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Cervical Cancer Prevention Through Human Papillomavirus Vaccination:

Using the "Teachable Moment" for Educational Interventions

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Abstract

Cervical cancer represents a global women's health issue. The emergence of vaccines against the most common types of human papillomaviruses causing cervical cancer represents a significant advance in cervical cancer prevention. Adolescent girls are the primary target population for vaccination—a population that traditionally has been difficult to reach. Obstetricians and gynecologists may hold the key to improving adolescent human papillomavirus vaccinations through the novel use of their existing relationships with adolescents' mothers during the routine cervical cancer screening visit. We propose using maternal cancer screenings, specifically breast and cervical cancer screening episodes, as "teachable moments," naturally occurring life or health events thought to motivate a person to adopt risk-reducing health behaviors spontaneously, to improve human papillomavirus vaccination rates among adolescents.

HUMAN PAPILLOMAVIRUS: AN EQUAL-OPPORTUNITY INFECTION?

Although human papillomavirus (HPV) infects men and women alike, the burden of HPV-related cancers is borne primarily by women. In particular, cervical cancer is the second most common malignancy in women worldwide and, despite advances in diagnosis and treatment, remains a leading cause of female cancer-related death. In the United States, 11,270 incident cervical cancer cases and 4,070 associated deaths are estimated to have occurred in 2008.[1] In addition, more than 1 million low- and high-grade squamous intraepithelial lesions of the cervix are detected each year, leading to multiple follow-up visits and invasive procedures to monitor and treat these precancerous cervical changes. Insinga et al estimate that the annual economic cost for the prevention and treatment of anogenital warts and cervical HPV-related disease to be at least $4 billion in 2004 U.S. dollars in direct medical costs alone.2 The cost of evaluating an abnormal Pap test result are an estimated $1,586 per patient in 2008 U.S. dollars, including the cost of physician visits, laboratory tests, colposcopies, and treatment of cervical neoplasia. 3 Assuming these costs of management is not acceptable when HPV vaccination is cost-effective in the United States compared with cervical cancer screening by Pap test.

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A MULTI-FACETED APPROACH TO REDUCING CERVICAL CANCER MORTALITY IS NEEDED

The bulk of resources devoted to cancer research is expended on either basic science efforts to better understand why cancer occurs or on the development of effective treatments for a specific neoplasm once it arises. Indeed, when considering the cancer research enterprise (often referred to as the "War Against Cancer"), attention too often is focused on the most recent basic science breakthrough regarding tumor genesis or the latest "cure" for cancer. Prevention and early detection of premalignant states and case finding of more readily treatable cancerous lesions represent critical aspects of a comprehensive strategy to battle cervical cancer effectively. With cervical cancer, effective screening for precancerous lesions currently exists, limited only by adherence to preventive guidelines and suboptimal accuracy of existing screening tests. Moreover, even for those willing to participate in screening, there is a wide variance in acceptance rates among proven screening tests, with cervical cancer screening rates in American women lagging compared with breast cancer screening.[4]

Primary prevention of cancer, clearly the most desirable option from a societal perspective, likely can be achieved for many common cancers with lifestyle choices such as smoking cessation and improved diet. As with other lifestyle choices, safer sex practices to reduce HPV infection and subsequent cervical cancer (eg, consistent condom use, fewer lifetime sex partners, and later age at sexual debut) can be difficult to implement and maintain. Scientific investment in cancer chemoprevention as an important adjunct to behavioral change recently has yielded HPV vaccines. These newly approved vaccines represent a major advance in our armamentarium for the reduction of cervical cancer.

The Centers for Disease Control and Prevention (CDC) has recommended universal administration of the quadrivalent HPV vaccine (Gardasil, Merck, Whitehouse Station, NJ) to girls 11 to 12 years old, with a comprehensive "catch up" strategy suggested for 13- to 26-year-old girls and women and vaccination allowable as young as age 9. On October 16, 2009, the U.S. Food and Drug Administration approved a second, bivalent HPV vaccine (Cervarix, GlaxoSmithKline, London, United Kingdom) for use in girls and women ages 10 through 25 to prevent cervical cancer. Within 1 week of U.S. Food and Drug Administration approval, the CDC's Advisory Committee on Immunization Practices recommended Cervarix for routine administration in girls ages 11 and 12 as well as in girls and women ages 13 through 25 who have not been vaccinated. In addition, the Advisory Committee on Immunization Practices issued a permissive recommendation for the use of the quadrivalent HPV vaccine (Gardasil) for boys and men ages 9 through 26, which should serve to further interrupt the chain of HPV transmission to girls and women.

Introduction of new vaccines specifically targeting adolescents presents unique challenges for immunization delivery. People make fewer visits to physicians' offices in their adolescent years than at any other time in their lives and are nonadherent to at least one recommended vaccine.[5] The Healthy People 2010 report advocates coverage levels of 90% for any new universally recommended vaccine within 5 years of the recommendation, yet recent analysis of national adolescent-vaccination rates indicate that none of the recommended adolescent vaccines has reached this level of coverage.[6] To achieve such high rates of coverage in adolescents will require novel strategies for improving vaccine uptake. In evaluating national patterns of adolescent health care visits, Rand et al conclude that vaccine provision to older adolescent girls requires the involvement of obstetrician– gynecologists in vaccine delivery,[7] a position supported by the American College of Obstetricians and Gynecologists. This novel involvement of gynecologists leverages the potential existing relationship they have through provision of cervical cancer screening services to the adolescent and her mother. In fact, using

maternal cancer-control behaviors as a teachable moment may represent one mechanism that may improve vaccine use among adolescents.

GYNECOLOGISTS MAY HOLD THE KEY TO IMPROVING ADOLESCENT HUMAN PAPILLOMAVIRUS VACCINATIONS

For an adolescent to receive preventive health care, eg, HPV vaccination, a parent schedules the appointment, accompanies the adolescent to the visit, gives consent, and ensures compliance with follow-up care. The 2003 Kaiser Women's Health Survey showed that more than 80% of mothers were responsible for coordinating health care for their children.[8] Dempsey et al evaluated parental acceptance of HPV vaccination by addressing mailed surveys to the "parent or primary caretaker." An overwhelming number of respondents were women, underscoring the importance of targeted maternal education.[9]

Central to the delivery of quality health care as defined by the IOM is integration and coordination of health services. This renewed focus on quality care has led to the "medical home" movement, defined as an approach to providing care that facilitates partnerships between individual patients, their personal physicians, and, when appropriate, the patient's family.[10] Within this context, the use of maternal cancer-screening visits to improve adolescent HPV vaccinations provides gynecologists a unique opportunity to expand their role as care providers.

Existing care relationships with the mother of an adolescent girl give obstetricians and gynecologists unique access and professional standing to deliver education regarding cervical cancer prevention through HPV vaccination. Education can be passive, through brochures, videos, or kiosks in the office setting. More effective is active education within the gynecologic visit itself.

THE TEACHABLE MOMENT

Behavior intervention effects can be enhanced through the intervention setting itself. A "teachable moment " refers to naturally occurring life or health events thought to motivate one to adopt risk-reducing health behaviors spontaneously.[11] A systematic review of the literature by McBride on teachable moments and smoking cessation showed a variety of health events as potential teachable moments, including office visits related to reproductive health and pediatric well care.[11] Notification of abnormal test results may represent an ideal teachable moment, providing a context for personalized discussion of risks. These teachable moments demonstrate increased effectiveness of even a self-administered, low-intensity intervention if administered during the teachable moment.

A paucity of data exists on the use of teachable moments in influencing cancer-preventive or vaccination behavior. Dempsey et al demonstrate that parents with a history of genital warts or HPV infection were more willing to vaccinate their adolescents,[12] suggesting that these may represent teachable moments. Using parental cancer screening visits to improve their child's cancer-preventive care represents a small but important extension of the teachable moment model. We posit (a hypothesis to be tested empirically) that coupling maternally directed educational interventions with a teachable moment potentially increases the effectiveness of the education and may result in improved HPV vaccination rates in daughters of women who adhere to cancer-screening behaviors.

MATERNAL CANCER CONTROL BEHAVIORS AS TEACHABLE MOMENTS FOR ADOLESCENT HPV VACCINATION: READY FOR PRIME TIME?

Despite Merck's launch of a national print, television, and online advertising campaign for Gardasil in the United States in November 2006, and the desire to be "One Less" not withstanding, public vaccination rates have been disappointing. The National Immunization Survey only recently added a component measuring vaccination practices in adolescents, with inclusion of questions on HPV vaccine use in the 2008 survey. The National Immunization Survey recently added a component measuring vaccination practices in adolescents (NIS-Teen), with inclusion of questions on HPV vaccine use, as has the National Survey of Family Growth. Early data available from NIS-Teen indicate that 25.1% of eligible girls 13–17 years old initiated vaccination, with 5.9% completing vaccination. [9] One may argue that women who adhere to recommended cancer-screening behaviors for themselves are more likely to adhere to health recommendations for their children; thus, targeting women during their breast or cervical cancer screening encounter may not be the best use of resources because they may be more likely to have their daughters vaccinated independent of any educational intervention. However, analysis of the CDC Behavioral Risk Factors Screening Surveillance Survey from 2006 suggests that only 13% of women who adhere to breast and cervical cancer screening also have had their adolescent children vaccinated against influenza in the past 12 months, with the lack of knowledge of influenza-vaccine recommendations cited as the overwhelming reason for nonvaccination (Carlos RC, unpublished data). This indirectly suggests that even those women who know about their own preventive care requirements may not be familiar with recommendations for their children, including recommendations for HPV vaccination.

Cost concerns have been cited a potential reason for declining vaccination. Since its introduction, the HPV vaccine has been included for coverage under the federal Medicaid program and most State Children's Health Insurance Programs. As with other vaccines, the majority of commercial insurers followed the action of these federal programs and also began providing coverage for the vaccine. Thus, barriers related to cost of the vaccine have been reduced significantly. Some privately insured families undoubtedly struggle with high copayments or deductibles. Uninsured women over the age of 18 have limited options for procuring the vaccine (eg, through Merck's Vaccine Patient Assistance Program or at reduced cost through public health departments). Nevertheless, the overall burden of cost for HPV vaccination has diminished over time.

Central to the acceptance of HPV vaccination for their daughters is the perceived severity of cervical cancer, their HPV risk, and their sexual activity. Analysis of waves I and III of the National Longitudinal Study of Adolescent Health shows that the sexual-activity status of adolescent girls (whether sexually active or virginal) was not associated with future risk of detecting high-risk subtypes of HPV currently covered by Gardasil (Merck) in these same individuals when they were sexually active young adults.[11] Given the high prevalence of HPV infection in the population, risk-factor–based HPV vaccination strategies are unlikely to cover the adolescent female population at risk for HPV infection adequately. A more general approach to disseminating HPV-infection risk and vaccination information may be accomplished effectively through the maternal teachable moment, particularly when delivered in the context of the gynecologic visit.

POTENTIAL IMPLEMENTATION OF THE MATERNAL TEACHABLE MOMENT

Implementing the maternal teachable moment may vary to fit the resources of local practice, with varying degrees of potential effectiveness. Low-intensity implementation may be limited to playing an educational video on HPV and HPV vaccinations in the waiting rooms of gynecology offices, having brochures available where patients can help themselves, or having

interactive kiosks where patients can browse electronically through information. A small increase in intensity would be to have the gynecologist or nurse practitioner hand the brochures to the patient at the end of a visit with a recommendation to vaccinate her daughter against HPV or to discuss the issue with her daughter's care provider, whether a pediatrician, family practitioner, or gynecologist. A marked increase in intensity would involve a shared decision-making encounter with the mother to discuss the perceived benefits and barriers to vaccinating her adolescent daughter and having her arrive at an informed decision (either to vaccinate or not to vaccinate). A still greater increase in intensity and resource use would be to have the gynecology practice prepared to administer the HPV vaccine to adolescent daughters of mothers who receive care within the practice; however, there may be cost constraints that limit the ability of individual practices, whether gynecology or pediatric practices, to stock the vaccine. The individual practitioner can decide what level of intensity is appropriate to implement maternal educational interventions using the teachable moment.

MINIMAL EFFECT OF NEW BREAST AND CERVICAL CANCER SCREENING RECOMMENDATIONS ON THE MATERNAL TEACHABLE MOMENT

Because the age range for adolescent HPV vaccination is broad, increasing the interval between screenings for cervical and breast cancer screening as recommended by the new the American College of Obstetricians and Gynecologists guidelines and the U.S. Preventive Health Task Force are unlikely to have a significant effect in reducing maternal teachable moment encounters. The U.S. Preventive Health Task Force recommendations on increasing age at initial screening mammography will allow it to be used as a teachable moment for older adolescents. Further, if the trend toward having children at later maternal ages continues, particularly in higher socioeconomic strata, the U.S. Preventive Health Task Force recommendations may have minimal effect on reducing maternal teachable moment encounters through breast cancer screening.

INNOVATIVE OPPORTUNITIES FOR CHANGE

Now that the HPV vaccine has entered the public domain, it is imperative to develop interventions to increase the use of this vaccine in adolescents. Thus far, there have been no studies that describe and test interventions to this effect. A maternal teachable moment may be an effective mechanism for improving adolescent HPV vaccination rates. Primary prevention of cervical and other HPV-associated cancers via vaccination is an important breakthrough in women's health. Over the long term, widespread vaccination against HPV will mean fewer cases of cervical cancer. In the short term, it will mean fewer cases of genital warts and less need for procedures used to diagnose and treat precancerous changes in the cervix; however, the success of HPV vaccination will depend largely on acceptance of the vaccine by those at risk of infection and on its clinical consequences. Implementing programs to reach adolescents is challenging because of relatively limited preventive health care encounters in this age group. The recent public availability of HPV vaccines now affords the opportunity to study HPV vaccination uptake and the factors that influence it in a "real-world" setting and to identify mechanisms to circumvent barriers.

The use of maternal cancer-screening encounters will expand and advance our understanding of specific maternal barriers in the early phase of HPV-vaccine availability. Information gained may help reduce missed opportunities for vaccination, improve vaccine delivery, and contribute to the primary prevention of cervical and other HPV-associated cancers. This will leverage well-accepted and widely advocated maternal cancer-screening behaviors into a novel education-outreach encounter that could have broader applicability to other adolescent cancer preventive behaviors, with obstetricians and gynecologists potentially leading the way.

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