Learning More About Ways to Improve Adolescent HPV Coverage

Amanda F. Dempsey, MD, PhD, MPH

Human papillomavirus (HPV) vaccines have been available for use in the United States since 2006 for girls and 2009 for boys.[1] Vaccination uptake levels among adolescents, the preferred age for vaccination, have been examined annually through several different mechanisms and found to be continually well below national goals.[2] The repetition of these findings is now, sadly, "old news." So you may be asking yourself, "Do we need yet another study on adolescent HPV vaccination coverage in the United States?" Based on the findings of the study by Chen et al[3] presented in this issue of *Pediatrics* the answer is a definitive "yes!" In this study, the authors provide some new and valuable insights regarding HPV vaccine uptake in the United States.

Like researchers in many other studies, these researchers used a nationwide, population-based database to examine HPV vaccination initiation and completion by age, sex, and geographic location. With >7 million children included, researchers in the study were well powered to examine differences in vaccination coverage by these and other factors. And, like in many other studies, Chen et al[3] demonstrated increasing vaccination levels over time, with no states reaching national target vaccination coverage levels of 80% series completion by age 15 years, and significant disparities between states in vaccination levels.

Although these data reiterate what has been demonstrated by others, a unique feature of this study is the ability of its researchers to study individuals over time, particularly at a national scope. The database, which represents commercially insured individuals, includes >800 000 children with continuous enrollment and data from age 9 to 17 years. It is from these longitudinal analyses that 2 unique insights arise.

The first comes from a longitudinal examination of vaccination levels among birth cohorts. This analysis shows us that with each subsequent year, we are able to achieve similar vaccination levels more and more quickly. For example, among the birth cohort from the year 2000, representing 17-year-olds at the time data were abstracted for the study, 40% vaccination coverage was achieved when this group was ~14 years old. In contrast, among the birth cohort from the year 2005, representing 12-year-olds at the time of data abstraction, 40% vaccination coverage was reached at the age of 12. So, although we still have not reached national target levels of 80% coverage by age 15 among any birth cohort, we are getting faster at reaching the levels we can currently achieve.

The second insight from these longitudinal analyses comes from using the trends in vaccination over time to model future projections of coverage. Using this approach, the authors estimate that by the year 2022, the 2012 birth cohort will have reached 80% coverage for the first dose in the HPV vaccine series. This would correspond to when this birth cohort is 17 years old. Given that at this age, most individuals will not have been

University of Colorado Denver, Aurora, Colorado

DOI: https://doi.org/10.1542/peds.2020-005454

Accepted for publication May 22, 2020

Address correspondence to Amanda F. Dempsey, MD, PhD, MPH, University of Colorado Denver, 13199 East Montview Blvd, Suite 300, Aurora, CO 80045. E-mail: amanda.dempsey@cuanschutz.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: Dr Dempsey serves on Advisory Boards for Merck, Pfizer, and Sanofi Pasteur. Dr Dempsey does not receive any research funding from these companies, nor did these companies play any role in this manuscript.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The author has indicated she has no potential conflicts of interest to disclose.

COMPANION PAPER: A companion to this article can be found online at www.pediatrics.org/cgi/doi/10.1542/peds.2019-3557

To cite: Dempsey AF. Learning More About Ways to Improve Adolescent HPV Coverage. *Pediatrics*. 2020;146(4):e2020005454

exposed to most concerning disease-causing HPV types, achieving 80% vaccine coverage would be a major public health victory. This is especially so given that the models also suggest that levels will be equivalently high among both boys and girls. Yet, it is important to remind ourselves that that these models are for a single HPV vaccine dose. Two or 3 doses (depending on the age of initiation) of the HPV vaccine are currently recommended for optimal protection. Ongoing research is examining the benefit of just 1 dose, which may actually be quite substantial.[4]

A final set of interesting conclusions from this study comes from the authors' exploratory analyses examining the association between vaccine coverage levels and various state policies related to vaccination. Somewhat surprisingly, the statistical models presented did not support the hypothesis that the presence of a school requirement for vaccination (ie, a "school mandate") results in higher vaccine coverage levels. This contrasts past data for other vaccines in which it was demonstrated that mandates do have a substantial positive influence on vaccination coverage.[5] However, it is important to note that the number of states included in this category was small (Rhode Island, Virginia, and Washington DC), limiting conclusions on this point. The strongest association with increased vaccination coverage was the presence of "legislation to improve HPV education," associated with a 3% to 14% increase in vaccination, depending on the state. Pediatrician density was the third factor identified, with a ≤2% vaccination coverage increase for every additional pediatrician per 10 000 children available in the state. This last point is especially noteworthy given recent data demonstrating significant disparities among rural teens in HPV vaccine coverage compared with urban ones,[6] presumably due at least in part to lack of providers in rural areas.

As with any study, this study has limitations, the biggest being that it represents only commercially insured children. With ~40% of US children insured by Medicaid, and 5% uninsured,[7] it is not known how broadly the findings from this study can be translated to the US adolescent population as a whole. Despite this fact, there are some encouraging conclusions found in this study related to the ability to achieve national vaccination goals as well as important, and potentially actionable, findings that warrant close consideration by policy makers and the medical community at large regarding vaccination policies and workforce.

REFERENCES

1. Markowitz LE, Gee J, Chesson H, Stokley S. Ten years of human papillomavirus vaccination in the United States. *Acad Pediatr*. 2018;18(2S):S3–S10
2. Walker TY, Elam-Evans LD, Yankey D, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 Years - United States, 2018. *MMWR Morb Mortal Wkly Rep*. 2019; 68(33):718–723
3. Chen ST, Huybrechts KF, Bateman B, Hernandez-Diaz S. Trends in human papillomavirus vaccination in commercially insured children in the United States. *Pediatrics*. 2020;146(4): e20193557
4. Markowitz LE, Naleway AL, Klein NP, et al. Human papillomavirus vaccine effectiveness against HPV infection: evaluation of one, two, and three doses. *J Infect Dis*. 2020;221(6):910–918
5. Hinman AR, Orenstein WA, Williamson DE, Darrington D. Childhood immunization: laws that work. *J Law Med Ethics*. 2002;30(3 suppl):122–127
6. Walker TY, Elam-Evans LD, Williams CL, et al. Trends in human papillomavirus (HPV) vaccination initiation among adolescents aged 13–17 by metropolitan statistical area (MSA) status, National Immunization Survey - teen, 2013–2017. *Hum Vaccin Immunother*. 2020;16(3):554–561
7. Kaiser Family Foundation. Health insurance coverage of children 0-18. 2018. Available at: https://www.kff.org/other/state-indicator/children-0-18/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D. Accessed June 14, 2009

Learning More About Ways to Improve Adolescent HPV Coverage

Amanda F. Dempsey

Pediatrics 2020;146;
DOI: 10.1542/peds.2020-005454 originally published online September 14, 2020;

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Learning More About Ways to Improve Adolescent HPV Coverage

Amanda F. Dempsey

Pediatrics 2020;146;
DOI: 10.1542/peds.2020-005454 originally published online September 14, 2020;

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN®