

# HPV Prevalence in the Postvaccine Era

**Source:** Markowitz LE, Hariri S, Dunne EF, et al. Reduction in human papillomavirus (HPV) prevalence among young women following HPV vaccine introduction in the United States, National Health and Nutrition Examination Surveys, 2003-2010. *J Infect Dis.* 2013;208(3):385-393; doi:10.1093/infdis/jit192

Investigators from the Centers for Disease Control and Prevention (CDC) determined the prevalence of HPV infection among females aged 14 to 59 years during the pre-HPV vaccine era (2003-2006) and postvaccine era (2007-2010). These eras were delineated by the June 2006 recommendation for HPV vaccination, which was published in early 2007.<sup>1</sup> Data were collected as part of the National Health and Nutrition Examination Survey (NHANES), an ongoing national survey conducted by the CDC that includes a household interview and a physical examination. Demographic data, sexual history, and a self-collected cervicovaginal swab were obtained from all participants, and HPV vaccination history was obtained via self-report. Cervicovaginal swabs were analyzed for 37 HPV types, classified as vaccine types, high-risk (HR) vaccine types, and HR nonvaccine types (12 clinically relevant types). Investigators used logistic regression to determine prevalence ratios (PR) for the total participant population as well as for 6 age groups between 14 and 59 years. Adjusted prevalence ratios (aPR) among a subgroup of sexually active females aged 14 to 19 years were also calculated. Vaccine effectiveness among 14- to 19-year-old females who reported sexual activity was estimated.

There were 4,150 prevaccine era and 4,253 postvaccine era participants included in the analysis. In the postvaccine cohort, 34% reported receipt of  $\geq 1$  vaccine doses and 63% reported receipt of all 3 doses. There was no significant difference in HPV prevalence in the postvaccine era compared to the prevaccine era in all age groups except among those aged 14 to 19 years. In the 14 to 19 age group, the prevalence of any HPV type (PR 0.79; 95% CI, 0.66-0.95), vaccine types (PR 0.44; 95% CI, 0.31-0.62), and HR vaccine types (PR 0.50; 95% CI, 0.34-0.74) were all significantly lower in the postvaccine era. There were no differences in sexual activity, number of lifetime sex partners, or race/ethnicity between 14- to 19-year-old participants in the prevaccine and postvaccine cohorts.

Among the subset of sexually active 14- to 19-year-old participants, the prevalence of any HPV type (aPR 0.82; 95% CI, 0.69-0.98) and vaccine types (aPR 0.47; 95% CI, 0.33-0.67) was lower in the postvaccine cohort compared to the prevaccine cohort. Among those in this subset who received at least 1 vaccine dose, the adjusted prevalence of vaccine types was even lower (aPR 0.18; 95% CI, 0.07-0.47), resulting in an estimated vaccine effectiveness of 82%.

The authors conclude that after HPV vaccine recommendations, vaccine HPV types have decreased 56% among 14- to 19-year-old females despite low HPV vaccine uptake.

## PICO

**Question:** Among females aged 14 to 59 years, what is the prevalence of human papillomavirus (HPV) infection in the post-HPV vaccine era compared to the prevaccine era?

**Question type:** Descriptive

**Study design:** Cross-sectional survey

## Commentary by

**Robert W. Tolan, Jr, MD, FAAP,\*** The Children's Hospital at Saint Peter's University Hospital, New Brunswick, NJ and Drexel University College of Medicine, Philadelphia, PA

*Dr Tolan has disclosed no financial relationship relevant to this commentary. This commentary does not contain a discussion of an unapproved/investigative use of a commercial product/device.*

This study is one of the first published to measure the impact of HPV vaccination on HPV prevalence. While the results suggest a significant impact on HPV prevalence despite relatively poor vaccine uptake, several potential limitations are notable. First, the investigators relied on self-report of vaccine receipt (rather than verification by review of provider records), likely resulting in misclassification of vaccine status. Second, although NHANES data are designed to be broadly representative, vaccine uptake from state to state varies widely (29%-73%),<sup>2</sup> compromising the validity of the sampling in this study. Third, adolescents were no longer oversampled in NHANES beginning in 2007, resulting in a lower number of postvaccine-era adolescent participants and reducing the strength of the study's results.

Hepatitis B virus and HPV together cause most of the infection-associated cancers worldwide.<sup>3,4</sup> Infections due to both viruses are now vaccine-preventable. The potential impact of the use of these vaccines worldwide is enormous. In terms of dollars alone, a 56% decrease in prevalence of HPV infection would save the United States more than \$4,000,000,000.<sup>5</sup> These health and economic burdens should serve as cogent reminders to strongly recommend HPV vaccination to our patients.

## Editors' Note

While we share, as always, Dr. Tolan's optimism, it is important to remember that receipt of HPV vaccine does not preclude the necessity of regular PAP screening. HPV vaccines do not prevent the progression of already established HPV infections, nor do they protect against all oncogenic HPV serotypes.

## References

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**Key words:** human papillomavirus, HPV vaccine, vaccine effectiveness

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