

## The Perceived Role of Physicians with Regard to the Human Papillomavirus Vaccine

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### Abstract

Pediatricians, obstetrician-gynecologists, and family practitioners were surveyed about knowledge, attitudes and practice patterns regarding the Human Papillomavirus vaccine in the context of the National Advisory Committee on Immunization (NACI) recommendation for immunizing girls aged 9 to 13 years and the initiation of school-based HPV vaccination program in the province of Manitoba. Knowledge scores were highest amongst obstetrician-gynecologists and female physicians. Pediatricians were more likely to recommend the vaccine to all eligible patients and were more likely to attempt to persuade those reluctant to be vaccinated. Female physicians were more likely to educate routinely about the HPV vaccine. Better knowledge about HPV is associated with increased likelihood to educate routinely about the vaccine, but counseling for vaccination in general is likely a knowledge gap for non-pediatricians.

**Keywords:** Human papillomavirus; Vaccination; Practice patterns

### Introduction

In 2006, Health Canada approved the first vaccine to prevent Human Papillomavirus (HPV) infection (*Gardasil*, Merck Frost Canada Ltd). *Gardasil*® is a highly effective quadrivalent HPV vaccine targeting high-risk HPV subtypes 16 and 18 as well as low-risk HPV subtypes 6 and 11 [1-4]. The National Advisory Committee on Immunization (NACI) released a statement in 2007 with the recommendation to vaccinate girls between 9 and 13 years of age for the prevention of infection caused by the HPV subtypes 6, 11, 16, and 18 and their associated diseases like cervical cancer, vulvar and vaginal cancers, genital warts (Condyloma Acuminata, Cervical Adenocarcinoma In Situ (AIS), Cervical Intraepithelial Neoplasia (CIN) grades 1, 2 and 3, vulvar and Vaginal Intraepithelial Neoplasia (VIN) grades 2 and 3 [1]. In February 2010, *Gardasil*® was authorized to expand its indications to include males 9 to 26 years of age for the prevention of infection caused by HPV subtypes 6, 11, 16, and 18. In April 2011, *Gardasil*® was approved for use in women up to the age of 45 years.

Since then, HPV vaccination programs have become widespread in Canada. On May of 2008, Manitoba has announced the introduction of a HPV immunization program whereby every grade six girl will be vaccinated with *Gardasil*®, provided consent from her parent or legal guardian is obtained [4].

HPV immunization programs; through combined primary prevention (immunization) and secondary prevention (screening); are expected to reduce the morbidity and mortality of cervical cancer, its precursors and other HPV-related cancers in women in Canada and to ease the burden of abnormal cytological results providing a high level of vaccine uptake is achieved. Uptake of the HPV vaccine across Canada varies between 50% and 80%, compared to 90% uptake for the Hepatitis B vaccine [5]. In Manitoba, uptake for the complete vaccination series is only 40% [1].

Health care providers are a significant resource to parents regarding the efficacy and safety of vaccines [6,7]. However, there is a paucity of Canadian research about physician attitudes and practice patterns since the approval of the HPV vaccine and the publication of recommendations about its use. Additionally, there is a distinct lack of information about the role of physicians in vaccine uptake when a school-based vaccination program is in place.

We sought to determine the pediatricians', gynecologists', and family practitioners' knowledge, attitudes and practice patterns regarding the HPV vaccine in the context of the NACI recommendation for immunizing the girls aged 9 to 13 years of age and initiation of school-based HPV vaccination program in the province of Manitoba (2008).

### Methods

The College of Physician and Surgeons of Manitoba's online database was used to obtain mailing addresses for all paediatricians (n=133), obstetrician-gynaecologists (n=67) and family practitioners (n=1064) practicing in Manitoba. Potential participants were excluded at the outset if they were listed as residents/fellows (n=23), had no office mailing address listed (n=23), were retired (n=9), practiced outside of Manitoba (n=2) or were listed as a *locum tenens* (n=13). In addition, given the large number of family practitioners compared to the other two specialties, the decision was made to select every 3rd family practitioner (after above exclusions) from an alphabetical list to be included in the study (every 3rd of 1013 = 336). In total, 120 paediatricians, 63 obstetrician-gynaecologists and 336 family practitioners were sent a mailing asking for participation in our study by completing the enclosed survey. The surveys sent out the first quarter of 2010.

Ethics approval was obtained from the Research Ethics Board of the University of Manitoba Bannatyne Campus (H2010:059).

The survey consisted of a 43-item questionnaire that comprised six sections assessing: (1) physician demographics (four items); (2) knowledge about HPV (six items); (3) knowledge about the HPV

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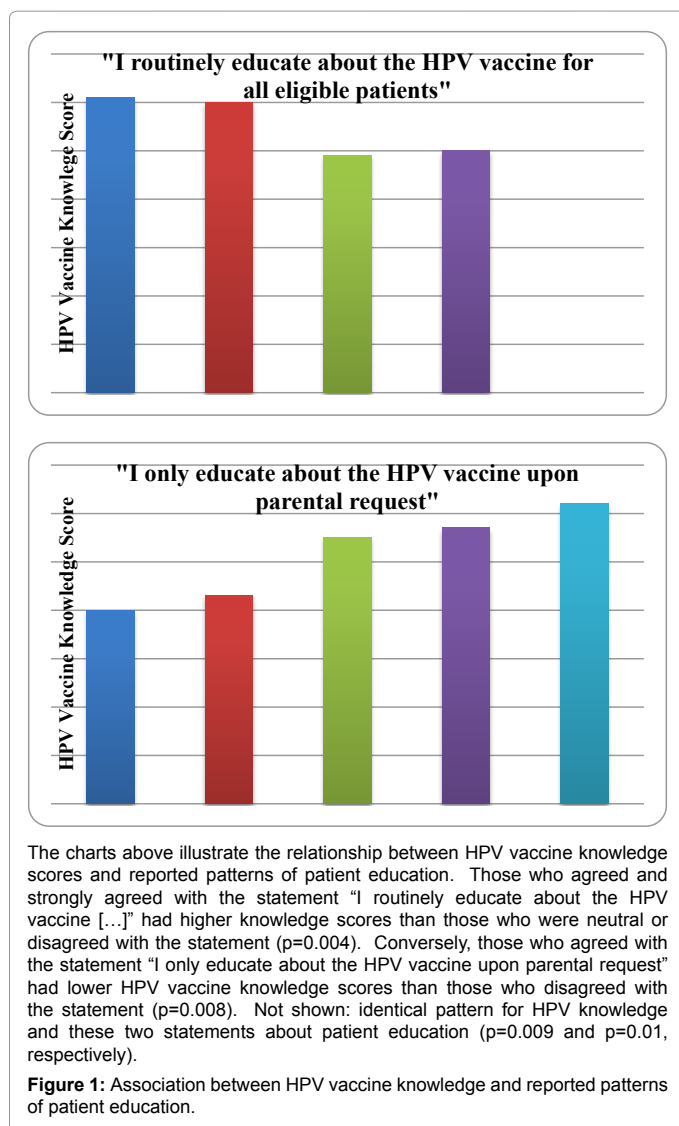
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Percent (%) of respondents (n)			
	Family Practice (n=49)	OBGYN (n=23)	Pediatrics (n=36)
Response Rate	14.60%	30.00%	36.50%
Gender			
Male	57.1 (28)	21.7 (5)	38.9 (14)
Female	42.9 (21)	78.3 (18)	61.1 (22)
Years in Practice			
< 5 Years	22.5 (11)	13.0 (3)	25.0 (9)
6-15 Years	20.4 (10)	30.4 (7)	27.8 (10)
16-25 Years	28.6 (14)	34.8 (8)	19.4 (7)
> 25 Years	28.6 (14)	21.7 (5)	27.8 (10)

\* Reflects the number of physicians who responded to our survey as a percentage of the total number of physicians from each specialty who were sent mailings.

† Significant differences between genders ( $p < 0.05$ ).

**Table 1:** Population characteristics by specialty.



vaccine (eight items); (4) attitudes about the HPV vaccine (nine items); (5) perceived role of the physician with regard to vaccination against HPV (nine items); and, (6) perceived barriers to uptake of the HPV vaccination (seven items). Study questions were adopted from a variety of previously published surveys on this topic [8-10]. Of note, one HPV

vaccine knowledge question was excluded from the analysis on account of ambiguity identified by participants through written comments on the returned surveys. To analyze knowledge questions, composite scores were constructed for both HPV knowledge and HPV vaccine knowledge.

Data analysis was performed using SAS (Version 9.2, SAS Institute Inc., Cary N.C.). Descriptive statistics were performed when appropriate. Non-parametric data was analyzed using Chi-squared, Fisher's Exact Test and the Cochran-Mantel-Haenszel statistical test. Parametric data was analyzed using Wilcoxon scores and the Kruskal-Wallis statistical test. Significance was set at  $p < 0.05$ .

## Results

A total of 114 surveys were returned (22% response rate, Table 1). Of these, six surveys were excluded from the analysis because the respondents had selected "other" or "retired" for type of practice.

### Population characteristics by specialty

A higher proportion of obstetrician-gynaecologists and paediatricians were female as compared to family practitioners (Table 1). The distribution of years in practice did not vary by specialty (Table 1). Of note, number of years in practice was not found to be associated with any marker of knowledge, belief, perceived role, practice pattern, or perceived barrier to HPV vaccination.

### Physician knowledge about HPV and the HPV vaccine

The overall mean score for knowledge about HPV was 4.1 out of 6 (median 4, range 0 to 6). The obstetrician-gynaecologists scored significantly higher ( $p=0.001$ ) with a mean score of 4.9 (median 5, range 3 to 6), followed by paediatricians (mean 4.2, median 4, range 0 to 6) and family physicians (mean 3.6, median 3, range 1 to 6). HPV knowledge was poorest with regard to whether infections with HPV 6 and 11 were associated with cervical cancer (only 37%,  $n=40$  of respondents answered correctly).

The overall mean score for knowledge about the HPV vaccine was 5.7 out of 7 (median 6, range 2 to 7). Here again, obstetrician-gynaecologists scored significantly higher ( $p=0.03$ ) with a mean score of 6.2 (median 5, range 3 to 7), followed by paediatricians (mean 5.8, median 4, range 0 to 7) and family practitioners (mean 5.3, median 3, range 1 to 6). HPV vaccine knowledge was poorest with regard to whether the vaccine had been approved for use in pregnancy (only 52%,  $n=56$  of respondents answered correctly).

### Effect of knowledge on practice patterns

Knowledge was significantly correlated with reported patterns of patient education about the HPV vaccine (Figure 1). Physicians who agreed or strongly agreed with educating eligible patients routinely about the HPV vaccine had higher scores for both HPV knowledge ( $p=0.0086$ ) and HPV vaccine knowledge ( $p=0.0004$ ). Conversely, those who responded that they provided education only upon parental request were more likely to have lower scores on HPV knowledge ( $p=0.0128$ ) and HPV vaccine knowledge ( $p=0.0084$ ). Knowledge was not significantly associated with any other markers of belief, reported practice pattern or perceived role.

### Physician beliefs about the HPV vaccine

When considering the target population of the vaccine, the majority of respondents (95.4%) agreed or strongly agreed that the vaccine should be administered to girls before the beginning of sexual

Statements about practice/perceived role with regard to HPV vaccination	Family Practice (n=49)	OBGYN (n=23)	Pediatrics (n=36)	p-value
	Practice (n=49)			
Percent (%) of respondents who agree (n)				
I recommend the HPV to:				<b>0.04</b>
All eligible patients	67.4 (33)	65.2 (15)	86.1 (31)	
Some of my patients	30.6 (15)	30.4 (7)	8.3 (3)	
None of my patients	2.0 (1)	0.0 (0)	5.6 (2)	
How do you discuss the vaccine:				<b>0.02</b>
I do not encourage the vaccine	4.1 (2)	0.0 (0)	0.0 (0)	
I recommend the vaccine and try to persuade those who are reluctant	42.9 (21)	56.5 (13)	75.0 (27)	
I offer the vaccine, but will not try to persuade one way or the other	38.8 (19)	30.4 (7)	16.7 (6)	
I will not promote the vaccine, but if asked, I will discuss and provide it	12.2 (6)	13.0 (3)	0.0 (0)	
I will not promote the vaccine, but if asked, I will refer to another physician	2.0 (1)	0.0 (0)	2.8 (1)	
I will not promote the vaccine, and if asked, I will try to discourage its use	0.0 (0)	0.0 (0)	0.0 (0)	
My primary role is to counsel	46.9 (23)	60.9 (14)	72.2 (26)	<b>0.16</b>
My primary role is to write prescriptions for those who are too old to qualify for the public vaccination program	30.6 (15)	39.1 (9)	38.9 (14)	<b>0.61</b>
My primary role is to write prescriptions for those who qualified for, but missed the public vaccination program	24.5 (12)	30.4 (7)	33.3 (12)	<b>0.91</b>
I play no role in vaccinating against HPV	4.1 (2)	0.0 (0)	5.6 (2)	<b>0.77</b>
I routinely educate about the HPV vaccine to all eligible patients	67.4 (33)	56.5 (13)	63.9 (23)	<b>0.46</b>
I will only educate about the HPV vaccine upon parental request	14.3 (7)	0.0 (0)	5.6 (2)	<b>0.50</b>

**Table 2:** Perceived role and practice patterns with regard to vaccination against HPV as a function of specialty.

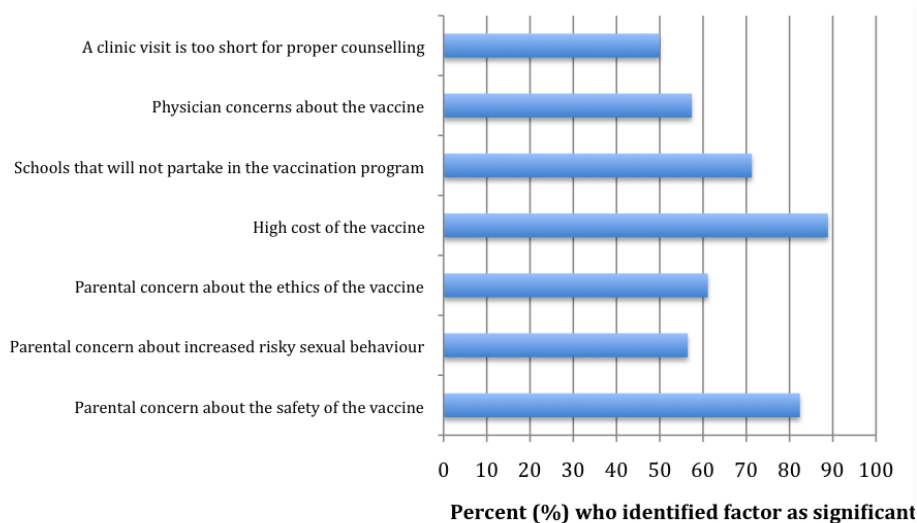
Survey Statements	Percent (%) of respondents who agreed or strongly agreed with the statement (n)	
	Female Physicians n=61	Male Physicians n=47
<b>Beliefs about HPV vaccine</b>		
The vaccine should be given to girls before adopting a sexually active lifestyle*	100.0 (61)	89.4 (42)
The vaccine should be given to all sexually active females	67.2 (41)	66.0 (31)
The vaccine should only be administered to individuals with many sexual partners*	6.6 (4)	12.8 (6)
Vaccination against HPV promotes promiscuity†	0.00 (0)	6.4 (3)
The HPV vaccine negatively impacts women's health by giving a false sense of security†	0.00 (0)	14.9 (7)
HPV vaccination will eliminate the need for annual Pap tests	0.00 (0)	8.5 (4)
<b>Practice Pattern/Perceived Role in regard to HPV vaccine</b>		
I recommend the HPV vaccine to all eligible patients§	77.0 (47)	68.1 (32)
The NACI guidelines have changed the role I play with regard to HPV vaccination	44.3 (27)	42.6 (20)
Individual physicians play an important role in the uptake of the HPV vaccine	91.8 (56)	89.4 (42)
I will recommend the vaccine and attempt to persuade those who are reluctant*	65.6 (40)	44.7 (21)
My primary role is to counsel parents regarding the HPV vaccine	65.6 (37)	55.3 (26)
Parents respect and appreciate the information and recommendations provided§	77.1 (47)	72.3 (34)
My primary role is to write prescriptions to vaccinate those who are too old for the school-based program	42.6 (26)	25.5 (12)
My primary role is to write prescriptions to vaccinate those who were eligible, but missed the school-based program	32.8 (20)	23.4 (11)
I have no role to play with regard to vaccinating against HPV*	1.6 (1)	6.4 (3)
I routinely educate all eligible female patients about the HPV vaccine*	72.1 (44)	53.2 (25)
I only educate about the HPV vaccination upon parental request*	1.6 (1)	17.0 (8)

\* Significant differences between genders (p<0.05)

† Significant differences between genders (p<0.01)

§ Items originally classified as beliefs in the survey were re-classified as practice pattern/perceived role to clarify presentation of results.

**Table 3:** The effect of gender on beliefs and practice patterns regarding HPV vaccination.



The chart above illustrates the percentage of respondents who perceived various factors as being important barriers to high uptake of the HPV vaccine.

**Figure 2:** Perceived Barriers to High Uptake of the HPV Vaccine.

activity. Most respondents (66.7%) also agreed or strongly agreed that the HPV vaccine should be given to all sexually active females. A small minority (9.3%) agreed or strongly agreed that the vaccine should only be given to individuals with many sexual partners and a smaller minority (2.8%) supported the statement that vaccination against HPV promotes promiscuity.

In terms of the impact of the HPV vaccine, only a very small proportion of the respondents (3.7%) thought the vaccination would eliminate the need for annual Pap tests. A small minority (6.5%) also supported the idea that the HPV vaccine negatively impact women's health by giving women a false sense of security.

### Perceived role regarding vaccination against HPV

Seventy-three percent of respondents agreed or strongly agreed that much of the responsibility for successful delivery of the HPV vaccine belongs to health care providers. The vast majority of respondents (91.6%) agreed or strongly agreed that individual physicians still play an important role in the uptake of the HPV vaccine even in the context of a school-based vaccination program. Significant differences were detected between specialties with regard to HPV vaccination practices, as outlined in Tables 2 and 3. A few notable differences are worth highlighting. A significantly higher proportion of paediatricians (86.1%) responded that they would recommend the vaccine to all eligible patients compared to obstetrician-gynaecologists and family practitioners (65.2% and 67.4%, respectively,  $p=0.04$ ). Additionally, paediatricians were more likely to recommend the vaccine and try to persuade those who are reluctant (79.4%) compared to obstetrician-gynaecologists and family practitioners (56.5% and 42.9%, respectively,  $p=0.02$ ).

### Perceived barriers to the uptake of the HPV vaccine

The vast majority of respondents (88.9%) believed that the high cost to the individual family of vaccinating girls who missed or who were not eligible for the school-based program is an important barrier to vaccine uptake. Other perceived barriers to uptake of the HPV are illustrated in Figure 2.

### Discussion

The data presented in this study represents information collected from physicians approximately 1.5 years after a province-wide HPV vaccination program was instated. To the best of our knowledge these findings represent some of the first reports in the literature that consider the perceived role of physicians and practice patterns with regard to the HPV vaccine in the context of a school-based vaccination program. The Manitoba program is somewhat limited in its scope since there are currently no catch up options for girls who do not qualify for the school program (i.e. were born prior to 1997).

The advent of the school-based program fundamentally changed HPV vaccine delivery by removing the need for administration in the physician office. In spite of this paradigm shift, over ninety percent of physicians surveyed agreed that they still have an important role to play in the uptake of the vaccine. The program has likely caused a shift in the perceived physician role toward an educational one, since over half of physicians felt that their primary role was to counsel parents rather than to prescribe the vaccine. In contrast to this statement, our finding that only 67% of physician's routinely educate about the HPV vaccine suggested discordance between perceived role and actual practice. Of further concern was the finding that only 70% of physicians routinely recommend the vaccine to all eligible patients, which raised concerns over the effectiveness of a "safety net" to capture and catch up those girls missed by the school-based program.

Given that the physician's role with regard to the HPV vaccine in the context of a school-based vaccination program appears to be the role of educator, it is relevant that we found a strong association between knowledge scores and a physician's reported propensity to educate about HPV. This appears to support Chow's report of HPV vaccine knowledge improving likelihood of physicians initiating conversations about the HPV vaccine [11]. There is evidence from influenza immunization that educational interventions aimed at increasing physician vaccine knowledge do increase uptake, but this has yet to be demonstrated with regard to the HPV vaccine [12].

Paediatricians in our study were more likely to (1) recommend the vaccine to all of their eligible patients and were also more likely to



(2) try to persuade those who are reluctant compared to obstetrician-gynaecologists and family practitioners. These findings may be related to an increased comfort among paediatricians in counseling for immunization in general which may translate well to counseling about the HPV vaccine. A recent study found that the majority of obstetrician-gynaecologists surveyed believed that their training with regard to immunizations in general was less than adequate [13,14]. As such, educational campaigns directed at non-paediatricians aimed at improving general immunization counseling competence might increase the propensity to counsel about the vaccine.

Barriers identified are remarkably consistent with previous studies [8-10]. Despite the advent of a school-based vaccination program, the high cost of the vaccine was the most important barrier to high vaccine uptake identified by physicians. While individuals do not incur any personal costs if being vaccinated through the school-based program, physicians surveyed were identifying cost as being a barrier for uptake of the vaccine for those who did not qualify for the school-based vaccination program.

Limitations of our study include a low response rate (22%), which may be related to the use of a traditional mail-based survey rather than an email-based survey owing to the fact that physician email addresses are not centralized in our province. Responder bias is inherent to our survey-based study and as such, gaps in knowledge and propensity to routinely educate and recommend the vaccine might be more significant than our results depict.

## Conclusion

Overall these findings are important in confirming that despite a school-based program, physicians still have an important role to play in HPV vaccine delivery, albeit one based more on counseling than delivery. We have identified specific gaps in physician knowledge and practice that could be targeted, but further research is required to determine whether efforts to close these gaps would translate into improved vaccine uptake.

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