



## Executive Summary

### OVERVIEW

Despite a history of remarkable successes and recent advances in research and development, today's U.S. vaccine enterprise is strained. Recent years have seen supply shortages, insufficient public and private funding, suboptimal immunization rates, disparities in access, and a decline in the public's appreciation of the value of vaccines.

Against this backdrop, the new human papillomavirus (HPV) vaccine is emerging, with the promise of greatly reducing cervical cancer in women. But, unless there are improvements, these same system-wide challenges will keep this important breakthrough from realizing its full potential.

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On the other hand, since so many of the issues are the same, repairing the road that leads to maximum adoption of the HPV vaccine presents a unique opportunity to fix what is broken throughout the broader immunization system.

This report provides an in-depth study of the HPV vaccine for the prevention of cervical cancer. Our analysis includes an overview of the vaccine's promise and value to patients, a discussion of the barriers that could impede its timely adoption, and a detailed call to action that – if acted upon – will systematically strengthen the adoption of all vaccines.

### VACCINES' PAST SUCCESSES AND FUTURE PROMISE

Vaccines are one of the most successful public health tools in history. During the 20th century alone, vaccines have dramatically reduced or eliminated morbidity from a number of diseases common in the United States, such as smallpox, diphtheria, and polio.<sup>1</sup>

Vaccines are more critical today than ever in the face of such emerging threats as global pandemics, bioterrorism, and new diseases like SARS and HIV.

In recent years we have seen a number of new vaccines that target a range of diseases such as meningococcal meningitis, herpes zoster, rotavirus and, most recently, the human papillomavirus, which is known to cause cervical cancer. Successful adoption of these vaccines will improve the public's health.

### VACCINE ENTERPRISE UNDER STRAIN

Notwithstanding these notable advances, the U.S. vaccine enterprise is strained. Its problems begin upstream, where research and development costs have risen in an economic environment that has squeezed prices and thus diminished revenues. Moreover, clinical trials and manufacturing requirements have tightened. There are wide gaps in public and private funding for vaccine coverage, so that some children, as well as many adolescents and adults, lack access. At the same time,



insufficient reimbursement limits the attention and time clinicians devote to immunization.

Systemic problems include poor record keeping, insufficient infrastructure and delivery mechanisms, and a lack of emphasis on prevention and immunization for adolescents and adults. Most adolescents and adults are uninformed about the vaccines they should be getting, much less where and when to get them.

Finally, in recent decades, public appreciation of vaccines has waned – we no longer fear the very diseases that vaccines prevent. In addition, despite the fact that vaccines have had an exemplary safety record, a number of anti-vaccine groups have formed and have had a disproportionate, dampening effect on the public's perception of vaccines and on overall demand.

All of these challenges have resulted in a broken system that undervalues vaccines, limits patient access – especially for adolescents and adults – and, at worst, threatens our public health.

#### **THE HPV VACCINE: INNOVATION IN THE PREVENTION OF CERVICAL CANCER**

The emerging HPV vaccine has the potential to greatly reduce cervical cancer for millions of women in the U.S. and worldwide. But it faces many of the same barriers that stand in the way of other vaccines. Hence, fixing what is broken for the HPV vaccine could, in turn, repair many of the challenges facing all vaccines.

##### **The Burden of HPV and Cervical Cancer: a Complex, Costly Disease**

There are approximately 6.2 million new HPV infections each year, and about 20 million men and women have HPV at any given time.<sup>2,3,4</sup> The virus is so prevalent that an estimated three in every four Americans aged 15 to 49 will become infected with HPV at some point in their lifetime.<sup>5</sup> Direct annual medical costs of treating symptoms of HPV in the U.S. are estimated to be \$1.6 billion.<sup>6</sup>

Of the many strains of HPV, 16 and 18 are the most carcinogenic and most prevalent; subtype 16 causes over half of all cervical cancers, worldwide.<sup>4,7</sup> And despite well-organized screening programs in the U.S., there are an estimated 9,700 new cases of cervical cancer each year, resulting in over 3,700 deaths.<sup>2</sup>

##### **Screening and Treatment Are Effective...But Not Foolproof**

Due to relatively high screening rates, cases of cervical cancer in the U.S. plummeted by 74 percent between the introduction of the Pap test in 1955 and 1992.<sup>8</sup> Nevertheless, cervical cancer screening has its own limitations, related to accuracy, follow-up, and patient access. Furthermore, screening is not as accessible to low-income, immigrant, rural, and minority women who suffer disproportionately high rates of cancer as a result. Overall screening rates in the U.S. are falling.

##### **Emergence of the HPV Vaccine**

Today, there are two products within this class of vaccines and both show immense promise in preventing cervical cancer. Merck & Co.'s quadrivalent



vaccine, Gardasil<sup>®</sup>, protects against the subtypes 16 and 18, as well as 6 and 11, the latter two of which cause 90 percent of genital warts. GlaxoSmithKline, Inc. (GSK) has developed a bivalent vaccine Cervarix<sup>®</sup>, which protects against two HPV subtypes: 16 and 18. The former recently received FDA approval, and GSK plans to submit its product for FDA approval by year-end.

### **High Value Potential**

Results from large Phase II clinical trials demonstrated that the quadrivalent vaccine was 86-89 percent effective and the bivalent vaccine 100 percent effective in preventing persistent infection with HPV subtypes 16 and 18.<sup>9,10</sup> Both vaccines were nearly 100 percent effective in preventing precancerous lesions.<sup>11</sup>

Four independent cost-effectiveness studies on the HPV vaccine have been published.<sup>12,13,14,15</sup> When compared to current cervical cancer prevention protocols, all of these studies found that a prophylactic vaccine targeting high-risk HPV subtypes decreased cervical cancer risk by 46 to 66 percent and significantly increased quality-adjusted life expectancy with a cost-effectiveness ratio ranging from \$14,600 to \$24,300/QALY. The bottom line from all these studies is that the HPV vaccine is cost-effective.

Additionally, the true value of the HPV vaccine is likely to be even higher. These studies do not factor in additional benefits that the HPV vaccine may provide: a decrease in other HPV 16 and 18-related cancers, the avoidance of psycho-social impacts of contracting an HPV-related condition, and the protection offered to non-immunized individuals through herd immunity.

### **Momentum Is Building**

Many stakeholders have already embraced the HPV vaccine and are actively engaged in driving its adoption through campaigns to promote public awareness. Professional societies, local governments, and organizations that advocate for women and minorities are also beginning to organize and develop plans to promote the adoption of the HPV vaccine.

Even groups that had moral objections to the vaccine have come out with messages of support, as long as the vaccine is not mandatory. Initial market research also indicates that clinicians, parents, and young adults would likely accept the vaccine if it were available. Lastly, the vaccine's approval by regulatory and recommending bodies is a strong catalyst for adoption by clinicians, professional societies, and public and private funding programs.

## **SIGNIFICANT BARRIERS IMPEDE ADOPTION**

Our research indicates that overcoming barriers to financing, delivery, and public acceptance will help ensure successful HPV immunization, nationwide.

### **Public Financing Gaps for Adolescents and Adults**

Today, a patchwork of private and public funding limits access to vaccines and creates disparities in a market where compliance is dependent upon adequate



coverage. There are still some gaps in funding for children and adolescents, while public financing for adults is almost nonexistent.

Although most health insurance plans provide some coverage for immunization if it is strongly recommended by the Advisory Committee on Immunization Practices (ACIP) and professional societies, some private plans do not cover adult and adolescent vaccines, and those that do may require patient cost-sharing. As many as 10-30 percent of adolescents and adults with private insurance are not covered for vaccines.<sup>16</sup>

### **Inadequate Delivery System Hinders Mass Immunization**

Other primary challenges for adolescent and adult immunization include:

*Infrequent prevention visits* – Adolescents and young adults are a challenging group to immunize, since many do not receive regular preventive care and clinicians miss opportunities to immunize at sick visits. Recent data suggest that just over half of females ages 11 and 12 - an important target population for the HPV vaccine - have an annual preventive health visit.<sup>17</sup>

*Inadequate data tracking* – Our system does not adequately track adolescent and young adult immunizations at both the individual and population level. As a result, it is difficult for clinicians to accurately assess a patient's immunization status and for public health officials to monitor the progress of immunization programs. Important tracking tools, such as immunization registries, are not widely adopted – only 39 percent of all private clinicians submit data for childhood immunizations.

*Insufficient reimbursement for clinicians* – Clinicians report that reimbursement for immunization is simply inadequate to cover the cost of purchasing, storing, and administering vaccines.<sup>18</sup> Moreover, without proper tracking tools, it is difficult for clinicians to determine patient insurance eligibility, complicating paperwork.

### **Regimen and Uninformed Public Are Barriers to Public Acceptance**

Today's health care delivery infrastructure is not built to accommodate the administration of three shots to an adolescent or young adult patient in the six-month interval required for the HPV vaccine. Compared to children, adolescents make few preventive health visits, and they have no established structure or routine for immunizations. Just the travel time, out-of-pocket costs, and consent laws that are associated with the HPV vaccine regimen are likely to make adoption problematic.

Patients and their parents have little knowledge about HPV and its risks, such as how one contracts HPV, the various types of virus and what they do to the body, the link to cervical cancer, or the need for early immunization.

Finally, clinicians might be resistant to discussing the HPV vaccine and sexual health issues with parents and young adolescents.



## A CALL TO ACTION FOR THE HPV VACCINE AND FUTURE VACCINES

It seems clear that there is a lot to be gained by galvanizing all the stakeholders in the U.S. vaccination system to overcome the barriers that remain for mass HPV immunization, thereby strengthening the progress of *all* immunization programs in this country. To achieve the best outcome, we recommend the following steps be taken as soon as possible:

### **Harness public support through both wide-scale and targeted education campaigns.**

A well-informed and impassioned public can drive increases and expansions in financing vaccines, plus improve vaccine acceptance and adoption. To achieve this, we need a general education campaign focused on the value and importance of vaccines to our public health, and a targeted campaign aimed specifically at driving the adoption of the HPV vaccine.

For a broad education campaign to be successful, we recommend that the National Immunization Program (NIP), a division of the U.S. Centers for Disease Control and Prevention, take the lead. We also recommend that the NIP create a coalition of supporters with aligned interests. These include state health departments, vaccine advocacy groups, public health organizations, vaccine manufacturers, and others. We also urge pooling the group's resources to engage a qualified public relations firm that can design and launch a unified, high-profile campaign, focused on the importance of vaccines to our public health, the responsibility of each individual to obtain all recommended vaccines, and the need for greater public financing.

For the targeted campaign, groups focused on cancer prevention, sexual health, health disparities, global health, and women's health should all work closely with one another – and with manufacturers – in order to maximize resources. Together, they should develop consistent messages targeted at adolescent females, their parents, and young women to inform and educate them about the HPV vaccine. To help reduce health disparities, stakeholders must ensure that such materials are culturally and linguistically accessible to a wide range of ethnic and racial minorities.

### **Strengthen the vaccine delivery system within our current health care system by...**

*Institutionalizing immunization visits for adolescents and young adults.* To institutionalize immunizations for adolescents and young adults, clinicians must put in place a health care delivery infrastructure with three preventive visits for immunization: one at ages 11-12, for initial immunization (such as HPV), and the other two at ages 14-15 and 17-18 that would be used to administer any newly recommended vaccines. Professional societies, like Society for Adolescent Medicine and adolescent health departments of major academic medical centers, should lead this effort.

*Educating clinicians about the importance of vaccines for adolescents and young adults.* Professional societies should quickly develop and disseminate information that includes guidance on specific diseases and vaccines, as well as how to



communicate with adolescent and young adult women about sexual health. This information can be delivered via guidelines, peer reviewed journals, websites, thought-leader endorsements, conferences, medical societies, and continuing medical education.

*Leveraging technology and tools for tracking immunizations.* Clinicians, state public health departments, and the CDC must renew their commitment to supporting, enhancing, and populating state vaccine registries and expanding them to include adolescents, with some kind of reminder or recall mechanism. The CDC, state public health departments, and professional societies must also work with individual clinicians to educate and encourage them to systematically input data for every patient.

*Aligning appropriate incentives and support.* We suggest that professional societies capitalize on Medicare's recent increases in reimbursement rates by working with clinicians and private payers to ensure the implementation of these new rates as soon as possible. Another emerging solution that will help bring clinicians on board is pay-for-performance programs that reward them for high immunization rates.

**Continue to expand the delivery system to include alternative sites.**

Large-scale, voluntary immunization programs for the HPV vaccine will require additional venues beyond the clinical setting. Schools, pharmacies, and urgent care sites are naturals, since they already have experience administering vaccines. Because most schools have limited resources, community health departments will need to take the lead in handling the administration and financing involved.

Moving beyond the physician's office to any of these sites makes registries and record-keeping even more important. Plus, these tools have to be geared up to track adolescent and young adult vaccinations.

Entirely new venues should also be considered for the target demographic, including shopping centers, clinics within local retailers, and community centers. Employers, faith-based organizations, and service groups can do much to educate their constituents, plus sponsor immunization drives and mobile clinics.

**CONCLUSION**

The HPV vaccine's immense promise in preventing cervical cancer, and the fact that it faces many of the same problems that face all vaccines today, make it an ideal vehicle for implementing important improvements in the U.S. immunization system. Unless we take up the call to action and solve these challenges in financing, delivering, and adopting vaccines, the immense benefits of this vaccine, and future vaccines, will not be realized.