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North Metropolitan Health Service
WA Cervical Cancer Prevention Program

Cervical Screening Registry (CSR) of Western Australia

2013 Statistical Report

WA Cervical Cancer Prevention Program

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Enquiries or comments should be addressed to:

WA Cervical Cancer Prevention Program
2nd Floor Eastpoint Plaza
233 Adelaide Terrace
Perth WA 6000
Phone (08) 9323 6788
Fax (08) 9323 6711
Email cervicalscreening@health.wa.gov.au

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Acknowledgements

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Special thanks must also be reserved for the women of WA.

Summary

This report is the 13th annual statistical report of the Cervical Screening Registry (CSR) of WA. The main features of the following statistical report are summarised below. Any slight variation from previous statistical reports in the proportion of women screened is due to population adjustments, system enhancements and standardisation of reporting parameters i.e. exclusion of women who appear to have had a hysterectomy.

The target population for the WA Cervical Cancer Prevention Program (WACCPP) is women aged 20 to 69 years. All data in this report is based on this age range, unless specified otherwise. For the purposes of comparison in this report, the retrospective time period utilised is the years 1991-2013.

Incidence and mortality[1]

- The number of new cases of cervical cancer in WA among women aged 20 to 69 years has decreased from 84 new cases in 2012 to 73 in 2013. The trend for 1991 to 2013 has been fluctuating, with the highest point of 100 new cases in 1994 to the lowest point of 46 new cases in 1997.
- Cervical cancer mortality in WA has also fluctuated for the years 1991 to 2013, with the highest point of 26 deaths in 1993 and the lowest point of 10 deaths in 2008.
- Since 1991, age-standardised incidence and mortality rates have fluctuated in both metropolitan and country target populations of WA.
- Incidence rates of cervical cancer in WA were 2.2 times higher and mortality rates 5.6 times higher for Aboriginal women compared with non-Aboriginal women for the years 2004-2013.

Participation

- In 2013, 227,462 women in WA participated in cervical screening. This represented an increase of 8,931 from 2012 (218,531). The trend for numbers of women screening in previous years has been fluctuating, with the highest point of 227,462 in 2013 to the lowest point of 192,721 in 1996.
- The percentage of women in the target population of WA who had been screened in a two-year period marginally decreased from 55.5% in 2011-12 to 55.4% in 2012-13.
- In the 2012-13 period, women living in metropolitan areas of WA had a cervical screening participation rate 3.3% above that of their country counterparts. Women aged 20-24 years were the exception to this trend where women living in country areas of WA had a cervical screening participation rate 4.0% above women living in metropolitan areas of WA.
- There has been a general declining trend in cervical screening participation rates for women aged less than 60 for the years 1996-97 to 2012-13.

[1] *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015).*

Early re-screening

- The National Policy states that routine screening with Pap smears should be carried out every **two** years for women who have no symptoms or history suggestive of cervical cancer. Of a cohort of women screened in February 2012 who had a normal Pap smear result, 10.5% had a subsequent Pap smear within 21 months. The previous year's figure was 10.9%.

Abnormalities

- In 2013, 89.9% of Pap smears were reported as normal, 6.4% indicated the presence of a possible or definite low-grade abnormality, and 1.6% were reported as either possible or definite high-grade abnormalities. These figures are consistent with previous years.
- Both low and high-grade abnormality rates declined with age and high-grade abnormality rates were highest for women aged between 20-29 years than any other age group in 2013. This is consistent with figures from 2012.

Follow-up

- In 2013, 96,710 reminder letters were sent to women following a normal Pap smear result. Of these women 30.9% had a follow-up Pap smear within three months of the reminder letter being sent.
- In 2013, 6,809 follow-up letters pertaining to unsatisfactory and abnormal Pap smear results were sent to providers and 3,910 letters were sent to women.

1. Background

The Western Australian Cervical Cancer Prevention Program (WACCPP) was established in 1992 as part of the *Organised Approach to Preventing Cancer of the Cervix,* a joint initiative of the Australian and state and territory governments to provide better protection against cervical cancer. In 1995, this organised approach was renamed the National Cervical Screening Program (NCSP).

The Cervical Screening Registry (CSR)[2] is an integral component of the WACCPP. It compiles and maintains the Register - a central confidential database of Pap smear and other cervical screening test results, including cervical biopsy and human papillomavirus (HPV) DNA test results, from women screened in WA. The CSR has been operational since late 1994.

Participation in the Register is voluntary and the confidentiality of data held is governed by legislation (*Health (Cervical Screening Register) Regulations 1991(WA))*. Health care providers are encouraged to inform women about the CSR and if the woman does not object, the pathology laboratory will routinely forward her cervical test results (together with basic identifying information) to the CSR. Provision is made for women to remove their name from the Register at any time by contacting the CSR.

As at 31 December 2013, there were approximately 4.77 million records (i.e. Pap smears, biopsies and HPV DNA test results) in the Register. The quality of information received by the CSR is dependent on all laboratories providing accurate data by electronic transmission.

The CSR has produced statistical reports since 1996. The data presented in this report refers to the 2013 calendar year unless otherwise specified. Seventeen overlapping two-year calendar time periods are utilised for CSR trend data (1996-97, 1997-98, 1998-99,1999-2000, 2000-01, 2001-02, 2002-03, 2003-04, 2004-05, 2005-06, 2006-07, 2007-08, 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13). Data sourced from the WA Cancer Registry of the Department of Health includes cervical cancer incidence and mortality rates from 1991-2013.

[2] *The Cervical Cytology Registry was renamed the Cervical Screening Registry, following amendments to the Health (Cervical Screening Register) Regulations 1991 (WA) in May 2014.*

2. Functions of the CSR

- To act as a ‘safety net’, providing follow-up and reminder letters to women and/or health care providers when Pap smears and other cervical investigations are overdue.
- To provide a linked record of women’s previous cervical screening test results in order to assist pathologists and cytologists in the reporting of current test results and to assist clinicians in the management of abnormalities detected in the screening process.
- To provide feedback to pathology laboratories about cytology and histology results to assist with quality control.
- To provide epidemiological data to enable monitoring of participation rates in cervical screening and trends in abnormalities.
- To provide data for use in approved research into cervical cancer, its alleviation and prevention.
- To contribute to the policy requirements of the National Pathology Accreditation Advisory Council (NPAAC) and the NCSP.
- To assist with planning and evaluation of health promotion and recruitment strategies for the WACCPP.

3. Cervical cancer in WA

The aim of the WACCPP is to improve the health and wellbeing of Western Australian women by reducing incidence and mortality from cervical cancer through the implementation of population based cervical screening strategies that enhance women's participation in cervical screening.

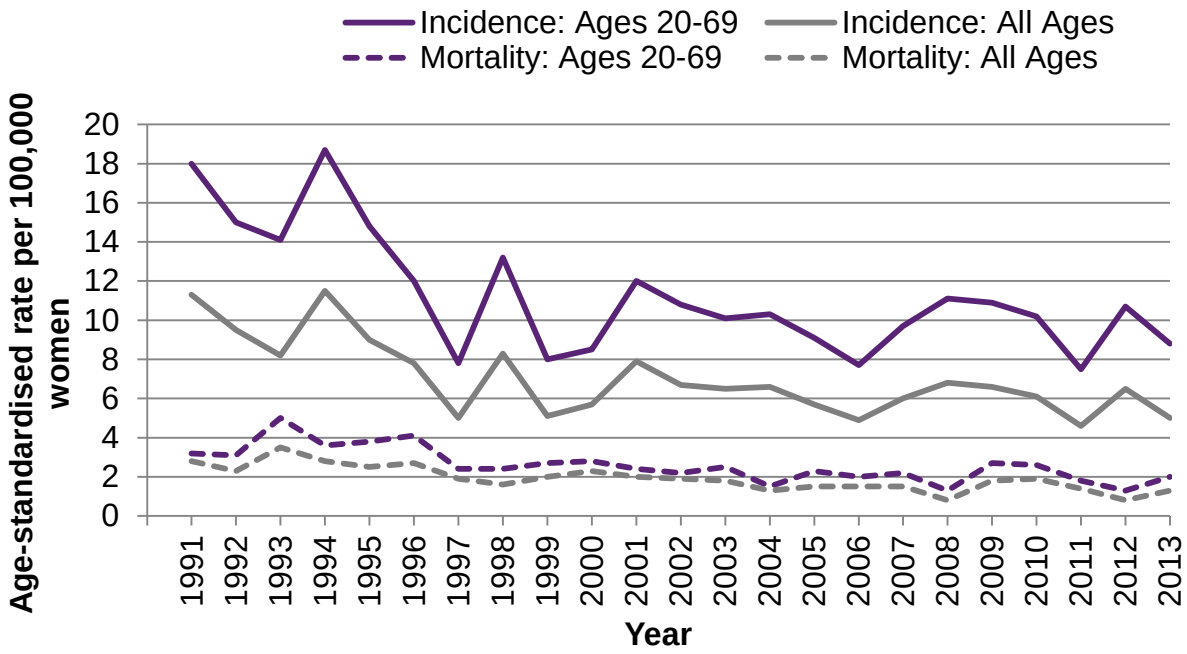
As seen in Figure 3.1 there has been a general decline in the age-standardised incidence rate of cervical cancer since 1991, when reliable WA Cancer Registry data became available. The peak seen in 1994 aligned with the period in which the CSR began receiving data from all pathology laboratories in WA. Subsequently, the spike seen in 1998 coincided with a national media campaign, which effectively increased the number of women participating in cervical screening. The declining incidence rate apparent in 1999 corresponded with a decline in women screened in the same period. Caution should be exercised when interpreting these results as there are many factors contributing to the observed incidence rates of cervical cancer.

The age-standardised cervical cancer mortality rate has fluctuated, but the general trend has been downwards. The highest point was observed in 1993 when the mortality rate reached 5.0 per 100,000 (26 deaths) for women in the target age group 20-69 years and 3.5 per 100,000 (37 deaths) for women of all ages.

Mortality was lowest in 2008 at 1.3 per 100,000 (10 deaths) for women in the target age group 20-69 years and 0.8 per 100,000 (11 deaths) for women of all ages. It should be noted that in 2012, the mortality rate was 1.3 per 100,000 (11 deaths) for women in the target age group 20-69 years and 0.8 per 100,000 (14 deaths) for women of all ages. Rates were therefore the same as those seen in 2008; although the number of deaths was slightly higher.

Note: The number of cases of cervical cancer and the number of deaths from cervical cancer in WA are relatively small, especially in rural areas, and so even small changes in the numbers can lead to marked fluctuations in the rates.

Figure 3.1 Age-standardised cervical cancer incidence and mortality rates WA 1991-2013

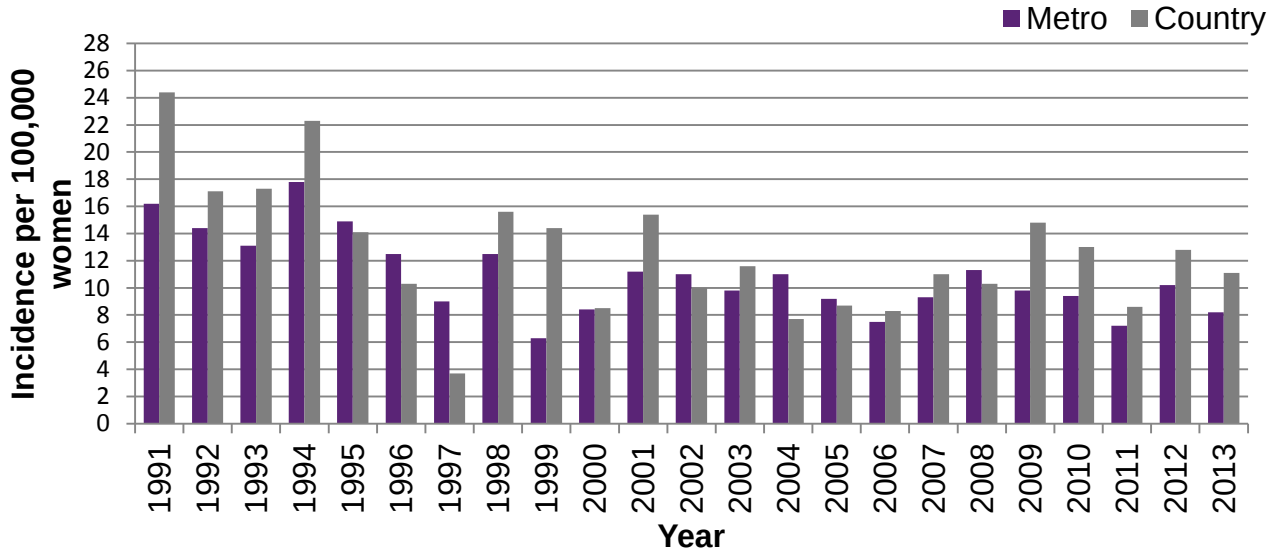


Note: *Rates are expressed per 100,000 women and age-standardised to the World population (Segi 1960).*

Source: *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015). ASRs: W1960.*

Figure 3.2 indicates women from country areas were more likely to experience higher age-standardised incidence rates of cervical cancer than their metropolitan counterparts. It should be noted again that the actual number of cases is small, and small changes in these numbers can lead to large fluctuations in age-standardised rates.

Figure 3.2 Age-standardised incidence rates of cervical cancer in women aged 20-69 years (metropolitan and country areas of WA) 1991-2013

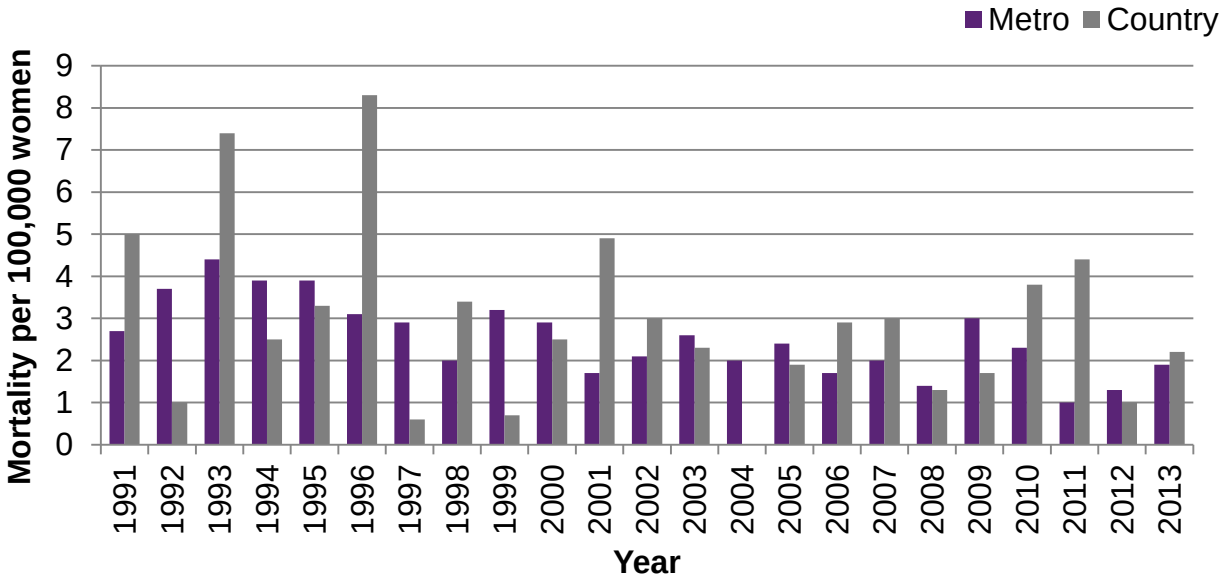


Note: *Rates are expressed per 100,000 women and age-standardised to the World population (Segi 1960).*

Source: *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015). ASR: W1960.*

Age-standardised mortality rates from cervical cancer for both metropolitan and country target populations have generally fluctuated since 1991(Figure 3.3). These fluctuations were particularly apparent in country areas.

Figure 3.3 Age-standardised mortality rates from cervical cancer in women aged 20-69 years (metropolitan and country areas of WA) 1991-2013

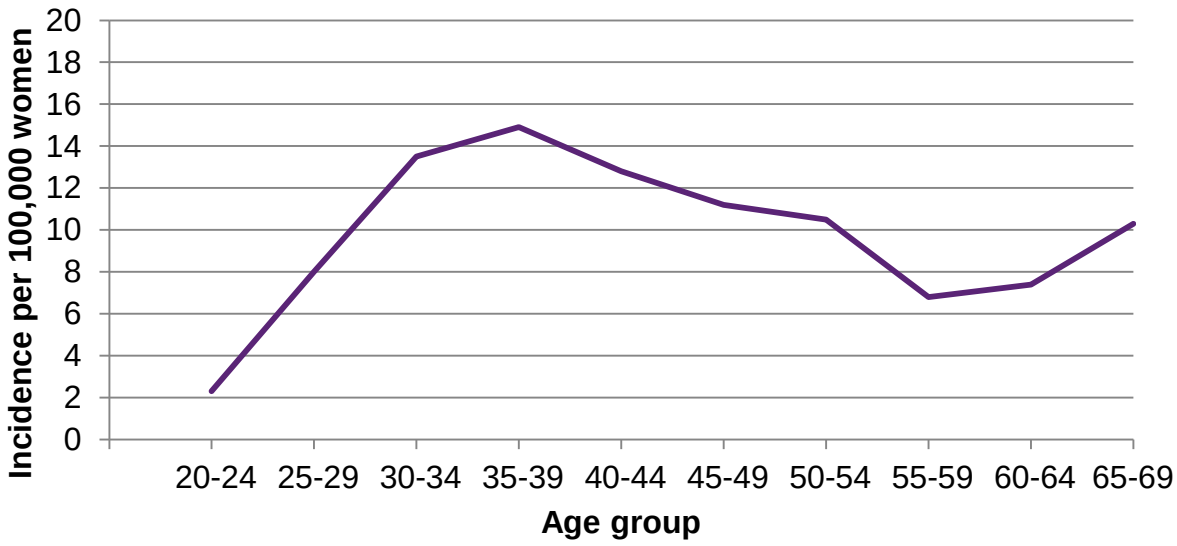


Note: *Rates are expressed per 100,000 women and age-standardised to the World population (Segi 1960).*

Source: *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015). ASR: W1960.*

Figures for the years 1991-2013 were pooled for examination of incidence (Figure 3.4) and mortality (Figure 3.5) rates by age. From Figure 3.4 it is evident that the age-specific incidence rate of cervical cancer was highest among women aged 35-39 years for the years 2004-2013.

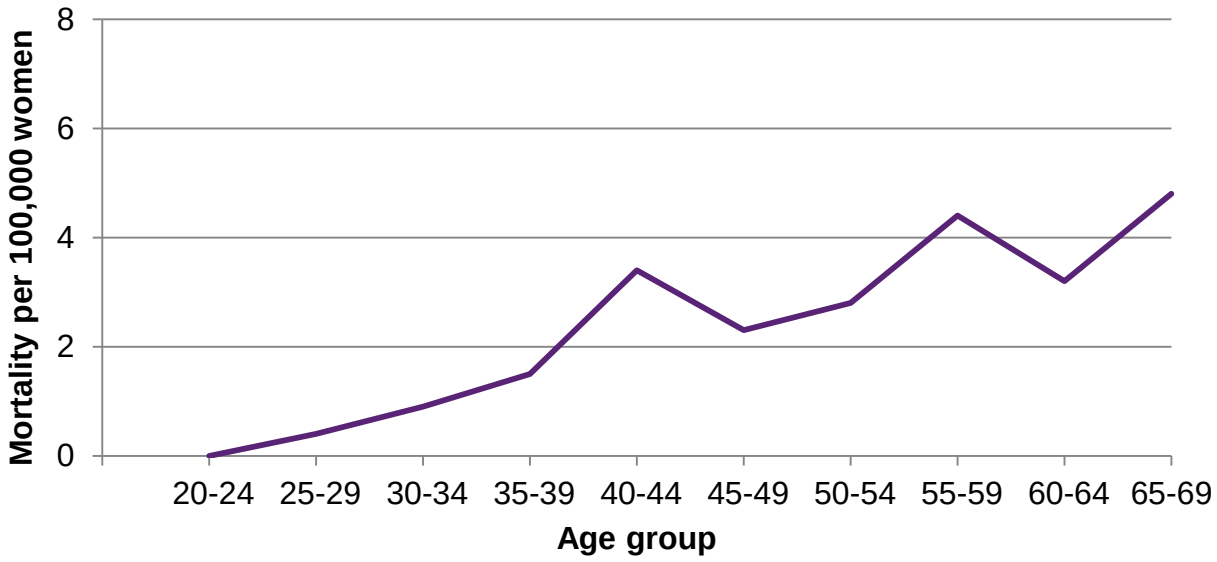
Figure 3.4 Age-specific incidence rates of cervical cancer in women aged 20-69 years WA 2004-2013



Note: *Rates are expressed per 100,000 women.*
Source: *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015)*

Figure 3.5 shows that amongst the target population of women (aged 20-69 years) the highest age-specific mortality rate was in women aged 65-69 years (4.8 per 100,000 women). This age group accounted for 20 deaths out of the total 155 deaths in the target population for WA for the years 2004-2013.

Figure 3.5 Age-specific mortality rates from cervical cancer in women aged 20-69 years WA 2004-2013



Note: *Rates are expressed per 100,000 women.*
Source: *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015)*

In WA, cervical cancer incidence rates were 2.2 times higher and mortality rates 5.6 times higher for Aboriginal women aged 20-69 years compared with non-Aboriginal women, for the years 2004-2013[3]. The WACCPP has a dedicated Aboriginal Health Promotion Officer who implements culturally safe and appropriate strategies to improve cervical screening uptake amongst Aboriginal women of WA.

[3] *WA Cancer Registry – Health Data Collections, Department of Health WA (unpublished data current as at March 2015).*

4. Participation

The National Cervical Screening Program Policy has been in place since 1991 and provides consensus guidelines on which women need screening and how often Pap smears should be taken. It states:

*Routine screening with Pap smears should be carried out every **two** years for women who have no symptoms or history suggestive of cervical pathology.*

All women who have ever been sexually active should commence having Pap smears between the ages of 18 and 20, or one or two years after first 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.

This policy only applies to women without symptoms that could be due to cervical pathology. Women with a past history of high-grade cervical lesions, or who are being followed-up for a previous abnormal Pap smear, should be managed in accordance with the National Health and Medical Research Council (NHMRC) guidelines[4]. It is important to note that this publication was issued by the NHMRC **over five years ago**. New guidelines are currently in development with an expected release date of 2017.

[4] *Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen detected abnormalities*, NHMRC 2005.

4.1 Number of tests and women screened per year

A total of 236,312 cytology tests (Pap smears) were performed in 2013 with 227,462 women screened during the year (Table 4.1).

Table 4.1 Number of tests performed and the number of individual women screened 1996-2013

Year	Number of tests performed	Number of women screened
1996	208,119	192,721
1997	209,298	194,953
1998	222,972	209,774
1999	208,222	196,308
2000	208,468	197,444
2001	204,475	193,857
2002	207,209	195,486
2003	209,781	197,643
2004	203,965	193,038
2005	214,386	203,800
2006	209,345	199,112
2007	212,589	204,497
2008	209,079	201,146
2009	225,480	216,791
2010	213,352	205,360
2011	221,463	213,746
2012	227,148	218,531
2013	236,312	227,462

Note: Includes all women with an address in WA at the time of the Pap smear. Excludes women's records after the date of hysterectomy or from the initial vault smear, i.e. post-hysterectomy.

The variation in the numbers from year to year highlights difficulties around sustaining and increasing screening participation.

Several factors influence the number of tests performed and recorded in the Register. Firstly, this data is dependent on medical and laboratory data management and transmission to the CSR. In addition, women who choose not to have their results available to the CSR (opt off) are omitted from these figures. In 2013, the proportion of women whose identifying information was withdrawn from the Register, at their request, was <0.1% (15 women).

It must also be acknowledged that there are likely to be minor inaccuracies in the number of women screened according to the CSR due to incomplete record linkage, as there is no truly unique identifier for each woman available to the CSR at this time.

4.2 Proportion of target population screened

The proportion of the target population screened is measured by the number of women having a Pap smear in a two-year period.

The denominators for the following percentages are based on the Australian Bureau of Statistics (ABS) *Estimated Resident Population (ERP) - Female - by Postal Areas in WA by five-year age groups*, adjusted for hysterectomy using the ABS *2001 National Health Survey* for 1996-2006 ERP and the Australian Institute of Health and Welfare (AIHW) *2011 National Hysterectomy Fractions* derived from the National Hospital Morbidity Database for 2007-2013 ERP. The proportion of women screened in the two-year periods between 1996-97 and 2012-13 was calculated using an average of yearly ERP data.

Table 4.2 Estimated percentage of women with an intact uterus who had at least one Pap smear for the two-year periods between 1996-1997 and 2012-2013: comparison of WA with Australia as a whole

Year	Percentage of women screened	
	WA	Australia
1996-1997	62.9	61.2
1997-1998	64.2	62.8
1998-1999	63.8	63.7
1999-2000	61.5	61.7
2000-2001	61.4	61.4
2001-2002	60.8	61.4
2002-2003	60.5	61.1
2003-2004	59.6	61.1
2004-2005	60.3	59.4
2005-2006	60.5	59.3
2006-2007	58.5	60.1
2007-2008	57.9	59.8
2008-2009	58.2	59.3
2009-2010	57.3	58.2
2010-2011	55.6	57.3
2011-2012	55.5	57.7
2012-2013	55.4	58.2

Note: Includes all women aged between 20 and 69 years, with an address in WA at the time of the Pap smear.

Source: National figures - AIHW Cervical Screening in Australia 2012-13

WA screening participation rates are comparable with national rates (Table 4.2). In the period 2012-13 the participation rate in WA was lower (55.4%) than the national cervical screening rate of 58.2%[5]. Attention to identified barriers and strengthening of regional collaborative working relationships is required to ensure continual improvement of the uptake of cervical screening in WA.

In keeping with the results seen in the number of women screened (Table 4.1), the 1997-98 period witnessed a peak in the rate of participation of WA women in the target age group (20-69 years) corresponding with the 1998 National Media Campaign (Table 4.2). Between the 1996-97 period and 2012-13 period, cervical screening participation rates in WA have experienced a decline of 7.5%.

The overall participation rates for cervical screening have marginally decreased from the two-year period 2011-12 to the period 2012-13 (Table 4.3). Participation rates for 2012-13 notably differed in women aged 20-24 years (45.6%) and 65-69 years (47.6%), with both having markedly lower rates compared to the other age groups. Women aged 45-49 years had the highest rate (61.3%). The participation rates among women under the age of 60 years has generally declined from 1996-97 to 2012-13.

There are many possible reasons for fluctuations in participation rates over time. One factor may be the implementation of improvements in record linkage procedures in the CSR. These allow more accurate tracking of women's individual screening over time and may lead to an apparent decrease in recorded participation rates.

[5] *Caution should be used when interpreting WA participation rates against national rates. WA participation rates are based on all women with an address in WA at the time of the Pap smear. However, the majority of states and territories (except Victoria and Australian Capital Territory) provide participation rates to the AIHW based on all women who were screened in the particular state or territory. Hence, it is acknowledged that this may lead to an over-estimation of numbers of women screened because of double counting of some women between states.*

Table 4.3 **Estimated percentage of women by age group with an intact uterus who had at least one Pap smear for the two-year periods between 1996-1997 and 2012-2013**

Age Group	Percentage of women screened by age																% change 1996-97 to 2012-13
	1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	
20-24	55.9	55.4	54.1	50.0	50.7	51.8	50.5	49.7	50.7	51.0	51.9	51.9	50.9	49.0	47.2	46.6	45.6	-10.3
25-29	67.0	67.7	66.5	62.1	61.7	61.3	59.9	58.5	58.1	58.1	59.1	58.1	57.4	55.9	53.6	53.1	52.6	-14.4
30-34	69.0	70.4	70.0	66.9	66.0	64.5	63.9	63.0	63.0	62.9	62.1	60.7	60.8	59.4	57.1	56.8	56.5	-12.5
35-39	68.1	69.8	69.2	66.6	66.2	64.6	64.4	63.4	64.4	64.4	63.0	62.4	62.6	61.2	58.8	58.3	58.7	-9.4
40-44	65.6	66.5	66.6	65.2	65.0	64.1	64.4	63.1	63.9	64.3	62.4	61.6	62.6	61.5	59.5	59.2	59.0	-6.6
45-49	64.3	65.6	65.6	64.4	64.4	63.9	64.8	64.3	65.3	65.4	62.6	61.8	62.4	62.2	60.6	60.8	61.3	-3.0
50-54	62.5	62.3	62.7	62.8	62.1	61.4	61.5	61.0	62.2	62.6	59.0	58.9	60.3	60.1	59.0	59.6	59.5	-3.0
55-59	59.4	63.0	63.2	62.6	62.8	62.6	63.0	62.8	64.4	65.2	56.2	55.6	56.5	56.9	56.5	56.6	56.9	-2.5
60-64	51.5	54.7	55.8	55.5	55.4	54.1	54.0	53.6	54.0	54.4	51.1	51.8	53.4	53.8	53.4	54.5	55.0	3.5
65-69	40.5	44.8	46.5	45.9	46.6	46.7	47.5	47.4	48.4	49.1	45.7	45.1	45.3	45.6	45.8	46.9	47.6	7.1
20-69	**62.9**	**64.2**	**63.8**	**61.5**	**61.4**	**60.8**	**60.5**	**59.6**	**60.3**	**60.5**	**58.5**	**57.9**	**58.2**	**57.3**	**55.6**	**55.5**	**55.4**	**-7.5**

Note: Includes all women aged between 20 and 69 years, with an address in WA at the time of the Pap smear.

The following table shows the estimated percentage of eligible women who had at least one Pap smear during a two-year period compared with a three-year period.

Table 4.4 Estimated percentage of women by age group with an intact uterus who had at least one Pap smear for the two-year period 2012-13 and the three-year period 2011-13

Age group	Percentage of women screened	
	2012-2013	2011-2013
20 – 24	45.6	59.7
25 – 29	52.6	66.5
30 – 34	56.5	70.3
35 – 39	58.7	72.0
40 – 44	59.0	71.6
45 – 49	61.3	73.0
50 – 54	59.5	69.7
55 – 59	56.9	65.4
60 – 64	55.0	62.2
65 – 69	47.6	51.9
20 – 69	**55.4**	**67.2**

Note: Includes all women aged between 20 and 69 years, with an address in WA at the time of the Pap smear.

Policies for screening intervals vary internationally, with many countries having a three-year screening interval. Australian policy currently advises a two-year screening cycle for women who have had a negative Pap smear and have no symptoms or history suggestive of cervical pathology[6]. While the NHMRC (9 June 2005) acknowledged the importance of the NCSP in maintaining the health of all Australian women, it was recommended that the screening interval in Australia be reviewed as soon as possible to ensure the NCSP is consistent with international best practice. In addition, there is a recognised need for the development of health systems to identify and actively target two important groups. They consist of women who have never been screened and women who have not been screened in more than four years (under-screened), as defined by the Practice Incentives Program (PIP). The vast majority of cervical cancer in Australia occurs among these groups of women.

It can be seen from Table 4.4 that a high proportion of women aged 25 to 59 years were screened at least once in the three-year period 2011-13. This is consistent with previous years. The lowest participation was observed in women below the age of 25 years during the two-year period 2012-2013. Women over 65 years of age appeared to have a low level of participation in both the two-year and three-year periods.

[6] *National policy of the NCSP.*

4.2.1 Practice Incentives Program (PIP)

Implementation of the 2001 Federal Cervical Screening Budget Initiative, which built on the existing PIP aimed at supporting general practice activities, attempted to contribute to addressing the issue of under-screened women through the establishment of a Cervical Screening Incentive. This individual incentive aims to encourage general practitioners (GPs) to screen under-screened women; that is women aged between 20 and 69 years who have not had a Pap smear in the last four years.

In November 2003, a system was introduced whereby a GP could submit a PIP Data Request Form and receive from the CSR a list of women who have not had a Pap smear in the past four years and for whom they were the last known health care provider.

The main goals of this project are to improve participation rates in cervical screening among under-screened women, to provide support to GPs in the community, and to raise awareness and the profile of the WACCPP's services.

The number of women identified on PIP Cervical Screening Incentive lists for GPs for the years 2003 to 2013 is shown in Table 4.5. Note that the first lists were sent in November 2003. Also shown is the number and percentage of women who were followed up within three months of their name being sent to a GP. Fluctuations observed can be directly attributed to the number of PIP requests received by the CSR each year. The high number of women identified for the PIP in 2004 can be attributed to increased awareness of this initiative at the outset of the inclusion of the Cervical Screening Incentive. Another factor likely to have impacted the follow-up rates presented in Table 4.5 was the delivery of health promotion and recruitment campaigns, including letter strategies that targeted under-screened women.

Table 4.5 Outcome of PIP lists sent by the CSR during 2003-2013

Year	Number of PIP requests	Number of women identified	Follow-up within three months of letter	Percentage
2003	49	2,186	116	5.3
2004	276	13,832	661	4.8
2005	28	1,042	59	5.7
2006	16	601	31	5.2
2007	13	529	39	7.4
2008	40	1,338	74	5.5
2009	45	2,397	93	3.9
2010	26	650	29	4.5
2011	23	901	32	3.6
2012	10	206	7	3.4
2013	33	1,441	65	4.5

4.3 Comparison of metropolitan and country participation

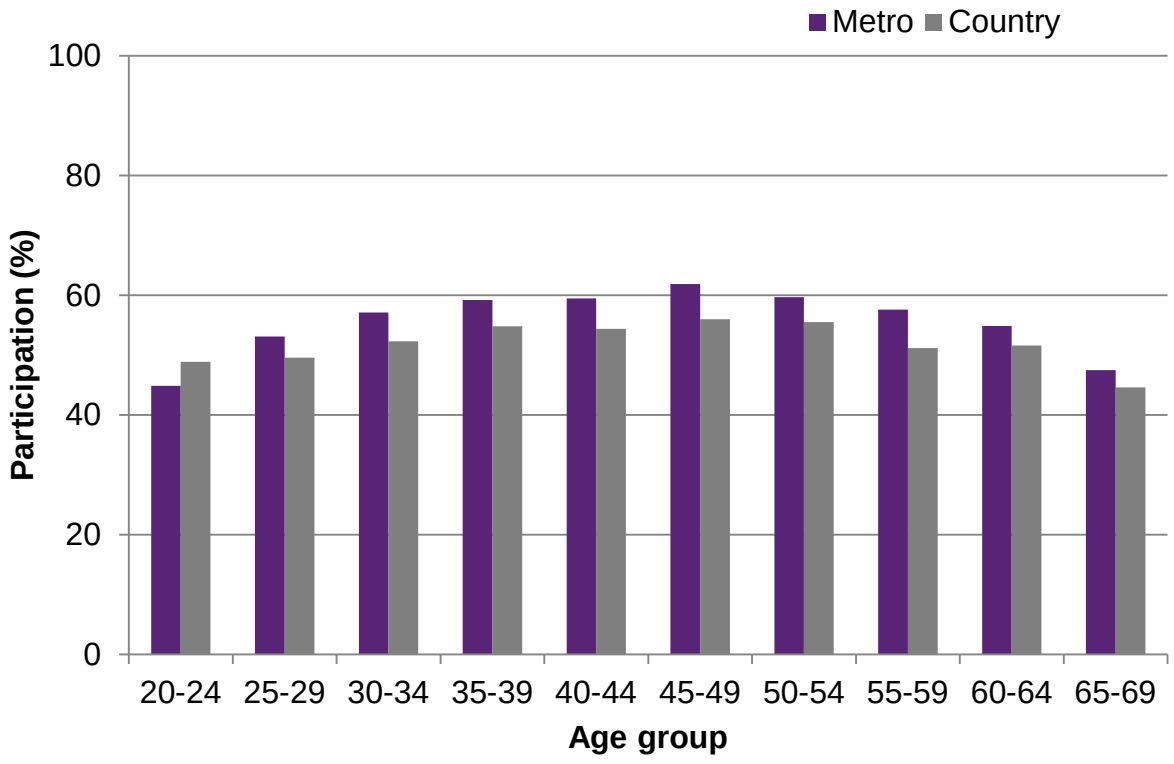
Figure 4.1 and Table 4.6 compare the screening coverage for women living in the Perth metropolitan area with those living in country WA.

The denominators for these percentages are as previously described in Section 4.2. Classification as metropolitan or country was based on information provided by the Epidemiology Branch, Department of Health WA[7].

Table 4.6 (overleaf) demonstrates that for all seventeen two-year periods, the proportion of women aged 20-69 years living in country WA, who had been screened within two years, was lower than for women living in the Perth metropolitan area. This difference between metropolitan and country areas reached an all-time high in the 2009-2010 period, where a 3.4% difference in participation rates was reported.

The exception to this was women in the 20-24 years age group, who experienced a higher rate of cervical screening participation in country areas for all seventeen two-year periods.

Figure 4.1 Estimated percentage of women by age group with an intact uterus who had at least one Pap smear for the two-year period 2012-2013: comparison of the Perth metropolitan area with country WA



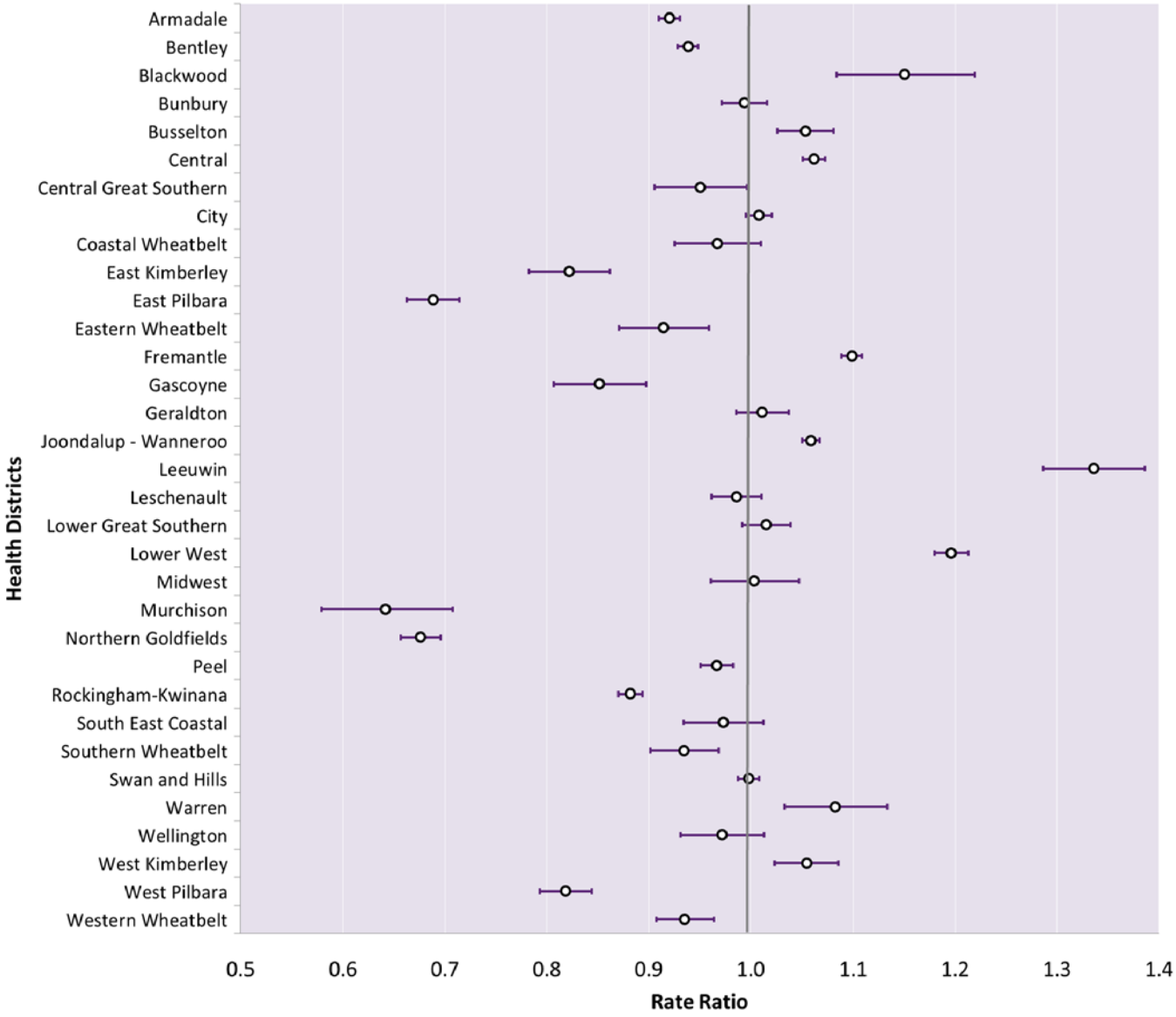
[7] *Postcode Allocation, Epidemiology, Health Information Centre, Department of Health WA.*

Table 4.6 Estimated percentage of women by age group with an intact uterus who had at least one Pap smear for the two-year periods between 1996-1997 and 2012-2013: comparison of the Perth metropolitan area with country WA

Age group		Percentage of women screened															
		1996-1997	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
20-24	Metro	55.5	54.7	53.3	49.5	50.3	51.4	50.0	49.6	50.1	50.3	51.1	51.1	50.3	48.4	46.4	45.8	44.9
	Country	60.7	61.6	60.0	54.7	54.0	54.5	54.0	52.6	53.5	53.9	54.2	53.9	52.4	50.5	49.4	49.8	48.9
25-29	Metro	67.9	68.3	67.2	62.7	62.2	61.9	60.4	59.3	58.4	58.3	59.1	58.1	57.5	56.3	53.8	53.4	53.1
	Country	66.2	67.7	66.0	61.5	60.6	59.7	58.9	57.5	56.0	56.0	57.3	56.4	55.5	53.2	51.2	50.8	49.6
30-34	Metro	70.2	71.5	71.5	68.5	67.1	65.2	64.8	64.1	63.6	63.5	62.4	61.0	61.1	59.9	57.6	57.4	57.1
	Country	65.8	67.6	66.0	62.1	62.5	61.6	60.7	60.4	58.9	58.4	58.5	57.1	57.7	55.2	52.6	52.6	52.3
35-39	Metro	69.3	70.5	69.9	67.3	66.9	65.1	64.8	64.5	64.9	64.9	63.6	62.8	63.1	61.7	59.3	58.7	59.2
	Country	64.9	67.6	66.9	64.3	63.0	61.9	62.1	60.1	60.0	59.7	57.6	57.6	57.6	56.3	54.7	54.7	54.8
40-44	Metro	66.7	67.2	67.2	65.7	65.3	64.2	64.3	63.4	63.6	64.5	62.5	61.6	62.8	62.0	59.8	59.5	59.5
	Country	61.5	63.4	63.9	62.8	62.7	62.4	63.1	62.6	61.8	60.3	58.1	58.0	58.1	56.4	55.0	54.7	54.4
45-49	Metro	65.0	66.0	66.1	64.8	64.9	64.4	64.9	64.9	65.3	65.4	62.6	61.6	62.4	62.5	60.8	61.1	61.9
	Country	61.5	63.3	62.3	61.7	60.4	60.3	62.5	62.2	61.7	61.5	58.7	58.6	58.6	57.4	56.0	56.2	56.0
50-54	Metro	63.4	63.0	63.3	63.5	62.5	61.8	62.0	62.1	62.5	63.0	59.4	59.2	60.4	60.3	59.0	59.6	59.7
	Country	59.2	59.6	59.8	59.4	58.2	57.8	57.8	57.3	57.7	57.2	53.2	54.0	55.5	55.7	55.2	55.6	55.5
55-59	Metro	59.6	63.2	63.8	62.9	62.8	63.0	63.2	63.4	64.5	65.1	56.3	55.7	56.3	57.0	56.9	57.1	57.6
	Country	58.8	61.8	61.1	60.7	61.0	59.2	60.4	60.5	59.9	60.5	50.9	51.0	52.5	52.3	51.3	51.0	51.2
60-64	Metro	51.2	54.6	55.7	55.2	55.2	54.2	53.5	53.7	53.7	54.3	51.3	51.7	53.0	53.4	53.1	54.4	54.9
	Country	52.6	55.3	55.9	55.9	55.1	52.6	54.4	53.3	51.9	51.1	46.9	48.3	50.5	50.8	50.3	50.6	51.6
65-69	Metro	41.0	44.9	46.5	46.1	46.9	46.5	47.4	47.4	48.2	48.9	45.4	45.0	45.2	45.6	45.7	46.9	47.5
	Country	39.1	44.3	46.4	45.3	45.1	46.6	47.2	47.7	47.7	47.6	44.3	42.7	42.9	43.1	43.3	43.9	44.6
20-69	Metro	63.5	64.5	64.2	61.9	61.7	61.0	60.6	60.2	60.3	60.6	58.5	57.8	58.1	57.4	55.7	55.6	55.6
	Country	61.8	63.8	62.9	60.4	59.8	59.1	59.4	58.5	57.9	57.6	55.3	55.0	55.2	54.0	52.6	52.6	52.3

Note: Includes all women aged between 20 and 69 years, with an address in WA at the time of the Pap smear.

Figure 4.2 Rate ratios of cervical screening participation by Health District for WA 2012-13



Note: Bars on graph represent 95% confidence intervals.
Bars completely to the right of the vertical line represent Health District participation rates that are significantly higher than the State rate.
Bars completely to the left of the vertical line represent Health District participation rates that are significantly lower than the State rate.

Figure 4.3 Geographical view of cervical screening participation by Health District for the Perth metropolitan area 2012-13

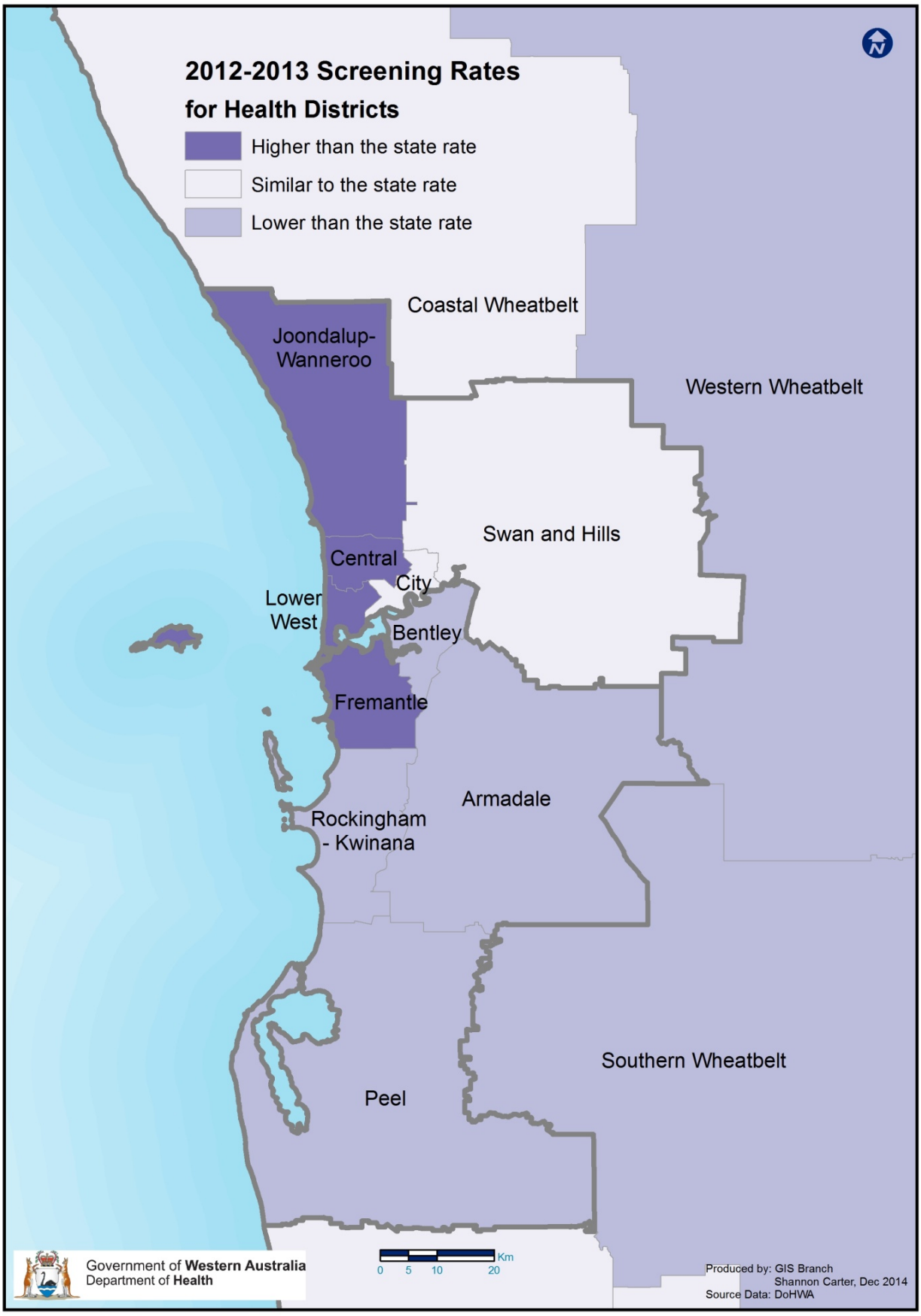


Figure 4.4 Geographical view of cervical screening participation by Health District for country WA 2012-13

From Figure 4.2, 4.3 and 4.4 it can be seen that Armadale, Bentley, Central Great Southern, East Kimberley, East Pilbara, Eastern Wheatbelt, Gascoyne, Murchison, Northern Goldfields, Peel, Rockingham-Kwinana, Southern Wheatbelt, West Pilbara and Western Wheatbelt Health Districts all experienced cervical screening participation rates lower than the State rate, and that these rates were statistically significant.

It is also evident that Blackwood, Busselton, Central, Fremantle, Joondalup-Wanneroo, Leeuwin, Lower West, Warren and West Kimberley Health Districts experienced statistically significant higher rates than the State rate.

Figure 4.3 and 4.4 also highlight Health Districts with screening rates that were not significantly different to the State rate. In 2012-2013 these were Bunbury, City, Coastal Wheatbelt, Geraldton, Leschenault, Lower Great Southern, Midwest, South East Coastal, Swan and Hills, and Wellington.

5. Early re-screening

Early re-screening is the repeating of a Pap smear within 21 months of a negative report, except for women who are being followed up in accordance with the NHMRC guidelines for the management of cervical abnormalities.

To assess the level of adherence to the national policy of two-yearly screening, figures were obtained for the proportion of women who were re-screened within a 21-month period, following a normal Pap smear result.

To comply with national monitoring standards, February was selected as the index month for all states and territories, as it is a relatively stable month in terms of the number of women who present for screening. Table 5.1 displays the frequency of women who have had subsequent Pap smears within 21 months (following a normal Pap smear result taken in February 2012).

Table 5.1 Early re-screening: number and percentage of women having a repeat test within 21 months of a normal Pap smear taken in February 2012

Number of repeat tests in a 21-month period after a normal Pap smear	Number of women	Percentage of women
0 (i.e. no repeat test)	14,965	89.5
1	1,695	10.1
2	54	0.3
3	5	<0.1
Total	**16,719**	**100**

Note: Includes all women with an address in WA at the time of the Pap smear. Excludes women's records after the date of hysterectomy or from the initial vault smear i.e. post-hysterectomy.

A total of 89.5% of women did not have subsequent Pap smears performed over the selected 21-month period meaning 10.5% of women were re-screened early and 0.4% exceeded one repeat Pap smear. The previous year's figures were 89.1%, 10.9% and 0.2% respectively.

Since 1997, there have been two changes to the definition of early re-screening that affect the ability to make direct comparisons. Direct comparison can be drawn from 2008 onwards[8].

It is anticipated that women with a history of abnormality may re-screen within 24 months. Improvements to the Register have enabled the extraction of data that provides a clearer picture of women who are re-screening outside of NHMRC guidelines. Clinical reasons and/or symptoms for subsequent Pap smears within two years are not recorded in the Register.

[8] *AIHW Cervical Screening in Australia 2012-13*

6. Cytology (Pap smear) reports

Pap smear results are coded according to standard CSR report categories (see Appendix A – Cytology Codes). These categories consist of a combination of results observed for a range of cell types. Table 6.1 summarises the profile of cytology reports for all laboratories combined and the range among the various laboratories.

In 2013, 89.9% of Pap smears were reported as normal, 6.4% indicated as either possible or definite low-grade abnormality and 1.6% reported as either possible or definite high-grade abnormalities (Table 6.1). These figures are consistent with previous years.

Table 6.1 Cytology report categories 2013

Cytology report category	Number	All laboratories (%)	Range (%)		
Unsatisfactory Pap smear	5,005	2.1	1.7	-	3.7
Normal Pap smear	212,520	89.9	62.0	-	92.0
Possible LGEA/LGEA*	15,089	6.4	5.1	-	22.2
Possible HGEA**	1,816	0.8	0.4	-	9.0
HGEA**	1,853	0.8	0.5	-	6.2
Malignant	29	<0.1	0.0	-	0.2
Total	**236,312**	**100**			

** Low-grade epithelial abnormality*
*** High-grade epithelial abnormality*

Note: Includes reports for women with an address in WA at the time of the test. Excludes reports after the date of hysterectomy or from the initial vault smear i.e. post-hysterectomy.

There is wide variation between laboratories in the proportion of normal Pap smears, which is partly accounted for by the fact that some laboratories primarily serve clinicians investigating women with abnormalities.

6.1 Analysis of individual components

Table 6.2 shows the distribution of results for the squamous cell component of the cytology reports. In 2013, the percentage of Pap smears reported as having an unsatisfactory squamous cell component was 2.1%, which is in accordance with the *Royal College of Pathologists of Australasia Quality Assurance Program (RCPA QAP)* recommended standard of performance[9]. The percentage of abnormal squamous cell categories (includes all categories from possible low-grade squamous intraepithelial lesion (LSIL) up to squamous carcinoma) reported was 7.9%. In 2012 this figure was 7.4%.

Table 6.2 Squamous cell categories 2013

Squamous cell category	Number	All laboratories (%)	Range (%)
Unsatisfactory	5,005	2.1	1.7 - 3.7
No abnormality	212,789	90.1	64.0 - 92.1
Possible LSIL	10,545	4.5	3.6 - 14.2
LSIL (HPV and/or CIN 1)	4,391	1.9	1.5 - 9.3
Possible HSIL*	1,751	0.7	0.4 - 9.0
HSIL* (CIN 2/CIN 3)	1,782	0.8	0.5 - 6.0
HSIL* possible microinvasion/invasion	42	<0.1	0.0 - 0.1
Squamous carcinoma	7	<0.1	0.0 - <0.1
Total	**236,312**	**100**	

** High-grade squamous intraepithelial lesion.*

[9] *RCPA QAP Performance Measures for Australian Laboratories reporting Gynaecological Cytology.*

Table 6.3 Endocervical cell categories 2013

Endocervical cell category	Number	All laboratories (%)	Range (%)
Unsatisfactory	2,168	0.9	0.0 - 3.7
No endocervical cells	57,387	24.3	3.5 - 26.7
No abnormal endocervical cells	176,451	74.7	71.4 - 94.4
Atypical endocervical cells	149	<0.1	<0.1 - 1.8
Possible adenocarcinoma-in-situ (AIS)	113	<0.1	0.0 - 0.2
AIS	30	<0.1	0.0 - 0.3
AIS with possible microinvasion/invasion	3	<0.1	0.0 - <0.1
Adenocarcinoma of the cervix	11	<0.1	0.0 - 0.1
Total	**236,312**	**100**	

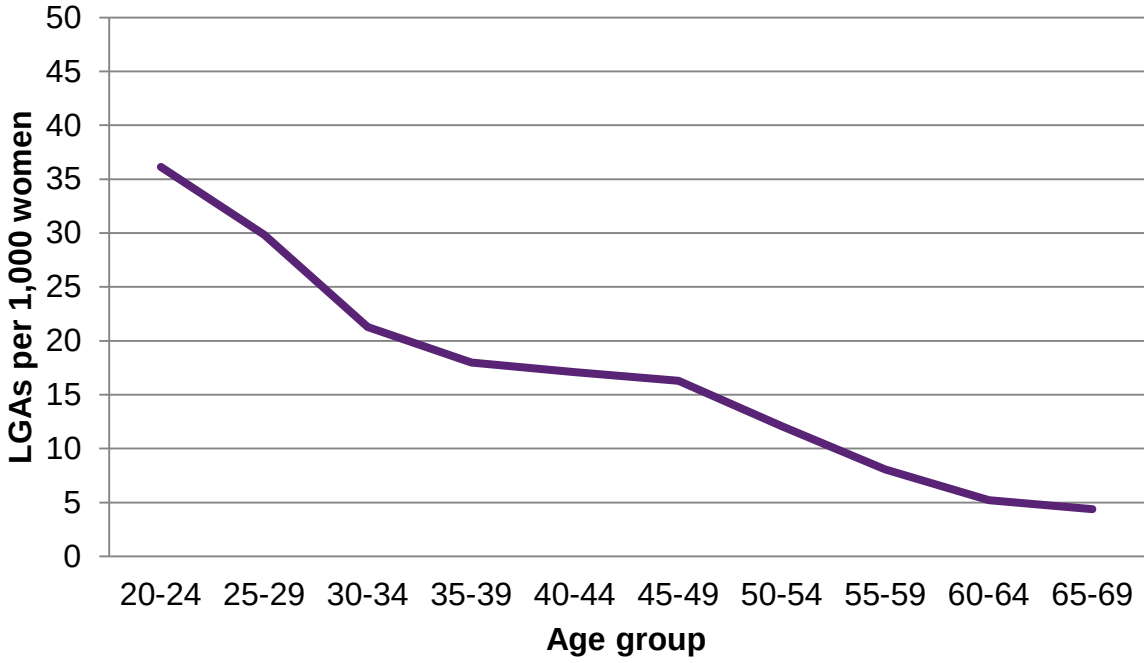
Table 6.3 shows the distribution of results for the endocervical cell component of cytology reports. Abnormalities of endocervical cells (which include all categories from atypical up to adenocarcinoma of the cervix) were reported in 0.1% of Pap smears and possible or definite high-grade glandular abnormalities in less than 0.1%. These figures are consistent with 2012 results.

In 2013, an endocervical component was absent in 24.3% of Pap smears compared with 23.8% in the 2012 calendar year. The absence of endocervical cells on a Pap smear may be due to a number of factors (including adequacy of the sampling of the transformation zone).

Since 1996, the proportion of Pap smears with an endocervical component has decreased by approximately 13 percentage points. Decreases have also been seen in other states and territories. The reason for the decreasing proportion of Pap smears with an endocervical component is unclear.

Figures 6.1 and 6.2 suggest that both low and high-grade abnormality rates decline with age. These results indicate that low-grade abnormalities on cytology were most prevalent among women aged 20-24 years, and high-grade abnormalities were highest for women aged between 25-29 years, compared to any other five-year age group.

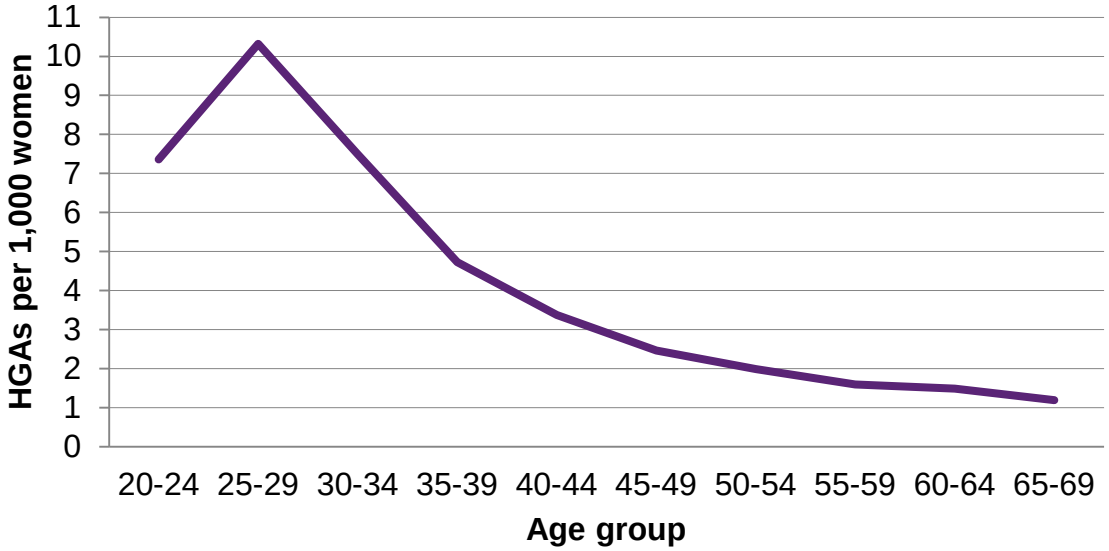
Figure 6.1 Age-specific low-grade abnormality rates in women aged 20-69 years WA 2013



Note: A low-grade abnormality is defined as: Possible LGEA/LGEA (S2, S3 [CIN 1], E2, O2 or O3). Includes human papillomavirus (HPV) effect alone and atypia of uncertain significance. Rates are expressed per 1,000 women.

Source: Cytology Codes, WA Cervical Cancer Prevention Program (Appendix A).

Figure 6.2 Age-specific high-grade abnormality rates in women aged 20-69 years WA 2013



Note: A high-grade abnormality is defined as:
Possible HGEA (S4, E3, O4 or O5); HGEA (S5 [CIN 2/CIN 3], S6, E4 or E5); Malignant (S7, E6, O6, O7, O8 or O9). Rates are expressed per 1,000 women.

Source: Cytology Codes, WA Cervical Cancer Prevention Program (Appendix A).

7. Follow-up and reminder letters to women and health care providers

7.1 Introductory letter

Since August 2003, the CSR has sent an introductory letter to women whose details are received for the first time. This letter is designed to raise awareness of the importance of regular cervical screening, educate women in the community of the CSR's role, and thereby raise awareness of the WACCPP within the State. The letter also serves to ensure CSR records are correct and current with regards to women's personal details and to provide women an opportunity to make an informed choice to not be included in the Register (opt off).

In the calendar year 2013 the number of introductory letters sent to women in WA was 31,836. This is more than 2012, in which 27,631 letters were sent. Of the 15 women whose identifying information was withdrawn from the Register in 2013 (at their request), 13 were in response to the receipt of an introductory letter. It is important to note that in 2013, the proportion of women opting off is <0.1%.

7.2 CSR of WA Protocol of Actions for follow-up and reminder letters

A core function of the CSR is to provide a 'safety net' to help ensure women participate in cervical screening at recommended timeframes, and that women with abnormal or unsatisfactory results are appropriately followed up.

The CSR delivers reminder and follow-up letters to women and health care providers in accordance with the *CSR of WA Protocol of Actions for follow-up and reminder letters* (*Protocol of Actions*) (Table 7.1). Letters to women with normal results are called reminder letters, reminding them when they become overdue for their next Pap smear; letters sent to providers and women in connection with abnormal or unsatisfactory Pap smear results are called follow-up letters.

In 2010 the WACCPP consulted with the WACCPP Advisory Group, in review of the *NCSP Minimum National Standards for Follow-up and Reminder Protocols for Cytology Registers (2010)*[10]. This review resulted in some adjustments being made to WA's enactment of timeframes relating to follow-up, which at the time were felt to better support the practice of WA providers. These differences are reflected in the *WA Protocol of Actions*.

The CSR is updated monthly with information from the WA Death Registry to minimise the risk of reminder and/or follow-up letters being sent to deceased women. In addition, the CSR allows for withholding of letters on the advice of a woman or her health care provider. For example, when the CSR has been advised of a woman's pregnancy and her expected date of delivery, a letter is normally sent six months after this date (if no further follow-up information is received).

[10] *The NCSP Minimum National Standards, derived from the NHMRC guidelines (2005), outline the frequency and conditions for contacting women and health care providers.*

Table 7.1 CSR of WA Protocol of Actions for follow-up and reminder letters

	Result of current Pap smear	Age	History [1]	Communication to practitioner	Communication to woman [6]
CYTOLOGY REPORT	Normal	<70 yrs[2]	No known history **OR** Normal history within last 36 months **OR** LSIL smear[3] within last 36 months followed by a normal Pap smear at least 6 months after the LSIL smear[3] and at least 6 months before the current normal Pap smear **OR** LSIL biopsy / normal Pap smear / normal Pap smear (as per above) **OR** Normal biopsy / normal Pap smear / normal Pap smear (as per above)	N/A	27 months
		N/A	Abnormal history within last 36 months, **excluding** LSIL smear[3] followed by a normal Pap smear at least 6 months after the LSIL smear[3] and at least 6 months before the current normal Pap smear. **OR excluding** LSIL biopsy / normal Pap smear / normal Pap smear (as per above) **OR excluding** Normal biopsy / normal Pap smear / normal Pap smear (as per above)	N/A	27 months
	Unsatisfactory	N/A	N/A	6 months	9 months
	Low-grade squamous intraepithelial lesion (LSIL), including possible LSIL	=>30 yrs[7]	No known history within last 36 months	9 months	12 months
		<30 yrs[7]	No known history within the last 36 months	18 months	24 months
		N/A	Any cytological abnormality without any subsequent histology result within the last 36 months, **excluding** LSIL cytology with prior histology result in the last 36 months	9 months	12 months
			Prior negative cytology or with abnormality that has been confirmed histologically or LSIL cytology with prior histology result, within the last 36 months	18 months	24 months
	High-grade squamous intraepithelial lesion (HSIL), & all glandular cell abnormalities[4]	N/A	N/A	6 months	9 months
					12 months (registered)
	Malignant[5]	N/A	N/A	4 months	6 months
					9 months (registered)
HISTOLOGY REPORT	**Result of biopsy**	**Age**	**History**	**Communication to practitioner**	**Communication to woman**
	Unsatisfactory, Normal or Low-grade abnormality	N/A	N/A	18 months	24 months
	High-grade abnormality or Malignant	N/A	N/A	12 months	18 months (registered)

1. *Based on cervical result elements only. Excludes unsatisfactory results and all results of non-cervical specimen types*
2. *At time of letter*
3. *Includes possible LSIL smear and LSIL smear*
4. *Includes possible HSIL, HSIL, HSIL with features suggestive of an invasive component, atypical endocervical cells of uncertain significance, atypical endometrial cells of uncertain significance, atypical glandular cells of uncertain significance – site unknown, possible AIS, AIS and AIS with features suggestive of invasion*
5. *Includes squamous carcinoma, endocervical adenocarcinoma and other/non-cervical malignancies*
6. *Elapsed timeframes between preceding and subsequent contact communication for a result are adhered to and include the receipt of missing/historical data that represent the woman's current result*
7. *At time of test*

Note: *'Test of Cure' safety net is not currently enacted by the CSR of WA*

7.3 Reminders to women with normal Pap smears

A reminder letter is sent to women whose last Pap smear result was normal and for whom no further Pap smear has been recorded on the CSR within a 27-month period. In the 2013 calendar year, 96,710 reminder letters were sent to women following a normal Pap smear. This figure is comparable with the previous year. Of these women, 30.9% had a follow-up Pap smear within three months of the reminder letter being sent (see Table 7.2). This level of response is similar to that seen in the previous year (30.8%).

7.4 Follow-up letters for unsatisfactory and abnormal Pap smear results

For follow-up of unsatisfactory and low-grade abnormal Pap smear results (including possible findings), a letter is sent in the first instance to the provider in accordance with the CSR's *Protocol of Actions*. If follow-up information is not received within the specified period of time, a letter is then sent directly to the woman.

For possible high-grade and high-grade abnormal Pap smear results, if no follow-up information is received within three months of sending a questionnaire letter to the provider, a letter is sent directly to the woman. If no follow-up information is received within three months of that letter being sent, another reminder letter is sent by registered post (with delivery confirmation) to the woman. Various databases are searched for a current address before contacting women with high-grade abnormalities.

In 2013, a total of 6,809 follow-up letters pertaining to unsatisfactory and abnormal Pap smear results were sent to providers and 3,910 letters were sent to women.

Table 7.2 displays the outcome of these reminder and follow-up letters. It is important to note that Table 7.2 represents women who have not had a further Pap smear or appropriate biopsy prior to activation of the *Protocol of Actions.* Also worth noting is that of the 100,620 letters sent to women in 2013, approximately 8.7% were returned to sender, indicating that the woman had changed address since the time of her most recent Pap smear. This is comparable to 2012, where 8.9% of the 99,962 letters sent to women were returned to sender.

Table 7.2 Outcome of reminder and follow-up Pap smear letters sent by the CSR in 2013

Cytology report category[1]	Letter recipient	Number of letters sent[4]	Follow-up within three months of letter	
			Number	Percentage
Normal	Woman	96,710	29,864	30.9
Unsatisfactory	Provider	2,206	814	36.9
	Woman	1,254	352	28.1
Possible LGEA/LGEA[2]	Provider	4,160	1,230	29.6
	Woman	2,379	685	28.8
Possible HGEA/HGEA[3]	Provider	443	210	47.4
	Woman	174	56	32.2
	Woman 2nd contact (registered post)	103	23	22.3

[1] *Based on the most recent Pap smear result.*
[2] *'Possible LGEA/LGEA' includes possible LSIL and LSIL.*
[3] *'Possible HGEA/HGEA' includes 'possible HSIL, 'HSIL, all glandular cell abnormalities and malignant'.*
[4] *This refers only to reminder and follow-up letters generated in 2013. Excludes subsequent reprints if the related tests were deemed outside of the follow-up period for a given letter category. The number of letters shown as sent to women is less than the number of women who were overdue, as letters continued to be sent into 2014.*

Table 7.2 demonstrates one of the 'safety net' functions of the CSR, whereby follow-up letters are sent as a timely reminder to support both providers and women. A total of 289 women with a finding of possible high-grade or high-grade abnormality (including malignant and all glandular cell abnormalities) and no initial follow-up information had either a Pap smear or biopsy within three months of the follow-up letter to their provider or themselves.

The CSR was initially unable to monitor follow-up for 80 women with possible or definite high-grade abnormalities during 2013. Various other methods, including requesting information from Medicare Australia, were utilised in obtaining further follow-up information. According to information since received into the Register, 47 of these women have now been re-screened. Further attempts to locate the remaining 33 women who are lost to follow-up are carried out periodically.

7.5 Follow-up letters for biopsy results

According to the CSR's *Protocol of Actions* (Table 7.1) the follow-up of unsatisfactory, normal and low-grade abnormal cervical biopsies is to send a letter to the provider at 18 months. For high-grade abnormal or malignant cervical biopsies, a letter is sent to the provider at 12 months. If follow-up information is not received within six months, a subsequent follow-up letter is sent directly to the woman. Various databases are searched for a current address when locating women.

In 2013, a total of 1,118 follow-up letters pertaining to unsatisfactory, normal and low-grade abnormal cervical biopsies were sent to providers and 639 letters were sent to women. For biopsy reports of a high-grade abnormality including malignancy findings, a total of 310 follow-up letters were sent to providers and 122 letters were sent to women.

Table 7.3 displays the outcome of these follow-up letters, once again demonstrating the 'safety net' function of the CSR. There were 465 women who had either a Pap smear or biopsy within three months of the letter to their provider or themselves. This represents a 21.2% response rate to letters sent and is consistent with figures from previous years.

Table 7.3 Outcome of follow-up biopsy letters sent by the CSR in 2013

Histology report category[1]	Letter recipient	Number of letters sent[3]	Follow-up within three months of letter	
			Number	Percentage
Unsatisfactory biopsy, normal biopsy or low-grade abnormality	Provider	1,118	229	20.5
	Woman	639	150	23.5
High-grade abnormality[2]	Provider	310	65	21.0
	Woman	122	21	17.2

[1] *Based on the most recent Pap smear result.*
[2] *'High-grade abnormality' includes results categorised as 'Invasive Malignancy'.*
[3] *This refers only to follow-up letters generated in 2013. Excludes subsequent reprints if the related tests were deemed outside of the follow-up period for a given letter category. The number of letters shown as sent to women is less than the number of women who were overdue for follow-up, as letters continued to be sent into 2014.*

8. Histology (biopsy) reports

The CSR collects information relevant to cervical biopsies. Biopsy results are coded according to standard CSR report categories (see Appendix B – Histology Codes). In 2013, a total of 8,905 women had at least one cervical biopsy. Corresponding figures for 2010 was 7,752, for 2011 was 7,739 and for 2012 was 8,070, respectively. Table 8.1 shows biopsies by report category for women of all ages.

Table 8.1 Histology report categories 2013

Biopsy report category	Number	Percentage
Unsatisfactory biopsy	80	0.8
Normal biopsy (no abnormality reported)	5,481	51.2
Low-grade intraepithelial abnormality	1,673	15.6
High-grade intraepithelial abnormality	3,117	29.1
Invasive malignancy	351	3.3
Total	**10,702**	**100**

Note: Includes reports for women with an address in WA at the time of the test.
As some women had more than one biopsy in 2013, the number of biopsies recorded is higher than the number of women.
This table includes results for women who have had a hysterectomy.

A normal result was reported for 51.2% of biopsies (compared with 50.3% in 2012), 15.6% showed the presence of a low-grade intraepithelial abnormality (16.2% in 2012) and 29.1% of biopsies revealed a high-grade intraepithelial abnormality (29.5% in 2012). Invasive malignancy was shown in 3.3% of biopsies (3.2% in 2012). Overall, these figures represent a notable increase in the number of biopsies performed (990 more biopsies than 2012: 10.2% increase), but a lower proportion of abnormalities found (48.0% in 2013 compared to 48.9% in 2012).

9. Cytology and histology correlation

The CSR provides information about the correlation of cytology and histology results to assist with quality control in pathology laboratories. In 2013, 1,853 Pap smears were reported as having a high-grade epithelial abnormality, whilst 1,816 Pap smears were reported as possible high-grade epithelial abnormality, in WA. Of the high-grade cases, 1,648 (88.9%) had a follow-up biopsy within six months. Of the possible high-grade reports, 1,405 (77.4%) had a follow-up biopsy within six months.

Table 9.1 shows that of the high-grade Pap smears in WA for 2013 that had a subsequent biopsy within six months, 14.5% of cases were negative or benign while 10.3% showed a low-grade intraepithelial abnormality. Histology reports confirmed the cytology finding of a high-grade intraepithelial abnormality in 73.6% of cases. Invasive malignancy was present in 1.0% of cases. In 2012, 73.8% of histology reports in WA confirmed the cytology finding of a high-grade intraepithelial abnormality and invasive malignancy was present in 1.2% of cases. A comparison of WA and national figures is given in Table 9.1.

Table 9.1 Histology reports within six months following high-grade abnormality on cytology 2013: comparison of WA and national figures

Histology report	WA number	WA (%)	National* (%)	National* range (%)		
Unsatisfactory biopsy	10	0.6	0.4	0	-	3
Negative/benign findings	239	14.5	8.3	0	-	22
Low-grade intraepithelial abnormality	169	10.3	11.3	0	-	60
High-grade intraepithelial abnormality	1,213	73.6	77.8	20	-	89
Invasive malignancy	17	1.0	2.2	0	-	14
Total	**1,648**	**100**				

* *Includes national aggregate percentages and range taken from RCPA Cytopathology Quality Assurance Program 2014 for Performance Measure 3a: Accuracy of reports predicting high-grade abnormality (Data for January 1 to December 31, 2013).*

Table 9.2 shows that of the possible high-grade Pap smears in WA for 2013 that had a subsequent biopsy within six months, 30.7% of cases were negative or benign while 21.2% showed a low-grade intraepithelial abnormality. Of the cytological findings of a possible high-grade intraepithelial abnormality, 46.6% of histology reports confirmed the suspected lesion as high-grade. Invasive malignancy was present in 0.4% of cases. In 2012, 47.1% of histology reports in WA confirmed the cytology finding of a possible high-grade intraepithelial abnormality as high-grade and invasive malignancy was present in 1.0% of cases. Table 9.2 provides an assessment of WA and national figures.

Table 9.2 Histology reports within six months following possible high-grade abnormality on cytology 2013: comparison of WA and national figures

Histology report	WA number	WA (%)	National* (%)	National* range (%)		
Unsatisfactory biopsy	16	1.1	0.8	0	-	9
Negative/benign findings	431	30.7	25.9	0	-	51
Low-grade intraepithelial abnormality	298	21.2	21.4	12	-	60
High-grade intraepithelial abnormality	655	46.6	50.7	28	-	66
Invasive malignancy	5	0.4	1.1	0	-	5
Total	**1,405**	**100**				

** Includes national aggregate percentages and range taken from RCPA Cytopathology Quality Assurance Program 2014 for Performance Measure 3b: Accuracy of reports of possible high-grade abnormality (Data for January 1 to December 31, 2013).*

9.1 Correlation between cytology and histology reports

The following tables (Tables 9.3 and 9.4) attempt to gauge the accuracy of cytological predictions of abnormality by correlating histology findings for the same woman within a six-month period. The figures in these tables represent for each eligible woman in 2013, the most severe cervical abnormality detected via a Pap smear and the most severe histological finding in the subsequent six months after that Pap smear. A hierarchical ranking was used to select the most severe Pap smear for individual women and the most severe biopsy. It should be noted that Pap smears showing atypia and HPV effect are not normally followed up by biopsy. Proportions should be interpreted carefully, as some predictions are small numbers.

Pap smears reporting squamous abnormalities or where a squamous abnormality is of a higher severity than the glandular abnormality are analysed in Table 9.3. Table 9.4 analyses Pap smears reporting glandular abnormalities or where a glandular abnormality is of an equivalent or higher severity than the squamous abnormality.

The CSR does not routinely collect information relating to colposcopy. Follow-up that may have involved this investigation alone is therefore not included in the following tables. It is also recognised that women who do not appear to have had histological follow-up for high-grade predictions, may have been followed up outside of the six-month period. Histology findings with no preceding Pap smears have been excluded from the following data in Tables 9.3 and 9.4.

Table 9.3 Correlation between cytology and histology reports for squamous and combined* squamous and glandular abnormalities on Pap smears with histology findings within six months

HISTOLOGY FINDINGS	CYTOLOGY PREDICTIONS													
	Squamous Atypia Total = 9,545[8]		HPV and/or CIN 1 Total = 3,934[8]		Possible HSIL[1] Total = 1,391[8]		HSIL[2] Total = 1,502[8]		Possible SCC[4] Total = 40[8]		SCC[5] Total = 7[8]	
UNSATISFACTORY	15	1.2%	8	1.1%	9	0.9%	4	0.3%				
NORMAL	660	52.6%	252	33.3%	299	28.1%	136	10.3%	1	2.7%		
ATYPIA	151	12.0%	62	8.2%	82	7.7%	27	2.1%				
HPV	96	7.7%	86	11.4%	41	3.9%	21	1.6%				
CIN 1	188	15.0%	213	28.1%	121	11.4%	77	5.9%				
CIN 2	89	7.1%	97	12.8%	236	22.2%	268	20.4%	1	2.7%		
CIN 3	52	4.2%	37	4.9%	265	24.9%	727	55.3%	26	70.3%	2	33.3%
CIN 3 + AIS[3]	1	0.1%	1	0.1%	3	0.3%	21	1.6%				
AIS[3]			1	0.1%	4	0.4%	8	0.6%				
SCC[5]					4	0.4%	20	1.5%	8	21.6%	4	66.7%
AdenoCa Cx[6]					1	0.1%	4	0.3%	1	2.7%		
SCC[5] + AdenoCa Cx[6]												
Other Carcinomas[7]	2	0.2%					2	0.2%				
Total with biopsy follow-up	1,254	100%	757	100%	1,065	100%	1,315	100%	37	100%	6	100%
No biopsy follow-up recorded at CSR within six months of index Pap smear	8,291		3,177		326		187		3		1	

*This table includes those combined squamous and glandular abnormalities where the squamous component is the most severe abnormality

Notes:

[1] Possible high-grade squamous intraepithelial lesion
[2] High-grade squamous intraepithelial lesion
[3] Adenocarcinoma-in-situ
[4] Possible squamous cell carcinoma
[5] Squamous cell carcinoma
[6] Adenocarcinoma of cervix
[7] Endometrial, vaginal or ovarian cancer
[8] Total number of cases with and without biopsy follow-up

Table 9.4 Correlation between cytology and histology reports for glandular and combined* glandular and squamous abnormalities on Pap smears with histology findings within six months

HISTOLOGY FINDINGS	CYTOLOGY PREDICTIONS									
	Endocervical Atypia Total = 121[7]		Possible AIS[1] Total = 88[7]		AIS[2] Total 24[7]		Possible AdenoCa Cx[3] Total = 3[7]		AdenoCa Cx[4] Total = 11[7]	
UNSATISFACTORY										
NORMAL	46	64.8%	32	43.8%	1	4.2%				
ATYPIA	4	5.6%	4	5.5%			1	33.3%		
HPV	3	4.2%	2	2.7%	1	4.2%				
CIN 1	6	8.5%	1	1.4%						
CIN 2			5	6.9%						
CIN 3	6	8.5%	13	17.8%						
CIN 3 + AIS[2]	1	1.4%	1	1.4%	5	20.8%				
AIS[2]	3	4.2%	8	11.0%	12	50.0%				
SCC[5]	1	1.4%			1	4.2%				
AdenoCa Cx[4]	1	1.4%	5	6.9%	4	16.7%	2	66.7%	7	63.6%
SCC[5] + AdenoCa Cx[4]										
Other Carcinomas[6]			2	2.7%					4	36.4%
Total with biopsy follow-up	**71**	**100%**	**73**	**100%**	**24**	**100%**	**3**	**100%**	**11**	**100%**
No biopsy follow-up recorded at CSR within six months of index Pap smear	50		15		0		0		0	

* This table includes those combined glandular and squamous abnormalities where the glandular component is the more severe abnormality or of equal severity

Notes:

[1] Possible adenocarcinoma-in-situ
[2] Adenocarcinoma-in-situ
[3] Possible adenocarcinoma of cervix
[4] Adenocarcinoma of cervix
[5] Squamous cell carcinoma
[6] Endometrial, vaginal or ovarian cancer
[7] Total number of cases with and without biopsy follow-up

9.1.1 Positive predictive values

Positive predictive value (PPV) is defined as the proportion of predicted abnormalities in which a high-grade abnormality was confirmed on biopsy.

The PPVs for Table 9.3 (high-grade squamous or combined squamous and glandular abnormalities where the squamous component is the most severe abnormality on Pap smears) are outlined in Table 9.5.

Table 9.5. Positive predictive values for Table 9.3

Squamous cytological prediction	% confirmed via histology
Possible HSIL	48.3%
HSIL	79.9%
Possible SCC	97.3%
SCC	100.0%

The PPVs for Table 9.4 (high-grade glandular abnormalities or where a glandular abnormality is of an equivalent or higher severity than the squamous abnormality on Pap smears) are outlined in Table 9.6.

Table 9.6. Positive predictive values for Table 9.4

Glandular cytological prediction	% confirmed via histology
Possible AIS	46.7%
AIS	91.7%
Possible AdenoCa Cx	66.7%
AdenoCa Cx	100.0%

As previously noted, caution should be exercised when evaluating figures where small numbers are specified.

List of Abbreviations

ABS	Australian Bureau of Statistics
AdenoCa	Adenocarcinoma
AIHW	Australian Institute of Health and Welfare
AIS	Adenocarcinoma-In-Situ
CIN	Cervical Intraepithelial Neoplasia
CIS	Carcinoma-In-Situ
CSR	Cervical Screening Registry
Cx	Cervix
DoH	Department of Health (WA)
ERP	Estimated Resident Population
GIS	Geographical Information Systems
GP	General Practitioner
HGA	High-grade Abnormality
HGEA	High-grade Epithelial Abnormality
HPV	Human Papillomavirus
HSIL	High-grade Squamous Intraepithelial Lesion
LGA	Low-grade Abnormality
LGEA	Low-grade Epithelial Abnormality
LSIL	Low-grade Squamous Intraepithelial Lesion
NCSP	National Cervical Screening Program
NHMRC	National Health and Medical Research Council
NPAAC	National Pathology Accreditation Advisory Council
PIP	Practice Incentives Program
PPV	Positive Predictive Value
Poss HSIL	Possible High-grade Squamous Intraepithelial Lesion
Poss AIS	Possible Adenocarcinoma-In-Situ
RCPA	Royal College of Pathologists of Australasia
SCC	Squamous Cell Carcinoma
WA	Western Australia
WACCPP	Western Australian Cervical Cancer Prevention Program

Glossary[11]

Adenocarcinoma: A rare cancer affecting the cervix, but involving columnar cells rather than the squamous cells. The columnar cells are involved in glandular activity. Adenocarcinoma has a different type and rate of progression and is not so often picked up in a Pap smear.

Age-standardised rates: Calculated by the direct method and represent a summation of weighted age-specific rates (weighting being determined by the relative proportion of the population in each age group compared with the proportion in the World Standard Population[12]).

Age-specific rates: Based on five-year age intervals and are calculated by dividing the number of cases by the population of the same sex and age group.

Asymptomatic: A term used to describe an individual who does not currently show any symptoms of disease.

Atypia: Slight changes in cells for which the cause is not obvious. Often these changes are due to inflammation and sometimes due to HPV effect.

Biopsy of the cervix: The removal of a small piece of the cervix for microscopic examination.

Cervical cancer: A type of cancer that develops when abnormal cells in the lining of the cervix begin to multiply out of control and may travel to other parts of the body.

Carcinoma-in-situ (CIS/CIN 3): Cancer cells that are restricted to the surface epithelium. The abnormal cells are evident throughout each of the layers of the epithelium but they have not extended into other, deeper tissue or surrounding areas.

Cervix: The neck of the uterus (womb), located at the top of the vagina.

Cervical Intraepithelial Neoplasia (CIN): Abnormal changes or growth in the surface layers of the cervix. These changes are not cancer but warn that cancer may develop over future years. CIN is graded CIN 1, 2 or 3; CIN 3 involves the most severe changes.

CIN 1 (Mild dysplasia): Dysplastic cells occupy the lower third of the epithelium.

CIN 2 (Moderate dysplasia): Dysplastic cells occupy up to the middle third of the epithelium.

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[11] *Unless otherwise indicated, all definitions have been sourced from the following publications:*

- *Australian Institute of Health and Welfare 2015. Cervical Screening in Australia 2012-2013 Cancer series no. 93. Cat. no. CAN 91. Canberra: AIHW.*
- *NHMRC Screening to prevent cervical cancer: guidelines for the management of asymptomatic women with screen detected abnormalities, 2005. https://www.nhmrc.gov.au/guidelines-publications/wh39, viewed 21 September 2015.*
- *Victorian Cervical Cytology Registry. Statistical Report 2013. http://www.vccr.org/data-research/statistical-reports/annual-statistical-reports/statistical-report-20131*

[12] *Segi M (1960) Cancer mortality for selected sites in 24 countries (1950-1957). Sendai, Japan, Tohoku University Press.*

CIN 3 (Severe dysplasia): Dysplastic cells occupy the full thickness of the epithelium.

Colposcopy: Examination of the cervix and vagina with a magnifying illuminated instrument called a colposcope to check for abnormalities.

Country: Rural and remote regions of WA.

Cytology: The microscopic evaluation of a sample of cells obtained from a tissue (or body fluid) during procedures such as Pap smears. The sample does not permit evaluation of the underlying structure of the tissue of origin (cf. histology).

Dysplasia: Abnormal appearance, development or growth patterns of cells.

Ectocervix: The outer surface layer of the cervix

Endocervical: Inside the canal of the cervix.

Epidemiology: The study of the distribution and pattern of diseases in a population to determine or trace the circumstances or events causing them.

Epithelium: Refers to layers of cells that line internal and external surfaces of the body.

High-grade abnormality - Pap smear: CIN 2; CIN 3; possible microinvasion/invasion; adenocarcinoma-in-situ possible adenocarcinoma of the cervix.

Histology: The microscopic study of the minute and detailed structure and composition of tissues.

Human papillomavirus (HPV): A virus that can cause infection in the skin surface of different areas of the body, including the genital area. The virus can sometimes cause visible genital warts. Some types can cause abnormal cell changes of the cervix, which may be detected on a Pap smear and which may lead to cancer.

HPV effect: Cellular changes due to HPV.

Hysterectomy: Refers to the surgical procedure whereby all or part of the uterus is removed.

Incidence rate: The number of new cases of disease during a given time period in a specified population, divided by the population at risk.

Low-grade abnormality - Pap smear: HPV effect alone; CIN 1; or atypical endocervical cells.

Malignant/invasive: Abnormal cells that grow out of control and can invade nearby tissues and spread to other parts of the body.

Metropolitan: The city of Perth and its surrounding suburbs.

Mortality rate: The number of deaths during a given time period in a specified population, divided by the population at risk. The mortality rate in this report is a 'cause-specific mortality rate', showing deaths from cancer of the cervix.

Normal Pap smear: A Pap smear with no abnormalities detected.

Pathology: Laboratory-based study of disease, as opposed to clinical examination of systems.

Pap smear: Simple procedure in which a number of cells are collected from the cervix, smeared onto a microscope slide and sent to a laboratory for cytological examination to look for changes that might lead to cervical cancer. Named after the test's inventor, Dr Papanicolaou.

Possible high-grade - Pap smear: Cytological findings raising the possibility of a high-grade lesion; accurate diagnosis is not possible.

Possible low-grade - Pap smear: Mild cellular changes, including minor squamous atypia - raising the possibility of low-grade lesion.

Positive Predictive Value (PPV): Proportion of those with a predicted cytological abnormality in whom a high-grade abnormality was confirmed on biopsy.

Squamous cells: Thin and flat cells, shaped like soft fish scales. Layers of squamous cells make up skin-like epithelium. In the cervix they form the skin on the outer surface of the cervix (ectocervix).

Squamous cell carcinoma: A carcinoma arising from the squamous cells of the cervix.

Unsatisfactory cervical histology (biopsy): Cervical tissue cannot be assessed sufficiently to give an accurate report.

Unsatisfactory Pap smear: The cervical cells cannot be assessed sufficiently to give an accurate report.

Uterus: Also known as the womb. A hollow, muscular organ of females in which the ovum is deposited and the embryo and fetus are developed.

Vault smear: Like a Pap smear, but taken from the top of the vagina as a means of detecting recurrent invasive or pre-invasive disease of the lower female genital tract in women who do not have a cervix uteri.

Appendix A – Cytology Codes

C Category	S	Squamous Cell	E	Endocervical	O	Other/Non-cervical
CU Unsatisfactory	SU	Unsatisfactory for evaluation e.g. poor cellularity, poor preservation, cell detail obscured by inflammation/ blood/degenerate cells	EU	Due to the unsatisfactory nature of the Pap smear, no assessment has been made	OU	Due to the unsatisfactory nature of the Pap smear, no assessment has been made
C1 Normal	S1	Cell numbers and preservation satisfactory. No abnormality or only reactive changes	E-	Not applicable: vault smear/previous hysterectomy	O1	No other abnormal cells
			EØ	No endocervical component		
			E1	Endocervical component present. No abnormality or only reactive changes		
C2 Possible LGEA/LGEA	S2	Possible low-grade squamous intraepithelial lesion (LSIL)	E2	Atypical endocervical cells of uncertain significance	O2	Atypical endometrial cells of uncertain significance
	S3	LSIL (HPV and/or CIN 1)			O3	Atypical glandular cells of uncertain significance – site unknown
C3 Possible HGEA	S4	Possible high-grade squamous intraepithelial lesion (HSIL)	E3	Possible high-grade endocervical glandular lesion	O4	Possible endometrial adenocarcinoma
					O5	Possible high-grade lesion – non-cervical
C4 HGEA	S5	High-grade squamous intraepithelial lesion (HSIL) (CIN 2/CIN 3)	E4	Adenocarcinoma-in-situ		
	S6	High-grade squamous intraepithelial lesion (HSIL) with possible microinvasion/invasion	E5	Adenocarcinoma-in-situ with possible microinvasion/invasion		
C5 Malignant	S7	Squamous carcinoma	E6	Adenocarcinoma	O6	Malignant cells – uterine body
					O7	Malignant cells – vagina
					O8	Malignant cells – ovary
					O9	Malignant cells - other

Cytology Specimen Types

Type	Specimen
AØ	Not stated
A1	Conventional Pap smear
A2	Liquid based specimen
A3	Conventional and liquid based specimen

Cytology Specimen Sites

Site	Specimen
BØ	Not stated
B1	Cervical
B2	Vaginal
B3	Other gynaecological site

Recommendation Codes

Code	Recommendation
RØ	No recommendation
R1	Repeat Pap smear 3 years
R2	Repeat Pap smear 2 years
R3	Repeat Pap smear 12 months
R4	Repeat Pap smear 6 months
R5	Repeat Pap smear 6 – 12 weeks
R6	Colposcopy/biopsy recommended
R7	Already under gynaecological management
R8	Referral to specialist
R9	Other management recommended
RS	Symptomatic - clinical management required

Appendix B – Histology Codes

C	Report Category[1]	S	Squamous Cell	W	Wart Virus (HPV Effect)	E	Endocervical	M	Endometrial	O	Other
C0	Unsatisfactory biopsy[1]	S0	Unsatisfactory for evaluation[1]	WU	Due to the unsatisfactory nature of the biopsy, no assessment has been made[1]	EU	Due to the unsatisfactory nature of the biopsy, no assessment has been made[1]	MU	Because the endometrial specimen appears to be unsatisfactory, no CSR code has been assigned (see notes)	OU	Because the vaginal specimen appears to be unsatisfactory, no CSR code has been assigned (see notes)
C1	Normal biopsy (no abnormality reported)	S-	Not applicable (no squamous epithelium collected)[2]	W-	Not applicable (no squamous epithelium collected)[2]	E-	Not applicable[2]	M-	Not applicable	O-	Not applicable
		S1	Native squamous epithelium; squamous metaplasia; immature squamous metaplasia with or without inflammatory or reactive changes; atrophy	W1	Absent	E1	Normal; inflammatory; reactive changes; endocervical polyp	M1	Normal; inflammatory; reactive; hormonal changes	O1	Normal vaginal tissues; inflammatory; reactive; hormonal changes
						E2	Mild nuclear changes (probably reactive)	M2	Endometrial hyperplasia		
C2	Low-grade intraepithelial abnormality	S2	S2 Atypia: atypical immature squamous metaplasia	W2	Suggestive/possible			M3	Endometrial atypical hyperplasia (mild)	O2	HPV effect in vaginal tissues
		S3	S3 HPV effect	W3	Definite/consistent					O3	Vaginal intraepithelial dysplasia (VAIN 1)
		S4	Mild dysplasia (CIN 1)								
C3	High-grade intraepithelial abnormality	S5	Moderate dysplasia (CIN 2)			E3	Endocervical dysplasia	M4	Endometrial atypical hyperplasia (moderate to severe)	O4	Vaginal intraepithelial neoplasia (VAIN 2 – VAIN 3)
		S6	Severe dysplasia/CIS (CIN 2)			E4	Adenocarcinoma-in-situ				
C4	Invasive malignancy	S7	Microinvasive squamous cell carcinoma			E5	Microinvasive adenocarcinoma	M5	Endometrial carcinoma (all types)	O5	Vaginal squamous cell carcinoma
		S8	Invasive squamous cell carcinoma			E6	Invasive adenocarcinoma	M6	Endometrial stromal tumour	O6	Vaginal adenocarcinoma
						E7	Adenosquamous carcinoma (cervix)	M7	Mixed mullerian tumour	O7	Ovarian carcinoma (all types)
						E8	Carcinoma of cervix (other)			O8	Metastatic tumour
										O9	Other malignancy

[1] *Unsatisfactory cervical biopsies should be coded: "CØ, SØ, WU, EU, MU, OU."*
[2] *- Code = Not applicable (i.e. No epithelium collected). E.g. if a cervical biopsy has no endocervical epithelium present; code = E-*

Histology Specimen Types

T	Specimen Type
TA	Amputated cervix
TP	Cervical polyp
TS	Subtotal hysterectomy
TØ	Not disclosed
T1	Punch biopsy of cervix
T2	Endocervical curettage
T3	Large loop excision of TZ
T4	Cone biopsy
T5	Endometrial curettage
T6	Hysterectomy
T7	Vaginal biopsy
T8	Other pelvic tissues
T9	Metastatic sites

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