

Closing editorial: processes, opportunities and challenges after introduction of human papillomavirus vaccine

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This issue of *Sexual Health* has reflected on processes, opportunities and challenges that human papillomavirus (HPV) vaccines have created for the prevention of cervical cancer and other HPV-related diseases. Having been in development for over a decade, it is notable how rapidly HPV vaccines have been implemented in developed countries worldwide after registration for use. It is fair to note that this reflects a wave of enthusiasm for a preventive strategy for cervical cancer which, unlike cervical cytology screening, does not rely solely on the use of a test that many women find awkward and which requires an enormous sustained, and often unfeasible, commitment to quality and resources in all steps of the screening process.

There are substantial challenges in moving forward: at least with the current generation of prophylactic HPV vaccines, cervical screening programs remain necessary to detect cervical HPV and related lesions due to HPV types not covered by vaccination or which were present at the time of vaccination in catch up cohorts. Close monitoring of participation in cytology screening is required, as is further work investigating the strong potential, and acceptability of, screening using primary HPV DNA testing as a more sensitive way to check, among both vaccinated and unvaccinated women, whether oncogenic HPV infection is currently present at the cervix as a predictor of pre-neoplastic lesions.¹ This approach will allow, in combination with cytological assessment of HPV positive women and perhaps the use of other biomarkers of the potential for progression, a stratification of the future risk of cervical cancer and appropriate management.

Australia is in a unique position to observe potentially rapid changes in the epidemiology of HPV infection and

disease following the implementation of the National HPV Vaccination Program, which has achieved high coverage in a large section of the female population (aged 12–26 years) over a short time frame.² While the speed at which the program was implemented created perhaps unprecedented challenges for success (including political, logistic and communication challenges^{3–6}), the substantial vaccination coverage achieved is notable. More work is now needed to maintain and improve coverage in the ongoing school programs, through a sustained commitment to education around the complex messages that need to be conveyed about HPV, continuing responsiveness to community concerns about vaccination safety as they arise and through careful examination of coverage data to allow identification of communities where coverage is lower. The National HPV Vaccination Program Register (NHPVR) will facilitate these latter evaluations and is also needed to facilitate evaluation of the impact of the vaccine on Pap screening behaviour and disease incidence. The Register was established with a clear intent that the vaccination data held on the register would be linked with Pap screening data to assess vaccine effectiveness. Logistically the next steps are to develop the systems required to enable data linkage between the NHPVR and the eight jurisdictional Pap test registers, pending any decision to move towards a National Pap Test Register, which most logically could be combined with the vaccination register to create a national cervical cancer prevention register. A sustained commitment is also required to continue to improve the recording of Indigenous status across health datasets in Australia. Moving forward, this information must be available in relation to cervical cancer prevention strategies to ensure equity of access and uptake of both vaccination and screening.

Australia also needs to simultaneously ensure that adequate resources are available to seize the unprecedented opportunity to measure the impact of population-based HPV vaccination on HPV infection prevalence and genital warts. The vaccine program is undoubtedly already impacting upon both HPV prevalence and genital warts in the target population and almost inevitably in the non-targeted male population through herd immunity.^{7,8} As key parameters of HPV transmission and infection in the population, and especially male HPV epidemiology, are uncertain,^{8,9} it is astonishing that evaluation of the program impact through type specific HPV surveillance and genital warts surveillance was not a funded part of the Program, which was Australia's most expensive vaccination program ever. Currently the high rate of uptake of HPV vaccine among females, combined with the high vaccine cost, makes extension of the program to males unlikely in the Australian setting, as prevention of the remaining male disease burden would be at a very high incremental cost above the current program.³ Unfortunately it is unlikely that gay men, who are clearly at a significantly higher risk of HPV-related anal disease, will receive any substantial herd immunity benefit from the current program.¹⁰ A selective vaccination program for gay men would require them to identify themselves to health care providers before they were infected with oncogenic HPV types and currently the evidence suggests they have had a significant number of partners before this time.¹¹

More affordable vaccines are not only required if we are to move to HPV vaccine programs that include both males and females, but are also required in order to deliver HPV vaccines now to women in developing countries, who need them most. Feasibility work, such as that reported in this issue by Nghi *et al.*,¹² indicate that it is realistic to develop programs for pre-adolescent girls in developing country populations, despite the potential difficulties in accessing and delivering three doses of vaccine to this group. Whilst vaccine delivery globally would be greatly facilitated if fewer than three doses were required for adequate protection, as noted by McIntyre¹³, determining whether a two dose schedule is adequate is a current and important research question. With adequate assistance in obtaining vaccines through international strategies for central procurement and pricing, what will then assist developing countries most to prioritise the health of young girls and future mothers will be definitive evidence from developed countries showing that population-based HPV vaccination programs can and do work. Let us rise to this challenge.

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