

# Vaccine Research and Development

Development of new vaccines is costly and complex: it can cost from USD 200 to 900 million and it can take from 8- to 18.5 years

During the last 30 years, the vaccine industry has invested significantly in new and improved vaccines. This has resulted in a broad range of vaccines targeting over 25 vaccine-preventable infections

INFECTIOUS DISEASES such as

NON-COMMUNICABLE DISEASES such as

HIV/AIDS  
Malaria  
Tuberculosis (TB)  
Neglected Tropical Diseases (NTDs)

Alzheimer's  
Cancer  
Multiple sclerosis  
Pediatric tumors

With the continued efforts of researchers, more vaccines to protect against life-threatening diseases will be available in the near future

Biopharmaceutical companies continue to make significant investments to extend the range of available vaccines. This includes work on preventing infectious diseases, including those that disproportionately affect the developing world, such as HIV/AIDS, Malaria, Tuberculosis (TB) and Neglected Tropical Diseases (NTDs). A number of vaccines are now in development that are designed to treat non-communicable diseases such as cancer.

Vaccines with multiple antigens or strains\* allow for broadened protection, while reducing the number of injections

Cervical cancer affects 500,000 women each year

Meningococcal disease in the African 'meningitis belt' meningococcal infection causes frequent epidemic attacks

Rotavirus diarrhea responsible for the deaths of over 500,000 children ≤ 5 years of age annually

Pandemic and pre-pandemic influenza future pandemics could result in millions of fatalities

Pneumococcal diseases responsible for 1.6 million deaths each year

\* (up to 5/6 in combination vaccines for infants and 10/13 in conjugated vaccines against pneumococcal disease)

Vaccine development has accelerated due to scientific breakthroughs in biotechnology, genetic decoding and information technology. This has resulted in recently introduced new vaccines to stop suffering from diseases.

Rigorous safety monitoring  
Sophisticated manufacturing processes  
Intense review by health authorities  
Multiple technologies  
Funds

Vaccine development is a complex, lengthy, and expensive process. It requires a mastery of multiple technologies, funds for clinical trials and manufacturing facilities, sophisticated scale-up processes, expertise in navigating demanding regulatory environments in multiple regions, and managing rigorous safety monitoring.

## R&D pipeline to protect against 50 life-threatening diseases

Bacterial diseases	Viral diseases	Parasitic diseases	Treatments to manage diseases
Buruli ulcer*	Cytomegalovirus	Fascioliasis*	Allergic rhinitis (hay fever)
Clostridium difficile	Dengue fever*	Human African Trypanosomiasis*	Alzheimer's
Chlamydia	Ebola	Hookworm	Breast cancer
Escherichia coli	Epstein-Barr	Leishmaniasis*	Cervical cancer
Helicobacter pylori	Genital herpes	Lymphatic filariasis*	Cocaine addiction
Leprosy*	Hepatitis C	Malaria	Colorectal cancer
Meningococcus B	Hepatitis E	Onchocerciasis (river blindness)*	Lung cancer
Plague	Herpes simplex	Schistosomiasis*	Melanoma
Pseudomonas Aeruginosa	HIV	Soil transmitted helminthiasis: hookworm*	Multiple sclerosis
Shigella	Influenza		Nicotine addiction
Staphylococcus	Parainfluenza		Pediatric tumors
Streptococcus group A & B	Respiratory syncytial virus		
Trachoma*	SARS		
Tuberculosis	West Nile		

\* Neglected Tropical Diseases (NTDs)