

TAKEDA IN VACCINES

ABOUT TAKEDA



Takeda is a global, values-based, R&D-driven biopharmaceutical leader headquartered in Japan, committed to bringing Better Health and a Brighter Future to patients by translating science into highly-innovative medicines.



Takeda focuses its R&D efforts on four therapeutic areas: Oncology, Gastroenterology (GI), Neuroscience and Rare Diseases. We also make targeted R&D investments in Plasma-Derived Therapies and Vaccines.



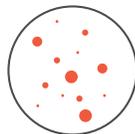
Our employees are committed to improving quality of life for patients and to working with our partners in health care in approximately **80 countries** and regions.

ABOUT TAKEDA VACCINES

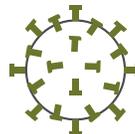
- For more than **70 years**, Takeda has produced vaccines to protect adults and children in Japan from infectious diseases including *Japanese encephalitis, measles, rubella, mumps, diphtheria tetanus toxoid, seasonal flu, varicella and H5N1 flu*. Today, Takeda's global vaccine business is applying innovation to tackle some of the world's most challenging infectious diseases, such as *dengue, Zika and norovirus*.
- Takeda continues to strengthen its global footprint in vaccines by collaborating with top partners who share our commitment to helping populations in need by developing and supporting access initiatives for life-saving vaccines.
- Takeda is committed to substantial investments in R&D and manufacturing platforms which take advantage of advancements in bioprocesses to reduce cost of goods, increase speed to scale up and simplify technology transfer.

PUBLIC HEALTH AND ECONOMIC BENEFITS OF VACCINES

- The global mortality rate for children has declined by more than **50%** over the past **50 years**, due in part to vaccines.¹
- Vaccines are one of the most cost-effective ways to save lives.²
- Among vaccines related to the following antigens, immunization yields benefits that exceed investment costs in **94 countries**. The return on investment (ROI) of the following diseases are³:



MEASLES:
MORE THAN
\$410 BILLION
(58.2% ROI)

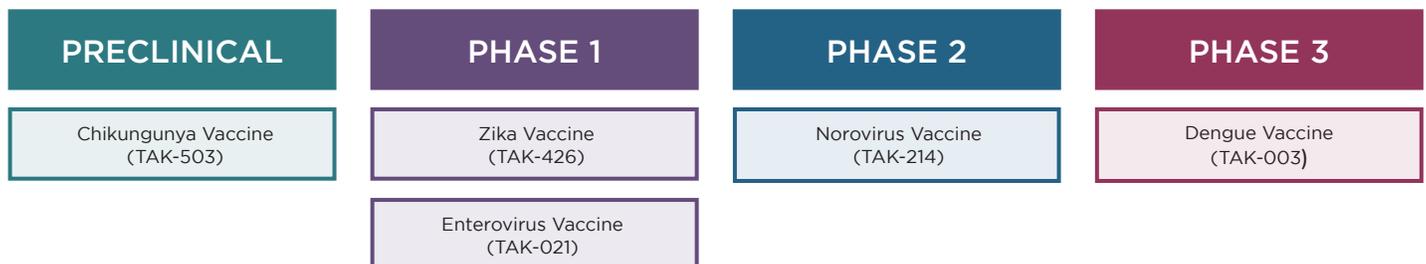


HEPATITIS B:
MORE THAN
\$25 BILLION
(9.4% ROI)



YELLOW FEVER:
MORE THAN
\$10 BILLION
(13.2% ROI)

PIPELINE



Many people across the world are at risk of mosquito-borne diseases and other illnesses for which we are developing vaccine candidates.⁴ Takeda's current global vaccine pipeline includes:

TAK-003 /Dengue:



Dengue is the fastest spreading mosquito-borne viral disease.⁵ Each year, dengue causes approximately **400 million infections, 500,000 hospitalizations** and more than **20,000 deaths**.⁵



TAK-003 is being developed to protect children and adults living in, or traveling to, endemic areas against all four virus serotypes, regardless of previous dengue exposure.⁶



Dengue is now endemic in more than **120 countries**, and half of the world's population is at risk of contracting the disease.⁵



Takeda announced in January 2019 that **TAK-003** met the primary endpoint in the ongoing **Phase 3** trial, showing its efficacy in preventing dengue fever caused by any of the four serotypes of the virus.

TAK-426 /Zika:



Zika is caused by a virus transmitted primarily by *Aedes aegypti* mosquitoes.⁷



Takeda responded to the WHO's declaration of Zika being a Public Health Emergency of International Concern by partnering with **Biomedical Advanced Research and Development Authority (BARDA)** in developing a Zika vaccine candidate.⁹



Zika has spread in recent years, impacting **86 countries** and territories, including the U.S.⁸



A **Phase 1** trial began in **November 2017** across the continental U.S. and U.S. territories.^{10, 11}



Although Zika transmission rates have declined since the outbreak began, the need for a Zika vaccine remains.

TAK-214 /Norovirus:



Norovirus is the leading cause of gastroenteritis across all ages in humans, and it is estimated to cause more than **685 million** illness cases and **219,000 deaths** globally each year.¹²



Takeda has the most advanced vaccine candidate for norovirus, which recently completed a **Phase 2b** study, and is working on future pivotal development plans.

PARTNERSHIPS AND ACCESS

- The fight against global infectious disease requires significant collaboration. Takeda is forging partnerships and collaborating across R&D, clinical science, operations and commercial functions to achieve its mission of making important vaccines available to those who need them.
- Examples of these partnerships include:



A partnership with the National Institutes of Health (NIH)/National Institute of Allergy and Infectious Diseases (**NIAID**) to support the early-stage development and non-human efficacy evaluations of Takeda's dengue vaccine candidate



Partnerships with the Centers for Disease Control (**CDC**) and Biomedical Advanced Research and Development Authority (**BARDA**) focused on collaborative research for assay development and preclinical data in support of Takeda's dengue and Zika programs



Collaboration with Biological E. Limited to develop low-cost combination vaccines for low- and middle-income countries around the globe¹³



A Zika program with funding from the U.S. Government's Biomedical Advanced Research and Development Authority (**BARDA**)



A collaboration with Zydus Cadila to develop a vaccine to tackle chikungunya, a virus most often spread to people by Aedes albopictus mosquitoes, the same vectors that spread dengue and Zika.¹⁴

TAKEDA'S ACCESS TO MEDICINES STRATEGY



Access to innovative vaccines, medicines and quality healthcare is vital to the well-being of people, yet it remains a significant issue around the world, particularly in countries with evolving healthcare systems. With our global Access to Medicines (AtM) strategy, Takeda is expanding its existing commitments to enhance global health so that eligible populations in evolving healthcare systems can have access to our innovative and potentially life-saving medicines and vaccines.

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