Human Papillomavirus Vaccination

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ABSTRACT: Human papillomavirus (HPV) is the most common sexually transmitted infection in the US and also the cause of many cancers. Vaccines against HPV were introduced in 2006 for females and in 2009 for males. Data so far have shown these vaccines to be safe and effective, although long term effectiveness and side effects are yet unknown. The American College of Pediatricians recommends offering but not mandating the vaccines.

Human Papillomavirus (HPV) is the most common sexually transmitted infection in the United States. The seroprevalence for any type of HPV in a 2009 study was 32.5% for females and 12.2% for males. Persistent HPV is estimated to cause about 5% of cancers worldwide. It contributes to invasive cancers of the cervix, vulva, vagina, penis, anus and nasopharyngeal areas. HPV is the cause of the vast majority of cervical cancers with an incidence of 20,000 invasive cases and over 4,000 deaths per year in the United States. Head and neck cancers have now become the sixth most common cancer worldwide and recent research has found HPV associated with 20-25% of cases, mostly oropharyngeal. There are at least 50 types of HPV, with types 16 and 18 responsible for most cervical cancers, and types 6 and 11 the most common cause of genital warts.

The first vaccine against HPV, Gardasil, was introduced in 2006 for females (2009 for males) ages 9 to 26. It protects against strains 6, 11, 16 and 18. Also in 2009 another HPV vaccine, Cervarix, was introduced for females age 10 to 25 against strains 16 and 18. Now over 33 million doses of HPV have been given and 25% of females ages 13 -17 have received at least one dose.

According to over 18,000 VAERS reports (Vaccine Adverse Event Reporting System) there were no common patterns of serious side effects. There were reports of Guillain-Barre Syndrome but not more than the non vaccine expected rate of 1-2/100,000 in this age group. Reports of thrombosis were also not more than expected in this age group which often has other risk factors such as oral contraceptive use and smoking. The most common side effects were headache, redness and swelling at the injection site, fever and myalgias. The most concerning side effect is syncope and/or occasional tonic-clonic movements after administration with the subsequent risk of falls and head injury. Current recommendations are to keep the patient sitting or lying down for 15 minutes after administration. Agorastos et al give a thorough review of multiple international reports and concludes that both types of HPV vaccines are safe and effective. Continued monitoring for long term problems is necessary.

The duration of effectiveness is not known. Studies in 2007 showed a decline in anti-HPV antibody levels after vaccination with a plateau from 24-60 months. Subjects given an intramuscular challenge at 60 months had an amnestic response with higher antibody levels one month after challenge than those observed one month after the third dose of HPV vaccine. In another study of over 5000 women the short term efficacy was 100% for vaccine types in those who were HPV negative through administration of the third dose and all HPV was reduced by 34% in a group not pre-screened for HPV infection but given vaccine in an attempt at treatment if already positive.

A study of the efficacy of the vaccine for over 4000 males showed 36 cases of external genital lesions in the treated group versus 89 in the placebo group (60.2% efficacy). In a group that was screened for HPV negativity prior to immunization the efficacy rose to 90.4%.

Many concerns remain regarding the vaccine. More research is necessary to find a vaccine that covers more types of HPV, is more thermostable (for international use where it is even more urgently needed) and has fewer side effects. Further studies are in progress to find a more cost effective and preferably non-injectable vaccine. Long term research is needed regarding the possibility of overgrowth or
replacement of the vaccine types by other non-vaccine types and the possibilities of crossover protection for other HPV types not included in the vaccine.

Over the next 20 or more years long term side effects and effectiveness will have to be carefully monitored. Although no adverse effects have been found so far in those inadvertently immunized during pregnancy, this needs continued monitoring and the vaccine is not recommended during pregnancy. Other unanswered questions include the effect of the vaccine when given at the same time as other vaccines and the interchangeability of the two current vaccines.13

Until further research is completed, HPV vaccine recipients should be fully informed as to the current limits of knowledge regarding the vaccine’s duration of protection. Waning protection is an issue with almost every vaccine. In the 1980’s it became clear that a single mumps-measles-rubella (MMR) vaccine was insufficient to offer complete protection against measles. When approved in 1995 a single dose of chickenpox vaccine was recommended; now we know a booster is needed. In 2011 a second dose of meningococcal vaccine was found necessary and recommended. It may be years before we know with certainty the duration of protection afforded by HPV vaccines. Delaying the administration of the vaccine until at least six months before the recipient is sexually active and, therefore, at risk of HPV exposure should be considered. Patients and families should be made aware that the vaccine is not fully effective until all three doses are given. They should also be reminded that 30% of cervical cancers are caused by HPV strains not included in the current HPV vaccines and regular gynecologic exams and pap tests are still necessary. Also 10% of genital warts will not be prevented.14 Unfortunately, some adolescents, after receiving the HPV vaccination, have the false sense of being protected against other sexually transmitted infections and therefore perceive less of a need to reduce the risk of infection through condom use and limiting the number of sexual partners.15 Parents and patients should understand that this vaccine offers no protection against other forms of sexually transmitted infections.

Not all adolescents will be sexually active. Some families present expectations, and provide support and monitoring, to guide their adolescent to delay sexual activity until adulthood and marriage and those values should be respected. Since the duration of protection offered by HPV vaccination is uncertain, these adolescents should be offered the option of deferring immunization until closer to the age of potential initiation of sexual activity. Adolescents known to be at risk of early sexual initiation should be immunized as early as possible because protection from the vaccine is much more effective if given before exposure to HPV. Patients and their families should be counseled, however, that HPV vaccination is not completely protective against cervical cancer. Special cellular characteristics of the developing adolescent cervix make it especially susceptible to infection with STIs. Parents and adolescents must understand that receiving this vaccine does not make any sexual activity “safe.” The most medically safe sexual conduct for adolescents is to delay sexual debut and they should be counseled accordingly. Whatever their views on sexual conduct, patients and families should be offered HPV vaccination if and when appropriate.

The American College of Pediatricians is opposed to any legislation that would require HPV vaccination for school attendance. Excluding children from school for refusal to be vaccinated against a disease spread only by sexual activity is a serious, precedent-setting action that trespasses on the right of parents to make medical decisions for their children as well as on the rights of the children to attend school. The administration of this vaccine is exclusively to prevent a disease that is sexually transmitted, and mandating it as early as 9 years of age places the medical provider in an ethical dilemma. Administering the vaccine requires explanation to both the parent and the child. Parents may have chosen not to introduce the subject of sexual activity to their nine year old due to the child’s physical and emotional immaturity. Most 9-12 year old children are not sexually active; many have not entered puberty. Forcing a parent to forsake his/her better judgment to prematurely discuss HPV with the
child would be inappropriate and unnecessarily intrusive.

The American College of Pediatricians recommends that parents use the availability of this vaccine to usher in a discussion of human sexuality in a way consistent with their culture and values at a time when they determine their child is ready to receive the information. Parents should closely monitor their children’s activities, reinforce their values, and consent to vaccination when appropriate. At that time, physicians should introduce the value of delaying sexual debut until marriage and fidelity within marriage as the only way to completely eliminate the risks associated with sexual activity.

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The American College of Pediatricians is a national medical association of licensed physicians and healthcare professionals who specialize in the care of infants, children, and adolescents. The mission of the College is to enable all children to reach their optimal, physical and emotional health and well-being.

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