

June 2021

Background

The most common human papillomavirus associated (HPVa) cancers are cervical cancer among women and oropharyngeal cancer among men. In Illinois, non-Hispanic Black women have the highest rate of new cervical cancer cases among all racial/ethnic groups, while non-Hispanic White men have the highest rate of new oropharyngeal cancer cases. Further, rural populations in Illinois have significantly higher rates of oropharyngeal and cervical cancer, when compared to suburban and urban areas of Illinois. See *HPV-Associated Cancers in Illinois – Part I (December 2020)*.

One of the most effective evidence-based interventions to reduce the incidence of HPVa cancers is uptake of the HPV vaccine. Studies in the U.S. and globally have shown the HPV vaccination prevents cancer-causing infections, including the HPV types that cause most genital warts.^{1,2} In fact, the HPV vaccination has the potential to prevent more than 90% of cancers caused by HPV.^{3,4}

The highly effective 9-valent HPV vaccine, Gardasil® 9, has been available for use in the United States since late 2016 and protects against nine types of HPV (types 6, 11, 16, 18, 31, 33, 45, 52, and 58);⁵ the majority of HPVa cancers are caused by HPV 16 or 18. Today, Gardasil® 9 is the only HPV vaccine available in the U.S. The HPV vaccine is an effective way to protect against HPV when administered at the recommended age of 11 or 12 years (or can start at age 9) for both girls and boys. In 2019, the Advisory Committee on Immunization Practices (ACIP) recommended the HPV vaccine for adults 27 – 45 years of age using a shared clinical decision-making strategy to determine if HPV vaccination for individuals within this age group is of benefit.⁶

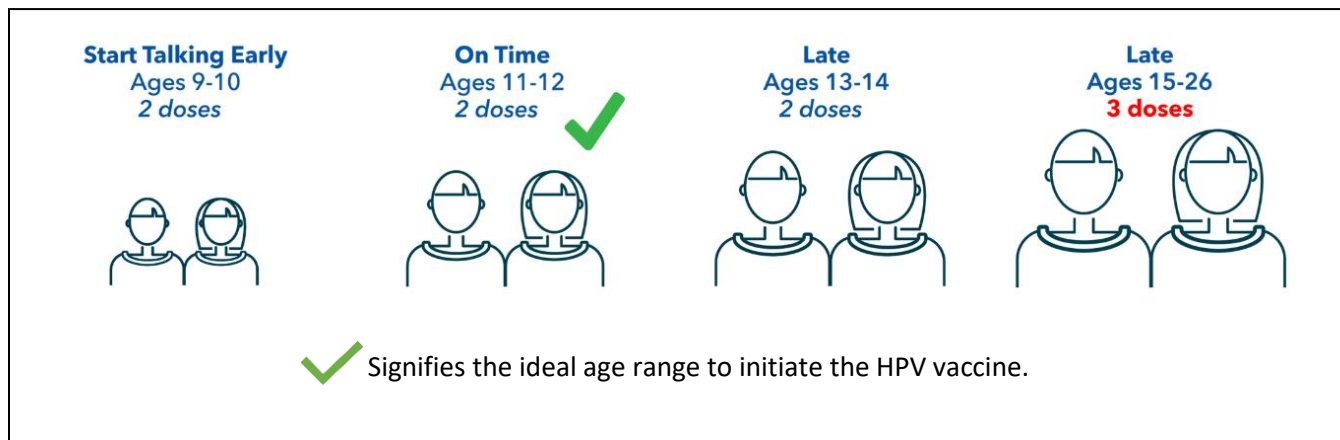
HPV Vaccines Recommended for Adolescents

Vaccines recommended for adolescents, 11 to 12 years of age, include tetanus-diphtheria-pertussis (Tdap) booster vaccination, also referred to as Tdap, and the initiation of meningococcal conjugate (MenACWY) vaccination and HPV vaccination.⁷

HPV vaccine dosage is dependent on age of initiation. Most individuals who initiate vaccination at ages 9 through 14 receive the vaccine as a two-dose series, and for those who initiate vaccination at ages 15 through 26, a three-dose series (Figure 1) is administered. For immunocompromised individuals ages 9-26 and individuals 27 years or older, a three-dose vaccination series is recommended.⁸

In Illinois, HPV vaccination is not a requirement for adolescents entering school, whereas Tdap and MenACWY are required, despite national recommendations from four leading national medical associations since 2014.^{9,10}

Figure 1: Recommended Schedule for HPV Vaccination[†] (Source: CDC)

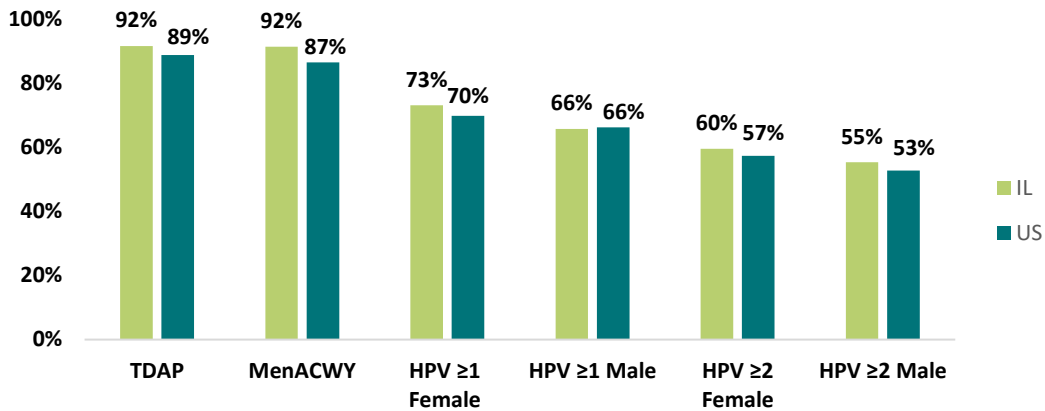


Since the HPV vaccine has been in use, rates of cancers and genital warts caused by HPV have dropped 86% among adolescent girls.¹¹ Although screening is available for HPV infection and for cervical cancer, no screening tests are available for the five other types of cancers caused by HPV: oropharyngeal, anal, vulvar, vaginal, and penile cancers.¹² As a result, these types of cancer are often detected at a later stage. HPV vaccination, however, can prevent these other HPV-related cancers from developing.⁷

Healthy People 2030 (HP2030) provides science-based, 10-year national objectives for improving the health of all Americans by encouraging collaborations across communities and sectors, empowering individuals toward making informed health decisions, and measuring the impact of prevention activities. The HP2030 objective for HPV is to “increase the proportion of adolescents ages 13 through 15 who receive recommended doses of the HPV vaccine.”¹³ Although Illinois has exceeded the HP2030 goal for Tdap (90%), the state has yet to reach the HP2030 goal of 80% for HPV vaccination (Figure 2). In Illinois, the percentage of males and females who have initiated and completed the HPV vaccination series is higher than the U.S., and females lead males in these metrics.

[†] HPV Vaccine Schedule and Dosing. Centers for Disease Control and Prevention. <https://www.cdc.gov/hpv/hcp/schedules-recommendations.html>. Published August 15, 2019. Accessed July 23, 2020.

Figure 2: Coverage for Recommended Adolescent Vaccines, 13-17 years (2018)[‡]



Programs and Policies to Increase HPV Vaccination

State and federally funded programs, laws, and regulations work to reduce the burden of infectious diseases, such as HPV. U.S. policies that have been effective include financing to assure access and availability of recommended vaccines¹⁴ and ensuring a reliable and steady supply of the HPV vaccine.¹⁵ National and state efforts are being administered to increase the proportion of adolescents receiving recommended doses of the HPV vaccine.

Specifically, the Illinois Department of Public Health’s (IDPH) Illinois Comprehensive Cancer Control Program (ICCCP) works with statewide and community partners to reduce cancer incidence and mortality by addressing areas across the cancer continuum, from primary prevention to survivorship. One of the focus areas within the ICCCP includes HPV-related primary prevention strategies. One of the primary functions of the ICCCP is collaboration with the Illinois Cancer Partnership (ICP), which includes public, private, and nonprofit sectors partners that work together to establish, promote, and implement the state’s cancer control plan, which is updated every five years. Increasing HPV vaccination is identified as a cancer prevention strategy in the [Illinois Comprehensive Cancer Control Plan \(2016-2021\)](#) and [the 2022-2027 Illinois Comprehensive Cancer Control Plan](#) with the goal of increasing the proportion of eligible adolescents who have completed the HPV vaccination series.

The IDPH ICCCP collaborates with the following internal and external programs:

- [IDPH Vaccines for Children Program](#)
- [Illinois Breast and Cervical Cancer Program](#)
- [IDPH School Health Program](#)
- [Illinois State Cancer Registry](#)
- [IDPH Oral Health Programs](#)
- [American Cancer Society](#)

[‡] Centers for Disease Control and Prevention TeenVax View. Data from 2018 National Immunization Survey—Teen (NIS-Teen). <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>. Accessed November 2020.

National HPV Vaccination Roundtable

The ICCCP actively participates in the Illinois HPV Advisory Group ([National HPV Vaccination Roundtable](#)), which is a coalition of more than 70 organizations working at the intersection of immunization and cancer prevention. Founded in 2014 by the American Cancer Society and the Centers for Disease Control and Prevention (CDC), the mission of the roundtable is to convene, communicate with, and catalyze member organizations and, by extension, the public to prevent HPV cancers and raise HPV vaccination rates.

Comprehensive Cancer Control National Partnership (CCCNP)

Since 1998, the CDC's National Comprehensive Cancer Control Program (NCCCP) has provided funding, guidance, and technical assistance that programs across the country use to develop, to implement, and to evaluate state-wide cancer control plans. NCCCP awardees advance cancer control priorities, including increasing HPV vaccination and participating in the [Comprehensive Cancer Control National Partnership](#) (CCCNP), where HPV vaccination remains a top priority.

In addition to these state and federal public health initiatives, some states have passed legislation and regulations to improve access to and uptake of the HPV vaccine as a part of their state's school attendance policies and cancer control efforts. Policy opportunities include legislative as well as system level strategies to increase HPV vaccination (see Table 1). In Illinois, all students entering sixth grade (and their parents or legal guardians) are required to be provided written information about the link between HPV and certain types of cancers.[§] In addition, individuals 18 years and younger are eligible to receive the vaccine, as medically indicated, at no cost.**

In 2014, four leading national medical associations — the American Academy of Family Physicians (AAFP), the American Academy of Pediatrics (AAP), the American College of Physicians (ACP), and the American College of Obstetricians and Gynecologists (ACOG) — together with the Immunization Action Coalition and the CDC, have issued a call urging physicians across the United States to educate patients about the HPV vaccine, and to strongly recommend HPV vaccination.¹⁰

[§] [Illinois Senate Bill 2866](#) (2017)

^{**} [Illinois Senate Bill 937](#) (2007)

Table 1: Summary of Policy Opportunities to Increase HPV Vaccination^{††}

Policy Opportunity	Description	Level
<i>Health care provider recommendation**</i>	HPV vaccination recommendation to patients at each visit, particularly when other vaccines are being administered; decreases missed opportunities.	Provider
<i>Reminder and recall systems**</i>	Reminders within the electronic medical record, prompting providers to initiate HPV vaccination recommendation; patient reminders to initiate and/or complete the HPV vaccine series.	Clinic
<i>State immunization registries*</i>	Statewide registries in which all immunization records are entered and maintained.	State
<i>Standing orders**</i>	Official clinic protocols that give clinical staff authorization to complete immunizations for patients meeting recommended guidelines.	Clinic
<i>Provider assessment and feedback evaluations**</i>	Routine feedback to providers on patients' HPV vaccination series initiation and completion rates.	Clinic
<i>Participation in Vaccine for Children (VFC) Program**</i>	Clinic approval and implementation of processes that allow for participation in the VFC Program.	Clinic
<i>Vaccination in alternative settings**</i>	Providing HPV vaccination programs in schools, pharmacies, mobile clinics, dental practices, and other community-based, non-medical settings.	Clinic, Community
<i>Pharmacy-related laws*</i>	State-enacted laws allowing pharmacists to provide the HPV vaccine series to youth and young adults.	State
<i>School-entry requirements*</i>	State-enacted laws that require students to initiate and complete the HPV vaccine series to maintain eligibility to attend school.	State
<i>Communication campaigns**</i>	Leveraging rural community partnerships and voices of local residents to deliver positive HPV vaccination messaging.	Community
<i>Rural HPV vaccination research*</i>	Increased funding for interventional rural HPV vaccination research (e.g., randomized controlled trials, quasi-experimental studies, and pragmatic trials).	National

***"Big P" policies include legislative policies and/or other federal or state mandates*

***"Little P" policies include local written policies and system level strategies and processes*

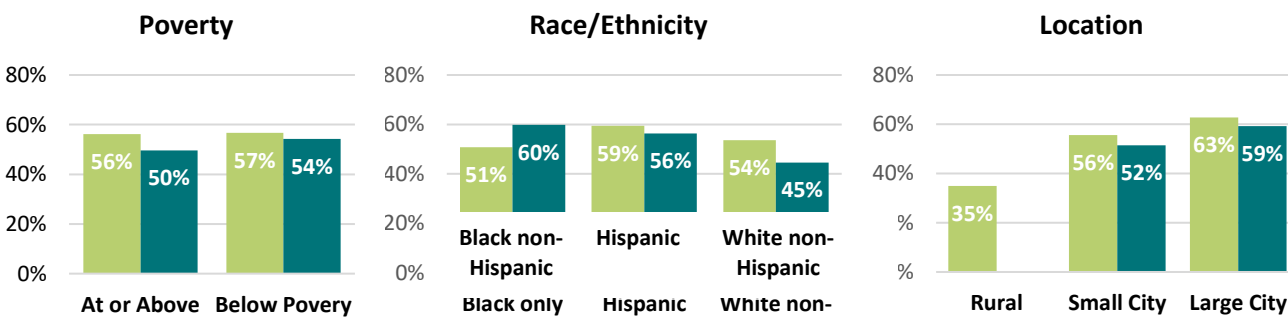
^{††} St. Jude Children's Research Hospital: HPV Cancer Prevention Program (2021, April 27) *HPV Vaccination: A Look at State Policy and A Path Forward*. [Virtual Seminar].

HPV Vaccination Coverage in Illinois

HPV vaccination rates in Illinois vary by select demographic characteristics (Figure 3). Slightly more individuals living below the poverty line are up to date (UTD) on HPV vaccination compared to those living at or above poverty for both males and females. With the exception of Black non-Hispanic males, the percentage of HPV UTD is slightly higher in females than males. Hispanic females have a higher percentage of HPV UTD than Black and White non-Hispanic females. The percentage of HPV UTD in Illinois varies based on location with the highest percentage of HPV UTD for both males and females in large cities.¹⁶ Females in rural areas of the state report the lowest HPV UTD percentage. Data on males in rural areas in the state has been suppressed due to small sample size.

The Illinois Comprehensive Automated Immunization Registry Exchange (I-CARE) is a web-based immunization record-sharing application developed by IDPH and is designed to record, to track, and to report immunizations. I-CARE 2018 data was examined to determine county-level variation in completion, also referred to as up to date (UTD), of the HPV vaccination series among 13- to 15-year-olds (Appendix A). In Illinois's 102 counties, HPV vaccination (UTD) ranged from 5% to 54%. Generally, UTD HPV vaccination percentages were higher in more urban areas, such as Cook County and Suburban Cook County, larger cities, including Chicago, Champaign, Peoria, and Springfield, and suburban areas in northeastern and central Illinois. UTD HPV vaccination percentages were lower in more rural regions in the state, particularly in northwestern and southern counties of Illinois.

Figure 3: HPV Vaccination Up to Date Percentages, Ages 13-17 by Select Demographics, Illinois (2018)



Data Source: TeenVax View, Illinois. Centers for Disease Control. Data from 2018 National Immunization Survey—Teen (NIS-Teen). <https://www.cdc.gov/vaccines/imz-managers/coverage/teenvaxview/data-reports/index.html>. Published July 22, 2019. Accessed June 25, 2020.

Note: UTD includes adolescents with three doses, and those with two doses (when the first HPV vaccine dose was initiated before age 15 years and time between the first and the second dose was at least five months minus four days). Data on males in rural areas in the state has been suppressed due to small sample size.

Identifying and Addressing Challenges to HPV Vaccine Uptake

One of the primary reasons behind lower rates of vaccine uptake, for both vaccine initiation and completion, ties back to parental intention to vaccinate their children. A 2020 study found the most common reason for lack of intent or vaccine hesitancy among parents to initiate the vaccine series for unvaccinated adolescents was safety concerns (23%).¹⁷ Among parents of adolescents who received only one HPV vaccine dose, lack of a recommendation from a health care provider (22%) was the most frequently cited reason for absence of intent to complete the series

Recent studies to better understand vaccine hesitancy, related to the COVID-19 vaccine among adolescents, aligns with similar themes to include safety, trust, and perceived risk of infection.¹⁸ Additional barriers to HPV vaccine uptake include health care access, cost, caregiver support, peer influence, school-based interventions, and provider/practice-based interventions.¹⁹ Improving vaccine confidence remains a critical strategy to instill trust among patients, parents or families, and providers, especially among rural populations in Illinois.

Clinician recommendation remains the number one reason parents decide to vaccinate; providers can leverage their relationship with parents to provide education and to address vaccine hesitancy. Provider resources have been developed by CDC, the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP), collectively referred to as [*Provider Resources for Vaccine Conversations with Parents*](#).

Conclusion and Next Steps

HPV cancer cases vary by demographic and geographic factors across Illinois. Several different strategies can effectively address these variations. However, HPV vaccine uptake using evidence-based strategies is a top national objective and has been a recommendation of the Community Preventive Services Task Force since 2009. Changes in recommendations from the ACIP in 2019 include HPV vaccination catch-up among not only females, but also males, through age 26 years and a simplified immunization schedule. However, adolescents are still the main focal point to initiate the HPV vaccine to prevent HPV infection and reduce HPV-associated cancer rates.

To address disparities in vaccine uptake, the ICCCP and partners will need to focus efforts around statewide policies to support vaccination among adolescents in parallel to addressing vaccine hesitancy and other known barriers. Many statewide and community-driven strategies are being implemented and evaluated to address vaccine access as well as hesitancy among adolescents during the response to the COVID-19 pandemic. These promising practices and lessons learned

would serve well to inform future strategies to increase HPV vaccine uptake, especially among males as well as rural populations across Illinois.

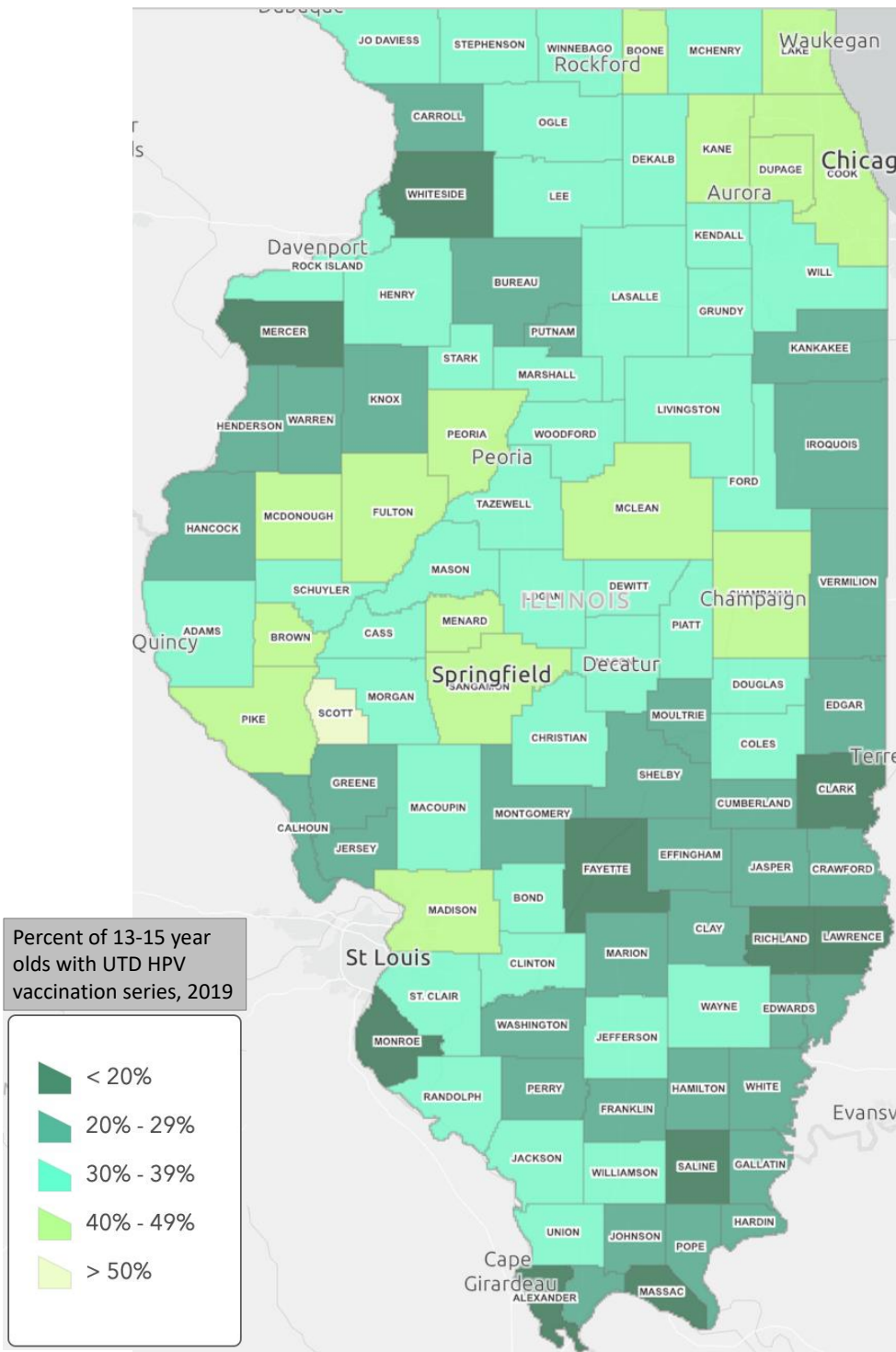
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APPENDIX A: HPV Vaccination Series Up to Date Among 13 – 15 Year Olds in Illinois, By County (2019)*



Data Limitations: I-CARE data source excludes deceased patients, as well as those patients that initiated one or more doses out of state and completed their series in Illinois.

* Source: Illinois Comprehensive Automated Immunization Registry Exchange (I-CARE) data. Unpublished data from 2019
 Notes: HPV Immunization rates for Illinois’s 102 counties were grouped into quintiles

Appendix B: Resource Guide (HPV Associated Cancers in Illinois – Part II)

HPV-Associated Cancers in Illinois – Part I (December 2020)

<https://www.dph.illinois.gov/sites/default/files/publications/hpv-associated-cancers-illinois-part-1-final-01282021.pdf>

IDPH Vaccines for Children Program

<http://dph.illinois.gov/topics-services/prevention-wellness/immunization/vfc-program>

Illinois Breast and Cervical Cancer Program

<http://dph.illinois.gov/topics-services/life-stages-populations/womens-health-services/ibccp>

IDPH School Health Program

<https://dph.illinois.gov/topics-services/life-stages-populations/maternal-child-family-health-services/school-health>

Illinois State Cancer Registry

<https://www.dph.illinois.gov/data-statistics/epidemiology/cancer-registry>

IDPH Oral Health Programs

<https://dph.illinois.gov/topics-services/prevention-wellness/oral-health>

American Cancer Society

<https://www.cancer.org/health-care-professionals/hpv-vaccination-information-for-health-professionals/our-hpv-vaccination-initatives.html>

Illinois Comprehensive Cancer Control Plan (2016-2021)

<https://dph.illinois.gov/sites/default/files/publications/state-cancer-plan-050818.pdf>

National Vaccination HPV Roundtable

<https://hpvroundtable.org/>

Comprehensive Cancer Control National Partnership (CCNP)

<https://www.ccnationalpartners.org/about-us>

Provider Resources for Vaccine Conversations with Parents

<https://www.cdc.gov/vaccines/hcp/conversations/>

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- ¹Centers for Disease Control and Prevention. HPV Vaccine Safety and Effectiveness Data <https://www.cdc.gov/hpv/hcp/vaccine-safety-data.html>. Accessed September 27, 2020.
- ²Centers for Disease Control and Prevention. HPV Vaccine Information for Young Women <https://www.cdc.gov/std/hpv/stdfact-hpv-vaccine-young-women.htm>. Accessed June 07, 2020.
- ³Lei J, Ploner A, Elfström KM, Wang J, Roth A, Fang F, Sundström K, Dillner J, Sparén P. HPV Vaccination and the Risk of Invasive Cervical Cancer. *N Engl J Med*. 2020 Oct 1;383(14):1340-1348. doi: 10.1056/NEJMoa1917338. PMID: 32997908
- ⁴Centers for Disease Control and Prevention (CDC). Cancers caused by HPV are preventable. <https://www.cdc.gov/hpv/hcp/protecting-patients.html>. Accessed June 11, 2021.
- ⁵Basic Information about HPV and Cancer. Centers for Disease Control and Prevention. https://www.cdc.gov/cancer/hpv/basic_info/index.htm. Published August 22, 2018. Accessed June 24, 2020.
- ⁶Centers for Disease Control and Prevention (CDC). Grading of Recommendations Assessment, Development and Evaluation (GRADE) for use of HPV vaccine in adults ages 27 through 45 years. <https://www.cdc.gov/vaccines/acip/recs/grade/HPV-adults.html>. Accessed May 31, 2021.
- ⁷Easy-to-read Immunization Schedule by Vaccine for Ages 7-18 Years. Centers for Disease Control and Prevention. <https://www.cdc.gov/vaccines/schedules/easy-to-read/adolescent-easyread.html>. Published February 3, 2020. Accessed August 4, 2020.
- ⁸HPV Vaccine Administration. Centers for Disease Control and Prevention. <https://www.cdc.gov/vaccines/vpd/hpv/hcp/administration.html>. Published March 17, 2020. Accessed June 24, 2020.
- ⁹Illinois Department of Public Health (IDPH). Minimum Immunization Requirements Entering a Child Care Facility or School in Illinois, Fall 2019. <http://www.dph.illinois.gov/sites/default/files/publications/Minimum%20Immunization%20Requirements.pdf> Accessed May 31, 2021.
- ¹⁰Leading Medical and Public Health Organizations Join Efforts Urging Physicians to Strongly Recommend Human Papilloma Virus (HPV) Vaccination. AAFP Home. <https://www.aafp.org/media-center/releases-statements/all/2014/HPV-vaccination-dear-colleague-letter.html>. Published February 12, 2014. Accessed August 4, 2020.
- ¹¹Reasons to Get Vaccinated Against HPV. Centers for Disease Control and Prevention. <https://www.cdc.gov/hpv/parents/vaccine/six-reasons.html>, Published March 26, 2019. Accessed June 24, 2020.
- ¹²HPV. Centers for Disease Control and Prevention. <https://www.cdc.gov/hpv/hcp/protecting-patients.html>. Published November 13, 2019. Accessed June 24, 2020.

¹³ U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. Objectives and Data, Vaccination. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/vaccination/increase-proportion-adolescents-who-get-recommended-doses-hpv-vaccine-iid-08>. Accessed March 21, 2021.

¹⁴ Institute of Medicine 2004. Financing Vaccines in the 21st Century: Assuring Access and Availability. Washington, DC: The National Academies Press. <https://doi.org/10.17226/10782>

¹⁵ U.S. Department of Health and Human Services (HHS). 2010 National Vaccine Plan, Protecting the Nation's Health through Immunization. https://www.hhs.gov/sites/default/files/nvpo/vacc_plan/2010-Plan/nationalvaccineplan.pdf. Accessed May 31, 2021.

¹⁶ MSA status was determined based on household reported city and county of residence and was grouped into three categories: MSA principal city, MSA nonprincipal city, and non-MSA. MSA and principal city were as defined by the U.S. Census Bureau (<https://www.census.gov/programs-surveys/metro-micro.html#external>). Non-MSA areas include urban populations not located within an MSA as well as completely rural areas.

¹⁷ K. Sonawane, Y. Zhu, J. Montealegre, D. Lairson, C. Bauer, L. McGee, A. Giulian, and A. Deshmukh, Parental intent to initiate and complete the human papillomavirus vaccine series in the USA; a nationwide, cross-sectional survey. Vol. 5 (pp 484-492): Sept 2020. [https://doi.org/10.1016/S2468-2667\(20\)30139-0](https://doi.org/10.1016/S2468-2667(20)30139-0)

¹⁸ Centers for Disease Control and Prevention. COVID-19 State of Vaccine Confidence Insights Report. Rpt 8, May 24, 2021 (date range: April 27 – May 10, 2021).

¹⁹ Peterson CE, Silva A, Holt HK, Balanean A, Goben AH, Dykens JA. Barriers and facilitators to HPV vaccine uptake among US rural populations: a scoping review. Cancer Causes Control. 2020 Sep 31(9):801-814. doi: 10.1007/s10552-020-01323-y. Epub 2020 Jun 14. PMID: 32537702.