

The Importance of Vaccines for Health, Reducing Health Care Costs, and Maintaining American Leadership

VACCINES AT-A-GLANCE



LIVES SAVED

16 diseases are now preventable in the U.S. as a result of routine childhood vaccines, preventing an estimated **508 million illnesses, 32 million hospitalizations, and over 1.1 million deaths** among children born between 1994 and 2023.^{1,2}



COMMUNITIES PROTECTED

Widespread vaccination **protects vulnerable populations**, including **infants, older adults**, and those with **weakened immune systems**. Vaccines also **prevent life-altering disabilities** associated with many vaccine preventable diseases like polio and meningitis.³



DISEASE BURDEN REDUCED

Diseases like polio, measles, and rubella have seen a **>90% reduction in the U.S.** and as of 1980 **smallpox has been entirely eradicated** due to vaccination programs.⁴ Once a large enough proportion of the population is vaccinated, those unable to be vaccinated or those who are immune compromised also benefit from the indirect protection of herd immunity. Additionally, flu vaccines prevented an estimated **7 million influenza cases, 3 million medical visits, 100,000 hospitalizations, and 6,300 deaths** between 2019–2020.⁵



ECONOMIC PRODUCTIVITY

Vaccines **prevent workplace and school absenteeism**, reducing disruptions to education and work caused by disease outbreaks and helping bolster the economy.^{6,7}



AMERICAN INNOVATION & LEADERSHIP

Over the past 20 years, most new vaccines approved worldwide have been **developed in the United States**, and the American biopharmaceutical industry alone is responsible for **nearly twice as much R&D investment** as companies based in all the countries of Europe combined.^{8,9}



HEALTH SYSTEM SAVINGS

Routine childhood vaccinations, among children born between 1994 and 2023, have saved the U.S. health care system **\$540 billion in direct health care costs**, and an estimated **\$2.7 trillion in societal costs** have been saved.¹⁰

Further, **each dollar invested** in childhood vaccination alone results in **\$11.00 in savings** for health systems and society.¹¹

Vaccines Have a Successful History in Eliminating or Significantly Decreasing the Incidence of Dangerous Diseases

Vaccines are one of the most powerful and cost-effective public health tools we have available, saving millions of lives each year and helping to prevent and control infectious disease outbreaks. Their development and widespread use has profoundly altered public health, drastically reducing—and in some cases even eliminating—diseases that once devastated communities, while also providing significant economic and social benefits.¹²

THEN AND NOW: VACCINES HELP LEAVE SERIOUS DISEASES IN THE PAST¹³

Before vaccines, infectious diseases like smallpox, polio, and measles caused widespread illness, disability, and death, particularly among children. The absence of effective preventive measures left entire populations vulnerable to outbreaks that could claim thousands of lives within weeks.

Once one of the deadliest diseases, smallpox had a mortality rate of around 30%, and those who survived often suffered life-altering complications such as blindness and permanent scarring. ¹⁴	Disease	Average annual reported cases pre-vaccine (20th Century)	2023 Reported Cases	Percent Decrease	Globally eradicated in 1980, smallpox vaccination campaigns save an estimated 5 million lives annually worldwide. ¹⁷
	Smallpox	29,005	0	100%	
	Diphtheria	21,053	2	>99%	
Reported cases of measles were much lower than actual incidence. Prior to the introduction of a measles vaccine, nearly every American child contracted measles, leading to 400-500 deaths and tens of thousands of hospitalizations each year. ¹⁵	Measles	530,217	47	>99%	Due to early adoption and widespread implementation of the measles vaccine in 1963, the U.S. was among the first countries to significantly reduce cases of measles, with cases dropping by 80% following the vaccine's introduction. ¹⁸
	Mumps	162,344	429	>99%	
	Rubella	47,745	3	>99%	
	Polio (paralytic)	16,316	0	100%	
In the 1940s and 1950s, polio paralyzed or killed thousands of children annually in the U.S., leaving many using iron lungs. ¹⁶	Tetanus	580	15	97%	Thanks to vaccination efforts, the U.S. has been polio-free since 1979 and global cases have decreased by 99%. ¹⁹

Immunization can protect against the serious threats posed by diseases like whooping cough, measles, and meningococcal meningitis. Those who have experienced these diseases firsthand can never forget the devastating impact of these illnesses—and how important it is to continue to promote vaccination.

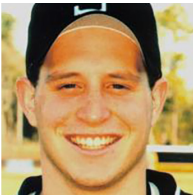


Emmi Herman's 9-year old sister Marcie contracted measles in 1960, putting her into a coma and taking away her chance at living the independent life she once hoped for.

After five weeks in the hospital, during which she narrowly escaped death, Herman's sister came home—but she wasn't the same. Marcie's measles turned into measles encephalitis—a dangerous swelling of the brain and the condition left her with a permanent brain injury and long-term physical and emotional difficulties.²⁰

“My sister lived a full life—she was so talented, playing the piano, making art—but she was childlike in many ways, and could not live independently. I often wonder what our lives would have been like had she been able to get the [measles] vaccine.”

—EMMI HERMAN, Marci's Sister
Searingtown, NY



Evan, a 20-year-old college athlete, contracted meningococcal meningitis in March 1998 and quickly developed severe complications from the infection entering his bloodstream. This included brain swelling, seizures, organ failure, and gangrene of his extremities, which required amputations. Despite intensive medical efforts, Evan ultimately succumbed to the disease. His parents later learned that a vaccine, which could have saved his life, was available but not widely recommended or communicated about at the time.²¹

“No family should lose a child to a vaccine-preventable disease. My husband and I had given Evan every vaccine that was recommended before he started college. No one told us about meningitis. Had we known that a vaccine even existed, whether it was recommended or not, Evan would have received it.”

—LYNN BOZOF, Evan's Mother,
Atlanta, GA

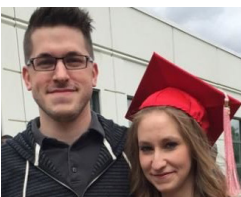


Brady was born a healthy baby but tragically contracted whooping cough (caused by the bacteria *Bordetella Pertussis*) despite his parents' careful precautions. After weeks of worsening symptoms and intensive medical care, he passed away at just two months old.

His parents now educate people about the risks of whooping cough and the importance of adult Tdap boosters in order to protect those too young to be vaccinated.²²

“People don't think much about diseases like whooping cough these days. I know that before going through this nightmare, I never would have imagined this could happen and even the best medical care couldn't help.”

—KATHY AND JOHN, Brady's Parents
Boston, MA



Joshua contracted measles in May 2016 after attending his sister's graduation, where he was exposed to a guest who had traveled internationally and was infected. Joshua didn't know he wasn't vaccinated against measles as a child until he ended up in the emergency

room with a high fever and rash that didn't respond to antibiotics. While he was eventually able to recover, his condition initially worsened and he ended up hospitalized for months, losing 25 pounds and at one point requiring assistance to walk.²³

“The science on this has been settled. It's been solved. When I look at where we are today, with people who are willfully deciding to ignore the facts, it really frustrates me.”

—JOSHUA NERIUS, Chicago, IL

Vaccines Play an Especially Critical Role in Protecting Young Children

Over the past 50 years, vaccination efforts have saved an estimated 154 million lives, or about 6 lives every minute worldwide. The vast majority of those lives saved—146 million—were children under the age of 5 years old.²⁴

As rates of childhood vaccination fall, children become especially at risk for contracting otherwise preventable diseases.

MEASLES

In recent years the U.S. has seen record number of measles cases—with outbreaks leading to the highest rates of measles since 1992—despite the disease being declared eliminated in 2000. These outbreaks predominantly occurred in communities with low vaccination rates.²⁵

- In Ohio in 2022, a measles outbreak infected 85 individuals, with 94% of cases among unvaccinated individuals. Forty-two percent of those infected had to be hospitalized.²⁶
- The largest measles outbreak in nearly three decades occurred in New York City in 2019, with 649 reported cases, primarily concentrated within communities with low vaccination rates. Extensive vaccination campaigns ultimately curtailed the outbreak, preventing an estimated 6,500–8,100 additional cases.²⁷
- Another 2019 outbreak in Clark County, Washington resulted in 71 confirmed cases, primarily affecting children under 10 years old. The community had a vaccination rate below 80%, far below the 95% threshold required for herd immunity. This led to rapid disease spread and required significant public health interventions to control the situation.²⁸

PERTUSSIS (WHOOPING COUGH)

Pertussis remains endemic in the U.S. because vaccine protection diminishes over time. Maintaining high vaccination rates and timely booster doses (e.g., Tdap during pregnancy) is essential to protect vulnerable groups, particularly infants, who are at the highest risk of severe complications and death from pertussis. Due to falling vaccine rates, the U.S. has experienced a resurgence of pertussis (whooping cough) in recent years, with several outbreaks resulting in the highest incidence of cases since the 1950s.²⁹

- In 2024, cases of pertussis have risen significantly in the U.S. As of early November, Pennsylvania reported over 2,500 cases, and New York reported 2,100 cases. Other states with significant outbreaks include Ohio, Wisconsin, Washington, and California. Overall, the incidence of whooping cough has quintupled compared to prior years. These outbreaks pose significant risks to infants who are too young to receive a vaccine.³⁰
- California experienced a resurgence of whooping cough in the 2010s. The state documented over 10,000 cases in 2014, including multiple infant fatalities, in areas with below-average vaccination rates.³¹

MUMPS

In the United States, mumps cases have historically been low following the introduction of a vaccine in 1967, but declining immunity has contributed to mumps outbreaks in schools and on college campuses, particularly in areas where vaccination rates are insufficient to maintain herd immunity.³²

- In 2017, a mumps outbreak in Iowa affected over 100 people—mostly college students—and was largely attributed to gaps in vaccination coverage. Many cases involved individuals who had received only one dose of the MMR vaccine, whereas two doses are recommended for full protection, highlighting how areas with lower vaccination uptake can be more vulnerable to outbreaks.³³

Major Milestones in Vaccine Science and Policy³⁴

Significant scientific, policy, and regulatory developments and milestones have shaped vaccine development, progress, and implementation over centuries. This progress has contributed to the prevention of infectious diseases, the advancement of public health, and the evolution of vaccination practices over time.

- **1796** Edward Jenner develops the **first vaccine (smallpox)**, laying the foundation for the field of immunology
- **1885** Louis Pasteur creates the **first rabies vaccines**, further establishing the principles of vaccination
- **1923** The **first diphtheria vaccine is licensed**, significantly reducing rates of a disease that was previously a leading cause of childhood death
- **1955** The **first polio vaccine is licensed in the U.S.**, leading to a rapid decline in polio cases
- **1963** The **first measles vaccine** is introduced (and later—in 1971—combined into the MMR vaccine)
- **1964** The **Advisory Committee on Immunization Practices (ACIP)** is established to provide expert, evidence-based recommendations on vaccine use and immunization schedules in the U.S., and to ensure public health policies are guided by science
- **1967** The FDA approves the **first mumps vaccine**
- **1969** The **first rubella vaccine** is licensed in the U.S.
- **1979** The U.S. achieves **elimination of all wild polio cases**
- **1980** The World Health Organization (WHO) **declares smallpox eradicated worldwide**
- **1986** The **National Childhood Vaccine Injury Act (NCVIA)** is passed, enacting the **Vaccine Injury Compensation Program (VICP)** and establishing the **Vaccine Adverse Event Report System (VAERS)** to ensure safety while also fostering innovation
- **1990** Launch of the **Vaccine Safety Datalink (VSD)**, a critical tool for monitoring vaccine safety using electronic health records
- **1994** The **Vaccines for Children (VFC) Program** is created, ensuring free vaccines for children in low-income families and leading to a significant increase in vaccination rates, and a total of \$2.7 trillion dollars in societal savings among children born over the past 30 years
- **2000** **Measles is declared eliminated** in the United States
The first **pneumococcal conjugate vaccine (PCV)** is licensed for infants at 2, 4, 6, and 12-15 months of age to prevent invasive pneumococcal disease (which includes meningitis)
- **2006** The **first HPV vaccine** is approved, marking a major step in cancer prevention by protecting against strains of HPV linked to cervical and other cancers
- **2009** The **Omnibus Autism Proceeding** concludes, with the federal court finding no credible links between vaccines and autism, and reaffirming vaccine safety
- **2010** Creation of the **Countermeasures Injury Compensation Program (CICP)**, which provides compensation for injuries related to vaccines or treatments used during public health emergencies
- **2015** The FDA and CDC approve **new vaccines for meningococcal disease** (which includes meningitis)
- **2020** The U.S. authorizes the **first COVID-19 vaccine** under an Emergency Use Authorization (EUA), demonstrating the ability to respond rapidly to a global pandemic
- **2021** COVID-19 vaccines for use in adults receive **traditional FDA approval**

The U.S. Leads the World in Developing Innovative Vaccine Technology and this Leadership Helps Keep Americans Safe

Emerging diseases, whether naturally occurring or biothreats like bioterrorism, pose significant risks of widespread death and disruption.³⁵ Most countries lack domestic vaccine production capabilities and depend on others to address health crises. Countries, including U.S. competitors, use their biopharmaceutical innovation for global influence.^{36,37}

A strong domestic vaccine infrastructure is essential for the U.S. to respond quickly and independently to these threats, ensuring the continued resiliency of the supply chain.

THE U.S. LEADS THE WORLD IN DEVELOPING NEW VACCINE TECHNOLOGY



The U.S. biopharmaceutical industry alone accounts for **more than half of global investment in biopharmaceutical R&D**³⁸



Over the past 20 years, **most new vaccines approved worldwide** have been developed in the **United States**³⁹

U.S. LEADERSHIP IN VACCINE INNOVATION BENEFITS AND KEEPS AMERICANS SAFE



HEALTH

Life-saving vaccines for children and adults

16 diseases are now preventable in the U.S. due to the development and availability of childhood vaccines, and the introduction of a new shingles vaccine in 2017 has **reduced the risk of shingles among older adults by 90%**.^{40,41}



SECURITY

The ability to develop vaccines quickly makes America more secure

The U.S. has invested heavily to ensure the resilience of our health care system, which has enabled the ability to develop and deliver vaccines quickly in the face of emerging threats, whether biological, viral, or bacterial.⁴²



ECONOMY

American innovation in vaccines creates significant economic benefit, not only through the prevention of disease but also through the industry's contributions to the workforce

The U.S. is the world leader in vaccine production and the U.S. biopharmaceutical industry **employs over 1 million people**.^{43,44}

Vaccines are critical to protecting Americans' health, saving lives, preventing billions in health care costs, and safeguarding the nation from emerging threats. Continued investment and support for vaccine innovation and access are essential to maintain U.S. leadership and keep communities safe.

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