

Human Papillomavirus

A Canadian Investigation into the Global Vaccination Controversy

Quinten Clarke

Simon Fraser University, Burnaby, BC, Canada

Background

Human papillomavirus (HPV) is one of the most prevalent sexually transmitted infections throughout the world. It is estimated that “as many as 75% of sexually active men and women will have at least one HPV infection in their lifetime.”¹ HPV is a viral sexually transmitted infection (STI) primarily spread through sexual contact. Unfortunately, there is no medical cure for HPV, so it cannot be treated post-infection.² Ho et al. (1998) discovered that HPV takes about eight months to be cured naturally by the immune system of a university-aged female. During the infected period, however, both males and females can transmit HPV to their sexual partners through skin to skin contact.^{3,4}

Physical symptoms of HPV include “cauliflower-like warts appearing on the genitals...typically three to eight months after intercourse with an infected person.” However, the majority of infected individuals are often unaware that they have been infected because the infection is frequently asymptomatic. In a study by Peyton et al. (2001), the researchers found that within their female participants, 39.2% of HPV infections were asymptomatic.⁵ Therefore, it is advisable for one to take precautions during sexual activity such as using condoms.⁴ HPV has been linked to cervical, penile and anal cancers, among others.⁶ Specifically, it has been shown to “[cause] approximately 70% of cervical cancers worldwide.”^{7,8}

In the context of public health, HPV remained an untreatable ailment until the recent development of HPV vaccines, notably Gardasil and Cervarix. These vaccinations can prevent infection with HPV if an individual is vaccinated prior to being exposed to the virus.⁹

Since their discovery, these vaccinations have been widely championed by public health organizations such as the World Health Organization, Public Health Association of Canada and American Center for Disease Control and Prevention as highly effective means for preventing HPV and its related cancers. Nonetheless, the vaccinations have become controversial in Canada because of the new vaccination campaign implemented by Health Canada. In July of 2006, Health Canada, the national body responsible for public health surveillance and interventions in Canada, approved the use of Gardasil, a vaccine that protects against HPV types 6, 11, 16 and 18, in females aged nine to 26.⁶ By September 2008 all provinces and territories had implemented school-based vaccination campaigns which targeted females as young as nine years old. These campaigns have provoked controversy among conservative political groups and religious organizations that oppose this alleged sexualization of young girls. However, medical professionals argue that vaccinating females early—prior to their sexual debut—increases the effectiveness of the vaccine. The vaccine is 16.9% more efficacious in preventing HPV (types 16 and 18) in females aged 16 to 26 than in those aged 24 to 45.⁶

Some physicians, who oppose the HPV vaccination, believe that regular Papanicolaou tests, also known as Pap smears, are an effective means of detecting HPV and thereby preventing cervical cancer.¹⁰ Detecting HPV is important in reducing its spread throughout the population, but given that HPV is untreatable, post-infection treatment is not a viable solution to preventing cervical cancer. These physicians have also suggested that the school-implemented, government-sponsored vaccination campaign is merely the result of lobbying by pharmaceutical companies that

produce the vaccine.¹⁰

Although this vaccine has been available in Canada for more than five years, its administration to youth (ages nine to 26) remains a controversial topic. Opponents of the vaccine criticize it for allegedly encouraging early sexual debut and risky sexual practices. In addition, this vaccine and its campaign raise many issues regarding the public perception of sexuality, such as the stigma regarding STIs and sexual activity among youth populations. The long-term effects of this vaccine and the level of protection that is actually established once it is administered are also matters of contention.

Effectiveness of the HPV Vaccines

Many groups who oppose the HPV vaccination hold disparate concerns over its application. Those opposed to the large scale vaccination program implemented by Health Canada have cited “concerns... regarding vaccine safety and long-term efficacy.”¹¹ During large, multinational clinical trials, vaccination has been proven safe in males and females aged nine to 26 for the short-term; however, long-term issues have yet to be investigated.^{6,11} Despite this, concern has arisen due to the dissemination of inaccurate statements by the media and certain social groups as well as a general lack of open dialogue regarding sexual matters.

Groups that endorse the implementation of this vaccine argue that its effectiveness in reducing HPV incidence, precancerous lesions and cervical cancer rates outweighs any possible long-term side effects.¹¹ Clinical trials of the HPV vaccine Gardasil show that individuals who receive the vaccine have an approximately 99% decreased relative risk of developing pre-cancerous cells caused by HPV compared to those who declined the vaccine. In a sample of 10,000 females, the incidence of HPV-based genital warts in the vaccinated population was zero, while it was 251 in the unvaccinated population. Additionally, a lower incidence of cervical cancer has been found in vaccinated individuals. In one study the HPV vaccination was 100% effective at preventing cervical cancer precursors. No discrepancies have been found between control groups, groups who did not receive the vaccine and vaccinated groups with regards to serious side effects from the vaccine.^{9,12}

In 2011, 390 women in Canada died of cervical cancer.¹³ Estimates have shown that vaccination may prevent 70% of such deaths. Therefore, the HPV vaccine appears to be a cost-effective intervention in preventing cervical cancer and HPV infections. Experts have stated that the vaccines “produced a cost per quality-adjusted life year ratio below the traditionally used cut-off of [\$50,000 USD] per [quality-adjusted life year].”¹⁴ These vaccines are arguably one of the largest breakthroughs in cancer prevention in the last decade.

Public Perception of the HPV Vaccines

The controversy surrounding these vaccines stems from the stigmatization of STI-infected individuals as “promiscuous, unfaithful, and shameful.”¹⁵ This can often be a barrier to the dissemination of information as well as the prevention, screening and treatment of these infections. As a result of stigma, pathogenically-positive individuals conceal their infections, further impeding honest discussion about the prevention of STIs. For example, some individuals report that they have not received or do not seek to receive the HPV vaccine because they fear it will make their

partner, family or community at large view them as promiscuous.¹⁵

Religious organizations and conservative political organizations often hold conservative view towards these topics and have questioned the national HPV immunization campaign. In 2012, the Calgary Catholic School Board implemented a policy banning vaccination clinics in their school after Bishop Henry expressed concern that the HPV vaccines encouraged promiscuity among youth.¹⁶ Yet, studies have shown that the fear of earlier sexual debut and increased frequency of sexual activity is unfounded as there is a “lack of association between receipt of HPV vaccine and initiation or increased frequency of sexual behaviors.”¹⁷ Rosenthal et al. (2008) noted that participants who received physician counseling had a more positive outlook regarding the vaccine and a better understanding of the need to vaccinate their children at a young age prior to sexual initiation.¹⁸ This may suggest that proper counseling with a healthcare professional may help parents recognize the need for vaccination.

Kahan et al. (2010) found that “disagreements about the risks and benefits of HPV vaccination are shaped by cultural values, which exert their influence through the biased assimilation of information.”¹⁹ This finding largely illustrates the reason for the apprehension and skepticism of some conservatives towards accepting the HPV vaccination.

The claim that the HPV vaccine will promote unsafe sexual practices is largely unsupported. Opponents of the HPV vaccines have argued that “vaccinating adolescents against a sexually transmitted infection is tantamount to encouraging them to become sexually active.”²¹ The public perception that an adult choosing to have their child vaccinated, or an adult themselves becoming vaccinated, is condoning high-risk sexual behavior is unsubstantiated. Liddon et al. (2012) found no association between unsafe sexual behavior and administration of the HPV vaccine.¹⁷ When considering public health interventions related to youth sexuality it has been demonstrated that providing more information and alternatives to youth leads to higher utilization rates of the respective public health intervention; indeed, if youth are ignorant to the reason behind a preventative measure they are unlikely to utilize it.²⁰ This is illustrated by the relative inefficacy of abstinence-only education programs compared to more comprehensive methods of sexual education.^{11,20} Santelli et al. (2006) noted that “while abstinence is theoretically 100% effective in typical use, the effectiveness of abstinence may approach zero.”²¹

During her campaign for the 2012 Republican Party Presidential nomination, Michelle Bachmann, a United States Republican Party Congresswoman, made unsubstantiated claims that the HPV vaccine caused mental retardation in a recipient and that parents should thus avoid vaccinating their children.²² This statement dramatically raised public concerns over the safety of HPV vaccines. Groups, conservative or otherwise, that oppose the HPV vaccine and publically propagate misinformation regarding a vaccine, may create a negative public opinion regarding the vaccine. One high-profile case of this phenomenon is that of British researcher and physician Andrew Wakefield’s false statements regarding the measles, mumps and rubella (MMR) vaccine in the UK that led to a dramatic decline in MMR vaccination rates.²³ This decline in vaccination rates due to misinformation resulted in at least four preventable deaths. One physician labeled the incident “the most damaging medical hoax in the last 100 years.”²³

Researchers have found that sex-fearing individuals are less likely to be proactive in utilizing preventative measures to reduce their risk of sexual health issues. An individual’s attitudes and beliefs about sexuality can be measured on a scale ranging from erotophilic, or sex-loving, to erotophobic, or sex-fearing. Erotophobic individuals “score higher on authoritarianism and need for achievement, have more traditional sex roles, experience more sex guilt, and have more

negative reactions to masturbation and homosexuality than erotophiles” who typically “masturbate and fantasize more frequently, think about sex more often, have sexual intercourse for the first time at an earlier age, have more past sexual experiences and have a greater number of intercourse partners.”²⁴ It is important to recognize that this continuum is neither a predictor nor a diagnostic tool for sexual dysfunction and that no position on this continuum is more desired than any other position. However, this scale can act as a predictor of one’s personality traits and whether or not an individual will utilize a sexual intervention.²⁵ Erotophobic individuals are considerably less likely than erotophilic individuals to “engage in certain preventative behaviors in respect to sexually transmitted [infections].”²⁴ This knowledge could explain the opposition to the vaccine in Canadian and American populations.

Public health professionals must address the discrepancies between proven medical information and the beliefs of the general public. Efforts should be made to bridge the information gap by providing accurate medical knowledge and scientific facts regarding the vaccine to household media outlets and public health authorities through either Health Canada or the Public Health Agency of Canada. The enactment of campaigns to reduce social stigma regarding sexually transmitted infections may also be an apt intervention.

Effect of Controversy on Immunization Rates

Though seemingly proactive compared to nations with privatized healthcare, due to the controversy surrounding the HPV vaccine, Canada is far behind other nations with socialized healthcare systems in implementing the vaccine.²⁶

Australia, with a similar GDP, healthcare system and HPV program to Canada, is a suitable country with which to contrast the Canadian vaccination program. In the period between April 2007 and December 2009, Australia’s national-level school vaccination program (which in that phase vaccinated females aged 12 and 13) exhibited an 83% coverage rate for first doses and a 73% coverage rate for the third/final dose of the HPV vaccine.²⁷ In the same period the Australian school catch-up program (which targets females aged 14

to 15) exhibited 84% and 72% coverage rates, respectively, for first and third/final doses of the HPV vaccine.²⁷ Australia has even begun vaccine campaigns for boys to further prevent the spread of HPV.²⁶

While national statistics on Canadian vaccine rates have not yet been reported, statistics from the initial vaccination efforts among school age children in the Canadian province of Ontario (where females in Grade Eight, aged 13 to 14, were offered the vaccine) showed that only 53% of those who were eligible received their government-subsidized vaccine in 2007.²⁶ Statistics from the United States are more concerning: at the end of 2008, after 2.5 years of HPV vaccination availability “only 37.2% of 13–17 year old girls had initiated the 3-dose series...and far fewer, only 17.9%, had completed it.”²⁸

While controversy surrounding the HPV vaccination will remain, it is imperative that we, as a country and as public health professionals, vaccinate as many individuals as possible. If we are able to vaccinate a majority of the population, then we may be able to provide herd immunity, a practice in which a significant proportion of the population is vaccinated. Due to a lower likelihood that unvaccinated individuals will come into contact with an infected individual, herd immunity would provide unvaccinated individuals with a level of protection.²⁹ This method is similar to the strategy used by the World Health Organization in eradicating polio in the late 1980s and early 1990s.³⁰

Although it is not an identical disease to HPV, the Hepatitis B vaccine has been compared to the HPV vaccine. Since 1986, children in Canada have been vaccinated against the B strain of Hepatitis in

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three doses administered at birth, one month after birth and six months after birth.⁶ Hepatitis B is commonly transmitted through sexual contact and yet there has been little to no controversy surrounding the sexual facet of this vaccine perhaps due to the extremely young age of the infants being vaccinated.³¹ The controversy that once surrounded this vaccine was over the safety of the vaccine in children and did not include any concerns about effects upon the individual's sexual behavior.³² While it is arguable that sexual initiation is a remote notion for the children receiving the Hepatitis B vaccine, it is important to remember that sexual initiation is likely to also be markedly distant for those who receive the HPV vaccine at age nine given that according to data from the National Longitudinal Survey of Children and Youth and the 2003 Canadian Community Health Survey the "average age of first sexual intercourse [is] 16.5" for Canadian males and females.³³ While the Hepatitis B vaccine was once controversial, it has more recently become widely accepted by both the medical community and the general population, a trend that could, perhaps, be replicated by the HPV vaccine.

Conclusion

The controversy surrounding the HPV vaccines, in Canada and abroad, is characterized by persistent opposition from those who oppose the vaccination of young girls, as well as varying opposition from select academics. Although this vaccine has repeatedly been proven safe and cost-effective through experimental trials as a means of preventing both HPV and cervical cancer, opposing individuals argue that these vaccines will increase rates of unsafe sex and decrease the age of sexual debut for youth. While this argument has been unsubstantiated, it has been widely spread through the media and must still be taken into account when considering interventions to increase vaccination rate.

Individuals who support the implementation of Health Canada's vaccination campaign recognize the efficacy of Gardasil and Cervarix in reducing the burden of disease caused by HPV and related cancers, particularly cervical cancer. Canada's HPV vaccination program is behind in comparison to other countries with socialized healthcare systems. Further expansion of the vaccination campaign to include males is needed given that the vaccination has been approved for use in this population and this would further the extent of herd immunity within the population. With proper utilization of the HPV vaccination, it may be possible to eradicate HPV altogether and also significantly reduce the incidence of cervical cancer.

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