Screening and HPV Vaccines Lead to Drop in Cervical Cancer

However, other malignancies caused by human papillomavirus, including anal and oral cancers, are on the rise.

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Screening and vaccination have led to a decline in cervical cancer, even as other cancers caused by human papillomavirus (HPV)—which do not have clear guidelines for routine screening—are increasing, according to research to be presented at the American Society of Clinical Oncology (ASCO) Annual Meeting in June.

“Without standardized screening, HPV-related cancers, such as oropharyngeal cancers and anal-rectal cancers, are increasing,” said Cheng-I Liao, MD, of Kaohsiung Veterans General Hospital in Taiwan, who previewed the study findings at a May 14 media briefing. “In order to reduce these trends and achieve success comparable to what we’re seeing with cervical cancer, we must develop effective screening strategies and determine vaccine efficacy in these patient populations.”

HPV is one of the most common sexually transmitted infections, and most people acquire some of the more than 150 known types of the virus soon after they become sexually active. HPV triggers abnormal cell growth that can lead to genital and anal warts, precancerous cell changes and, if left undetected and untreated, cancer of the cervix, anus, vulva, vagina, penis, mouth and throat (oropharyngeal cancer).

Deaths due to cervical cancer dropped dramatically after the introduction of routine Pap smear screening in the 1950s, which can detect abnormal cell changes before they progress to invasive cancer. Today, women are advised to receive a Pap smear (cytology test) every three years, with or without HPV testing. Screening is not routinely recommended for oral cancer or anal cancer, although some experts recommend anal screening for people at high risk, such as men who have sex with men (especially those living with HIV).

HPV vaccines can prevent these cancers, but only about half of adolescents are fully vaccinated, according to the Centers for Disease Control and Prevention (CDC). The Gardasil 9 vaccine, approved in December 2014, protects against the two main cancer-causing HPV types (16 and 18), five additional high-risk types (31, 33, 45, 52 and 58) and two other types that cause genital and anal warts (6 and 11). The original Gardasil vaccine, which protected against four types (6, 11, 16

and 18), was approved for young women in 2006 and for young men in 2011.

The vaccine is most effective when given to adolescents before they become sexually active. The CDC recommends Gardasil 9 for girls and boys and girls ages 11 or 12, with catch-up vaccination for those up to age 26. The Food and Drug Administration has approved the vaccine for women and men up to age 45; the CDC advises that people between 27 and 45 should discuss with their health care providers whether they might still benefit.

Trends in HPV-Related Cancers

Liao and colleagues looked at trends in HPV-related cancers in the United States, analyzing data for more than 657,000 individuals with such malignancies (60% women and 40% men) from the U.S. Cancer Statistics program between 2001 and 2017. Overall, the incidence of HPV-related cancers rose by 2.4% per year—0.8% among women and 2.7% among men—during this period.

Cervical cancer, however, declined by 1.0% annually. The decrease was even greater for women ages 20 to 24 (4.6% per year) compared with older women, who were adolescents before HPV vaccination was widely adopted. But oral, anal-rectal and vulvar cancers in women rose by 1.3% annually, mainly driven by anal cancer. Cervical cancer accounted for 52% of all HPV-related cancers among women during this period, but as anal cancer increases, it is expected to exceed cervical cancer in women of every age group over 50 by 2025.

“It is likely that the significant decrease in cervical cancer incidence results from clear guidelines for cervical cancer screening and may also reflect promotion and acceptance of vaccination, particularly in younger women,” Liao said.

Among men, HPV-related cancers rose by 2.4% per year, including a 2.7% rise in oral cancer and a 1.7% rise in anal cancer. The increase in oral cancer was greatest for men over 65. Oral cancer accounted for 81% of HPV-related cancers in men—a nearly fivefold higher incidence compared with women.

“The decrease in cervical cancer is welcome news and may reflect intensive efforts to screen and vaccinate patients at risk,” ASCO president Lori J. Pierce, MD, said in a press release. “Clearly, this study shows that we still have a great deal of work to do in order to reverse the increasing incidence rates of other HPV-related cancers.”

HPV Infection Rates

Another recent study showed that vaccination has dramatically reduced the prevalence of HPV infection among women, which is expected to decrease future cases of HPV-related cancer.

Hannah Rosenblum, MD, of the CDC’s Epidemic Intelligence Service, and colleagues analyzed nationally representative data from the National Health and Nutrition Examination Survey from 2003 through 2018.

The researchers found that the prevalence of the four HPV types covered by the original Gardasil

vaccine, which was mainly used until 2015, declined by 88% among teens ages 14 to 19, from 11.5% in the pre-vaccine era (2003 to 2006) to just 1.1% during the most recent period (2015 to 2018). Among young women ages 20 to 24, the prevalence declined by 88%, from 18.5% to 3.3%.

What's more, the findings suggest that vaccination is providing indirect "herd effects" for unvaccinated young women. Among sexually experienced women who had received at least one vaccine dose, the prevalence of the four HPV types fell by 97% in the 14 to 19 age group and by 86% in the 20 to 24 group. But even among unvaccinated women, rates declined by 87% and 65%, respectively.

The researchers also saw a 65% decline in the prevalence of the additional five HPV types covered by the Gardasil 9 vaccine among teens ages 14 to 19 but no significant change in the older group. The prevalence of other HPV types not covered by either vaccine also fell in the younger group but not in the older group. The authors suggested that this might be attributable to a decrease in sexual activity reported by the younger but not the older group.

"These data show increasing impact of HPV vaccination in the United States," the study authors wrote. "HPV vaccination is a critical prevention tool against HPV infection, anogenital warts and HPV-attributable precancers and cancers."

Click here to read the ASCO study abstract.

Click here to read the CDC study.
Click here to learn more about cervical, anal and oral cancer.
