



Human papillomavirus vaccine uptake in boys and girls in a school-based vaccine delivery program in Prince Edward Island, Canada



Carol A. McClure*, Mary-Ann MacSwain, Heather Morrison, Carolyn J. Sanford

Chief Public Health Office, Department of Health and Wellness, Government of Prince Edward Island, 16 Fitzroy Street, 2nd Floor Sullivan Building, Charlottetown, PE, Canada C1A 7N8

ARTICLE INFO

Article history:

Received 4 November 2014
Received in revised form 10 February 2015
Accepted 17 February 2015
Available online 27 February 2015

Keywords:

Human papillomavirus
HPV
HPV vaccination
Uptake
School-based
Public Health Nursing

ABSTRACT

Background: In 2013, Prince Edward Island was the first province to introduce HPV vaccine universally to grade six boys in a school-based program. Because uptake rates in boys are unknown in this type of vaccination program, uptake of HPV vaccination in boys was measured and compared with uptake rates in girls and then analyzed with factors such as county, urban–rural location of the school, and school board to identify where the vaccine program could be improved.

Methods: HPV vaccination records from the provincial childhood immunization registry in PEI were merged with Department of Education data containing all grade six girls and boys in PEI. Vaccine uptakes between years and between sexes were compared using two sample tests of proportions. Logistic regression modeling which accounted for the hierarchical nature of the data was used to analyze associations between factors and uptake rates.

Results: Although uptake was high in boys and girls, a significantly greater proportion of girls (85%) received all three doses of the HPV vaccine compared to boys (79%; $p = 0.004$). The odds of grade six girls being fully vaccinated for HPV were 1.5 times greater than of grade six boys, and the odds of students in the English Language School Board receiving all three doses were more than twice as great as the odds of French Language School Board students.

Conclusions: HPV vaccination for boys in PEI has had a successful launch, almost reaching the Canadian Immunization Committee recommendations of >80% for the early years of a program. PEI has a highly organized Public Health Nursing program that is involved in all childhood and school-based vaccinations in PEI and in this context very high coverage rates were obtained. Areas to target for improving uptake include the boys and the students in the French Language School Board.

© 2015 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

The World Health Organization recognizes human papillomavirus (HPV) as the most common sexually transmitted infection in the world [1]. Although cervical cancer is the most common cancer caused by HPV, other cancers associated with HPV infection are squamous cell carcinomas of the anus, vagina, vulva, penis, and the oropharynx (the base of the tongue, the tonsil, and pharynx) [2]. Approximately 43–88% of these different anogenital cancers worldwide and 56% of oral cancers in North America are associated with HPV infection [3–5]. In addition, HPV (mainly types 6

and 11) cause warts in the anogenital areas including the anus, penis, vagina, and vulva [6]. Genital warts are common having an annual incidence between 1 and 2 cases per 1000 people in North America [7]. They are highly infectious and cause significant direct health care costs as well as indirect costs including psychosocial harm [8–10]. Although rare, recurrent respiratory papillomatosis is also caused by HPV [11].

In the fall of 2008 an HPV vaccination program was initiated in grade 6 girls in Prince Edward Island (PEI)¹, Canada. In February 2010, Health Canada approved the use of the quadrivalent HPV vaccine in boys aged 9–12. By January 2012, the National Advisory Committee on Immunization (NACI) (see footnote 1) recommended

* Corresponding author. Tel.: +1 902 368 5101; fax: +1 902 620 3354.

E-mail addresses: cmclure@ihis.org (C.A. McClure), mamacswain@ihis.org (M.-A. MacSwain), cjsanford@gov.pe.ca (C.J. Sanford).

¹ Abbreviations: Prince Edward Island (PEI), National Advisory Committee on Immunization (NACI).

the use of HPV vaccine to protect males against intraepithelial neoplasia, anal cancer and anogenital warts [12]. In 2013, PEI was the first province to introduce HPV vaccine universally to boys in grade 6. In 2014, Alberta added boys to their HPV vaccination program [13].

Increasing the proportion of the population that is vaccinated will decrease the risk of individuals becoming infected either directly or indirectly from the herd effect [6,14]. This is a major aim of a successful vaccination program. Unfortunately, vaccination uptake by boys in the United States has been quite variable and not very high [15–18]. Quantification of the uptake of HPV vaccines in both boys and girls in PEI is necessary to ensure successful delivery of the school-based program.

The aims of this study were two fold. The first aim was to measure the uptake of HPV vaccination in boys after the first year of the universal school-based program. The second aim was to determine if there were any changes in the girls' recent uptake rate relative to previous years. Additionally, the relationships between HPV vaccination and factors such as county, urban–rural location of the school, and school board were analyzed to identify areas where the vaccine program could be improved.

2. Methods

2.1. Description of vaccine program and student status

The PEI HPV vaccine program is a school-based program that is administered by Public Health Nursing and covers all grade six girls and boys. A specific Public Health Nurse is assigned to every school in PEI. Prior to vaccine delivery, an information package that includes a parental consent form, a fact sheet, and a Question and Answer document is sent home with students. The consent must be signed and returned to Public Health prior to the immunization date. If consent forms are not returned prior to the date of vaccine delivery or if consent has been refused, a public health nurse will phone the parent or guardian to discuss the HPV immunization and answer questions. At the end of the phone call, parents may give consent or a refusal. The three doses of vaccine are administered by the school Public Health Nurse and additional Public Health Nurses as deemed necessary based on the grade 6 population. Students are immunized by class, both boys and girls together using the NACI recommended schedule [19]. All three doses are required to be considered fully immunized.

2.2. Data collation and analyses

An extract of HPV vaccination records from September 1, 2013 to September 2, 2014 were received from the provincial childhood immunization registry in PEI. These records were merged with a dataset provided by the Department of Education containing all grade 6 girls and boys in PEI for the 2013–2014 school year, using a minimum of two common identifiers. In cases where a student's record was found to be incomplete, vaccination records were individually reviewed, and where possible data were extracted manually. Students were not counted in the analysis if there was

evidence to show a student had moved, received HPV vaccine doses in another province or a previous school year, or refused the vaccine for legitimate medical reasons. Vaccine uptake rates in girls from previous school years (2008–2009, 2011–2012, and 2012–2013) were calculated similarly with the exception of the 2008–2009 school year in which only the number of grade 6 girls attending all PEI schools was provided as a denominator for the uptake rate. Vaccine uptake rates between years and between sexes were compared using two sample tests of proportions.

Unconditional associations between predictors and the outcome (fully immunized or not) were tested using chi square analysis, and those with a p -value <0.20 were retained for investigation in the multivariable model. A logistic regression model was used which accounted for the hierarchical nature of the data (students clustered in schools, schools clustered in school boards) by controlling for clustering of individual schools using robust standard errors and using school board as a fixed effect. This model was repeated two more times using vaccine initiation (≥ 1 dose) and receipt of 2 or more doses as the outcome measure. All analyses were conducted using Stata 13.1 [20].

3. Results

Of the 1443 students registered in the school system, 1349 (93%) records merged with the immunization database. Of the remaining 94 (7%) unmerged records, 50 had data entry issues and eventually merged while the remaining 44 (3%) records did not have a corresponding record in the immunization database. Three records were excluded from the analysis because the vaccine was refused for legitimate medical reasons or the student had moved in or out of the province during the school year. The final 2013–2014 grade 6 cohort consisted of 725 boys and 715 girls. Of these students, 242 (17%) received at least one dose outside of the school vaccination clinic. Thirty-eight (3%) had an indication that they had missed a school clinic or that they needed to make an appointment with Public Health Nursing for their vaccine but failed to get their final dose.

Although uptake was high in boys and girls, a significantly greater proportion of girls (85%) received all three doses of the HPV vaccine compared to boys (79%; $p=0.004$). The proportion of grade 6 girls who received all three doses for HPV vaccine has increased significantly since the start of the program, from 81% in the 2008–2009 school year, to 85% in the 2013–2014 school year ($p=0.03$) (Table 1). The pattern of uptake is similar across the years with the decrease in the number of students between the second and third dose larger than the decrease in number of students between the first and second dose.

Results of unconditional associations between complete immunization status and predictors are displayed in Table 2. Sex of the student and school board were included in a multivariable logistic model which controlled for clustering by individual schools ($n=43$) using robust standard errors. Both sex and school board significantly predicted immunization status (Table 3). More specifically, the odds of grade 6 girls being fully vaccinated for HPV were 1.5 times greater than of grade 6 boys (OR = 1.50, 95% CI 1.14–1.98).

Table 1
HPV vaccine dose uptake by school year and sex.

| | 2008–2009 | | 2011–2012 | | 2012–2013 | | 2013–2014 | | | |
|-------------|-------------------|-----|-------------------|-----|-------------------|-----|-------------------|-----|------------------|-----|
| | Girls ($n=801$) | | Girls ($n=731$) | | Girls ($n=678$) | | Girls ($n=715$) | | Boys ($n=725$) | |
| | % | n | % | n | % | n | % | n | % | n |
| One dose | 87.6 | 702 | 87.3 | 638 | 90.7 | 615 | 90.6 | 648 | 85.4 | 619 |
| Two doses | 84.9 | 680 | 86.7 | 634 | 90.3 | 612 | 88.7 | 634 | 83.0 | 602 |
| Three doses | 81.1 | 650 | 85.1 | 622 | 87.3 | 592 | 84.9 | 607 | 79.0 | 573 |

Download English Version:

<https://daneshyari.com/en/article/10965685>

Download Persian Version:

<https://daneshyari.com/article/10965685>

[Daneshyari.com](https://daneshyari.com)