St. Jude Children's Research Hospital

HPV Cancer Prevention Program

PATH to prevention

Analysis of Public Policy Decisions and Factors Driving HPV Vaccination Coverage in the United States

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Every year, millions of individuals in the United States (U.S.) are exposed to human papillomavirus (HPV), a virus that is linked to six different types of cancer affecting everyone. Approximately 13 million Americans will become infected with HPV each year, and more than 37,000 individuals will develop HPV cancers.[1,2] Fortunately, there is a vaccine available that is safe, effective, and proven to help prevent more than 90% of the cancers caused by HPV;[3] however, too many vaccine-eligible individuals are not getting vaccinated as recommended. As a result, a diverse group of partners, providers, advocates, policymakers, and interest groups have been seeking innovative policy solutions to increase HPV vaccination coverage. Increasing HPV vaccination coverage will reduce HPV cancer incidence and mortality and will contribute significantly to the effort to eliminate HPV cancers.

Through activities focused on clinical interventions, community interventions, and public policy and advocacy efforts, the HPV Cancer Prevention Program at St. Jude Children's Research Hospital strives to galvanize existing successful efforts and to introduce new ones to support increasing HPV vaccination coverage in the U.S. St. Jude partnered with FTI Consulting to examine public policy decisions and related factors that drive HPV vaccination coverage across the U.S. Ultimately, the research and analysis conducted by FTI Consulting are intended to educate and inform allies, partners, and advocates about public policy strategies, approaches, and opportunities that might have a meaningful impact on national, state, and local HPV vaccination coverage efforts.

FACTORS EXAMINED

The research and analysis conducted by FTI Consulting examined the relationship between HPV vaccination initiation and series completion with regard to nine factors:

- Medicaid expansion
- Insurance coverage
- Parents' educational level
- Access to pediatricians and primary care physicians
- Access to Vaccines for Children (VFC) providers
- Coverage of other adolescent vaccinations
- Vaccination exemptions
- Vaccination requirements
- Rurality (i.e., the percentage of the population living in rural geographic regions of the U.S.)

POLICY RECOMMENDATIONS

The analysis revealed factors with a positive relationship to HPV vaccination that may be leveraged to increase HPV vaccination coverage. Conversely, existing and new policies and regulations could help address factors that have a negative impact on HPV vaccination coverage. Using the results of the analysis, FTI Consulting developed five policy recommendations to improve HPV vaccination coverage:

- Leverage meningococcal conjugate vaccination as a model for HPV vaccination education and recommendations;
- Expand health care provider and practice staff education and training related to HPV vaccination and strengthen HPV vaccination recommendations for parents and caregivers;
- Improve recruitment efforts to enroll various health care provider types at the state level in the federal Vaccines for Children (VFC) program;
- Expand the resources available to improve HPV vaccination data collection and reporting through state immunization information systems (IISs); and
- Engage in efforts to preserve and expand eligibility for Medicaid.

Increased HPV vaccination series completion and reduced HPV cancer incidence resulting from addressing these policy factors could reduce national direct health care expenditures by more than $26 million.

COST SAVINGS ANALYSIS

FTI Consulting also conducted a cost savings analysis. The analysis projects increased HPV vaccination series *initiation* and reduced HPV cancer incidence resulting from addressing these policy factors could reduce national direct health care expenditures by more than $24 million. In addition, increased HPV vaccination series *completion* and reduced HPV cancer incidence could reduce national direct health care expenditures by more than $26 million.

BENEFITS OF HPV CANCER PREVENTION THROUGH POLICY CHANGE

Implementing these new policies requires investment and participation by multiple partners across sectors at the national, regional, state, local, and system levels. Therefore, allies must prioritize collaboration to achieve increased HPV vaccination coverage. Partners must work together to develop consistent and effective HPV cancer prevention messaging, educational tools, and resources that consider the differing needs of communities and the individuals and families within these communities. In addition, partners should be prepared to communicate the value of HPV vaccination to policymakers and health care experts who can provide the funds, coordination, and staffing needed to support, expand, and initiate the policy recommendations detailed in this report.

METHODS

FTI Consulting performed quantitative research and analysis in the form of multivariate regression analyses, testing the relationship between HPV vaccination initiation and completion with regard to nine key factors that affect HPV vaccination coverage: (1) Medicaid expansion (nationally and in rural areas); (2) parental education (college or above); (3) access to pediatricians and primary care physicians (nationally and in rural areas); (4) access to VFC providers (nationally and in rural areas); (5) commercial and public insurance status of children; (6) other childhood vaccination coverage (meningococcal vaccine and Tdap); (7) vaccination exemptions; (8) vaccination requirements; and (9) rural areas (i.e., the percentage of the population living in rural areas). All findings, including affiliated factors, HPV cancer incidence rates, and HPV vaccination initiation and series completion rates, were derived from pre-pandemic data. To perform the analysis, FTI Consulting used data from the U.S. Census Bureau's American Community Survey (ACS) and Decennial Census of Population and Housing, County Health Rankings & Roadmaps (CHR&R), the National Center for Education Statistics (NCES-ED), the Centers for Disease Control and Prevention (CDC), the Kaiser Family Foundation (KFF), and the American Board of Pediatrics.

FTI Consulting also performed a cost savings analysis to estimate the potential direct medical cost savings as a result of increased HPV vaccination initiation and series completion and the subsequent reduced incidence of HPV cancer. Using CDC data and peer-reviewed literature,[3,4] FTI Consulting applied cancer treatment costs, HPV cancer cases, and available HPV vaccine effectiveness information to the regression model results to estimate the cost savings that would result from increased HPV vaccination initiation and series completion and the subsequent reduced incidence of cancer.[5,6, 7,8,9,10,11] In terms of treatment costs, average direct medical costs during the first two years after diagnosis were used in the model. Direct medical costs include medical care services, such as physician services, diagnostic tests, and hospitalization expenses. Cost savings were calculated for four actionable policy factors: average meningococcal conjugate vaccination coverage, Medicaid expansion, access to VFC providers, and access to pediatricians. The estimates comprise direct medical costs only during the first two years after the diagnosis of an HPV cancer. The net cost savings over the lifetimes of these patients would be much larger. The study was unable to characterize pre-cancers of the cervix and other HPV diseases for this analysis.

The quantitative analysis was complemented by qualitative research, including two focus groups and five one-on-one interviews with people who identified as providers, public health experts, patient advocates, and/or cancer prevention and control researchers. The results of both the quantitative and qualitative analysis were used to inform policy insights and recommendations related to the observed factors.

POLICY RECOMMENDATIONS

Recommendation 1:
Leverage meningococcal conjugate vaccination as a model for HPV vaccination education and recommendations

Coverage for meningococcal conjugate vaccination, which, like HPV vaccination, is recommended for children starting at 11 years of age but is not consistently required for school entry nationwide, had the strongest positive relation with HPV vaccination initiation and series completion in the regression analysis. Additional research shows that adolescents who receive at least one other childhood vaccine are more likely than their counterparts to initiate

HPV vaccination, indicating that meningococcal conjugate vaccination could be leveraged as a key factor influencing HPV vaccination.[12] The cost savings analysis by FTI Consulting found that a 1% increase in meningococcal conjugate vaccination coverage is associated with more than $13 million in savings during the first two years after an HPV cancer diagnosis as a result of increased HPV vaccination series initiation and, therefore, a reduced incidence of HPV cancer. A 1% increase in meningococcal conjugate vaccination coverage is also associated with more than $16 million in savings during the first two years after an HPV cancer diagnosis as a result of increased HPV vaccination series completion and, therefore, a reduced incidence of HPV cancer.

Policies should encourage training health care providers to recommend HPV vaccination as strongly as they recommend the meningococcal conjugate vaccine. Additionally, health systems and payors should establish a plan to educate and incentivize providers who have a large gap between HPV vaccination and meningococcal conjugate vaccination rates.

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Recommendation 2:
Expand health care provider and practice staff education and training related to HPV vaccination and strengthen HPV vaccination recommendations for parents and caregivers

Parental education level of college or higher was the second largest factor with a positive impact on HPV vaccination initiation and series completion in the analysis. Although cancer prevention partners and advocates may not be positioned to affect the education level of parents and caregivers, there are other ways to increase knowledge of HPV vaccination. Qualitative research participants said that the decision of parents or caregivers – those who make vaccination decisions in a family – to vaccinate their children is largely contingent on a recommendation from their child's health care provider. Providers are key to facilitating vaccination but focus group and interview participants indicated that providers receive inconsistent messaging about HPV vaccination and cancer prevention from national public health, vaccinations, and cancer control leaders, which affects their vaccine recommendations and practices. Research participants emphasized the need for consistent messaging from organizations and leaders at the national and local levels that HPV vaccination is a cancer prevention measure.

Broadening the reach and dissemination of existing training and educational programs and leveraging cancer specialists and oncologists as messengers could improve providers' understanding of the HPV vaccine as a cancer prevention vaccine. These training and education programs also empower providers and practice staff to address educational gaps among parents, caregivers, and patients. This training should extend across health systems and practices to ensure that patients, parents, and caregivers receive consistent messaging at

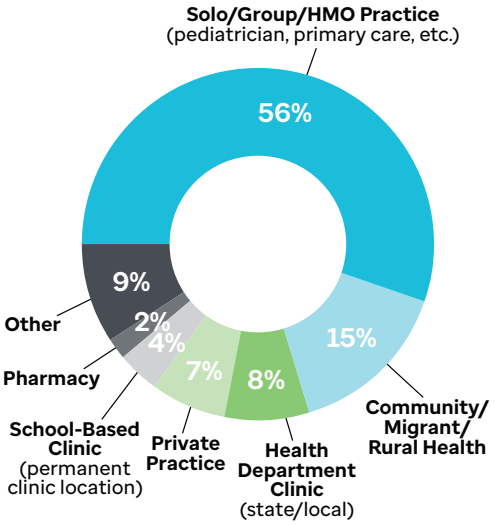
every touchpoint in the health care provider's office and when seeking care. In addition, emphasis should be placed on provider and practice training to initiate the vaccination series as a cancer prevention method at 9 years of age to ensure series completion by 13 years of age. This approach will also combat parental and caregiver hesitancy surrounding the administration of multiple vaccinations recommended during the well-child visit at 11 years of age and increases the likelihood of the child being vaccinated before exposure to HPV, which is when the vaccine is most effective.

Recommendation 3:

Improve efforts to recruit various types of health care providers at the state level and enroll them in the federal Vaccines for Children (VFC) program

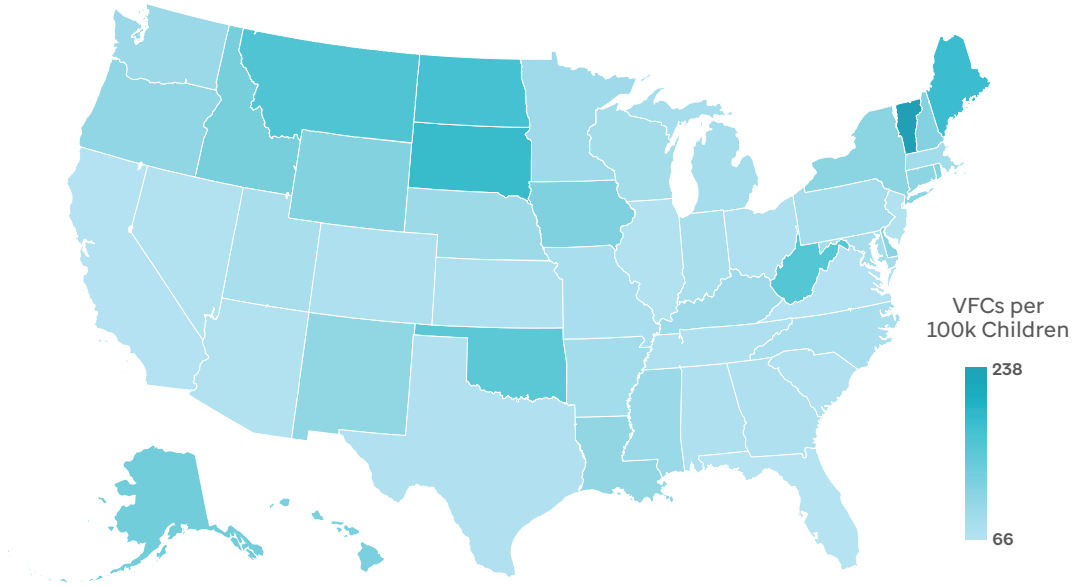
Policymakers and state-level decision makers should aim to improve VFC provider participation nationwide by increasing the recruitment and enrollment of diverse provider types, such as pharmacists or oral health providers, who could increase access to HPV vaccination for people living in rural areas and those with lower incomes. Policymakers should also establish a mechanism for payors, health systems, and other trusted providers, such as oncologists, to recruit providers and incentivize their participation in the program. *Figure 1* shows the current breakdown of VFC provider types. *Figure 2* shows the number of VFC providers per 100,000 children in each state.

FIGURE 1 VFC Provider Types, 2022



Source: Data provided by CDC, 2022

FIGURE 2 Number of VFC Providers per 100,000 Children by State, 2022



Source: Data provided by CDC, 2022

Recommendation 4:

Expand the resources available to improve HPV vaccination data collection and reporting through state immunization information systems (IISs)

State IISs, or immunization registries, enable health care providers, public health officials, and health care organizations to report, collect, and access information about vaccines administered to individuals at the state or local level. Data collection and reporting have a significant impact on the measurement and evaluation of targeted interventions and on the investment of resources to increase HPV vaccination coverage. However, HPV data collection has been inconsistent, resulting in incomplete reporting. Additionally, the systems and platforms through which vaccination data are reported and accessed vary greatly. Interview and focus group participants agreed that standardized, comparable (cross-jurisdiction) data would improve HPV vaccination series completion. In addition, participants noted that data visibility and sharing would give key partners greater insight into HPV vaccination coverage in their communities and regions, helping them to understand how and where to improve coverage.

A critical first step in improving collaboration among HPV vaccination partners to increase vaccination coverage is establishing reliable and standardized data collection procedures. To do this, state and federal officials should increase funding to improve and expand IIS capacity. Additional funding could be used to improve infrastructure, e.g., by introducing bi-directional cloud-based systems to enable real-time data analysis and visualization reporting (i.e., dashboards). Furthermore, all clinical staff, not only health care providers, should be trained in and educated about accessing the state IISs and entering data promptly and accurately.

Finally, establishing a centralized national immunization registry could help standardize immunization data collection to improve reporting methods, vaccination rates, and data quality and coverage.

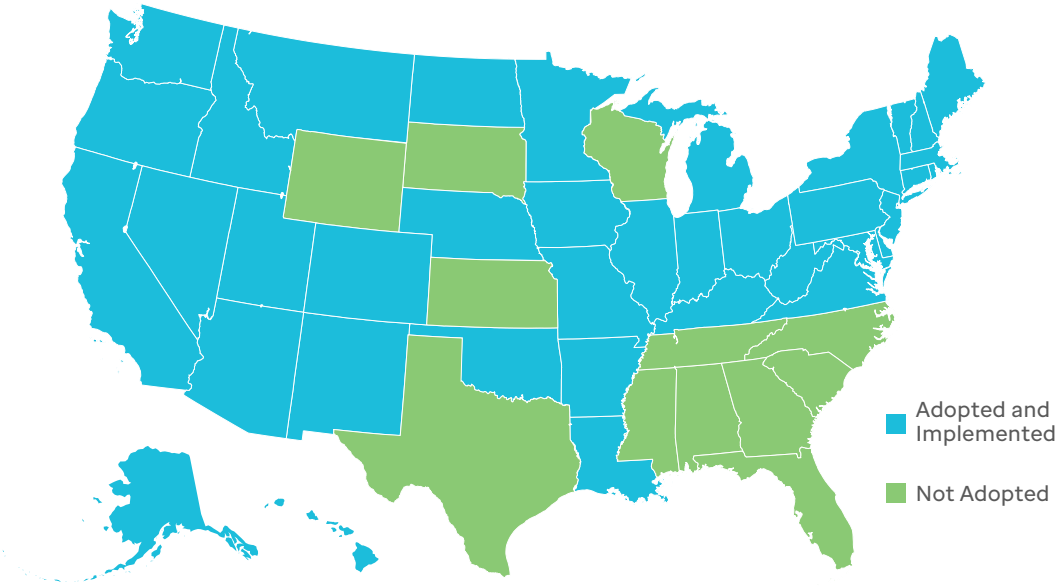
Recommendation 5:

Engage in efforts to preserve and expand eligibility for Medicaid

Many experts view Medicaid expansion as a public policy change that is instrumental to increasing HPV vaccination coverage.[13] The 2010 Patient Protection and Affordable Care Act (ACA) improved access to comprehensive and affordable health insurance coverage for countless individuals and families, including millions of low-income adults, and increased HPV vaccination series completion.[14] Since the passage of the ACA, 12 states have chosen not to expand eligibility for their state Medicaid programs, leaving more than 2 million individuals without access to health care coverage, as shown in *Figure 3*.

Medicaid expansion in the 12 non-expansion states is predicted to be associated with more than $10.5 million in savings during the first two years after an HPV cancer diagnosis as a result of increased HPV vaccination initiation and the subsequent reduced incidence of HPV cancers.

FIGURE 3 Status of State Action on the Medicaid Expansion Decision



Source: "Status of State Action on the Medicaid Expansion Decision," Kaiser Family Foundation

The regression analysis by FTI Consulting found that Medicaid expansion correlates positively and significantly with HPV vaccination coverage. Moreover, the cost savings analysis estimates that Medicaid expansion in the 12 non-expansion states is predicted to be associated with more than $10.5 million in savings during the first two years after an HPV cancer diagnosis as a result of increased HPV vaccination initiation and the subsequent reduced incidence of HPV cancers.

These findings demonstrate that expanding access to health insurance coverage through Medicaid expansion has a positive impact on HPV vaccination coverage. Partners, advocates, and policymakers should encourage states that have yet to expand Medicaid to consider taking advantage of the opportunities associated with expansion. Partners may also want to consider that advocating for Medicaid expansion in the 12 non-expansion states could be more effective if pursued as a policy change in conjunction with other HPV prevention policy proposals.[13]

CONCLUSION

The introduction and recommendation of the HPV vaccine in the U.S. in 2006 changed the lives of millions of individuals and families in the U.S.; however, there is still a need for significant efforts nationwide to improve access to HPV vaccination, raise awareness of its importance, and increase the number of HPV vaccinations administered to children and adolescents. To increase HPV vaccination initiation and series completion significantly, policymakers, interest groups, and health systems should consider a combination of existing and new policies, specifically those discussed in this report.

The long-lasting implications of raising HPV vaccination initiation and series completion rates would manifest in several ways; not only can HPV vaccination reduce the incidence of HPV cancer from more than 37,000 diagnoses every year,[2] but the nation's health care system could realize millions of dollars in savings. FTI Consulting's findings show that increased HPV vaccination initiation and a reduction in HPV cancer incidence as a result of addressing the four actionable policy factors tested in the regression analysis, i.e., meningococcal conjugate vaccination coverage, Medicaid expansion, access to VFC providers, and access to pediatricians, could reduce national direct health care expenditures by more than $24 million. Likewise, the cost savings analysis estimates that increased HPV vaccination series completion and a reduction in cancer incidence as a result of addressing these four factors could reduce national direct health care expenditures by more than $26 million.

The aim of this report has been to provide a roadmap for the hopeful future of HPV cancer prevention through increased HPV vaccination coverage, as well as to inspire partners, advocates, and interest groups. At the core of the recommendations that we have offered are several universal themes that must be prioritized in the next stage of HPV advocacy. These are requirements for a collaborative effort between local, state, and national HPV vaccination and cancer prevention leaders; an understanding of the differing needs of local communities, regions, and geographies and the potential impact of targeted approaches on HPV vaccination coverage efforts and strategies; consistency in cancer prevention messaging and education; and the setting of standards for how care related to HPV can be delivered, measured, and improved. The use of these resources and the other tools offered in this report can increase HPV vaccination rates and reduce the number of individuals and families facing a diagnosis of a preventable cancer.

The evidence is indisputable: HPV vaccination is cancer prevention. Unfortunately, the U.S. continues to underutilize the vaccine's power as a lifesaving cancer prevention tool, as demonstrated by the nation's suboptimal HPV vaccination coverage. For society to reap the full benefits of this vaccine, policy change must be pursued at multiple levels to address systemic barriers to HPV vaccination coverage and provide long-lasting, sustainable, meaningful, and measurable impact. Through policy change, partners and advocates can prioritize, promote, and change social norms that will improve population health for generations. The pursuit of evidence-based policy change will allow us to realize the full potential and promise of the HPV vaccine – the complete eradication of HPV cancers.

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St. Jude Children's Research Hospital

HPV Cancer Prevention Program

stjude.org/hpv

preventhpv@stjude.org

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