30 June 2001; rates based on fewer than 20 new cases should be interpreted with caution.

Source: AIHW Australian Cancer Database 2012.

**Table A6.4: Incidence of cervical cancer in women aged 20–69, by state and territory, 2006–2010**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
New cases	1,029	701	711	359	216	69	35	52	3,172
AS rate	9.2	8.2	10.5	10.4	8.6	8.8	6.1	15.4	9.3

Note: 'Age-standardised (AS) rate' is the number of new cases of cervical cancer per 100,000 women age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2012.

**Table A6.5: Incidence of cervical cancer in women aged 20–69, by remoteness, 2006–2010**

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
New cases	2,190	574	297	63	35	3,172
AS rate	9.2	8.8	9.7	13.1	15.1	9.3

Notes

1. Women were allocated to a remoteness area using residential statistical local area (SLA) according to the 2006 Australian Standard Geographic Classifications.
2. 'Australia' does not match the total due to some women not being allocated to a remoteness area.
3. 'Age-standardised (AS) rate' is the number of new cases of cervical cancers per 100,000 women age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2012.

**Table A6.6: Incidence of cervical cancer in women aged 20–69, by socioeconomic group, 2006–2010**

	1 (lowest)	2	3	4	5 (highest)	Australia
New cases	698	671	604	641	541	3,172
AS rate	10.6	10.0	8.8	9.3	7.6	9.3

Notes

1. Women were allocated to a socioeconomic group using residential SLA according to the Australian Bureau of Statistics Socio-Economic Indexes for Areas (SEIFA) Index of Relative Socio-Economic Disadvantage for 2006.
2. 'Australia' does not match the total due to some women not being allocated to a socioeconomic group.
3. 'Age-standardised (AS) rate' is the number of new cases of cervical cancers per 100,000 women age-standardised to the Australian population at 30 June 2001.

Source: AIHW Australian Cancer Database 2012.

**Table A6.7: Incidence of cervical cancer in women aged 20–69 (New South Wales, Queensland, Western Australia and the Northern Territory), by Indigenous status, 2006–2010**

<b>New South Wales, Queensland, Western Australia, and the Northern Territory<sup>(a)</sup></b>			
	<b>Aboriginal and Torres Strait Islander</b>	<b>Non-Indigenous</b>	<b>Total<sup>(b)</sup></b>
New cases	123	1,865	2,151
Crude rate	18.3	8.8	9.9
AS rate	20.9	8.8	9.9

(a) Data shown for 'Aboriginal and Torres Strait Islander', 'Non-Indigenous' and 'Total' are for New South Wales, Queensland, Western Australia and the Northern Territory only; data from these jurisdictions were considered to have adequate levels of Indigenous identification in cancer registration data at the time this report was prepared.

(b) Total includes those whose Indigenous status is not stated.

*Notes*

1. 'Crude rate' is the number of new cases of cervical cancer per 100,000 women; 'age-standardised (AS) rates' are the number of cervical cancers detected per 100,000 women directly age-standardised to the Australian population at 30 June 2001.
2. Some states and territories use an imputation method for determining Indigenous cancers, which may lead to differences between these data and those shown in jurisdictional cancer incidence reports.

Source: AIHW Australian Cancer Database 2012.

## Survival after a diagnosis of cervical cancer

**Table A6.8: Five-year relative survival from cervical cancer, by age, 2008–2012**

Age group	5-year relative survival (%)	95% confidence interval
<20	n.p.	n.p.
20–24	93.5	83.3–97.6
25–29	92.2	88.3–94.8
30–34	90.5	87.1–93.1
35–39	86.5	82.9–89.3
40–44	81.6	77.4–85.1
45–49	76.8	72.2–80.7
50–54	67.4	62.0–72.2
55–59	67.0	61.1–72.3
60–64	58.1	51.5–64.2
65–69	57.7	50.5–64.3
70–74	53.0	44.6–60.9
75–79	44.2	35.4–53.0
80–84	36.4	27.0–46.4
85+	19.0	11.2–29.4
<b>All ages</b>	<b>71.8</b>	<b>70.2–73.4</b>
<b>Ages 20–69 years</b>	<b>77.4</b>	<b>75.9–78.9</b>

n.p. not published

*Note:* Relative survival was calculated with the period method, using the period 2008–2012 (Brenner & Gefeller 1996). Note that this period does not contain incidence data for 2011–2012 for NSW and ACT.

*Source:* AIHW Australian Cancer Database 2012.

**Table A6.9: Trend in 5-year relative survival from cervical cancer in women aged 20–69, 1983–1987 to 2008–2012**

Year	5-year relative survival (%)	95% confidence interval
1983–1987	72.8	71.0–74.4
1988–1992	75.7	74.4–77.0
1993–1997	78.3	77.0–79.6
1998–2002	78.4	77.0–79.8
2003–2007	78.1	76.5–79.6
2008–2012	77.4	75.9–78.9

*Note:* Relative survival was calculated with the period method, using the period 2008–2012 (Brenner & Gefeller 1996). Note that this period does not contain incidence data for 2011–2012 for NSW and ACT.

*Source:* AIHW Australian Cancer Database 2012.

**Table A6.10: Relative survival at diagnosis and 5-year conditional survival from cervical cancer in women aged 20–69, 2008–2012**

Years after diagnosis	Relative survival		Years already survived	Conditional survival	
	Relative survival (%)	95% confidence interval		5-year conditional relative survival (%)	95% confidence interval
1	91.2	90.1–92.2	..	..	..
2	84.6	83.2–85.8	..	..	..
3	81.0	79.5–82.4	..	..	..
4	79.0	77.4–80.4	..	..	..
5	77.4	75.9–78.9	0	77.4	75.9–78.9
6	76.5	75.0–78.1	1	83.9	82.5–85.3
7	75.8	74.2–77.3	2	89.6	88.3–90.8
8	75.4	73.8–76.9	3	93.1	91.9–94.1
9	75.0	73.3–76.6	4	95.0	93.9–95.9
10	74.7	73.0–76.3	5	96.5	95.5–97.3
11	74.2	72.5–75.8	6	96.9	95.9–97.7
12	73.5	71.8–75.1	7	97.0	96.0–97.8
13	73.1	71.3–74.7	8	96.9	95.9–97.8
14	72.5	70.8–74.2	9	96.8	95.8–97.6
15	72.0	70.2–73.7	10	96.3	95.3–97.2
16	71.5	69.7–73.2	11	96.3	95.3–97.2
17	71.1	69.3–72.8	12	96.7	95.7–97.6
18	70.6	68.7–72.3	13	96.6	95.5–97.5
19	70.1	68.3–71.9	14	96.6	95.6–97.5
20	69.7	67.9–71.5	15	96.9	95.8–97.8

*Note:* Relative survival was calculated with the period method, using the period 2008–2012 (Brenner & Gefeller 1996). Note that this period does not contain incidence data for 2011–2012 for NSW and ACT.

*Source:* AIHW Australian Cancer Database 2012.

### **Box A1: Confidence intervals**

Confidence intervals are only presented in this report for survival estimates. This is because that, for survival, it has been deemed important to show the degree of error due to rare events in small populations, to avoid potential misinterpretation of data and/or to present data consistent with other publications.

Where shown, 95% confidence intervals can be used to determine if a statistically significant difference exists between compared values: where the confidence intervals do not overlap, the difference between rates is greater than that which could be explained by chance and is regarded as statistically significant. Because overlapping confidence intervals do not imply that the difference between two rates is definitely due to chance, it can only be stated that no statistically significant differences were found, and not that no differences exist.

Judgment should be exercised in deciding whether or not any differences shown are of clinical significance.

## A7 Mortality from cervical cancer

Table A7.1: Mortality from cervical cancer, 1982 to 2016

Year	Deaths		AS rate	
	20–69	All ages	20–69	All ages
1982	237	346	5.5	5.2
1983	248	343	5.6	5.0
1984	223	339	5.0	4.9
1985	234	363	5.1	5.1
1986	240	341	5.1	4.6
1987	225	348	4.8	4.6
1988	219	345	4.5	4.5
1989	243	369	4.9	4.7
1990	245	339	4.8	4.2
1991	204	331	4.0	4.0
1992	188	322	3.6	3.8
1993	204	318	3.9	3.7
1994	223	341	4.2	4.0
1995	211	334	3.9	3.8
1996	174	301	3.1	3.3
1997	160	285	2.8	3.0
1998	153	260	2.6	2.7
1999	131	227	2.2	2.3
2000	154	265	2.6	2.6
2001	156	271	2.5	2.6
2002	126	217	2.0	2.1
2003	140	239	2.2	2.2
2004	119	210	1.8	1.9
2005	136	221	2.0	2.0
2006	137	228	2.0	2.0
2007	125	201	1.8	1.7
2008	145	237	2.0	2.0
2009	143	242	1.9	1.9
2010	151	230	2.0	1.9
2011	152	228	2.0	1.8
2012	141	225	1.8	1.7
2013	149	224	1.9	1.7
2014	157	242	1.9	1.8
2015	159	245	1.9	1.8
2016	163	250	1.9	1.8

*Notes*

1. Deaths from 1982 to 2012 were derived by year of death; deaths in 2013 were derived by year of registration of death. Deaths registered in 2011 and earlier are based on the final version of cause-of-death data; deaths registered in 2012 and 2013 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. 'Age-standardised (AS) rate' is number of deaths from cervical cancer per 100,000 women age-standardised to the Australian population at 30 June 2001.
3. Estimated mortality data for 2014–2016 are based on 2004–2013 mortality data. Actual mortality data for 2014–2016 may differ from estimated data for 2014–2016 due to current and ongoing program or practice changes

Source: AIHW National Mortality Database.

**Table A7.2: Mortality from cervical cancer, by age, 2016**

	Age group (years)									
	20–24	25–29	30–34	35–39	40–44	45–49	50–54	55–59	60–64	65–69
Deaths	1	5	7	12	16	19	23	25	28	26
Crude rate	0.1	0.6	0.8	1.4	2.0	2.3	2.9	3.4	4.2	4.4

*Notes*

1. Projected estimates for 2016 are based on mortality data for cervical cancer from 2004 to 2013 for females, and from ABS population projections.
2. 'Crude rate' is the number of deaths from cervical cancer per 100,000 women; rates based on fewer than 20 deaths should be interpreted with caution.

Source: AIHW National Mortality Database.

**Table A7.3: Mortality from cervical cancer in women aged 20–69, by state and territory, 2009–2013**

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Deaths	243	148	159	85	60	24	8	9	736
AS rate	2.0	1.6	2.0	2.2	2.2	2.8	1.3	2.7	1.9

*Notes*

1. Deaths from 2009 to 2012 were derived by year of death; deaths in 2013 were derived by year of registration of death. Deaths registered in 2011 and earlier are based on the final version of cause-of-death data; deaths registered in 2012 and 2013 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
2. 'Age-standardised (AS) rate' is the number of deaths from cervical cancer per 100,000 women, age-standardised to the Australian population at 30 June 2001; rates based on less than 20 deaths should be interpreted with caution.

Source: AIHW National Mortality Database.

**Table A7.4: Mortality from cervical cancer in women aged 20–69, by remoteness area, 2009–2013**

	Major cities	Inner regional	Outer regional	Remote	Very remote	Australia
Deaths	480	140	88	13	12	736
AS rate	1.8	1.9	2.5	2.5	4.7	1.9

*Notes*

1. For 2009–2010, women were allocated to a remoteness area using residential Statistical Local area (SLA) according to the Australian Standard Geography Classification (ASGC). For 2011–2013, women were allocated to a remoteness area using residential Statistical Area level 2 (SA2) according to the Australian Statistical Geography Standard (ASGS).
2. 'Australia' does not match the total due to some women not being allocated to a remoteness area.
3. Deaths from 2009 to 2012 were derived by year of death; deaths in 2013 were derived by year of registration of death. Deaths registered in 2011 and earlier are based on the final version of cause-of-death data; deaths registered in 2012 and 2013 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.
4. 'Age-standardised (AS) rate' is the number of deaths from cervical cancers per 100,000 women age-standardised to the Australian population at 30 June 2001; rates based on less than 20 deaths should be interpreted with caution.

Source: AIHW National Mortality Database.

**Table A7.5: Mortality from cervical cancer in women aged 20–69 (New South Wales, Queensland, Western Australia, South Australia and the Northern Territory), by Indigenous status, 2009–2013**

	New South Wales, Queensland, Western Australia, South Australia and the Northern Territory <sup>(a)</sup>		
	Aboriginal and Torres Strait Islander	Non-Indigenous	Total <sup>(b)</sup>
Deaths	47	500	556
Crude rate	6.1	2.0	2.2
AS rate	7.5	1.9	2.0

(a) Data shown for 'Aboriginal and Torres Strait Islander', 'Non-Indigenous' and 'Total' are for New South Wales, Queensland, Western Australia, South Australia and the Northern Territory only; data from these jurisdictions were considered to have adequate levels of Indigenous identification in cancer mortality data at the time this report was prepared.

(b) Total includes those whose Indigenous status is not stated. This means that 'Total' is not equal to the sum of 'Aboriginal and Torres Strait Islander' and 'Non-Indigenous'.

*Notes*

1. 'Crude rate' is the number of deaths from cervical cancer per 100,000 women; 'age-standardised (AS) rate' is the number of deaths from cervical cancer per 100,000 women directly age-standardised to the Australian population at 30 June 2001.
2. Deaths from 2009 to 2012 were derived by year of death; deaths in 2013 were derived by year of registration of death. Deaths registered in 2011 and earlier are based on the final version of cause-of-death data; deaths registered in 2012 and 2013 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.

Source: AIHW National Mortality Database.

# Appendix B: National Cervical Screening Program information

In 1991, the Australian Health Ministers' Advisory Council (AHMAC) accepted recommendations made by the Screening Evaluation Steering Committee in the then named Australian Institute of Health (now the AIHW) report *Cervical cancer screening in Australia: options for change* (AIHW 1991) that saw the establishment of the Organised Approach to Preventing Cancer of the Cervix, Australia's cervical screening program. Now known as the National Cervical Screening Program (NCSP), it operates as a joint program of the Australian Government and state and territory governments, targeting women aged 20–69. A statement of the current national policy for cervical screening in Australia is provided in Box B1.

## Box B1: National policy for Australia's National Cervical Screening Program

The national policy has been in place since 1991 and states:

- Routine screening with Pap smears should be carried out every two years for women who have no symptoms or history suggestive of cervical cancer.
- All women who have ever been sexually active should start having Pap smears between the ages of 18 and 20, or one or two years after first having sexual intercourse, whichever is later.
- Pap smears may cease at the age of 70 for women who have had two normal Pap smears within the past five years. Women over 70 who have never had a Pap smear, or who request a Pap smear, should be screened.

Women with abnormal smear results should be managed in accordance with the National Health and Medical Research Council's guidelines.

Source: Department of Health (2015)

<[www.cancerscreening.gov.au](http://www.cancerscreening.gov.au)>

The National Health and Research Council's (NHMRC) *Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen-detected abnormalities* (NHMRC 2005) provides recommendations for the management of women with an abnormal Pap test result. They enable practitioners and clinicians to manage the abnormalities detected by Pap tests according to evidence-based information which guides best practice.

A cervical screening register or 'Pap test register' operates in every state and territory of Australia. Cervical screening registers fulfil many important roles, including sending reminder letters to women overdue for screening, providing a safety net for women who have not had follow-up of an abnormal result, and providing cytology laboratories and cervical cytology providers with previous results for a woman, to allow a more detailed evaluation of present findings. State and territory cervical cytology registries also provide data on the epidemiology and natural history of precancerous lesions, as well as providing data for national monitoring of the NCSP. These registers are key to the NCSP and were established along with the program in 1991.

High-quality cervical cytology in Australian pathology laboratories has also been a key component of the screening program, facilitated through the development of the National Pathology Accreditation Advisory Council's (NPAAC's) *Performance measures for Australian laboratories reporting cervical cytology* (NPAAC 2006).

## Performance indicators

The effectiveness of the NCSP has been monitored since 1996–1997 using performance indicators developed to monitor what were originally defined as essential aspects of the program. Full definitions of the original performance indicators can be found in *Breast and cervical cancer screening in Australia 1996–1997* (AIHW 1998). New performance indicators were developed following a review that considered changes to both the NCSP and the cervical screening environment to ensure the NCSP continued to be monitored optimally. These new performance indicators were officially endorsed in September 2009 by the Screening Subcommittee of the Australian Population Health Development Principal Committee for use by the NCSP, and appeared for the first time in *Cervical screening in Australia 2008–2009* (AIHW 2011).

Table B1 lists the current performance indicators for the NCSP.

**Table B1: Performance indicators for the National Cervical Screening Program**

Performance indicator	Definition
1 Participation	The percentage of women aged 20–69 who have a Papanicolaou smear or 'Pap test' in a 2-year period
2 Rescreening	
2.1 Early rescreening	The proportion of women who have another Pap test within 21 months of a negative Pap test result
2.2 Rescreening after 27-month cervical screening register reminder letter	The proportion of women who have a Pap test within 3 months of being sent a 27-month reminder letter
3 Cytology	The number of Pap test results in each result category
4 Histology	The number of histology results in each result category (including the number of women with a high-grade histology for every 1,000 women screened)
5 Cytology–histology correlation	A measure of how well cytology correlates with histology performed not more than 6 months after the cytology test
6 Incidence	The number of new cases of cervical cancer
7 Mortality	The number of deaths from cervical cancer

*Note:* Further details and definitions of performance indicators are available in previous reports *Cervical screening in Australia 2008–2009* to *Cervical screening in Australia 2011–2012* (see <[www.aihw.gov.au/publications/cervical-screening/](http://www.aihw.gov.au/publications/cervical-screening/)>), and in the *National cervical cancer prevention data dictionary version 1: working paper* (AIHW 2014b).

*Source:* *National cervical cancer prevention data dictionary version 1: working paper* (AIHW 2014b).

## Standards

While there are no official standards for NCSP performance indicators, NPAAC standards in *Performance measures for Australian laboratories reporting cervical cytology* (NPAAC 2006) have been used in this report to provide a benchmark for the data presented. These are used as a guide to interpretation only, since this is a different purpose to that for which these standards were developed, and differences in definitions and data may exist.

NPAAC standards that relate to these data, along with data analysed by the AIHW, appear in Table 3.2 in this report.

**Table B2: Contacts and links for the state and territory and Australian Government components of the National Cervical Screening Program**

<b>Cervical Screening NSW</b>	
Tel: (02) 8374 5757	< <a href="http://www.csp.nsw.gov.au">http://www.csp.nsw.gov.au</a> >
Fax: (02) 8374 5700	
Email: < <a href="mailto:cervicalscreening@cancerinstitute.org.au">cervicalscreening@cancerinstitute.org.au</a> >	
<b>PapScreen Victoria</b>	
Tel: (03) 9635 5000	< <a href="http://www.papscreen.org.au">http://www.papscreen.org.au</a> >
Fax: (03) 9635 5360	
Email: < <a href="mailto:papscreen@cancervic.org.au">papscreen@cancervic.org.au</a> >	
<b>Queensland Cervical Screening Program</b>	
Tel: (07) 3328 9467	< <a href="http://www.health.qld.gov.au/cervicalscreening">http://www.health.qld.gov.au/cervicalscreening</a> >
Fax: (07) 3328 9487	
Email: < <a href="mailto:cssb@health.gov.au">cssb@health.gov.au</a> >	
<b>WA Cervical Cancer Prevention Program</b>	
Tel: (08) 9323 6788	< <a href="http://www.health.wa.gov.au/cervical/home">http://www.health.wa.gov.au/cervical/home</a> >
Fax: (08) 9323 6711	
Email: < <a href="mailto:cervicalcancer@health.wa.gov.au">cervicalcancer@health.wa.gov.au</a> >	
<b>SA Cervix Screening Program</b>	
Tel: (08) 8226 8181	< <a href="http://www.sahealth.sa.gov.au/wps/wcm/connect/Public+Content/SA+Health+Internet/About+us/Department+of+Health/Public+Health+and+Clinical+Systems/Public+Health+Services/SA+Cervix+Screening+Program/SA+Cervix+Screening+Program">http://www.sahealth.sa.gov.au/wps/wcm/connect/Public+Content/SA+Health+Internet/About+us/Department+of+Health/Public+Health+and+Clinical+Systems/Public+Health+Services/SA+Cervix+Screening+Program/SA+Cervix+Screening+Program</a> >
Fax: (08) 8226 8190	
Email: < <a href="mailto:cervixscreening@health.sa.gov.au">cervixscreening@health.sa.gov.au</a> >	
<b>Tasmanian Cervical Cancer Prevention Program</b>	
Tel: (03) 6216 4300	< <a href="http://www.dhhs.tas.gov.au/cancerscreening/TCSR">http://www.dhhs.tas.gov.au/cancerscreening/TCSR</a> >
Fax: (03) 6216 4309	
Email: < <a href="mailto:canscreen@dhhs.tas.gov.au">canscreen@dhhs.tas.gov.au</a> >	
<b>ACT Cervical Screening Program</b>	
Tel: (02) 6205 1545	< <a href="http://www.health.act.gov.au/paptest">http://www.health.act.gov.au/paptest</a> >
Fax: (02) 6205 5035	
Email: < <a href="mailto:pap.register@act.gov.au">pap.register@act.gov.au</a> >	
<b>Well Women's Cancer Screening (Cervical Screen NT)</b>	
Tel: (08) 8922 6444	< <a href="http://www.health.nt.gov.au/Womens_Health/Well_Womens_Cancer_Screening/index.aspx">http://www.health.nt.gov.au/Womens_Health/Well_Womens_Cancer_Screening/index.aspx</a> >
Fax: (08) 8922 6455	
Email: < <a href="mailto:wcpp.ths@nt.gov.au">wcpp.ths@nt.gov.au</a> >	
<b>Australian Government Department of Health</b>	
< <a href="mailto:cancerscreening@health.gov.au">cancerscreening@health.gov.au</a> >	< <a href="http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/cervical-screening-1">http://www.cancerscreening.gov.au/internet/screening/publishing.nsf/Content/cervical-screening-1</a> >
<b>Australian Institute of Health and Welfare</b>	
< <a href="mailto:screening@aihw.gov.au">screening@aihw.gov.au</a> >	< <a href="http://www.aihw.gov.au/cancer/screening/cervical/">http://www.aihw.gov.au/cancer/screening/cervical/</a> >

# Appendix C: Data sources

Data used in this report are derived from multiple sources and are summarised in Table C1.

**Table C1: Data sources for *Cervical screening in Australia 2013–2014***

Data used to monitor cervical screening in Australia	Data source
<b>Monitoring cervical screening in Australia using NCSP data</b>	
Performance Indicator 1 Participation	State and territory cervical screening registers, ABS population data; AIHW National Hospital Morbidity Database
Performance Indicator 2 Rescreening	State and territory cervical screening registers
Performance Indicator 3 Cytology	State and territory cervical screening registers
Performance Indicator 4 Histology	State and territory cervical screening registers
Performance Indicator 5 Cytology–histology correlation	State and territory cervical screening registers
<b>Monitoring cervical screening in Australia using AIHW data</b>	
Performance Indicator 6 Incidence of cervical cancer	AIHW Australian Cancer Database 2011; ABS population data
Performance Indicator 7 Mortality from cervical cancer	AIHW National Mortality Database; ABS population data
<b>Monitoring other aspects of cervical screening in Australia</b>	
Monitoring the safety of cervical screening management guidelines	State and territory cervical screening registers
Expenditure on cervical screening	AIHW Health Expenditure Database; Medicare Australia Statistics

## State and territory cervical screening registers

Data for the performance indicators participation, rescreening, cytology, histology and the cytology–histology correlation are provided by the cervical screening register in each state and territory according to definitions and data specifications in the *National cervical cancer prevention data dictionary version 1: working paper* (AIHW 2014b). These data are compiled into national figures by the AIHW to allow national monitoring of the NCSP.

The Data Quality Statement for cervical screening data appears in Appendix D, and can also be found on the AIHW website at

<<http://meteor.aihw.gov.au/content/index.phtml/itemId/610779>>.

## AIHW Australian Cancer Database

All forms of cancer, except basal and squamous cell carcinomas of the skin, are notifiable diseases in each Australian state and territory. This means there is legislation in each jurisdiction that requires hospitals, pathology laboratories and various other institutions to report all cases of cancer to their central cancer registry. An agreed subset of the data collected by these cancer registries is supplied annually to the AIHW, where they are compiled into the Australian Cancer Database (ACD). The ACD currently contains data on all cases of cancer diagnosed from 1982 to 2010 for all states and territories, and for 2011 and 2012 for all except New South Wales and the Australian Capital Territory. Incidence

projections were calculated for 2013 to 2016 (see *Cancer in Australia: an overview 2014* (AIHW 2014a) for more details).

The 2011 and 2012 incidence data for New South Wales and the Australian Capital Territory were not available for inclusion in the 2012 version of the ACD. The development of the new NSW Cancer Registry system has resulted in a delay in processing incidence data for 2011 onwards and therefore the most recent New South Wales data available for inclusion in the ACD are for 2010. As the coding of Australian Capital Territory cancer notifications is contracted to the NSW Cancer Registry, the most recent data available for the Australian Capital Territory are also for 2010.

The 2011 and 2012 incidence data for New South Wales and the Australian Capital Territory were estimated by the AIHW. These estimates were combined with the actual data supplied by the other 6 state and territory cancer registries to form the 2012 ACD. More information can be found in the Data Quality Statement for the 2012 ACD (see below). The detailed methodology by which data are estimated is available in Appendix F of *Cancer in Australia: an overview 2014* (AIHW 2014a).

Cancer reporting and registration is a dynamic process, and records in the state and territory cancer registries may be modified if new information is received. As a result, the number of cancer cases reported by the AIHW for any particular year may change slightly over time and may not always align with state and territory reporting for that same year.

Data have been analysed using the year of diagnosis of cancer. This is a more accurate reflection of incidence during a particular year than the year of registration of cancer.

The Data Quality Statement for the 2012 ACD can be found on the AIHW website at <<http://meteor.aihw.gov.au/content/index.phtml/itemId/624388>>.

## **AIHW National Mortality Database**

The AIHW National Mortality Database (NMD) contains information provided by the Registries of Births, Deaths and Marriages and the National Coronial Information System, and coded by the ABS, for deaths from 1964 to 2013. Registration of deaths is the responsibility of the state and territory registrars of births, deaths and marriages. These data are then collated and coded by the ABS and are maintained at the AIHW in the NMD.

In the NMD, the year of occurrence of the death, and the year in which the death was registered, are both provided. For the purposes of this report, actual mortality data are shown based on the year of occurrence of the death, except for the most recent year (2012) where the number of people whose death was registered is used. Previous investigation has shown that the year of death and its registration coincide for the most part. However, in some instances, deaths at the end of each calendar year may not be registered until the following year. Thus, year-of-death information for the latest available year is generally an underestimate of the actual number of deaths that occurred in that year.

In this report, deaths registered in 2011 and earlier are based on the final version of cause-of-death data; deaths registered in 2012 and 2013 are based on revised and preliminary versions, respectively, and are subject to further revision by the ABS.

The data quality statements underpinning the AIHW National Mortality Database can be found in the following ABS publications:

- Quality Declaration summary for *Deaths, Australia* (ABS cat. no. 3302.0)  
<<http://www.abs.gov.au/ausstats/abs%40.nsf/mf/3302.0>>
- Quality Declaration summary for *Causes of death, Australia* (ABS cat. no. 3303.0)  
<<http://www.abs.gov.au/ausstats/abs%40.nsf/mf/3303.0>>.

For more information on the AIHW National Mortality Database, see *Deaths data at AIHW*  
<<http://www.aihw.gov.au/deaths/aihw-deaths-data>>.

## ABS Population data

Throughout this report, population data were used to derive rates of participation in cervical screening, cervical cancer incidence and cervical cancer mortality. The population data were sourced from the ABS using the most up-to-date estimates available at the time of analysis.

To derive their estimates of the resident populations, the ABS uses the 5-yearly Census of Population and Housing data and adjusts it as follows:

- All respondents in the Census are placed in their state or territory, Statistical Local Area (SLA) and postcode of usual residence; overseas visitors are excluded.
- An adjustment is made for persons missed in the Census.
- Australians temporarily overseas on Census night are added to the usual residence Census count.

Estimated resident populations are then updated each year from the Census data, using indicators of population change, such as births, deaths and net migration. More information is available from the ABS website at <[www.abs.gov.au](http://www.abs.gov.au)>.

For the Indigenous comparisons in this report, the most recently released Indigenous experimental estimated resident populations as released by the ABS were used. Those estimates were based on the 2011 Census of Population and Housing.

## ABS population data for participation calculations

Participation rates were calculated using the average of the estimated resident female population for the 2-year, 3-year or 5-year reporting period. Denominators for participation rates were calculated using the average of the ABS estimated resident population for 2013 and 2014 for 2-year participation; the average for 2012, 2013 and 2014 for 3-year participation; and the average of the ABS estimated resident population for 2010, 2011, 2012, 2013 and 2014 for 5-year participation. These average populations were then adjusted for the estimated proportion of women who have had a hysterectomy using national hysterectomy fractions derived from the AIHW National Hospital Morbidity Database (NHMD).

Note that there is the potential for variation in published participation rates between the AIHW and state and territory reports because of different sources of estimated resident population data and/or different hysterectomy fractions used in calculations.

## Hysterectomy fractions

Hysterectomy fractions represent the proportion of women with an intact uterus (and cervix) at a particular age, and are the tool used to adjust the population for participation

calculations. This is because women who have had a hysterectomy with their cervix removed are not at risk of cervical cancer and thus do not require screening, and since substantial proportions (20–30%) of middle-aged and older women in Australia do not have an intact cervix, the population is adjusted to remove these women so that true participation in cervical screening can be more accurately estimated.

Previously, the AIHW used hysterectomy fractions derived from self-reported information on hysterectomies collected in the 2001 National Health Survey (NHS) conducted by the ABS. However, hysterectomy incidence has fallen since 2001, which means the 2001 NHS hysterectomy fractions no longer allow accurate estimates. Thus, the introduction of new performance indicators in the AIHW annual monitoring report, *Cervical screening in Australia 2008–2009* (AIHW 2011), provided an appropriate opportunity to update the method by which hysterectomy fractions were estimated.

The National Hospital Morbidity Database (NHMD) is based on summary records of patient separations, referring to episodes of care in public and private hospitals, and allows us to view relatively complete hysterectomy numbers and rates for financial years from the mid-1990s. These data were used, with projections forward and backward where required, to generate estimates of current hysterectomy prevalence for women aged 20–69. Published hysterectomy incidence trends, as well as data from the 1995, 2001 and 2004–05 NHS, were drawn on to ensure accuracy in assumptions.

The results of these combined approaches are robust hysterectomy fractions that reflect both historical and current hysterectomy trends, which can be used in the calculation of participation in cervical screening for the most recent participation data.

The fractions themselves are similar to previous estimates taken from population health surveys, with the proportion of women with an intact cervix remaining comparatively higher in most age groups – a reflection of the national trend of decreasing incidence of hysterectomies over time. These are shown next to the previously adopted hysterectomy fractions based on the 2001 NHS in Table C2.

**Table C2: National hysterectomy fractions**

Age group (years)	% of women who have not had a hysterectomy	
	Derived from NHS 2001	Modelled on NHMD
20–24	100.0	100.0
25–29	100.0	99.7
30–34	98.9	98.8
35–39	95.6	96.2
40–44	90.6	91.6
45–49	82.5	85.9
50–54	76.5	81.0
55–59	66.2	77.2
60–64	68.9	73.6
65–69	66.8	70.6

Source: AIHW analysis of the National Hospital Morbidity Database.

The incorporation of these new hysterectomy fractions, based on lower prevalence of hysterectomy procedures, into cervical screening participation calculations results in a slight

decrease in the participation rate compared with calculations using the previous hysterectomy fractions – as would be expected, since the population at risk (and therefore the population eligible for cervical screening) is larger.

## **ABS population data for incidence and mortality calculations**

Incidence and mortality rates were calculated using the estimated resident population for single-year calculations, and the aggregate of the estimated resident populations for the 5 relevant years for 5-year calculations (or 4 years in the case of incidence for different socioeconomic groups).

## **AIHW National Hospital Morbidity Database**

The AIHW National Hospital Morbidity Database (NHMD) is compiled from data supplied by the state and territory health authorities. It is a collection of electronic confidentialised summary records for episodes of admitted patient care (separations or hospitalisations) in essentially all public and private hospitals in Australia. The data include demographic, administrative and clinical information, including patient diagnoses and other procedures.

In this report, the NHMD is only used as the source of data for hysterectomy fractions, which are used to adjust ABS population data for the estimated proportion of women who have had a hysterectomy for participation calculations.

The Data Quality Statement for the AIHW NHMD 2012–13 can be found on the AIHW website at <<http://meteor.aihw.gov.au/content/index.phtml/itemId/568730>>.

## **AIHW Disease Expenditure Database**

The AIHW Disease Expenditure Database contains estimates of expenditure by disease category, age group and sex for each of the following areas of expenditure: admitted patient hospital services, out-of-hospital medical services, prescription pharmaceuticals, optometrical and dental services, community mental health services and public health cancer screening.

For more information on the AIHW Disease Expenditure Database, see *Health system expenditures on cancer and other neoplasms in Australia: 2008–09* (AIHW 2013a).

The Data Quality Statement for the Disease Expenditure Database can be found on the AIHW website at <<http://meteor.aihw.gov.au/content/index.phtml/itemId/512599>>.

## **Medicare Australia Statistics**

Medicare Australia Statistics is an online resource of the Department of Human Services, available at <[http://medicarestatistics.humanservices.gov.au/statistics/mbs\\_item.jsp](http://medicarestatistics.humanservices.gov.au/statistics/mbs_item.jsp)>.

The resource was used to source Australian Government expenditure data for Medicare Benefits Schedule (MBS) items for cervical screening (including MBS items for cervical cytology tests and Practice Incentive Program (PIP) incentive payments). These expenditure data were then combined with expenditure data sourced from the AIHW Disease Expenditure Database to produce estimates of expenditure on cervical screening in Australia.

# Appendix D: Data quality statement

## Data Quality Statement: cervical screening data 2013–2014

### Summary of key issues

- All states and territories maintain population-based cervical screening registers (also referred to as 'Pap test registers' or 'Pap smear registers') to which all cervical cytology, histology and human papillomavirus (HPV) DNA tests are reported.
- State and territory cervical screening registers were established to support the National Cervical Screening Program (NCSP) that commenced in 1991.
- The AIHW compiles cervical screening data using aggregate data supplied from state and territory cervical screening registers in order to monitor the NCSP annually.
- Some duplication may occur where the same test is reported to the cervical cytology data in 2 or more jurisdictions. AIHW is unable to identify or resolve these instances, and the level of duplication is unknown, but believed to be small.
- Cervical screening register databases change every day, adding new records and improving the quality of existing records as new information becomes available.

### Description

All states and territories have legislation that requires pathology laboratories to send all cervical tests to the relevant state or territory population-based cervical screening register.

Cervical screening programs in each state and territory interrogate their own cervical screening register in accordance with detailed data specifications to supply aggregate data annually to the AIHW. These data are compiled into the only repository of national cervical screening data, although because these are aggregate and not unit record data, these data do not exist in a database per se, and cannot be interrogated further.

Any Pap test performed in Australia, unless the woman has opted-off, will be included in NCSP data. This means that NCSP data are a virtually complete repository of all cervical screening performed in Australia.

### Institutional environment

The Australian Institute of Health and Welfare (AIHW) is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act 1987* to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent corporate Commonwealth entity established in 1987, governed by a management Board, and accountable to the Australian Parliament through the Health portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and

welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the main functions of the AIHW is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national data sets based on data from each jurisdiction, to analyse these data sets and disseminate information and statistics.

The *Australian Institute of Health and Welfare Act 1987*, in conjunction with compliance to the *Privacy Act 1988* (Cwlth), ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information, see the AIHW website, <[www.aihw.gov.au](http://www.aihw.gov.au)>.

The AIHW has been receiving cervical screening data since 1989.

### **Timeliness**

Cervical cytology data are available within about 6 months (there can be a lag of up to 6 months in the transmission of test results from pathology laboratories to cervical screening registers), and data for the previous calendar year are supplied in July each year (rescreening and correlation data lag behind, as the specifications for these require a specified period of time to pass before this can be accurately calculated).

The current cervical screening data are for cervical cytology and histology tests performed in 2013 and 2014.

### **Accessibility**

Cervical screening data are published annually in the report *Cervical screening in Australia*, available on the AIHW website, <<http://www.aihw.gov.au/cervical-cancer-screening>>, where they can be downloaded without charge. Supplementary data tables that provide more detailed data are also provided to accompany each report, and these, too, are available on the AIHW website where they can be downloaded without charge.

General enquiries about AIHW publications can be made to the Digital and Media Communications Unit on (02) 6244 1000 or via email to <[info@aihw.gov.au](mailto:info@aihw.gov.au)>.

### **Interpretability**

While many concepts in the report *Cervical screening in Australia* are easy to interpret, other concepts and statistical calculations are more complex and may be confusing to some users. All concepts are explained within the body of the report presenting these data, along with footnotes to provide further details and caveats. Appendixes C and E provide additional detail on the data sources and classifications, respectively, and Appendix F provides details on the statistical methods used.

### **Relevance**

Cervical screening data are highly relevant for monitoring trends in cervical screening participation and abnormality detection. The data are used for many purposes by policy-makers and researchers, but are supplied and analysed specifically to monitor and inform the NCSP.

**Accuracy**

All data provided by state and territory cervical screening programs, once analysed, are supplied back for verification.

Further, National Pathology Accreditation Advisory Council (NPAAC) *Performance measures for Australian laboratories reporting cervical cytology* exist which allow some cervical screening data compiled and reported by the AIHW to be compared with data that are also sourced from state and territory cervical screening registers for a different purpose.

**Coherence**

Cervical screening data are reported and published annually by the AIHW. Changes in reporting practices over time are clearly noted throughout the reports.

# Appendix E: Classifications

## Age

The data in this report are stratified by the age of the woman at the time of the specified test (for screening data), at the time of diagnosis (for cancer incidence data) or at the time of death (for cancer mortality data).

## State or territory

The state or territory reported is the one where screening took place (for the screening data), where the diagnosis was made (for the cancer incidence data) or the place of usual residence (for the cancer mortality data).

This means that it is possible for a woman to be double-counted in the screening data. If she was screened in one jurisdiction and then screened again less than 2 years later in another jurisdiction, both screens may be included in participation. This should, however, have a negligible effect on the reported participation.

## Remoteness area

The remoteness areas (RAs) divide Australia into broad geographical regions that share common characteristics of remoteness for statistical purposes. The remoteness structure divides each state and territory into several regions on the basis of their relative access to services. There are 6 classes of RA in the remoteness structure: *Major cities*, *Inner regional*, *Outer regional*, *Remote*, *Very remote* and *Migratory*. The category *Major cities* includes Australia's capital cities, except for Hobart and Darwin, which are classified as *Inner regional*. RAs are based on the Accessibility and Remoteness Index of Australia produced by the Australian Population and Migration Research Centre at the University of Adelaide.

## Remoteness area for participation calculations

For participation calculations, women were allocated to an RA using their residential postcode supplied at the time of screening. Caution is required when examining differences across RAs. First, postcodes used to allocate women may not represent their location of residence. Second, because these are based on the 2011 census, the accuracy of RA classifications diminishes due to subsequent changes in demographics. Third, some postcodes (and hence some individual women) are unable to be allocated to an RA.

## Remoteness area for incidence and mortality calculations

Each unit record in the Australian Cancer Database contains the 2006 Statistical Local Area (SLA) and 2011 Statistical Area Level 2 (SA2) but not the RA. In order to calculate the cancer incidence rates by RA, a correspondence was used to map the 2006 SLA to the 2006 RA. Similarly, the cancer mortality rates by RA were calculated by applying a correspondence from the 2011 SA2 to the 2011 RA.

## Socioeconomic group

The Index of Relative Socio-economic Disadvantage (IRSD) is one of four Socio-Economic Indexes for Areas (SEIFAs) developed by the ABS. This index is based on factors such as average household income, education levels and unemployment rates. The IRSD is not a person-based measure; rather, it is an area-based measure of socioeconomic disadvantage in which small areas of Australia are classified on a continuum from disadvantaged to affluent. This information is used as a proxy for the socioeconomic disadvantage of people living in those areas and may not be correct for each person in that area.

In this report, the first socioeconomic group (quintile 1) corresponds to geographical areas containing the 20% of the population with the greatest socioeconomic disadvantage according to the IRSD (that is, the lowest socioeconomic group), and the fifth group (quintile 5) corresponds to the 20% of the population with the least socioeconomic disadvantage (that is, the highest socioeconomic group).

### Socioeconomic group for participation calculations

For participation, women were allocated to a socioeconomic group using their residential postcode supplied at the time of screening. Caution is required when examining differences across socioeconomic groups for several reasons. First, postcodes used to allocate women may not represent their location of residence. Second, because these are based on the 2011 census, the accuracy of socioeconomic group classifications diminishes due to subsequent changes in demographics. Third, many postcodes (and hence women) are unable to be allocated to a socioeconomic group.

### Socioeconomics group for incidence and mortality calculations

Socioeconomic quintiles were assigned to cancer cases according to the IRSD of the Statistical Local Area (SLA) of residence at the time of diagnosis, and to deaths according to the Statistical Area Level 2 (SA2) of residence at the time of death.

## Classification of cervical cancer by histology

Histology codes to classify cervical cancer into histological groups are listed in Table E1.

**Table E1: Cervical cancer by histological type**

Type of cervical cancer	ICD-O-3 codes
1: Carcinoma	8010–8380, 8382–8576
1.1: Squamous cell carcinoma	8050–8078, 8083–8084
1.2: Adenocarcinoma	8140–8141, 8190–8211, 8230–8231, 8260–8263, 8382–8384, 8440–8490, 8570–8574, 8310, 8380, 8576
1.3: Adenosquamous carcinoma	8560
1.4: Other specified and unspecified carcinoma	ICD-O-3 codes for carcinoma excluding those for squamous cell carcinoma, adenocarcinoma and adenosquamous carcinoma
2: Sarcoma	8800–8811, 8840–8921, 8990–8991, 9040–9044, 9120–9133, 9540–9581, 8830, 9150
3: Other specified and unspecified malignant neoplasm	ICD-O-3 codes for cervical cancer excluding those for carcinoma and sarcoma.

# Appendix F: Statistical methods

## Crude rates

A 'crude rate' is defined as the number of events over a specified period of time (for example, a year) divided by the total population. For example, a crude cancer incidence rate is similarly defined as the number of new cases of cancer in a specified period of time divided by the population at risk. Crude mortality rates and cancer incidence rates are expressed in this report as number of deaths or new cases per 100,000 population. Crude participation rate is expressed as a percentage.

## Age-specific rates

Age-specific rates provide information on the incidence of a particular event in an age group relative to the total number of people at risk of that event in the same age group. It is calculated by dividing the number of events occurring in each specified age group by the corresponding 'at-risk' population in the same age group and then multiplying the result by a constant (for example, 100,000) to derive the rate. Age-specific rates are often expressed per 100,000 population.

## Age-standardised rates

A crude rate provides information on the number of, for example, new cases of cancer or deaths from cancer in the population at risk in a specified period. No age adjustments are made when calculating a crude rate. Since the risk of cancer is heavily dependent on age, crude rates are not suitable for looking at trends or making comparisons across groups in cancer incidence and mortality.

More meaningful comparisons can be made by the use of age-standardised rates, with such rates adjusted for age in order to facilitate comparisons between populations that have different age structures – for example, between Indigenous people and other Australians. This standardisation process effectively removes the influence of age structure on the summary rate.

There are 2 methods commonly used to adjust for age: direct and indirect standardisation. In this report, the direct standardisation approach presented by Jensen and colleagues (1991) is used. To age-standardise using the direct method, the first step is to obtain population numbers and numbers of cases (or deaths) in age ranges, typically 5-year age ranges. The next step is to multiply the age-specific population numbers for the standard population (in this case, the Australian population as at 30 June 2001) by the age-specific incidence rates (or death rates) for the population of interest (such as those in a certain socioeconomic group or those who lived in *Major cities*). The next step is to sum across the age groups and divide this sum by the total of the standard population to give an age-standardised rate for the population of interest. Finally, this is expressed per 1,000 or 100,000 as appropriate.

# Glossary

**cytology:** Cytology means 'study of cells' and, in the context of cervical screening, refers to cells from the cervix that are collected and examined for abnormalities. Cervical cytology using the Pap test is the primary screening tool of the NCSP.

**endocervical abnormality (cytology):** Defined as an endocervical result of 'E2 Atypical endocervical cells of uncertain significance', 'E3 Possible high-grade endocervical glandular lesion', 'E4 Adenocarcinoma in situ', 'E5 Adenocarcinoma in situ with possible microinvasion/invasion' or 'E6 Adenocarcinoma', regardless of the corresponding squamous result for that cytology test.

**endocervical abnormality (histology):** Defined as an endocervical result of 'HE02 Endocervical atypia', 'HE03.1 Endocervical dysplasia', 'HE03.2 Adenocarcinoma in situ', 'HE04.1 Microinvasive adenocarcinoma', 'HE04.2 Invasive adenocarcinoma', 'HE04.3 Adenosquamous carcinoma' or 'HE04.4 Carcinoma of the cervix (other)' regardless of any squamous result. Note that HE04.3 Adenosquamous carcinoma and HE04.4 Carcinoma of the cervix (other) are included as endocervical abnormalities for data reporting purposes, but that the former is not solely of endocervical origin, and the latter category comprises rarer carcinomas of other epithelial origin.

**high-grade abnormality detection rate:** The number of women per 1,000 screened with a histologically confirmed high-grade abnormality (cervical intraepithelial neoplasia (CIN) that has been graded as 'moderate' (CIN II) or 'severe' (CIN III), or for which the grade has not been specified; endocervical dysplasia; or adenocarcinoma in situ).

**high-risk HPV:** High-risk HPV types are those that are associated with the development of cervical cancer. Currently 15 high-risk types of HPV are recognised. HPV types 16, 18, and 45 are most predominantly associated with cervical cancer, with HPV types 16 and 18 detected in 70–80% of cases of cervical cancer in Australia (Brotherton 2008).

**histology:** The examination of tissue from the cervix through a microscope, and is the primary diagnostic tool of the NCSP.

**HPV:** Human papillomavirus, a virus that affects both males and females. There are around 100 types of HPV, with around 40 types known as genital HPV that are contracted through sexual contact. Persistent infection with high-risk HPV types can lead to cervical cancer, whereas infection with low-risk types of HPV can cause genital warts.

**negative cytology:** Defined as a cervical cytology test where the squamous result is 'S1 Negative' and the endocervical result is either 'E0 No endocervical component' or 'E1 Negative'.

**no endocervical component:** A cytology test with no endocervical component is defined as a cervical cytology test with any squamous result and an endocervical result of 'E0 No endocervical component', meaning that no endocervical cells are present in the sample, and thus only the squamous cells in the sample can be assessed for the presence of abnormalities or cancer.

**Pap test:** Papanicolaou smear, a procedure to detect cancer and pre-cancerous conditions of the female genital tract, which is the screening test of the National Cervical Screening Program. During a Pap test, cells are collected from the transformation zone of the cervix – the area of the cervix where the squamous cells from the outer opening of the cervix and

glandular cells from the endocervical canal meet. This is the site where most cervical abnormalities and cancers are detected. For conventional cytology, these cells are transferred onto a slide, and sent to a pathology laboratory for assessment. Collected cells are then examined under a microscope to look for abnormalities.

**National HPV Vaccination Program:** This program was first introduced on 1 April 2007 as a program for females. At its inception, it comprised an ongoing program for females aged 12–13 administered through schools, as well as a catch-up program for females aged 13–26 between 2007 and 2009, with females aged 13–17 vaccinated through schools and females aged 18–26 vaccinated through the community. From February 2013, the current school-based program for females aged 12–13 was extended to males aged 12–13, with a catch-up program in 2013 and 2014 for males aged 14–15.

**screening:** The application of a test to a population which has no overt signs or symptoms of the disease in question, to detect disease at a stage when treatment is more effective. The screening test is used to identify people who require further investigation to determine the presence or absence of disease and is not primarily a diagnostic test.

The purpose of screening an asymptomatic individual is to detect early evidence of an abnormality or abnormalities, such as pre-malignant changes (for example, by Pap test) or early invasive malignancy (for example, by mammography), in order to recommend preventive strategies or treatment that will provide a better health outcome than if the disease were diagnosed at a later stage.

**squamous abnormality (cytology):** Defined as a squamous result of 'S2 Possible low-grade squamous intraepithelial lesion', 'S3 Low-grade squamous intraepithelial lesion', 'S4 Possible high-grade squamous intraepithelial lesion', 'S5 High-grade squamous intraepithelial lesion', 'S6 High-grade intraepithelial lesion with possible microinvasion/invasion' or 'S7 Squamous cell carcinoma', regardless of the corresponding endocervical result for that cytology test.

**squamous abnormality (histology):** Defined as a squamous result of 'HS02 Low-grade squamous abnormality', 'HS03.1 Cervical intraepithelial neoplasia (CIN) not otherwise specified (NOS)', 'HS03.2 CIN II', 'HS03.3 CIN III', 'HS04.1 Microinvasive squamous cell carcinoma' or 'HS04.2 Invasive squamous cell carcinoma', regardless of any endocervical result.

**unsatisfactory cytology:** Defined as a cervical cytology test where the squamous result is 'SU Unsatisfactory' and the endocervical result is 'EU Unsatisfactory' or where the squamous result is 'SU Unsatisfactory' and the endocervical result is either 'E0 No endocervical component' or 'E1 Negative'. While not a true result per se, 'unsatisfactory cytology' means that, due to the unsatisfactory nature of the cells sampled, the pathologist is unable to determine a clear result. This may be due to either too few or too many cells, or the presence of blood or other factors obscuring the cells, or to poor staining or preservation. The absence of an endocervical component is not considered sufficient grounds to deem a cervical cytology sample unsatisfactory (NPAAC 2006).

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## Related publications

*Cervical screening in Australia* is an annual report.

This and previous *Cervical screening in Australia* reports and their supplementary data tables are available at <<http://www.aihw.gov.au/publications/cervical-screening>>.

You may also be interested in the following related publications:

AIHW (Australian Institute of Health and Welfare) 2014. National cervical cancer prevention data dictionary version 1: working paper. Cancer series no. 88. Cat. no. CAN 85. Canberra: AIHW.

AIHW 2013. Report on monitoring activities of the National Cervical Screening Program Safety Monitoring Committee. Cancer series 80. Cat. no. CAN 77. Canberra: AIHW.

AIHW 2015. National Bowel Cancer Screening Program: monitoring report 2013–14. Cancer series 94. Cat. no. CAN 92. Canberra: AIHW.

AIHW 2014. Analysis of bowel cancer outcomes for the National Bowel Cancer Screening Program. Cat. no. CAN 87. Canberra: AIHW.

AIHW 2015. BreastScreen Australia monitoring report 2012–2013. Cancer series no. 95. Cat. no. CAN 93. Canberra: AIHW.

AIHW 2014. Cancer in Australia: an overview 2014. Cancer series no. 90. Cat. no. CAN 88. Canberra: AIHW.

AIHW 2016. Australian Cancer Incidence and Mortality (ACIM) books: cervical cancer. Canberra: AIHW. Viewed 28 March 2016, <<http://www.aihw.gov.au/acim-books>>.

## Supplementary online data tables

Additional tables are available as online Excel tables at <[www.aihw.gov.au](http://www.aihw.gov.au)>, under the 'Additional material' tab for this report. These tables contain detailed statistics for many of the tables and figures presented in summary form in both the body of the report and in Appendix A. Supplementary data tables have the prefix 'S' (for example, 'Table S1.1').

There are 7 Excel files, one for each performance indicator:

- Indicator 1 Participation
- Indicator 2 Rescreening
- Indicator 3 Cytology
- Indicator 4 Histology
- Indicator 5 Cytology–histology correlation
- Indicator 6 Incidence
- Indicator 7 Mortality

Cervical screening in Australia 2013–2014 presents the latest national statistics monitoring the National Cervical Screening Program, which aims to reduce incidence, morbidity and mortality from cervical cancer. Around 57% of women in the target age group of 20–69 took part in the program, with more than 3.8 million women screening in 2013 and 2014.

Cervical cancer incidence for women of all ages remains at an historical low of 7 new cases per 100,000 women, and deaths are also low, historically and by international standards, at 2 deaths per 100,000 women.