### Abstract

Australia implemented a national, publicly-funded vaccination program against human papillomavirus (HPV) in 2007. Initially the program targeted females aged 12-13 years, with catch-up of females aged 13-26 years to 2009. Since 2013, males aged 12-13 years have also been included in the program, with a two-year catch-up for males aged to 14-15 years. Three-dose coverage in 12-13 year-old females is approximately 71%, and estimated coverage rates over the female catch-up program were 70% in the school-based program (females 12-17 years) and ~30-50% in the primary-care-based program (female 18-26 years). Early data on cervical abnormalities, genital warts and HPV prevalence in cervical specimens suggest the impact of this program has been rapid and substantial, and that it also provided some indirect protection for young unvaccinated females and young males. Almost seven million doses of HPV vaccine have been delivered in Australia, and the vaccine safety profile remains favorable and comparable to that of other vaccines. Ongoing monitoring of coverage, impact and safety will be critical for the ongoing success of the program. It is important to emphasise that female cohorts offered vaccination should continue to attend cervical screening, since current generation vaccines do not protect against all types of HPV implicated in cervical cancer.

### Coverage

Doses delivered through the NHVP are recorded on the NHVP Register, although completeness of recording is likely to be higher for doses delivered through the school-based program than through primary care. Three-dose coverage in the school-based program as recorded in the NHVP Register ranged from 74% (females aged 12 years in 2007) to 62% (females aged 17 years in 2007). Reported three-dose uptake in the catch-up program delivered through primary care was lower at 41% (females aged 18 years in 2007) to 17% (females aged 26 years in 2007), yielding 32% across this group, although under-reporting to the NHVP Register is likely for this component of the program, and survey data suggest an overall coverage rate closer to 50% in women aged 18-26 years in 2007. Early data suggest that uptake in the school-based program has been similar across different socioeconomic status strata. This is encouraging in terms of increasing health equity, as cervical screening participation and cervical cancer incidence are known to vary by socioeconomic status in Australia. National coverage data by Indigenous status are not available, but recent data from Queensland and the Northern Territory suggest that three-dose uptake is lower in Indigenous females (by 15% and 9% respectively). Coverage data are not yet available for uptake in males.

While coverage in Australia is relatively high compared to many other countries, the most recent data available for the target age group suggests slightly lower coverage in the years since the commencement of the NHVP (71% in females aged 12-13 years, 2011). Coverage in Australia has remained lower than for some other countries with similar school-based publicly-funded programs, such as England (three-dose coverage 86%) and Scotland (three-dose coverage 91%).

### Vaccine impact to date

Due to the comparatively early commencement of the NHVP and wide age range over which catch-up vaccination was offered in Australia relative to other countries, Australia has been the source of many population impact studies. Since the commencement of the NHVP, substantial reductions have been documented in rates of anogenital warts in young females and young males in sexual health clinics and in national hospital data, and in young females presenting to primary care, and also in HPV prevalence, and precancerous cervical abnormalities in young women. HPV vaccination status has been found to be associated with a reduction in precancerous cervical abnormalities in Victoria and Queensland. The impact of HPV vaccination on anogenital warts appears similar in young Indigenous and non-Indigenous females, based on the national hospital data. There is some evidence of indirect protection for unvaccinated groups, including...
an observed reduction in genital warts in young males attending sexual health clinics and admitted to hospital, prior to their inclusion in the program, and also an observed reduction in the prevalence of vaccine-included HPV types in cervical specimens from unvaccinated females. The extent and rapidity of impact are consistent with prior predictions made by epidemiological models. Vaccination against HPV 6/11 also raises the possibility that future reductions may be observed in the rare but serious disease, juvenile-onset recurrent respiratory papillomatosis, due to reduced transmission of HPV6/11 from vaccinated mothers. Surveillance commenced for juvenile-onset recurrent respiratory papillomatosis, via the Australian Paediatric Surveillance Unit, in October 2011.

However, a reduction in cervical screening participation has also been documented in young women in Australia. In spite of consistent messaging that screening remains important for vaccinated women, since current generation vaccines do not protect against all oncogenic HPV types, recent data suggest that young women who are vaccinated are significantly less likely to attend for screening than young unvaccinated women. There is also evidence that current cervical screening programs will become less efficient in the context of HPV vaccination. Recently, the Medical Services Advisory Committee recommended that Australia adopt HPV-based cervical screening with partial genotyping and a call-recall invitation system, in order to provide a program which will be more effective, efficient and accessible to Australian women, both HPV vaccinated and unvaccinated. A renewed invitation-based screening program, which involves direct testing for HPV, may motivate HPV-vaccinated women to attend for screening.

Safety

The safety profile of the HPV vaccine is good, and comparable to other vaccines. Around seven million doses have been delivered to date in Australia, with adverse events reported in less than 0.05% of cases. These adverse events have generally been mild and consistent with those recognised in clinical trials and recorded in product information.

Conclusion

Australia has implemented a successful and equitable vaccination program against HPV. Early data suggest the impact of this program has been rapid and substantial. Ongoing monitoring of coverage, impact and safety will be critical for the ongoing success of the vaccination program. However, the success of the overall cervical cancer prevention program will also critically depend on cervical screening. It will be important to encourage and motivate female cohorts offered vaccination to attend for cervical screening, in order to achieve the maximum potential of the comprehensive cervical cancer prevention program in Australia.

References