

## Surveillance summaries

# INTERIM ESTIMATES OF HUMAN PAPILLOMAVIRUS VACCINATION COVERAGE IN THE SCHOOL-BASED PROGRAM IN AUSTRALIA

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### Abstract

In November 2006, the Australian Government announced the National HPV Vaccination Program, consisting of a course of prophylactic human papillomavirus (HPV) vaccine for all Australian females aged 12–26 years. Females aged 12–18 years are vaccinated through school-based programs. The school-based component commenced in April 2007, with the school years targeted varying across jurisdictions. Each jurisdiction maintains comprehensive records of HPV doses delivered in the school-based programs although how this is captured varies. This report presents interim coverage estimates for Year 1 (2007) of the program. Both New South Wales and Victoria achieved coverage of 70% or more among almost all school cohorts vaccinated in the program. Some of the variation in coverage achieved may reflect different levels of experience with school-based programs, and varying methods for school-based vaccine delivery and recording of doses administered. Except for some doses in South Australia, these interim coverage estimates do not include catch-up doses delivered by general practitioners or persons who were vaccinated prior to the onset of the program. Therefore, these data should be considered minimum estimates of coverage. The 1st year of the school-based HPV vaccination program should be considered a success, given time and resource constraints. Public sector immunisation providers across Australia should be commended for planning and implementing a new national immunisation program in approximately 4 months. *Commun Dis Intell* 2008;32:457–461.

**Keywords:** human papillomavirus immunisation, immunisation coverage, school-based immunisation, Australia, vaccination.

In November 2006, the Australian Government announced the National HPV Vaccination Program, consisting of a course of human papillomavirus (HPV) vaccine for Australian females aged 12–26 years. The program will provide ongoing vaccination to future cohorts of girls

in the 1st year of high school (aged 12–13 years), with the catch-up component (ages 14–26 years) running for 2 years (i.e. 2007/08). Females aged 12–18 years are vaccinated through school-based programs, established in all states and territories of Australia, with women aged 18–26 years and those aged 12–18 years not in school, vaccinated through primary care services; primarily general practitioners (GPs). A complete course requires 3 doses of vaccine to be given over a 4–6 month period. The Federal Government is responsible for the development and dissemination of communication materials, funding of the vaccine (including most of the resources for service delivery), and the establishment of the National HPV Vaccination Program Register. States and territories are responsible for program implementation including vaccine delivery, provider education, and implementing school-based programs, including production of local program resources, such as consent forms and information for parents and data collection. The school-based component commenced in April 2007.

The school-based programs provide free vaccination to female students within both public and private schools by teams of trained immunisation providers. Information and consent forms are provided to parents and, in some jurisdictions, older students through the school. Parental consent is required for students under 18 years of age to receive the vaccine at school except in South Australia and Queensland, where consent may be accepted from students aged 16 years or older if they are assessed as competent to give consent. Consent is also obtained for inclusion of details of the vaccination on the National HPV Vaccination Program Register. If a student missed a scheduled dose during school-based delivery, parents/students were requested to obtain the remaining doses of the course either through immunisation clinics or their GP.

Due to the need to complete the vaccine course within the school year, in Year 1 of the program an accelerated schedule of 0, 1, and 4 months was considered acceptable where necessary, based on data provided by the manufacturer to the Australian

Technical Advisory Group on Immunisation (the usual schedule is 0, 2, and 6 months). In 2007, the only HPV vaccine available for use in the Program was the quadrivalent HPV vaccine, Gardasil®.

The National HPV Vaccination Program Register, established under the *National Health Amendment Act 2007 (National HPV Vaccination Program Register)*, will maintain a record of HPV vaccinations given in Australia. The Register will receive data (retrospectively initially) from all states and territories and from all types of vaccination providers. Until the register is fully operational, no estimates of HPV vaccination coverage in women targeted for the program are available. However, all states and territories maintain comprehensive records of HPV doses delivered in the school-based programs although how this is captured varies across jurisdictions. In some jurisdictions the number of doses administered are collated at a local level (e.g. council level) before being forwarded to a central database, whereas in others (e.g. New South Wales) doses administered are reported to a central database on a daily basis. There is also no standard approach for estimating the denominator population. Some jurisdictions use the enrolled school population at the time each dose is administered (e.g. Western Australia and New South Wales) and others use start of year enrolments as the denominator throughout (e.g. South Australia, Tasmania and Victoria).

The Table shows interim coverage estimates by jurisdiction, vaccine dose and school year for Year 1 of the school-based HPV vaccine program. The cohorts targeted for the 1st year of the program varied by jurisdiction.

### Australian Capital Territory

The HPV school-based program commenced in the Australian Capital Territory in April 2007 offering the vaccine to girls in Years 7, 10, 11 and 12 (n=~9,400). In 2007, the HPV vaccine was not co-administered with any other vaccine. Dose 3 coverage rates for Year 7 were 68.3%, while the Year 10, 11 and 12 catch-up years had a combined coverage rate of 61.3% (Table). The 1st dose HPV coverage rates are comparable to the 2007 coverage rates for single dose dTpa (79.8%), which in the Australian Capital Territory is administered to Year 9 students.

The HPV program was implemented through the existing school-based vaccination program run by ACT Health. The school program allows for missed doses to be administered through a general practice program at the end of the school year. The catch-up program is continuing in 2008 with girls in Years 7, 9 and 10 being offered the HPV vaccine.

### New South Wales

In New South Wales, the school-based program commenced in late April 2007 and targeted females in Years 10, 11 and 12 (ages 15–18 years, n=~114,000). HPV vaccine was not co-administered with other vaccines and catch-up of missed doses is ongoing through targeted clinics and GPs. School-based immunisation is delivered by area health service or public health unit (n=8) based teams of immunisation nurses.

Surveillance of adverse events following immunisation (AEFI) in the school-based program in New South Wales in 2007 noted an apparently higher rate of anaphylaxis than documented from other vaccination programs. An investigation confirmed 7 reported cases (2.6 per 100,000 doses)<sup>1</sup> but this apparently increased rate was not observed in other areas of Australia.

### Northern Territory

In the Northern Territory, the school-based program commenced in April 2007 and targeted females in Years 10, 11 and 12 (ages 15–18 years) at 21 schools (n=~2,800 students). HPV vaccination was co-administered with pneumococcal vaccine for Indigenous students in Year 10, where possible. School-based immunisation was delivered by health promoting school nurses in public schools and by public health unit immunisation nurses in private schools. Across all schools and Years 10, 11 and 12, the coverage for the 1st dose was 80% (2,260), second dose 71% (2,000) and third dose 64% (1,795).

### Queensland

In 2007, the Queensland Health School-based Vaccination Program offered the HPV vaccine to approximately 79,000 girls in Years 10, 11 and 12 across 560 private and public schools. The program commenced in April 2007. HPV vaccine for Year 10 female students was co-administered with dTpa vaccine.

Initial data indicates approximately 74% of students (58,824) in Years 10, 11 and 12 received dose 1, 69% (55,082) received dose 2, and 62% (49,416) received dose 3 in the school program. Vaccination coverage for school students is expected to be higher, given that some students completed the series through their GP. GP data are currently being analysed at Queensland Health.

The school-based program is provided by qualified vaccination teams from Queensland Health, the local council or another health provider contracted by Queensland Health. The program is managed at a state-wide level with Zonal Coordinators located

in Southern, Central and North Queensland. Catch-up vaccination is offered by the vaccination teams at follow-up visits to schools or through community clinics. Students are also able to access free catch-up vaccine through their GP.

## Tasmania

In Tasmania, the school-based HPV program is predominantly being delivered by local government councils. There are 29 council municipalities across the state; all have participated in the HPV program. The program is being coordinated, and the data collected centrally, through the Department of Health and Human Services, Communicable Diseases Prevention Unit.

The school-based program commenced in May 2007. The recommended target groups for 2007 were Grades 6 or 7, and 10 through 12 (ultimately however only a few schools vaccinated Grades 11 and 12 in 2007). Approximately 176 schools participated. In 2008, the target group will be Grades 6 or 7, 8 and 9, and 11 and 12. Some local councils chose to do all grades in 2007 and this is reflected in the coverage data (estimated target population in 2007 approximately 16,000). HPV vaccinations were co-administered with hepatitis B and varicella vaccines in Grade 6 and 7 and dTpa in Grade 10. Hepatitis B coverage was slightly higher in Grade 7 students than HPV coverage (hepatitis B vaccine dose 1 and 2 coverage of 79% and 71% respectively).

Almost 32,000 doses of vaccine were administered in the school-based program in 2007 and it is anticipated that coverage will increase as the program continues in 2008. Currently, catch-up of missed doses is ongoing through council school programs, immunisation clinics, targeted HPV clinics, and through GPs.

## South Australia

In South Australia, the 1st year of high school commences at Year 8 (13 years of age). It was considered impractical to offer the vaccine to 12 year olds in Year 7 as there are significantly more primary than high schools. South Australia elected to deliver both the ongoing program and the entire school catch-up program over 1 year. In 2007, the HPV vaccine was offered to 50,191 girls in Years 8 through 12. Coverage for the full series was highest in Year 8 (Table). Students who were not vaccinated on the day the immunisation team visited, attended local council clinics or general practice for vaccination.

Providers who deliver the vaccine to individuals outside of the school setting are asked to report on a special 'follow up' card. These data are added to the

school year level data. Providers were also asked to obtain consent on specifically designed forms from all individuals who wished their details to be sent to the HPV Register. Until the Register is operational, providers were asked to send the completed register forms to the South Australian health department. As some GPs considered the register forms as replacing the 'follow up' cards, data on some doses were included on the HPV Register forms but not on the 'follow up' cards. This explains why the school coverage may have a lower figure for dose 2 compared with dose 3.

## Victoria

In Victoria, the HPV vaccine secondary school program commenced on 16 April 2007. Females in Years 7, 10, 11 and 12 (ages 12 and 15 to 18 years) were targeted ( $n \approx 125,000$ ). This program was coordinated and provided by 78 local councils (1 council has no secondary schools). The HPV vaccine was administered at the same time as other scheduled vaccines due in Year 7 and Year 10. Coverage rates for co-administered vaccines were stable or improved from 2006 (e.g. diphtheria tetanus and acellular pertussis [dTpa] Year 10 coverage was 78% for both years).

A cluster of AEFI reported in May 2007 led to mass media coverage regarding HPV vaccine safety.<sup>2</sup> The Surveillance of Adverse Events Following Vaccination in the Community service provided a clinical investigation of the reported AEFI. The final assessment of the HPV-related adverse events (that they were cases of mass psychogenic illness) did not alter the administration or safety profile of the vaccine program.

## Western Australia

In Western Australia the school-based HPV program is coordinated by the Communicable Disease Control Directorate (CDCD). It is delivered by either community school nurses employed by area health services (in 7 rural and 1 metropolitan region), or contracted out to local government authorities (5 in total in the metropolitan area) who engage nurses to deliver the immunisation program in schools. CDCD is responsible for the overall coordination of the HPV program to the target group aged 12–18 years.

The school-based HPV program commenced in May 2007 and was offered to females in Years 10, 11 and 12 in all schools in Western Australia. ( $n \approx 39,000$ ). In 2008 the HPV vaccine is being offered to females in Years 7, 8, 9 and 10 in all schools.

**Table. Quadrivalent human papillomavirus vaccine coverage (doses administered to enrolled population) in school-based programs, 2007,\* by state or territory**

Dose	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12
<b>Australian Capital Territory</b> (Years 10 to 12 combined)							
Dose 1	NA	82%	NA	NA	79%		
Dose 2	NA	79%	NA	NA	74%		
Dose 3	NA	68%	NA	NA	61%		
<b>New South Wales</b>							
Dose 1	NA	NA	NA	NA	84%	82%	84%
Dose 2	NA	NA	NA	NA	81%	79%	81%
Dose 3	NA	NA	NA	NA	75%	72%	75%
<b>Northern Territory</b> (Years 10 to 12 combined)							
Dose 1	NA	NA	NA	NA	80%		
Dose 2	NA	NA	NA	NA	71%		
Dose 3	NA	NA	NA	NA	64%		
<b>Queensland</b> (Years 10 to 12 combined)							
Dose 1	NA	NA	NA	NA	74%		
Dose 2	NA	NA	NA	NA	69%		
Dose 3	NA	NA	NA	NA	62%		
<b>South Australia</b>							
Dose 1	NA	NA	83%	69%	70%	64%	66%
Dose 2	NA	NA	78%	64%	64%	57%	60%
Dose 3	NA	NA	77%	65%	64%	57%	55%
<b>Tasmania</b>							
Dose 1	76%	72%	70%	67%	73%	64%	57%
Dose 2	71%	67%	65%	63%	67%	58%	52%
Dose 3	64%	61%	58%	55%	57%	50%	44%
<b>Victoria</b>							
Dose 1	NA	85%	NA	NA	82%	81%	82%
Dose 2	NA	81%	NA	NA	76%	76%	78%
Dose 3	NA	75%	NA	NA	69%	70%	71%
<b>Western Australia</b> (Years 10 to 12 combined)							
Dose 1	NA	NA	NA	NA	71%		
Dose 2	NA	NA	NA	NA	67%		
Dose 3	NA	NA	NA	NA	60%		

\* Does not include catch-up doses delivered in general practice/community health settings, except in South Australia where these are partially recorded.

NA Not applicable as this year cohort was not targeted in 2007.

The 2007 school-based HPV program for Years 10, 11 and 12 in Western Australia achieved a combined vaccine uptake of 71% (28,590) for dose 1, 67% (27,235) for dose 2, and a 60% (24,520) uptake for dose 3. Reports of adverse events were minimal; the majority of reports were arm soreness, arm tingling and general malaise for 24 hours.

## Summary

Public sector immunisation providers in all Australian jurisdictions should be commended for

planning and implementing a new national immunisation program in approximately 4 months. This achievement is even more remarkable considering that Australia was the 1st country in the world to implement a universal HPV vaccination program delivered to females through the school system.

HPV vaccination coverage in the school-based programs reached a high of 77% among Year 8 students in South Australia. Both New South Wales and Victoria achieved coverage of 70% or more among almost all school cohorts vaccinated in the 1st year

of the program. Some of the variation in coverage achieved reflects different levels of experience with school-based vaccination delivery across jurisdictions, with those jurisdictions that have had such programs in place for many years benefiting from parental and student familiarity with the process. It should be noted that these coverage estimates record doses delivered in schools and do not (except for some doses in South Australia) include catch-up doses delivered outside the school system if doses were missed. In addition, anyone who had been vaccinated prior to the onset of the program would not be included. Therefore, these data should be considered minimum estimates of coverage.

While reported coverage varied by jurisdiction, it also varied by school year and tended to be inversely proportional with increasing age, as has been documented in other school-based vaccination programs in Australia. As many jurisdictions started the program among the older school year cohorts, coverage could be expected to increase in Year 2 of the program, targeting the lower enrolment years. There is, however, an ongoing risk of coverage rates being adversely affected by media reporting of adverse events following HPV immunisation or by the activities of anti-immunisation proponents.

Although coverage was less than optimum among some cohorts of students, the 1st year of the school-based HPV vaccination program should be considered a success, given time and resource constraints. It is anticipated that this success will continue, and perhaps be surpassed, during the second year. However, the school-based program is only 1 component of the overall National HPV Vaccination Program; the other is vaccination of women aged 18–26 years through primary care services. Coverage will be much more difficult to capture. However, as the National HPV Program Vaccination Register is implemented, a more accurate estimate of coverage among the entire cohort of women targeted for the program is anticipated.

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## References

1. Brotherton JM, Gold MS, Kemp AS, McIntyre PB, Burgess MA, Campbell-Lloyd S, New South Wales Health HPV Adverse Events Panel. Anaphylaxis following quadrivalent human papillomavirus vaccination. *CMAJ* 2008;179:525–533.
2. BATTERY JP, Madin S, Crawford NW, Elia S, La Vincente S, Hanieh S, et al. Mass psychogenic response to human papillomavirus vaccination. *Med J Aust* 2008;189:261–262.