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HPV Vaccine Policy Landscape

Public Health Strategies



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The Center for Health Law and Policy Innovation of Harvard Law School (CHLPI) advocates for legal, regulatory, and policy reforms to improve the health of underserved populations, with a focus on the needs of low-income people living with chronic illnesses and disabilities. CHLPI works with consumers, advocates, community-based organizations, health and social services professionals, food providers and producers, government officials, and others to expand access to high-quality health care and nutritious, affordable food; to reduce health disparities; to develop community advocacy capacity; and to promote more equitable and effective health care and food systems. CHLPI is a clinical teaching program of Harvard Law School and mentors students to become skilled, innovative, and thoughtful practitioners as well as leaders in health, public health, and food law and policy. For more information, visit <https://www.chlpi.org>.

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PURPOSE OF HPV VACCINE POLICY LANDSCAPE

Low uptake rates of the HPV vaccine have remained a challenge in several states. This resource provides a landscape overview of potential pathways to increasing HPV vaccination rates. Our hope is that advocates are able to use this information to inform their state-based efforts to increase vaccination rates, particularly among children and adolescents, as well as young adults enrolled in colleges and universities. For further questions or inquiries, please contact chlpi@law.harvard.edu.

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Foreword

Over the past two years, we have borne witness to the enormous costs of a public health crisis brought on by a highly transmissible illness, COVID-19. We have been forced to contend with the ways in which these enormous costs fall disproportionately on Black, Indigenous, Asian American, and Latino communities, unhoused people, and people with disabilities. Over 900,000 people in the United States have lost their lives to COVID-19 to date, with data collection issues continuing to limit our full understanding of the impact of the pandemic. Furthermore, the health care cost of survival — in delayed care, mental health impacts, violence, and long-term COVID symptoms — remains to be calculated.

During this time, we have also seen public health guidance take center stage in an increasingly polarized political climate. Guidance and mandates around COVID-19 vaccination have been a key component of the country's widely successful vaccination campaign, but have also been met with substantial pushback from those who cannot or will not be vaccinated.

HPV vaccination rates dropped precipitously during the early months of the COVID-19

pandemic, and while they have since rebounded to pre-pandemic levels, there is still catching up to be done. Increasing HPV vaccine uptake will require targeted policy solutions to navigate the landscape that COVID-19 has forever changed.

It is with this context that we present *HPV Vaccine Policy Landscape: Public Health Strategies*. This resource provides an in-depth look at HPV vaccination pathways across the United States and across the globe, with a particular focus on state-level policies that have yielded high rates of adolescent vaccine uptake. We look at the challenges and barriers to expanded uptake, and identify available pathways for expanded uptake, with emphasis on school-based vaccination campaigns, state policy approaches, and the role of health care providers.

Our current moment shines a light on many facets of public health policy and vaccine uptake. It is our hope that this report will highlight the roles that state policy-makers, educational institutions, and health care providers can play in improving public health outcomes, and serve as a tool in navigating this landscape effectively.

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Introduction

The human papillomavirus (HPV) is a virus that can cause abnormal growths on the skin or mucus membrane and is etiologically associated with six different types of cancer. The virus is spread through vaginal, anal, and oral sex with someone living with HPV. According to the Centers for Disease Control and Prevention (CDC), HPV is the most common sexually transmitted infection in the United States, with an estimated 42.5 million people currently living with HPV and 13 million people newly acquiring the virus each year.¹

While some people may not develop symptoms from HPV and may have the virus resolve spontaneously, the virus can still present a great danger as it can lead to six different types of cancers, including cancer of the cervix, vagina, vulva, penis, anus, and oropharynx. HPV causes nearly all cervical cancers,² and “90% of anal, 69% of vaginal, 60% of oropharyngeal, 51% of vulvar, and 40% of penile cancers.”³ Over 36,000 cases of cancer are estimated to be caused by HPV each year in the United States.⁴ In addition to the thousands of lives lost annually, HPV-associated cancers and conditions are estimated to cost \$8 billion in the United States each year.⁵

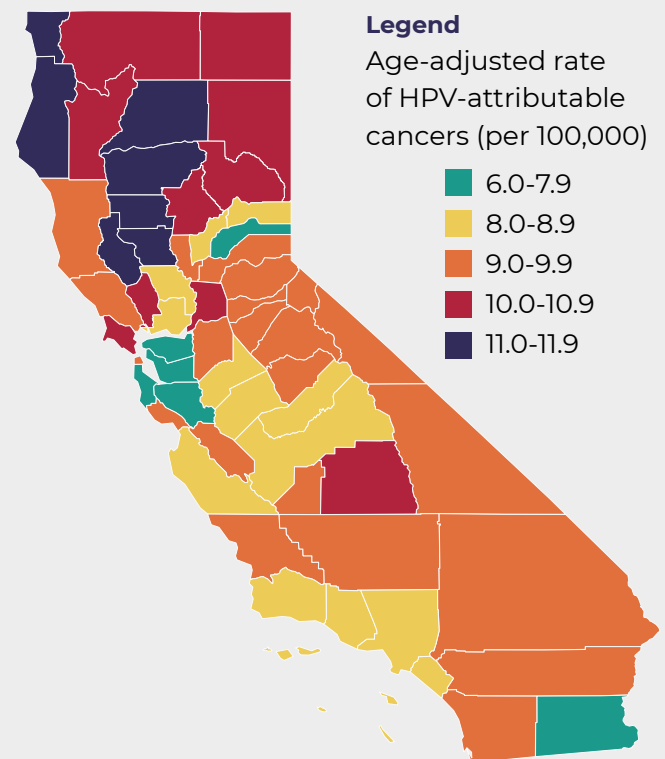
The HPV vaccine can help protect people from HPV and HPV-associated cancers. In the United States alone, the HPV vaccine is estimated to prevent around 33,000 cancer cases annually.⁶ However, many states still have low HPV vaccination rates, leaving many residents at risk of grave and sometimes fatal illness. Even when cervical cancer is not fatal, it can severely affect fertility depending on time of detection and available treatment options.⁷

FIGURE 1

A Look at California

Based on data from the California Cancer Registry

California County-level Age-adjusted Rates of HPV-attributable Cancers per 100,000 people (2012–2016)⁸



This map illustrates the age-adjusted rate of HPV-attributable cancers across California counties. The variation in rates highlights the importance of a coordinated HPV prevention strategy that accounts for access barriers in both rural and urban counties. For more information, see Appendix B.



HPV is also known to cause oropharyngeal cancer, or cancer of the throat, tongue, and tonsils.⁹ Rates of HPV-associated oropharyngeal cancer are rising dramatically, with some experts suggesting this cancer may become more common than cervical cancer.¹⁰ HPV currently causes around 9,000 cases of oropharyngeal cancers each year in the United States.¹¹

The HPV Vaccine

WHAT IS THE HPV VACCINE?

The HPV vaccine protects against HPV and the cancers associated with HPV. While there are over 100 different kinds of HPV, most health problems associated with HPV (including cancer) are linked to a handful of types and thus are targeted by these vaccines.¹²

The vaccine can prevent most cases of cervical cancer if given before a person is exposed to the virus.

The vaccine can prevent most cases of cervical cancer if given before a person is exposed to the virus. The vaccine also prevents vaginal/vulvar cancer and can prevent genital warts, anal cancer, and strains of HPV related to oral cancers. While the vaccine was originally targeted at “females aged 9–26 years,”¹³ vaccinating *all* people can provide a protective effect against these cancers by decreasing transmission. The vaccine only protects against strains of HPV that an

individual hasn’t yet been exposed to, so it is important to receive the vaccine before potential exposure through sexual activity.

Even when vaccination is not possible before a person becomes sexually active, the national Advisory Committee on Immunization Practices (ACIP) recommends “catch-up” vaccinations for everyone up to age 26.¹⁴ Because the HPV vaccine protects against multiple strains of HPV, even if an individual has been exposed to or has contracted one strain of HPV, they could still benefit from protection from other strains.

WHO SHOULD GET THE HPV VACCINE?

The HPV vaccine is most effective if administered before potential exposure. It is recommended by the CDC for all children at ages 11 or 12, and by the American Cancer Society for children ages 9 to 12.¹⁵ The vaccine elicits a higher immune response from individuals aged 11 to 12 than in older teens, meaning that individuals who receive the vaccine before their 15th birthday can receive two doses as opposed to the three doses needed for those 15 and older.¹⁶

It is recommended by the CDC for all children at ages 11 or 12, and by the American Cancer Society for children ages 9 to 12.

The HPV vaccine is recommended by ACIP for everyone through the age of 26 years if they haven't yet been vaccinated. Adults over the age of 26 are more likely to have been exposed to specific serotypes and have fewer sexual partners, and thus cost effectiveness of providing the vaccine to that age group tends to decline.¹⁷ In 2019, updated recommendations noted that shared clinical decision-making was recommended to identify people aged 27 to 45 years who may benefit from catch-up HPV vaccination.¹⁸

THE HISTORY OF THE HPV VACCINE

The CDC first issued guidelines in 2006 for females between ages 11 and 12 to receive the HPV vaccine through ACIP.¹⁹ In 2011 ACIP expanded those guidelines to recommend the vaccine for males between ages 11 and 12.²⁰ Early controversy around possible school-age mandates for the vaccine centered on parental sensitivity to the primary mode of HPV transmission (sexual activity).²¹ Concerns about vaccine safety were investigated by the Institute of Medicine and the CDC; both entities found the vaccine to be safe.^{23,23} Since the vaccine has been in use, among teen girls, infection with HPV types that cause the most HPV-related cancers and genital warts have dropped 86%. Among adult women, the infection rate has dropped 71%.²⁴

HPV VACCINE UPTAKE IN THE UNITED STATES

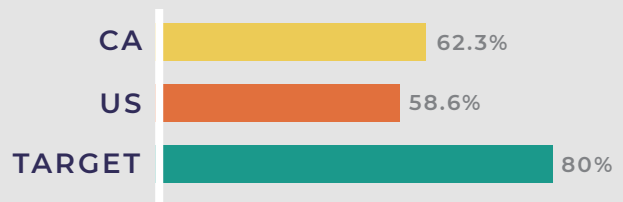
HPV vaccination has been associated with decreased HPV prevalence in the United States and is currently recommended by the ACIP for people at ages 11 or 12 (with catch-up recommendations for all people

through age 26 who were not previously vaccinated).²⁵ Despite these recommendations, HPV vaccination rates in the United States as a whole, and in most individual states, have been consistently lower than rates necessary to achieve strong herd immunity and do not meet the national Healthy People 2030 target of 80% HPV vaccination uptake.²⁶ In 2020, 58.6% of United States adolescents aged 13–17 years were up to date on HPV vaccination, with uptake as low as 31.9% in Mississippi.²⁷ According to CDC estimates, only Rhode Island has achieved the Healthy People 2030 target of 80% uptake.²⁸

FIGURE 2

HPV Vaccination in CA

Based on data from the National Immunization Survey (2020)



In 2020, California had a higher rate of HPV vaccination coverage for adolescents aged 13–17 years (62.3%) than the United States (58.6%).²⁹ However, California has not met the Healthy People 2030 target of 80%.

The following table ranks states by up-to-date HPV vaccination rates among adolescents aged 13–17 years in 2020 based on data collected by the National Immunization Survey. Participants are considered up-to-date when they have received the recommended doses of the HPV vaccine, either two doses if they received the vaccine before they were 15 or three doses if they receive the vaccine after the age of 15.

FIGURE 3

State Rates of Up-to-date HPV Vaccinations Among Adolescents Aged 13–17

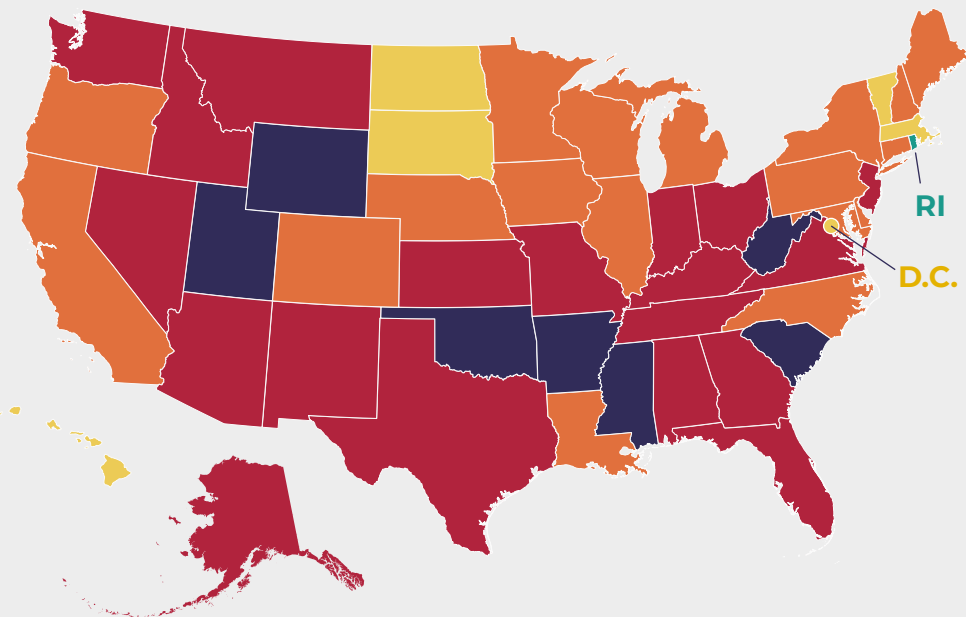
Based on data from the National Immunization Survey (2020)³⁰

With vaccination strategies developed at the state level, there is considerable variation in HPV vaccination rates across the country. This map illustrates up-to-date HPV vaccination among adolescents aged 13–17. For more information, see Appendix C.

Legend

Rate of Up-to-Date HPV Vaccination

- 30.0-49.9%
- 50.0-59.9%
- 60.0-69.9%
- 70.0-79.9%
- 80.0-89.9%



BARRIERS TO HPV VACCINE UPTAKE

While the HPV vaccine has been approved for use since 2006, the country remains far from reaching the national Healthy People 2030 target of 80% HPV vaccination uptake.³¹ Researchers have identified a number of barriers that have led to low HPV vaccine uptake, including inadequate provider recommendation, low parental demand, lack of personal knowledge, financial concerns, sexuality-related concerns, low perceived risk, and concerns about safety.³² National

and global groups, such as the National Vaccine Advisory Committee and the World Health Organization, have recommended public health leaders develop and use strategies that bolster provider communication and that are tailored to address parental concerns.³³ Non-physician providers, such as pharmacists or dental health professionals, have unique roles to play in HPV vaccination recommendations as well, though additional research and strategy development may be necessary to support unified and effective messaging.³⁴



Health Disparities

DISPARITIES IN HPV VACCINE KNOWLEDGE, ACCESS, & UPTAKE

Unfortunately, HPV vaccine knowledge and uptake varies among race/ethnicity, genders and sexual orientations. Studies have found that non-Hispanic Black and Hispanic individuals are less likely than non-Hispanic whites to have heard of HPV and the HPV vaccine, despite higher burden of cervical cancer in these communities.³⁵ Additionally, women are more likely than men to be aware of HPV and the HPV vaccine.³⁶

Similar trends can be seen in local studies among parents. For example, a study of parents in Los Angeles County, California found that “parents who were male, older, less educated, Asian/Pacific Islander, and had sons remained significantly less aware” of HPV vaccination.³⁷ In another study, parents of uninsured children, parents with lower incomes, parents whose primary language was not English, and parents born outside of the United States were also less likely to have heard of HPV vaccines.³⁸

While many studies have shown knowledge and access to lead to increased uptake, these may not suffice in all communities. For example, a study based in Los Angeles County found that even when HPV vaccine

awareness is on par with white parents, African American parents were significantly less likely to vaccinate their daughters.³⁹ In another example, a U.S. study found that lesbian respondents with vaccine awareness were less likely (8.5%) to initiate vaccination compared to bisexual respondents (33.2%) and heterosexual counterparts (28.4%).⁴⁰ Studies focused on vaccine uptake among LGBTQ+ youth highlight gaps in provider recommendations and HPV education efforts for sexual minority men and transgender women, despite high HPV incidence and prevalence among these groups.⁴¹ A study of transgender women in Chicago and Los Angeles found that young transgender women have particularly low HPV and HPV vaccine knowledge.⁴² Thus, effective public health campaigns should strongly consider the local target population and seek out multiple, culturally-specific strategies in improving vaccination uptake.⁴³

CERVICAL CANCER DISPARITIES

Examination of cervical cancer incidence and mortality rates reveal disparities among different communities and racial groups. Researchers have observed disparities in incidence of cervical cancer between urban and rural communities, with a higher rate of cervical cancer in rural communities. This could be a result of barriers to cervical cancer prevention, detection, and treatment.⁴⁴

There are also racial disparities in cervical cancer incidence and mortality rates. Nationally, Latina women have the highest age-adjusted

incidence rate per 100,000 women (9) of cervical cancer compared with Black (8), white (7), Asian/Pacific Islander (6), and American Indian/Alaska Native (6) women.⁴⁵

Despite having higher rates of recent Pap testing to screen for cervical cancer (75% of Black women compared to 69% of white women), Black women have the highest mortality rate associated with the disease.⁴⁶ A recent study showed that the 2000–2012 mortality rate for Black women in the United States was 5.4 women per 100,000, while the mortality rate for white women was 2.4 per 100,000.⁴⁷ Systemic racism and its impact on treatment access, continuity of care, and patient-provider relationships is likely to account for some of the disproportionate impact of cervical cancer on Black women.⁴⁸

International Trends

Approximately 99 countries and territories have introduced HPV vaccination programs in the last 10 years.⁴⁹ With varying rates of success in increasing uptake of the HPV vaccination, a look into international trends can help inform stakeholders looking to increase uptake of the HPV vaccination in their jurisdictions.

SCHOOL-BASED VACCINATION PROGRAMS

Internationally, school-based vaccination programs have proven to be particularly successful in increasing rates of HPV vaccine uptake.⁵⁰ These programs provide vaccine access to diverse populations, regardless of individual access to healthcare. Australia, for example, has a robust school-based vaccination program that sends local teams of trained providers to schools and targets

grades with the intended age range based on national recommendations. The vaccines are paid for by the government. Australia has observed higher uptake rates with this method than with other strategies, such as making the vaccine mandatory for school entry or vaccination through an individual's general practitioner.⁵¹ School-based vaccination programs in Spain, Scotland, and Switzerland achieved completion rates of 77.3%, 81.0%, and 61.4%, respectively.⁵²

Internationally, school-based vaccination programs have proven to be particularly successful in increasing rates of HPV vaccine uptake.

Developing countries with school-based programs also have high vaccination rates. Program for Appropriate Technology in Health, a nonprofit global health organization, partnered with the governments of four countries to provide the HPV vaccine free at schools and clinics. This program led to high completion rates in India (87.8%), Peru (82.6%), Uganda (88.9%), and Vietnam (98.6%).⁵³

School-Based Vaccination Programs in the United States

School based vaccination programs decrease barriers to access by partnering with health care providers to provide vaccinations during school hours on school campuses. The ACIP includes school-based vaccination programs under recommendations in the General Best Practice Guidelines for Immunization.⁵⁴

School-based vaccination programs have been used to increase uptake of the hepatitis B vaccine in places such as Denver, Colorado⁵⁵ and Hawaii.⁵⁶

In addition to being recommended by the ACIP, school-based vaccination programs are recommended by the Community Preventive Services Task Force (CPSTF) “based on strong evidence of effectiveness in increasing vaccination rates, and in decreasing rates of vaccine-preventable disease and associated morbidity and mortality.”⁵⁷

Because the HPV vaccine is recommended for all children at ages 11 or 12, targeting this age group through schools could increase HPV vaccine uptake. Studies in Texas and North Dakota both showed significant increases in rates of HPV vaccination completion by using school based programs.^{58,59} This suggests that providing HPV vaccinations at school may be an effective pathway to increasing uptake, particularly in rural areas.

SCHOOL-BASED HEALTH CENTERS

Leveraging school-based health centers (SBHCs) to provide the HPV vaccine to students attending co-located schools is also another promising way to increase vaccine uptake. In the United States, there are over 2000 SBHCs, ranging from fixed sites on school campuses to mobile health centers and telehealth.⁶⁰ The services offered by these centers vary depending on the community health professionals partnered with the centers.

SBHCs offer enhanced access to health care, help reduce health care disparities among populations, and provide for better population health. California has approximately 277 SBHCs.⁶¹

Studies in Denver and Seattle suggest that use of SBHCs may increase uptake of the HPV vaccine. SBHCs in Denver were used to administer the first dose of the HPV vaccine, and a study found the program effectively increased uptake of the vaccine.⁶² A study of SBHCs in Seattle found that female SBHC users had 37% higher odds of completing the series at any time compared with SBHC nonusers, and male SBHC users had 45% higher odds of completing the series at any time compared with SBHC nonusers.⁶³ These results suggest that SBHCs create a considerable opportunity to work with co-located schools to implement successful school based HPV vaccination programs.

State Legislative Action

One potential pathway to increasing rates of completion of the HPV vaccine is through legislative action. Out of the 18 states (including the District of Columbia) that have higher rates of uptake of the HPV vaccine than California,⁶⁴ ten have passed some type of legislation related to the vaccine. Three have administrative or legislative mandates requiring vaccination for public school attendance, seven have provisions aimed at easing the cost of the HPV vaccine, and three have used legislation to establish programs that promote education on HPV, cervical cancer, and the HPV vaccine. This section will provide an overview of all state legislative action directed towards increasing uptake of the HPV vaccine, including what types of policies have been enacted, examples of legislative language used, and individual state case studies.

TABLE 1

Summary of Up-To-Date HPV Vaccination Rates and Related Legislation

Many of the 18 states with higher rates of HPV vaccine uptake than California have enacted legislation or regulations to support HPV vaccination. The following table summarizes the policies that have supported HPV vaccination in these states as of February 2022.

#	Jurisdiction	HPV Up-to-Date Vaccination Rate (%)	Summary
1	Rhode Island	83.0	<p>Funding Rhode Island General Laws § 23-1-44 establishes an immunization program that covers the cost of vaccines recommended by the ACIP, including the HPV vaccine.</p> <p>Administrative Mandate 216-RICR-30-05-3.5.2 requires children have at least one dose of the HPV vaccine before 7th grade, and the completed series by 9th grade.</p>
2	Hawaii	73.9	<p>Administrative Mandate Hawaii Administrative Rules Title 11 Ch. 157 requires HPV vaccination prior to 7th grade attendance.</p>
3	Massachusetts	73.4	<p>Funding M.G.L. Ch. 111 § 24N establishes the Vaccine Purchase Trust Fund, which provides all federally recommended pediatric vaccines including HPV.</p>
4	District of Columbia	72.3	<p>Legislative Mandate D.C. Code § 7-1651.04 requires vaccination for students entering 6th grade.</p>
5	South Dakota	71.5	None
6	Vermont	70.5	None
7	North Dakota	70.3	<p>Education N.D. Cent. Code Ann. § 23-01-33 provides funding for distribution of educational materials on HPV and the HPV vaccine.</p>
8	Minnesota	69.2	None
9	New Hampshire	68.8	<p>Funding N.H. Rev. Stat. § 126-Q creates funding for NHIP, a program that provides all recommended vaccines for children through age 18 at no cost. HPV is included in this program.</p>

#	Jurisdiction	HPV Up-to-Date Vaccination Rate (%)	Summary
10	New York	68.1	None
11	Pennsylvania	67.1	None
12	Connecticut	66.9	None
13	Maryland	66.8	<p>Funding Md. Code Regs. 10.09.58.05 establishes the HPV vaccine as a covered service under the Maryland Department of Health's Family Planning Program.</p>
14	Colorado	66.4	<p>Funding 2019 Colo. Rev. Stat. § 25-4-2503 provides funding support for local public health agencies and FQHCs to administer cervical cancer vaccinations.</p> <p>Education 2019 Colo. Rev. Stat. § 25-4-2504 establishes a public campaign for cervical cancer awareness. the cervical cancer immunization fund.</p>
15	Nebraska	64.8	None
16	Maine	63.5	<p>Funding 22 M.R.S.A. § 1066 establishes the Universal Childhood Immunization Program, which includes coverage of the HPV vaccine free of charge for children ages 9-18.</p>
17	Delaware	63.2	None
18	Illinois	63.1	<p>Education Illinois Senate Bill 2866 (2017) provides all students entering sixth grade and their parents or legal guardians written information about the link between HPV and certain types of cancers.</p> <p>Funding 20 Ill. Comp. Stat. Ann. 2310/2310-617 directs the Department of Public Health to administer a program for no-cost coverage of the HPV vaccine for all Illinois residents under the age of 18.</p>

OVERVIEW OF MANDATES

Four jurisdictions currently require the HPV vaccine for school attendance: Hawaii, Rhode Island, Virginia, and the District of Columbia (D.C.). Of these four mandates, two are legislative (Virginia and D.C.), while Rhode Island and Hawaii both have administrative mandates, discussed later in this toolkit.

In 2007, D.C. and Virginia, alongside 23 states introduced legislation to mandate the HPV vaccine for school-aged children.⁶⁵ Virginia and D.C. were the only jurisdictions that successfully enacted school-based mandates that year. D.C. Code §7-1651.04 (2007) provides that “the parent or legal guardian of a female child enrolling in grade 6 for the first time at a school in the District of Columbia shall be required to submit certification that the child had received the HPV vaccine,” or certification that the child has not received the vaccine in compliance with one of the three legislative exceptions. The D.C. mandate allows children to be exempted if the vaccination would violate their or their parents’ religious belief, the child’s physician has certified that the vaccine is medically inadvisable for that child, or “the parent or legal guardian, at his or her discretion, has elected to opt out of the HPV vaccination program, for any reason . . .”⁶⁶ Although the initial mandate only applied to female students, § 7-1651.04(a)(3) (2007) extends “the HPV vaccination program requirements to males, consistent with standards set forth by the CDC.”⁶⁷ When the CDC expanded HPV vaccine recommendations to include males at age 11 or 12, the D.C. mandate extended to males as well.

Virginia Code § 32.1-46(A)(12) mandates three doses of the HPV vaccine for females,

and the first dose must be administered before the child enters sixth grade.⁶⁸ Like D.C., Virginia allows liberal opt-out options for parents who object to the vaccine, whether based on religious objections, a physician or nurse practitioner statement that the administration of the vaccine would be detrimental to the health of the child, or if the “parent or guardian, at the parent’s or guardian’s sole discretion, may elect for the parent’s or guardian’s child not to receive the human papillomavirus vaccine after having reviewed materials describing the link between the human papillomavirus and cervical cancer approved for such use by the Board.” The Virginia mandate applies only to females.

Despite having liberal opt-out provisions, D.C. has achieved a rate of HPV vaccine uptake well above the national average, with 72.3% of adolescents age 13–17 up to date in 2020.⁶⁹ Meanwhile, although Virginia’s vaccine uptake among adolescent females exceeded the national average in 2020, a comparatively low uptake among adolescent males has caused the state’s overall HPV vaccine uptake to fall below the national average.⁷⁰

OTHER STATE LEGISLATIVE ACTION

Outside of a legislative or administrative mandate, HPV vaccine-related legislation largely falls into three categories: (1) education campaigns; (2) funding or coverage provisions; and (3) taskforce creation.

Illinois, Indiana, Iowa, Louisiana, Michigan, Missouri, New Jersey, North Carolina, South Carolina, Texas, Virginia, Washington, and the District of Columbia have all passed laws

promoting education on the HPV vaccine, including measures such as mandates that schools distribute information on the HPV vaccine to parents and children and creation of state-funded awareness campaigns.⁷¹

Alaska, Colorado, Illinois, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Nevada, New Hampshire, New Mexico, Ohio, Oklahoma, Oregon, and West Virginia have

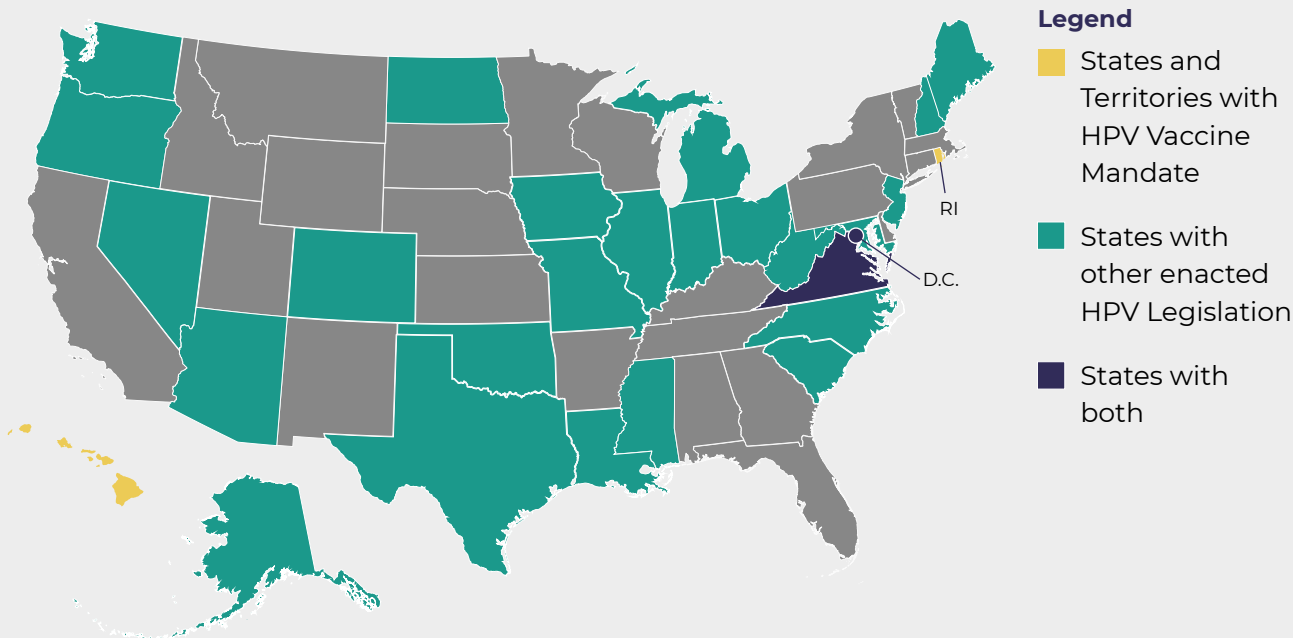
all passed laws aimed at easing the cost of the HPV vaccine, either by providing state funding or mandating that insurers cover the cost of the vaccine.⁷²

Colorado, Illinois, Indiana, North Dakota, Texas, and the District of Columbia have all passed laws creating taskforces, committees, or studies to create recommendations for the HPV vaccine.⁷³

Figure 4

United States Map of Enacted HPV-Related Mandates and Legislation

Legislation is one promising pathway to support increased HPV vaccine uptake. Many states have enacted legislation related to the funding, study, or education of patients related to the HPV vaccine, while relatively few have more stringent mandates.





State Executive Action

Another possible pathway to increase rates of completion of the HPV vaccine is through state-level executive action.

In 2007, the year after the HPV vaccine was first recommended by the ACIP for girls between the ages of 11 and 12,⁷⁴ Governor Rick Perry of Texas issued Executive Order RP65 mandating the vaccine for females prior to admission to the sixth grade.⁷⁵ The executive order was overturned within months by the Texas House of Representatives through a vote of 118 to 23.⁷⁶ Although Governor Perry defended his position initially, he revised his stance during his presidential campaign in 2011, highlighting the politicized treatment of the HPV vaccine.⁷⁷ Since Governor Perry's executive order was overturned in 2007, no other state executive has pursued an increase in HPV vaccine uptake through executive action.

Generally, however, state executive action has been used to promote vaccination requirements. For example, in California, executive action has been used to successfully require and recommend a number of vaccinations for college entry. In 2019, Executive Order 803 updated the immunization requirements for attendance at California State University campuses; the Executive Order tracked the California Department of Health's list of vaccines that should be required, which does not currently include HPV.⁷⁸

State Administrative Action

Rather than pursuing legislative or executive action, Rhode Island and Hawaii have targeted HPV through administrative action. Rhode Island used legislation to vest power in the Director of Health to promulgate immunization regulations. Pursuant to these laws, 216-RICR-30-05-3.5.2 requires the HPV vaccine for all school age children. Hawaii's mandate for all students in grades seven through twelve to receive the vaccine is similarly promulgated through an administrative rule from the state Department of Health and Human Services.⁷⁹ Notably, both the Rhode Island regulation and the Hawaii administrative rule offer fewer exemption categories than the D.C. and Virginia legislative mandates. They allow exemptions only for religious objection or proof from a medical professional that the student should be exempt for medical reasons, limiting the extent to which parents and guardians are permitted to refuse the vaccine on their child's behalf.

In California, executive action has been used to successfully require and recommend a number of vaccinations for college entry.



Practitioner Focus

Communication between healthcare providers and patients is one of the strongest predictors of HPV vaccination.⁸⁰ One promising approach to increase uptake of the HPV vaccine is to focus on provider-patient interactions and to give providers the best tools to educate their patients on the HPV vaccine. Conversations between medical professionals and patients or patients' parents and guardians can help emphasize the importance of the HPV vaccine as a cancer prevention tool. This may serve to combat the stigma brought on by the HPV vaccine's historical association with sexually transmitted disease.

To aid providers in navigating these interactions, the CDC published "Top 10 Tips for HPV Vaccination Success."⁸¹ Among these tips for providers, the CDC recommends bundling the HPV vaccine with other vaccination recommendations, and emphasizing vaccination against HPV-related cancers — not just HPV.

Another useful resource for healthcare providers counseling patients and parents on the HPV vaccine is the "HPV Vaccine Myth Busting for Health Care Providers Social Media Toolkit," published by the George Washington University Cancer Center. This toolkit offers providers tips on social media usage to promote awareness of the HPV vaccine and best practices for provider communication about the HPV vaccine.⁸²

Other Points of Access: Pharmacists and Dentists

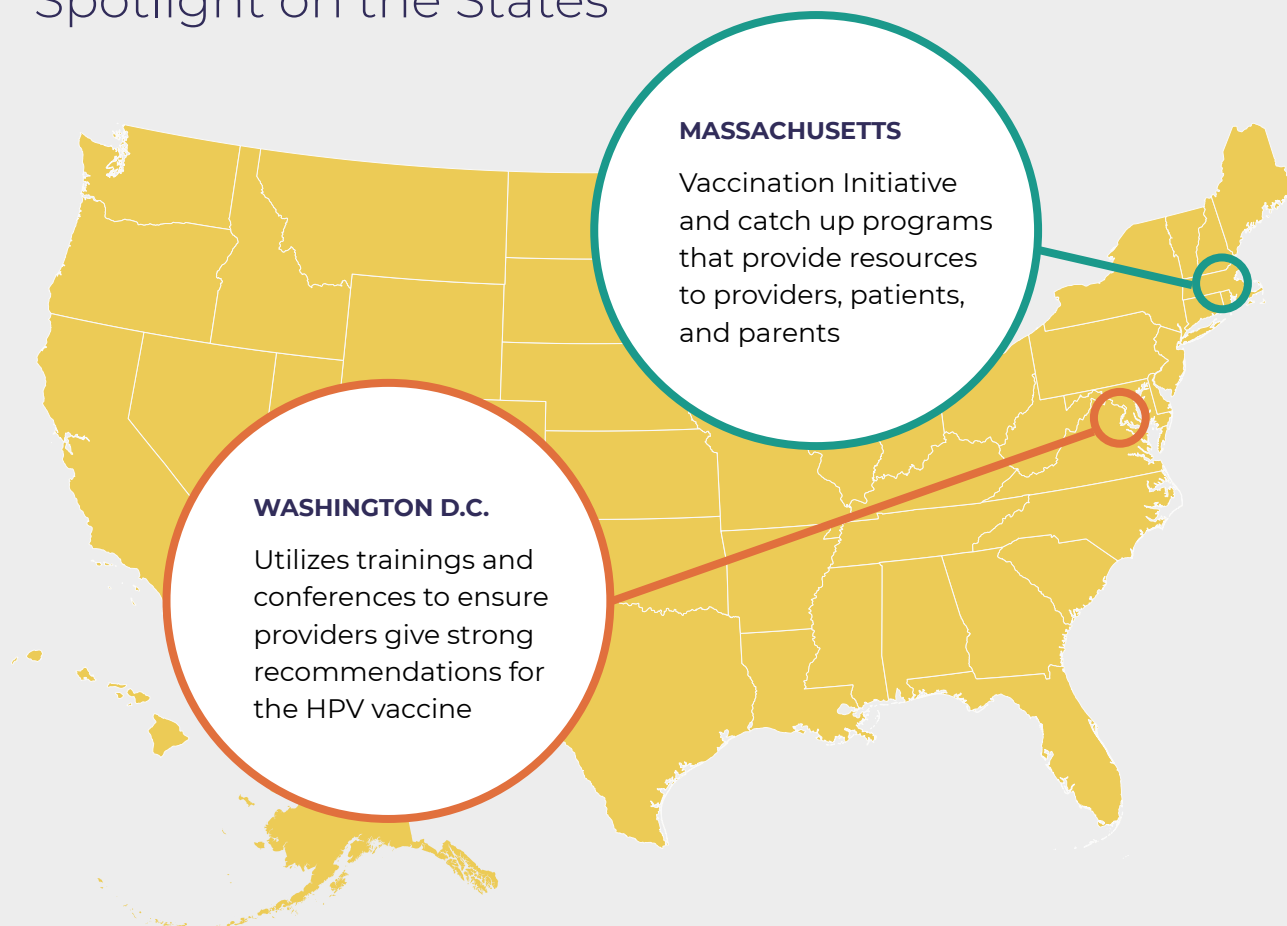
Another potential pathway to increasing uptake of the HPV vaccine is to increase points of access to receive the vaccine. This method may be particularly useful in reaching rural populations, where access to physicians may be limited.

Currently, 22 states allow pharmacists to give HPV vaccines to patients between the age of 11 and 12, but nine of those states require a patient-specific prescription.⁸³ California is one of only two states, along with Idaho, that allows pharmacists to administer the HPV vaccine without a prescription or standing order.⁸⁴ One method of increasing uptake would be to promote vaccination at pharmacies, though administrative burdens of participating in specific vaccination programs may be a barrier for interested pharmacies.

Dental offices present another potential point of access with both the tools to administer vaccines and an interest in protecting patient populations from HPV and associated cancers. In 2018, the American Dental Association adopted a policy that urged dentists to support the use and administration of the HPV vaccine in response to growing rates of HPV-related oropharyngeal cancers.⁸⁵ In 2019, Oregon passed a law that added the prescription and administration of vaccines into a dentist's scope of practice, becoming the first state to do so.⁸⁶

Figure 5

Spotlight on the States



Many states have focused on provider outreach in order to increase vaccination rates in their states. For example, the District of Columbia (which has one of the highest vaccine rates in the country despite having one of the least restrictive mandates) has utilized trainings and conferences to ensure providers give strong recommendations for the HPV vaccine.⁸⁷

In Massachusetts, state officials have a strong and collaborative partnership with the Massachusetts Chapter of the American Academy of Pediatrics (MCAAP). The MCAAP has a Vaccination Initiative that provides resources for providers, patients, and parents on HPV and other childhood vaccines, with a current emphasis on vaccine catch-up programs.⁸⁸

Allowing pharmacists and dentists to administer the HPV vaccine could increase rates of uptake of the vaccine by reducing the barriers to access. Patients who visit a general practitioner infrequently may have more regular contact with a dentist or pharmacist. Furthermore, for patients and their guardians who may be resistant to the vaccine as a result of its association with sexually-transmitted disease, conversations with a dentist regarding the risk of oropharyngeal cancer may serve to underline the importance of the HPV vaccine as a cancer prevention tool.

Targeting the College Population

With vaccination rates for target populations lower than desired by many health professionals, targeting college-age students presents an opportunity to impact total rates of HPV vaccine uptake and prevent HPV-related cancers.⁸⁹ Although vaccination is recommended at the age of 11 or 12 and the vaccine is most effective when administered before any sexual activity, vaccination is still recommended for everyone up to age 26 because there are multiple strains of HPV to protect against.

Targeting college-age students presents an opportunity to impact total rates of HPV vaccine uptake and prevent HPV-related cancers.

A 2012 study looked into the feasibility of a “catch up” vaccination program for college students and found that knowledge of the vaccine was moderate, and especially weak regarding its use as a cancer-prevention tool.⁹⁰ The same study found that 71% of student participants were eligible and willing to receive school-based HPV vaccines at college. These data are encouraging and show that a college-based vaccination program could be very beneficial.

COVID-19

In October 2021, California signaled its intent to require COVID-19 vaccination for public school attendance once the FDA has fully approved the vaccines for children.⁹¹ While it remains to be seen how the state intends to enact the requirement, its chosen levers may be instructive for HPV vaccine pathways in California. Both Louisiana and the District of Columbia have announced similar requirements pending FDA approval.⁹²

The CDC has warned that disruptions to childhood vaccination schedules as a result of the COVID-19 pandemic may create significant risks of vaccine-preventable disease outbreaks among children and adolescents as schools resume in-person learning.⁹³ Although pediatric vaccination has returned to pre-pandemic levels in recent months, the increase remains insufficient to account for its steep decline in early 2020.⁹⁴ As recovery from COVID-19 continues, states will have to contend both with the delays in care and the pervasive vaccine hesitancy that the pandemic has left in its wake.



Conclusion

Despite the HPV vaccine's proven efficacy at reducing rates of HPV and associated cancers, uptake remains low across the United States. Low demand, inadequate provider recommendations, limited individual awareness, financial concerns, and sexuality-related stigma have all contributed to this problem. Faced with an array of challenges, no one policy pathway will be the solution: increasing HPV vaccine uptake

will require coordinated, multi-pronged approaches that give careful consideration to the needs and context of target populations. State policy-makers, educational institutions, and healthcare providers of all kinds have important roles to play in promoting uptake and improving health outcomes. It is our hope that this resource may serve as a tool in occupying those roles effectively.



Resource Library

PRESIDENT'S CANCER PANEL, *HPV Vaccination for Cancer Prevention: Progress, Opportunities, and a Renewed Call to Action*, <https://prescancerpanel.cancer.gov/report/hpvupdate/>

In 2018, the President's Cancer Panel published a report designed to provide an overview of progress made with the HPV vaccine in the preceding five years and to identify strategies to increase uptake of the HPV vaccine. This resource includes information on efforts related to the HPV Vaccine and sets four new goals moving forward.

CALIFORNIA HPV VACCINATION ROUNDTABLE, <https://cahpvroundtable.org/>

The California HPV Vaccination is a statewide coalition of various stakeholders, including members that represent immunization, cancer control, academia, community organizations, state and local agencies, among others, who work together to prevent HPV-associated cancers and pre-cancers by increasing the HPV vaccination among the recommended age group.

HPV Vaccination Project, MAINE AREA HEALTH EDUCATION CENTER, <https://www.une.edu/ahec/hpv-vaccination-project>

The Maine Area Health Education Center received funding from the CDC to provide continuing education to health professionals about the HPV vaccine. This resource includes Clinician FAQs, recommendations for improving general practice related to the HPV Vaccine, HPV Fact Sheets, and documents with tips on how to talk to parents.

HPV CAMPUS VACCINATION CAMPAIGN, <https://www.hpv-cvc.org/>

This resource provides downloadable visual messaging tools, including patient brochures, bulletin boards, slide sets, and pre-visit patient questionnaires that providers can use to increase uptake of the HPV vaccine.

Mission: HPV Cancer Free, AMERICAN CANCER SOCIETY, <https://www.cancer.org/healthy/hpv-vaccine.html>

This resource focuses on the HPV vaccine as a cancer-prevention tool and includes downloadable info graphs highlighting the importance of the HPV vaccine in the fight against cancer.

NATIONAL HPV VACCINATION ROUNDTABLE, <https://hpvroundtable.org/>

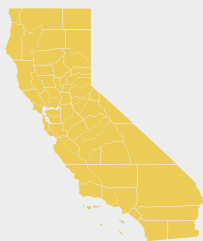
The National HPV Vaccination Roundtable is a coalition of organizations across the country that work at the intersection of immunization and cancer prevention.

"We Need Access": Ending Preventable Deaths from Cervical Cancer in Rural Georgia, HUMAN RIGHTS WATCH AND SOUTHERN RURAL BLACK WOMEN'S INITIATIVE FOR ECONOMIC AND SOCIAL JUSTICE, https://www.hrw.org/sites/default/files/media_2022/01/us_cervicalcancer0122_web.pdf

This resource documents racial disparity in access comprehensive cervical cancer treatment and makes recommendations for how state and federal policies can better address the healthcare needs of rural Black women.

A Review of Pathways for California

There are many different paths available to stakeholders looking to increase completion rates of the HPV vaccine in California. Different states, countries, and advocacy groups have increased uptake of the vaccine through legislative action, regulatory action, school-based vaccination programs, and aiding providers in their direct-to-patient outreach. Based on California's specific barriers and opportunities, this toolkit recommends four key pathways:



Current California Public University Immunization Requirements

California has two public university systems: California State University (CSU) and the University of California (UC), which require a number of vaccinations, both by statute and through the California Department of Public Health (CDPH).

CSU, with 23 campuses, requires that incoming students are vaccinated for hepatitis B (HBV) in accordance with the California Health and Safety Code.⁹⁵ The University of California, with 10 campuses, is exempted from the mandate unless the Regents of the University of California expressly adopt the provision, and they have not.⁹⁶

CSU has a series of required immunizations beyond the statutorily mandated HBV and meningococcal vaccines. In March of 2019, Executive Order 803 (EO) was issued on immunization requirements for CSU campuses, which are based on CDPH's immunization and screening recommendations for college students.⁹⁷ HPV is not required by this order, but is listed under *recommended immunizations and screenings for people through age 26*.⁹⁸ This designation means that students are “strongly encouraged” to obtain the service and that students are directed to discuss the service with a health care provider.

UC campuses, although not covered by the EO, also elect to follow CDPH recommendations.⁹⁹ The current UC Immunization Policy requires incoming students to obtain the vaccinations recommended by CDPH for those diseases that can be passed on to others by respiratory transmission.¹⁰⁰ All UC campuses require HBV, TB, measles, mumps and rubella, meningococcus, varicella, and tetanus, diphtheria and pertussis.¹⁰¹ Like CSU, UC also strongly recommends the HPV vaccine but does not require it.¹⁰²

CDPH ACTION

Although the HPV vaccine is recommended as young as 11, the CDC recommends the vaccine through the age of 26 (with shared clinical decision-making for people aged 27 to 45 years).¹⁰³ College students may have already been exposed to some strains of HPV, but because there are many strains of HPV the vaccine can still be a helpful cancer prevention tool for that population. Targeting college students is a step in the right direction in order to increase rates of completion for the population as a whole.

Because CSU is mandated to follow CDPH recommendations and UC has elected to follow the current UC Immunization Policy, one key pathway to increase uptake of the HPV vaccine in California would be for CDPH to update its current recommendations to reflect the ACIP's recommendations and include the HPV vaccine.

LEGISLATIVE OR REGULATORY MANDATE

State law can mandate, or state agencies may regulate, receipt of the HPV vaccine for school entry. Of the four jurisdictions that have such mandates, three are in the top five states for rates of up-to-date vaccination of the HPV vaccine.¹⁰⁴

INCREASED ACCESS POINTS

California already allows pharmacists to administer the HPV vaccine; however, many do not do so.¹⁰⁵ Investigating barriers to pharmacists administering the vaccine may be instructive, particularly for increasing

vaccine uptake in rural communities. Another opportunity to increase access to the HPV vaccine would be to pass legislation or promulgate regulations allowing dentists to administer the HPV vaccine.

PROVIDER OUTREACH

A low-cost pathway to increasing uptake of the HPV vaccine in California would be to increase resources and support for provider direct-to-patient outreach. As stated in this toolkit, communication between healthcare providers and patients is one of the strongest predictors of HPV vaccination.¹⁰⁶ Effective provider-patient communication is likely to prove complementary to any chosen policy pathway.

SCHOOL-BASED VACCINATION PROGRAMS

School-based vaccination programs have seen great success in other countries and in pilot programs, like the SBHCs in Denver, in increasing uptake of the HPV vaccine.

Not only are these programs demonstrably successful and recommended by the ACIP, but they also help to address disparities among populations that arise from a lack of access to healthcare. Disparities in cervical cancer among racial groups and between rural and urban populations have been observed. Widespread school-based vaccination programs aimed at increasing access and uptake of the HPV vaccine could not only help prevent cancer, but also combat these disparities.

Appendix B

California Age-Adjusted Rate of HPV-Attributable Cancers by County

The following table represents data collected and analyzed by the California HPV Vaccination Roundtable's Using and Improving HPV Vaccination Data Workgroup (Data Workgroup). The Data Workgroup used base data from the California Cancer Registry (CCR). To address data suppression in smaller counties, county groupings were used where there were fewer than 11 total HPV-attributable cases.¹⁰⁷

County	Age-adjusted rate of HPV-attributable cancers (per 100,000)	County	Age-adjusted rate of HPV-attributable cancers (per 100,000)
All California	8.6	Orange	8.1
Alameda	7.5	Placer	9.7
Alpine, Amador, and Calaveras	9.8	Riverside	9.8
Butte	10.9	Sacramento	10.2
Colusa, Glenn, Tehama	11.9	San Benito	9.6
Contra Costa	7.8	San Bernardino	9.3
Del Norte, Humboldt	11.2	San Diego	9.2
El Dorado	9.6	San Francisco	9
Fresno	8	San Joaquin	9.2
Imperial	7.7	San Luis Obispo	9
Inyo, Mono	9.2	San Mateo	7.1
Kern	9.4	Santa Barbara	8.5
Kings	9.7	Santa Clara	6.2
Lake	11.5	Santa Cruz	9.5
Lassen, Modoc, Plumas	10.2	Shasta	11.5
Los Angeles	8.2	Sierra, Yuba	8.9
Madera	8.6	Siskiyou, Trinity	10
Marin	10.4	Solano	8.5
Mariposa, Tuolumne	9.8	Sonoma	9.9
Mendocino	9.8	Stanislaus	8.7
Merced	8.2	Sutter	9.4
Monterey	8.5	Tulare	10.4
Napa	10.3	Ventura	8.9
Nevada	7.8	Yolo	8.3

Credit: *Assessment of Human Papillomavirus (HPV) Attributable Cancers and Vaccination Rates in California*, CALIFORNIA HPV VACCINATION ROUNDTABLE (2020).

Rate of Up-to-Date HPV Vaccination by State

The following table ranks states by up-to-date HPV vaccination rates among adolescents aged 13–17 years in 2020 based on data collected by the National Immunization Survey.¹⁰⁸ Participants are considered up-to-date when they have received the recommended doses of the HPV vaccine, either two doses if they received the vaccine before they were 15 or three doses if they receive the vaccine after the age of 15.

Jurisdiction	Rate of Up-to-date HPV Vaccination	95% Confidence Interval	Jurisdiction	Rate of Up-to-date HPV Vaccination	95% Confidence Interval
United States	58.6	57.3–60.0	26 New Jersey	59.7	53.1–66.0
1 Rhode Island	83.0	76.9–87.7	27 New Mexico	59.2	53.0–65.1
2 Hawaii	73.9	67.6–79.4	28 Washington	59.0	52.2–65.5
3 Massachusetts	73.4	67.6–78.5	29 Virginia	56.4	50.0–62.5
4 District of Columbia	72.3	65.1–78.5	30 Kentucky	55.7	48.3–62.9
5 South Dakota	71.5	65.4–76.9	31 Alaska	54.9	47.8–61.8
6 Vermont	70.5	64.5–75.8	32 Georgia	54.9	47.7–62.0
7 North Dakota	70.3	64.0–76.0	33 Texas	54.9	49.9–59.9
8 Minnesota	69.2	62.5–75.1	34 Idaho	54.5	47.9–61.0
9 New Hampshire	68.8	63.1–73.9	35 Montana	54.4	47.6–61.0
10 New York	68.1	63.5–72.4	36 Missouri	53.6	46.9–60.1
11 Pennsylvania	67.1	61.2–72.5	37 Indiana	53.4	46.4–60.2
12 Connecticut	66.9	60.5–72.7	38 Kansas	53.3	46.9–59.6
13 Maryland	66.8	61.9–71.3	39 Ohio	53.2	46.4–59.8
14 Colorado	66.4	59.9–72.4	40 Alabama	52.9	46.3–59.4
15 Nebraska	64.8	58.9–70.3	41 Tennessee	52.9	46.3–59.4
16 Maine	63.5	57.5–69.1	42 Florida	51.6	44.4–58.7
17 Delaware	63.2	56.6–69.2	43 Arizona	51.4	45.0–57.7
18 Illinois	63.1	57.9–68.1	44 Nevada	50.1	43.4–56.8
19 California	62.3	55.4–68.8	45 Arkansas	49.6	42.6–56.5
20 Oregon	61.6	55.0–67.8	46 South Carolina	47.0	40.2–53.8
21 Wisconsin	61.5	54.4–68.0	47 Oklahoma	45.8	39.4–52.3
22 Michigan	61.3	55.1–67.2	48 Utah	45.0	38.1–52.1
23 North Carolina	60.7	53.4–67.5	49 Wyoming	44.8	38.3–51.4
24 Louisiana	60.4	53.6–66.8	50 West Virginia	43.4	37.1–49.8
25 Iowa	60.3	53.4–66.8	51 Mississippi	31.9	25.9–38.5

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