

Commentary

Impact of Vaccinations on Improving the Health of Children^a

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Vaccination is the administration of antigenic material (a vaccine) to stimulate an individual's immune system to develop adaptive immunity to a pathogen. Vaccination is the most effective method of preventing infectious diseases. Widespread immunity due to vaccination is largely responsible for the worldwide eradication of smallpox and the restriction of diseases such as polio, measles, and tetanus from much of the world. Vaccinations or immunizations work by stimulating the immune system (the natural disease-fighting system of the body). The healthy immune system is able to recognize invading bacteria and viruses and produce substances (antibodies) to destroy or disable them. Immunizations prepare the immune system to ward off a disease. Vaccines can prevent or better decrease infection, and can be used to boost your immune system and prevent serious, life-threatening diseases.

Vaccinations have had an enormous impact on improving the health of children in the United States. It is one of the best ways parents can protect children from 16 potentially harmful diseases. While these diseases are not common in the U.S., they persist around the world. Most parents today have never seen first-hand the devastating consequences that vaccine-preventable diseases have on a family or community. Vaccine-preventable diseases can be very serious, may require hospitalization, or even be deadly – especially in infants and young children. It is important that we continue to protect our children with vaccines because outbreaks of vaccine-preventable diseases can and do occasionally occur in this country.

Healthy People 2020 goals for immunization and infectious diseases are rooted in evidence-based clinical and community activities and services for the prevention and treatment of infectious diseases. Objectives new to Healthy People 2020 focus on technological advancements and ensuring that States, local public health departments, and non-governmental organizations are strong partners in the Nation's attempt to control the spread of infectious diseases. Objectives for 2020 reflect a more mobile society and the fact that diseases do not stop at geopolitical borders. Awareness of disease and completing prevention and treatment courses remain essential components for reducing infectious disease transmission.

According to Healthy People 2020, vaccines are among the most cost-effective clinical preventive services and are a core component of any preventive services package. Childhood immunization programs provide a very high return on investment. For example, for each birth cohort vaccinated with the routine immunization schedule (DTap, Td, Hib, Polio, MMR, Hep B, and Varicella), society saves 33,000 lives, prevents 14 million cases of disease, reduces direct health care costs by \$9.9 billion, and saves \$33.4 billion in indirect costs. Despite progress, approximately 300 children in the United States die each year from vaccine-preventable diseases. Communities with pockets of unvaccinated and under-vaccinated populations are at increased risk for outbreaks of vaccine-preventable diseases. The emergence of new or replacement strains of vaccine-preventable disease can result in a significant increase in serious illnesses and death. In 2008, imported measles resulted in 140 reported cases, nearly a 3-fold increase over the previous year.

In the developing world some other key needs are immunization for the other basics such as diphtheria, pertussis, tetanus, and Hemophilus type b infections. These all remain scourges of many developing countries with high morbidity and mortality. In the developing countries, the top four causes of mortality in children less than five years old are pneumonia, diarrhea, malaria and measles (CDC, 2014).

Pros and Cons of Vaccination in Children

Pro Vaccines

- Vaccines can save children's lives. In 2008 The American Academy of Pediatrics states that most childhood vaccines are 90%-99% effective in preventing disease. According to a United Nations Foundation partner organization, vaccines save 2.5 million children from preventable diseases every year, which equates to roughly 285 children saved every hour. The Centers for Disease Control (CDC) estimated that 732,000 American children were saved from death and 322 million cases of childhood illnesses were prevented between 1994 and 2014 due to vaccination. The measles vaccine has decreased childhood deaths from measles by 74%.
- The ingredients in vaccines are safe in the amounts used. Ingredients, such as thimerosal, formaldehyde, and aluminum, can be harmful in large doses, but they are not used in harmful quantities in vaccines. Children are exposed to more aluminum in breast milk and infant formula than they are exposed to in vaccines. Also, children are exposed to more bacteria, viruses, toxins, and other harmful substances in one day of normal activity than are in vaccines. The FDA requires up to 10 or more years of testing for all vaccines before they are licensed, and then they are monitored by the CDC and the FDA to make sure the vaccines and the ingredients used in the vaccines are safe.
- Vaccines save children and their parents time and money. Vaccines cost less in time and money to obtain than infectious diseases cost in time off of work to care for a sick child, potential long-term disability care, and medical costs. For example, children under five with the flu are contagious for about eight days, and, according to a 2012 CDC study, cost their parents an average of 11 to 73 hours of wages (about \$222 to \$1,456) and \$300 to \$4,000 in medical expenses. Children with rotavirus are contagious for up to 30 days. A Jan. 2008 outbreak of measles in San Diego, CA resulted in 11 unvaccinated children catching measles and a resulting net public-sector cost of \$10,376 per case (\$123,512 total) due to emergency vaccination and outbreak response.
- Vaccines provide economic benefits for society. The CDC estimates that children vaccinated between 1994 and 2014 have yielded net savings of \$1.38 trillion in "societal costs," including money saved by preventing lost productivity due to disability and early death.

- Vaccines eradicated smallpox and have nearly eradicated other diseases such as polio. Children are no longer vaccinated against smallpox because the disease no longer exists due to vaccination.
- Vaccines protect future generations. Vaccinated mothers protect their unborn children from viruses that could potentially cause birth defects, and vaccinated communities can help eradicate diseases for future generations

Con Mandatory Vaccines

- Vaccines can cause serious and sometimes fatal side effects. According to the CDC, all vaccines carry a risk of a life-threatening allergic reaction (anaphylaxis) in about one per million children. The rotavirus vaccination can cause intussusception, a type of bowel blockage that may require hospitalization, in about one per 20,000 babies in the United States.
- Vaccines contain harmful ingredients. Some physicians believe thimerosal, an organic mercury compound found in trace amounts in one flu vaccine for children and other vaccines for adults, is linked to autism. Aluminum is used in some vaccines and excess aluminum in human bodies can cause neurological harm.
- The government should not intervene in personal medical choices. Medical decisions for children should be left to the parents or caregivers.
- Vaccines can contain ingredients some people consider immoral or otherwise objectionable. Some DTaP/IPV/Hib combination, Hep A/Hep B combination, HepA, MMR, and chicken pox vaccines are cultivated in cells from two fetuses aborted in the 1960s
- Vaccines are unnatural, and natural immunity is more effective than vaccination. Even pro-vaccine organizations state that natural vaccination causes better immunity. The Children's Hospital of Philadelphia notes that "It is true that natural infection almost always causes better immunity than vaccines. Whereas immunity from disease often follows a single natural infection, immunity from vaccines occurs only after several doses."
- Most diseases that vaccines target are relatively harmless in many cases, thus making vaccines unnecessary. The chickenpox is often just a rash with blisters and can be treated with acetaminophen, cool compresses, and calamine lotion. The measles is normally a rash accompanied by a fever and runny nose and can be treated with rest and fluids.

Mississippi is seldom viewed as a leader on health issues due to high rates of smoking, obesity and physical inactivity. However, Mississippi is one of two states that permit neither religious nor philosophical exemptions to its vaccination program (West Virginia is the other). Only children with medical conditions that would be exacerbated by vaccines may enroll in Mississippi schools without completing the immunization schedule, which calls for five vaccines. For the 2013-14 academic year, Mississippi reported that nearly all of its 45,719 kindergarten students had been adequately immunized, and the state's measles, mumps and rubella vaccination rate was about five percentage points higher than the national median of 94.7 percent. For kindergartners that year, Mississippi approved just 17 medical exemptions, the Centers for Disease Control and Prevention said. Neighboring state Arkansas had about 3,100 fewer kindergarten students than Mississippi that year and recorded 24 medical exemptions along with 468 religious or philosophical exemptions. Mississippi, a vaccination leader in vaccinating children, stands by its strict rules.

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