

PREGLED LITERATURE – REVIEW ARTICLE

**Human Papilloma Virus Vaccination in the United States**  
Infekcija humanim papiloma virusom u Sjedinjenim Američkim državama

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**Summary** Human Papilloma Virus (HPV) is the most common sexually transmitted virus in the United States with the highest affected population being adolescents and young adults. Most HPV infections resolve spontaneously, but they are also known to cause genital warts as well as cervical, penile, and anal cancers. In the United States, HPV causes 7,000 male cancers and 15,000 female cancers annually. Due to this high prevalence, the American Academy of Pediatrics recommends vaccinating all males and females against HPV starting between the ages of 11 and 12, and as early as 9 years old. The current clinical indications, vaccine efficacy, and physician and patient compliance will be presented.

**Key words:** human papilloma virus, vaccine, prevention, compliance

**Sažetak** Humani papiloma virus (HPV) je najčešći seksualno prenosiva virusna infekcija u Sjedinjenim Američkim državama (SAD), u populaciji adolescenata i mladih ljudi. U mnogim slučajevima HPV infekcija se spontano povlači, ali moguće je da prouzrokuje genitalne bradavice, maligne alteracije na cerviksu, anusu i muškim polnim organima. U SAD, HPV je uzrok malignih bolesti kod 7000 osoba muškog pola i 15000 osoba ženskog pola godišnje. Zbog visoke prevalencije, Američka akademija za pedijatriju, preporučuje vakcinisanje svih osoba muškog i ženskog pola u uzrastu 11 i 12 godina, a najranije sa 9 godina starosti. U radu su prikazane novine u vezi sa kliničkim indikacijama, efikasnošću i prihvatanju primene vakcine od strane lekara i pacijenata.

**Ključne reči:** humani papiloma virus, vakcina, prevencija, saradnja

### What is it?

Human Papilloma Virus (HPV) is the most common sexually transmitted virus in the United States with the highest affected population being adolescents and young adults (1). Most HPV infections resolve spontaneously, but they are also known to cause genital warts as well as cervical, penile, and anal cancers. In the United States, HPV causes 7,000 male cancers and 15,000 female cancers annually (1). Due to this high prevalence, the American Academy of Pediatrics recommends vaccinating all males and females against HPV starting between the ages of 11 and 12, and as early as 9 years old (1).

The vaccine itself consists of bioengineered particles from the capsid proteins of HPV strains 6, 11, 16, and 18, the strains most strongly linked to HPV and cancer (1).

The United States first recommended its use in females in 2006 and expanded recommendations to males in 2011(3).

At this time, more than 60 countries recommend use of the HPV vaccine (5). Historically, the immunization was given in three separate doses, but recently revised guidelines reduce the series to two doses given 12 months apart starting before the age of 15 (2). For young adults starting the series later or for those who are immunocompromised, 3 doses is still the recommendation. In these patients, the second dose is given 1-2 months after the first dose and the third dose is given 6 months after the first (2). Vaccination achieves optimal immunity and the largest antibody response when given during early adolescence. Antibodies persist for at least 9 years in females and 5 years in males with further long-term studies underway (3).

### How effective is it?

Within 6 years of introducing the HPV vaccine in the United States, prevalence of confirmed infection in females has decreased in the 14-19 age group and the 20-24 age group by 64% and 34% respectively. Studies have also demonstrated a decrease in HPV vaccination in other countries such as Sweden, Germany, and Belgium. In Australia, women aged 18-24 had a decrease in infection by 86% after 3 doses and 76% after 1 or more doses (5). Prevalence of genital warts and precancerous cervical changes also decreased up to 92% in Australia after 4 years of vaccine implementation (5).

### How do we increase physician and patient compliance?

In 2014, only 40% of American adolescent girls and 22% of boys received all 3 recommended doses of the HPV vaccine (4). Researchers attribute these poor compliance rates to variable physician recommendations, inconsistent administration protocols, and inadequate patient education. Physicians report hesitancy addressing HPV with families due to parental skepticism of vaccine efficacy or necessity and avoidance of lengthening outpatient visits to discuss adolescents' sexual activity (4). Physicians are more likely to recommend immunization in older age groups despite evidence of increased immunity the earlier children are vaccinated (3). Compounding these difficulties are decreasing well child visits with increasing age thereby limiting chances to vaccinate. Since HPV vaccine approval in the United States, educational and awareness campaigns geared toward physicians and families include television commercials and office pamphlets (3). Physicians are encouraged to talk about the HPV vaccine with patients and parents early on and recommend administration

simultaneously with other adolescent immunizations to help increase patient acceptance.

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