Human papillomavirus and papillomavirus vaccines: knowledge, attitudes and intentions of general practitioners and practice nurses in Christchurch

Judith Henninger CT (ASCP) (IAC), BS, MPH

ABSTRACT

INTRODUCTION: General practitioners (GP) and practice nurses (PN) perform the majority of cervical screening in Christchurch and will have a key role in influencing uptake of human papillomavirus (HPV) immunisation.

AIM: To assess and compare GP and PN knowledge about HPV disease, attitudes concerning adolescent sexual behaviour and intentions to recommend HPV immunisation.

METHODS: A self-administered, anonymous questionnaire was distributed to GPs and PNs in Christchurch, New Zealand who attended peer-led small group meetings hosted by Pegasus Health Independent Provider Association in May 2008.

RESULTS: Participation rate was 39%. Overall, 94% of respondents knew that HPV immunisation will not replace cervical cancer screening; 73% knew that HPV is the cause of cervical cancer; 48% knew that most HPV infections will clear without medical treatment; 20% correctly reported that anogenital warts are not cervical cancer precursors. More GPs reported comfort discussing sexual behaviour with adolescents than PNs ($p < .008$). While 95% of participants intend to recommend immunisation for 13–15-year-old girls, PNs were more likely than GPs to recommend HPV immunisation to older female adolescents and more often indicated that HPV vaccination may lead to risky sexual behaviour ($p < .0001$).

DISCUSSION: This is the first New Zealand study to assess primary care knowledge and attitudes about HPV and HPV immunisations. The results are encouraging, provide a baseline for future research and may guide the development of training materials for GPs and PNs.

KEYWORDS: Papillomavirus, human; papillomavirus vaccines; family physician; primary health care

Introduction

In New Zealand (NZ), the National Cervical Screening Programme has driven the dramatic decline in cervical cancer incidence and mortality since 1990. Still, approximately 200 women are diagnosed with cervical cancer each year and about 70 will die from it.[1] Human papillomavirus (HPV) is now recognised as the most common sexually transmitted infection (STI)[2] with at least 15 types linked to the development of cervical cancer.[3] Most HPV infections will clear without medical treatment, but almost all cervical cancers are associated with persistent infection with high-risk HPV types.[4,5]

Vaccines are available which demonstrate almost 100% efficacy in preventing persistent infection and the development of precancerous lesions caused by high-risk HPV types, HPV16 and HPV18 (Gardasil® and Cervarix®).[6] These two strains are responsible for 70% of cervical cancers.[7] Most anogenital warts are caused by strains of HPV6 and HPV11,[8] and these two are also incorporated in Gardasil®. HPV vaccination is expected to ultimately reduce cervical cancer incidence,

J PRIMARY HEALTH CARE
2009;1(4):278–285.

CORRESPONDENCE TO:
Judith M Henninger
PO Box 4511
Christchurch 8140
New Zealand
judyhenninger@hotmail.com

the required frequency of cytologic testing in the future, and the number of women who will be subjected to the stress of abnormal test results, colposcopy and treatment.[9,10] To obtain these positive effects, a high level of vaccination uptake is necessary, preferably before the onset of sexual activity. This in turn is dependent upon the willingness of individuals to accept vaccination, parents' willingness to have their children vaccinated and GP and PN willingness to administer HPV vaccines.

Beginning September 2008 Gardasil® became publicly funded and available for girls aged 12–18 years.[11] Studies repeatedly have shown that the public trusts their primary health care providers to give them the best information about HPV, cervical cancer and the HPV vaccines.[12-15] GPs and PNs are in an ideal position to discuss perceived barriers to immunisation by initiating a conversation with girls and their parents about their concerns, clarifying any misunderstandings and to support informed consent for the vaccine.[16] What limited evidence there is from overseas suggests that doctors and nurses who are charged with providing HPV vaccines need information on current understanding of HPV natural history, epidemiology, prevention, treatment or vaccination.[17,18] In some studies, clinicians (mostly specialists rather than generalists) have expressed a level of discomfort in addressing sexually transmitted infections, especially among preadolescent children and their parents.[16,19-24]

The goal of this survey was to provide the first estimates of NZ GP and PN knowledge, attitudes and intentions regarding HPV and HPV vaccines. Christchurch was an ideal place to base this research as the Canterbury District Health Board has decided to incorporate the HPV immunisation programme into the usual general practice schedule.[25] In other DHB catchments, the decision was made to deliver through school-based programmes using public health nurses.

WHAT GAP THIS FILLS

What we already know: General practitioners (GPs) and practice nurses (PNs) provide patient care across a broad spectrum and are familiar with the challenges of a continually changing immunisation schedule. In Canterbury, New Zealand, human papillomavirus (HPV) immunisations will be delivered through primary care. Clear, concise and relevant HPV information will be essential for their HPV-related practices.

What this study adds: This study provides the first estimates in New Zealand describing the knowledge, attitudes and intentions of GPs and PNs about HPV and HPV vaccines. It identifies areas which deserve particular attention and may inform efforts to strengthen primary care providers' capacity to deliver comprehensive HPV-related patient care.

Methods

Study design

Between 5 and 20 May 2008, a cross-sectional survey was carried out of primary care providers who were attending peer-led, small-group meetings conducted by the Pegasus Health Independent Provider Association. GPs and PNs undertake similar educational topics in their own disciplinary small groups.

Approval and support for the distribution of the questionnaire during the educational meetings was secured from the Clinical Practice Education Committee at Pegasus and ethical approval for the study was granted by the Upper South Island 'B' Regional Ethics Committee.

Study population

The target population included all GPs and PNs in Christchurch who were attending a series of small group educational meetings on public health topics.

Questionnaire and its administration

A self-administered, anonymous questionnaire (see Appendix 1 available in the electronic version) along with an information sheet and a preaddressed, stamped envelope was hand-delivered to GPs and PNs at the small group meetings by Pegasus Clinical Education facilitators. Participants could either leave their completed questionnaires at the meeting or post them in subsequently. One postal reminder notification about the questionnaire was sent to all GPs and PNs via the Pegasus Health Education Team.

The questionnaire included some questions used in previous overseas studies,[20,21,24,26-29] together

with questions developed with NZ-specific content. The questionnaire was pre-tested on a convenience sample of seven GPs and PNs in order to ensure clarity and ease of administration.

The questionnaire included four sections assessing: provider and practice characteristics (six items); knowledge about HPV infection and its prevention (five items); attitudes about adolescent behaviour and counselling (five items) including intentions to recommend HPV vaccines (nine items) and self-rated sufficiency of received HPV information (one question); preferences for educational topics and sources of information (two multiple response questions).

No financial or material incentives for participation were used in this study. On average, the survey took five to 10 minutes to complete.

Data assessment and statistical analysis

Responses used Likert agreement scales and were entered into EpiInfo version 3.4.3, 2007. Due to the non-random distribution of the participants and because responses may have been altered by what happened within the group meetings, clustering was taken into consideration by using the Complex Sample Analysis. Descriptive statistics, including frequencies, percentages, 95% confidence intervals and design effects, were used to describe the responses. Because of the small sample size and because the design effects of this study were determined to be minimal, p-values of $<.05$ were used to indicate statistical significance as calculated in the StatCalc option of EpiInfo 2007. All results were reported separately for GPs and PNs.

Results

Profile of respondents

Three hundred and ninety-seven questionnaires were distributed and 155 were returned for an overall participation rate of 39%; 16% of the participants completed a questionnaire at the meeting and 84% returned it by post. Participation was higher amongst GPs (43%) than PNs (36%).

All questionnaires were analysed. However, data pertaining to age and years in practice were unusable in one instance due to inconsistencies. Table 1 details the demographic characteristics of the respondents. Practice nurses were on average three years older than GPs. Two-thirds of GPs and all PNs were female.

Knowledge about HPV and HPV vaccines

As seen in Table 2, most GPs and PNs were aware that HPV vaccination will not eliminate the need for continued cervical screening. Over half of the

Table 1. Provider characteristics

Demographic characteristic		GP		PN	
		n (%)	Mean (SD)*	n (%)	Mean (SD)*
Age			46.4 years (8.1) Range (30-68)		49.2 years (9.2) Range (24-65)
Cervical screening Offered	**Yes** **No**	84 (100%) 0		67 (95.7%) 3 (4.3)	
Gender	**Female** **Male**	55 (65.5) 29 (34.5)		69 (100)	
Years in practice	**<10 years** **10–19 years** **20–29 years** **≥30 years**	12 (15.2) 29 (36.7) 31 (39.2) 7 (8.9)	17.6 years (8.6)	24 (35.8) 15 (22.4) 21 (31.3) 7 (10.4)	15.5 years (10.4)
Ethnicity	**NZ/European** **Maori** **Pacific** **Asian** **Other**	69 (85.2) 3 (3.7) 0 1 (1.2) 8 (9.9)		65 (92.9) 0 1 (1.4) 1 (1.4) 3 (4.3)	

* SD = standard deviation

Table 2. Respondent knowledge regarding HPV and HPV vaccines

	Correct response n (%) (95% CI*)		Not sure n (%) (95% CI)		Incorrect response n (%) (95% CI)	
True/False Statement	**GP**	**PN**	**GP**	**PN**	**GP**	**PN**
HPV is most common sexually transmitted infection (TRUE)	69 (81.2%) (73.3–89.1)†	42 (60.0%) (48.4–71.6)†	11(12.9%) (5.6–20.3)	14 (20.0%) (11.3–28.7)	5 (5.9%) (0.5–11.3)	14 (20.0%) (9.4–30.7)
Persistent HPV is necessary cause of cervical cancer (TRUE)	63 (75.0) (65.1–84.9)	49 (71.0) (60.9–81.2)	10 (11.9) (5.7–18.1)	12 (17.4) (8.0–26.7)	11(13.1) (4.4–21.7)	8 (11.6) (6.1–17.1)
Anogenital warts induced by HPV 6 and 11 are cervical cancer precursors (FALSE)	28 (33.3) (24.4–17.8)†	5 (7.2) (2.4–12.1)†	27 (32.1) (17.8–46.5)	25 (36.2) (26.8–45.7)	29 (34.5) (24.6–44.4)†	39 (56.5) (47.0–66.0)†
Immunisation with HPV vaccine will eliminate need for cervical screening (FALSE)	79 (92.9) (88.7–97.0)	65 (94.2) (88.1–100.3)	3 (3.5) (0.4–6.7)	3 (4.3) (-1.4–10.1)	3 (3.5) (0.4–6.7)	1 (1.4) (-1.5–4.4)
Most HPV infections will clear without medical treatment (TRUE)	46 (54.1) (44.7–63.5)	29 (42.0) (25.5–58.6)	19 (22.4) (12.4–32.3)	10 (14.5) (5.5–23.5)	20 (23.5) (15.9–31.1)†	30 (43.5) (31.1–55.9)†

* CI = Confidence Interval
† Denotes a difference of statistical significance (p-value < .05) when compared to other provider type

participants knew that HPV is the most common STI and the majority knew that persistent HPV infection is a necessary cause of cervical cancer. One-third of GPs and half of PNs incorrectly agreed that anogenital warts induced by HPV types 6 and 11 are cervical cancer precursors. Approximately 50% of all participants knew that most HPV infections will clear without medical treatment; however, significantly more PNs than GPs answered this question incorrectly (p< .008).

Attitudes and intentions to recommend HPV vaccine

Table 3 reports attitudes about patient counselling messages and intentions to recommend HPV vaccination. Most participants agreed that their patients will heed their advice about cervical screening and comply with counselling about receiving the HPV vaccination. Half of the GPs and two-thirds of PNs somewhat agreed that their patients will comply with counselling regarding safe sexual behaviours. Most participants reported that they are comfortable addressing sexual behaviour with adolescents. However, significantly more GPs indicated that they were comfortable discussing sexual behaviour compared with PNs. When asked if vaccination against an STI might encourage risky sexual behaviour in adolescents, significantly more PNs than GPs agreed with the statement (37% vs 10%). It should be noted that PN responses (100% female) were significantly different than either male or female GP responses to questions about increased risk-taking behaviour after immunisation and comfort discussing adolescent sexual behaviour.

The majority of GPs and PNs stated that they intend to recommend an HPV vaccine to their patients if it is publicly funded. More than 70% also indicated that they would recommend the vaccine even if their patients have to pay for it. Over 90% of all respondents favour recommendation of the quadrivalent HPV vaccine which is protective against both cervical cancer and anogenital warts.

GPs were most likely to recommend HPV immunisation for girls aged 13–15 years followed by pre-adolescent girls aged 9–12 and young women aged 16–26. PNs were most likely to recommend the HPV vaccine for young women aged 16–26, followed closely by girls aged 13–15 and then by pre-adolescent girls aged 9–12 years. GPs were significantly more likely than PNs to recommend HPV vaccine to 9–12-year-old girls (p< .004).

Table 3. Attitudes about patient counselling and intentions to recommend HPV vaccine

	Agree*			
	GP		PN	
Statement	**N**	**n (%) (95% CI†)**	**N**	**n (%) (95% CI†)**
My patients will comply if I counsel them about:				
Safe sex behaviour (condom, abstinence)	85	43 (50.6%) (39.1–62.1)	69	45 (65.2%) (54.1–76.3)
Regular Cervical Screening (frequency ≤3 years)	85	82 (96.5%) (92.5–100)	68	63 (92.6%) (85.8–99.5)
HPV vaccination	82	75 (91.5%) (85.0–97.9)	68	60 (88.2%) (80.0–96.5)
I am comfortable addressing sexual behaviour with adolescent patients	85	82 (96.5%)‡ (92.2–100)	69	58 (84.1%)‡ (74.5–93.6)
Vaccination against an STI may encourage risky sexual behaviour in adolescents	83	8 (9.6%)‡ (2.4–16.8)	68	25 (36.8%)‡ (25.3–48.3)
I will recommend an HPV vaccine to my patients:				
If it is publicly-funded	85	81 (95.3%) (90.4–100)	69	66 (95.7%) (91.2–100)
Even if my patients have to pay for it	85	65 (76.5%) (68.8–84.1)	70	51 (72.9%) (60.6–85.1)
I will be most likely to recommend the HPV vaccine to:				
Females aged 9–12 years	78	66 (84.6%)‡ (75.2–94.0)	57	36 (63.2%)‡ (50.0–76.3)
Females aged 13–15 years	81	81 (100%)‡ (100.0–100.0)	65	59 (90.8%)‡ (82.7–98.9)
Females aged 16–26 years	82	67 (81.7%) (75.5–87.9)	60	55 (91.7%) (83.8–99.6)
Females aged 27–45 years	73	16 (21.9%) (12.2–31.6)	53	16 (30.2%) (17.8–42.6)
Males aged 9–15 years	72	37 (51.4%) (41.2–61.5)	51	25 (49.0%) (35.3–62.8)

* Agree = 'Strongly Agree + Somewhat Agree'
† CI = Confidence Interval
‡ Denotes a difference of statistical significance (p-value < .05) when compared to other provider type

About half of all participants would be likely to recommend the vaccine to boys aged 9–15. Females aged 27–45 were the most unlikely age group to receive support for vaccine recommendation from either GPs or PNs.

Twelve percent of GPs and 17% of PNs indicated that they have not received enough information.

Discussion

This is the first NZ study to provide descriptive estimates of the knowledge, attitudes and intentions of GPs and PNs about key issues surrounding HPV infection and its prevention. Unlike most previous studies, this study was conducted after approval and licensing but prior to the widespread public distribution of any HPV vaccine. This survey found that most GPs and PNs were aware of new scientific evidence about HPV infection and HPV-related conditions. Similar to other studies,[21,24] most Christchurch providers know that HPV is a very common STI. While some early provider studies found little knowledge about the link between HPV infection and cervical cancer, more recent studies, including this one, indicate that this connection has been made.[16,20,21,24,30] Differences in knowledge may be linked to the availability of vaccines or the timing of the studies and more information may have been accessible to the participants of this study.

Most Christchurch providers correctly reported that immunisation with the HPV vaccine will not eliminate the need for cervical screening. Currently available vaccines do not protect against all pathologic HPV types, and vaccinated individuals are not protected against viral types to which they have already been exposed.[31] Furthermore, benefits of vaccination may be reduced if a false sense of protection results in a decrease in cervical screening practices. This study is consistent with other studies of HPV-related knowledge that show providers may not completely understand the relationship of genital warts to genital cancers by HPV type.[19-21,23,32]

The influence providers perceive they have over the reception of their counselling messages may gauge the potential effectiveness of HPV management and vaccine delivery practices in Christchurch. When compared to the Canadian survey of providers,[21] the results are similar with most providers confident that their counselling messages are well-received. This implies that Christchurch providers believe they are able to influence patient behaviour and that their patients trust them.

Social stigma related to STIs, or vaccination against an STI, has been voiced as a concern by parents and young women.[15,33] Although some studies reported a reluctance by some providers to discuss sexual behaviour with adolescents or their parents, these findings were mostly reported from surveys and qualitative research on paediatricians in the USA.[20,34-36] Although GPs in Christchurch and paediatricians in the US are not directly comparable, this reluctance does not appear to be a concern as the majority of GPs in this study are quite comfortable with these discussions.

This study did, however, demonstrate that Christchurch PN respondents were less comfortable with addressing sexual behaviour with adolescents and their perception of increased sexual risk-taking behaviour after immunisation. It is unknown whether those who are vaccinated against HPV will participate in more risky sexual behaviour although previous adolescent research suggests they will not.[18] Nevertheless, providers should continue to reinforce the importance of safe sexual behaviour post-vaccination because of the health risks posed by STIs other than the HPV types included in the vaccine. In Christchurch, vaccine uptake is high in relation to the rest of NZ.[37] However, providers may anticipate challenging barriers to immunising children against an STI that are not present with other childhood vaccines. Reluctance by providers to discuss sexual behaviour with preadolescents or to address parental concerns about vaccination may reduce vaccine uptake.

Most previous studies which questioned intention to recommend the HPV vaccine by age, found that across provider specialties there was a greater intention to recommend HPV vaccination for older as compared to younger adolescents.[18] While this study found similar results among PNs, all Christchurch GPs who took part in this study reported that they would recommend the vaccine for girls aged 13–15 years. This is consistent with other studies of nurses which also found a linear increase in acceptability for age of administration for 11–17 years of age.[38] This reluctance to vaccinate young adolescents may be due to perceptions that their patients are at low risk for HPV infection or concerns about discussions of sexuality.

Compared to the 7% of Canadian GPs who reported having sufficient information, Christchurch GPs indicated that they were better informed.[21] This indicates that more information may have been available at the time of this survey. It should be noted that half of the Christchurch providers still reported that they had received only somewhat sufficient information implying that further educational efforts about HPV and HPV vaccines are warranted.

Limitations

The response rate was low although higher than some earlier studies.[16,39] Provider surveys about HPV which have achieved the highest responses have used monetary incentives and computer-assisted options whereas this survey did not.[20,24] It is of interest that more GPs than PNs who attended the small group meeting participated in the survey. This study was unlike other studies about HPV which sampled nurses and achieved extremely high response rates.[32,38] However, it is similar to a previous survey of Christchurch

primary care providers conducted in 1996, which also reported a low participation by PNs in contrast to GPs.[40] Non-response bias, which suggests that the attitudes of those who responded may differ from those who did not respond, is also a possibility. Although most GPs and PNs practising in Christchurch were invited to attend the meeting, not all chose to do so. Perhaps the knowledge and attitudes of the participants of this survey differed from other Christchurch GPs and PNs, or that the providers who chose to attend the Pegasus meetings were more interested in the topics being presented than those who did not attend. Because survey uptake was only 39% overall and analysis to compare the collected demographics in this group with the broader GP/PN profile and then the national demographics of GPs and PNs was not undertaken, these results cannot be easily generalisable to the NZ GP/PN population.

It is difficult to assess the amount of information to which GPs and PNs were exposed prior to survey distribution. The announcement placing Gardasil® on the National Immunisation schedule was made concurrent with the administration of this survey and it is reasonable to assume that providers may have had different amounts of information exposure.

While this survey covered intentions to recommend HPV vaccination, it did not address knowledge about, and attitudes to the vaccine.

Recommendations

Because practice nurses expressed more discomfort than GPs about addressing adolescent sexual behaviours, additional nurse education and training in counselling techniques may be helpful. A disinclination by some PNs to recommend vaccination to younger adolescent girls indicates a need for clear education about the logic for completing the HPV vaccination series before girls become sexually active. It is important for providers, patients and parents to understand the vaccine limitations. Providers may benefit by having materials designed to aid their discussions and reduce patients' anxiety, psychosocial distress, and relationship issues associated with an HPV-related diagnosis or in relation to HPV vaccination.

Future research

The effectiveness of the HPV Immunisation Programme will be best understood through further studies over time. Future quantitative research to discover the actual vaccine recommendations by providers and vaccine uptake by patients will allow comparisons to the intentions described in this study. Qualitative research can expand upon and explore issues which have been identified. Focus group discussions or interviews may help to explain the reluctance of some providers to recommend immunisation to younger adolescents. Further investigation of reasons surrounding discomfort addressing sexual behaviour with adolescents or perceptions about risky sexual behaviour after HPV vaccination is also suggested. This study did not identify perceptions among providers about barriers to HPV immunisation which may be due to cultural or religious belief, nor did it specifically address challenges to reducing inequalities that exist between socioeconomic or ethnic groups.

Conclusion

This study has highlighted areas which may inform future educational efforts to improve providers' knowledge of clinically important issues about HPV. Applying new information in practice could translate into more accurate and relevant counselling messages when GPs and PNs provide cervical cancer screening, HPV vaccination or manage patients with genital warts or other HPV-related infections.

References

1. National Screening Unit. Cervical Cancer in New Zealand. 2008a [cited April, 2008]; Available from: http://www.nsu.govt.nz/current-nsu-programmes/1228.asp
2. de Sanjose S, Diaz M, Castellsague X, Clifford G, Bruni L, Munoz N, et al. Worldwide prevalence and genotype distribution of cervical human papillomavirus DNA in women with normal cytology: a meta-analysis. Lancet Infect Dis. 2007 Jul;7(7):453–9.
3. Franco EL, Duarte-Franco E, Ferenczy A. Prospects for controlling cervical cancer at the turn of the century. Salud Publica Mex. 2003;45 Suppl 3:S367–75.
4. Moscicki AB, Shiboski S, Hills NK, Powell KJ, Jay N, Hanson EN, et al. Regression of low-grade squamous intra-epithelial lesions in young women. Lancet. 2004;364:1678–83.
5. Moscicki AB, Ellenberg JH, Farhat S, Xu J. Persistence of human papillomavirus infection in HIV-infected and -uninfected adolescent girls: risk factors and differences, by phylogenetic type. J Infect Dis. 2004;190(1):37–45.

6. Villa LL, Costa RL, Petts CALO-. Prophylactic quadrivalent human papillomavirus (types 6, 11, 16 and 18) Lw Virus-like particle vaccine in young women: a randomized double-blind placebo-controlled multicentre phase II efficacy trial. Lancet Oncol. 2005;6:271–8.
7. Clifford G, Franceschi S, Diaz M, Muñoz N, Villa L. Chapter 3: HPV type-distribution in women with and without cervical neoplastic diseases. Vaccine. 2006 Epub 2006;24 Suppl 3:S3/26–34.
8. Lacey CJ. Therapy for genital human papillomavirus-related disease. J Clin Virol. 2005;32(Suppl 1):S82–90.
9. Bosch FX, Castellsague X, de Sanjose S. HPV and cervical cancer: screening or vaccination? Br J Cancer. 2008(98):15–21.
10. Adams M, Jasani B, Fiander A. Human papillomavirus (HPV) prophylactic vaccination: challenges for public health and implications for screening. Vaccine. 2007;25(16):3007–13.
11. Ministry of Health. Human Papillomavirus (HPV) Immunisation Programme. 2008a [cited 05 May, 2008]; Available from: http://www.moh.govt.nz/moh.nsf/indexmh/immunisation-diseasesandvaccines-hpv-programme#resources
12. Brabin L, Roberts SA, Farzaneh F, Kitchener HC. Future acceptance of adolescent human papillomavirus vaccination: a survey of parental attitudes. Vaccine. 2006 12;24(16):3087–94.
13. Giles M, Garland S. A study of women's knowledge regarding human papillomavirus infection, cervical cancer and human papillomavirus vaccines. Aust N Z J Obstet Gynaecol. 2006;46(4):311–5.
14. McCree DH, Sharpe PA, Brandt HM, Robertson R. Preferences for sources of information about abnormal Pap tests and HPV in women tested for HPV. Prev Med. 2006;43(3):165–70.
15. Zimet GD, Liddon N, Rosenthal SL, Lazcano-Ponce E, Allen B. Chapter 24: Psychosocial aspects of vaccine acceptability. Vaccine. 2006b(Suppl 3):S201–9.
16. Riedesel JM, Rosenthal SL, Zimet GD, Bernstein DI, Huang B, Lan D, et al. Attitudes about human papillomavirus vaccine among family physicians. J Pediatr Adolesc Gynecol. 2005;18(6):391–8.
17. Sherris J, Friedman A, Wittet S, Davies P, Steben M, Saraiya M. Chapter 25: Education, training, and communication for HPV vaccines. Vaccine. 2006;24 Suppl 3:S3/210–8.
18. Zimet GD, Shew ML, Kahn JA. Appropriate use of cervical cancer vaccine. Annu Rev Med. 2008;59:223–36.
19. Aldrich T, Becker D, Garcia SG, Lara D. Mexican physicians' knowledge and attitudes about the human papillomavirus and cervical cancer: a national survey. Sex Transm Infect. 2005;81(2):135–41.
20. Daley MF, Liddon N, Crane LA, Beaty BL, Barrow J, Babbel C, et al. A national survey of pediatrician knowledge and attitudes regarding human papillomavirus vaccination. Pediatrics. 2006;118(6):2280–9.
21. Duval B, Gilca V, McNeil S, Dobson S, Money D, Gemmill IM, et al. Vaccination against human papillomavirus: a baseline survey of Canadian clinicians' knowledge, attitudes and beliefs. Vaccine. 2007 Nov 7;25(45):7841–7.
22. Esposito S, Bosis S, Pelucchi C, Begliatti E, Rognoni A, Bellasio M, et al. Pediatrician knowledge and attitudes regarding human papillomavirus disease and its prevention. Vaccine. 2007;25(35):6437–46.
23. Jain N, Irwin KL, Montano D, Kasprzyk D, Carlin L, Freeman C, et al. Family physicians' knowledge of genital human papillomavirus (HPV) infection and HPV-related conditions, United States, 2004. Fam Med. 2006;38(7):483–9.
24. Montano D, Kasprzyk D, Carlin L, Freeman C. HPV provider survey: knowledge, attitudes and practices about genital HPV infection and related conditions. Executive Summary submitted to the Centers for Disease Control and Prevention, June 14, 2005. 2005.
25. CDHB, Canterbury District Health Board. Free Cervical Cancer Vaccination Extended To All Young Women, 12–18 Years Old. 2009 [cited 2009 11 March, 2009]; Available from: http://www.cdhb.govt.nz/communications/media/2009/090106.htm
26. Henderson Z, Irwin KL, Montano DE, Kasprzyk D, Carlin L, Greek A, et al. Anogenital warts knowledge and counseling practices of US clinicians: results from a national survey. Sexually Transmitted Diseases. 2007;34(9):644–52.
27. Jain N, Irwin KL, Montano D, Kasprzyk D, Carlin L, Freeman C, et al. Family physicians' knowledge of genital human papillomavirus (HPV) infection and HPV-related conditions, United States, 2004. Fam Med. 2006;38(7):483–9.
28. Kahn JA, Zimet GD, Bernstein DI, Riedesel JM, Lan D, Huang B, et al. Pediatricians' intention to administer human papillomavirus vaccine: the role of practice characteristics, knowledge, and attitudes. J Adolesc Health. 2005;37(6):502–10.
29. Riedesel JM, Rosenthal SL, Zimet GD, Bernstein DI, Huang B, Lan D, et al. Attitudes about human papillomavirus vaccine among family physicians. J of Ped Adolesc Gyn. 2005;18(6):391–8.
30. Kahn JA, Zimet GD, Bernstein DI, Riedesel JM, Lan D, Huang B, et al. Pediatricians' intention to administer human papillomavirus vaccine: the role of practice characteristics, knowledge, and attitudes. J Adolesc Health. 2005;37(6):502–10.
31. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent Human Papillomavirus Vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). MMWR Recomm Rep. 2007 23;56(RR-2):1–24.
32. Henderson Z, Irwin KL, Montano DE, Kasprzyk D, Carlin L, Greek A, et al. Anogenital warts knowledge and counseling practices of US clinicians: results from a national survey. Sex Transm Dis. 2007;34(9):644–52.
33. Friedman AL, Shepeard H. Exploring the knowledge, attitudes, beliefs, and communication preferences of the general public regarding HPV: findings from CDC focus group research and implications for practice. Health Educ Behav. 2007;34(3):471–85.
34. Sussman AL, Helitzer D, Sanders M, Urquieta B, Salvador M, Ndiaye K. HPV and cervical cancer prevention counseling with younger adolescents: implications for primary care. Ann Fam Med. 2007;5(4):298–304.
35. Tissot AM, Zimet GD, Rosenthal SL, Bernstein DI, Wetzel C, Kahn JA. Effective strategies for HPV vaccine delivery: the views of pediatricians. J Adolesc Health. 2007;41(2):119–25.
36. Kahn JA, Rosenthal SL, Tissot AM, Bernstein DI, Wetzel C, Zimet GD. Factors influencing pediatricians' intention to recommend human papillomavirus vaccines. Ambul Pediatr. 2007;7(5):367–73.
37. Ministry of Health. National Immunisation Register. 2008b [cited April 17, 2008 from http://www.moh.govt.nz/nir].
38. Mays RM, Zimet GD. Recommending STI vaccination to parents of adolescents: the attitudes of nurse practitioners. Sex Transm Dis. 2004 Jul;31(7):428–32.
39. Raley JC, Followwill KA, Zimet GD, Ault KA. Gynecologists' attitudes regarding human papilloma virus vaccination: a survey of Fellows of the American College of Obstetricians and Gynecologists. Infect Dis Obstet Gynecol. 2004 Sep-Dec;12(3–4):127–33.
40. Toop L, Hodges I. Primary care teamwork in the Christchurch area Part 1: Health professionals actual and preferred levels of inter disciplinary contact and collaboration. NZ Fam Phys. 1996;23:42–9.

ACKNOWLEDGEMENTS
I would like to express gratitude to my dissertation supervisors Gillian Abel, Les Toop, Ann Richardson and Elisabeth Wells for their support of this research. I would also like to thank Vladimir Gilca for sharing the questionnaire from his survey of Canadian physicians which provided 60% of the questions used in this survey. Finally, this study would not exist without the participating GPs, PNs of Christchurch and the Pegasus Health Educational Team.

FUNDING
This research was partially funded by a dissertation allowance from the University of Otago.

COMPETING INTERESTS
The author is involved in the analysis of cervical smears and has no commercial or other association that might pose a conflict of interest.

APPENDIX

Office Use Only
Date: _____
Session: _____

Knowledge, Attitudes, and Practices, of General Practitioners and Practice Nurses in Christchurch about HPV and HPV Vaccines

- **This survey is voluntary and completely anonymous.**
- **The questionnaire should only take 5 – 10 minutes to complete.**
- **Please answer ALL of the questions.**
- **When finished, please leave the questionnaire on the table, with a Pegasus representative, or kindly return the completed questionnaire in the stamped and addressed envelope provided. Mailing address: PO Box 4511, Christchurch 8041.**
- **Please feel free to call 377- 3397 if you have any questions about this survey.**

Thank you for taking time to complete this questionnaire!

Your timely response is appreciated.

Please turn the page to begin →

Section 1

►Please answer the following questions about yourself and your practice:

__X__Please mark the response that best applies to you.

1. What type of health care provider are you?

_____1 General Practitioner

_____2 Practice Nurse

2. Do you offer cervical screening in your practice?

_____ Yes

_____ No

3. What is your age?

____ Years

4. What is your gender?

_____1 Female

_____2 Male

5. How many years have you been in practice?

_____ Years

6. Which ethnic group do you belong to?
(please mark X all that apply to you)

____New Zealand /European

____Maori

____Tongan

____Samoan

____ Cook Island Maori

____Niuean

____ Chinese

____Indian

____ Other (please state):_____

Section 2

► Please indicate if you agree or disagree with these statements:

For each row, please circle one number	Agree	Disagree	Not Sure
1. HPV is the most common sexually transmitted infection	1	2	3
2. Persistent HPV is a necessary cause of cervical cancer	1	2	3
3. Anogenital warts induced by HPV 6 and 11 are cervical cancer precursors	1	2	3
4. Immunisation with the HPV vaccine will eliminate the need for cervical screening	1	2	3
5. Most HPV infections will clear without medical treatment	1	2	3

Please go on to the next page →

Section 3

► **Please indicate if you agree or disagree with these statements:**

For each row, please circle one number	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree
1. My patients will comply if I counsel them about:				
a) Safe sex behaviour (condom, abstinence)	1	2	3	4
b) Regular screening (frequency < 3 years)	1	2	3	4
c) HPV vaccination	1	2	3	4
2. I am comfortable addressing sexual behaviour with adolescent patients	1	2	3	4
3. Vaccination against an STI may encourage risky sexual behaviour in adolescents	1	2	3	4
4. I will recommend an HPV vaccine to my patients:				
a) If it is publicly-funded	1	2	3	4
b) Even if my patients have to pay for the vaccine (estimated cost $120 per dose)	1	2	3	4
c) If it protects against both cervical cancer and anogenital warts	1	2	3	4
d) If it only protects against cervical cancer	1	2	3	4
5. I will be most likely to recommend the HPV vaccine to:				
a) Females aged 9-12 years	1	2	3	4
b) Females aged 13-15years	1	2	3	4
c) Males aged 9-15 years	1	2	3	4
d) Females aged 16-26 years	1	2	3	4
e) Females aged 27-45 years	1	2	3	4

6. So far, the information I have received about HPV and HPV vaccines is:
(please mark X only one)

_____ 1 **Not sufficient**
_____ 2 **Somewhat sufficient**
_____ 3 **Sufficient**

Please turn the page to finish →

Section 4

► **Please indicate where you would look for new information on HPV or HPV vaccines:**

For each row, please circle one number	Very Likely	Quite Likely	Somewhat Likely	Not at all Likely
1.				
a) Ministry of Health	1	2	3	4
b) Immunisation Advisory Centre (IMAC)	1	2	3	4
c) Immunisation coordinators	1	2	3	4
d) Independent Provider Associations (Pegasus)	1	2	3	4
e) New Zealand Professional organisation guidelines	1	2	3	4
f) International guidelines (CDC, ACS, etc)	1	2	3	4
g) Journals and Scientific literature	1	2	3	4
h) Colleagues	1	2	3	4
i) Pharmaceutical companies	1	2	3	4
j) Internet	1	2	3	4
k) Other (please specify) _____				

► **Please indicate the importance of topics to be included in clinical training materials and clinical decision support tools to guide the prevention and management of HPV infection:**

For each row, please circle one number	Very Important	Quite Important	Somewhat Important	Not at all Important
2.				
a) Natural history of HPV related disease	1	2	3	4
b) Epidemiology/prevalence of HPV infection	1	2	3	4
c) Vaccine development	1	2	3	4
d) Vaccine safety profile	1	2	3	4
e) Vaccine efficacy and effectiveness	1	2	3	4
f) Impact of the vaccine on screening policy and practice	1	2	3	4
g) Cervical cancer screening/ management of Pap results	1	2	3	4
h) Genital warts management	1	2	3	4
i) HPV counseling	1	2	3	4
j) Psycho-social issues related to HPV	1	2	3	4
k) Other (please specify) _____				

Thank you for your participation in this survey !

Your completed questionnaire can be turned in at the meeting or mailed back in the postage-paid envelope provided.