

JUST THE FACTS

16 DISEASES

ARE NOW
PREVENTABLE IN
THE UNITED STATES
AS A RESULT OF
CHILDHOOD
VACCINES¹

\$1.4 TRILLION

IN SOCIETAL COSTS
ARE ESTIMATED TO
HAVE BEEN SAVED
IN THE UNITED
STATES BECAUSE
OF CHILDHOOD
VACCINES²

7.1+ MILLION

LIVES HAVE BEEN
SAVED AROUND THE
GLOBE SINCE 2000
AS A RESULT OF THE
MEASLES VACCINE³

\$9.9 BILLION

REDUCED IN DIRECT
HEALTH CARE COSTS
FROM VACCINES⁴

MEDICINES IN DEVELOPMENT | 2017 UPDATE

VACCINES

Biopharmaceutical Research Companies are Developing More Than **260 Vaccines**; Focusing on Prevention and Treatment

Today, there are 264 vaccines in development by America's biopharmaceutical companies to both prevent and treat diseases.⁵ These include 137 for infectious diseases, 101 for cancer, 10 for allergies, eight for autoimmune disease, four for Alzheimer's disease and five for other diseases.

Vaccines have a critical role in reducing and, in some cases, eliminating the threat of many devastating infectious diseases around the world. According to the U.S. Centers for Disease Control and Prevention (CDC), naturally-occurring smallpox has been eliminated worldwide as a result of vaccines and in most countries polio has been eliminated. The transmission of rubella has been eliminated in the United States and measles and mumps, two highly contagious childhood infections, are very close to being eliminated. In recent years, vaccines have emerged to prevent infection of several strains of human papillomavirus, helping to prevent cervical and other devastating forms of cancer.

These public health victories illustrate the major contributions vaccines are making in saving countless lives in the United States and around the world. While vaccines are powerful tools for preventing disease, scientists are also making progress in therapeutic vaccines with the potential to treat disease. Therapeutic vaccines work by either stimulating or restoring the body's immune system to fight infection and disease, such as in cancer. Currently, outside of infectious diseases, there are three oral therapeutic vaccines approved to treat grass and ragweed allergies and one therapeutic vaccine for prostate cancer, with many more in development.

All of the 264 vaccines in development are either in clinical trials or awaiting review by the U.S. Food and Drug Administration. Among the vaccines in development are:

- A vaccine to prevent HIV infection, which has the potential to teach the patient's immune system to recognize and effectively fight HIV.
- A therapeutic vaccine for non-small cell lung cancer (NSCLC) which uses messenger RNA (mRNA) to mobilize the patient's own immune system to fight the tumor(s). The vaccine targets six specific tumor-associated antigens (substances produced in tumors that trigger an immune response) that are overexpressed in lung cancer.
- A therapeutic vaccine for Alzheimer's disease combines beta-amyloid peptide fragments to a virus-like particle (VLP) to generate antibodies against the beta-amyloid protein and inhibit plaque formation.
- A vaccine for the prevention of respiratory syncytial virus (RSV) infections in adults over the age of 60 acts differently than traditional vaccines that "mimic" viruses and activate the natural immune system to fight the infection. The vaccine seeks to elicit genetically-engineered immune responses, which may be more effective than naturally-occurring immunity.

VACCINATION AND THE ELDERLY⁶

While vaccines are one of the most effective ways we have to protect people from infectious diseases, the effectiveness of vaccination can decrease with age. Seniors experience age-related changes to their immune response – called immunosenescence – that affects their ability to fight infections and also may impact a vaccine's effectiveness in preventing an infection. Because of these immune system changes, researchers are pursuing new and novel vaccines tailored to the special needs of the elderly. Currently, there are 15 potential vaccines being studied specifically for use in older adults.

SCIENTIFIC ADVANCES IN VACCINE DEVELOPMENT

Using promising new scientific approaches, researchers are building on the successful history of vaccination against infectious diseases. For example, researchers are pursuing vaccines against difficult viral diseases with no prevention options such as Zika and Ebola. In addition, advances in areas such as genomics are enabling researchers to develop therapeutic vaccines for many non-infectious diseases and conditions, including some forms of cancer. Researchers are also exploring new ways to deliver vaccines that may improve patient adherence to important vaccine regimens, including nasal sprays, powders and transdermal applications.

Sources:

1. U.S. Centers for Disease Control and Prevention (CDC). "10 Things You Need to Know About Childhood Immunizations."
2. CDC, Benefits from Immunization during the Vaccines for Children Program Era – United States, 1994-2013, MMWR
3. World Health Organization (WHO). "Measles vaccination has saved an estimated 17.1 million lives since 2000," November 12, 2015.
4. Healthy People 2020. Immunization and Infectious Diseases. www.healthypeople.gov
5. Number of vaccines obtained through public, government and industry sources, and the Springer "Adis Insight" database. Current as of October 10, 2017. The medicines are either in clinical trials or undergoing regulatory review at the U.S. Food and Drug Administration.
6. Immunosenescence and Novel Vaccination Strategies for the Elderly. *Frontiers in Immunology*, June 2013. Volume 4. Article 171.



America's
Biopharmaceutical
Companies

GOBOLDLY