



Beliefs, behaviors and HPV vaccine: Correcting the myths and the misinformation [☆]

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ABSTRACT

Objective: Human papillomavirus (HPV) vaccine uptake in many countries has been sub-optimal. We examine several issues associated with non-vaccination that have received particular attention, including fears about sexual risk compensation, concerns about vaccine safety, inadequate vaccination recommendations by health care providers (HCPs), and distrust due to the perceived “newness” of HPV vaccines.

Methods: Selective review of behavioral and social science literature on HPV vaccine attitudes and uptake.

Results: There is no evidence of post-vaccination sexual risk compensation, HPV vaccines are quite safe, and they can no longer be considered “new”. Nonetheless, research findings point to these issues and, most importantly, to the failure of HCPs to adequately recommend HPV vaccine as major drivers of non-vaccination.

Conclusion: Most fears related to HPV vaccine are more related to myth than reality. In the absence of major health policy initiatives, such as those implemented in Canada, the U.K., and Australia, a multi-level, multi-faceted approach will be required to achieve high rates of HPV vaccination. It will be essential to focus on the education of HCPs regarding indications for HPV vaccination and approaches to communicating most effectively with parents and patients about the safety and benefits of vaccination and the risks associated with non-vaccination.

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Introduction

Human papillomavirus (HPV), a highly prevalent sexually transmitted infection (Dunne et al., 2007; Smith et al., 2011; Winer et al., 2008), has potentially serious health consequences in males and females, including anogenital and oropharyngeal cancers and genital warts (Chaturvedi, 2010; Giuliano et al., 2010; Parkin and Bray, 2006). HPV vaccination can be a very effective way to prevent infection; however vaccine uptake has been variable and suboptimal in most countries, with low levels of both initiation and completion of the three-dose series (Etter et al., 2012). A considerable amount of research has focused on identification of factors that influence HPV vaccine uptake (see recent reviews by: Etter et al., 2012; Fisher, 2012; Stupiansky et al., 2012). Some of the many factors associated with non-vaccination are information deficits and include lack of knowledge about HPV infection and vaccination and frank misinformation that is antagonistic to vaccine uptake (e.g., that HPV vaccine will provoke sexual disinhibition or that vaccines are unsafe, ineffective, and insufficiently studied). Other barriers to vaccination involve motivational obstacles,

such as negative attitudes about HPV vaccination (based on negative beliefs about the outcomes of vaccination, which are often the result of dissemination of inaccurate information from anti-vaccine groups) and lack of social support from significant others for vaccination (e.g., lack of health care provider (HCP) recommendation). Finally, logistical obstacles to HPV vaccination include the complexities of access to service, vaccine cost, and the requirement for multiple vaccine doses.

The intent of this paper is not to provide a comprehensive review of behavioral science research about HPV vaccination (for recent reviews of this literature, see, for example, Etter et al., 2012; Fisher, 2012; Stupiansky et al., 2012). Rather, it is to provide a targeted commentary that addresses a specific set of topics that we consider timely and important. We therefore critically examine several of the issues and misconceptions associated with HPV vaccine refusal/non-acceptance that have received particular attention in the research literature and popular media, including fears about risk compensation, concerns about vaccine safety, inadequate vaccination recommendations by HCPs, and distrust due to the perceived “newness”, as well as the perceived “stigma” of HPV vaccines.

Risk compensation

One of the presumed concerns about HPV vaccine is the fear that adolescents will respond to vaccination with sexual risk compensation (also referred to as sexual disinhibition), initiating sexual activity at a younger age and/or reducing self-protective sexual behaviors.

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This issue has received considerable coverage in the U.S. and U.K. media (Abdelmutti and Hoffman-Goetz, 2010; Forster et al., 2010) and parental concern about disinhibition has been found to be associated with lower HPV vaccine acceptability (Zimet et al., 2008). However, post-licensure research has generally shown that fear about sexual disinhibition is not frequently endorsed by parents as a major reason for non-vaccination (Ogilvie et al., 2010; Schuler et al., 2011). In addition, several research studies have now been published that strongly suggest that risk compensation is not a post-vaccination problem (Bednarczyk et al., 2012; Cummings et al., 2012; Forster et al., 2012; Kahn et al., 2012; Liddon et al., 2012b; Mullins et al., 2012). One U.S. national cross-sectional study of 15–24 year old females found no evidence of sexual disinhibition in vaccinated compared to unvaccinated females (Liddon et al., 2012b). Another cross-sectional study of 13–21 year old females who had just received their first dose of vaccine found that a large majority of participants recognized the need for ongoing safer sexual behaviors post-vaccination (Mullins et al., 2012). Similar findings were reported in a study of 16–23 year old HIV-infected young women (Kahn et al., 2012). A longitudinal study in the U.K. surveyed 16–17 year old girls before and after HPV vaccine was offered (Forster et al., 2012). After adjusting for baseline characteristics, participants who received vaccine were not more likely to have initiated sexual intercourse at the time of the follow-up survey. Furthermore, among those who were sexually active, vaccination status was not predictive of frequency of condom use. Moreover, in a study of 14–17 year old girls that involved a comparison of 75 who were recruited after HPV vaccine licensure to 150 who were recruited prior to licensure, no difference was found in the rates of gonorrhea, chlamydia, and trichomonas infections (Cummings et al., 2012). The only difference in self-reported sexual behaviors was that the pre-licensure group had more instances of unprotected sexual intercourse than the post-licensure group, the opposite of what would have been predicted by risk-compensation theory. Finally, a very recent analysis of a large managed care data base found that vaccinated girls did not have higher subsequent scores on a sexual-risk composite measure that included rates of pregnancy, pregnancy testing, sexually transmitted infection testing or diagnosis, and contraceptive counseling (Bednarczyk et al., 2012). The findings presented above may reassure parents and providers who are reluctant to vaccinate due to concerns about risk compensation. However, as noted by Stupiansky and Zimet (2013), "... it is important to remember that risk compensation (real or imagined) is not a rationale for withholding vaccine. Instead, it is a rationale for ensuring adequate education both pre- and post-vaccination" (p. 262).

Safety issues

Underlying some parental HPV vaccine concerns (e.g., feeling that HPV vaccine is too new) are questions about vaccine safety (Fisher, 2012; Krawczyk et al., unpublished results). Fear-inducing news stories may have contributed to these concerns as they sometimes have misreported Vaccine Adverse Event Reporting System data, incorrectly suggesting that HPV vaccination has often led to severe adverse health effects, including death (see, for example the August, 2007 edition of Maclean's magazine in Canada; Gulli, 2007). Numerous large-scale studies on HPV vaccine safety have been published and show little or no evidence of severe side-effects associated with vaccination (Agorastos et al., 2009; Chao et al., 2012; Gee et al., 2011; Klein et al., 2012; Lu et al., 2011). The most frequently reported side-effects are similar to those reported with other vaccines and are transient events, such as mild pain and bruising at the injection site, faintness, and syncope (Naleway et al., 2012). It is important to highlight that a reported adverse event after vaccination does not automatically mean that it was caused by the vaccine. A major challenge, however, is how to effectively communicate to parents the evidence that HPV vaccine is quite safe. As noted following, an

additional challenge involves communicating the very substantial risks of non-vaccination, in the context of generalized, relatively early, sexual debut, delayed marriage, serial monogamy, and the accumulation of risk of HPV infection over time.

Communication of safety data

Development of effective strategies for clearly and accurately communicating information about risk of vaccines has been an enduring focus of vaccine researchers (Ball et al., 1998; Betsch and Sachse, 2013; Davis et al., 2001; Offit and Coffin, 2003). Best practices in this regard may rest on the nature of the vaccine (routine versus elective), the controversies that may surround the vaccine (e.g., MMR and autism, HPV and risk compensation), and, importantly, whether parents or patients harbor ongoing concerns about HPV vaccine safety, actively ask about vaccine safety, or have no concerns in this area. Suggestions for communication about HPV vaccine safety include asking patients whether they have any questions about the vaccine and providing accurate information (including credible websites) that can address concerns about safety. Further, in discussions of vaccine safety, a useful approach may be to reframe non-vaccination as an active decision, comparable to vaccination, introducing the notion that there is risk associated with *not* receiving HPV vaccine. When presented side by side, the minimal risks associated with the decision to vaccinate may be completely over-shadowed by the health risks associated with the decision to not vaccinate, potentially aiding parents and young adults in making decisions about HPV vaccination. Communication concerning the high prevalence of HPV and the high likelihood of acquisition of the virus shortly after sexual debut also may be instrumental in conveying the risk of inaction as a counterpoint to discussion of risk of vaccination. As a note of caution, however, acknowledging the known minor risks associated with HPV vaccination (e.g., pain at the injection site, syncope, dizziness, mild fever) is very important. Recent research suggests that communicating that vaccination entails no risk may, paradoxically, lead patients to view vaccines as more risky (Betsch and Sachse, 2013).

HCPs' influence on HPV vaccine uptake

Particularly in the U.S., where HPV vaccination typically occurs in medical settings, the recommendation from a HCP plays a central role in the decision to receive HPV vaccine (Brewer et al., 2011; Guerry et al., 2011). A recent study of Canadian undergraduates showed similar results (Krawczyk et al., 2012). Conversely, among those who have not received HPV vaccine, the lack of HCP recommendation has been identified as a major reason for non-vaccination (Liddon et al., 2012a; Zimet et al., 2010). While HCPs generally embrace their important role in recommending the HPV vaccine, these recommendations may nevertheless be unevenly carried out due to such issues as time constraints, patient age, availability of insurance or other coverage, safety and/or efficacy concerns, and discussion of sexuality and information needs (Vadaparampil et al., 2011). Vaccine risk communication, in general, is a challenge to HCPs (Evans and Bostrom, 2002). Some providers feel that extensive discussion of risks and benefits of vaccines (including sexuality issues related to HPV transmission in particular) might alarm rather than reassure and may take up too much time. Many HCPs report feeling uncomfortable engaging in discussions regarding sexuality with their adolescent patients (Esposito et al., 2007; Schnatz et al., 2010), while others feel more comfortable discussing sexuality primarily with older adolescents or with males over females (Kahn et al., 2005; Ko et al., 2010).

One potential strategy for overcoming the problems associated with reliance on HCP recommendations would be to establish alternate venues for vaccination, such as schools or pharmacies. The success of school-based HPV vaccination policies, for example, is

demonstrated by the high rates of vaccination achieved in Australia, the U.K., and Canada (Franceschi, 2010; Garland et al., 2011; Shearer, 2011). Another policy-based approach would be for insurance companies to establish practice guidelines with high rates of HPV vaccination identified as a benchmark for successful provision of health care. Still another strategy for overcoming reluctance of HCPs to discuss sexuality with patients would be to frame HPV vaccination as routine, and/or to frame it as a cancer prevention vaccine.

Another set of strategies involves giving HCPs the necessary tools to more effectively implement HPV vaccination (for some suggestions regarding vaccinations in general, see: Leask et al., 2012; Sturm et al., 2010). HCPs must be well-informed about current guidelines and safety information in order to communicate accurately with parents and adolescents (Bynum et al., 2011). Schnatz et al. (2010) found that providers' unwillingness to discuss sexual matters with their patients was correlated with poorer HPV knowledge. The challenge, then, is how to educate HCPs so that they can educate their patients. Bynum et al. (2011) emphasized the importance of professional organizations and web-based resources in this regard. It is particularly important for providers to be familiar with credible websites, as parents of adolescents increasingly use the internet as a source for information about HPV vaccination (Ekos Research Associates, Inc., 2011; McRee et al., 2012b).

Promising communication strategies that can be implemented in clinical settings include messaging to promote HPV vaccination (Cox et al., 2010; Hopfer, 2012) and the use of text-messaging reminders to increase returns for second and third doses of vaccine (Kharbanda et al., 2011).

Additional challenges

In addition to the issues which have been discussed above, there are other areas of research which both support the need for early vaccination and alleviate some potential concerns that parents may have when vaccinating their children against HPV. Studies that have examined the dyadic process of vaccine decision-making between parents and adolescents have identified benefits that result from the process itself as well as the communications surrounding HPV vaccine. Many researchers have concluded that communication about HPV vaccine by parents with young adolescents is an opportunity to discuss sexual health topics which can build positive sexual health values (Askelson et al., 2011; Brabin et al., 2009; Gamble et al., 2010; Griffioen et al., 2012; McRee et al., 2012a; Roberts et al., 2010). Additionally, there is growing empirical evidence that HPV vaccine decision-making represents an early opportunity for adolescents to actively participate in their own clinical health care (Alexander et al., 2012; Brabin et al., 2009). By recognizing the HPV decision-making process as an opportunity to instill sound health care practices in adolescents, both clinicians and parents should embrace this unique opportunity instead of avoiding it.

There is also strong immunologic support for early vaccination of adolescents, as the vaccine is most effective when given prior to sexual initiation (Villa et al., 2005) and results in a stronger immune response in younger versus older adolescents (Dobson et al., 2013). There is evidence, as well, that HPV vaccine induces robust immune memory (Olsson et al., 2007) and that sufficient antibody levels may last for at least 12 years and perhaps much longer in most vaccinated individuals (Fraser et al., 2007). Evidence has also suggested that, if needed, an additional dose of vaccine administered years after the initial series may boost the sustained effectiveness of vaccination (Olsson et al., 2007). A communication challenge posed by HPV vaccination is that while both vaccines are very efficacious, they do not protect against all types of HPV responsible for cervical and other anogenital cancers. This kind of complexity (high efficacy against vaccine types, but more modest efficacy when the whole range of oncogenic HPV is considered) may be difficult to communicate in a health care setting and difficult

for parents to understand. Visual aids, such as the use of charts and graphs, may help to most effectively deliver this kind of information (Chua et al., 2006). In the context of such communication, the need for sexually active females who have been vaccinated to nonetheless have periodic cervical cancer screening must remain an emphasis.

Although the strong evidence for efficacy and safety of HPV vaccine dispels many concerns that have been associated with a new vaccine, it is also important to note that HPV vaccine has been licensed in the U.S. and Canada since 2006 and in Australia since 2007 (Centers for Disease Control and Prevention, 2007; Garland and Smith, 2010; National Advisory Committee on Immunization, 2012). Clinicians who are influential in vaccine uptake, therefore, should no longer consider this vaccine new.

Content analysis studies about the media's representation of the HPV vaccine demonstrate that the tone associated with the vaccine is inconsistent, ranging from negative to neutral to positive (Briones et al., 2012; Habel et al., 2009; Keelan et al., 2010). Unfortunately, it is often the unrealistic, negative vaccine fears that become salient to the public, which then tends to sensationalize potential side effects of vaccination. These rumors then filter down to adolescents and become further exaggerated (Brabin et al., 2009). In order to overcome this type of misinformation, clinicians and public health officials need to advocate for more accurate vaccine information and evidence-based media coverage (Cooper et al., 2008). Further, using social media tools (e.g. Facebook, Twitter) is another key strategy to disseminate accurate information and dispel some of misinformation that is spread by the anti-vaccine movement (Betsch et al., 2012; Keelan et al., 2010).

Conclusions

Accumulating evidence suggests that many of the social/behavioral concerns associated with HPV vaccine that have sparked resistance among patients and providers (and have been the focus of media reports) have little or no basis in reality. Several studies have been published indicating that risk compensation after HPV vaccination is not a significant issue. Similarly, an increasing number of studies show that HPV vaccine is quite safe, with little or no evidence of severe adverse effects. While safety must continue to be closely monitored, the findings to date should be reassuring to providers, parents, young adults, and adolescents. Although it is certainly true that parents have the right to refuse vaccination, the "safety" of non-vaccination can be questioned and the risks of non-vaccination can honestly be discussed. Although Pap testing has reduced the incidence of cervical cancer, particularly in industrialized nations, it is an imperfect approach to prevention with only moderate sensitivity, and cervical cancer rates remain unacceptably high. Furthermore, Pap testing cannot prevent genital warts and anal cancers. HPV vaccine can no longer be considered a "new" vaccine, as one of the vaccines has been licensed in the U.S./Canada for over six years and was carefully evaluated via extensive clinical trials for many years pre-licensure.

The major challenge, then, is how to most effectively communicate this information to parents, young adults, adolescents, and HCPs so that higher HPV vaccination rates can be achieved. In the absence of major HPV vaccination health policy initiatives, such as those implemented in Canada, the U.K., and Australia, a multi-level, multi-faceted approach will be required. HCP recommendation is among the most important determinants of HPV vaccination. It is essential, therefore, to focus on the education of HCPs regarding indications for HPV vaccination and approaches to communicating most effectively with parents and patients about the safety and benefits of vaccination and the risks associated with non-vaccination. Such educational interventions should be based on established theoretical principles, such as social cognitive theory or diffusion theory (Bandura, 2001; Rogers, 2004), and should be empirically evaluated.

Conflicts of interest

Two of the authors (GDZ and NWS) are investigators on investigator-initiated grants funded by Merck and Co. GDZ is a recipient of an unrestricted program development grant from GlaxoSmithKline. WAF has received speaker fees, educational, and unrestricted research grants from Merck Canada. ZR has received a fee for consulting with Merck on behavioural science issues. Author SP has no conflicts of interest to report.

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