



Overview

This year Bill Gates made headlines when he warned that if a highly contagious and lethal airborne pathogen like the 1918 influenza were to break out today, nearly 33 million people worldwide would die in just six months, based on research by the Institute for Disease Modeling. Despite the Centers for Disease Control and Prevention (CDC) recommending vaccinations against 18 dangerous or deadly diseases, the Office of Disease Prevention and Health Promotion (ODPHP) at the Department of Health and Human Services (HHS) estimates roughly 42,000 adults and 300 children in the United States still die each year from vaccine-preventable diseases, including influenza. Worldwide, an estimated 1.5 million children die each year - one every 20 seconds - from a vaccine-preventable disease.

In the third piece of our four-part Harm Reduction series, we explore vaccines as a method of harm reduction in public health. Specifically, what are the benefits and challenges of vaccination and is the United States prepared for a mass outbreak?

Vaccination Rates

According to a 2014 report by the CDC, an estimated 322 million illnesses, 21 million hospitalizations, and 732,000 deaths in the U.S. have been prevented thanks to routine childhood vaccinations since the year 1994, the launch year of the CDC Vaccines for Children Program. While the number of vaccine critics has seemingly grown recently, the percentage of parents refusing any vaccinations for their children is still less than 1% according to the National Immunization Survey; however, that number can be much higher for individual vaccines and varies greatly across the U.S.

Requirements for child vaccinations are decided at the state level. All states and the District of Columbia allow a medical exemption for children with medical conditions that prevent them from receiving a vaccine; however, all but two states offer nonmedical exemptions for religious or philosophical reasons (Mississippi and West Virginia).

The CDC sets the childhood immunization schedule at the advice of the Advisory Committee on Immunization Practices (ACIP) and both are active in quelling concerns for parents. The full list of 18 dangerous or deadly diseases the CDC recommends vaccinating against can be found [HERE](#).

The rate of vaccination also varies greatly between children and adults. Whereas children are required to have certain vaccines to attend school, adults do not have a set vaccine schedule mandated by the state. For instance, in 2015 the percentage of children vaccinated against Polio was almost 94%, while the percentage of adults ages 65 and older vaccinated against Pneumococcal Disease, for which the CDC recommends all adults over age 65 vaccinate for, was only about 63%. Similarly, the CDC recommends American women receive the human papillomavirus (HPV) vaccine series by age 26 and men by age 21, but the percentage of women and men that reported at least beginning the series in 2015 was just 41% and 10%, respectively. The full list of adult vaccination results from the National Health Interview Survey can be found [HERE](#).

Center Forward Basics

Center Forward brings together members of Congress, not-for-profits, academic experts, trade associations, corporations and unions to find common ground. Our mission: to give centrist allies the information they need to craft common sense solutions, and provide those allies the support they need to turn those ideas into results.

In order to meet our challenges we need to put aside the partisan bickering that has gridlocked Washington and come together to find common sense solutions.

For more information, please visit www.center-forward.org

Definitions

- **Vaccine:** A product that produces immunity therefore protecting the body from the disease. Vaccines are administered through needle injections, by mouth and by aerosol.
- **Antibiotic:** Type of drug that kills or stops the growth of bacteria.
- **Antimicrobial:** Type of drug that kills or stops the growth of microbes, such as bacteria, viruses, fungi, and parasites.
- **Community immunity:** When a sufficient proportion of a population is immune to an infectious disease (through vaccination and/or prior illness) to make its spread from person to

Antibiotic Resistance

Vaccines can also help limit the spread of antibiotic resistance, the greatest and most urgent global risk we face, according to the World Health Organization (WHO). Antibiotic resistance occurs when bacteria change in response to the use of antibiotics. These bacteria can infect humans and animals and cause infections that are more difficult to treat than non-resistant bacteria. Antibiotic resistance is similar to antimicrobial resistance, a broader term used to include drugs that treat infections caused by bacteria as well as parasites, viruses, and fungi. In the long run, antibiotic resistance leads to higher medical costs, prolonged hospital stays, and increased mortality.

More than 23,000 Americans die each year from infections caused by germs resistant to antibiotics. In fact, the CDC warned earlier this year of a “nightmare bacteria” found in over 200 cases in 2017 resistant to all or most antibiotics tested and carrying uncommon or special resistance genes. Improper use or overuse of antibiotics perpetuates antibiotic resistance. According to the CDC, antibiotics are not optimally prescribed up to 50% of the time, often done so with incorrect dosage or duration, or when they are not necessary at all. The World Bank estimates that in a worst-case scenario, antibiotic resistance could lead to low-income countries losing 5% of their GDP and up to 28 million people being pushed into poverty by 2050.

Experts encourage researchers and medical staff to take the necessary steps to combat antibiotic resistant bacteria from spreading. Since about one in every 25 U.S. hospital patients has a healthcare-associated infection (HAI) on any given day, CDC publishes data on HAIs caused by antibiotic resistant bacteria, which are reported to CDC through the National Healthcare Safety Network (NHSN). The WHO also encourages proper use of existing vaccines and development of new vaccines to tackle antibiotic resistance and reduce preventable illness and deaths worldwide.

Vaccine Production

The frequency and diversity of disease outbreaks have steadily increased over the last few decades, largely due to the unprecedented mobility of people, products, and food. Because of this, outbreaks of disease-causing bacteria are inevitable, but the World Bank insists strong health systems can prepare countries to detect and respond to diseases and prevent an outbreak from becoming a pandemic. Estimates suggest severe pandemics can result in millions of deaths and can destroy up to 1% of global GDP. Aside from countries’ chronic underinvestment in public health functions like disease surveillance and diagnostic laboratories, vaccine production to prevent outbreak is also a cause for concern.

Developing a new commercial vaccine can take over ten years and cost more than \$1 billion. Unlike other therapeutics, governments are generally the largest purchasers of vaccines, which can create an uncertain vaccine market. The U.S., for instance, has functioned under short-term spending bills, or continuing resolutions (CR), for several years. These spending bills mean only a portion of federal funds meant for local and state public health programs can be made available, which often means they cannot purchase as many vaccines as they need. Additionally, U.S. agencies like the Biomedical Advanced Research and Development Authority (BARDA) fund public-private partnerships to research and develop new vaccines. With uncertainty surrounding Congressional spending bills, manufacturers are less likely to take part in this necessary research.

person unlikely. Even individuals not vaccinated (such as newborns and those with chronic illnesses) are offered some protection because the disease has little opportunity to spread within the community. Also known as “herd immunity.”

- **Pandemic:** Large disease outbreak that affect several countries and poses major health, social, and economic risks.
- **Outbreak:** Sudden appearance of a disease in a specific geographic area (e.g. neighborhood or community) or population (e.g., adolescents).

Key Statistics

- After accounting for the costs associated with giving immunizations, the CDC estimated a net savings of **\$295 billion in direct costs and \$1.38 trillion in societal costs** from averting vaccine-preventable illnesses, hospitalizations and deaths.
- CDC estimates that since 2010, flu-related hospitalizations in the United States have ranged from **140,000 to 710,000** and flu related deaths have ranged from **12,000 to 56,000**.
- More than **100 million** children worldwide are immunized each year against tuberculosis, polio, measles, diphtheria, tetanus, pertussis, hepatitis B, Haemophilus influenzae type B, and, in some countries, yellow fever. These vaccines save an estimated **2.5 million lives each year**.

Looking Ahead

The last outbreak of smallpox in the U.S. was in 1949, but the CDC still recommends vaccinating against this disease because of how rampant and deadly it was in its time (on average, three out of every ten people who contracted it died). Most Americans are too young to remember the effects of some of the most deadly diseases the world has vaccines for, but the CDC insists if we were to stop vaccinating, the U.S. could see a re-emergence of diseases we haven't seen in the U.S. in decades, such as polio. Our public health infrastructure depends on community immunity, or the majority of people vaccinating to protect those who are not vaccinated, such as newborns and the chronically ill.

However, our infrastructure also depends on consistent research and development of new vaccines for emerging diseases, as well as improvements to existing vaccines to make delivery easier and more efficient. Public health experts at the World Health Organization and the World Bank are concerned countries are not equipped to handle a mass disease outbreak.

Congress can take numerous steps to better equip the U.S, and to their credit, they are expected to pass a reauthorization of the Pandemic and All Hazards Preparedness Act (PAHPA) this year to ready the U.S. for events such as infectious diseases, natural disasters or chemical, biological, radiological or nuclear (CBRN) agents. More information on PAHPA can be found [HERE](#). However, our research institutions and public health programs also need consistent funding if they are going to be successful in protecting the population from a possible pandemic. Otherwise, they will be set up for failure and the public's health could be forced to pay the price.

Links to Other Resources

Healthy People, Office of Disease Prevention and Health Promotion (ODPHP):

<https://www.healthypeople.gov/2020/topics-objectives/topic/immunization-and-infectious-diseases>

CDC Vaccine-Preventable Adult Diseases:

<https://www.cdc.gov/vaccines/adults/vpd.html>

CDC Vaccines for Children Program:

<https://www.cdc.gov/media/releases/2014/p0424-immunization-program.html>

CDC Recommended Vaccines:

<https://www.cdc.gov/vaccines/vpd/vaccines-diseases.html>

Bill Gates' Remarks on Global Pandemic Preparedness:

<https://www.gatesnotes.com/Health/Shattuck-Lecture>

National Immunization Survey:

https://www.cdc.gov/mmwr/volumes/66/wr/mm6643a3.htm#T1_down

CDC Vaccination Rates by State:

<https://www.cdc.gov/mmwr/volumes/66/wr/mm6640a3.htm>

CDC Vaccine Coverage Among Children:

https://www.cdc.gov/mmwr/volumes/66/wr/mm6643a3.htm#T1_down

CDC Vaccine Exemption:

<https://www.cdc.gov/vaccines/imz-managers/coverage/schoolvaxview/requirements/exemption.html>

CDC Making the Vaccine Decision:

<https://www.cdc.gov/vaccines/parents/vaccine-decision/index.html>

CDC Glossary of Terms:

<https://www.cdc.gov/vaccines/terms/glossary.html>

CDC Recommended Vaccines by Disease:

<https://www.cdc.gov/vaccines/vpd/vaccines-diseases.html>

CDC Drug Resistance:

<https://www.cdc.gov/drugresistance/about.html>

WHO Vaccination Antibiotic Resistance:

<http://www.who.int/features/qa/vaccination-antibiotic-resistance/en/>

WHO UN Commitment to Act on Antimicrobial Resistance:

<http://www.who.int/news-room/detail/21-09-2016-at-un-global-leaders-commit-to-act-on-antimicrobial-resistance>

WHO Antimicrobial Resistance:

<http://www.who.int/features/qa/75/en/>

CDC Containing Unusual Resistance:

<https://www.cdc.gov/vitalsigns/containing-unusual-resistance/index.html>

CDC HAI Data and Statistics:

<https://www.cdc.gov/hai/surveillance/index.html>

CDC Antibiotic Resistance Patient Safety Atlas:

<https://www.cdc.gov/hai/surveillance/ar-patient-safety-atlas.html>

Gates Foundation Vaccine Delivery:

<https://www.gatesfoundation.org/What-We-Do/Global-Development/Vaccine-Delivery#AreasofFocus>

Bipartisan Policy Center:

<https://bipartisanpolicy.org/wp-content/uploads/2018/02/BPC-Health-Budgeting-For-Medical-Countermeasures-An-Ongoing-Need-For-Preparedness.pdf>

Trust for America's Health:

<http://healthyamericans.org/assets/files/TFAH-2018-InvestInAmericaRpt-FINAL.pdf>

World Bank:

<http://www.worldbank.org/en/topic/pandemics#1>

BARDA Public-Private Partnerships:

<https://www.phe.gov/about/barda/stratplan/Pages/barda-guiding-principles.aspx>