

Human Papillomavirus Vaccine

More Good News



Linda Eckert, MD

Herd immunity is when “the risk of infection among susceptible individuals in a population is reduced by the presence and proximity of immune individuals.”¹ When a vaccine offers both an individual protection against disease by stimulating one’s own immune response to the antigen(s) contained in the vaccine and also broader protection to those who are not vaccinated by mechanisms such as decreased circulating antigen, this is a public health win and a coveted population benefit. The vaccine coverage level needed to induce herd immunity depends on multiple factors, such as infectivity and ease of viral or bacterial spread. With some diseases, such as measles, herd immunity is not present without 90–95% vaccine coverage.²

Globally, evidence of herd immunity resulting from human papillomavirus (HPV) vaccine administration came within a few years of the HPV vaccine’s introduction. In July 2007, Australia launched a fully government-funded HPV vaccine program for girls aged 12–13 years using the quadrivalent vaccine (protecting against HPV types 6, 11, 16, and 18) and offered catch-up vaccinations for females through the age of 26. By 2009, 65% of eligible Australian females had received the HPV vaccine, and by December 2009, prevalence of genital warts in young heterosexual males was decreasing. In contrast, genital warts did not decrease in similarly aged men who had sex with men, nor were decreases seen in other sexually transmitted infections. Hence, this decreased prevalence of genital warts in unvaccinated heterosexual male partners of HPV vaccinated females was consistent with herd immunity.³

In the United States, HPV vaccine coverage rates have been on a slower upward trajectory than in many other countries, including Australia. In 2007, 32% of girls aged 13–17 years received at least one dose of HPV vaccine; in 2015, this had increased to 62%.^{4,5} Despite these slowly increasing coverage rates, HPV vaccine efficacy has been clearly demonstrated in this country. Between the years 2008 and 2012, females who received at least one dose of HPV vaccine had a reduction in HPV 16/18–associated high grade cervical lesions. However, this decrease was not seen among unvaccinated females.⁶

An article in this month’s issue of *Obstetrics & Gynecology*, “Change in Human Papillomavirus Prevalence Among U.S. Women Aged 18–59 years, 2009–2104”⁷ (see page 693), extends the benefits of HPV vaccine beyond the individual to the broader community by demonstrating that HPV types 16 and 18 prevalence is decreasing in women aged 18–26 years who have been vaccinated and in those who have not been vaccinated. These results, which represent sampling from more than 5,500 women geographically spread across the United States, demonstrate broad herd immunity. Considering the vaccination rate was just 44% in the 18- to 26-year-olds in this study, these results are even more remarkable. Achieving herd immunity with this relatively low vaccine

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Dr. Eckert is from the Department of Obstetrics and Gynecology at the University of Washington, Seattle, Washington; email: eckert@u.washington.edu.

Financial Disclosure

The author did not report any potential conflicts of interest.

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ISSN: 0029-7844/17



coverage rate further highlights the public health contribution and disease prevention potential of this vaccine.

The growing body of data of HPV vaccine efficacy in this country and globally, both for individuals and through herd immunity, is compelling. It is clearly a lost opportunity when the HPV vaccine is not administered. Coverage rates for this cancer-preventing vaccine continue to lag behind other vaccines recommended for the same age group. Although pertussis-containing and meningococcal vaccines have already reached their Healthy People 2020 targets, the HPV vaccine has not.⁵

This study did not address age at vaccination, because samples of females aged younger than 18 were not available for analysis. However, recently published data looking at the National Health and Nutrition Examination Survey, which collects information on HPV vaccination history as well as sexual activity, found that, among females with age at first HPV vaccine dose known, 43% reported initiating sexual activity before or in the same year they received this first HPV vaccine. As clinicians, we should provide strong recommendations consistent with guidelines, including routine vaccination of girls and boys at age 11 or 12 years.⁸ As obstetrician-gynecologists, we may not care for 11- to 12-year-old patients. However, we can talk with our patients who have children in this target age range and encourage them to vaccinate their daughters and sons. In fact, the recently updated American College of Obstetricians and Gynecologists' Committee Opinion on HPV vaccination recommends that health care providers both offer all patients in the target age range HPV vaccine and have a conversation encouraging patients with children in the target age range to vaccinate their children.⁹ The Committee Opinion provides other suggestions to increase HPV vaccine coverage, along with information for health care providers, patients, and parents about HPV vaccine, including frequently asked questions.

When one does talk with patients about HPV vaccine, or any vaccine, familiarity with safety information is invaluable. According to the World Health Organization, more than 200 million HPV doses have been distributed worldwide. Thus far, the Global Advisory Committee on Vaccine Safety, which is a group of independent vaccine safety experts that continually advises the World Health Organization on vaccine safety issues, has reviewed

safety of the HPV vaccine in six different reports starting in 2007. In all of these reviews, including its latest statement on Safety of the HPV Vaccine, the Global Advisory Committee on Vaccine Safety has not found any safety issue that alters its recommendations for use of this vaccine.¹⁰ We can remind patients that 200 million doses is a large denominator.

The study published in this month's journal⁷ is an exciting forerunner of the good news we can anticipate as HPV prevalence, and hence disease, continues to decline owing to HPV vaccine effect. As we move beyond the first decade of HPV vaccines, may we enthusiastically launch into this second decade confident and compelled by the continued promise of these efficacious and safe tools that markedly diminish HPV-associated disease.

REFERENCES

1. Fine P, Eames K, Heymann D. "Herd Immunity": a rough guide. *Clin Infect Dis* 2011;52:911-16.
2. Thompson KM. Evolution and use of dynamic transmission models for measles and rubella risk and policy analysis. *Risk Anal* 2016;36:1383-403.
3. Ali H, Donovan B, Wand H, Read TR, Regan DG, Grulich AE, et al. Genital warts in young Australians five years into national human papillomavirus vaccination programme: National Surveillance Data. *BMJ* 2013;346:f2032.
4. Centers for Disease Control and Prevention (CDC), Jain N, Stokley S, Yankey D. Vaccination coverage among adolescents aged 13-17 Years—United States, 2007. *MMWR Morb Mortal Wkly Rep* 2008;57:1100-3.
5. Reagan-Steiner S, Yankey D, Jeyarajah J, Elam-Evans LD, Curtis CR, MacNeil J, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13-17 Years—United States, 2015. *MMWR Morb Mortal Wkly Rep* 2016;65:850-8.
6. Hariri S, Bennett NM, Nicolai LM, Schafer S, Park IU, Bloch KC, et al. Reduction in HPV 16/18-associated high grade cervical lesions following HPV vaccine introduction in the United States—2008-2012. *Vaccine* 2015;33:1608-13.
7. Berenson AB, Hirth JM, Chang M. Change in human papillomavirus prevalence among U.S. women aged 18-59 years, 2009-2014. *Obstet Gynecol* 2017;130:693-701.
8. Petrosky EY, Liu G, Hariri S, Markowitz LE. Human papillomavirus vaccination and age at first sexual activity, national health and nutrition examination Survey. *Clin Pediatr (Phila)* 2017;56:363-70.
9. Human papillomavirus vaccination. Committee Opinion No. 704. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2017;129:e173-8.
10. Safety of HPV vaccines. Available at http://www.who.int/vaccine_safety/committee/topics/hpv/Dec_2015/en/. Retrieved July 24, 2017.

