



Human papillomavirus (HPV) vaccination coverage in young Australian women is higher than previously estimated: Independent estimates from a nationally representative mobile phone survey



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ABSTRACT

Background: Accurate estimates of coverage are essential for estimating the population effectiveness of human papillomavirus (HPV) vaccination. Australia has a purpose built National HPV Vaccination Program Register for monitoring coverage, however notification of doses administered to young women in the community during the national catch-up program (2007–2009) was not compulsory. In 2011, we undertook a population-based mobile phone survey of young women to independently estimate HPV vaccination coverage.

Methods: Randomly generated mobile phone numbers were dialed to recruit women aged 22–30 (age eligible for HPV vaccination) to complete a computer assisted telephone interview. Consent was sought to validate self reported HPV vaccination status against the national register. Coverage rates were calculated based on self report and weighted to the age and state of residence structure of the Australian female population. These were compared with coverage estimates from the register using Australian Bureau of Statistics estimated resident populations as the denominator.

Results: Among the 1379 participants, the national estimate for self reported HPV vaccination coverage for doses 1/2/3, respectively, weighted for age and state of residence, was 64/59/53%. This compares with coverage of 55/45/32% and 49/40/28% based on register records, using 2007 and 2011 population data as the denominators respectively. Some significant differences in coverage between the states were identified. 20% (223) of women returned a consent form allowing validation of doses against the register and provider records: among these women 85.6% (538) of self reported doses were confirmed.

Conclusions: We confirmed that coverage rates for young women vaccinated in the community (at age 18–26 years) are underestimated by the national register and that under-notification is greater for second and third doses. Using 2011 population estimates, rather than estimates contemporaneous with the program rollout, reduces register-based coverage estimates further because of large population increases due to immigration since the program.

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1. Introduction

In mid-2007 the Australian government introduced a National Human Papillomavirus (HPV) Vaccination Program. The prophylactic quadrivalent vaccine used prevents infection with HPV types

16 and 18, which are responsible for 70–80% of cervical cancers, as well as HPV types 6 and 11 which are responsible for almost all genital warts [1,2]. For a limited two year period from July 2007 to December 2009, females aged 13–26 years were offered catch-up vaccination through schools, general practitioners (GPs) and other community based immunization providers [3]. The ongoing national program provides routine school based vaccination to 12–13 year old females and, from 2013, 12–13 year old males with a two year catch-up for males aged 14–15 years. The quadrivalent and bivalent HPV vaccines have been available on the private market in Australia since mid 2006 and mid 2007, respectively.

HPV vaccination coverage in Australia is routinely monitored using a purpose built register, the National HPV Vaccination

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Program Register, established by legislation as part of the program [3]. The Register collects notification of HPV vaccinations from immunization providers, with States and Territories routinely notifying all HPV vaccination episodes from their State school based programs. GPs and community based providers can report doses delivered to individuals through either paper based notifications, including print outs from practice software, or electronically as spreadsheets or via a secure web portal directly to the Register [3]. Throughout the two year female catch-up program GPs were paid \$6 per notification as an incentive payment.

A good understanding of coverage levels is essential if the population effectiveness of HPV vaccination is to be estimated. However a one year delay between the commencement of the program and the establishment of the Register, and the fact that notifications from community providers were voluntary and required patient consent, suggest under-notification of doses for the adult women vaccinated in the community [4]. Available data from the Register show substantial variation in adult vaccine coverage recorded between States and Territories, suggesting that coverage data was more completely captured in the jurisdictions with existing state-based vaccination registers (e.g. Queensland); however an underlying difference in actual vaccination rates between jurisdictions cannot be excluded. New South Wales (NSW), which has the largest population, has reported coverage that is lower by 10–20% than the other populous Eastern states of Victoria and Queensland [4].

In 2011, we conducted a national computer assisted telephone interview (CATI) survey using random digit dialing of mobile phones of young women (aged 18–39 years) (the Young Women's Reproductive Health Survey). Here we present the findings for women eligible for HPV vaccination in the catch-up program with the aim of providing independent estimates of HPV vaccination coverage at a national and state level and comparing these results with those recorded in the Register.

2. Methods

Prior to undertaking the survey, we conducted a pilot study in March 2011 using the same method of dialing, which established the superiority of mobile phones over landlines as a means of randomly sampling young women in Australia [5]. We therefore conducted the coverage survey using random digit dialing of mobile phones with recruitment targets stratified by age and sex to ensure a representative sample with adequate power.

The CATI survey was conducted between August and December 2011 under a contract with the Hunter Valley Research Foundation, which trained telephone interviewers following standard scripts. Questions were adapted from previous standardized questions used in Australian sexual health surveys, and included in the pilot study. The sample of phone numbers was generated using listed mobile numbers in a composite electronic residential phone number database, with a random sample drawn and number suffixes altered. These numbers were matched with a major business directory database to eliminate known business numbers.

Women were eligible for the survey if they were aged 18–39 years and able to communicate verbally in English. If a selected phone number was unanswered when called, up to three messages were left on different days requesting a callback to complete the survey on a free call number.

Study participants who said that they had or may have received the HPV vaccine were asked if they would consent to having their vaccination details checked in the National HPV Vaccination Program Register and, where necessary, with their health care provider. These women were sent a form requesting consent, demographic details to allow checking on the Register, and details

of dates and locations of doses received. If no corresponding record of HPV vaccination could be located in the Register, staff from the Register contacted the health care provider to seek verification of the reported dose(s).

Analyses: Mobile phone respondents from the pilot study were combined with respondents from the main study. Women who reported vaccination but were unsure of the number of doses, were assumed to have received one dose only in coverage calculations. For women who consented to have their self reported vaccination data checked by the Register, the percentage agreement was examined. Vaccine coverage was examined overall and then focused on women who, on the basis of age, were eligible for catch up vaccination in the community under the national HPV vaccination program (18–26 years in 2007, corresponding to 22–30 years at the time of survey in 2011). Descriptive analysis was conducted in SPSS. Weighting variables were created to adjust the sample to the national distribution of women by State and age in single years using Australian Bureau of Statistics (ABS) population estimates for 2011. Weighted confidence intervals for coverage estimates were calculated using STATA. Estimates for population subgroups defined by demographic variables were compared using Pearson chi squared tests. Odds ratios were adjusted for age.

Coverage was separately estimated using data from the National HPV Vaccination Program Register, extracted as at 31 March 2013, for the cohort of women aged 18–26 years in 2007. Two denominators were used when comparing Register data with the estimates from the CATI survey responses. First were the ABS estimated resident population (ERP) estimates as at June 2007, as used in previously published results from the catch up program in this age group [4]. Secondly updated ABS ERP estimates as at June 2011 were used.

The study was approved by the University of New South Wales Human Research Ethics Committee and access to Register data was approved by the data custodian, the Commonwealth Department of Health and Ageing.

3. Results

In the main study, 2836 eligible women were identified (2.9% of 97,463 numbers dialed) of whom 2269 completed an interview (participation rate 80.0%). Of the other numbers called, the most frequent outcomes were male respondent (23.8%), answering machine (22.3%), woman of ineligible age (16.0%), disconnected (15.4%), no answer (8.9%), engaged (8.0%) and business numbers (1.8%). Initial refusals before screening for eligibility occurred in 0.2% of cases. Taking into account calls to numbers where eligibility was unknown [5] (40% of calls e.g. unanswered calls or answering machines), the estimated response rate was 41.7%. Interview time averaged 9.8 min. With the addition of 128 mobile phone respondents from the pilot study, given the identical methods and consistent results, there were 2397 participants in total.

3.1. Validation of self-reported vaccination status

There were 1334 women in the total sample who were vaccinated or unsure. Phone permission to be sent a consent form to authorize checking of HPV vaccination status by the Register was given by 1118 (84%). Of these, 223 (20%) returned a signed consent form (with 11 return to senders). Women who returned the consent form were older (mean 24.95 vs 23.77 years; $F=17.843$; $P<0.001$), more likely to be English speaking (92% vs 87%; $P=0.03$), of higher educational status (university degree 42% vs 27%; $P<0.001$) and married (26% vs 17%; $P=0.005$) than non consent returners.

Overall, of 629 self-reported doses (unsure women who did not nominate number of doses excluded), 538 doses (85.6%) were

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