

Vaccination for Human Papillomavirus, Part 2: Public Health Aspects

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In part 1 of this series, I addressed the need for and immunogenicity of human papillomavirus (HPV) vaccines. Although efficacy has been confirmed¹ and long-term protective antibodies² have been established with some HPV vaccines, there are a few issues. What are the goals of vaccination? Who should receive the vaccines and when?

Public health decisions, such as who receives a vaccine, are complex and controversial. Factors such as cost of vaccination, cost of illness, burden of disease, and immunogenicity are contributory.

The recently approved HPV vaccine (HPV quadrivalent [types 6, 11, 16, and 18] recombinant vaccine) has demonstrated immunogenicity in females aged 9 to 26 years.³ The Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention recommended routine (not mandatory) vaccination for girls aged 11 to 12 years, with catch-up vaccination for females aged 13 to 26 years.⁴ Monovalent HPV subtype vaccination in females with active HPV-induced cervical neoplastic disease generally is not sufficient to induce neoplastic clearance.⁵ While vaccination in active infection in the absence of neoplasia may aid in reducing active neoplasia,⁶ there are a variety of reasons for reduced efficacy of vaccination after disease acquisition, which include the fact that many HPV-induced cervical diseases have multiple HPV subtypes,⁷ and once abnormal HPV DNA is intercalated into the human host, DNA oncogenesis may not be preventable. Thus, vaccination is ideally intended for females prior to engaging in sexual activity. The vaccine is delivered in 3 doses at 0, 2, and 6 months. It targets HPV types (HPV-6, HPV-11, HPV-16, and HPV-18) causing 70% of cervical cancers and 90% of genital warts.⁴

The result seems ideal—preventing cervical cancer and consequent mortality and preventing genital warts and consequent morbidity in women. In addition, vertical HPV disease transmission to newborns causes early childhood condyloma and juvenile-onset recurrent respiratory papillomatosis, which may cost up to \$123 million to treat each year in the United States.⁸ Vaccination at \$120 per dose appears to be a bargain when you factor in the cost of treatment.

With all of the benefits of HPV vaccination, one major problem exists—many parents do not wish to give their children this vaccine. Many parents are suspicious of vaccination and its effect on their children. Even further, many parents cannot mentally address their daughter's sexuality when she is a preteen. Unfortunately, it seems that parental education through information sheets is not nearly as influential as "attitudes and life experience" on acceptance of this vaccine.⁹ On the other hand, the first rotavirus vaccine was withdrawn from the market in 1999 due to an association with intussusception. This vaccine was replaced last year with a safer vaccine.¹⁰ Thus, it is hard to say that parents who worry about long-term safety have fears completely without basis.

Another issue in the United States is the problem of herd immunity. Many vaccines work in the populous, even when they are not universally used, because the reservoirs of disease shrink when most individuals have been vaccinated. In countries such as Australia, HPV vaccination programs include young men.¹¹ In the United States, we have focused on girls and young women to help them prevent acquisition of HPV. One could anticipate there being a number of problems because we are not immunizing boys and young men. The spread of genital HPV in homosexual men will not be quelled. In addition, many young girls are sexually active with older boys, and lack of reduction in HPV disease acquisition will only address girls who have not had any sexual activity before 12 years of age.

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For now, the American Academy of Pediatrics and the US Food and Drug Administration seem to be aiming HPV vaccination at females, but hopefully vaccination will expand with time. As more data become available, it may be found that vaccination of 6 and 7 year olds can last a lifetime, in which case it will be easier to capture the entire pediatric population before they engage in sexual activity.

There are a variety of public health strategies that are being used in the United States to promote universal preteen female HPV vaccination, including some states making such vaccination mandatory (eg, Texas, Virginia).¹² As physicians, we also can promote similar legislation through letter writing to our state representatives. To promote HPV vaccination, we also can be proactive with our female teenaged patients. Inquiring if teenaged patients with acne have had HPV vaccination and promoting vaccination will help parents make the decision to vaccinate their teenaged girls. This social intervention will help for a lifetime of genital health.

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