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1/22/03 News Release

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COST-EFFECTIVENESS OF HPV VACCINE ESTABLISHED IN STANFORD STUDY

STANFORD, Calif. - Stanford University Medical Center researchers have found that it would be cost-effective to administer a vaccine to protect women against the virus that causes cervical cancer. Their projection, based on estimates of how effective and long-lasting a vaccine might be, was published in the January issue of *Emerging Infectious Disease.* The researchers found that even if a vaccine is only moderately effective, it could save 1,300 lives and prevent more than 3,300 cases of cervical cancer over the lifetime of an estimated 2 million study subjects.

In doing the analysis, Gillian Sanders, PhD, assistant professor of medicine, and her colleague Al Taira, a third-year medical student at Stanford, estimated that a potential vaccine would be 75 percent effective and assumed it would be used to vaccinate all girls at age 12. Under these conditions, the girls would live on average 2.8 days longer but many would in fact live much longer than that while others would not benefit from the vaccine. The vaccination program would cost $22,755 per quality-adjusted year of life.

"This is definitely seen as cost-effective compared to other things we pay for," Sanders said.
The researchers adjusted the life expectancy of the women to take into account the quality of those additional years. "Living five years with cancer is different from living five years while healthy," Sanders said. She estimated a somewhat lower quality of life for women being treated for precancerous conditions and an even lower quality of life for women with cancer.

The human papilloma virus has many different strains, some of which lead to genital warts but carry a low risk of cancer while others, such as HPV-16 and HPV-18, carry a much higher risk of cancer. The theoretical vaccine in this analysis was 75 percent effective against all high-risk forms of the virus and required booster shots every 10 years.

Sanders and Taira chose to target 12-year-old girls because 3 percent of girls are sexually active by age 13 and 18.6 percent are sexually active by age 15. The cancer-causing forms of the virus are spread sexually, so any vaccine would ideally be given before the girls are sexually active. Based on current attempts to vaccinate school-age children against hepatitis B, the researchers assumed that 70 percent of the girls would get the vaccine.

With these assumptions, Sanders and Taira followed the theoretical girls through two scenarios. In one scenario, a vaccine is available to all girls in the United States while the other assumes that the girls receive today's standard care, including a bi-yearly Pap smear to screen for signs of cervical cancer but no vaccine. The two scenarios assumed the same rates of sexual activity, the same levels of exposure to the HPV strains, and similar cancer treatment and progression once a Pap smear revealed precancerous cells.

From this, Sanders and Taira estimated that the vaccination program would cost $246 per person more than the current standard care, but that roughly 3,300 cases of cancer and 1,300 cancer deaths would be avoided during the girls' lifetimes. Currently, about 4,000 U.S. women die of cervical cancer per year.
In analyzing different scenarios, Sanders found that the vaccine would still be cost-effective even if it worked only 40 percent of the time or if it required boosters every three years rather than the 10-year booster the researchers predicted.

Sanders points out that an HPV vaccine may also protect women's sexual partners from HPV infection, which could prevent some cancers of the anus, penis and scrotum. Taking this into account, the vaccine may save more lives than this study predicts. What's more, Sanders said that an HPV vaccine now undergoing clinical trials appears to be better than 75 percent effective, further raising the potential cost-effectiveness.

"As clinical trials finish, we'll know more about the true effectiveness of the vaccine and we'll be able to use our analysis to refine our estimates," Sanders said.

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