



## ARMED FORCES HEALTH SURVEILLANCE BRANCH

503 Robert Grant Avenue ▪ Silver Spring, MD 20910 ▪ (301) 319-3240 (DSN: 285) ▪ [www.afhsc.mil](http://www.afhsc.mil)

### Study Finds Strong Immune Response to HPV Vaccine Among Female Service Members

A new study of female service members that examined their immune response to a vaccine to combat the sexually transmitted virus that causes cervical cancer showed development of antibodies in 80 to 99 percent of recipients against each of the four strains of the disease.

Results of the [study](#) that investigated the differences in immune response to each of the four strains (6, 11, 16 and 18) of the human papillomavirus, or HPV, among female service members who received one, two or three doses of the vaccine were published in the *Medical Surveillance Monthly Report (MSMR)*.

HPV is the most common sexually transmitted infection (STI) diagnosed in U.S. military service members. An estimated 304,021 incident cases of HPV infection (a rate of 175.5 per 10,000 person-years) were diagnosed during 2000 to 2012 among active component U.S. service members, according to the study released by the Armed Forces Health Surveillance Branch (AFHSB).

Although most HPV infections produce no symptoms and may clear within one to two years, persistent HPV infection with a few strains (especially 16 and 18) has been established as a necessary cause of all cervical cancers. HPV strains 6 and 11 are linked to genital warts.

The Department of Defense recommends male and female military service members, ages 17-26 years, receive an HPV vaccine series to generate a robust immune response to the HPV virus. The recommended vaccine series in the United States consists of three doses.

The results in the *MSMR* analysis confirm findings in other studies that the HPV vaccine can induce the development of antibodies to the virus after one dose in most women. That's important given the relatively low percentage of service members – and females in the U.S. civilian population – that completes the three-dose series. In other countries, the vaccine is given in two doses. An immunization advisory committee to the CDC recently met to learn more about the efficacy of the lower dose.

“These data provide useful and important information regarding both the epidemiology of HPV infection in active component service women and the high proportions of HPV vaccine recipients who develop antibodies to the four targeted HPV strains, even after fewer than the three recommended doses of the quadrivalent vaccine,” said Air Force Colonel Dana Dane, chief of the AFHSB's Epidemiology and Analysis section. “This analysis echoes similar findings in other dose-comparative studies of immunogenicity for HPV vaccination. The findings of this study will inform Department of Defense policy for the use of the HPV4 vaccine to reduce the burden of HPV-related infections and their sequelae.”

Among the 792 female service members in the study who had no antibodies to any of the four virus strains prior to receiving the HPV vaccine, virtually all (99.9 percent) developed detectable antibodies in the blood against those strains, a response known as seroconversion, regardless of the number of doses received.

Women who had antibodies to at least one of the four HPV strains prior to receiving the vaccine showed varying seroconversion responses.



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Service members who were antibody negative for the HPV 16 strain, and received just one dose had an 89.8 percent seroconversion ratio, increasing to 97 percent after two doses and 98.8 percent after three. Those with no antibody to the HPV 18 strain prior to vaccination had no statistically significant differences in seroconversion ratios by number of doses.

The study was a retrospective cohort analysis using data from the Defense Medical Surveillance System (DMSS), a database of medical encounters, immunization, demographic, and service records for U.S. military service members maintained by AFHSB. The pre- and post-immunization serum specimens (0.5 ml aliquots) for each subject were retrieved from the Department of Defense Serum, Repository of over 60 million serial blood serum specimens from service members and shipped to The Johns Hopkins University in Baltimore for serological testing for HPV antibodies.

A large percentage of service members in the study were diagnosed with an STI prior to receiving their first HPV vaccine dose (32.9 percent) or after their first HPV vaccine dose (24.5 percent). The percentage of those who had antibodies to at least one of the four HPV strains prior to immunization was higher among those with a diagnosis of an STI prior to receiving the initial HPV4 dose (70.9 percent), compared with those never diagnosed with an STI (55.2 percent) or those diagnosed with an STI after the first dose (62.5 percent).