Targeting Low Immunization Rates In Adolescents

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TABLE OF CONTENTS

EXECUTIVE SUMMARY 2
INTRODUCTION 2
RECOMMENDED VACCINES FOR ADOLESCENTS 3
Recently Approved Vaccines 3
Catch-up Vaccines 5
Vaccines for High-risk Adolescent Populations 6
Vaccines of the Future 6
HOW VACCINES ARE PAID FOR 6
Private Sector Financing 6
Public Sector Financing 7
STATE ACTIONS TO IMPROVE IMMUNIZATION COVERAGE 8
State Immunization Requirements 8
State Policy Solutions for Childhood Immunization Programs 9
Data Sharing Systems 10
Education/Outreach to Reduce Disparities 10
CONCLUSIONS AND CALL TO ACTION 11
ENDNOTES 11

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EXECUTIVE SUMMARY

The childhood immunization program in the United States has been successful in reducing deaths and illness from diseases that were once commonplace. These successes were brought about by the discovery and commercial production of vaccines, the development of a public health infrastructure that can monitor disease and improve vaccine coverage rates, and the availability of federal funds to purchase vaccines.

States have successfully developed immunization policies that have improved coverage rates to protect the health of their citizens. But more will be needed as new vaccines under development are recommended for adolescents. Assuring adequate vaccination coverage of this population will present unique challenges for policymakers.

Building on the success of childhood immunization policies by focusing on adolescents, state legislators can:

- Provide the infrastructure and financial support for vaccine purchase and administration for adolescents;
- Require all health insurance companies to provide coverage and reimbursement of routine vaccinations for adolescents with no co-payments; and
- Promote adoption of model legislation regarding mandated vaccine benefits.

INTRODUCTION

Vaccines are among the most successful and cost-effective public health tools available for preventing disease and death. Immunization programs have resulted in a vast reduction in deaths and illnesses from at least 13 once-common diseases, including smallpox, polio, diphtheria and whooping cough. In addition to protecting individuals from those vaccine-preventable diseases spread by person-to-person contact, vaccinations provide population-based (herd) immunity that prevents the spread of infectious diseases. However, despite their proven effectiveness, the CDC estimates that tens of thousands of people die annually from vaccine-preventable diseases or their complications.

The failure of adolescents to receive proper immunization is a growing concern—35 million American adolescents fail to receive at least one recommended vaccine. In an effort to improve adolescent immunization rates, Healthy People 2010 set a goal of 90 percent coverage of adolescents aged 13 to 15. Low immunization rates in adolescents have a wide array of implications—outbreaks of vaccine-preventable diseases, increased disease-associated costs, and increased exposure for infants who have yet to be immunized.

Until recently, adolescence was a time to catch up on immunizations missed in childhood and to administer the tetanus-diphtheria (Td) booster. But this situation is changing rapidly, and adolescence is becoming an age of vaccines. Last year the Td shot was replaced with one that also provides immunity against pertussis (Tdap), and a vaccine that protects against meningococcal disease was approved and recommended for adolescents. In June of 2006, the Advisory Committee on Immunization Practices (ACIP) recommended a vaccine that provides protection against the human papillomavirus (HPV).
As vaccines progress from development through licensure to implementation, policymakers and public health providers will face new challenges in achieving effective adolescent coverage rates. While there has been considerable state activity related to childhood immunizations—including federal and state funds allocated to purchase and administer vaccines and an effective infrastructure—little effort has been made thus far to target the adolescent population. Most states have developed immunization information systems, conducted public campaigns, and engaged in provider education and assessment endeavors. Such efforts have been successful in improving coverage among children but the need remains for more state-level initiatives targeted at adolescents. These successful childhood immunization initiatives can serve as models for states in achieving effective adolescent coverage rates.

RECOMMENDED VACCINES FOR ADOLESCENTS

Recommendations for vaccine use are made by CDC’s Advisory Committee on Immunization Practices (ACIP) and harmonized schedules are developed with the American Academy of Family Physicians (AAFP) and the American Academy of Pediatrics (AAP). The current recommended schedule of vaccines for children and adolescents can be accessed at http://www.cdc.gov/nip/recs/child-schedule.htm#printable.

Vaccines for adolescents can be classified into four groups:

1. Recently approved vaccines (human papillomavirus, pertussis, and meningococcal);
2. Vaccines that should have been administered in childhood for those adolescents who missed them as part of a “catch up” program (hepatitis A and B, measles/mumps/rubella and varicella);
3. Vaccines that should be given to high-risk adolescents (influenza and pneumococcal polysaccharide vaccine (PPV); and
4. Vaccines of the future.

Recently Approved Vaccines

Human papillomavirus (HPV): The ACIP recommended routine vaccination for girls ages 11-12 and allows its use for girls beginning at nine years old as well as those ages 13 – 26. These recommendations by the ACIP will become policy of the CDC once they have been accepted by the director of the CDC and the secretary of Health and Human Services and published in CDC’s Morbidity and Mortality Weekly (MMWR).

This vaccine is highly effective in preventing four types of HPV in young women who have not been previously exposed to HPV. This vaccine targets HPV types that cause up to 70 percent of all cervical cancers and about 90 percent of genital warts. Cervical cancer is the 11th most common cancer among women in the United States. The American Cancer Society estimates that in 2006, more than 9,700 women will be diagnosed with cervical cancer and some 3,700 will die from this disease.5

Because HPV is sexually transmitted, experts recommend the vaccine, to be effective, should be administered to adolescent females before they become sexually active. Adolescents, however, are a difficult population to reach through immunization programs and the prospect of vaccinating young people against a sexually transmitted infection (STI) raises sensitive social
and cultural issues that may create opposition among parents, communities, providers and policymakers. One concern is that a drug that makes sex safer would encourage sexual activity among adolescents, which would not be acceptable to many parents. Another concern is that if a vaccine that prevents HPV and cervical cancer is administered to girls only, parents, providers and policymakers may question why an STI vaccine is not also targeted to young men.

In addition to cultural and social considerations, the cost of the vaccine itself may be an issue. The three-dose schedule of HPV vaccine has been estimated to cost $360 in the private sector, making it more expensive than many recommended vaccines. Immunization against HPV offers a cheaper, simpler and more effective way to prevent cervical cancer by reducing the need for medical care, biopsies and other invasive procedures, as well as alleviating the anxieties and health care costs associated with cervical cancer.

**Pertussis:** Pertussis (whooping cough) is a highly contagious respiratory disease characterized by severe coughing. It is the only disease for which children are routinely vaccinated, but for which incidence rates are rising. Reports of pertussis increased from a record low of 1,010 in 1976 to more than 11,000 in 2003. A substantial increase in reported cases was among adolescents, who become susceptible to pertussis approximately six to 10 years after childhood vaccinations. Because pertussis often goes undiagnosed in adolescents and adults, it is likely that the incidence rates are even higher. The true burden of the disease is estimated at approximately 1 million cases per year in the United States.

The increased cases are most likely due to waning of immunity gained through childhood vaccinations, putting adolescents at greater risk. By early adolescence, immunity has waned at a time when most students are entering secondary schools where they mix with a larger and more diverse population, increasing their chances of exposure to the bacteria. Although the disease is milder in adolescents than in infants, the prolonged and severe coughs associated with pertussis can negatively impact schoolwork. An outbreak of pertussis can disrupt school functions; it also increases the need for public health and school efforts to educate families and to detect and treat cases. For every dollar spent on diphtheria/tetanus/acellular/pertussis vaccine (DtaP), the country reaps a $27 benefit.

Adolescents play an even more dangerous role in the transmission of pertussis to infants who have not yet received vaccinations. Ninety percent of unvaccinated children living with someone with pertussis will also contract the disease.

**Tetanus/diphtheria:** The pertussis vaccine is administered along with the vaccine for tetanus and diphtheria as a single “booster” dose to adolescents. Tetanus “lockjaw” is an acute, often-fatal disease of the nervous system caused by bacteria entering the body through a puncture wound. Diphtheria is a bacterial infection that affects the nose and throat. Children in the United States have been vaccinated against both these diseases for decades.

**Meningococcal (MCV4):** The meningococcal vaccination is recommended for adolescents ages 11-12, teenagers not previously vaccinated before high school entry (around age 15), and all college freshmen living in dormitories. Meningococcal disease, also known as meningococcal meningitis, is a bacterial infection that strikes 1,400 to 2,800 Americans each year. Approximately 20 percent of cases in the U.S. occur among adolescents and young adults.
Meningococcal meningitis can be devastating because early symptoms resemble the flu, making it difficult to recognize. Unlike the flu, however, the disease can progress rapidly and within hours of initial symptoms, may cause hearing loss, brain damage, limb amputation and even death. Approximately 10 percent of people who contract meningococcal disease will die. Nearly 20 percent of those infected suffer long-term disabilities. The CDC estimates the cost of meningococcal disease at $13,341 per case with estimated lifetime costs due to residual effects ranging from $44,187 per case (hearing loss) to $864,980 (severe retardation).

**Catch-up Vaccines**

*Hepatitis A*: Hepatitis A vaccine is routinely recommended for children 12 to 23 months of age. In areas without existing hepatitis A vaccination programs, catch-up vaccination of unvaccinated children ages 2 – 18 years can be considered. Such programs might especially be warranted when there are increases in rates of Hepatitis A or ongoing outbreaks among children or adolescents.

*Hepatitis B*: A catch-up vaccination is recommended for adolescents to provide added protection against hepatitis B as they enter adulthood. Adolescents in whom the infection becomes chronic have a 15 percent chance of dying of liver disease. The vaccine is the first to prevent cancer (liver) and is effective in providing protection after the three-dose recommendation in more than 95 percent of adolescents. Vaccine against hepatitis B can be provided for a cost of $44 per child, while the average lifetime health care costs for a patient with chronic hepatitis B is $65,000 (for patients not requiring liver transplants).

*Measles*: During a major measles outbreak in 1996, one-third of the reported 575 cases were in persons aged 10 to 19 years. Measles in adolescents is a concern not only for the person affected, but also for those at increased risk of measles complications—people younger than 5 and adults age 20 and older—with whom they may come in contact. The measles incidence is low, yet there is a constant risk of outbreak through importation and travel to endemic areas.

*Mumps*: Prior to the licensing of the mumps vaccine in the 1960s, more than 200,000 cases of the disease occurred each year. In recent years, 4,500 to 13,000 cases of mumps were reported annually in the United States. Outbreaks still occur, such as the one that recently affected at least 4,000 people in 12 Midwestern states. Teenagers and adults, especially males, who catch mumps are often much sicker for a longer period of time than younger children who get mumps. In rare cases this disease can cause deafness, encephalitis and male sterility. All adolescents who have not been vaccinated or acquired mumps should receive the vaccine.

*Rubella*: Rubella is normally a mild childhood disease; however, infection during early pregnancy may cause fetal death or congenital rubella syndrome (CRS). This syndrome is characterized by multiple defects, particularly to the brain, heart, eyes and ears. The overall incidence of rubella is down, but there are notable increases in two groups—Hispanics and persons 15 to 44 years old. The increase among Hispanics is of particular concern because of the higher rate of CRS among Hispanics.
Varicella: The adoption of a universal varicella (chicken pox) vaccine in 1995 has greatly reduced morbidity and mortality from this disease. A recent study reports an annual savings of $100 million hospital care costs since the chicken pox vaccine was introduced. Before its use became widespread in the United States, 4 million cases of chicken pox were reported annually. The disease was responsible for 11,000 hospitalizations and 100 deaths each year. Children with varicella expose adults in households, schools and day-care centers to the risk of severe, even fatal, disease.

Vaccines for High-risk Adolescent Populations
Influenza, pneumococcal polysaccharide vaccine (PPV) and hepatitis A vaccines are also recommended for adolescents in certain high-risk groups.

Influenza: The influenza vaccine is recommended for adolescents who are at increased risk of complications due to underlying medical conditions, including asthma and diabetes.

Pneumococcal polysaccharide vaccine (PPV): The incidence among adolescents is the lowest for any age group, but infected adolescents can transmit it to those at highest risk of infection and death (including infants and the elderly). It is recommended for all persons at least 2 years old who are immunocompromised or have certain chronic illnesses (e.g., cardiovascular or pulmonary disease, diabetes).

Vaccines of the Future
Additional vaccines targeted for adolescents are under development and include ones that protect against sexually transmitted diseases such as chlamydia and gonorrhea. Other vaccines in the pipeline include the serogroup B meningococcus, cytomegalovirus, and the syncytial virus (respiratory).


HOW VACCINES ARE PAID FOR

The number of vaccine-preventable diseases has grown from only four in the 1950s (polio, pertussis, diphtheria and tetanus) to fifteen today, with additional vaccines in the research and development phase. Along with this increase in the number of vaccines, costs have significantly increased. Newer vaccines cost more than older vaccines. CDC contract costs for the universally recommended vaccines for children and adolescents have risen from $45 per person in 1985 to $894 per person in 2006, excluding the cost of the HPV vaccine.

The current system of financing vaccines is shared jointly by the private and public sectors (Figure 1). The system is fragmented and uneven, leaving some children, adolescents and many adults with limited or no coverage.

Private-Sector Financing
Approximately 160 million Americans have employer-sponsored health insurance and another 12 million purchase their own policies. Of these, approximately 100 million are enrolled in some form of state-licensed health insurance plan; those who remain are members of self-
insured health benefit plans that are not governed by state insurance laws, such as the Employee Retirement Income Security Act (ERISA). For these 100 million people, state laws play a primary role in determining coverage of vaccinations.

Thirty-two states and the District of Columbia have some level of insurance immunization mandate although requirements vary significantly. While all jurisdictions mandate coverage of children, they differ greatly with respect to the ages of children covered, the standard of coverage used, and the regulation of cost-sharing and administration fees—factors that have the potential to impact coverage rates among adolescents.

- All states require coverage from the “moment of birth,” while the cutoff varies from as young as the second birthday (Mississippi and Montana) to as old as 19 in New York.
- Only six states specify the ACIP recommendations as the standard of coverage; four states are silent on the issue; and the remaining states use various standards with the more common approach being “appropriate” or “routine and necessary.”
- Twenty-three states prohibit deductibles; 13 states prohibit both co-payments and deductibles; and four states expressly permit the use of deductibles.
- Only one state (West Virginia) specifically addresses payment for administration fees. The remaining states are ambiguous or fail to mention administration fees.

**Public Sector Financing**
Most publicly funded vaccinations are financed with federal funds through two sources, Section 317 of the Public Health Service Act and the Vaccines for Children Program (VFC).

- **Section 317 of the Public Health Service Act** was established in 1962 to provide grants to state and local health departments to support mass immunization campaigns, rather than to provide a continuing program of support for childhood immunizations. Vaccines purchased through Section 317 can be provided to anyone and are often used by states to provide vaccines for children who are not eligible for VFC.

- The **Vaccines for Children Program** was created legislatively in 1993 to provide free vaccines to children under 18 who are: uninsured; eligible for Medicaid; Native American or Alaskan Native; or underinsured and receive vaccines in federally qualified health centers (FQHC) or rural health clinics (RHC). VFC allows the CDC to negotiate the purchase of large quantities of vaccines from manufacturers that are then made available to providers in all 50 states. The VFC is the major government vaccine purchase program for disadvantaged children.

In addition, several states have made the commitment to “universal purchase,” in which the state, using a combination of federal and state funds, purchases and distributes vaccines recommended for children to all immunization providers, both public and private. Thus, vaccines become available to all children, regardless of their insurance status; however, not all universal purchase states buy all recommended vaccines. In December 2000, there were 15 universal purchase states.

- **North Carolina** has implemented a “universal vaccine purchase” program. A recent study showed that this program improved immunization rates, especially for children who were underinsured.
STATE ACTIONS TO IMPROVE IMMUNIZATION COVERAGE

States play an important role in assuring high levels of vaccination coverage through legislative requirements for immunization policies. Since the introduction of smallpox vaccination policies in the mid-to-late 1800s, states have amended these policies to include additional vaccines as they become available, resulting in greatly improved vaccination rates among preschool-aged children. States have further expanded their vaccination policies to include essential components of a comprehensive vaccination policy such as:

- middle school entry requirements;
- development of data systems to track childhood immunizations (immunization registries); and
- education/outreach programs to identify populations that are underimmunized.

State Immunization Requirements

All immunization laws are state-based, with variations among individual states. Some states specify which vaccines and how many doses are required, whereas others authorize state health departments or a state health board to make such decisions. State officials often rely on recommendations of authoritative bodies such as the Advisory Committee on Immunization Practices (ACIP) to guide them; however, states retain the responsibility for determining which vaccines to mandate. All states, as a condition of school entry, now require proof of vaccination against a number of diseases (e.g., measles, mumps, rubella and polio). These statutes often require schools to maintain immunization records and submit reports to public health authorities.
Because elementary school vaccination requirements have been so successful, many states have chosen middle school immunization mandates as a strategy to improve adolescent vaccination coverage. Initial reports show that this public policy strategy has been successful. State middle school entry vaccination requirements have proven to be among the most effective means of increasing adolescent immunization rates. As of 2006, 35 states require proof of hepatitis B vaccine, and one more state will implement the requirement in the next few years. Twenty states have mandates for varicella vaccinations with three more scheduled for implementation in the next few years.

Information on the laws in each state can be accessed from http://www.immunize.org/laws/index.htm.

**State Policy Solutions for Childhood Immunization Programs**

The following examples of successful policies for childhood immunizations could be extended to adolescent immunization programs.

**Connecticut:** The state department of public health established standards according to the recommended schedule for immunization of infants and children. The state immunization program furnishes vaccines at no cost to health care providers; provides the recommended immunization schedule to all parents; assists hospitals, providers and local health departments in developing and implementing recordkeeping and outreach; and assists in the development of a program to assess the vaccination status of children who are clients of state and federal programs. (Connecticut General Statute §19a-7f; http://www.cga.ct.gov/2005/pub/Chap368a.htm)

**New Mexico:** Individual and group health insurance plans are required to provide coverage for childhood immunizations in accordance with the current schedule of immunizations recommended by the American Academy of Pediatrics. (New Mexico Stat. Ann. §59-A-22-34.3; http://www.state.nm.us/category/governmentnm.html)

**North Carolina:** North Carolina partners with public and private organizations inside and outside the state to increase its immunization rates. North Carolina has 170 federally qualified health centers and rural health clinics that provide free immunizations to eligible children. The state also operates a “Health Check” program designed to improve patient education and information, simplify administrative paperwork and increase payments to private health care providers. Additionally, its immunization registry demonstration project, PAIRS (Provider Access to Immunization Registry Securely), received a 2002 Excellence in Immunization Award from the National Partnership for Immunization.43

**Rhode Island:** Rhode Island enjoys one of the nation’s highest immunization rates. It is one of only a few states that provide childhood vaccines to providers free of charge with health insurance companies sharing the cost of providing these vaccines. (Rhode Island General Laws § 23-1-46; available at http://www.rilin.state.ri.us/Statutes/TITLE23/23-1/23-1-46.HTM)

**Texas:** The Texas Department of Health established a childhood immunization registry which may be used by the department to notify a parent or guardian by mail, telephone, personal
contact or other means that a child is due or overdue for an immunization. (Texas Health & Safety Code §161.007; http://www.capitol.state.tx.us/statutes/statutes.html.)

**Data Sharing Systems**

Immunization registries are confidential, computerized systems that contain information about immunizations and children. As of 2004 every state is either operating or developing statewide or regional immunization information systems.245 Twenty-two states have laws or rules specifically authorizing immunization registries, and 11 require health care professionals to report immunizations to registries.

Information on each state’s immunization registry can be accessed at http://www.immregistries.org/public.php/ImmRegs/regMain.php.

Because families often move from state to state and change providers within states, it may be necessary to share information among jurisdictions. To assist states that would like to begin sharing immunization information across state lines, Every Child by Two has partnered with the George Washington University School of Public Health and Health Services to create a model interstate immunization sharing statute. For additional information on this model legislation, see: http://www.immregistries.org/public.php/ImmRegs/regMain.php.

**Education/Outreach to Reduce Disparities**

Racial and ethnic disparities in vaccination coverage rates in children are generally nonexistent,246 but significant disparities persist in coverage rates in many urban areas with large populations of low-income residents. In some cases, childhood coverage rates are as much as 19 percent lower for urban residents, compared to the remainder of the state.247

In contrast with the childhood population, significant disparities in coverage exist for adolescent and adult populations, particularly in hepatitis B, influenza and pneumococcal vaccines. Coverage levels among adolescents for three doses of hepatitis B vaccine are 75 percent in Latinos, 68 percent in African-Americans, and 65 percent in whites, lower than rates for other adolescent recommended vaccines.248

Several states have implemented education/outreach programs to address ethnic and racial disparities in immunization rates, particularly in the childhood population. State examples include:

- **Illinois**: The state established an immunization outreach program under the Department of Health to respond to under-immunization of children due to poverty, lack of health insurance or cultural/language differences in an effort to address ethnic and racial disparities in immunization rates. The department can establish permanent, temporary or mobile sites for immunizing children, including public places such as school grounds or places where parents of children at high risk of not being immunized reside, shop, worship or recreate. (20 ILCS 2310/2310-255: http://www.ilga.gov/legislation/lcs/ilcs.asp.)
• **Minnesota:** In 2001, as part of its *Eliminating Health Disparities Initiative*, the state established a goal to decrease by 50 percent the disparities in adult and child immunizations for American Indians, African-Americans, Asian-Americans and Latinos/Hispanics in Minnesota. The legislation directed the Department of Health to design and implement a comprehensive plan to achieve this goal. Activities including educational workshops, interpretation services, cultural competency courses, immunization clinics and media campaigns reached almost 80,000 adults and children with many positive results.\(^4\) (http://www.revisor.leg.state.mn.us/stats/145/928.html)

• **South Carolina:** The state targeted racial and ethnic minorities through its immunization program, which developed public service announcements about influenza and pneumococcal vaccines. These announcements were played on radio stations serving minority communities to reach high-risk populations. (http://www.partnersforimmunization.org/immunizationprogram.html)

**CONCLUSIONS AND CALL TO ACTION**

Vaccines remain the most important strategy in preventing infectious diseases in children and adolescents and in reducing the medical costs of associated diseases. States have developed successful policies and programs related to childhood immunizations and recently have expanded these efforts to target adolescents, such as middle school entry requirements, data systems for tracking and education/outreach programs to address disparities. While these efforts have been successful, they may not be enough to meet the challenges states will face when new immunizations targeted at adolescents are licensed and recommended for routine use.

Policy actions for state legislators include:
- Provide the infrastructure and support for vaccine purchase and administration for adolescents;
- Implement uniform middle school entry requirements for tetanus, diphtheria and acellular pertussis vaccine (TdaP) and meningococcal vaccine;
- Require all health insurance companies to provide coverage and reimbursement of routine vaccinations for adolescents with no co-payments; and
- Promote adoption of model legislation regarding mandated vaccine benefits.

**ENDNOTES**

33 Ibid.
34 Ibid.
35 Ibid.
39 Ibid.
47 Institute of Medicine. Calling the Shots: Immunization Finance Policies and Practice.