

## Surveillance summaries

# CATCHING UP WITH THE CATCH-UP: HPV VACCINATION COVERAGE DATA FOR AUSTRALIAN WOMEN AGED 18–26 YEARS FROM THE NATIONAL HPV VACCINATION PROGRAM REGISTER

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### Abstract

This report describes human papillomavirus (HPV) vaccine coverage data for Australian women 18–26 years of age, as notified to the National Human Papillomavirus Vaccination Program Register. A cross-sectional analysis was conducted of notifications to the Register of HPV vaccine doses delivered as part of the National HPV Vaccination Program, which provided free catch-up vaccination to women 18–26 years of age across Australia between 2007 and 2009. HPV vaccination coverage estimates were calculated by age, state or territory of residence and dose number, using the Australian Bureau of Statistics population estimates as the denominator. As at March 2011, approximately 4.49 million doses had been notified to the Register of females of all ages, and 1.7 million of these were for women aged 18–26 years in 2007. Vaccination coverage was highest for females aged 18 years and lowest in females aged 26 years. For the entire 18–26 years cohort, coverage was estimated at 55.2% for dose 1, 44.8% for dose 2 and 31.7% for dose 3. Notified dose 1 coverage rates by single year of age and state or territory ranged between 22% for females aged 26 years in the Northern Territory and 76% in females aged 18 years in Queensland, with dose 1 coverage highest across the age range in the Northern Territory, Queensland and South Australia. These data suggest that over half of Australian women aged 18–26 years commenced HPV vaccine courses and about one-third are fully vaccinated. Some of the differences in the coverage observed between states and territories likely reflect differing mechanisms for notifying to the Register. *Commun Dis Intell* 2011;35(2):197–201.

Keywords: human papillomavirus, immunisation, vaccination coverage

### Introduction

Both currently registered prophylactic human papillomavirus (HPV) vaccines are highly efficacious at preventing persistent infection with, and cervical

lesions due to, targeted HPV types.<sup>1</sup> Both vaccines protect against the high risk HPV types 16 and 18, which are detected in 70%–80% of cervical cancers in Australia,<sup>2</sup> and the quadrivalent vaccine also provides protection against HPV types 6 and 11, which are detected in 90%–95% of genital warts.<sup>3</sup> As part of the National Immunisation Program, in 2007 the Australian Government funded a Human Papillomavirus Vaccination Program at a cost of \$632.9 million over 4 years. A catch-up program using a 3-dose course of quadrivalent vaccine for women 12–26 years of age was delivered through school-based programs for girls at school and through general practice and community-based programs, until 30 June 2009. Women who had started the 3-dose course were provided the opportunity to complete the course by 31 December 2009. The Program now provides HPV vaccine on an ongoing basis through schools for girls aged 12–13 years.

As HPV vaccines are prophylactic only, the primary target group for HPV vaccination is non-sexually active, pre-adolescent females (i.e. before exposure to HPV). Based on trial evidence and policy considerations, many countries have made national recommendations for the inclusion of HPV vaccine in their vaccination programs, with differing target populations according to local data about age of sexual debut, delivery strategies and resources.<sup>5,6</sup> Whilst both Canada and the United States of America recommend vaccination through to age 26 years (the oldest age included in the pre-registration vaccine trial population), to date only Australia has implemented a national, funded vaccination catch-up program for women aged 18–26 years.

As part of the National HPV Vaccination Program, the establishment of an HPV Vaccination Register was enabled through legislation. The National HPV Vaccination Program Register (NHVPR) is Australia's first national adult vaccination register. Consent (verbal or written) is required to provide details to the Register of doses administered, and an individual may opt-off at any time by writing to the Register. Because of the tight timelines for

the initial roll-out of the vaccination program by April 2007, there was a relative delay in the establishment of the NHVPR, which commenced operations in June 2008. This report presents vaccine coverage data for women 18–26 years of age as notified to the NHVPR.

## Methods

### Collection of notifications from general practitioners and other immunisation providers

In July 2008, all practitioners identified as practising general practitioners (GPs) through Medicare Australia (Medicare) claims data, were invited by mail to register with the NHVPR. However, GPs were only required to complete a registration form if notification payments were requested. GPs were paid \$6 per dose notified as having been administered to an age-eligible woman. To encourage notification, the NHVPR provides a range of options for notification to the Register. In most states and territories, immunisation providers notify the Register directly using one of several methods: using automated print-outs from any of the commonly used practice management software packages, by completing a notification form; or via any other paper-based recording of notifications as long as the required fields are present. Notifications can be mailed or faxed to the Register. Both Queensland and the Northern Territory have state-based immunisation registers to which immunisation providers are accustomed to reporting. Providers are not required to directly notify the Register but rather to notify their health department, which then notifies the Register. In South Australia, at the commencement of the catch-up program, their health department established central reporting of GP delivered HPV vaccinations to the department, which then notified the Register once it was established. Since late 2008, South Australian providers have notified the Register directly.

State and territory health departments are responsible for providing notifications from their school-based programs to the NHVPR. Most states and territories maintain state immunisation databases and notify episodes to the Register by electronic upload.

### Data entry and processing

Vaccination episodes notified to the NHVPR undergo validation, where the data are checked for mandatory fields, correct data formats and correct data. This validation process checks gender, Medicare number algorithms, presence of localities and postcodes, vaccination dates within a defined range and validity of provider details. Records failing validation are rejected and require review and follow-up. This involves contacting GP practices

to check details submitted and to collect missing information. Records that pass the initial validation then undergo consumer matching and further data quality checks. Specialised matching software attempts to match the incoming records with existing consumers on the Register. Where the system is able to locate an exact match, the incoming record is then added to the existing consumer's record. Where the system is not able to find an exact match, it will either create a new record or look for possible matches, which are then reviewed by a data processing operator. The records are also checked for data anomalies and inconsistencies, such as invalid combinations of state, suburb and postcode or GP details inconsistent with Medicare Provider files. These anomalies are presented to an operator for resolution.

### Analysis of notifications

Data were extracted from the NHVPR as at 22 March 2011, for all valid doses (i.e. administered according to the minimum dose intervals specified in *The Australian Immunisation Handbook* 9th edition (2008)<sup>6</sup> or constituting part of a clinically complete course, as designated by the Guidelines of the Chief Medical Officer<sup>7</sup>) in women aged 18–26 years in 2007. Coverage was calculated as valid doses notified, divided by estimated resident population expressed as a percentage. Coverage was calculated by dose number, consumer state of residence and age in years as at mid-2007, using mid-year 2007 Australian Bureau of Statistics population estimates as the denominator.

## Results

As at 28 January 2011, 22,899 GPs had registered to notify doses with the NHVPR. By March 2011, approximately 4.5 million doses had been notified to the Register from females of all ages, with 1.7 million of these valid doses in women aged 18–26 years in 2007.

National notified coverage for women aged 18–26 years was 55.2% for dose 1, 44.8% for dose 2 and 31.7% for dose 3. Women aged 26 years in 2007, only half of whom were eligible for vaccination given that the GP or community program started in July 2007 and women who had already turned 27 were ineligible to commence the course, had substantially lower notified coverage than other ages. Coverage for women aged 18–25 years is therefore slightly higher at 58.3%, 47.4% and 33.5% for doses 1, 2, and 3 respectively. Coverage rates by dose number, age in 2007 and state are given in the Table. The Figure presents dose 1 coverage data by age in years and state of residence, and graphically indicates that the 2 states and 1 territory with central reporting of HPV doses have the highest documented vaccine coverage.

**Table: Notified Australian human papillomavirus vaccination coverage on the National HPV Vaccination Program Register for women aged 18 to 26 years in 2007, as at 22 March 2011,\* by dose number, age, and state or territory of residence**

State (total doses)	Dose	Age in years (as at mid-2007)									
		18 (%)	19 (%)	20 (%)	21 (%)	22 (%)	23 (%)	24 (%)	25 (%)	26 (%)	18–26 (%)
ACT n=33,066	1	64	59	56	58	58	56	54	46	31	53
	2	54	48	45	47	45	45	43	39	26	43
	3	41	35	31	33	33	33	33	29	19	32
NSW n=474,102	1	60	55	53	52	50	50	49	43	26	48
	2	49	43	41	40	39	38	38	34	20	38
	3	37	30	29	27	27	26	26	24	15	27
NT n=20,826	1	74	69	69	64	66	64	61	48	22	59
	2	63	54	55	50	53	51	48	40	18	47
	3	49	40	41	34	38	37	35	29	13	34
Qld n=394,872	1	76	74	72	68	67	67	66	58	33	64
	2	63	61	60	56	56	55	55	47	26	53
	3	40	38	37	36	35	36	35	29	13	33
SA n=132,837	1	69	67	64	61	60	60	59	52	32	59
	2	57	55	52	50	49	49	49	43	26	48
	3	42	39	36	35	34	34	34	31	18	34
Tas n=37,326	1	65	60	63	60	59	57	54	48	31	56
	2	55	49	51	49	48	47	45	40	25	46
	3	43	36	38	36	35	35	33	30	18	34
Vic n=470,004	1	70	63	62	60	60	60	58	52	35	58
	2	61	53	52	50	50	50	48	44	29	48
	3	49	41	39	37	37	38	37	34	23	37
WA n=155,461	1	58	56	55	54	53	52	51	41	25	50
	2	47	46	44	43	43	41	41	33	20	40
	3	35	34	32	31	31	30	30	25	15	30
Australia n=1,718,494	1	67	62	61	59	58	57	56	49	30	55
	2	55	50	49	47	46	46	45	40	24	45
	3	41	36	34	33	32	32	32	28	17	32

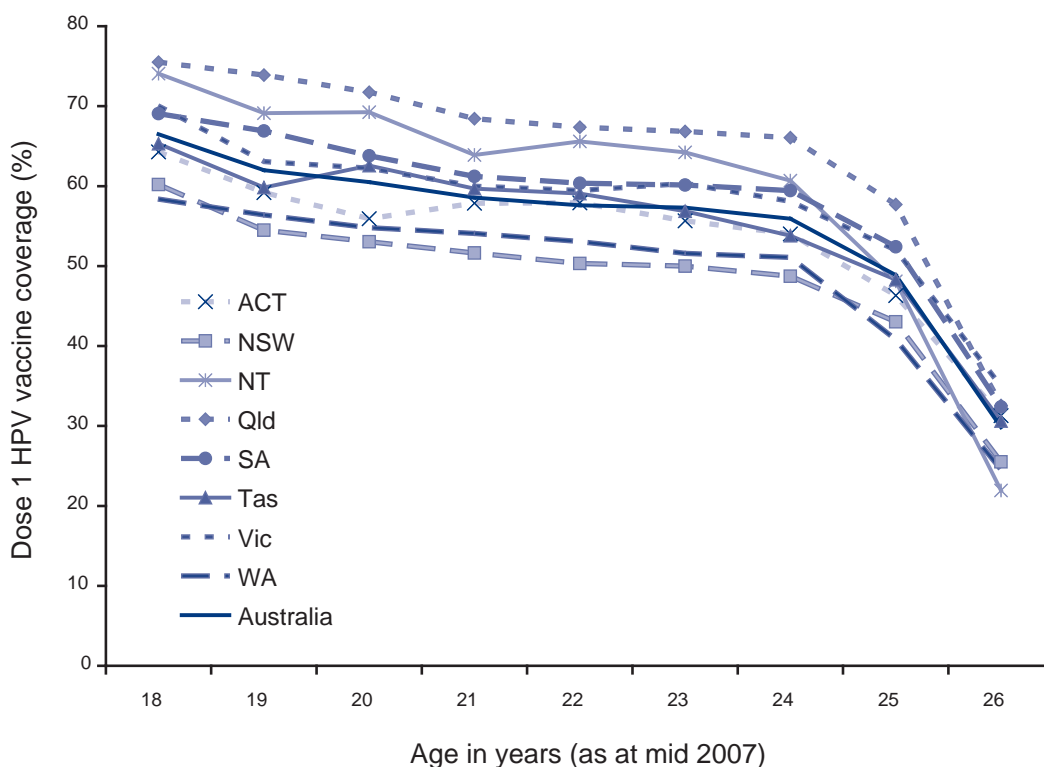
\* The catch up component of the National HPV Vaccination Program concluded on 31 December 2009. Notification of doses to the National HPV Vaccination Program Register (NHVPR) is ongoing. Excludes consumers who do not wish their details to be recorded on the Register.

## Discussion

Based on these estimates from HPV vaccine doses notified to the NHVPR, vaccine coverage achieved in Australian young adult women is higher than was anticipated based on previous efforts to vaccinate this age group (e.g. young adult measles-mumps-rubella vaccine campaign) and Australia has achieved the highest coverage in young adult women in the world to date. It is estimated that around 60% of all Australian women 18–26 years of age received at least 1 HPV vaccine dose, based on estimates from those states and territories with central notification of administered doses.

The Northern Territory, Queensland and South Australia, the jurisdictions with centralised mechanisms for notification of vaccine doses, have the highest reported HPV vaccine coverage estimates to date (10%–20% higher than in other states and territories). Because promotion of the program was conducted at a national level, it is likely that this difference reflects relative under-notification from other states and territories rather than truly higher coverage in these areas. This relative under-notification is apparent despite the very high number of GPs who registered with the NHVPR to notify. A national study of the Divisions of General Practice Immunisation Coordinators conducted in 2010

**Figure: Notified dose 1 human papillomavirus vaccine coverage in women aged 18–26 years on the National HPV Vaccination Program Register, Australia, as at 22 March 2011,\* by state or territory of residence**



\* Excludes consumers who do not wish their details to be recorded on the Register.

found that 50% thought that more than 90% GPs in their Division had notified but that several felt that reporting rates were closer to 50%.<sup>8</sup> A particular challenge for providers was the requirement to retain data and notify doses previously administered, as the NHVPR was not operational at the time of program commencement. Some providers did not initially gain consent for the notification of administered doses to the NHVPR, delaying or preventing subsequent reporting. Concerns about consent gained traction in some states more than others and may explain why New South Wales has apparently lower HPV vaccination uptake.<sup>9</sup> This is supported by NHVPR records which show that 48% of all consent-based queries received by the telephone information service requiring follow up were from New South Wales GPs.

Calculating the percentage of notified doses against dose distribution data for the period 2007–2009 by state and territory shows a range by jurisdiction of 74% to 86% (data not shown, in-confidence). In reconciling these data it was important to account for the number of doses purchased but not yet distributed by the end of 2009, which differed substantially by jurisdiction: these doses were used for the on-going program. As accurate HPV vaccine coverage data are essential for monitoring and evaluating the program, as well

as for the future records of women and their doctors, an estimate of the extent of under-notification is vital to adequately adjust for this factor in future assessments of vaccine effectiveness: failure to do so will bias estimates towards the null (i.e. no effect) when outcomes are compared in vaccinated vs apparently unvaccinated women. As well as comparisons against dose distribution data, independent population based coverage estimates are important to accurately assess the extent of non-notification. A population based computer-assisted telephone interview (CATI) in Victoria in May 2009 found coverage of 74%, 69%, and 56% for doses 1, 2, and 3, respectively, among 234 women aged 16–26 years in 2007<sup>10</sup> and a national survey of Year 10 and 12 school girls in 2009 found that 86% reported receipt of at least 1 dose.<sup>11</sup> The Victorian Cytology Service, operator of the NHVPR, is currently undertaking a national CATI survey, in conjunction with the Kirby Institute, to provide independent national estimates of HPV vaccine coverage in young adult women by age and State. Because the survey relies on self reporting, a validation sub-study will compare self-reported doses against the NHVPR and where necessary, provider's records.

All immunisers are strongly encouraged to notify the NHVPR of all HPV vaccinations to make the information on the Register as complete as possible. This

will not only ensure accurate vaccination records are available for women and their health care providers in the future but also improve the quality of data available to measure the impact of Australia's world leading HPV vaccination program.

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## References

1. Lu B, Kumar A, Castellsagué X, Giuliano AR. Efficacy and safety of prophylactic vaccines against cervical HPV infection and diseases among women: a systematic review & meta-analysis. *BMC Infect Dis* 2011;12(11):13.
2. Brotherton JM. How much cervical cancer in Australia is vaccine preventable? A meta-analysis. *Vaccine* 2008;26(2):250–256.
3. Garland SM, Steben M, Sings HL, James M, Lu S, Railkar R, et al. Natural history of genital warts: analysis of the placebo arm of 2 randomized phase iii trials of a quadrivalent human papillomavirus (types 6, 11, 16, and 18) vaccine. *J Infect Dis* 2009;199(6):805–814.
4. Koulova A, Tsui J, Irwin K, Van Damme P, Bielik R, Aquado MT. Country recommendations on the inclusion of HPV vaccines in national immunization programmes among high-income countries, June 2006–January 2008. *Vaccine* 2008;26(51):6529–6541.
5. Dorleans F, Giambi C, Dematte L, Cotter S, Stefanoff P, Mereckiene J, et al, on behalf of the VENICE 2 project gatekeepers group. The current state of introduction of human papillomavirus vaccination into national immunisation schedules in Europe: first results of the VENICE2 2010 survey. *Euro Surveill* 2010;15(47):pii=19730. Available from: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19730>
6. National Health and Medical Research Council. *The Australian Immunisation Handbook*, 9th edn, 2008. Australian Government; Canberra.
7. Chief Medical Officer. Guidance on revaccination where HPV vaccine doses have been given at less than recommended minimum intervals. Australian Government. Department of Health and Ageing, January 2009. Available from: [http://www.health.gov.au/internet/immunise/publishing.nsf/Content/D5F6C9E0EEAE74FFCA25770300807AA3/\\$File/CMO-full-advice-hpv.pdf](http://www.health.gov.au/internet/immunise/publishing.nsf/Content/D5F6C9E0EEAE74FFCA25770300807AA3/$File/CMO-full-advice-hpv.pdf)
8. Brotherton JML, Barbaro B. Why did some practices not notify HPV vaccination: implications for coverage assessment. Proceedings from the *Communicable Diseases Control Conference 2011*, Hotel Realm, Canberra, Australia, 4–6 April 2011.
9. Australian Medical Association. Privacy Commissioner advice on HPV Register. GP Network News Issue 09, Number 21, 10 July 2009. Available from: <http://ama.com.au/node/4811>
10. Brotherton JML, Mullins R. Will young women have a free HPV vaccine and will it impact on cervical screening? An analysis from Victoria, Australia. Presented at the 26th International Papillomavirus Conference, Montreal, Canada, 3–8 July 2010.
11. Agius PA, Pitts MK, Smith AM, Mitchell A. Human papillomavirus and cervical cancer: Gardasil vaccination status and knowledge amongst a nationally representative sample of Australian secondary school students. *Vaccine* 2010;28(27):4416–4422.