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

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A dissertation submitted for the Master of Public Health at the University of Otago, Dunedin, New Zealand

March, 2009
ABSTRACT

Background: Human papillomavirus (HPV) is a very common sexually transmitted infection (STI) and nearly all cervical cancers are causally related to infections by HPV. Gardasil®, a quadrivalent HPV vaccine, is now on the New Zealand immunization schedule. This announcement has stimulated widespread media attention focusing on the pros and cons of HPV vaccination of pre-adolescents and adolescents. General practitioners (GP) and practice nurses (PN) perform the majority of cervical screening in Christchurch and will also have a key role in promoting or discouraging uptake of HPV immunization. Therefore, it is essential that they are accurately informed in order to provide patients with information and counseling necessary to meet the challenges of HPV management and prevention.

Objectives: The objectives of this study were to examine Christchurch GP and PN general knowledge about HPV and HPV immunization, identify their attitudes and intentions about HPV and HPV immunization, to discover what information they consider important and to whom they turn for information to guide their HPV-related practices.

Methods: A self-administered, anonymous questionnaire was distributed to 396 GPs and PNs practicing in Christchurch who attended peer-led small group meetings sponsored by Pegasus Health Independent Provider Association (IPA) from 5 May – 21 May, 2008. Data analysis was conducted and reported using the EpiInfo Complex-sample analysis program and comparisons were made between provider specialties.

Results: The overall participation rate was 39%. Christchurch GPs and PNs know that HPV is a very common sexually transmitted infection (STI) and that it is necessary for the development of cervical cancer. Importantly, they are also aware that cervical screening will need to continue, even after immunization against HPV. This study found that some providers may be unaware of differences between viral types included in the HPV vaccines relative to disease outcomes and some may not understand that most HPV
infections do not require medical intervention. While both GPs and PNs are confident that their patients will comply with recommendations about cervical screening and HPV vaccination, GPs were more likely than PNs to report being comfortable discussing sexual behavior with adolescents. PNs intend to recommend immunization for older female adolescents over younger females and are more likely to indicate that HPV vaccination may lead to an increase in risky sexual behavior than GPs. The Independent Provider Association (IPA) was reported to be the most valuable source of new information about HPV and HPV vaccines by both GPs and PNs. While GPs indicated the need for more information about evidence-based HPV facts, PNs reported that they would like more training about HPV counseling and psychosocial issues related to HPV.

**Conclusions:** This study has identified an overall good level of HPV knowledge and has identified areas where knowledge can be improved upon among Christchurch GPs and PNs. It has also discovered significant differences between GPs and PNs in their attitudes about adolescent sexual behavior and communication challenges pertaining to HPV-related issues. In addition, a difference in intention to recommend the HPV vaccine to adolescents by age between the two provider specialties was identified. The findings of this study may be useful for guiding the development of training materials and communication tools which will enhance GPs and PNs capacity to discuss HPV and HPV vaccines with their patients. The findings of this study may also be used to inform programs and policies which will improve general knowledge about HPV, direct the planning and policy of vaccine delivery, and inform public relation efforts.
ACKNOWLEDGEMENTS

It is with heartfelt thanks and gratitude to my supervisors that I have been able to conduct this research. Gillian Abel has been my guide throughout, steadily driving me forward while always encouraging, advising and supporting my efforts. Her kind manner was appreciated as much as her incredible skill and expertise in social research. Ann Richardson graciously provided invaluable initial support giving me the confidence to develop a sound foundation upon which to structure this research. Les Toop introduced me to the Pegasus Health education team and therefore my survey participants. Through his amazing ability to succinctly communicate across a wide range of topics, I now have a much greater understanding of my sample population and genuine appreciation for the word general in general practice. I am also extremely grateful for the brilliant statistical support and technical advice of Elisabeth Wells. She generously offered her time and expertise while patiently steering me through the complexities of quantitative analysis.

This survey would have been impossible without the assistance of the Educational Team at Pegasus Health. Jacqui McAlpine, Sue Rogers, Nikki Ford, Andrea Copeland, Linda Collier and Diane Bos welcomed and supported my work all along the way. Toreka Wansbrough and Ling Ling Dou were pillars of logistical efficiency as they distributed and faithfully collected my questionnaires during the 40 small-group meetings. I am also extremely grateful to the seven doctors and nurses who so generously agreed to pilot my survey. Their excellent feedback was central to the development of a comprehensive questionnaire that would be easy to understand and complete.

Finally, my study would not exist without the GPs and PNs of Christchurch who participated in the survey. I understand how precious time is to these primary care providers and truly thank them for giving of it so generously. I am hopeful that the information discovered during this research expedition will be beneficial to them as we work together to meet the challenges of reducing the burden of HPV-related disease.
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<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACIP</td>
<td>Advisory Committee on Immunization Practices</td>
</tr>
<tr>
<td>ACS</td>
<td>American Cancer Society</td>
</tr>
<tr>
<td>ARTISTIC</td>
<td>A Randomised Trial in Screening to Improve Cytology</td>
</tr>
<tr>
<td>CDC</td>
<td>Centers for Disease Control and Prevention (United States)</td>
</tr>
<tr>
<td>CDHB</td>
<td>Canterbury District Health Board</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence Interval</td>
</tr>
<tr>
<td>CIN</td>
<td>Cervical Intraepithelial Neoplasia</td>
</tr>
<tr>
<td>CPEC</td>
<td>Clinical Practice Education Committee</td>
</tr>
<tr>
<td>deff</td>
<td>Design effect</td>
</tr>
<tr>
<td>DNA</td>
<td>Deoxyribonucleic acid</td>
</tr>
<tr>
<td>FDA</td>
<td>Food and Drug Administration (United States)</td>
</tr>
<tr>
<td>fpc</td>
<td>Finite population correction factor</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>HPV</td>
<td>Human Papillomavirus</td>
</tr>
<tr>
<td>iid</td>
<td>Independent and identically distributed</td>
</tr>
<tr>
<td>IPA</td>
<td>Independent Provider Association</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NHANES</td>
<td>National Health and Nutrition Examination Survey (United States)</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service (United Kingdom)</td>
</tr>
<tr>
<td>NSU</td>
<td>National Screening Unit (New Zealand)</td>
</tr>
<tr>
<td>NZHIS</td>
<td>New Zealand Health Information Service</td>
</tr>
<tr>
<td>OB/GYN</td>
<td>Obstetrician/Gynecologist</td>
</tr>
<tr>
<td>PHO</td>
<td>Primary Health Organisation</td>
</tr>
<tr>
<td>PN</td>
<td>Practice Nurse</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized Controlled Trial</td>
</tr>
<tr>
<td>srs</td>
<td>Simple random sample</td>
</tr>
<tr>
<td>STI</td>
<td>Sexually Transmitted Infection</td>
</tr>
<tr>
<td>VaIN</td>
<td>Vaginal Intraepithelial Neoplasia</td>
</tr>
<tr>
<td>VIN</td>
<td>Vulvar Intraepithelial Neoplasia</td>
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</table>
Almost all cases of cervical cancer and precancerous intraepithelial lesions are caused by infection with oncogenic types of HPV (Trottier and Franco 2006). In New Zealand, the National Cervical Screening Program (NCSP) has been instrumental in driving the dramatic decline in cervical cancer incidence and mortality since 1990. Approximately 200 New Zealand women are diagnosed with cervical cancer each year and 70 will die from it (National Screening Unit 2008a). HPV is recognized as the most common sexually transmitted infection (de Sanjose, Diaz et al. 2007). Over 100 HPV types have been identified, 15 of which are linked to the development of cervical cancer (Franco, Duarte-Franco et al. 2003). A male or female of any age who takes part in any kind of sexual activity that involves genital contact is at risk for HPV. The virus can be passed on to others without knowledge as often people who have HPV have no signs or symptoms. Most infections will clear, but persistent infection with high-risk HPV types is associated with almost all cervical cancers (Friedman and Shepeard 2007). This has led to the development of prophylactic vaccines which demonstrate almost 100% efficacy in preventing persistent infection and the development of precancerous lesions caused by the most prevalent high-risk HPV types, HPV16 and HPV18 (Harper, Franco et al. 2006; Bosch, Castellsague et al. 2008).

HPV vaccination and the use of HPV tests are expected to reduce cervical cancer incidence and ultimately reduce the required frequency of cytologic testing in the future (Bosch, Castellsague et al. 2008). Additionally, fewer women will be subjected to the stress of abnormal test results, colposcopy and treatment (Adams, Jasani et al. 2007). To obtain these positive effects, a high level of vaccination uptake is needed. This will be dependent upon the willingness of individuals to accept vaccination, parents' willingness to have their children vaccinated, GP and PN willingness to recommend and distribute HPV vaccines and the ability of patients to pay for the vaccine. Vaccine efficacy and effectiveness are also dependent upon a variety of factors. These include patient exposure to HPV prior to vaccination, the duration of protection provided by the vaccine,
HPV type-specific prevalence rates within the New Zealand population and whether the vaccine is offered to females only or to both males and females. Immediately prior the distribution of this survey, the New Zealand Ministry of Health (MOH) announced the HPV Immunization Program (Ministry of Health 2008a). Beginning September, 2008 Gardasil® which is protective against four viral types, became publicly funded and available for girls aged 12-18 years.

HPV vaccines have received substantial media attention since the approval of Gardasil® in 2006. Television talk shows, newspapers, pharmaceutical advertising and awareness campaigns, and public interest groups have sparked a significant amount of controversy over the HPV vaccine, especially because of the sexually transmitted nature of the infection. A public campaign to improve HPV education and awareness is planned for 2009 in New Zealand.

Studies have repeatedly shown that the public trusts their primary health care providers to give them the best information about HPV, cervical cancer and the HPV vaccines (Brabin, Roberts et al. 2006; Daley, Liddon et al. 2006; Giles and Garland 2006; McCree, Sharpe et al. 2006; Zimet, Liddon et al. 2006b; Saslow, Castle et al. 2007). Information from trusted sources like GPs and PNs should enable patients and their parents to sort the truths from partial or misinformation that they may have received by the media, special interest groups, pharmaceutical manufacturers and others, who may deliberately misinform or simply lack accurate and current HPV information themselves (Anhang, Stryker et al. 2004a). GPs and PNs may be persuasive in addressing perceived barriers to immunization by initiating a conversation with patients about their concerns, clarifying any misunderstandings and recommending or discouraging the vaccine (Riedesel, Rosenthal et al. 2005).

GPs and their PNs will be the most likely resource Christchurch residents will use to obtain information about HPV and HPV vaccines. There is some evidence that doctors and nurses who will provide HPV vaccines may not be current on HPV natural history, epidemiology, prevention, treatment or vaccination and may be uncomfortable addressing

In order to provide accurate and reliable information to their patients so that they can make informed decisions regarding their immunization choices, GPs and PNs will require exposure to the most up-to-date information available about HPV and the vaccines. Educational efforts should build upon and enhance the existing capacity within primary care in Christchurch to deliver services. These primary care doctors and nurses provide patient care across a broad spectrum and are familiar with the challenges of a continually changing immunization schedule. Therefore clear, concise and relevant HPV information will be essential. This survey will attempt to identify where inconsistencies in knowledge occur and to discover areas where Christchurch GPs and PNs may require or desire additional training and education in order to answer questions posed to them by their patients and their patients’ parents.

To describe and compare the knowledge, attitudes and intentions of Christchurch primary care providers about HPV-related issues, the following objectives of this study are:

1. establish GP and PN demographic characteristics
2. determine knowledge about HPV and HPV vaccination
3. describe attitudes and intentions about HPV and HPV vaccination
4. ascertain sources used to guide cervical screening, HPV and vaccination practices
5. identify importance of topics to be included in training material

To overcome the challenges which will come with the introduction of HPV vaccines, organizations that can influence HPV programs will need to work together to ensure that HPV and HPV vaccine messages are clear, factually correct and consistent among key resources. A clear understanding of beliefs and priorities of Christchurch GPs and PNs regarding HPV and HPV immunization will inform resource allocation, and policy.
The following chapter reviews the literature about HPV-related issues and critiques studies which have investigated all of the above-mentioned factors. The information obtained from these studies served as a framework for developing the questionnaire used in this study and as a basis for placing the survey results in context with previous research.
CHAPTER 1: REVIEW OF THE LITERATURE

This chapter reviews the literature concerning knowledge and attitudes about HPV and HPV vaccines amongst the general public and health care providers. A framework is then developed to place the findings of this study in context to previous research and thereby inform public health and provider education efforts in Christchurch.

This literature review begins by examining evidence about HPV infection and HPV vaccines. Public awareness about HPV is on the rise internationally and many studies have attempted to understand the impact of information which has been received by people from a variety of sources. Therefore, studies which identify current public awareness and who the public trusts for accurate information about HPV, its related diseases and for reliable information about the vaccines are reviewed. This leads to a review of published international studies describing HPV knowledge and attitudes amongst primary healthcare providers. A critical review of this published literature will provide a platform for discussion about how Christchurch primary care providers compare to others in their HPV knowledge, attitudes and practices. Finally, studies describing provider preferences about where to obtain accurate information and the topics they consider important for further education about HPV and the HPV vaccines are discussed. The findings of this study can then be used to understand the implications for public health, provider education and point to areas for further research.

Search Strategy: The PubMed database was searched through June, 2008 to identify published research on HPV and HPV vaccines. Keywords used as search criteria were “HPV”, “human papillomavirus”, “vaccine”, “knowledge”, “attitudes”, “survey”. Journal articles were selected for review by scanning the abstracts for content. If relevant, the article was saved and the ‘related articles’ link was used to find similar or related publications. The references of all retrieved articles were then screened for further citations and the results were saved in a personalized National Center for Biotechnology Information (NCBI) collection. The search was limited to articles in English.
1.1 HUMAN PAPILLOMAVIRUS (HPV) INFECTION

1.1.1 Epidemiology

Worldwide, HPV is the most commonly diagnosed sexually transmitted infection (de Sanjose, Diaz et al. 2007). Persistent infection with oncogenic HPV types is a necessary cause of virtually all cervical cancers, with HPV DNA detected in 99.7% of cervical cancers (Walboomers, Jacobs et al. 1999). Most genital HPV infections are asymptomatic, transient and will clear without medical intervention (Montano, Kasprzyk et al. 2005; Moscicki, Schiffman et al. 2006). Epidemiologic studies have revealed that women without HPV do not develop cervical cancer but also emphasize that most women with HPV clear the infection and do not get cervical cancer, confirming that HPV is a necessary, but not sufficient, cause of cervical cancer (Schiffman and Castle 2003).

1.1.2 Viral types

More than 100 types of HPV have been identified and at least 40 of these specifically infect the genital areas. Genital HPV types are categorized by their epidemiological association with cervical cancer and are divided into low and high-risk types. High-risk types are associated with cervical cellular changes including low-grade cervical intraepithelial lesions (CIN1), high-grade cervical intraepithelial lesions (CIN 2 and 3), and squamous or glandular carcinoma of the cervix. Infection with low-risk types are reported in 70-100% of cases of low-grade changes and genital warts (Munoz, Bosch et al. 2003; Dunne, Unger et al. 2007).

High-risk types HPV 16 and HPV 18 account for approximately 70% of cervical cancers worldwide and 77% in Oceana but the specific regional prevalence of additional HPV types varies (Bosch and de Sanjose 2003). To date, there are no published studies in New Zealand about HPV prevalence, but studies in the United

\[ ^{1} \text{Cervical Intraepithelial Neoplasia} \]
States (US), the United Kingdom (UK) and Australia have been published which quantify HPV prevalence by specific viral type. A Centers for Disease Control and Prevention (CDC) prevalence study examined a representative sample of American women aged 14-59, who were enrolled in the 2004 National Health and Nutrition Examination Survey (NHANES) (Dunne, Unger et al. 2007). The prevalence of high-risk HPV types targeted by the currently available vaccine (HPV16 and 18) was noted to be lower than previously estimated and high-risk types 53, 52, 59, 66 and 51 were found more often. In contrast, the ARTISTIC (A Randomised Trial in Screening to Improve Cytology) trial of women enrolled in the routine National Health Service (NHS) Cervical Screening Program in Greater Manchester in the UK found high-risk HPV types 16, 18, 31, 51 and 52, to be the most commonly detected types (Sargent, Bailey et al. 2008). A systematic literature review of 553 published articles, where information from HPV typing of Australian cervical cancers was available, found that infection with HPV types 16 and 18 are the leading causes of cervical cancer in Australian women (Brotherton 2008). While these studies emphasize a regional variance of HPV types, they are limited in their comparability as the differences may have been influenced by the use of different tests for HPV detection and also differences in the study populations.

1.1.3 HPV prevalence

Models have projected that 50% percent of sexually active people will acquire a genital HPV infection within their lifetime and by the age of 50, up to 80% of women will have been exposed to at least one HPV type (Myers, McCrory et al. 2000). The CDC HPV prevalence study of a nationally representative sample of females in the United States, conducted in 2003-2004, found that overall 27% of females aged 14-59 years were infected (Dunne, Unger et al. 2007). Prevalence of any HPV infection was highest among females aged 20-24 years with high or low-risk HPV types found in 49%. The study further found that current HPV infections increased from 14-24 years, then decreased at older ages. While the response rate of this study was high at 82%, non-responders were found to be significantly different than responders with respect to demographic variables including
race/ethnicity and age. Therefore the validity of the study may be limited. However, the estimates may be comparable to findings of the UK ARTISTIC trial which reported on high-risk HPV prevalence for 24,510 women aged 20-64 years (Sargent, Bailey et al. 2008). There was a marked decline in the prevalence of high-risk HPV infection with age, showing 27% below age 30 and 6% age 30 or above.

While most studies of HPV prevalence have been about infections in females, males are also at high risk of acquiring HPV infections. A recent prevalence study in the US of 463 men aged 18-40 years with no history of genital warts found that about half (51%) were positive for at least one oncogenic or non-oncogenic HPV type (Nielson, Harris et al. 2007). These findings suggest that there is a relatively high prevalence of undetected HPV in men which may be accompanied by a high rate of transmission to their female partners.

1.1.4 Impact of HPV in New Zealand

HPV is not notifiable as a sexually transmitted infection (STI) in New Zealand; therefore it has been difficult to measure the extent of HPV incidence or prevalence. However, there are approximately 200 new cases of cervical cancer reported each year and about 70 deaths (National Screening Unit 2008a). The National Cervical Screening Program (NCSP) detects approximately 4,000 new cases of high-grade dysplasia (CIN 2 or 3), which are cervical cancer precursors, annually (Ministry of Health 2007). Low grade changes due to infection with low-risk HPV types and genital warts add to the burden of minor cervical cytology abnormalities causing significant psychological stress and substantial healthcare costs (Jones, Coughlan et al. 2007). In 2004, there were 3822 new diagnoses of genital warts in males and females in sexual health clinics; population rates cannot be calculated (IMAC 2008).
1.2 HPV VACCINES

HPV vaccines have been primarily developed to prevent HPV-related cancers of the cervix and genital warts (Saslow, Castle et al. 2007). Less commonly, HPV infection is also associated with other genital cancers such as cancer of the vulva, vagina, penis and anus. The vaccinations are considered to be most effective if administered prior to the onset of sexual activity (IMAC 2008).

1.2.1 Gardasil® and Cervarix®

Two prophylactic HPV vaccines have been developed. Gardasil®, manufactured by Merck and Co, Inc., protects against HPV types 6, 11, 16, and 18 (quadrivalent), and the other Cervarix®, manufactured by GlaxoSmithKline, protects against types 16 and 18 (bivalent).

Gardasil® was licensed for use in New Zealand in July 2006 for females aged 9-16 and males aged 9-15 (Medsafe 2006). Three doses per patient are recommended at zero, two and six months. Cervarix® was licensed in January 2008 for females aged 10-45 (Medsafe 2008). Three doses are recommended at zero, one and six months.

1.2.1.1 Safety of vaccines

Both HPV vaccines have been relatively well tolerated in clinical trials according to the guidelines published by the Advisory Committee on Immunization Practices (ACIP) in the US (Markowitz, Dunne et al. 2007). Local reactions, including injection-site pain, swelling and erythema have been the most common adverse events when compared with placebo. Systemic adverse effects have generally been similar in placebo and vaccine groups while adverse events at the injection site were higher in women allocated active vaccine. Pain was the most common injection-site adverse event and headache the most common systemic adverse event. There were no vaccine-related serious adverse events (Villa, Costa et al. 2005).
1.2.1.2 Efficacy and duration of protection

Gardasil®: The quadrivalent HPV vaccine has a high efficacy for prevention of vaccine HPV types 6, 11, 16, and 18 related persistent infection, vaccine type-related CIN, CIN 2/3, and external genital lesions (genital warts, VIN² and VaIN³). The vaccine demonstrated 100% efficacy in preventing warts and 98% efficacy in preventing high-grade cervical lesions (Villa, Costa et al. 2005; Markowitz, Dunne et al. 2007).

Cervarix®: Among women aged 15 to 25 years who completed the 3-dose vaccination regimen and participated in an extended follow-up study, vaccine efficacy for prevention was 100% for four and a half years (95% CI, 42.4% - 100%) effectiveness in preventing persistent infection of HPV types 16 and 18 (Harper, Franco et al. 2006).

There are several randomized controlled clinical trials (RCTs) evaluating a 3-dose vaccine (U.S. Food and Drug Administration 2006). Overall these trials have indicated that HPV negative women vaccinated with bivalent or quadrivalent vaccine report sustained efficacy of both vaccines for at least five years (Koutsky and Harper 2006; Villa, Costa et al. 2006). However, these studies have several limitations. Different clinical efficacy endpoints ranging from persistent HPV infection to cervical cancer and differences regarding to which serotypes were included in the vaccine, dosage levels, sample characteristics and outcome measures may impact the comparability of these results.

1.2.1.3 Recommendations and funding of HPV vaccines

The US ACIP, a 15-member expert panel selected by the Secretary of the U.S. Department of Health and Human Services, has recommended the vaccine for 11-12 year-old girls. The panel also has recommended catch-up vaccinations for females aged 13–26 years who have not been vaccinated previously or who have

² Vulvar Intraepithelial Neoplasia
³ Vaginal Intraepithelial Neoplasia
not received the full vaccine series of three doses, ideally before exposure to HPV has occurred (Markowitz, Dunne et al. 2007).

The high cost of vaccines has been a commonly stated barrier to receiving the HPV vaccines (Friedman and Shepeard 2007; Zimet, Shew et al. 2008). From 2009, Gardasil® will be part of the New Zealand National Immunization Program for Year 8 (12-13 year-old) girls and delivered through school based programs, primary care and health clinics. A catch up program beginning in September, 2008 focuses on older girls, aged 17 and 18 through primary care services. School Based programs and primary care delivery will start in 2009 for girls aged 12-18 years (Ministry of Health 2008c). This is similar to the HPV vaccine programs in Australia (Australian Government Department of Health and Ageing 2007) and the UK (UK Department of Health 2007). The high cost of privately available HPV vaccines in New Zealand prior to implementation of the HPV immunization schedule discussed above may have prevented many young women from seeking this vaccine (Lewis 2008).

1.2.1.4 Impact of HPV vaccines on cervical screening

Girls and women who receive HPV vaccines should continue to follow current cervical screening guidelines. Cervarix® and Gardasil® target HPV types 16 and 18 which have been identified as being responsible for approximately 70% of cervical cancer cases worldwide and around 55% of pre-cancerous lesions, but screening needs to continue in order to detect cervical disease caused by other types of HPV that are carcinogenic (Markowitz, Dunne et al. 2007; Saslow, Castle et al. 2007). Benefits from HPV vaccines may be offset if vaccinated women acquire a false sense of protection that results in decreased compliance with recommended cervical cancer screening (Kulasingam, Pagliusi et al. 2007).

1.2.1.5 Vaccination of males

Australia and New Zealand have licensed Gardasil® for use in males aged 9-15 years. Vaccination of both males and females will increase indirect protection or
‘herd-immunity’ (Garnett 2005). In the US, a cost-effectiveness study found that including men and boys in the program was the most effective strategy in reducing the incidence of genital warts, cervical intraepithelial neoplasia and cervical cancer by 97%, 91%, and 91%, respectively. However, the cost of this strategy is very high at $45,056 per quality-adjusted life year (QALY) when compared to vaccinating girls before the age of 12 years with a temporary catch-up program for 12 to 24 year-olds. This female only strategy would reduce the incidence of genital warts (83%) and cervical cancer (78%) due to HPV 6/11/16/18 at a much lower cost of US $4,666 per QALY gained (Elbasha, Dasbach et al. 2007). Policy recommendation and guidelines for dissemination of the vaccine in males is still awaiting results from ongoing clinical trials and so far males have not been targeted specifically by any country.

1.2.1.6 Limitations of HPV vaccines

Even though studies have demonstrated the safety and efficacy of the currently available vaccines, it is important to recognize their limitations. Gardasil® and Cervarix® do not protect against all carcinogenic HPV types nor do they treat existing HPV infections. The duration of protection, the required length of protection needed to prevent cancer and the possible need for additional booster vaccinations are yet unknown. Also, the three-dose regimen for primary vaccination may be difficult to achieve in populations where follow up is poor (Saslow, Castle et al. 2007).

1.3 PUBLIC KNOWLEDGE AND ATTITUDES ABOUT HPV AND HPV VACCINES

Despite the high prevalence of HPV, many studies have shown that awareness amongst the general public is limited.
1.3.1 General public knowledge and awareness about HPV

A review of published research about HPV knowledge across the US, Canada and the UK found that, in general, young women and men have limited awareness about HPV and related issues (Zimet, Liddon et al. 2006b). They often reported no knowledge of the virus or were unaware of the association of HPV with cervical cancer.

In the United States, for one year prior to licensure, the manufacturer of Gardasil® (Merck and Co.) was required by the Food and Drug Administration (FDA) to conduct a media campaign with the intent of raising consumer awareness about the vaccine and to help alleviate concerns that had arisen among parents. Merck funded an awareness campaign called “Make the Connection” which was run by the Cancer and Research Prevention Foundation and Step Up Women’s Network. These direct-to-consumer advertising campaigns focused on educating the public on the association between oncogenic HPV infection and cervical cancer. Prior to these campaigns, the media reported that less than 20% of women in the US knew that HPV can cause cervical cancer according to a study by the manufacturer of Gardasil® (Medical News Today 2006).

Since the HPV awareness campaigns described above, there has been only one published study assessing HPV knowledge and awareness in the general public of the United States. This self administered quantitative study convenience-sampled 124 ethnically diverse college students who were recruited during a university event and invited to take part in a brief, anonymous survey for a study called “20 Questions: A Health Study”. Females and males, aged 18-26 years completed a questionnaire to assess awareness, knowledge, and beliefs about HPV since the HPV vaccine approval in the US (Gerend and Magloire 2008). More than 75% of the sample had heard of HPV and of those 60% reported getting their information from public media, including television, radio and magazines, 39% heard about it from health care providers, 31% from friends, 28% from the Internet and 27% from
their parents. A high percentage (92%) correctly identified the causal link between HPV and cervical cancer. There was no information presented on the actual response rates for students in this study because it was offered to all passers by and only those who were interested in participating in the survey did so. Therefore, the study has limited external validity and may not be generalizable to other populations. Also, because the sample was limited to university students who may be more aware of HPV than other groups, the findings may not reflect the knowledge and awareness of the general population of the US or even other university students.

While quantitative studies are good for capturing information related to knowledge and attitudes at a particular point in time, they may not provide the depth of understanding which may be obtained by using qualitative studies. However, when used to describe knowledge about HPV, quantitative studies may be useful to determine if knowledge levels are increasing. A recent British study compared awareness of HPV in a randomly-selected population sample of women aged 19-97 years (Marlow, Waller et al. 2007) with a previous survey conducted in 2002. Using a similar questionnaire with closed and open-ended questions, computer-assisted face-to-face interviews were conducted (response rate 53.4%). The results were merged with the data from 2002 to analyse changes over time. Compared with the 2002 results, there was a small increase (from 0.9% in 2002 to 2.5% in 2007) in the number of women who knew HPV was a risk factor for cervical cancer even though about 25% of the women stated that they had heard of HPV. This extremely low level of knowledge is in spite of significant media attention surrounding the HPV vaccine. It should also be noted that there has been no widespread public awareness campaign in the UK as was the case in the US. Public awareness and knowledge of HPV in New Zealand may also be limited because there have been no widespread national public health efforts to educate the general public about HPV.
1.3.2 Parental knowledge, awareness and concerns about HPV and HPV vaccines

Most studies of parental attitudes were conducted in the USA prior to 2006 and before intensive HPV awareness campaigning and licensure of the HPV vaccines. Since that time there have been several studies in other countries which have had no widespread education interventions.

1.3.2.1 Parental knowledge and intention to vaccinate their children

In the Netherlands, 1150 parents of 10-12 year-old children were invited to participate in a telephone survey to determine parental acceptance of HPV vaccination (Lenselink, Gerrits et al. 2008). These parents received information in a pre-survey letter with facts about cervical cancer, HPV and HPV vaccination. With a response rate of only 31%, the survey found that only 29.5% of respondents had ever heard of HPV and only 14% knew that HPV is related to cervical cancer. This indicates that they had either not read or misinterpreted the educational message in the informative letter. Despite this 88% said they would have their child vaccinated if recommended by the government. Furthermore, a quantitative study of women who were the primary caregivers of a girl 10-18 years old and recruited face-to-face from Da Nang General Hospital in Vietnam, were asked to complete a survey addressing HPV vaccines, beliefs about sexuality, recommendations from others, and likelihood of having their daughter vaccinated against HPV (Dinh, Rosenthal et al. 2007). All women who were approached in this convenience sample agreed to complete the questionnaire. The women were not exposed to any information about HPV or HPV vaccines. Ninety-three percent of the returned surveys contained analyzable data. While only 11% of women were aware of an HPV vaccine, 94% believed that the HPV vaccines would be effective and 90% of the women were in favor of the girls receiving the vaccine. In contrast, a mailed questionnaire in Finland to the parents of 727 fifteen years olds (response rate 39.5%) found that 79% of parents had heard of HPV and 86% were interested in HPV vaccination for their child if recommended by the government (Woodhall,
Lehtinen et al. 2007). Across the three studies there was a high acceptance of the vaccines regardless of the level of knowledge of HPV vaccines or HPV and its link to cervical cancer.

It should be noted that these studies used a variety of sampling methods. Although the telephone and mail surveys were able to provide the respondents with anonymity thereby avoiding the discomfort which may be associated with personal interviews and allowing participants more freedom to express their opinions, the low response rates of both the telephone survey and mail survey (31% and 39.5% respectively) suggests that the subject itself may have made it uncomfortable for parents to respond or they did not want to take the time to participate. The direct approach face-to-face method adopted in Vietnam had the highest response rate with all women approached agreeing to take part in the survey. Differences in response rates may reflect cultural differences between the studied populations. The external validity of these studies may be severely limited by either low response rates, homogeneity of the study population or because no comparison between responders to non-responders was made.

1.3.2.2 Sexual disinhibition and risky sexual behavior

There has been concern expressed by some parents that HPV vaccination of young girls might give them a false sense of protection against STIs leading them to initiate sexual behavior at an earlier age or not use condoms when sexually active (Zimet, Liddon et al. 2006b). A US cross-sectional quantitative study (response rate 63%) that used a computer-based anonymous questionnaire of 278 parents accompanying their children to medical appointments, demonstrated that parents are more likely to make the decision to immunize based on vaccine efficacy and perceived severity of the infection to be prevented rather than on the sexual nature of disease transmission (Zimet, Mays et al. 2005). However, a telephone survey of Californian parents found that 18% of the parents opposed to vaccination expressed concerns about effects on sexual behavior, moral concerns about sexual behavior, general vaccine concerns, and denial of their daughters' need of a vaccine against
an STI (Constantine, Jerman et al. 2007). By comparison, a Dutch telephone survey found only one parent concerned that the HPV vaccination might lead to promiscuity or early initiation of sexual activity (Lenselink, Gerrits et al. 2008). The results of telephone surveys may have limited external validity because they present an abstract scenario presented by a stranger and may not accurately reflect the actual decision a parent may make in real-life when choosing immunization for their child.

1.3.3 Preferred sources of information about HPV and HPV vaccines

With the introduction of HPV vaccines, increasing public awareness about the link between HPV infection and cervical cancer is inevitable even though the studies described above demonstrate that a lack of knowledge and awareness about HPV exists. Because of the high profile of this disease and the societal concerns associated with its sexually transmitted nature, it will be important to provide easy to understand, accurate and honest information in plain language which is easily understood by the public.

Quantitative investigation can provide a baseline for investigation about preferences for information as illustrated in an Australian study about HPV knowledge. A convenience sample of thirty women who were either participating in an HPV vaccine trial, attending a university health service or attending a cervical dysplasia clinic were asked to complete the questionnaire about HPV (Giles and Garland 2006). When asked where they go to find information about HPV, cervical cancer or HPV vaccination, 79% of women requested face-to-face interaction with their own GP. Thirty percent of the respondents would seek information from another health professional while 52% would use the Internet. This study was limited by selection bias that may have been introduced by a small sample size and because of the involvement of participants in their respective health care settings. Therefore, this study may not be generalizable to a broader population.
Expanding on findings which used quantitative research methods, several studies used qualitative methods (focus groups and face-to-face interviews) to understand the issues surrounding public knowledge and perception about HPV (Anhang, Wright et al. 2004b; McCree, Sharpe et al. 2006; Friedman and Shepeard 2007). Although the sample sizes are not as large as those usually found in quantitative investigation, it is often possible to gather a greater depth of understanding about specific issues. While the findings will usually not be generalizable to other populations and statistical information cannot be produced, there are situations when focus groups can enable the researcher to examine people’s different perspectives as they operate within a social network. This method has proved valuable when trying to understand women’s preferred sources of information about HPV and HPV vaccines.

A qualitative study conducted eight focus groups with ethnically diverse women in the US and found that there was confusion about HPV because the information which has been made available by health agencies, pharmaceutical companies as well as through the news media and on the Internet is often conflicting, inaccurate, outdated, biased, incomplete or written at inappropriately high literacy levels for general audiences (Anhang, Wright et al. 2004b). Across all groups, participants wanted to know more about HPV including its symptoms, transmission and consequences and stated that to find that information they would look on the Internet or ask their health care provider.

Face-to-face interviews were conducted with 44 purposefully sampled women in the US who were patients at four federally funded clinics in a rural region of South Carolina. All patients had received a diagnosis of high-risk HPV and an abnormal Pap smear result (McCree, Sharpe et al. 2006). The women were asked their preferences about HPV information sources. Pamphlets, videotapes, and books were noted to lack the ability to interact and ask questions of other people, specifically a doctor. Women felt they could not trust the information provided by television and radio because of the commercial aspects of the media. Furthermore,
they perceived that information provided via the Internet was confusing and not reliable. Other women with similar experiences to their own were thought to be a reliable source of information, but by far the most trusted source of information was the woman's own health care provider. Many women preferred face-to-face interaction with a provider for education about HPV because it ensures privacy, provides an opportunity to ask questions and enables them to receive information from a trusted, reliable source. Conversation with a health care provider was preferable to the use of all other educational material. While this study is limited in its generalizability due to both the small sample size and the disease status of participants, the results generated are able to contribute to the theoretical understanding of patients' preferences for information about HPV. This is further elaborated on by a later qualitative study that also used focus groups, but consisting of men and women. The study was conducted in six geographically dispersed US sites and explored participants' communication preferences for HPV-related educational messages (Friedman and Shepeard 2007). The study participants were between the ages of 25 and 45 and the most trusted sources of HPV information included Planned Parenthood, community-based organizations, doctors' offices, health departments, clinics, health insurance companies and the CDC. There was distrust of government agencies especially noted by African American participants and all groups stated that they would not trust information developed by pharmaceutical companies.

In the UK, a qualitative study using focus groups was conducted and, similar to the above-mentioned studies, found that although most women had positive attitudes towards cervical screening, many had no prior knowledge or awareness of HPV (Goldsmith, Bankhead et al. 2007). This study indicated that information provided by the screening service alone did not meet the women in this qualitative study's information needs. After reading HPV information included in the UK National screening program leaflet about abnormal results, women felt the details provided were complicated and difficult to understand and left them feeling worried and confused.
Parents also routinely identified doctors as the strongest influence for vaccination of their children in several studies (Zimet, Mays et al. 2005; Brabin, Roberts et al. 2006). A qualitative study in New Zealand of parents who chose not to immunize their children, found that 86% percent of these parents said the health professional from whom they received the most information about immunization was their own GP even though some thought the information supplied by their GP was biased in favour of immunization and downplayed the risk of side-effects from immunization (Hamilton, Corwin et al. 2004).

The literature indicates that people receive information about HPV and HPV vaccines from a variety of sources and it is often misleading or difficult to comprehend. The recent media attention surrounding the availability of the HPV vaccines in New Zealand will raise issues surrounding HPV and its link to cervical cancer as well as its role as a sexually transmitted infection. GPs and PNs as an identified trusted source of information about HPV will be relied upon to provide accurate information for their patients. Although the results of the qualitative studies are not generalizable, insightful information is provided about how and why people think the way they do so that their needs about HPV and the HPV vaccines can be met. It should also be noted that all of these studies were conducted prior to licensure of the HVP vaccines and since that time, there has been a considerable amount of information distributed to the public, especially in the United States.

1.4 PROVIDER HPV-RELATED KNOWLEDGE, ATTITUDES AND BELIEFS

In Christchurch, GPs and PNs who provide services to adolescents will have most of the responsibility for the delivery of HPV vaccines. Having the knowledge necessary to properly inform patients and parents and having the appropriate communicative skills are two separate issues but are both necessary for providing comprehensive patient care.
Fifteen studies, both qualitative and quantitative, which looked at providers' knowledge, attitudes, beliefs and practices about HPV and HPV vaccines, have been identified in the literature. These studies focused on a variety of health care providers, including but not limited to pediatricians, GPs, nurse practitioners, and OB/GYNs and are summarized in Table 1 (pages 33-34).

Pediatricians have been the main focus in many US studies because these doctors are likely to be the primary contact for younger adolescents. In the United States, children in the targeted age group for vaccination, 11-12 year-old girls, are twice as likely to visit a pediatrician as any other provider and parental decisions about vaccination are influenced strongly by a pediatricians' recommendation (Zimet, Mays et al. 2000). GPs and Obstetrician/Gynecologists (OB/GYN) may have more experience dealing with STIs, including HPV, than their pediatrician colleagues. Quantitative studies which sampled specific medical specialties, such as pediatricians, GPs and OB/GYNs, are quite likely generalizable to their own practices but may have poor external validity to other physician specialties. A further limitation of the studies which addressed vaccine recommendations was the intention to prescribe HPV vaccination rather than actual prescription. However, it has been shown that behavioral intention is a consistent predictor of actual behavior, including immunization behavior (Millstein 1996).

1.4.1 Provider knowledge about HPV and HPV vaccines

In order to describe information about provider knowledge of HPV, several quantitative, cross-sectional surveys are reviewed. These studies describe what providers understand about HPV infection and where inconsistencies in knowledge occur.

Most studies have found that providers are well aware that HPV is a very common sexually transmitted infection. A quantitative study which surveyed GPs and nurse
practitioners (NPs) in the US found that 89% of GPs (95% CI 86-92, response rate 68%) and 89% of NPs (95% CI 84-93, response rate 96%) correctly identified HPV as a common STI (Montano, Kasprzyk et al. 2005), while 85% (response rate 43%) of GPs in Canada also understand the sexually transmitted nature of HPV (Duval, Gilca et al. 2007).

Recent studies have noted that physicians are generally well aware that HPV is related to the development of cervical cancer and genital warts. Knowledge about HPV and its link to cervical cancer appears to have increased over time as HPV vaccines become available, but the extent of the association between HPV and cervical cancer is less often understood. A US survey conducted in 2004, distributed a mailed-questionnaire to two different specialties, GPs and pediatricians, and found little knowledge that most cervical cancer is caused by HPV infection; only 66% and 41% respectively (Kahn, Zimet et al. 2005; Riedesel, Rosenthal et al. 2005). In contrast to this, a large mail-survey which sampled a wider range of health care providers found that while even though 98% were aware that persistent HPV infection increases the risk of cervical cancer (Montano, Kasprzyk et al. 2005), they may not be aware that scientific evidence has shown that HPV is necessary for the development of cervical cancer (Walboomers, Jacobs et al. 1999). When asked this question specifically, pediatricians surveyed by Daley et al, 2006 found that only 33% knew that HPV is necessary for cervical cancer to develop. This consistent lack of knowledge was further illustrated in a later study that found only 49% of Canadian pediatricians aware of this association (Duval, Gilca et al. 2007).

Knowledge about the different HPV types and their relationship to cervical cancer (HPV16 and 18) and genital warts (HPV6 and 11) has been described in several quantitative studies. A survey of GPs in Mexico (response rate 76%) found that while 79% knew that HPV is the principal cause of cancer, 61% incorrectly thought that high-risk types cause genital warts and not cervical cancer (Aldrich, Becker et al. 2005). This is further emphasized by other studies, where less than half of

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4 Confidence Interval
participants correctly knew that HPV types associated with genital warts differ from types associated with cervical cancer (Montano, Kasprzyk et al. 2005; Jain, Irwin et al. 2006; Henderson, Irwin et al. 2007). The GPs in the US who were surveyed by Jain et al, 2006, found that 47% (95% CI, 41-53) were unable to make this distinction. HPV knowledge differs by provider specialty as shown in another study where GPs and pediatricians were surveyed separately but completed identical self-administered questionnaires. GPs were more likely than pediatricians (83% to 44% respectively) to correctly identify HPV types associated with genital warts and cervical cancer (Kahn, Zimet et al. 2005; Riedesel, Rosenthal et al. 2005). This was also illustrated in the Canadian survey by Duval et al 2007. While 77% of OB/GYNs knew that HPV types 6 and 11 are not cervical cancer precursors, relatively few, only 22% of GPs and 15% of pediatricians, were aware of this evidence-based fact (Duval, Gilca et al. 2007).

This trend in knowledge difference by specialty may exist because information concerning HPV was likely to have had more relevance to GPs and OB/GYNs since they would have been more likely than pediatricians to deal with HPV-related disease in their medical practice.

A multi-specialty study in the US found that only about 35% of providers understood that most HPV infections may clear without medical intervention (Montano, Kasprzyk et al. 2005). This proportion was slightly less, 33% (95% CI 28-38), when results were limited to GPs (Jain, Irwin et al. 2006). Similarly, only 36% of nurse practitioners thought that most genital warts spontaneously regress without medical attention (Henderson, Irwin et al. 2007). This information is important because it may be relevant to counseling patients about treatment related to HPV infection.

A limitation of these studies was that most of the estimates provided in the studies cited did not include 95% confidence intervals (CIs) with the exception of the studies performed by Jain et al., 2005 and Henderson et al, 2007, which were sub-studies of GPs and PNs taken from a broader study (Montano, Kasprzyk et al. 2005). The
estimates which did not publish confidence intervals, while informative, may not allow comprehensive interpretation as to the precision of the results.

1.4.2 Provider intention to recommend HPV vaccines

Provider intent to recommend HPV vaccines was mostly studied in the United States prior to the licensing of Gardasil®. Therefore, all studies, except for one recent yet to be published survey of pediatricians, reflect the intent to recommend the HPV vaccines rather than actual recommendation practices. Several factors need to be considered when commenting on intention to recommend the HPV vaccines. These include patient age, cost or funding and whether that is private or public, and whether providers have a preference for a vaccine that protects against cervical cancer and genital warts or cervical cancer only.

1.4.2.1 By age and gender of patient

Across all of the studies, especially the earlier ones, it was found that although providers understand that the HPV vaccines are most effective if given prior to the onset of sexual activity, most were still more likely to express a preference to recommend vaccine to older age groups, especially 13-15 year-old females. This was a cause for concern in the discussion sections of many of the studies because current published guidelines strongly recommend immunization for ages 10-12, or prior to sexual debut, for the maximum protective effect.

In two early US studies, although most providers identified younger adolescents (<13 years of age) as the ideal age to receive the vaccine, two quantitative surveys, one of gynecologists (response rate 17%) and one of pediatricians (response rate 51%), noted a strong preference towards recommending the vaccine for older adolescents even though the age ranges of the patients seen by these different specialties are quite different (Raley, Followwill et al. 2004; Kahn, Zimet et al. 2005). In a large survey of pediatricians by Daley et al in 2006, while only 46% of respondents would recommend HPV vaccination for 10-12 year-olds, 77%
identified 13-15 year-olds as likely candidates for vaccine and 89% preferred vaccination of 16-18 year-olds. Their preference for vaccination of older males followed this same trend at 37%, 67% and 82% respectively (Daley, Liddon et al. 2006). Nurse practitioners completing questionnaires at a conference (98% response rate) also favored vaccination against STIs in general for 17 year-olds as compared to 11 year-olds but expressed no preference of immunizing females over males (Mays and Zimet 2004). In Italy, 73% of pediatricians thought HPV vaccination should be recommended before sexual activity (Esposito, Bosis et al. 2007). A small majority, 61%, thought that both females and males should be vaccinated. In the Canadian study of providers, a majority of the physicians believe HPV vaccines should be given to girls prior to the onset of sexual activity and that the best age for an immunization program is 14 years or younger. However, 20% still favored immunization at an older age (Duval, Gilca et al. 2007).

Each of these studies was limited by the absence of published guidelines recommending immunization of 10-12 year-old girls and the unavailability of an HPV vaccine at the time of the research. Even though these studies indicated a preference for immunizing older adolescents, the impact of recent HPV awareness and education campaigns in the US, along with insurance coverage of vaccination costs and guidelines recommending immunization of 11-12 year-old females may influence intention to prescribe behavior.

The latest, and only, study from the US which describes pediatricians intent to recommend HPV vaccination post-licensure, reports that 78% of pediatricians are extremely likely to recommend the HPV vaccine to 11-12 year-olds, which is in line with the current guidelines published by the ACIP (Markowitz, Dunne et al. 2007; Feemster, Winters et al. 2008).
1.4.2.2 By cost and funding

Cost has been identified as a significant barrier to uptake of HPV vaccines. A qualitative study which interviewed 31 pediatricians noted that cost was critically important to vaccine delivery, particularly in urban or low-income areas. As one of the physicians stated “It really comes down to cost every time” (Kahn, Rosenthal et al. 2007, page 371).

However, the Canadian study by Duval et al. found that about 84% of GPs would still recommend the vaccine even if their patients had to pay for it while 88% would recommend the vaccine if it was publicly funded. These studies did not address the issues of disparity that could occur if the vaccines are only recommended to patients who could afford to pay for them.

1.4.2.3 By type of protection offered

When asked about a preference between vaccines that protect against high-risk HPV types that lead to the prevention of cervical cancer only (bivalent-Cervarix®) and the vaccines that protected against HPV infection leading to both cervical cancer and genital warts (quadrivalent-Gardasil®), most health care providers preferred the quadrivalent vaccine. In early studies of GPs and pediatricians, both groups expressed a preference for a vaccine protective against cervical cancer and warts over a vaccine strictly for cancer (Raley, Followwill et al. 2004; Kahn and Bernstein 2005; Riedesel, Rosenthal et al. 2005). Rationalising this, a pediatrician interviewed favored the quadrivalent vaccine because it provided “more bang for the buck.” (Kahn, Rosenthal et al. 2007, page 370). Most recently, Duval et al. found that 93-95% of Canadian physicians favoured an HPV vaccine that prevents both cervical cancer and genital warts. The study by Feemster et al. which addresses pediatricians’ intent to recommend post-licensure only assesses the quadrivalent vaccine because the bivalent vaccine had not received FDA approval at the time of the study.
1.4.3 Psychosocial aspects of HPV and HPV vaccines

Because HPV vaccines target a sexually transmitted infection which is the cause of genital warts as well as cervical cancer, there are unique issues that may be encountered when discussing HPV and HPV vaccines with patients or the parents of their adolescent patients.

1.4.3.1 Perception of increased risky sexual behavior in adolescents by providers

In a self-administered, quantitative survey of pediatrician attitudes by Daley et al (2006), 70% of pediatricians thought that parents would be upset that a vaccine against a sexually transmitted vaccine was offered to young adolescents. The Italian survey of pediatricians found that a majority of participants thought that parents might refuse HPV vaccines because they were worried that a vaccine against a sexually transmitted disease would promote risky sexual behavior or because they had little fear of HPV-related disease (Esposito, Bosis et al. 2007). Similar concerns were also expressed in other early quantitative surveys of pediatricians and GPs (Kahn, Zimet et al. 2005; Riedesel, Rosenthal et al. 2005).

Extending the findings of previous descriptive quantitative research, several qualitative studies were conducted to describe the range of attitudes among doctors and to explore which factors may influence their behaviors to recommend the HPV vaccines.

In-depth interviews with 37 GPs in New Mexico, USA, were conducted in 2005 to understand the context in which they provide guidance about sexual health risks as well as their attitudes regarding counseling about HPV (Sussman, Helitzer et al. 2007). One striking theme was the presumption that adolescents engage in risky health behaviors, including sexual, safety and substance abuse, at high rates beginning around age 13 or 14. Some clinicians in this study were concerned that the HPV vaccine would give adolescents a false sense of protection. They also expressed some concerns about the vaccine’s receptivity based on cultural beliefs.
regarding sexual activity or that some parents might not consider their own adolescents at risk of disease related to HPV.

Another qualitative study, building on concerns raised in an earlier quantitative study by the same research team, engaged 31 Midwestern US pediatricians in semi-structured interviews (Kahn, Zimet et al. 2005; Kahn, Rosenthal et al. 2007). They found reluctance on the part of some physicians to discuss sexuality with their patients and their parents. They also found that some of the physicians believed that the HPV vaccine might encourage more risky behavior.

However, at least in the US, these apprehensions may not be warranted as noted in focus groups and survey studies that have been conducted more recently with parents of adolescents. These studies found that most parents are quite likely to accept vaccines against sexually transmitted infections (Zimet, Mays et al. 2005; Brabin, Roberts et al. 2006; Dempsey and Davis 2006). In fact, the most recent information obtained in a descriptive survey of pediatricians in the United States post-licensing found that pediatrician and perceived parental concerns about sexuality were not associated with intention to recommend HPV vaccines (Feemster, Winters et al. 2008).

1.4.3.2 Provider comfort with counseling practices related to HPV and HPV vaccines

Many adolescent and young adult women will learn that their abnormal cervical smear indicates that they have been exposed to HPV. In early quantitative studies of both adults and adolescents, HPV testing has been associated with anxiety, distress, perceived stigma, and fear of further testing and treatment procedures (Kahn, Slap et al. 2005). Providers who effectively educate adolescents about HPV infection may be able to prevent the potentially harmful psychosocial and interpersonal responses to HPV and pap test results, while promoting healthy sexual behavior and regular pap screening (Wetzel, Tissot et al. 2007). General recommendations for patient education include talking in simple everyday language, discussing the content of written materials with the patient and providing
materials that are culturally sensitive and appropriate to the educational level (Mayeaux 2005).

The New Mexico interviews with primary care doctors revealed that they seldom initiated discussions about HPV infection because of the complexity of HPV counseling, the low level of baseline knowledge of most adolescents about HPV and personal discomfort due to their own limited knowledge of HPV (Sussman, Helitzer et al. 2007). Instead they found that HPV infection was more likely to be addressed during a ‘teachable moment’ such as when genital warts were discovered or an abnormal pap smear was reported. The same appears to be true in Italy where a majority of Italian pediatricians surveyed described not discussing sexual behavior at all unless asked specifically or if the patient presented with a clinical problem (Esposito, Bosis et al. 2007). In stark contrast, the survey of nurse practitioners in the US found almost no disinclination to endorse STI vaccinations due to the potential for discomfort around discussing sexuality issues with parents of adolescent patients (Mays and Zimet 2004).

The Canadian study by Duval et al. found that while only 48% of GPs thought that their patients would comply with counseling about safe sex, 89% reported that they would heed their advice about regular cervical screening and 94% about HPV vaccination (Duval, Gilca et al. 2007).

1.5 PROVIDERS PREFERRED SOURCES OF INFORMATION

Multiple studies in the US indicate that providers look to professional and other influential organizations including the ACIP and the American Cancer Society (ACS) for guidance with regard to new vaccines. Although each of these studies was conducted prior to the licensing and availability of HPV vaccines, it indicates the trust and importance providers place on these organizations to define their clinical practice. A review of four early cross-sectional provider surveys amongst a variety of health care providers (nurse practitioners, gynecologists, GPs and pediatricians) in the US, found, in all studies, that the approval by professional
organizations is very important to their intention to recommend HPV vaccines (Zimet, Liddon et al. 2006b). Similarly, the 2005 survey of GPs in the US noticed a strong preference for information from their own professional organization. Colleagues were mentioned as a good source by 72% while pharmaceutical representatives as a source of guidance was low at 14% (Riedesel, Rosenthal et al. 2005).

The situation appears somewhat different in Italy since even though >90% of Italian pediatricians felt that their HPV knowledge was inadequate, only 16% and 10% of primary care and hospital doctors respectively preferred information from internationally published references (Esposito, Bosis et al. 2007). However, among the pediatric residents, who were identified as the most well-informed of all participants, 30% expressed a preference for international references while only 20% of the more experienced doctors had the same preference. The most trusted source identified by the Italian pediatricians was meetings with colleagues and physicians from different specialties, with 33-46% favoring this resource.

1.6 PROVIDER EDUCATION

Health care providers have been identified as the most trusted source of information about HPV and HPV vaccines to their patients. They will need to understand HPV and how it relates to the care and management of their patients, both physically and psychologically. They need to know how and why the vaccine is important and understand the vaccine’s limitations in order to recommend or discourage uptake amongst their patients.

Qualitative research has provided useful information about the education needs of health care providers suggesting that education was of primary importance in enhancing their personal ability to educate patients, parents and adolescents about HPV and the HPV vaccines. A qualitative study which conducted one-on-one interviews with 31 pediatricians found that lack of knowledge about HPV and physician attitudes was a barrier to recommending HPV vaccines (Kahn, Rosenthal
et al. 2007). One participant perceived that without adequate physician education about HPV it would be difficult to encourage adolescents to accept the vaccine. Another qualitative study in the US, which also conducted personal interviews with pediatricians, identified what they thought was critical for the future implementation of HPV vaccination (Tissot, Zimet et al. 2007). They indicated that given the availability of an STI vaccine in an environment of low levels of knowledge about HPV among providers and the general public, the educational needs of both groups would need to be met. For themselves, they provided some practical suggestions for meeting their own educational needs. Participants expressed a preference towards lectures and written material from local experts and professional and public health organizations, but also considered on-line educational activities and web-sites containing information and recommendations useful. These pediatricians felt that the most important information for providers about HPV is data about prevalence, description of HPV-related diseases and their health impact and the susceptibility to HPV of their own patient population. The information they desired on vaccines included vaccine safety and efficacy, duration of immunity, contraindications and the potential public health and economic benefits of vaccination. Providers also reported that they would benefit from educational activities that help them to acquire the skills needed to address adolescent sexuality with different racial, ethnic, religious, or cultural groups.

Although these studies have provided rich information about how pediatricians perceive their ability to discuss HPV with their patients and their parents, it may not reflect the attitudes of providers who care for a wider age range of patients. In the CDC study, which included multiple provider specialties and was not limited to pediatricians, more than 92% rated topics related to wart diagnosis and treatment, transmission and methods to prevent transmission as important for training materials for clinicians (Montano, Kasprzyk et al. 2005). This study also recommended that providers would benefit by having materials designed to reduce patients’ anxiety, psychosocial distress and relationship issues.
1.7 SUMMARY

Christchurch GPs and PNs have a major role in cervical cancer screening and the prevention, diagnosis and treatment of genital warts and will be directly involved in delivering and discussing the HPV vaccines. With the introduction of the HPV Immunization Program, parents and patients will have information requests that will need to be met by their primary health care provider. The literature review has revealed that the public is relatively unaware of the link between HPV infection and cervical cancer and lacks knowledge about HPV and its relationship to the HPV vaccines. Healthcare providers have been identified by women and parents of adolescents as their primary and most trusted source of health and vaccine information. GPs and PNs will be presented with opportunities to counsel and educate patients about genital HPV and how HPV infection relates to cervical cancer and genital warts. Previous research has indicated that some providers are not up-to-date on HPV natural history, epidemiology, prevention, treatment, or vaccination. There may be a lack of awareness about HPV transmission and natural history and some providers may be uncomfortable addressing patient concerns about HPV acquisition and sex partners. Some confusion has been shown to exist about the recommended screening and management practices for HPV associated conditions. Providers will need to know how and why the vaccine is important and understand the vaccine's limitations, including that it does not protect against all HPV types linked to cervical cancer and that cervical screening will need to continue regardless of vaccination status. As more information is received by health care providers, these inconsistencies should be reconciled.

This survey reports the attitudes about HPV and HPV immunization among GPs and PNs who are likely to provide HPV-related services in Christchurch. The research will identify areas where HPV knowledge is good and where it can be improved upon. It will also discover the attitudes and intentions of Christchurch GPs and PNs about HPV immunization at a time when widespread educational messages are not yet available to the public.
TABLE 1.1: Provider studies addressing HPV and HPV vaccines: 2004-2008

<table>
<thead>
<tr>
<th>Study/Region/Date</th>
<th>Participants</th>
<th>Method</th>
<th>Response Rate</th>
<th>Outcome Measure</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frentner, Winter, et al. USA (2008)</td>
<td>Pediatricians participating in prospective cohort study</td>
<td>Electronically self-administered questionnaire (quantitative)</td>
<td>59% (convenience-sample of members of prospective cohort study)</td>
<td>Intention to recommend HPV vaccine, Sexual concerns</td>
<td>78% reported that they were extremely likely to recommend the vaccine to 11-12 year-old. Pediatricism and perceived parental concerns about sexuality were not associated with intention to recommend the HPV vaccine.</td>
</tr>
<tr>
<td>Duval et al. Canada (British Columbia, Quebec, Nova Scotia) (2007)</td>
<td>GPs, Pediatricians, OB/GYNs</td>
<td>Self-administered mail-survey (quantitative)</td>
<td>51% Overall 42.5% (GP) 49% (Pediatricians) 60% (OB/GYN) (random sample)</td>
<td>Knowledge, Intention to recommend HPV vaccine, Patient counseling/sexual health</td>
<td>(For GPs) 84.8% correctly knew that HPV is the most common sexually transmitted infection. 59.8% were correctly aware that persistent HPV infection is a necessary cause of cervical cancer. 71.7% correctly thought that genital warts induced by HPV 6 and 11 are cervical cancer precursors. 87.8% will recommend HPV vaccination if it is publicly funded. 84.4% will recommend the vaccine if patients have to pay for it. 93.3% will recommend a quadrivalent HPV vaccine. 91.3% will recommend a bivalent HPV vaccine. 48% patients will comply with counseling about safe sex. 89% patients will comply with counseling about regular screening. 96% patients will comply with counseling about HPV vaccines.</td>
</tr>
<tr>
<td><strong>Tisset, Zimet, et al. USA (2007)</strong></td>
<td>Pediatricians</td>
<td>Semi-structured interviews (qualitative)</td>
<td>31 Interviews (specific to HPV vaccine delivery strategies) Ohio, Indiana, Kentucky</td>
<td>Patient counseling/sexual health, Preferred sources of information, Topic for education</td>
<td>Expressed a need for guidance as to how to address parental concerns. Endorsements by influential organizations, AAP and CID, important. Of primary importance to educate physicians. Thought that large-scale public awareness efforts were needed.</td>
</tr>
<tr>
<td><strong>Kahn, Reemthol, et al. USA (2007)</strong></td>
<td>Pediatricians</td>
<td>Semi-structured interviews (qualitative)</td>
<td>31 Interviews (Same group as Tisset et al. above—but specific to factors influencing intention to recommend HPV vaccine)</td>
<td>Intention to recommend HPV vaccine</td>
<td>High likelihood of recommending vaccine, preferred females &gt;15 years old. Cost as a barrier. Discomfort discussing sexually transmitted nature of vaccine with parents/patients. Preference note for endorsement by professional organizations. Results indicate need for increasing provider understanding of HPV and vaccines.</td>
</tr>
<tr>
<td>Esposito, Bosis, et al. Italy (2007)</td>
<td>Pediatricians</td>
<td>Self-administered pre-selected (convenience-sample) at Annual Meeting of Pediatricians (quantitative)</td>
<td>77.8% (convenience-sample at specialty meeting)</td>
<td>Knowledge, Attitudes about HPV vaccination, Intention to recommend HPV vaccine, Patient counseling/sexual health, Preferred source of information, Provider education</td>
<td>50.8% knew that HPV types 16-18 linked to cervical cancer. 75.3% thought vaccination should be recommended before beginning of sexual activity. 52.7% knew that 11-12 year-olds were the age group targeted for vaccination. 66.6% think both males and females should be vaccinated. 84.4% intend to recommend the vaccine. Do not discuss sexual behavior unless asked specifically or if patient has a clinical problem. Approximately 45% thought that meetings with physicians from different specialties would be most useful. 30% of pediatric residents preferred information from internationally published references while &lt;20% of primary care and hospital pediatricians believed this. &gt;90% of all pediatricians thought that their current knowledge of HPV vaccines was not enough.</td>
</tr>
<tr>
<td>Daley, Liddon, et al. USA (2006)</td>
<td>Pediatricians</td>
<td>Self-administered Internet and mail-survey (quantitative)</td>
<td>68% (non-random, recruitment to develop ‘sentinel’ pediatrician network designed to be representative of specialty membership)</td>
<td>Knowledge, Intention to vaccinate, Patient Counseling/sexual health, Preferred sources of information</td>
<td>33% were correctly aware that persistent HPV infection is a necessary cause of cervical cancer. 46% of respondents would recommend vaccination for 10- to 12-year-old females, 77% for 13- to 15-year-old females, and 89% for 16- to 18-year-old females. Corresponding rates for males were 37%, 62%, and 82%, respectively. 77% felt that cost would be a barrier to vaccination. 88% reported feeling comfortable discussing sexual behavior with female adolescents and 93% with male adolescents. 11% thought vaccination might lead to risky sexual behavior. Professional association guidelines and recommendations important.</td>
</tr>
<tr>
<td>USA Handulon, Irwin, et al. (2006)</td>
<td>GPs, Nurse Practitioners (anogenital wart specific—reduced from Montano et al study)</td>
<td>Semi-administered mail-survey (quantitative)</td>
<td>96.5% (random-sample)</td>
<td>Knowledge, Preferred sources of information</td>
<td>89% correctly knew that HPV is fairly common sexually transmitted infection. 52% knew that HPV types associated with warts are different than HPV types associated with cancer. 36% thought that most genital warts clear without medical intervention. 68% rated guidelines/materials of their specialty organization valuable and 65% rated materials from the CDC valuable.</td>
</tr>
<tr>
<td>Study/Region (Date)</td>
<td>Participants</td>
<td>Method</td>
<td>Response Rate</td>
<td>Outcome Measure</td>
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<tr>
<td>Jain et al. USA (2005)</td>
<td>GPs (sub-group of Montano et al.)</td>
<td><strong>Self-administered mail-survey (quantitative)</strong></td>
<td>68% (random-sample)</td>
<td>Knowledge</td>
<td>88% (95% CI: 86-90) agreed correctly that HPV is a common STI. 98% (95% CI: 97-99) agreed correctly that persistent HPV infection increases the risk of cervical cancer. 47% (95% CI: 41-52) agreed that HPV types associated with warts differ from those associated with cancer. 35% (95% CI: 28-43) agreed that most HPV infections may clear without medical intervention.</td>
</tr>
<tr>
<td>Montano, Karpfis, et al. (2004) (Executive Summary of primary care providers survey)</td>
<td>GPs, OB/GYNs, pediatricians (NP), etc. estimators based on entire sample</td>
<td><strong>Self-administered mail-survey (quantitative)</strong></td>
<td>81% Overall (random-sample)</td>
<td>Knowledge</td>
<td>89% agreed that HPV is a very common sexually transmitted infection. 98% agreed correctly that persistent HPV infection increases the risk of cervical cancer. 47% were aware that HPV types are associated with genital warts differ from types associated with cervical cancer. 35% believed that most genital HPV infections clear without medical intervention.</td>
</tr>
<tr>
<td>Aldrich, Becker, Mexico (2005)</td>
<td>GPs, gynecologists</td>
<td><strong>Self-administered questionnaire (hand-delivered and collected) (quantitative)</strong></td>
<td>76% (non-random, by recruitment-designed to be nationally representative) (HPV, no vaccine information)</td>
<td>Knowledge</td>
<td>79% of GPs knew that HPV is the principal cause of cervical cancer. 61% GPs incorrectly thought that high-risk types 16,18,31,33, and 45 also cause genital warts. 99% believed that women in the general public should be informed that HPV is the principal cause of cervical cancer.</td>
</tr>
<tr>
<td><strong>Kahn, Zimet et al. USA (2005)</strong></td>
<td>Pediatrics</td>
<td><strong>Self-administered mail-survey (quantitative)</strong></td>
<td>51% (random-sample)</td>
<td>Intention to recommend HPV vaccine</td>
<td>45% knew that the subtypes associated with cervical cancer. 42% knew the subtypes associated with genital warts. 41% knew the approximate percentage of cervical cancer caused by HPV infection. 65% thought 9-13 ideal age to receive vaccine. More likely to recommend cervical cancer/wart vaccine to girls at ages. More likely to recommend for older than younger adolescents. Most favored information/guidelines from AAP, CDC, ACIP.</td>
</tr>
<tr>
<td>Roodstein, Rosenthal, et al. USA (2005)</td>
<td>GPs</td>
<td><strong>Self-administered mail-survey (quantitative)</strong></td>
<td>13.5% (random-sample)</td>
<td>Knowledge</td>
<td>84% correctly identified HPV types associated with cervical cancer. 73% correctly identified HPV types associated with genital warts. 66.4% knew that most cervical cancer is caused by HPV. 65% thought vaccine ideally should be given to 9-13 year-old. More likely to vaccinate older than younger adolescents. More likely to recommend quadrivalent than bivalent vaccine. More likely to recommend high risk HPV types.</td>
</tr>
<tr>
<td>Mays and Zimet USA (2004)</td>
<td>Nurse Practitioners</td>
<td>Self-administered scenario-based questionnaire</td>
<td>98% (convenience-sample)</td>
<td>Intention to recommend HPV vaccine</td>
<td>Preferred to recommend vaccination for 17 year-old and a reluctance to recommend vaccination for 11 year-old. Little difference in preference for recommending vaccination for male compared to female adolescents. Most favorable information/guidelines from AAP, CDC, ACIP. Preferred sources of information: 97% - Strong preference for recommending vaccines with are endorsed by a professional organization (American Academy of Pediatrics).</td>
</tr>
<tr>
<td>Ruby, Fellow, et al. USA (2004)</td>
<td>Gynecologists</td>
<td>Self-administered scenario-based questionnaire</td>
<td>17.3%</td>
<td>Intention to recommend HPV vaccine</td>
<td>79% would accept the HPV vaccine. Preference toward targeting older adolescents or young adults. More likely to vaccinate for cervical cancer/warts than cervical cancer only. Preferred sources of information: 97% - Strong preference for recommending vaccines with are endorsed by a professional organization.</td>
</tr>
</tbody>
</table>

* Same survey instrument administered to different physician specialties (Pediatrician and GPs)
** Qualitative investigation based on previous quantitative survey information
*** Same survey instrument used; findings reported by physician specialty; however, Henderson et al. (2006) estimates include Nurse Practitioner while Jain et al. (2005) is limited to GP
CHAPTER 2: RESEARCH DESIGN AND METHODOLOGY

This chapter describes the study design, selection of participants, questionnaire development, and data collection methods. Data entry, cleaning and analysis are also addressed.

Surveys are the most appropriate tool for description, prediction and to collect facts, opinions and behaviors from respondents (Dane 1990). A questionnaire was chosen as the survey instrument because it is well suited to providing descriptive information regarding knowledge, attitudes and practices of the population being studied. Also, mail surveys of more homogenous groups, like GPs and PNs, have been shown to be comparable to other survey techniques, especially when the topic being investigated is particularly relevant to a particular group (Dillman 1978). The data collected from this survey will describe knowledge, attitudes and behaviors about HPV and HPV vaccination and determine if there are differences between and amongst survey participants. The results will also establish a basis for furthering education and training of GPs and PNs.

This survey attempts to balance technical, practical and ethical considerations in order to achieve reliable and valid results. Technical considerations ensure that the sample design, the questionnaire construction, and the development of scales and data analysis are as rigorous as possible. Practical considerations ensure that the survey is carried out with realistic expectations that are within the limits imposed by a student budget and course deadlines. Ethical considerations include voluntary participation, informed consent, freedom from harm, anonymity, and privacy (de Vaus 2002).

Careful construction and administration of the questionnaire, assurance of anonymity, representative sampling and the implied consent of participants to partake in the survey contributed to ensuring an ethical survey. An information sheet distributed alongside the survey instrument informed participants of the purpose of the study, how it was funded,
how the data will be used and how to contact the researcher. Ethical approval for this study was given by the Upper South ‘B’ Regional Ethics Committee.

2.1 SAMPLE DESIGN

The Clinical Practice Education Committee (CPEC) at Pegasus Health, an Independent Provider Association (IPA) in Christchurch, was approached directly and requested to support the distribution of this survey. The CPEC is a Clinical Advisory Group established to provide clinical input and advice to support education services to Pegasus Health GPs and PNs, Partnership Health Primary Health Organisation (PHO), GPs and PNs and other primary health care practitioners.

Small group educational meetings are held periodically by Pegasus Health in order to promote best clinical practice and are part of an evidence-based, peer-led program. The meetings generally last for 1.5 hours plus associated time for pre- and post-reading educational materials. Each group is composed of between 10 and 20 participants. The meetings are held at various times throughout the day. The doctors and nurses invited to attend the educational meetings make up approximately 90% of Christchurch GPs and PNs. Attendance at the meetings is normally around 60-70% of these providers (McAlpine 2008).

The decision to distribute this survey during the small group education program, entitled “Cradle to Grave, Part 2” was based on timing, and also because educational material about immunizations was presented at these meetings. Approval and support for the distribution of the questionnaire during educational small group meetings was secured by submitting a Topic Proposal Form\(^5\) to the CPEC at Pegasus Health. The group meetings ran from 5 May to 20 May, 2008. Concurrent GP and PN programs provide the opportunity to develop and present material which meet the needs of both GPs and PNs and helps facilitate teamwork as both groups receive consistent educational messages. The sample population was stratified into two groups by practice, PNs and GPs, and then clustered, into small groups, by Pegasus Health.

\(^5\) See Appendix A: Topic Proposal Form
Clinical Education Facilitators. There were nineteen GP and twenty-one PN small group clusters in this series of meetings. GPs and PNs are organized into their groups by their preference and in most cases this is according to meeting date and time (Collier 2008).

2.2 PARTICIPANTS

The target population included all GPs and PNs in Christchurch who were invited by Pegasus Health to attend the meetings. All of the GPs and PNs who attended the Cradle to Grave 2, peer-led small group meetings were invited to participate in the survey. Group leaders were excluded from the survey because they were either involved in piloting of the questionnaire or they facilitated more than one small group meeting making it possible to count them more than once. Additionally, the names of the group leaders were disclosed to the researcher, thereby potentially compromising their anonymity.

2.3 RESPONSE AND PARTICIPATION RATES

The response rate is the proportion of people selected for the study who actually complete the questionnaire. The participation rate is the proportion of people who attended the meetings and returned a completed questionnaire. Low response rates to physician surveys are common and could impair the validity and generalizability of results. However, surveys mailed to physicians have demonstrated response rates comparable to telephone and personal interview surveys (Kellerman and Herold 2001). Also, non-responding physicians have been found to be similar to responders, thereby potentially increasing the external validity of physician surveys. This survey was hand-delivered to Pegasus IPA meeting attendees who then had the option of completing the questionnaire at the meetings or return posting them to the researcher in pre-addressed, stamped envelopes which were provided. Mailed or self-administered questionnaires are recommended when the respondent needs more control over time, when privacy may be important and when the sample is highly literate, all of which apply to GPs and PNs. Doctors and nurses are less likely to need
the help of an interviewer to answer questions or clarify concerns about the questionnaire. GPs and PNs as groups are more homogeneous regarding knowledge, training, attitudes, and behavior than the general population. Although variations do exist among GPs and PNs, they may not be as associated with willingness to respond as in the general population (Kellerman and Herold 2001).

2.4 DATA COLLECTION

Survey packets, including an information sheet\(^6\), a questionnaire\(^7\) and a pre-addressed, stamped envelope, were organized, batched by small group ID and distributed to the Pegasus Clinical Education Administrators, Toreka Wansbrough (TW) and Ling Ling Dou (LD) by the researcher, Judith Henninger (JH). The date of meeting and cluster identification (small group ID) were written on the front of each questionnaire in a section labeled “For Office Use Only”. TW and LD then organized the batched survey packets and prepared them for distribution to individual participants at their respective small group meetings. The leaders of the small group meetings were asked to mention the survey during their discussions and request participants to either complete the questionnaire at the meeting and leave it with a Pegasus administrator or take the questionnaire away and post it in the return envelope. Both the information sheet and the survey stressed that participation in the survey was voluntary and completely anonymous. As stated in the Ethical Guidelines for Observational Studies, Section 6.26, “Completion of the questionnaire can be taken as consent, provided the letter of invitation expressly leaves the participant free of obligation”. Therefore, receipt of a completed survey is taken for consent and a separate consent form was not required. TW and LD collected completed and unused survey packets after each meeting and these were retrieved by JH from Pegasus twice weekly. Reminder notices\(^8\) thanking the meeting attendees for their participation in the survey and requesting non-responders to complete and return the questionnaire were attached to letters describing the next educational meeting from the Pegasus

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\(^6\) See Appendix B: Information Sheet  
\(^7\) See Appendix C: Questionnaire  
\(^8\) See Appendix D: Reminder notice
Health Education team. These letters were distributed directly after the conclusion of the small group meetings on 21 May 2008.

2.5 MEASUREMENT INSTRUMENT

2.5.1 Questionnaire design

A self-administered questionnaire, hand-delivered with the option of posting the completed instrument was selected as the most appropriate format for this survey.

The questionnaire design followed the techniques of survey design described as *The Total Design Method* (Dillman 1978). This method involves creating a survey instrument that is well-organized and easy to complete in order to maximize response rates. The questionnaire was presented in booklet format on one folded page. The front cover was designed to capture the respondent’s attention and contained the title of the study, the graphic logo of the research institution, clear instructions and printed in colour to give it a professional and attractive appearance. A systematic review of 66 published reports to improve response rates to physician surveys and a further review describing 97 incentive and design strategies, were consulted when developing the questionnaire (Edwards, Roberts et al. 2007; VanGeest, Johnson et al. 2007). With these design methods in mind, a short questionnaire, in booklet format was created and pre-addressed/stamped return envelopes were included. The questionnaire layout attempted to place the easiest questions first, used questions particularly relevant to the study participants and did not include open-ended questions that might need clarification. A closed-question format was used in order to make the questions relatively quick and easy to answer. This format thus made the responses easy to code, collate and compare. The odds of obtaining a response have not been shown to be changed significantly by including ‘don’t know’ choices or by using a tick versus circle answer format. Origination from a university has been shown to increase response rates and the University of Otago logo was used on all documents. Anonymity and voluntary response options tend to increase response

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*See Appendix C, page 109*
rates and both of these strategies were utilized. Due to budgetary constraints, no incentives were used for this study even though this has been shown to significantly increase response rates among physicians (Kellerman and Herold 2001).

2.5.2 Questionnaire construction

The questionnaire was designed to cover all areas of interest and developed after a thorough review of the literature. Methods to improve the reliability of the questionnaire included careful wording of the questions, piloting, multiple-term indicators (Likert scales) and easily utilized methods of coding. Attempts were made to avoid questions that address what people are unlikely to have an opinion or knowledge about and the use of 'not sure' or 'do not know' categories was minimized.

The questionnaire included questions used in other studies of health care providers about HPV and HPV vaccines. A valid result is one which measures what it is intended to measure. The internal validity of the study may be increased by the use of pre-tested questions which makes it more likely to collect reliable, accurate, and valid results (de Vaus 2002). The use of pre-tested questions allows direct comparisons of the current study findings with those of other studies where similar populations have answered the same question. This process, however, makes an assumption about the validity of the established question.

The questions adapted from previous studies are tabulated below.

Section 2:

<table>
<thead>
<tr>
<th>Question 1, 2, 3</th>
<th>Duval et al. 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 4</td>
<td>Devised by JH based on literature review</td>
</tr>
</tbody>
</table>

Section 3:

<table>
<thead>
<tr>
<th>Question 1 (a,b,c)</th>
<th>Duval et al, 2007</th>
</tr>
</thead>
</table>
Question 3
Daley et al. 2006

Question 4 (a,b,c,d)
Duval et al. 2007

Question 5 (a,b,c,d,e)
Designed by JH to include age-specific NZ approved HPV vaccines

Question 6
Duval et al. 2007

Section 4:

Question 1 (a-k)
Designed by JH to cover NZ information sources

Question 2 (a-k)
Duval et al. 2007

2.5.3 Questionnaire content

The questionnaire was divided into four sections. Section 1 asked about respondent demographic characteristics. Participants were asked to state their practice specialty as either General Practitioner or Practice Nurse and indicate whether they offered cervical screening in their practice. They were then asked to provide information about their age, gender, number of years in practice and ethnicity. The question on ethnicity was the same as that asked in the 2006 New Zealand Census which allowed participants to choose one or more options depending on the ethnic group(s) with which they identified. Ethnicity was reported using the ‘single and combination responses’ method, which outputs ethnicities into a single or combination of ethnic groups that the participants have reported. Using this method the total number of responses equals the total number of people who stated an ethnicity (Statistics New Zealand 2008).

Section 2 is a short general knowledge section about HPV and HPV vaccines. Questions 1, 2, 3 and 5 were developed based on information found in Chapter 1, Section 1.4.1. Question 4 was developed based on information found in Chapter 1, Section 1.2.1.4 which discussed the potential impact of HPV vaccination upon cervical screening. Previous studies, as discussed in the literature review, have found limited knowledge about HPV amongst health care providers. Therefore, the intent of Section 2 is to determine the current general knowledge of HPV facts amongst Christchurch GPs and PNs so that comparisons can be made. The questions were not
selected to test participants about their HPV knowledge, but to describe whether or not information containing current evidence-based facts about HPV and HPV vaccines facts had been received and understood by Christchurch GPs and PNs. The questions were chosen because a poor understanding of basic HPV facts may have an impact upon effective patient counseling practice. An estimate of the participant’s knowledge was assessed by circling “Agree”, “Disagree” or “Not Sure” as an answer to five statements that are and are not consistent with current scientific evidence.

Section 3, questions 1-3, address issues related to attitudes and behaviors regarding patient counseling and vaccine recommendations. The questions about attitudes toward issues relating to counseling practices were developed based on details found in Chapter Section 1.4.3. Attitudes to statements about patient counseling, cervical screening, HPV vaccines and adolescent sexual behavior were addressed using a 4-point Likert scale ("strongly agree" to "strongly disagree"). Questions 4 and 5 ask about intentions to recommend HPV vaccines and were based on information found in Chapter 1, Section 1.4.2. Intention behaviors were assessed using the same 4-point Likert scale mentioned for questions 1-3. Although HPV vaccines have been approved and are available New Zealand, actual HPV immunization practices were not covered in this study. Questions taken from previous studies which surveyed intentions rather than actual practice used the Theory of Planned Behavior as a framework for designing these questions. This theory proposes that attitudes about behavior, in this case, intention to recommend HPV vaccine, and perceived control over performing the behavior, is associated with actual behavior (Armitage and Conner 2001). Question 6 aims to establish if GPs and PNs believe the information they have received so far about HPV and HPV vaccines is sufficient and was self-rated as “not sufficient”, “somewhat sufficient” or “sufficient”.

Section 4 is about discovering where participants are likely to look for new information on HPV or HPV vaccines and the importance of topics they would like to see included in future clinical training and support tools. The development of Question 1 was based on preferred sources of information by providers as discussed
in Chapter 1, Section 1.5. Opinions about HPV-related clinical information sources were assessed using a 4-point Likert scale ("very likely" to "not at all likely"). Question 2 described the importance of topics that GPs and PNs might like to see included in clinical training materials and as clinical decision making support tools for HPV management and was based on information addressed in Chapter 1, Section 1.6. These opinions were addressed using a 4-point Likert scale ("very important" to "not at all important").

2.5.4 Piloting the questionnaire

The questionnaire was piloted by three PNs and four GPs in Christchurch. After completing the pilot questionnaire, participants were asked to answer questions about the wording and clarity of the questions, the design and flow of the questionnaire and their interpretation of the questions. As a result of this pilot study, a few minor changes were made to the questionnaire. It was estimated that the questionnaire would take about five minutes to complete. The pilot participants were excluded from participation in the formal survey. Data from the piloted questionnaires were then entered into the EpiInfo (Version 3.4.3, 2007) program and there were no complications found during this test.

2.5.5 Coding and storage of questionnaires

Codes were allocated to responses and were visible on the printed questionnaire in order to assist with data entry. Knowledge questions were coded as 1 for "Agree", 2 for "Disagree", 3 for "Not Sure". Response scales were used for sections 3 and 4 and a continuum was presented. Opposing responses on either extreme (such as 'very likely and 'not at all likely') had a series of numbered categories (1-4) between them. The number that respondents chose became the code for their response. The questionnaire was designed to be anonymous and therefore no coding requirements of participants were required. All questionnaires are kept in a secure place within the Department of Public Health and General Practice, Christchurch School of Medicine.

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10 See Appendix E: HPV Survey – PILOT response sheet
and Health Sciences. They will remain in storage for a period of 5 years before being destroyed as required by the University of Otago.

2.6 DATA ENTRY AND CLEANING

Data from all questionnaires received by 5 July, 2008 were double-entered into EpiInfo version 3.4.3, 2007. After both data entry sets were completed, one hundred percent of entries within these questionnaires were checked for accuracy using the Data Compare program in EpiInfo. Of a total of 8060 entries, there were 98 inconsistent responses, giving an error rate of 1.2%. These discrepancies were resolved and the Data Compare program was run again to verify no differences between the two sets of data before conducting analysis.

Internal validity checks were carried out by calculating the frequencies for responses to all questions. No questionnaires were excluded from further analysis. Questions from which data were missing were also tabulated. The same code for missing data (99) was used for all variables in order to avoid confusion and make computer programming simpler. Missing data may be due to the respondent refusing to answer a question, not knowing the answer to a question or not having an opinion on the subject (de Vaus 2002).

2.7 DATA ANALYSIS

The goal of sampling is to obtain a sample that properly reflects the population it is designed to represent (de Vaus 2002). This involves defining the population and selecting the sample so that each person selected has a known probability of selection. This study, however, attempted to sample the entire population of GPs and PNs who were invited to the group meetings. Some of those invited did not attend the meetings and others who did attend the meetings did not return a questionnaire. Because the sample was not randomly selected, the use of inferential statistics is somewhat dubious. Nevertheless, inferential statistics were applied as a learning exercise and to

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11 See Appendix F: Missing Data
ensure that conclusions were limited to differences which were more than would be expected by chance if the sample was randomly selected.

The study design included both stratification by provider specialty (GP or PN) and clustering by small group. Whereas large group meetings combine GPs and PNs into a single mixed-specialty group, these meetings separated GPs and PNs into small groups which were made up of their peers. The Pegasus Health education group assigned participants to small groups based on their personal time and/or date preferences. Because of this non-random distribution of the participants and because responses may have been altered by what happened within the group meetings, clustering was taken account of in the analysis.

The sampling design has an effect on the conclusions drawn from survey data and the method of analysis must take into effect the survey design. The use of standard statistical procedures (95% CIs for a proportion or $X^2$ for 2 x 2 tables) based on simple random sampling (srs) assumes independent and identically distributed (iid) observations. These cannot be used for this study and may lead to erroneous variance estimates and invalid conclusions (Kish 1995). With clustering, if observations within a cluster are more similar (or less similar) than occur across the whole population, then the simple standard error used to calculate the 95% CI will not be appropriate. The cluster design of this study was taken into account by using Complex Sample in Epilnfo 2007 analysis. Using complex sample analysis, standard errors will be higher than for simple random samples.

For statistical analysis of survey data it is important to know the effect of the sampling design. The design effect (deff) is the ratio of the actual sampling variance of a statistic under a particular sample design to the variance of the same statistic that would have been obtained had a simple random sample of the same size been used (Kish 1965, P 285). If a deff is very close to or equal to 1, the sample results closely approximate those of srs and clustering has no apparent impact. If the deff is >1, the cluster sample has a greater variance than a srs with the same $n$ and the clusters are
more similar within than over the whole sample. If the deff is <1, then the clusters are more uniform than would be produced by srs and the variance of the estimate is decreased. With clustering, the deff is usually > 1.

Since this survey sampled members of a finite population and a quarter of the GPs and PNs within this population were sampled, it would have been appropriate to use the finite population correction (fpc) factor when analyzing the results. The fpc measures how much extra precision is achieved when the sample size becomes close to the population size (Cochran 1977). Usually, the fpc can be ignored if the sampling fraction does not exceed 10%, however the effect of ignoring the correction is to overestimate the standard error of the estimate. Ultimately, the fpc was not used in this survey because it was unavailable in EpilInfo 2007 and calculations would have to be done manually.

Descriptive statistics obtained from complex sample analysis, 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 EpilInfo 2007. All results were reported by provider specialty (GP or PN) strata.

Data analysis was performed and the results are presented in the following chapter.

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12 All percentages are reported as "valid" percentages (missing data excluded)
CHAPTER 3: RESULTS

This chapter presents the findings of the survey in relation to the study objectives. Participating Christchurch GPs and PNs are identified according to demographic characteristics. Because providers should be aware of the most recent scientific evidence, their current knowledge about several HPV-related topics is described. Attitudes pertaining to HPV infection and vaccination are discovered and reported specific to patient counseling messages, perceptions about adolescent sexual behavior and intention to recommend HPV vaccines. Resources likely to be consulted to meet the HPV-related needs are identified and topics for further education and training are recognized as to their relative importance to GPs and PNs. This sequencing of the data presentation follows the same ordering format of the questionnaire and as discussed in the literature review so that comparisons can be made in the final chapter between the present study and previous studies.

3.1 PARTICIPATION AND RESPONSE RATES

All Christchurch GPs (n=362) and PNs (n=262) who are members of Partnership Health PHO (Primary Health Organisation), other PHOs and Pegasus IPA were invited to attend small group educational meetings presented by Pegasus Health IPA and entitled “Cradle to Grave Part 2”. GPs and PNs were assigned to 40 small groups according to their personal preferences (19 GP and 21 PN groups). The groups met during pre-scheduled dates and times for the meetings which lasted approximately an hour and a half. Small group attendance data can be found in Appendix G.

All of the GPs and PNs who attended the group meetings were invited to participate in the HPV survey which was distributed at the meetings by Pegasus Health administrators. Data collection started on 05 May and proceeded until 20 May, 2008.

Participation and response rates can be found in Table 3.1 (page 49). A total of 155 questionnaires were returned; 16% of the participants completed a questionnaire at
the meeting and 84% returned it by post. Twenty-six percent of GPs completed the questionnaire at the meetings compared to 4% of PNs.

The response rate is the number of questionnaires returned divided by the number of GPs and PNs invited to the meetings. The overall response rate was 25%; 24% for GPs and 27% for PNs. The participation rate is the number of questionnaires returned divided by the number of questionnaires handed out. The overall participation rate was 39%; 43% for GPs and 36% for PNs. Survey participation was higher amongst GPs than PNs although a higher percentage of PNs attended the meetings.

3.2 DESCRIPTION OF SAMPLE

One hundred and fifty-five questionnaires were completed by 85 GPs and 70 PNs. All questionnaires were analysed. Data pertaining to age and years in practice were unusable in one instance due to inconsistencies.

Table 3.2 (page 49), details the demographic characteristics of participants. The mean age of GPs was 46 years with a range of 30-68 years. Female GPs averaged 44 years of age while males averaged 50 years. The mean age of PNs was 49 years with a range of 24-65 years. Sixty-six percent of GPs and 100% of PNs were female. All GPs reported offering cervical screening in their practice. Three PNs indicated that they did not offer cervical screening. However, because 2 PNs reported that they did not offer cervical screening themselves but doctors in their practices did, this may have caused these results to be overestimated if other PNs reported for their group practice rather than their individual practice.

The average number of years in practice was approximately 18 years for GPs and 16 years for PNs. Participants were counted just once according to the ethnic group or combination of ethnic groups they have reported. Each participant selected one
### TABLE 3.1: Attendance, Response and Participation Rates, by Provider Specialty

<table>
<thead>
<tr>
<th>Provider Specialty</th>
<th>Number invited to meeting</th>
<th>Number attending meeting (given questionnaire)</th>
<th>Attendance %</th>
<th>Number of questionnaires returned</th>
<th>Response Rate %</th>
<th>Participation Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practitioner (GP)</td>
<td>362</td>
<td>199</td>
<td>55%</td>
<td>85</td>
<td>24%</td>
<td>43%</td>
</tr>
<tr>
<td>Practice Nurse (PN)</td>
<td>262</td>
<td>197</td>
<td>75%</td>
<td>70</td>
<td>27%</td>
<td>36%</td>
</tr>
<tr>
<td><strong>TOTAL (GP &amp; PN)</strong></td>
<td><strong>624</strong></td>
<td><strong>396</strong></td>
<td><strong>64%</strong></td>
<td><strong>155</strong></td>
<td><strong>25%</strong></td>
<td><strong>39%</strong></td>
</tr>
</tbody>
</table>

*Group leaders were excluded from this table because they attended multiple meetings and did not fill out questionnaires.

### TABLE 3.2: Provider Characteristics

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>GP</th>
<th>PN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>Mean (SD)*</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>46.4 years (8.1)</td>
<td>Range (30-68)</td>
</tr>
<tr>
<td><strong>Cervical Screening Offered</strong></td>
<td>Yes</td>
<td>84 (100%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>55 (65.5)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>29 (34.5)</td>
</tr>
<tr>
<td><strong>Years in practice</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 10 years</td>
<td>12 (15.2)</td>
</tr>
<tr>
<td></td>
<td>10-19 years</td>
<td>29 (36.7)</td>
</tr>
<tr>
<td></td>
<td>20-29 years</td>
<td>31 (39.2)</td>
</tr>
<tr>
<td></td>
<td>≥ 30 years</td>
<td>7 (8.9)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Zealand/European</td>
<td>69 (85.2)</td>
</tr>
<tr>
<td></td>
<td>Maori</td>
<td>3 (3.7)</td>
</tr>
<tr>
<td></td>
<td>Pacific</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Asian</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td></td>
<td>Other*</td>
<td>8 (9.9)</td>
</tr>
</tbody>
</table>

*SD = standard deviation

^ includes, Australian, Canadian, European, North American, British, Sri Lankan and Malayan
ethnic category with the exception of three GPs who ticked both New Zealand/European and Maori as their ethnicity choices. Using prioritisation, these GPs were identified as Maori. The majority of both GPs and PNs were of New Zealand/European ethnicity.

3.3 KNOWLEDGE ABOUT HPV AND HPV VACCINES

GP and PN answers for items concerning HPV and HPV vaccines are reported in Table 3.3 (page 51). Data are presented as a percentage of “Correct”, “Incorrect” or “Not Sure” responses. Each of the statements presented was consistent with scientific evidence as discussed in Chapter 1.

Over half of the participants knew that HPV is the most common STI. Significantly more GPs correctly agreed with the statement than PNs, however, 20% of PNs admitted that they were ‘not sure’ about this answer compared to 6% of GPs. The majority of GPs (75%) and PNs (71%) knew that persistent HPV infection is a necessary cause of cervical cancer. Most GPs and PNs (93% and 94%, respectively) were aware that HPV vaccination will not eliminate the need for continued cervical screening.

GPs were evenly divided in their responses to the statement that anogenital warts induced by HPV types 6 and 11 are cervical cancer precursors. Thirty-five percent agreed and 33% disagreed with the false statement while 32% were not sure. Significantly more GPs were aware that anogenital warts are not cervical cancer precursors than PNs. Fifty-six percent of PNs incorrectly agreed that anogenital warts induced by HPV types 6 and 11 are cervical cancer precursors, however more than a third of PNs also answered ‘not sure’ to this statement. Although the specification of HPV by type number rather than disease process (warts or cervical cancer) may have added confusion to this statement, the results indicate that both GPs and PNs may be unaware that anogenital warts are not cervical cancer precursors.
<table>
<thead>
<tr>
<th>True/False Statement</th>
<th>Correct Response</th>
<th></th>
<th>Incorrect Response</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correct Response</td>
<td></td>
<td>Incorrect Response</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Sure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HPV is the most common sexually transmitted infection. (TRUE)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
</tr>
<tr>
<td></td>
<td>69 (81.2%)</td>
<td>42 (60.0%)</td>
<td>11 (12.9%)</td>
<td>14 (20.0%)</td>
</tr>
<tr>
<td></td>
<td>(73.3-89.1)‡</td>
<td>(48.4-71.6)‡</td>
<td>(5.6-20.3)</td>
<td>(11.3-28.7)</td>
</tr>
<tr>
<td>Persistent HPV is a necessary cause of cervical cancer. (TRUE)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
</tr>
<tr>
<td></td>
<td>63 (75.0)</td>
<td>49 (71.0)</td>
<td>10 (11.9)</td>
<td>12 (17.4)</td>
</tr>
<tr>
<td></td>
<td>(65.1-84.9)</td>
<td>(60.9-81.2)</td>
<td>(5.7-18.1)</td>
<td>(8.0-26.7)</td>
</tr>
<tr>
<td>Anogenital warts induced by HPV 6 and 11 are cervical cancer precursors. (FALSE)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
</tr>
<tr>
<td></td>
<td>28 (33.3)</td>
<td>5 (7.2)</td>
<td>27 (32.1)</td>
<td>25 (36.2)</td>
</tr>
<tr>
<td></td>
<td>(24.4-17.8)‡</td>
<td>(2.4-12.1)‡</td>
<td>(17.8-46.5)</td>
<td>(26.8-45.7)</td>
</tr>
<tr>
<td>Immunization with the HPV vaccine will eliminate the need for cervical screening. (FALSE)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
</tr>
<tr>
<td></td>
<td>79 (92.9)</td>
<td>65 (94.2)</td>
<td>3 (3.5)</td>
<td>3 (3.5)</td>
</tr>
<tr>
<td></td>
<td>(88.7-97.0)</td>
<td>(88.1-100.3)</td>
<td>(0.4-6.7)</td>
<td>(0.4-6.7)</td>
</tr>
<tr>
<td>Most HPV infections will clear without medical treatment. (TRUE)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
<td>GP n (%)</td>
<td>PN n (%)</td>
</tr>
<tr>
<td></td>
<td>46 (54.1)</td>
<td>29 (42.0)</td>
<td>19 (22.4)</td>
<td>10 (14.5)</td>
</tr>
<tr>
<td></td>
<td>(44.7-63.5)</td>
<td>(25.5-58.6)</td>
<td>(12.4-32.3)</td>
<td>(5.5-23.5)</td>
</tr>
</tbody>
</table>

*Denotes a difference of statistical significance (p-value < .05) when compared to other provider type
About half of the GPs and PNs knew that most HPV infections will clear without medical treatment. The remaining GPs were equally divided between disagreement and ‘not sure’ to this statement. Significantly more PNs than GPs incorrectly answered that most HPV infections will clear without medical treatment. Forty-four percent of PNs and 24% of GPs were in disagreement with the true statement which may reflect confusion about the transient nature of most HPV infections or the question itself.

Complex design analysis of 2 x 2 tables to determine the impact of clustering found design effect (deff) close to or less than 1 for 90% of the estimates. This indicates that clustering had no impact on the variance of the estimates of these results. The deff was 1.86 for PN responses to the statement that most HPV infections will clear without treatment. Because this value is less than 2, the clusters may be more similar within than over the entire sample, thereby increasing the variance of the estimate.

3.4 ATTITUDES ABOUT COUNSELING AND HPV VACCINE RECOMMENDATIONS

All responses for Section 3 were assessed using 4-point Likert Scales with the participants given the choice to respond as “Strongly Agree”, “Somewhat Agree”, “Somewhat Disagree” and “Strongly Disagree”. Frequencies were calculated for all categorical responses to each statement. The responses were found to be similarly distributed between the categories, sometimes with high frequencies in the “somewhat” categories and without extreme variation in the “strongly” categories when comparing strata. It was determined that recoding would not mask any significant relationships that may have existed between GPs and PNs. Therefore categories were collapsed into dichotomous variables and recoded as “Agree” = “strongly agree + somewhat agree” and “Disagree” = “somewhat disagree + strongly disagree”. This also allows for direct comparison to previous studies which used this same technique. Complex sample analysis was performed and findings are reported as percentages with 95% confidence intervals for “Agree” or “Disagree” responses with only the “Agree” category presented in the tables. The design effect of each
statement by strata was very close to 1 (range = 0.90 - 1.12), indicating that clustering had no impact on the variance of the estimates of provider attitudes within each strata.

3.4.1 Attitudes about patient compliance with counseling messages

GP and PN attitudes about patient compliance with counseling messages are reported in Table 3.4 (page 54). Half of the GPs (51%) and two-thirds of PNs (65%) reported that their patients will comply with counseling regarding safe sexual behaviors, including the use of condoms and/or abstinence. Most GPs (97%) and PNs (93%) indicated that their patients will heed their advice about cervical screening at the recommended intervals. Similarly, a high percentage of GPs and PNs (92% and 88%, respectively) reported that most of their patients will comply with their counseling about receiving the HPV vaccination. There were no significant differences between GP and PN responses.

3.4.2 Attitudes about sexual behavior and adolescents

The results for the two questions pertaining to comfort with counseling adolescents about sexual behavior and provider perceptions of adolescent sexual behavior after immunization for an STI are presented in Table 3.5 (page 55). Clustering had no impact on the reported results as the design effect of each statement was very close to 1 (deff range = 0.93 - 1.12).

Most participants reported that they are comfortable addressing sexual behaviors with adolescents. However, significantly more GPs indicated that they were comfortable discussing sexual behavior with adolescents when compared to PNs (97% and 84% respectively). This significant difference was further analysed to determine if the responses were biased by gender. The results are presented in Table 3.6 (page 55).
**TABLE 3.4: Attitudes about patient counseling messages**

<table>
<thead>
<tr>
<th>Statement:</th>
<th>GP</th>
<th>Agree*</th>
<th>PN</th>
<th>Agree*</th>
</tr>
</thead>
<tbody>
<tr>
<td>My patients will comply if I counsel them about:</td>
<td></td>
<td>n (%)</td>
<td></td>
<td>n (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(95% CI)</td>
<td></td>
<td>(95% CI)</td>
</tr>
<tr>
<td>Safe sex behavior (condom, abstinence)</td>
<td>85</td>
<td>43 (50.6%)</td>
<td>69</td>
<td>45 (65.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(39.1-62.1)</td>
<td></td>
<td>(54.1-76.3)</td>
</tr>
<tr>
<td>Regular Cervical Screening (frequency ≤ 3 years)</td>
<td>85</td>
<td>82 (96.5%)</td>
<td>68</td>
<td>63 (92.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(92.5-100)</td>
<td></td>
<td>(85.8-99.5)</td>
</tr>
<tr>
<td>HPV vaccination</td>
<td>82</td>
<td>75 (91.5%)</td>
<td>68</td>
<td>60 (88.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(85.0-97.9)</td>
<td></td>
<td>(80.0-96.5)</td>
</tr>
</tbody>
</table>

*Agree = "Strongly Agree + Somewhat Agree"
TABLE 3.5: Attitudes of providers concerning adolescent sexual behavior

<table>
<thead>
<tr>
<th>Statement:</th>
<th>GP (N)</th>
<th>Agree (% (95% CI))</th>
<th>PN (N)</th>
<th>(% (95% CI))</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am comfortable addressing sexual behavior with adolescent patients</td>
<td>85</td>
<td>82 (96.5%) (92.2-100)</td>
<td>69</td>
<td>58 (84.1%) (74.5-93.6)</td>
<td>.008§</td>
</tr>
<tr>
<td>Vaccination against an STI may encourage risky sexual behavior in adolescents</td>
<td>83</td>
<td>8 (9.6%) (2.4-16.8)</td>
<td>68</td>
<td>25 (36.8%) (25.3-48.3)</td>
<td>.0001§</td>
</tr>
</tbody>
</table>

* Agree = "Strongly Agree + Somewhat Agree"

§ Denotes a difference of statistical significance (p-value < .05) when compared to other provider type

TABLE 3.6: Provider comfort addressing sexual behavior with adolescents, by practice specialty and gender

<table>
<thead>
<tr>
<th>I am comfortable addressing sexual behavior with adolescents</th>
<th>GP (Male) % (95% CI)</th>
<th>GP (Female) % (95% CI)</th>
<th>PN (Female) % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>93.1% (77.2-99.2)</td>
<td>98.2% (90.3-100.0)</td>
<td>84.3% (73.6-91.9)*</td>
</tr>
<tr>
<td>Disagree</td>
<td>6.9% (0.8-22.8)</td>
<td>1.8% (0.0-9.7)</td>
<td>15.7% (8.1-26.4)*</td>
</tr>
<tr>
<td>Total n</td>
<td>29</td>
<td>55</td>
<td>70</td>
</tr>
</tbody>
</table>

* Denotes a difference of statistical significance (p-value < .05) when compared to male GPs or female GPs

TABLE 3.7: Perception of risky sexual behavior after STI immunization, by practice specialty and gender

<table>
<thead>
<tr>
<th>Vaccination against an STI may encourage risky sexual behavior in adolescents</th>
<th>GP (Male) % (95% CI)</th>
<th>GP (Female) % (95% CI)</th>
<th>PN (Female) % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>4% (0.1-19.0)</td>
<td>12.7% (5.3-24.5)</td>
<td>36.8% (24.5-48.5)*</td>
</tr>
<tr>
<td>Disagree</td>
<td>96% (81.0-99.9)</td>
<td>87.3% (75.5-94.7)</td>
<td>64.2% (51.5-75.5)*</td>
</tr>
<tr>
<td>Total n</td>
<td>27</td>
<td>55</td>
<td>67</td>
</tr>
</tbody>
</table>

* Denotes a difference of statistical significance (p-value < .05) when compared to male GPs or female GPs
More female GPs (98%) report being comfortable addressing sexual behavior with adolescents than their male GP counterparts (93%), however this difference is not significant. There were no male PNs for comparison purposes, however female PNs are significantly less comfortable addressing sexual behavior with adolescents than either female or male GPs ($p = .009$). Therefore, the difference in comfort appears to be between provider specialty rather than gender.

When asked if vaccination against an STI might encourage risky sexual behavior in adolescents, significantly more PNs (37%) than GPs (10%) agreed with the statement. This significant difference in the perception of risk-taking behaviors by adolescents between GPs and PNs was further analysed.

To determine if gender was a factor, comparisons were made between males (GPs) and females (GPs and PNs). The character of the relationship between gender and perception of risky sexual behavior after STI immunization is strong, positive and linear as shown in Table 3.7 (page 55). Compared to 4% of male GPs, 13% of female GPs and 36% of female PNs agreed that immunization for an STI may lead to risky sexual behavior. This relationship was further illustrated using $p$-values to indicate significance between gender categories. While female GPs more often agree that STI immunization may lead to risky sexual behavior than their male counterparts, the difference is not significant ($p = .196$). Female practice nurses were significantly more likely than female GPs to agree with the statement ($p = .003$). The difference therefore, as in the previous question about comfort discussing sexual behavior with adolescents, appears related to differences between doctors and nurses rather than gender.

3.4.3 HPV vaccine recommendations

Intention to recommend HPV vaccines to patients was assessed in regards to cost, type of protection offered by the vaccine and age/gender preferences. Clustering had
minimal or no impact on the reported results as the design effect of each statement pertaining to vaccine recommendation was close to 1 (deff range = 0.661-1.70).

3.4.3.1 Based on funding

There were two statements pertaining to vaccine recommendation based on public or private funding. The results are presented in Table 3.8 (page 58). The majority of GPs (95%) and PNs (96%) stated that they intend to recommend an HPV vaccine to their patients if it is publicly funded. However, more than 70% of GPs and PNs reported that they would recommend the HPV vaccine even if their patients have to pay for it.

3.4.3.2 Based on type of protection offered

Two statements addressed provider intentions to recommend a vaccine based on the type of protection offered. The statements asked for agreement or disagreement about a provider recommendation if the vaccine protected against both cervical cancer and anogenital warts or cervical cancer only. The results are presented in Table 3.9 (page 58).

More than 90% of all respondents favor recommendation of the quadrivalent HPV vaccine which is protective against both cervical cancer and anogenital warts. There is no significant difference between GPs preference to recommend the quadrivalent over the bivalent vaccine. PNs, however, are less likely to recommend the bivalent vaccine (79%) compared to the quadrivalent vaccine (91%).

3.4.3.3 Based on patient age and gender

Intention to recommend HPV vaccination by patient age and gender was assessed by agreement or disagreement to the statement, “I will be most likely to recommend
TABLE 3.8: Intention to recommend HPV vaccines, by funding

<table>
<thead>
<tr>
<th>Statement:</th>
<th>GP</th>
<th>Agree* n (%)</th>
<th>PN</th>
<th>Agree* n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will recommend an HPV vaccine to my patients:</td>
<td>N</td>
<td>n (%) (95% CI)</td>
<td>N</td>
<td>n (%) (95% CI)</td>
</tr>
<tr>
<td>If it is publicly-funded</td>
<td>85</td>
<td>81 (95.3%) (90.4-100)</td>
<td>69</td>
<td>66 (95.7%) (91.2-100)</td>
</tr>
<tr>
<td>Even if my patients have to pay for the vaccine</td>
<td>85</td>
<td>65 (76.5%) (68.8-84.1)</td>
<td>70</td>
<td>51 (72.9%) (60.6-85.1)</td>
</tr>
</tbody>
</table>

* Agree = “Strongly Agree + Somewhat Agree”

TABLE 3.9: Intention to recommend HPV vaccines, by protection offered

<table>
<thead>
<tr>
<th>Statement:</th>
<th>GP</th>
<th>Agree* n (%)</th>
<th>PN</th>
<th>Agree* n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I will recommend an HPV vaccine to my patients:</td>
<td>N</td>
<td>n (%) (95% CI)</td>
<td>N</td>
<td>n (%) (95% CI)</td>
</tr>
<tr>
<td>If it protects against both cervical cancer and anogenital warts</td>
<td>82</td>
<td>74 (90.2%) (84.1-96.4)</td>
<td>68</td>
<td>62 (91.2%) (85.2-97.1)</td>
</tr>
<tr>
<td>If it only protects against cervical cancer</td>
<td>82</td>
<td>73 (89.0%) (83.5-94.6)</td>
<td>67</td>
<td>53 (79.1%) (66.0-92.2)</td>
</tr>
</tbody>
</table>

*Agree = “Strongly Agree + Somewhat Agree”
the HPV vaccine to: ...". Scaled responses were given for each of 5 age/gender ranges. The results are presented in Table 3.10 and Figure 1 (page 60).

GPs were most likely to recommend HPV immunization for girls aged 13-15 years followed by pre-adolescent girls aged 9-12 and young women aged 16-26. Practice nurses 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 vaccination to 9-12 year-old girls ($p = .004$). Nineteen percent of PNs did not indicate a response to the statement about recommending HPV vaccination for these youngest females compared to 8% of GPs (refer to Appendix F). Although there is a significant difference between GPs and PNs about recommending HPV vaccination for girls aged 13-15 years, a very high percentage of both GPs and PNs chose this option.

As seen in Table 3.10, half of GPs and PNs would be likely to recommend the vaccine to boys aged 9-15 years. Females aged 27-45 years were the most unlikely age group to receive support for vaccine recommendation from both GPs and PNs. However, slightly more PNs than GPs agreed with recommending HPV vaccination for women in the oldest age group. There was more missing data from these age and gender categories than the others. In the age group "Males aged 9-15 years", 15% of GPs and 27% of PNs did not indicate a response. Likewise, 14% of GPs and 24% of PNs did not respond to the statement about recommending HPV vaccination for older women in the 27-45 year age range. Therefore, these results may be underestimated if a blank response may have meant that a provider was unsure or perhaps not considering recommendation for these patient groups (refer to Appendix F).
TABLE 3.10: Provider intention to recommend HPV vaccine by patient age and gender

<table>
<thead>
<tr>
<th>Statement: I will be most likely to recommend the HPV vaccine to:</th>
<th>GP</th>
<th></th>
<th>PN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>n (%) (95% CI)</td>
<td>N</td>
</tr>
<tr>
<td>Females aged 9-12 years</td>
<td>78</td>
<td>66 (84.6%) (75.2-94.0)</td>
<td>57</td>
</tr>
<tr>
<td>Females aged 13-15 years</td>
<td>81</td>
<td>81 (100%) (100.0-100.0)</td>
<td>65</td>
</tr>
<tr>
<td>Females aged 16-26 years</td>
<td>82</td>
<td>67 (81.7%) (75.5-87.9)</td>
<td>60</td>
</tr>
<tr>
<td>Females aged 27-45 years</td>
<td>73</td>
<td>16 (21.9%) (12.2-31.6)</td>
<td>53</td>
</tr>
<tr>
<td>Males aged 9-15 years</td>
<td>72</td>
<td>37 (51.4%) (41.2-61.5)</td>
<td>51</td>
</tr>
</tbody>
</table>

*Agree = “Strongly Agree + Somewhat Agree”
* Denotes a difference of statistical significance (p-value < .05) when compared to other provider type
3.5 PROVIDER SELF-RATED SUFFICIENCY OF INFORMATION

Adequate information is essential to providing comprehensive patient care. GPs and PNs were asked whether the information they have received so far about HPV and the HPV vaccines is sufficient. The results are presented in Charts 3.1 and 3.2 (page 62).

Forty percent of GPs and 24% of PNs report having received sufficient information about HPV and HPV vaccines. Twelve percent of GPs and 17% of PNs indicated that they have not received enough information. However, about half of GPs and PNs, reported only having somewhat sufficient information. There were no significant differences noted between GPs and PNs.

3.6 PROVIDERS’ PREFERRED SOURCES OF INFORMATION

GPs and PNs are able to receive new information about HPV and HPV vaccines from a wide variety of sources. Providers were asked to indicate which sources of information they would be likely to use based on a 4-point rating scale of “very likely” to “not at all likely”. The results were collapsed into two categories: Likely = “very likely” + “quite likely” and Unlikely = “somewhat likely” + “not at all likely”. The frequency, percentages and p-values for the category “Likely” were calculated, then ranked in order of likelihood and are presented with percentages and 95% CIs in Table 3.11 (page 64) and Table 3.12 (page 65).

Eighty-four percent of GPs were most likely to look to their IPA for new information about HPV and HPV vaccines. This was followed by colleagues and the Immunization Advisory Center. The Ministry of Health, immunization coordinators, New Zealand professional organizations, the Internet and journals and scientific literature were cited by over half of GPs as likely information sources. A minority of GPs considered international guidelines a likely place to look for new information and pharmaceutical companies were rated as the least likely information source that GPs would use.
CHART 3.1: Self-rated sufficiency of information received, by provider specialty (GP)

Self-rated Sufficiency of Information - GPs

- Sufficient: 40%
- Not Sufficient: 12%
- Somewhat Sufficient: 48%

CHART 3.2: Self-rated sufficiency of information received, by provider specialty (PN)

Self-rated Sufficiency of Information - PNs

- Sufficient: 24%
- Not Sufficient: 17%
- Somewhat Sufficient: 59%
Practice nurses reported that immunization coordinators, who are based at Pegasus IPA, are their most likely source of new information about HPV and HPV vaccines, followed closely by the Immunization Advisory Centre. Colleagues and the Ministry of Health were also cited as likely sources by three quarters of PNs and half would use the Internet. Pharmaceutical companies were an unlikely place to look for new information by two-thirds of PNs while International Guidelines were the most unlikely choice for the majority of PNs.

When compared to GPs, PNs are significantly more likely to use immunization coordinators as a source of new information to meet their HPV needs. However, the two categories, “Immunization coordinators” and “IPA” are closely related as immunization coordinators are employed by Pegasus IPA and practice nurses interface more with the immunization coordinators than GPs.

Significantly more GPs were likely to consult their New Zealand professional organization guidelines or journals and scientific literature for guidance about HPV and HPV vaccines than PNs. However, they were significantly less likely to use the Ministry of Health or IMAC as a resource when compared with PNs.

Participants were able to specify other sources of information which were not listed. "Conference topics”, the “Sexual Health Society”, and “Radio New Zealand” were cited by GPs as other sources of new information about HPV and HPV vaccines.
TABLE 3.11: Likelihood of using a resource for new information about HPV and HPV vaccines, by rank (General Practitioners)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topic</th>
<th>N</th>
<th>Likely* (n)** % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Independent Provider Association (IPA)</td>
<td>81</td>
<td>(68) 84% (77.7-90.2)</td>
</tr>
<tr>
<td>2</td>
<td>Colleagues</td>
<td>77</td>
<td>(57) 75% (62.6-87.4)</td>
</tr>
<tr>
<td>3</td>
<td>Immunization Advisory Centre (IMAC)§</td>
<td>81</td>
<td>(59) 73% (60.5-85.2)</td>
</tr>
<tr>
<td>4</td>
<td>Ministry of Health§</td>
<td>79</td>
<td>(49) 62% (50.2-73.9)</td>
</tr>
<tr>
<td>5</td>
<td>Immunization Coordinators§</td>
<td>73</td>
<td>(45) 62% (48.9-74.4)</td>
</tr>
<tr>
<td>6</td>
<td>New Zealand Professional Organisations§</td>
<td>77</td>
<td>(44) 57% (45.2-69.1)</td>
</tr>
<tr>
<td>7</td>
<td>Internet</td>
<td>73</td>
<td>(41) 56% (46.7-65.7)</td>
</tr>
<tr>
<td>8</td>
<td>Journals and Scientific Literature§</td>
<td>66</td>
<td>(21) 51% (42.8-59.9)</td>
</tr>
<tr>
<td>9</td>
<td>International Guidelines</td>
<td>73</td>
<td>(26) 36% (23.3-47.9)</td>
</tr>
<tr>
<td>10</td>
<td>Pharmaceutical Companies</td>
<td>76</td>
<td>(19) 25% (16.23-33.8)</td>
</tr>
</tbody>
</table>

* Likely = “Very likely + Quite likely”

** n = number of responses indicating ‘Important’

§ Denotes significant difference from other provider specialty (p < .05)
TABLE 3.12: Likelihood of using a resource for new information about HPV and HPV vaccines, by rank (Practice Nurses)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topic</th>
<th>N</th>
<th>Likely*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(n) %</td>
</tr>
<tr>
<td>1</td>
<td>Immunization Coordinators§</td>
<td>68</td>
<td>(61) 90%</td>
</tr>
<tr>
<td>2</td>
<td>Independent Provider Association (IPA)</td>
<td>67</td>
<td>(59) 88%</td>
</tr>
<tr>
<td>3</td>
<td>Immunization Advisory Centre (IMAC)§</td>
<td>67</td>
<td>(58) 87%</td>
</tr>
<tr>
<td>4</td>
<td>Colleagues</td>
<td>66</td>
<td>(52) 88%</td>
</tr>
<tr>
<td>5</td>
<td>Ministry of Health§</td>
<td>68</td>
<td>(53) 78%</td>
</tr>
<tr>
<td>6</td>
<td>Internet</td>
<td>68</td>
<td>(40) 59%</td>
</tr>
<tr>
<td>7</td>
<td>Pharmaceutical Companies</td>
<td>64</td>
<td>(23) 36%</td>
</tr>
<tr>
<td>8</td>
<td>New Zealand Professional Organisations§</td>
<td>62</td>
<td>(22) 35%</td>
</tr>
<tr>
<td>9</td>
<td>Journals and Scientific Literature§</td>
<td>66</td>
<td>(21) 32%</td>
</tr>
<tr>
<td>10</td>
<td>International Guidelines</td>
<td>63</td>
<td>(16) 25%</td>
</tr>
</tbody>
</table>

* Likely = “Very likely + Quite likely”

§ Denotes significant difference from other provider specialty (p < .05)
3.7 TOPICS FOR FURTHER EDUCATION AND TRAINING

GPs and PNs will need training, education and communications tools to facilitate effective discussion with their patients. In order to describe the importance of topics that GPs and PNs consider the most necessary for their HPV related practices, participants were asked to indicate the importance of topics from a list on a scale with the choices “Very Important”, “Quite Important”, “Somewhat Important”, and “Not at all Important”. The results were dichotomized into two categories as “Important” (very/quite important) and “Not Important” (somewhat/not at all important). The frequency, percentages and 95% CIs are calculated, ranked in order of preference and are presented with percentages and 95% CIs in Table 3.13 (page 67) and Table 3.14 (page 68).

GPs indicated that the natural history of HPV related diseases and vaccine efficacy and effectiveness were the most important topics for clinical training materials followed closely by the epidemiology and prevalence of HPV and vaccine safety.

Seventy-five to 85% of GPs indicated that education pertaining to cervical cancer screening and the management of pap results, HPV counseling, genital warts management and the impact of the HPV vaccine on cervical screening policy and practice was important to them.

Further clinical training related to the psychosocial issues of HPV was considered important by about two-thirds of GPs while vaccine development was considered an important topic by less than half of the GPs.

Most practice nurses indicated that vaccine efficacy, effectiveness and safety were the most important topics to be included in educational materials. HPV counseling and psychosocial issues related to HPV management were also ranked as very important by the majority of PNs. Clinical training about cervical cancer screening and the management of pap results, the impact of vaccines on screening policy and procedure,
### TABLE 3.13: Importance of topics for education and training to guide HPV-related practices, by rank (General Practitioners)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Topic</th>
<th>N</th>
<th>Important* (n) % (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Natural History of HPV related disease§</td>
<td>84</td>
<td>(83) 99% (96.4-100)</td>
</tr>
<tr>
<td>2</td>
<td>Vaccine efficacy and effectiveness</td>
<td>84</td>
<td>(82) 98% (94.3-100)</td>
</tr>
<tr>
<td>3</td>
<td>Epidemiology/prevalence of HPV infection</td>
<td>83</td>
<td>(79) 95% (90.3-100)</td>
</tr>
<tr>
<td>4</td>
<td>Vaccine safety profile</td>
<td>84</td>
<td>(78) 93% (86.9-98.8)</td>
</tr>
<tr>
<td>5</td>
<td>HPV counseling</td>
<td>82</td>
<td>(69) 84% (74.7-93.6)</td>
</tr>
<tr>
<td>6</td>
<td>Cervical cancer screening and management of Pap results</td>
<td>84</td>
<td>(70) 83% (74.6-92.1)</td>
</tr>
<tr>
<td>7</td>
<td>Genital warts management§</td>
<td>84</td>
<td>(64) 76% (63.3-89.0)</td>
</tr>
<tr>
<td>8</td>
<td>Impact of vaccine on screening policy and practice</td>
<td>83</td>
<td>(63) 76% (64.8-87.0)</td>
</tr>
<tr>
<td>9</td>
<td>Psycho-social issues related to HPV§</td>
<td>83</td>
<td>(57) 69% (58.3-79.0)</td>
</tr>
<tr>
<td>10</td>
<td>Vaccine development§</td>
<td>82</td>
<td>(36) 44% (32.6-55.2)</td>
</tr>
</tbody>
</table>

* Important = “Very important + Quite important”

§ Denotes significant difference from other provider specialty (p < .05)
TABLE 3.14: Importance of topics for education and training to guide HPV-related practices, by rank (Practice Nurses)

<table>
<thead>
<tr>
<th>PN</th>
<th>Rank</th>
<th>Topic</th>
<th>N</th>
<th>Important* (n)% (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>Vaccine efficacy and effectiveness</td>
<td>69</td>
<td>(68) 97% (95.6-100)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Vaccine safety profile</td>
<td>68</td>
<td>(65) 96% (91.0-100)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>HPV counseling</td>
<td>68</td>
<td>(64) 94% (88.9-99.3)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Psycho-social issues related to HPV§</td>
<td>70</td>
<td>(65) 93% (85.8-99.9)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>Epidemiology/prevalence of HPV infection</td>
<td>69</td>
<td>(64) 93% (87.1-98.4)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>Genital warts management§</td>
<td>68</td>
<td>(63) 93% (87.5-97.8)</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>Cervical cancer screening and management of Pap results</td>
<td>69</td>
<td>(63) 91% (85.8-96.8)</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>Natural History of HPV related disease§</td>
<td>66</td>
<td>(59) 89% (82.7-96.1)</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>Impact of vaccine on screening policy and practice</td>
<td>67</td>
<td>(58) 87% (80.5-92.7)</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Vaccine development§</td>
<td>66</td>
<td>(44) 67% (54.9-78.4)</td>
</tr>
</tbody>
</table>

* Important = “Very important + Quite important”

§Denotes significant difference from other provider specialty (p < .05)
epidemiology and prevalence, and the natural history of HPV related disease were also important for most practice nurses.

In contrast to GPs, PNs were significantly more likely to report that further training about HPV counseling, genital warts management and psychosocial issues related to HPV was important. Similar to GPs, vaccine development was considered the least important topic for education and training material necessary to guide HPV management practices by practice nurses.

"Patient focused education materials for health professionals to give out" was mentioned when participants were asked to indicate "other" topics to guide HPV prevention and management practice.

3.8 SUMMARY

This chapter has presented the survey results. Statistical tests have demonstrated where knowledge inconsistencies occur, described provider attitudes about patient counseling messages and their intentions to recommend HPV vaccines. Differences that exist between GP and PN responses were identified and their significance reported. The likelihood of providers to use specified information sources and the importance topics for future education and training were prioritized. A discussion of these results and their relevance in terms of comparability with results in the existing literature, and the implications for public health and provider education will be covered in depth in the following chapter.
CHAPTER 4: DISCUSSION

This study has provided the first description of the knowledge, attitudes and intentions of Christchurch GPs and PNs about key issues surrounding HPV infection and its prevention. It has also identified the HPV-related topics that these Christchurch primary care providers consider important to their practices and where they go to find information pertaining to those topics.

This final chapter draws together the findings reported in the previous chapter and places them in relation to the studies discussed in Chapter One. A comparison of the findings of this study and others confirms much of what has already been reported, but provides information that is unique within the Christchurch context. The implications for public health and provider education relative to the results of this study are discussed within the boundaries of the strengths and limitations imposed by the survey design. Finally, suggestions for future research are proposed which may serve to better understand the challenges that GPs and PNs will be facing as the HPV Immunization Program (Ministry of Health 2008a) is rolled out.

4.1 PROVIDER KNOWLEDGE

Recently, HPV has received significant attention in New Zealand media mostly because of the addition of Gardasil® to the New Zealand immunization schedule. Historically, information about HPV has been available to the public through the Internet and pamphlets distributed by the Ministry of Health and the National Screening Unit (NSU) (National Screening Unit 2008; Ministry of Health 2008e). Until now, there has been no widespread public education and awareness campaign in New Zealand to educate people about HPV or the HPV vaccines. Previous research has shown that even with such programs an increase in awareness does not necessarily imply correct understanding. Misconceptions may remain even after extensive media coverage about HPV-related topics. This was indicated by the large percentage of Florida university students who were still unaware of the transient
nature of most HPV infections or unfamiliar with the connection between HPV infection and genital warts (Gerend and Magloire 2008). It is possible that with increased HPV media exposure the same confusion will become apparent in Christchurch.

Accurate HPV knowledge is critical. Trustworthy public and provider education about HPV and HPV vaccines will help people make informed decisions about immunizations, managing HPV-associated risk, interpreting cervical screening results, and managing and treating HPV related conditions. Previous qualitative research, as discussed in Chapter One, Section 1.3.3, indicates that information about HPV and HPV vaccines comes from a variety of sources and can be misleading or difficult to comprehend. However, it has been shown that patients trust their primary health care providers above all other resources to give them accurate information about HPV and immunizations (Giles and Garland 2006; McCree, Sharpe et al. 2006; Friedman and Shepeard 2007; Lee, Kwan et al. 2007). This same trust in providers was noted amongst parents and is particularly important because the HPV vaccines are aimed at pre-adolescent girls (Hamilton, Corwin et al. 2004; Zimet 2005; Brabin, Roberts et al. 2006). In Christchurch, GPs and PNs will be relied upon to provide this information to their patients because they provide the vast majority of cervical screening and immunization.

In order to describe their knowledge, this survey asked Christchurch GPs and PNs to respond to statements about current HPV evidence. Unlike most previous studies, this study was conducted after approval and licensing but prior to the widespread public distribution of any HPV vaccine. However, as with all surveys, it should be understood that reported knowledge and attitudes may not reflect actual knowledge and practices.

This survey found that most GPs and PNs are aware of new scientific evidence about HPV infection and HPV-related conditions. Similar to other studies (Montano,
Kasprzyk et al. 2005; Duval, Gilca et al. 2007), most Christchurch providers know that HPV is a very common STI.

While the earliest provider studies (Kahn and Bernstein 2005; Riedesel, Rosenthal et al. 2005) 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 (Jain, Irwin et al. 2006; Duval, Gilca et al. 2007; Henderson, Irwin et al. 2007). Scientific evidence now proclaims that HPV is a necessary, but not sufficient, cause of cervical cancer (Walboomers, Jacobs et al. 1999). This study found that the majority of Christchurch GPs and PNs are aware that persistent HPV infection is necessary for cervical cancer to develop. Compared to Canadian GPs, where 60% knew this fact (Duval, Gilca et al. 2007), 75% of Christchurch GPs and 71% of PNs were aware that persistent infection with HPV is necessary for the development of cervical cancer. The difference between the present study and the Canadian study may be related to increased information about HPV available post-licensure or a difference in the interpretation and wording of the statement; specifically the epidemiologic term 'necessary cause'.

Importantly, the vast majority of Christchurch GPs and PNs correctly reported that immunization with the HPV vaccine will not eliminate the need for cervical screening. As discussed in Chapter One, Section 1.2.1.4, vaccine benefits may be offset if a false sense of protection results in a decrease in cervical screening practices. This is especially important because all pathologic strains of HPV are not included in the currently available vaccines, nor is a vaccinated individual protected against viral types to which they have already been exposed. It is interesting to note that several respondents wrote-in comments to this statement indicating that perhaps, over time, HPV immunization might eliminate the need for screening.

Some respondents were unaware of details that could influence counseling messages and clinical management. These include the differences in HPV genotypes and the usually transient and benign nature of genital HPV infections. 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 viral type. In Canada, only 22% of GPs correctly answered that anogenital warts induced by HPV 6 and 11 are not cervical cancer precursors while in Christchurch more GPs (33%) but significantly less PNs (7%) were aware of this fact (Duval, Gilca et al. 2007). Without assigning the HPV type-specific identifying numbers, other studies also assessed whether providers knew that HPV types associated with warts are different from those associated with cervical cancer. Similarly, they found that only about half were aware that there is a difference between viral types and their associated pathologic outcomes (Aldrich, Becker et al. 2005; Jain, Irwin et al. 2006; Henderson, Irwin et al. 2007).

There may be some debate about the importance of knowing the specific viral types by their numbers. When discussing HPV prevention or management with patients, knowing the actual viral type, by its identifying number, may not be considered essential for patient care. While it is important to convey the message that vaccines offer protection against cervical cancer, genital warts, or both, it is likely to be of little consequence to a busy practice which viral types are specifically responsible for which clinical outcomes. Furthermore, GPs and PNs manage a multiplicity of tasks each day and remembering the specific viral types may not be important to them as they manage their patients. Nevertheless, several studies, including this one, have indicated a consistent lack of knowledge relating HPV types to infection and neoplasia. Misconceptions that benign warts caused by low-risk HPV types 6 and 11 may become malignant could potentially lead to increased health care costs in the form of patient discomfort and anxiety as well as the medical costs of unnecessary treatment and follow-up. Also, because Gardasil® protects against specific strains of HPV related to genital warts as well as cervical cancer, the distinction may arise during providers’ communications with their patients, especially if the public becomes aware of the viral types included in the vaccine.
The transient nature of most HPV infections is well documented (Moscicki, Schiffman et al. 2006). Compared to a large study of a variety of health care providers in the USA which found that only 35% were aware that most HPV infections will clear without medical treatment, about half of the Christchurch GPs and PNs were correct in their responses to this statement (Montano, Kasprzyk et al. 2005). Because the statements were phrased identically, the results are comparable. However, the timing between the studies and an increase in HPV awareness may have influenced the results. It is still important to point out that this means that half of Christchurch providers may be either unaware of unsure about HPV transience. Understandably, there may have been some confusion over the word 'clear'. 'Spontaneously regresses' may have been more appropriate since 'clear' may relate to either the virus itself or the pathologic changes associated with the virus. The transient nature of most HPV has been addressed by the National Cervical Screening Programs’ guidelines for management of women with abnormal cervical smears (National Screening Unit 2008b). These guidelines have extended the timing of cytologic follow-up from six months to one year for most initial low grade cytologic diagnoses in order to give the infection a chance to clear on its own.

4.2 PROVIDER ATTITUDES ABOUT HPV COUNSELING AND SEXUAL BEHAVIOR

GPs and PNs develop personal relationships with their patients and their patients’ parents. How much influence providers perceive they have over the reception of their counseling messages may explain the effectiveness of HPV management and vaccine delivery practices in Christchurch.

When compared to the Canadian survey of providers (Duval, Gilca et al. 2007), the results of this study concerning patient compliance with counseling messages are similar. While 89% of Canadian GPs believed that their patients would heed their advice about regular cervical screening, 97% of Christchurch GPs and 93% of the PNs also believe this to be true. Similarly, a high proportion (>92%) of both, Canadian and Christchurch GPs reported that their patients would receive HPV
vaccination if it was recommended to them. To a slightly lesser degree, practice nurses were also confident that their patients would follow their advice about HPV vaccination. These results indicate the trust and confidence that Christchurch providers believe their patients have in them and their ability to influence patient behavior. On the other hand, like the Canadian GPs, only about half of Christchurch GPs and PNs report that their patients would comply with counseling about safe sexual behavior including the use of condoms and abstinence; the majority only somewhat, rather than strongly agreed with this statement.

The media attention surrounding the availability of the HPV vaccines in New Zealand has raised sensitive issues about HPV and its link to cervical cancer as well as its role as a sexually transmitted infection. This is similar to concerns raised, in other parts of the world, especially amongst parents of adolescents (Zimet, Shew et al. 2008).

Social stigma related to STIs, or vaccination against an STI, has also been voiced as a concern by parents and young women (Zimet, Liddon et al. 2006b; Friedman and Shepeard 2007). Furthermore, health care providers may hold personal beliefs that make them reluctant to discuss HPV. Although evidence has been collected showing that these apprehensions may not be warranted, GPs and PNs may feel unprepared for, or uncomfortable with, the possibility of discussing sexual behavior and STIs with patients or parents of adolescents (Zimet, Liddon et al. 2006b). In New Zealand, GPs and PNs are the primary providers of children and adolescents and therefore will need to be comfortable addressing sexual behavior with their patients and their patients' parents.

Even though some studies reported a reluctance by some providers to discuss sexual behavior with adolescents or their parents, these findings were mostly reported from surveys and qualitative research on pediatricians in the USA (Daley, Liddon et al. 2006; Kahn, Rosenthal et al. 2007; Sussman, Helitzer et al. 2007; Tissot, Zimet et al. 2007). Although GPs in Christchurch and pediatricians in the US are not directly comparable, this reluctance does not appear to be a concern as 96% of GPs in this
study report that they are comfortable discussing sexual behavior with adolescents. However, when Christchurch PNs were asked the same question, only 84% reported being comfortable. This is in stark contrast to a study of nurse practitioners in the USA who reported little discomfort conversing about sexual behavior with patients or their parents (Mays and Zimet 2004).

As discussed in Chapter One, Section 1.3.5, parents may have concerns that HPV vaccination may send a message to children that they condone early sexual initiation, or that HPV vaccination could lead to false sense of security about their susceptibility to an STI resulting in unsafe sexual behaviors. Likewise, when asked if HPV vaccination might increase risk-taking sexual behavior by adolescents in previous studies, some providers were concerned that HPV vaccination would give adolescents a false sense of protection encouraging them to engage in this behavior (Kahn, Zimet et al. 2005; Esposito, Bosis et al. 2007; Sussman, Helitzer et al. 2007). Indeed, recent media attention surrounding Gardasil®'s inclusion on the New Zealand Immunization Schedule has raised these same moral concerns amongst parents and politicians about sexual disinhibition of adolescents (Silkstone 2008). This is a topic that will most likely continue to receive significant media attention as Gardasil® is made available through the HPV Immunization Program.

Although a minority of Christchurch GPs (10%) believed that HPV vaccination would promote risky sexual behavior among vaccinated patients, 37% of PNs in Christchurch reported that sexual risk-taking behavior was more likely after HPV vaccination. It is currently difficult to evaluate whether those who are vaccinated against HPV will participate in more risky behavior but previous adolescent research suggests it will not (Zimet, Shew et al. 2008). Regardless, providers should continue to reinforce the importance of safe sexual behaviors post vaccination to adolescents because of the health risks posed by STIs other than the HPV types included in Gardasil®.
This study has shown that Christchurch PNs differ significantly from their GP counterparts in their attitudes about addressing sexual behavior with adolescents and their perception of increased sexual risk-taking behavior after HPV immunization. Therefore, it may be important to understand why these differences exist and what the implications of these differences are between provider specialties as the HPV vaccine is distributed in Christchurch.

4.3 PROVIDER INTENTION TO RECOMMEND AN HPV VACCINE

The effectiveness of vaccine delivery will depend largely upon whether providers recommend the HPV vaccine to patients within and outside the immunization program. Although provider attitudes about HPV vaccines may differ from their attitudes about other routine childhood vaccines, a recommendation from a trusted provider is likely to strongly influence parent or adolescent decisions to receive the vaccine (Zimet, Mays et al. 2000). In this study, most Christchurch GPs and PNs have indicated that they feel that their patients will heed their advice about HPV immunization.

In Christchurch, vaccine uptake is high in relation to the rest of New Zealand (Ministry of Health 2008b). However, providers may anticipate challenging barriers to immunizing children against a sexually transmitted infection that are not present with other childhood immunizations. A personal reluctance by providers to discuss sexual behavior with preadolescents or to address parental concerns about vaccination against an STI may reduce vaccine uptake. HPV vaccine delivery may also be influenced by the availability of funding for the vaccine, the type of protection offered and the age or gender of patients.

4.3.1 By funding

Previous studies have demonstrated considerable concern among providers about vaccine costs and that addressing these financial concerns was a challenge to vaccine implementation (Kahn, Zimet et al. 2005; Riedesel, Rosenthal et al. 2005). The high
cost of privately available HPV vaccines in New Zealand prior to inclusion on the immunization schedule may have prevented adolescents and other women from seeking this vaccine. This could have resulted in an increase in already well-documented disparities between socioeconomic or ethnic groups (Lewis 2008). The public availability of HPV vaccines and recommendations for universal vaccination of 12-18 year-old has the potential to narrow existing disparities, but only if women in all ethnic and socioeconomic groups have access to them.

The lack of public funding for HPV vaccines since approval in 2006 may have accounted for a delay in uptake of the vaccine. With inclusion of Gardasil® into the New Zealand immunization schedule, funding is not a concern for girls falling within the specified age range. However, women over the age of 18 and males who would like to receive the HPV vaccine will do so at their personal expense.

While public funding of an HPV vaccine was anticipated, the actual message from the Ministry of Health was delivered concurrently with the survey distribution (see Appendix H). It is possible that some respondents may have been influenced by awareness of the Ministry of Health decision to fund Gardasil® for girls aged 12-13 and a catch-up program for adolescents up to the age of 18 years. However, because HPV vaccines were mentioned at Pegasus Health large-group meetings shortly after the licensing of Gardasil® in 2006, it is likely that the imminent funding of the vaccine was expected by GPs and PNs in Christchurch.

Ninety-five percent of Christchurch GPs and PNs reported that they would recommend an HPV vaccine if it were publicly funded compared to 88% of Canadian GPs (Duval, Gilca et al. 2007). Interestingly, most providers (84% Canadian and 75% Christchurch) still report recommending the vaccine even if their patients have to pay for it. Some of the GPs and PNs who report recommending the vaccine if their patients have to pay for it may be including males and/or women who are not covered by the HPV immunization program in their responses.
4.3.2 By type of protection offered

There are currently two vaccines approved for use in New Zealand, so providers have a choice of which one to recommend. As discussed above, Gardasil® which protects against most genital warts caused by HPV6 and 11 and cervical cancer related to HPV16 and 18 (quadrivalent), has been chosen by the MOH for public funding. Cervarix® offers protection against high risk HPV16 and 18 and not genital warts (bivalent). Therefore, these vaccine differences, and the different promotional messages (protection against cervical cancer or sexually transmitted warts), may present communication challenges. Similar to other studies, most Christchurch GPs and PNs slightly favor recommending the quadrivalent vaccine over the bivalent vaccine (Duval, Gilca et al. 2007). Recommendation of quadrivalent vaccine by providers may have been influenced by the MOH decision since this study was conducted concurrently with the announcement of the HPV Immunization Program.

4.3.3 By age and/or gender

Most of the 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, despite reporting that the ideal age for vaccination was 13 years or younger (Zimet, Shew et al. 2008). While this study found similar results among practice nurses, all Christchurch GPs reported that they would recommend HPV vaccine for girls aged 13-15 years.

There are no published studies which report on nurses' intention to recommend HPV vaccines specifically and therefore it is not possible to directly compare these findings. However, a recent radio program featured an interview with Jessica Kahn, a pediatrician, mother of an 11 year-old daughter and a prominent HPV vaccine researcher (Wilson 2008). Dr. Kahn referenced an as yet unpublished survey which reported that of 10,000 nurses, who were also mothers, in the USA, less than half were opposed to giving an 11 year-old the vaccine, compared with 90 percent who
would agree to it for 15-18 year-old. This is comparable to the findings of this survey as stated above. All of the nurses in this study were female and many are likely to be mothers. Therefore, it is impossible to distinguish between nurses’ personal and professional behaviors and opinions by this study alone. However, demonstrating a consistency in the attitudes of nurses over time, a much earlier survey of nurse practitioner recommendations of STI vaccines also found a linear increase in acceptability for age of administration from 11-17 years of age (Mays and Zimet 2004). 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. Also, as discussed in Chapter One, Section 1.3, the complexity of HPV infection and the low level of HPV baseline knowledge held by most adolescents about HPV infection, as well as their own personal discomfort resulting from limited knowledge about HPV, may discourage recommending HPV vaccination for the very young (Sussman, Helitzer et al. 2007).

There may have been some confusion about this question which partially may be explained by the design and/or the timeliness of the MOH announcement about HPV vaccination. The question, and resultant age categories, was designed prior to the recommendations published by the Ministry of Health which places girls aged 12-13 and a catch-up program for those up to 18 years of age in the HPV immunization program. The question was developed to include all ages and genders for which the vaccine has approval in New Zealand and was categorized from youngest to oldest. Therefore, because the vaccine is now recommended for girls aged 12-13 years of age in New Zealand and the two youngest categories in the questionnaire straddle these ages, it may have been more likely for the respondents to choose the older age category of 13-15 years. This is more likely applicable to the GP sample as PNs were significantly more likely to recommend HPV vaccination for the oldest female age group (16-26 years) as compared to the youngest (9-12).

Many GPs and PNs did not report any intention to recommend the HPV vaccine to boys or women aged 26-45 even though vaccines are privately available for these
populations. "Not sure" or "Don't know" were not options for responses to items in this section. Therefore, missing responses may be a result of the MOH not funding immunization for these age/gender categories or providers not having enough information to make a decision.

4.4 PROVIDER SELF-RATED SUFFICIENCY OF INFORMATION

If providers feel that they have sufficient knowledge about a subject, it is possible that they will not need or desire further education or training. Compared to the 7% of Canadian GPs who reported having sufficient information about HPV and HPV vaccines, Christchurch GPs indicated that they were better informed. Almost half of GPs and a quarter of PNs reported that they had sufficient information about HPV and HPV vaccines indicating an awareness of HPV and HPV vaccines in Christchurch that may not have existed in Canada at the time of their survey (Duval, Gilca et al. 2007). However, it must be noted that half of the Christchurch providers also reported that they had received only somewhat sufficient information. These results imply that further educational efforts about HPV and HPV vaccines are warranted.

4.5 PROVIDERS' PREFERRED INFORMATION SOURCES

In order to address the HPV-related needs of their patients, providers must be equipped with the most current information so that the messages they communicate are clear, relevant and complete. As discussed in Chapter One, Section 1.4, healthcare providers in different parts of the world look to a variety of sources to meet their HPV information needs.

Most providers in the USA stated that their HPV practices are influenced by the recommendations of organizations, including their own professional affiliations as well as others such as the CDC, the ACS and the ACIP (Raley, Followwill et al. 2004; Riedesel, Rosenthal et al. 2005; Tissot, Zimet et al. 2007). Studies from other countries indicate that providers mainly use information from their
governmental agencies, professional organizations, colleagues and less often from international guidelines and references (Aldrich, Becker et al. 2005; Esposito, Bosis et al. 2007). Overwhelmingly, the most popular choice to meet the educational needs of Christchurch providers was their Independent Provider Association (Pegasus Health), followed by colleagues. IPAs provide considerable educational information to GPs and PNPs in New Zealand and other studies did not indicate a comparable resource. When compared to GPs, Christchurch PNPs are significantly more likely to use immunization coordinators as a source of new information to meet their HPV needs. However, the two categories, “Immunization coordinators” and “IPA” are somewhat interchangeable because immunization coordinators are employed by the IPA and practice nurses may interface more with them than GPs. It must also be noted that this survey was distributed at peer-led small group discussion meetings which were presented by Pegasus IPA in Christchurch. Therefore, the survey did not measure the responses of those who chose not to attend the meetings for whatever reason. It is also possible that those who attended the meetings are more supportive of the IPA than those who did not attend.

The Immunization Advisory Center (IMAC), a nationwide organization based at the School of Population Health at the University of Auckland, was also highly rated as an information source. New Zealand professional organizations, international organizations and scientific journals and publications were not found to be as important to Christchurch providers and the Internet was cited by just over half of all participants as a good information resource. However, it is likely that information from many of these sources is extracted by the educational team at the IPA and information reaches GPs and PNPs through educational materials distributed by them or discussed at informational meetings. In Christchurch, international guidelines and pharmaceutical companies were not noted to be an important information source for providers.
4.6 TOPICS TO AID CLINICAL DECISION AND HPV MANAGEMENT

While most of the choices of topics to be included for future clinical training materials and decision support tools for the prevention and management of HPV were considered important to the majority of GPs and PNs, there were differences in which topics were considered the most important. Similar to previous studies about HPV vaccines (Kahn, Zimet et al. 2005; Tissot, Zimet et al. 2007), Christchurch GPs and PNs are most interested in knowing about HPV vaccine safety, efficacy and effectiveness. GPs in Christchurch expressed a strong desire to know more about the natural history and progression of HPV-related disease and HPV prevalence and epidemiology which is shared by physicians in other counties (Tissot, Zimet et al. 2007).

Previous research has suggested that comfort discussing adolescent sexuality and psychosocial issues related to HPV are a concern among physicians (Sherris, Friedman et al. 2006; Zimet 2006a; Tissot, Zimet et al. 2007). However as indicated by their strong confidence in discussing sexual behavior with adolescents as discovered in this survey, Christchurch GPs placed less importance on more training about HPV counseling and psychosocial issues than other HPV-related topics.

Practice nurses, on the other hand, reported a strong preference for further training materials related to HPV counseling and psychosocial issues associated with HPV. In Christchurch, PNs will be directly involved in delivering HPV vaccines to all age groups and therefore intimately involved in discussions with patients and their parents about the vaccines. Although both GPs and PNs will have contact with adolescents during HPV vaccination, PNs are likely to have more interaction with them during the three-dose delivery of the vaccine. Therefore, the differences between GPs and PNs may warrant further investigation. Research to better understand attitudes concerning adolescent sexual behavior and counseling and insight into the rationale underlying specific beliefs may be better understood by further research using qualitative methods.
4.7 STRENGTHS AND LIMITATIONS OF THE STUDY

This study attempted to survey all GPs and PNs in Christchurch. Because the majority of these providers are associated with Partnership Health PHO or Pegasus Health IPA, the small group meetings were chosen as a convenient and economical venue to survey this finite population and obtain informative estimates. Once again, it is important to note that this study was conducted at a time of heightened awareness of HPV and the HPV vaccines as it was conducted simultaneously with the Ministry of Health’s announcement to place Gardasil® on the New Zealand immunization schedule.

4.7.1 Response and participation rates

The response rate of 24% of GPs and 27% of PNs of the invited population of providers in Christchurch was fairly low. The participation rate was better at 43% (GP) and 36% (PN). These rates may be considered reasonable because they are comparable to the study of Canadian physicians which provided the model for several questions, and better than the earliest studies conducted prior to HPV vaccine approval, where the response rates were low (Raley, Followwill et al. 2004; Riedesel, Rosenthal et al. 2005; Duval, Gilca et al. 2007). Provider surveys about HPV which have achieved the highest responses have used monetary incentives and computer-assisted options whereas this survey did not (Montano, Kasprzyk et al. 2005; Daley, Liddon et al. 2006).

It is of interest that more GPs than PNs who attended the small group meetings participated in the survey. Unlike other studies about HPV which sampled nurses and had extremely high response rates, only 36% of the PNs who attended the small group meetings chose to take part in the survey (Mays and Zimet 2004; Montano, Kasprzyk et al. 2005; Henderson, Irwin et al. 2007). The response rates of this study, however, are 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 (response rates: 30% and 79%, respectively) (Toop and Hodges 1996). Nevertheless, the low participation by PNs in this survey was disappointing; not only because there
are so few studies which have surveyed nurses on this topic, but also because PNs will be a major provider of HPV vaccination and associated patient communication in Christchurch.

4.7.2 Non-response bias

One limitation of this survey is possible non-response bias which indicates that the attitudes of those who participated in the survey may differ from those who did not participate.

Expanding on this limitation, although most GPs and PNs practicing in Christchurch were invited to attend the meetings, not all chose to do so. Therefore, potential non-response bias must be taken into account. It is possible that the knowledge and attitudes of the participants of this survey differed from other Christchurch GPs and PNs. It is also possible that the providers who chose to attend the small group meetings were more interested in the topics being presented than those who did not attend.

However, a systematic review of non-response to physician surveys found that physicians tend to be relatively homogenous, with respect to attitudes and behaviors, which therefore limits non-response bias (Kellerman and Herold 2001). There is no similar published review about nurses and non-response specifically, but perhaps they also have a tendency to behave homogenously as a group. It should be noted that while of similar average age when compared to New Zealand national averages, the GPs and PNs who participated in this survey were more likely to be female and this may have had some impact on the findings (Pande and Stenson 2008).

4.7.3 Validity

The external validity and therefore the generalizability of this study to the broader population of GPs and PNs outside of Christchurch was sacrificed because the survey was limited to Christchurch GPs and PNs. Due to this exclusive sample selection, the findings are meant to be representative of the Christchurch populations only.
The validity of this survey was good due to good survey design and pre-testing of the questionnaire. The close-ended format design ensured consistent and concise responses and was based on extensive formative research. The use of a stratified sampling design to assess the results across GP and PN specialties was another advantage of this survey design. The results obtained were able to describe both specialty responses separately and also compare and contrast them.

However, some important issues were left out in an attempt to keep the questionnaire brief. This was done because of time constraints which limited a participant’s ability to complete the survey during time allotted at the small-group meetings and their busy schedules in general. In retrospect, a question that specifically asked if a provider was prepared to recommend or not recommend the vaccine at all may have been helpful in avoiding some blank responses. Also, although there were relatively few missing responses overall, perhaps even more of these could have been avoided if a ‘not sure’ or ‘don’t know’ response was provided for questions pertaining to attitudes and behaviors.

4.7.4 Ability to compare with previous research

There is very limited information about nurses’ knowledge and attitudes specific to HPV and HPV vaccines available in the literature and thus comparisons between Christchurch practice nurses and others are constrained. In addition, many of the previous studies are from the US where pediatricians will be the primary source of vaccine delivery for younger patients and so the studies are reflective of that population more than GPs and PNs in Christchurch.

4.7.5 Intention to recommend vaccine

Another limitation of this study is that it measured GP and PN intention to recommend a vaccine against HPV rather than actual vaccine recommendations. Intention to recommend HPV vaccination was appropriate for this study because although two vaccines were approved and available prior to this study, the survey was
conducted before any widespread distribution of Gardasil® through the HPV Immunization Program. Intention to recommend was also appropriate for comparisons with the outcomes of similar studies. The Theory of Planned Behavior was used by this and previous studies to justify the use of measuring intention as a predictor of behavior. This theory proposes that attitudes about a behavior, in this case, recommendation for HPV vaccination, perceived attitudes of individuals or organizations and perceived control over performing the behavior are associated with intention to perform the behavior, which is then associated with actual behavior (Godin and Kok 1996). This study may serve as baseline information for future studies to assess actual behavior as uptake of the vaccine occurs.

### 4.8 INFORMATION EXPOSURE TO HPV AND HPV-RELATED TOPICS

It is worthwhile to consider the exposure of providers to information pertaining to HPV at the time of this survey. Information about HPV was available to GPs and PNs prior to this survey from a variety of sources. The 2006 approval of Gardasil® and the subsequent approval of Cervarix® received some media attention and data sheets about the vaccines were available to general practices. Pegasus IPA also presented some basic HPV information in large group educational meeting in anticipation of broader availability and distribution of the vaccine. However, there was no widespread campaign to educate either the public or providers about HPV or the vaccine even though sporadic mentions were made in print and via radio and television programming. Television advertisements by the manufacturer of Gardasil® in early 2007 encouraged patients to ask their GP for more information, but it was unknown at that time how prepared GPs or PNs were to answer questions that may have been posed to them by their patients.

Immediately prior to the distribution of this survey, however, there was a flurry of information available to GPs. Most of this was provoked by the Ministry of Health decision to fund Gardasil® and add it to the National Immunization Program. On 02 May, 2008 a fax was sent to all GPs and PNs in New Zealand advising them of this change and outlining the HPV Immunization Program for girls aged 12-18 years (See
Appendix H). The most current information about the HPV Immunization Program, including HPV-related facts, was also available online as of this date and is updated regularly (Ministry of Health 2008a). Furthermore, on 07 May, 2008, New Zealand Doctor magazine published comprehensive details about HPV-related facts, guidelines for vaccine delivery and an overview of the HPV Immunization Program. The magazine is delivered to GP surgeries and is available online at www.nzdoctor.co.nz.

Finally, pre-reading materials sent to all GPs and PNs who were invited to attend the Pegasus-sponsored small group meetings where this survey was distributed included only a small amount of HPV vaccine-related facts as other vaccines were also discussed at these meeting. During the group discussions, the group leaders were instructed to briefly cover HPV vaccines and to discuss only if their group was interested. There is no way of knowing which groups may have discussed HPV vaccines and in how much detail when compared to others. However, the results, which included the design effect of the group clusters, did not find any significant differences between the small groups. Therefore, it appears that any discussion that may have taken place within groups did not seriously affect the study findings.

Because this survey was conducted between the dates of 05 May and 20 May 2008, the actual amount of HPV information that participants were exposed to pre-survey is unknown. This was illustrated by one GP ticking the response ‘Sufficient’ to the statement about HPV information but writing in the comment: “(I just haven’t read it all!)”. Therefore, there is the distinct possibility that HPV knowledge or attitudes and associated responses may have been influenced by a participant’s actual exposure to published information.

Prompted by the MOH announcement about the HPV Immunization Program and subsequent to the conclusion of this questionnaire’s distribution, Pegasus sponsored a large group meeting about Gardasil® in order to inform GPs and PNs about the vaccine. This meeting was attended by 10% of GPs and 66% of PNs and included
comprehensive information about all topics related to HPV and HPV vaccines which were included in the survey questionnaire (Bos 2008).

This study has highlighted the importance and trust that participants place on the support they receive from their IPA. Although this survey was somewhat biased because it was presented at a meeting sponsored by Pegasus Health IPA, it gives reassuring evidence that this Independent Provider Association is able and prepared to satisfy most of the educational needs of GPs and PNs in Christchurch.

4.9 IMPLICATIONS FOR PUBLIC HEALTH

Ultimately, a combination of public health activities addressing HPV-related issues will be needed to reduce the incidence and mortality of HPV-related diseases, including genital warts, cervical intraepithelial neoplasia and cervical cancer. Success in achieving these goals will be measured differently depending upon which viewpoint is considered. The Ministry of Health sets targets as described in their Cervical Screening and HPV Vaccination Strategies (Ministry of Health 2003; Ministry of Health 2008a). These arbitrary targets are based on program enrollment, uptake of services and the reduction of existing disparities as outcome measures of success. Simply making the vaccine available may be considered a success by many, while reduced health care costs for treating HPV-related disease will measure success for the health economist. A reduction in the personal risk and associated physical, emotional and monetary costs of HPV-related disease is the success indicator for women and their families.

The effectiveness of a program, which is always multi-faceted as discussed above, is probably the most important public health indication of success. Doctors and nurses participating in this survey indicated a strong importance for information relating to HPV vaccine efficacy and effectiveness. Whether or not an intervention can work under ideal conditions relates to efficacy and several clinical studies have demonstrated HPV vaccine efficacy in protecting against infection with four HPV types included in Gardasil® (Markowitz, Dunne et al. 2007).
Efficacy, however, is not the same as effectiveness. A treatment can only be considered effective if it works in real life circumstances. HPV vaccines may be used in patient groups, dosages and situations which differ from the clinical trials. For optimal effectiveness, wide distribution is necessary. Because vaccine effectiveness will be decreased by immunization of patients who are already infected with HPV, it should be administered before girls become sexually active. Furthermore, co-infection with multiple types of HPV allows for 'cross-protection' and 'competitive release' which may either enhance or diminish vaccine effectiveness depending on whether the HPV types are synergistic or competitive in nature. The potentially more virulent strains may make protection incomplete and the vaccine may be less effective than anticipated (Zonfrillo and Hackley 2008). HPV prevalence rates have not been published for New Zealand and therefore it is still unknown whether or not the types included in Gardasil® will cover the majority of HPV types present within the New Zealand population. Continued participation by all sexually active women between the ages of 20-69 years in the National Cervical Screening Program is an absolute necessity. Vaccine effectiveness is also dependent upon how long protection lasts. Because the HPV vaccine is targeted at young girls and cervical cancer takes years to develop, protection against infection acquisition must be long lasting. Finally, while vaccinating males as well as females would increase overall effectiveness, cost-effectiveness analyses and the results of ongoing clinical trials will need to be considered.

If the HPV Immunization Program is to be considered effective in Christchurch, high uptake of vaccine will be needed. Because the HPV immunization schedule is a guideline, not a mandate, choice is a key ingredient for vaccine delivery and uptake. This includes the choice of a provider to recommend or discourage the vaccine to their patients and the patient and parents’ choice to accept or refuse the vaccine.

4.9.1 Vaccine delivery

Policies related to vaccine delivery and addressing barriers to access will significantly impact the effectiveness of HPV-related practices. Slow uptake within New Zealand
has already been noted for young women born in 1989 and 1990, the first group able to receive the publicly funded Gardasil® since its availability (Cameron 2008a). As of January 2009, the vaccine will be available for all females aged 12-18 and will be incorporated into the routine immunization schedule for year eight girls. According to the Ministry of Health, District Health Boards (DHBs) will have flexibility in their approaches to implementation of the HPV program and will be responsible for engaging the support of primary care providers. The Canterbury District Health Board (CDHB) has suggested that HPV vaccinations may be distributed primarily through primary care; through local PHOs, general practices, Maori and Pacific providers and family planning and sexual health clinics, rather than through schools and thus significantly affecting GP and PN involvement with the vaccine (Bos 2008). However, if the vaccine is ultimately administered through the schools, primary care providers will still have a key role in delivering the vaccine to young women not attending school or for those who prefer immunization through general practice. Vaccine effectiveness requires three doses within six months and full course immunization will be a challenge for primary providers. Also, a decision by the CDHB to provide the HPV vaccines only through primary care may prompt residents to question why the vaccine is not available in schools. It may also result in a significant variation from other DHB regions in vaccine uptake.

4.9.2 Public Education

To date, there has been no widespread public education effort about HPV or HPV vaccines in Christchurch, or for that matter, New Zealand. While the MOH has developed resources, including a poster, a fact sheet and a flipchart for immunization providers, and has sent them to primary care providers, widespread advertisement of the HPV program will not begin until after the November general election in New Zealand (Cameron 2008a; Ministry of Health 2008d). Because Gardasil® is protective against both genital warts and cervical cancer, decisions will need to be made by providers about marketing the HPV vaccines to a diverse audience of patients and parents. They will need to decide whether to emphasize the vaccine as one which is protective against cervical cancer, a sexually transmitted infection or
both. Most importantly, providers will need to convey the message that Gardasil® does not offer complete protection; that there are other viral types that can cause disease which are not included in the vaccine and that the vaccine only protects against those types to which the patient has not yet been exposed. School-based sex education programs may need to be expanded to include information about HPV infection and the strengths and limitations of vaccination against HPV. They must also stress that vaccination against this STI will not protect anyone against other STIs.

Rapid uptake of Gardasil®, although desirable, is not expected as it will take time for public confidence about HPV vaccination in New Zealand to increase. (Cameron 2008a). As other countries, like Australia and the UK, publish results about the strengths and limitations of their HPV immunization programs, valuable information about what may be expected in New Zealand will become available. The roles of GPs and PNs involved in the HPV immunization programs in other parts of the world may serve as models for Christchurch providers as the HPV program gathers momentum.

4.10 IMPLICATIONS FOR PROVIDER EDUCATION

This study has highlighted HPV-related areas that deserve more attention for primary care practices in Christchurch. This comes at an opportune time as the HPV immunization program in New Zealand begins. An informed provider is a prerequisite to uptake of HPV vaccines by the targeted groups. In most respects Christchurch GPs and PNs appear to be better informed than primary care providers globally in their knowledge about HPV. However, this study has illustrated important differences in behaviors that exist between GPs and PNs. These differences can be specifically addressed so that educational and support tools can be developed to aid them in their respective HPV-related activities.

While GPs in this study were interested in the latest available scientific evidence and facts to direct their HPV-related practices, practice nurses emphasized their need for training relating to the psychosocial issues of HPV, HPV counseling and genital warts
management. Because practice nurses also expressed more discomfort than GPs about addressing adolescent sexual behaviors, additional education and training in counseling techniques is strongly suggested.

A disinclination by some PNs to recommend vaccination to younger adolescents indicates a need for clear education about completing the HPV vaccination series before girls become sexually active and a persistent HPV develops. Because HPV vaccination may not be effective if given after HPV exposure, counseling about future abnormal cervical screening results must be anticipated. Young women who were vaccinated after sexual debut may discover that they have genital warts or other HPV-related disease upon cervical screening and appropriate counseling will need to be initiated. It is extremely important for providers, patients and parents alike to understand the vaccine limitations because the psychosocial issues related to HPV diagnosis after immunization may be a topic which causes significant worry and alarm. Nurses would 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. It is extremely important for providers to emphasize the limitations of the currently available HPV vaccines.

Anything that makes communication with patients and parents about HPV easier will add to the quality of communication which will need to be accomplished within the time allotted during a patient visit. Therefore, a readily available supply of literature and ‘hands-on’ communication tools should be available to GPs and PNs in order to facilitate discussions with patients. Fortunately, new patient education materials have been developed reflecting the latest information about HPV and the HPV vaccines (Ministry of Health 2008d). Websites such as the one developed by the Auckland District Health Board and the University of Auckland are providing very up-to-date information about HPV and the HPV vaccine to young women in language that is easy for them to access and understand (ADHB 2008). Providers should be made
aware of these websites to better understand what information their patients might have received from them or how to direct them to them as a helpful resource.

New developments and information relating to HPV and HPV vaccines should always be made available as soon as possible to GPs and PNs so that the most current messages can be conveyed to their patients. Some GPs and PNs in this study were unaware that HPV types associated with genital warts differ from those associated with cervical cancer and that most HPV-caused conditions will clear without treatment. This lack of awareness has been consistently demonstrated amongst providers throughout the world and this distinction continues to be a confusing and complex subject.

GPs and PNs are under increasing pressure to keep abreast of the latest developments concerning a wide range of topics. A study conducted in Christchurch in 2002 determined that peer-led small group education is beneficial to general practice (Richards, Toop et al. 2003). Although this study measured the benefit of educational meetings relative to prescribing practices, similar benefits may be achieved for other topics, including HPV and HPV vaccines. The small-group meetings presented by Pegasus Health are conducted in conjunction with larger group meetings and are well-attended, as described in this research.

In Christchurch, the IPA was the top-ranked resource for information by providers and has already demonstrated an ability to provide education about HPV to GPs and PNs. IPAs and PHOs, in turn, are an important provider of valuable feedback from their membership to the MOH and the IMAC to strengthen their efforts to satisfy the HPV-related needs of primary care providers.
4.11 FUTURE RESEARCH

This study has provided valuable information about Christchurch GPs and PNs as the HPV Immunization Program gets underway. It has illustrated several areas which impact HPV-related practices in primary care and provides a good baseline for future research. However, the cross-sectional, quantitative methods employed in this survey have only scratched the surface of a complicated and controversial subject.

The vaccine delivery strategy chosen by the CDHB, whether through primary care or school-based, will strongly impact Christchurch GP or PN involvement with the HPV Immunization Program. Therefore, a longitudinal approach using a similar questionnaire would provide valuable observations about the changes in primary care provider knowledge, attitudes and behaviors related to HPV and HPV vaccines over time.

Qualitative research can expand upon and explore issues which have been highlighted by this descriptive study. Focus group discussions or interviews with practice nurses may help to understand or explain the reluctance of some PNs to recommend immunization to younger adolescents. Qualitative investigation of practice nurses about discomfort discussing sexual behavior with adolescents or perceptions about increased risk-taking sexual behavior after HPV vaccination is also suggested. Research using qualitative methods may provide valuable information that can guide the development of educational measures to address the needs and concerns of nurses.

This study did not identify perceptions among providers about barriers to HPV immunization which may be caused by cultural or religious beliefs nor did it specifically address concerns or challenges to reducing inequalities that exist between socioeconomic or ethnic groups. Research addressing these perceptions may provide valuable information to help reduce disparities that exist within the Christchurch community.
Follow-up studies could discover the actual vaccine recommendations by providers and vaccine uptake by patients and comparisons can be made with the intentional recommendations described in this study. The effectiveness of the HPV Immunization Program will be best understood through observational studies over time. Analysis of delivery strategies used by the Canterbury DHB will allow comparisons to other vaccine delivery programs and uptake ratios throughout New Zealand.

Finally, this survey was limited to Christchurch GPs and PNs who attended group meetings sponsored by Pegasus IPA. It would be interesting to see how the information collected in this study compares to providers and IPAs in other parts of New Zealand.

4.12 CONCLUSION

Cervical screening programs with high uptake, like the NCSP in New Zealand, have been responsible for a dramatic decline in the rates of cervical cancer in developed countries. The identification of HPV as the necessary cause of cervical cancer and genital warts has prompted the development of a vaccine to prevent these diseases. With this knowledge and these tools, it appears that elimination, or at least further reduction, of cervical cancer is a possibility. These recent scientific and technological advances have allowed for a rapid increase in HPV-related knowledge and awareness amongst providers. Therefore, providers must be adequately informed and prepared to meet the needs of their patients.

This study has highlighted areas which deserve particular attention and has provided valuable information about GP and PN knowledge and attitudes in Christchurch. In addition, it has come at a time when HPV is becoming increasingly visible as the HPV Immunization Program is implemented. This study can be useful to inform future educational efforts and materials to help improve providers’ knowledge of clinically relevant issues around HPV. Applying this new information in practice could translate into more accurate and relevant counseling messages when GPs and PN provide cervical cancer
screening, HPV vaccination or manage patients with genital warts or other HPV-related disease processes.

Although this study provided important information about Christchurch GP and PN knowledge, attitudes and intentions with regard to HPV, it did not allow for the investigation to identify the full range of provider views about their HPV practice strategies, the rationale underlying these views or actual recommendation of an HPV vaccine. Further research by longitudinal and qualitative methods would be useful to better understand the challenges faced by GPs and PNs as the New Zealand HPV Immunization Program is launched.
REFERENCES


Collier, L. (2008). Discussion regarding organization of small groups of GPs and PNs.


EDUCATION SERVICES PEGASUS HEALTH

Pegasus Health is a collaborative association of 500 doctors and nurses working in general practice and the 24 Hour Surgery, committed to providing comprehensive primary health care services including accident and acute medical care to improve the health status of Christchurch people.

The Clinical Practice Education Committee (CPEC) is a Clinical Advisory Group established to provide clinical input/advice to support the delivery of best practice high quality education services to Pegasus Health GPs and PNs, Partnership Health GPs and PNs and other primary health care practitioners.

These education services include:

Small Group Meetings:
The primary objective of the small group education program is the promotion of best clinical practice with optimal and ethical use of finite resources. This is an evidence based peer led program. Meetings are generally for 1½ hours each group comprising approximately 15 members. Concurrent GP and PN programs provide the opportunity to develop and present material which specifically meets the needs of both GPs and Practice Nurses and helps facilitate teamwork as GPs and PNs receive the same educational messages.

Large Group Meetings:
These meetings are generally facilitated by secondary care colleagues or outside presenters and the venue and size of these meetings necessitate a more didactic lecture style format.

Workshops and Skills Based Training:
It is anticipated the format of these meetings and venue will be determined by the topic and size of the target audience. For example these meetings may be utilised to roll out a new project, or may be offered to those with an area of special interest or expertise.

Records of Attendance:
Pegasus Health is a Royal New Zealand College of General Practitioners Registered CME Provider. GPs attending RNZCGP endorsed CME events will receive a record of attendance and CME credits. Practice Nurses will receive a record of attendance and professional development hours for inclusion in their professional portfolio.
Process for Submitting a Topic:

- All sections of the topic proposal form must be completed
- Topic proposals from within a Pegasus Health division, must be signed off by the Manager of that division before submitting to CPEC for consideration
- Completed Topic Proposal forms are submitted electronically to the Health Services Administrator.
- All topic proposals will be added to the CPEC agenda and circulated to all members of CPEC
- CPEC members will review topic proposal using criteria in the Education Topic Prioritisation Framework
- Topic proposals will be discussed by the CPEC committee.
- CPEC recommendations will be forwarded to the Executive for a final decision.
- The topic proposers will be notified of the outcome of their proposal by either the Clinical Leader for education services or the Health Services Manager.
### Topic Proposal Form

**Please use a separate form for each proposal**
**Try to avoid using abbreviations**
**Please submit your proposal (ideally maximum 2 pages) electronically to toreka_w@pegasus.org.nz**

<table>
<thead>
<tr>
<th>Date:</th>
<th>25/02/2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggested Topic:</td>
<td>SURVEY - Knowledge, Attitudes and Practices of General Practitioner’s and Practice Nurses in Christchurch about HPV and HPV Vaccination: Implications for Public Health and Provider Education</td>
</tr>
<tr>
<td>Topic Submitted by:</td>
<td>Judith Henninger</td>
</tr>
</tbody>
</table>

**Give a brief overview of, and rationale for proposing this topic**

Human papillomavirus (HPV) is one of the most common sexually transmitted infections and virtually all cervical cancers are causally related to infections by HPV. There are two HPV vaccines, Gardasil® and Cervarix®, currently approved for clinical use in New Zealand. This study will focus on the current knowledge and attitudes about HPV and HPV vaccines among Christchurch General Practitioners and Practice Nurses. There is not a national HPV awareness program in New Zealand and women are encouraged by pharmaceutical industry advertisement of HPV vaccines to contact their GPs to contact their GPs for more information. GPs and PNs have an important role in promoting or discouraging uptake of HPV immunization.

The objectives of this study are to examine GP and PN general knowledge about HPV and HPV immunization, identify their attitudes and practices about HPV and HPV immunization, and to discover what information they consider important as well their preferred sources of that information to guide their HPV information and immunization practices. Ideally, the survey instrument, a questionnaire, will be distributed at the upcoming small group immunization meeting held by the Pegasus in Christchurch. The questionnaire can be completed and returned at the meeting or mailed using the postage-paid, pre-addressed envelope provided. This study may provide valuable information to guide the development of training, education and communication tools so that GPs and PNs are able to confidently discuss HPV and HPV vaccines with their patients.

**List the main aims of the topic.**

For GPs and PNs:
- determine knowledge about HPV and HPV vaccination
- identify attitudes about HPV and HPV vaccination
- ascertain sources used to guide cervical screening, HPV and vaccination practices
- identify importance of topics to be included in training material

**List the key take home messages for participants**

- N/A

**What are the benefits to Pegasus Health patients and members?**

Data generated from this study may influence interventions that can be developed to inform GPs and PNs of the most recent scientific evidence that may affect clinical practice. Materials may be produced for counseling and informing patients about HPV and the HPV vaccines. The research will also highlight areas where attitudes towards immunization for HPV differ among Christchurch GPs and PNs. Access to HPV clinical training, clinical decision support tools, and materials to facilitate patient counseling and education, as well as easy access to updated information about HPV from
respected and authoritative sources, is necessary for effective management of HPV and the HPV vaccines. This survey will identify which information Christchurch GPs and PNs consider important and where they would go to find this information.

How will this topic help to address the current health inequalities for Maori and Pacific peoples?

Maori women are no more likely than non-Maori to acquire HPV but are twice as likely to be diagnosed with cervical cancer and more than 4 times as likely to die from the disease according to the National Screening Unit. Cervical cancer screening will need to continue as the vaccines only cover two oncogenic HPV types. There is the possibility that the vaccine will be given to women who are already more likely to be screened for cervical cancer while not doing enough to promote vaccination amongst those who do not normally receive cervical screening, thereby increasing existing disparities. This survey will attempt to identify to whom GPs and PNs are likely to recommend the HPV vaccine.

Outline how this topic will support the strategic goals of Pegasus Health.

The data from this survey can support the clinical Advisory Group in providing valuable information to guide the development of training, education and communication tools so that GPs and PNs are able to confidently discuss HPV and HPV vaccines with their patients.

Outline how this topic will support the strategic goals of your organisation.

I am an MPH student and this topic is for fulfillment of my degree requirements. I have a strong interest in HPV and the new HPV vaccines and have been working in the field of cervical cytology as a cytotechnologist over the past 25 years. My research is being supervised by Gillian Abel and Ann Richardson of the University of Otago, Christchurch School of Medicine and Health Sciences; Department of Public Health and General Practice.

<table>
<thead>
<tr>
<th>When would you like this topic presented?</th>
<th>TBD – April or May during Small Group Meeting on Immunization (HPV specifically).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are there any time constraints on the delivery of this topic? (e.g. mental health awareness week).</td>
<td>No</td>
</tr>
<tr>
<td>Are there any funding constraints? (e.g. contract expiry)</td>
<td>No</td>
</tr>
<tr>
<td>Do you have key people who would like to be involved in the development of the topic?</td>
<td>Sue Rogers Jackie McAlpine</td>
</tr>
<tr>
<td>Is there a conflict of interest associated with the topic? If yes please state.</td>
<td>No</td>
</tr>
<tr>
<td>Has this topic been presented before? If yes when, where and by whom?</td>
<td>No</td>
</tr>
<tr>
<td>Is this topic currently being considered by another provider? If yes, which provider?</td>
<td>No</td>
</tr>
<tr>
<td>How will this topic be funded?</td>
<td>MPH dissertation allowance, University of Otago</td>
</tr>
</tbody>
</table>
Knowledge, Attitudes and Practices of General Practitioners and Practice Nurses in Christchurch about HPV and HPV Vaccination: Implications for Public Health and Provider Education.

You are invited to take part in a survey about HPV and HPV vaccines. General Practitioners and Practice Nurses have an important role in promoting or discouraging uptake of HPV immunization. The objectives of this study are to describe your attitudes, practices, and knowledge about HPV and HPV immunization and to discover what information you require to guide your HPV knowledge and immunization practices.

A short questionnaire will be distributed at the Pegasus small group meeting where you will be discussing HPV vaccines. Your participation in this study is entirely voluntary and anonymous. You are under no obligation to complete this survey. No material which could personally identify you will be used in any reports on this study. If you have any queries or concerns regarding your rights as a participant in this study, you may wish to contact your professional organisation. Your consent to participate in this study is given with receipt of your completed questionnaire by the investigator.

The findings of this survey can be used to inform programs and policy which will improve general knowledge about HPV and the HPV vaccines, affect future policy decisions within the government of New Zealand, direct planning of public relations and identify areas where provider awareness can be improved. This study may provide valuable information to guide the development of training, education and communication tools so that GPs and PNs are able to confidently discuss HPV and HPV vaccines with their patients.

The study will be completed by the end of 2008. The results will be made available upon request to survey participants, to Pegasus Health, and to the University of Otago as a bound dissertation. It may also be submitted for journal publication and presented at local conferences.

This study is part of student work towards a Master of Public Health Degree by Judith Henninger. If you require further information about this study, you may contact her at: P.O. Box 4511, Christchurch or by telephone at (03) 377-3397. The research is being supervised by Gillian Abel and Ann Richardson of the University of Otago, Christchurch School of Medicine and Health Sciences; Department of Public Health and General Practice. It is funded in part by a dissertation allowance of the MPH program.

Your support of this research is greatly appreciated.
APPENDIX C: QUESTIONNAIRE

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?
   _____ General Practitioner
   _____ Practice Nurse

2. Do you offer cervical screening in your practice?
   _____ Yes
   _____ No

3. What is your age?
   _____ Years

4. What is your gender?
   _____ Female
   _____ 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

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

Please go on to the next page
## Section 3

Please indicate if you agree or disagree with these statements:

<table>
<thead>
<tr>
<th>For each row, please circle one number</th>
<th>Strongly Agree</th>
<th>Somewhat Agree</th>
<th>Somewhat Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
</table>

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 13-15 years ............................... 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 1, 2, 3, 4 only one) ....................................................... 1

   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

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

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

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

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.
APPENDIX D: REMINDER NOTICE

Thank you for participating in the HPV Survey!
(distributed at the Cradle to Grave small group meetings)

If you haven’t returned your questionnaire yet, please do – your input is valuable and greatly appreciated!

Knowledge, Attitudes and Practices of General Practitioners and Practice Nurses in Christchurch about HPV and HPV Vaccination: Implications for Public Health and Provider Education

If you’ve lost or misplaced your copy from the meeting, please call 377-3397 or e-mail jhenninger@xtra.co.nz to request another.
APPENDIX E: HPV SURVEY; PILOT RESPONSE SHEET

HPV Survey – PILOT responses

Your Name: ____________________________

- Please complete the questionnaire.
- Please feel free to write any comments directly on the questionnaire.
- Please answer the following questions:

1. How long did it take you to complete the survey?

2. Do you feel that it is too long, too short or of appropriate length?

3. Did you find the questionnaire design attractive and easy to follow?

4. Were the questions worded clearly?

5. Do the questions seem to fit together?

6. Are the transitions from one section to another smooth?
7. Did you find the variety of questions adequate?

8. Did any of the questions make you feel uncomfortable? If so, which ones?

9. Do you feel that any important information was missing?

10. Were there any sections where you feel that you wanted to say more than what was asked?

Additional Comments:

THANK YOU!

Please don’t hesitate to contact me if you have any questions!

Judy Henninger
027-257-0263
377-3397
jhenninger@xtra.co.nz
## APPENDIX F: MISSING DATA

<table>
<thead>
<tr>
<th>Section</th>
<th>Question/Statement</th>
<th>Number of Missing Entries</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Section 1</td>
<td>1. What type of health care provider are you?</td>
<td>GP-0, PN-0</td>
<td>Very few missing responses, however those that chose not to answer may have done so to protect their privacy.</td>
</tr>
<tr>
<td></td>
<td>2. Do you offer cervical screening in your practice?</td>
<td>GP-0, PN-0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. What is your age?</td>
<td>GP-2, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. What is your gender?</td>
<td>GP-1, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. How many years have you been in practice?</td>
<td>GP-6, PN-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. What ethnic group do you belong to?</td>
<td>GP-4, PN-0</td>
<td></td>
</tr>
<tr>
<td>Section 2</td>
<td>1. HPV is the most common sexually transmitted infection.</td>
<td>GP-0, PN-0</td>
<td>Very few missing responses.</td>
</tr>
<tr>
<td></td>
<td>2. Persistent HPV is a necessary cause of cervical cancer.</td>
<td>GP-1, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Anogenital warts induced by HPV 6 and 11 are cervical cancer precursors.</td>
<td>GP-1, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Immunization with the HPV vaccine will eliminate the need for cervical screening.</td>
<td>GP-0, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Most HPV infections will clear without medical treatment.</td>
<td>GP-0, PN-1</td>
<td></td>
</tr>
<tr>
<td>Section 3</td>
<td>1. My patients will comply if I counsel them about:</td>
<td></td>
<td>Missing responses © may indicate that participant is unwilling, unsure or does not have an opinion about recommending HPV vaccine at the time of the survey.</td>
</tr>
<tr>
<td></td>
<td>a) Safe sex behavior (condom, abstinence)</td>
<td>GP-0, PN-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>b) Regular screening (frequency ≤ 3 years)</td>
<td>GP-0, PN-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) HPV vaccination</td>
<td>GP-3, PN-2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. I am comfortable addressing sexual behavior with adolescent patients.</td>
<td>GP-0, PN-0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Vaccination against an STI may encourage risky sexual behavior in adolescents.</td>
<td>GP-2, PN-2</td>
<td>May indicate ‘unsure’ or ‘don’t know’ as that was not given as a response choice.</td>
</tr>
<tr>
<td></td>
<td>4. I will recommend an HPV vaccine to my patients.</td>
<td></td>
<td>May indicate ‘unsure’ or ‘don’t know’ as that was not given as a response choice.</td>
</tr>
<tr>
<td></td>
<td>a) If it is publicly-funded</td>
<td>GP-0, PN-1</td>
<td></td>
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<td></td>
<td>b) Even if my patients have to pay for the vaccine.</td>
<td>GP-0, PN-0</td>
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<tr>
<td></td>
<td>c) If it protects against both cervical cancer and anogenital warts.</td>
<td>GP-3, PN-2</td>
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<tr>
<td></td>
<td>d) If it only protects against cervical cancer.</td>
<td>GP-3, PN-3</td>
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<tr>
<td></td>
<td>5. I will be most likely to recommend the HPV vaccine to:</td>
<td></td>
<td>Responses may have been omitted based on information distributed by the OH about funding HPV vaccination for specific ages and/or genders. Also, respondents may not have felt that they had enough information to make a decision at the time of the survey and therefore skipped the category.</td>
</tr>
<tr>
<td></td>
<td>a) Females aged 9-12 years.</td>
<td>GP-7, PN-13</td>
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<td></td>
<td>b) Females aged 13-15 years.</td>
<td>GP-4, PN-5</td>
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<td></td>
<td>c) Males aged 9-15 years.</td>
<td>GP-13, PN-19</td>
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<tr>
<td></td>
<td>d) Females aged 16-26 years.</td>
<td>GP-3, PN-10</td>
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<tr>
<td></td>
<td>e) Females aged 27-45 years.</td>
<td>GP-12, PN-17</td>
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<td>Question/Statement</td>
<td>Number of Missing Entries</td>
<td>Explanation</td>
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<tr>
<td>6.</td>
<td>So far, the information I have received about HPV and HPV vaccines is:</td>
<td>GP-2 PN-0</td>
<td>A missing response may have indicated that the participant was not considering using the listed information source at all or did not have an opinion about the resource, or skipped the question.</td>
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<tr>
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<td></td>
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<tr>
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<td>Somewhat sufficient</td>
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<td></td>
<td>Sufficient</td>
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</tr>
<tr>
<td>Section 4</td>
<td>1. Please indicate where you would look for new information on HPV or HPV vaccines:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Ministry of Health</td>
<td>GP-6 PN-2</td>
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</tr>
<tr>
<td></td>
<td>b) Immunization Advisory Centre (IMAC)</td>
<td>GP-4 PN-3</td>
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<tr>
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<td>c) Immunization coordinators</td>
<td>GP-12 PN-2</td>
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<tr>
<td></td>
<td>d) Independent Provider Associations (Pegasus)</td>
<td>GP-4 PN-3</td>
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<tr>
<td></td>
<td>e) New Zealand Professional organisation guidelines</td>
<td>GP-8 PN-8</td>
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<tr>
<td></td>
<td>f) International guidelines (CDC, ACS, etc)</td>
<td>GP-12 PN-7</td>
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<tr>
<td></td>
<td>g) Journals and Scientific literature</td>
<td>GP-9 PN-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>h) Colleagues</td>
<td>GP-9 PN-4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>i) Pharmaceutical companies</td>
<td>GP-9 PN-6</td>
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<tr>
<td></td>
<td>j) Internet</td>
<td>GP-12 PN-2</td>
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<td>A missing response may have indicated that the participant did not feel that further information was needed, or did not have an opinion on the topic, or skipped the question.</td>
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<td>2. 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:</td>
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<tr>
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<td>a) Natural history of HPV related disease</td>
<td>PN-1 GP-4</td>
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<td>b) Epidemiology/prevalence of HPV infection</td>
<td>PN-2 PN-1</td>
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<td>c) Vaccine development</td>
<td>GP-3 PN-4</td>
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<td>d) Vaccine safety profile</td>
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<td>e) Vaccine efficacy and effectiveness</td>
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<td>f) Impact of the vaccine on screening policy and practice</td>
<td>GP-2 PN-3</td>
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<td>g) Cervical cancer screening/management of Pap results</td>
<td>GP-1 PN-1</td>
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<tr>
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<td>h) Genital warts management</td>
<td>GP-1 PN-2</td>
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<tr>
<td></td>
<td>i) HPV counseling</td>
<td>GP-3 PN-2</td>
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<tr>
<td></td>
<td>j) Psycho-social issues related to HPV</td>
<td>GP-2 PN-0</td>
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APPENDIX G: ATTENDANCE, PARTICIPATION AND RESPONSE RATES

Attendance, Participation and Response Rates

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<th>Number Invited (minus group leaders)*</th>
<th>Number Attended (given questionnaires)</th>
<th>%</th>
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PNs

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<th>Response Rate</th>
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<td><strong>Total PNs</strong></td>
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Overall Total: 624, 396, 63.5%, 155, 24.8%, 39.1%
APPENDIX H: FAX TO GPs AND PNs FROM MINISTRY OF HEALTH ABOUT HPV IMMUNIZATION PROGRAM

Facsimile Cover Page

To: General Practitioners & Practice Nurses  
From: Alison Roberts (Dr)  
       Senior Advisor Public Health Medicine  
       Ministry of Health

Date: 02 May 2008  
No. of pages: 4  
Subject: Important information for practice nurses and doctors

Dear Colleague

Addition of the Human Papillomavirus (HPV) vaccine to the National Immunization Programme and the HPV Immunization Programme for girls age 12-18 years.

The Prime Minister has announced funding for the HPV Immunization Programme. The HPV vaccine will be added to the National Immunization Schedule for year 8 girls from 2009. A catch-up programme will be delivered over two years for girls born on and after 1 January 1990. The programme will start from 1 September 2008, for the ages specified below.

Gardasil® is the vaccine that will be used.

Some questions and answers about the programme are attached. More comprehensive questions and answers are in the immunization section of the Ministry of Health’s website (www.moh.govt.nz).

National Immunization Schedule
From 2009, the vaccine will part of the National Immunization Programme for Year 8 (12 to 13 year-old girls). The vaccine will be delivered through school based programmes, primary care and health clinics.
**Catch-up Programmes**

The catch-up programme will be in two phases:

- **Primary Care:** Initially, from 1 September 2008 the catch-up programme will focus on older girls, aged 17 and 18 (born in 1990 and 1991) through primary care services.
- **School Based Programmes:** These will start from 2009 for girls aged 12-18 years.

**National Immunization Register (NIR) and School Based Vaccination System (SBVS)**

The NIR and the SBVS will be used to record HPV immunizations. The SBVS will message immunization events to the NIR.

**Claiming the Immunization Benefit**

The claiming of immunization benefits for HPV will be made through the standard HealthPAC claiming process. The benefit will be the same as that paid for other National Immunization Schedule vaccines.

**Communication**

Resources for health professionals and training materials are being developed. Health education materials are being planned for girls, parents and schools.

**More Details**

Details about HPV and the vaccine are available on the Ministry of Health website (www.moh.govt.nz). More information about the programme and how it will be delivered in your area will be sent out when local details have been finalised.

If you have any questions in the meantime, you can email them to the HPV Project Team (HPV@moh.govt.nz).

Yours sincerely

Dr Alison Roberts  
Senior Advisor Public Health Medicine  
Ministry of Health
HPV Immunization Programme Questions and Answers.

When does the HPV Immunization Programme start?
From 1 September 2008, the vaccine will be available for free to young women aged 17 and 18 from their family doctor or practice nurse, or health clinic. From early 2009, it will be available to all girls and young women from the age of 12 to 18. Most will get the vaccine at school. More details will be released once consultation has been completed and local plans are finalised.

How is the vaccine given?
The vaccine is given by injection in the upper arm. Three injections are given over a 6-month period:
- 1st injection
- 2nd injection 1-2 months after the first dose
- 3rd injection 4-6 months after the first dose.

Gardasil® contains highly purified VLPs of each HPV type, sodium chloride, and very small amounts of aluminium-containing adjuvant to enhance the immune response and stabilisers (histidine and polysorbate 80). The vaccine does not contain thiomersal. The vaccine should be stored at 8°C and should not be frozen.

What is HPV (human papillomavirus)?
HPV is the name for the types of viruses that cause certain types of cancer and warts. Different types of HPV affect different parts of the body, including the cervix.
HPV types that cause warts do not lead to cancer.
The human papillomavirus is spread by direct, skin-to-skin contact with a person who has the virus.
Most women who develop HPV infections clear the virus naturally and do not develop cervical cancer.

How effective is the vaccine, and how long does it last?
Gardasil® vaccine targets HPV types 16 and 18, which are responsible for most cases of cervical cancer and HPV type 6 and 11 that cause genital warts. Clinical trials show Gardasil® is highly effective in preventing these types of HPV in young women who have not previously been exposed to them.
So far, ongoing studies show the vaccine protects against HPV infection for five years after immunization, and suggest protection will last much longer. Research is continuing to find out how long protection will last.
Gardasil® does not protect against all HPV types that can cause cervical cancer. And, as with any vaccine, Gardasil® may not provide protection for everyone who is vaccinated.
All women should have regular cervical smear tests every three years from the age of 20 until they turn 70 if they have ever been sexually active.
Are there any groups who should not get HPV vaccine, or should wait?
There are a few people for whom the vaccine is not recommended, including:
• anyone who has ever had a life-threatening reaction to yeast, or any other component of Gardasil®
• anyone who has any severe allergies – these people should check with their doctor first
• pregnant women. The vaccine appears to be safe for both the mother and the unborn baby, but this is still being studied. Pregnant women who inadvertently who receive the vaccine do not need to consider terminating the pregnancy
• people with moderate or severe illnesses should wait until they recover to receive their HPV immunization.

Women who are breastfeeding may safely get the vaccine.
People who are mildly ill can still get their immunization as scheduled.

How safe is the vaccine?
The vaccine was shown to be safe during large clinical trials in which more than 11,000 young women from 13 countries received the vaccine. The trials found that Gardasil® was safe and caused no serious side effects.
After the injection, some girls and women developed injection site pain. This reaction is common but mild. Any injection can cause a mild fever, redness or swelling at the injection site.
Gardasil® has been licensed for use in more than 100 countries, including New Zealand, Australia, the United States, and the 27 countries in the European Union including the U.K.

Can boys be vaccinated?
The research into the effectiveness of the vaccine in preventing HPV infection and related diseases in boys and men has not been completed. For now, free HPV immunization is only available to girls.

More information about the HPV Immunization Programme
More information about the programme is at www.moh.govt.nz/immunization.

If you have queries about the HPV Immunization Programme please contact:
• the Ministry of Health HPV Immunization Project Team by email: hpv@moh.govt.nz (cleared daily), or
• Janine Bryce (Administrator HPV Project Team) email: Janine_Bryce@moh.govt.nz or phone (04) 816 4451.