



The HPV vaccine: A major public health breakthrough

from CSAC, the Clinical and Scientific Affairs Council of the AAPA

Who should read this? Any physician assistant who provides care to females 9 to 26 years old.

What's new? In early June 2006, the FDA licensed Merck's quadrivalent human papillomavirus (HPV) recombinant vaccine (Gardasil) for females aged 9 to 26 years old. This is the first vaccine that protects against four of the approximately 120 types of HPV infection: types 6, 11, 16, and 18. In the same month, the Advisory Committee on Immunization Practices (ACIP) recommended that the vaccine be given routinely to girls 11 to 12 years old and also approved its use for females 13 to 26 years old. The minimum age for vaccine administration is 9 years.

What is HPV? Papillomaviruses are double-stranded DNA viruses that belong to the Papillomaviridae family and infect only humans. There are more than 100 types, which are subdivided into categories based on their ability to infect cutaneous or mucosal epithelium. Cutaneous HPV types are found in plantar warts, common warts, flat warts, and butcher's warts. HPV types that have a predilection for mucous membranes primarily infect the anogenital region. They cause genital warts (condyloma acuminata) and intraepithelial neoplasia and/or carcinoma of the vulva, cervix, anus, or penis.

HPV types 16 and 18 are considered high risk because they are associated with approximately 50% and 20% of cervical cancers, respectively.^{1,2} HPV types 6 and 11 are low risk and cause 12% of low-grade cervical lesions and 80% of genital warts.^{3,4} Eight other intermediate risk types are not covered by the vaccine.

Why is this important? HPV is one of the most common sexually transmitted infections (STIs). In the United

Take-home points

- A quadrivalent vaccine against four types of HPV that cause genital warts and cervical cancer is now available for females aged 9 to 26 years and is part of ACIP's recommended routine vaccinations.
- This new vaccine is a major public health breakthrough that promises to dramatically reduce the incidence of cervical cancer in women who receive the completed series.
- The vaccine is effective only in preventing HPV type-specific infection, not in clearing infection.
- PAs should anticipate that parents of young female patients who are eligible for the vaccine will need education and advice on its benefits.

States, the estimated prevalence of anogenital infections is 20 million, with an annual incidence of 5.5 million.⁵ Among sexually active adults, 75% to 80% will acquire a genital tract HPV infection before age 50 years;⁵ 75% to 90% of these infections will clear within a year of initial infection.² Those with persistent infection are at the highest risk for the development of cervical intraepithelial neoplasia or invasive cervical cancer.⁶

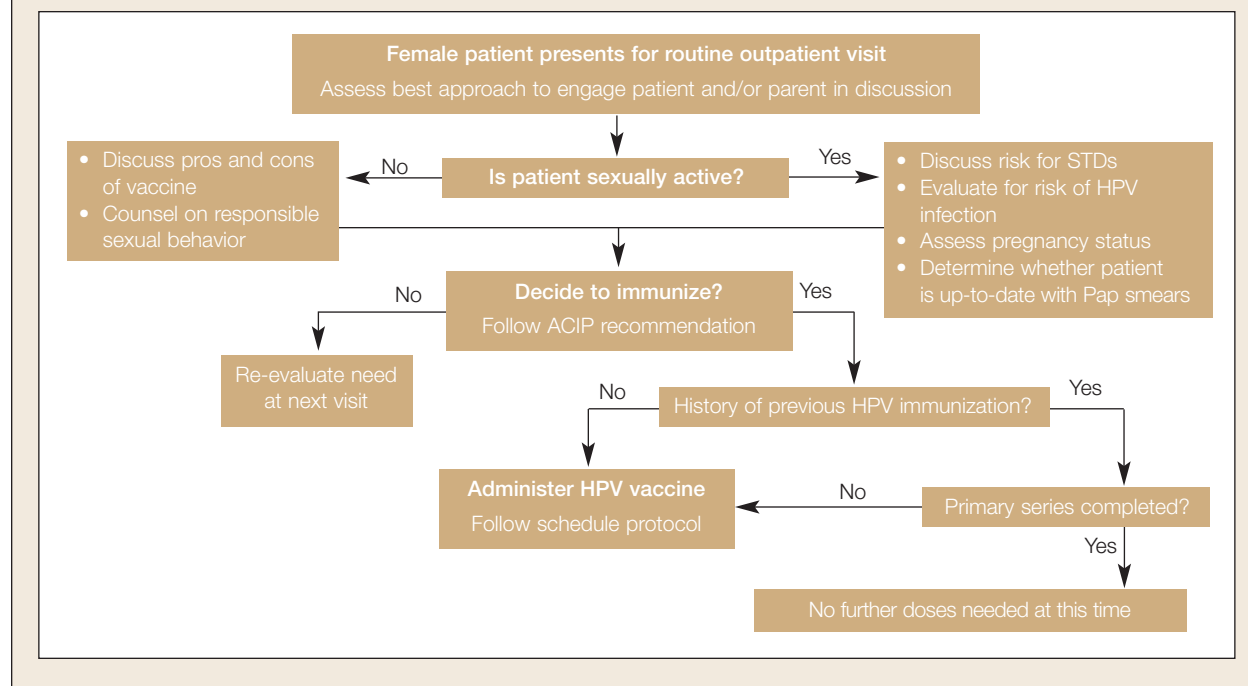
This vaccine has been shown to be nearly 100% effective in preventing 70% of all cervical cancers and 90% of genital warts. The vaccine is given as a three-dose series, with the second and third doses administered 2 and 6 months after the first. The vaccine is effective only when given before infection with HPV has occurred. Females who already have been infected with one or more HPV types will be protected only from the HPV types they have not acquired. An additional benefit of the vaccine is the reduction in the number of abnormal Pap tests in women who have been vaccinated.

Because of the method utilized to prepare the vaccine, it has no known oncogenic or disease-causing potential.⁷ Mild injection site reactions have been reported in clinical trials,^{8,9} but no serious adverse events have been recorded.¹⁰ The FDA has designated this vaccine as pregnancy category B, however, and vaccination is not recommended during pregnancy. *Continued on page 18*

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ALGORITHM

Administering the HPV vaccine



The cost of the vaccine is \$120 per dose (\$360 for the series). Because the ACIP has just recommended its use and it has been added to the Vaccine for Children Program, some private insurance companies may cover the vaccine while others may not.

Where is this most important? In the United States, there are 9,700 new cases of and 3,700 deaths from invasive cervical cancer annually.¹¹ The incidence and mortality of cervical cancer have decreased 75% over the past 50 years.¹¹ However, rates are considerably higher in Hispanic and African-American women and in southern states like Arkansas and Mississippi.¹²

What else should I know? The vaccine is most effective if administered before the initiation of sexual activity. Recommendations for Pap screening remain unchanged. Although the vaccine should be offered to all women who have not yet received it, those who are sexually active should be counseled that the vaccine may be less effective in those with prior HPV exposure (see the algorithm). HPV immunization is not effective in clearing cytologically evident disease or infection.

Some parents may worry that receiving the vaccine may encourage a young girl to engage in sexual activity or make her believe that barrier protection is less necessary. It must be stressed that the vaccine only prevents HPV infection and has no protective effect against other STIs.

The duration of protection is unknown, but the vaccine was studied for more than 5 years and it provided protection throughout this period. Duration of protection must be clarified to determine whether booster vaccines will be needed. Ongoing clinical research is studying the effective duration of this vaccine. □

REFERENCES

- Munoz N, Bosch FX, Castellsague X, et al. Against which human papillomavirus types shall we vaccinate and screen? The international perspective. *Int J Cancer*. 2004; 111(2):278-285.
- Cox JT. The development of cervical cancer and its precursors: what is the role of human papillomavirus infection? *Curr Opin Obstet Gynecol*. 2006;18(suppl 1):s5-s13.
- Clifford GM, Gallus S, Herrero R, et al. Worldwide distribution of human papillomavirus types in cytologically normal women in the International Agency for Research on Cancer HPV prevalence surveys: a pooled analysis. *Lancet*. 2005;366:991-998.
- Greer CE, Wheeler CM, Ladner MB, et al. Human papillomavirus (HPV) type distribution and serological response to HPV type 6 virus-like particles in patients with genital warts. *J Clin Microbiol*. 1995;33(8):2058-2063.
- Centers for Disease Control and Prevention; Workowski KA, Berman SM. Sexually transmitted diseases treatment guidelines, 2006. *MMWR Recomm Rep*. 2006;55 (RR-11):1-94.
- Wright TC Jr, Schiffman M. Adding a test for human papillomavirus DNA to cervical-cancer screening [comment]. *N Engl J Med*. 2003;348(6):489-490.
- Frazer IH, Cox JT, Mayeaux EJ Jr, et al. Advances in prevention of cervical cancer and other human papillomavirus-related diseases. *Pediatr Infect Dis J*. 2006;25(2 suppl): S65-S81.
- Ozsaran AA, Ates T, Dikmen Y, et al. Evaluation of the risk of cervical intraepithelial neoplasia and human papilloma virus infection in renal transplant patients receiving immunosuppressive therapy. *Eur J Gynaecol Oncol*. 1999;20(2):127-130.
- Koutsky LA, Ault KA, Wheeler CM, et al. A controlled trial of a human papillomavirus type 16 vaccine. *N Engl J Med*. 2002;347(21):1645-1651.
- Harper DM, Franco EL, Wheeler C, et al. Efficacy of a bivalent L1 virus-like particle vaccine in prevention of infection with human papillomavirus types 16 and 18 in young women: a randomized controlled trial. *Lancet*. 2004;364:1757-1765.
- Jemal A, Siegel R, Ward E, et al. Cancer statistics, 2006. *CA Cancer J Clin*. 2006; 56(2):106-130.
- Dept of Health and Human Services; Centers for Disease Control and Prevention. National Program of Cancer Registries. United States cancer statistics: 2002 incidence and mortality. Available at: www.cdc.gov/cancer/npcr/uscs/. Accessed February 14, 2007.