

TAKEDA IN VACCINES

ABOUT TAKEDA



Takeda is a patient-focused, innovation-driven global pharmaceutical company that builds on more than **230 years** of distinguished history, aspiring to bring better health and a brighter future for people worldwide.



Takeda innovates with a focus on oncology, gastroenterology (GI), neuroscience and vaccines.



Today, more than **30,000** Takeda employees are committed to improving quality of life for patients, working with our partners in health care in more than **70 countries**.

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, egg-based 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, norovirus and polio*.
- 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
- Increased rates of vaccination against infectious diseases over the next **10 years** could save or prevent*³:



64 MILLION
LIVES



426 MILLION
CASES OF ILLNESS



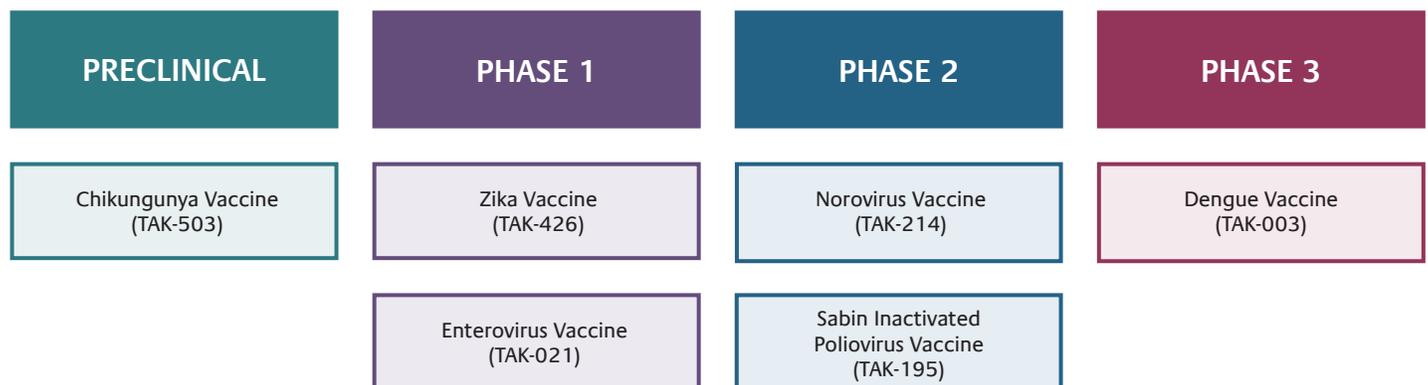
\$6.2 BILLION IN
TREATMENT COSTS



\$145 BILLION
IN PRODUCTIVITY LOSSES

*Based on the Lives Saved Tool. In this analysis, estimates were based on number of lives saved among children under age five by increasing the rate of vaccination against seven diseases to 90 percent by 2015 in the seventy-two countries eligible for assistance through the GAVI Alliance.

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:



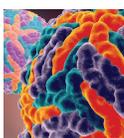
Dengue is the fastest spreading mosquito-borne viral disease.²¹ Each year, dengue causes approximately **400 million infections**²¹, **500,000 hospitalizations**²³ and more than **20,000 deaths**.²⁴



A **Phase 3** efficacy study was initiated in **September 2016**.⁷ The primary endpoint results are expected to be available in early **2019**.



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

TAK-426 / Zika:



Zika is caused by a virus transmitted primarily by *Aedes aegypti* mosquitoes.²²



Zika has spread in recent years, impacting **84 countries** and territories, including the U.S.⁸



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



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



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

TAK-214 / Norovirus:

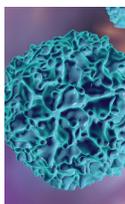


Norovirus is the leading cause of gastroenteritis across the age spectrum in humans, and it is estimated to cause more than **699 million** illness cases and **219,000 deaths** globally each year.¹²



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

TAK-195 / Polio:



Polio (poliomyelitis) is a crippling and potentially fatal infectious disease caused by the poliovirus, with no cure.^{14, 15} It has been nearly eliminated, and the strategy to completely eradicate the disease is based on preventing infection through immunization until transmission stops, which requires a switch from oral poliovirus vaccine (OPV) to injectable trivalent inactivated poliovirus vaccine (IPV).^{15, 16}



Takeda joined this global effort toward polio eradication by partnering with the Bill & Melinda Gates Foundation and committing to develop, license and supply at least **50 million** doses per year of Sabin-strain inactivated poliovirus vaccine (sIPV) to more than **70 developing countries**.¹⁷



A **Phase 1/2** clinical study of the vaccine candidate was initiated in **June 2017**.¹⁸

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

BILL & MELINDA
GATES foundation

A polio program in which Takeda will make at least **50 million** doses available per year for developing countries through a **\$38 million grant** from the Bill & Melinda Gates Foundation¹⁷



A partnership with Zydus Cadila to tackle chikungunya, a virus most often spread to people by *Aedes aegypti* and *Aedes albopictus* mosquitoes, the same vectors that spread dengue and Zika¹⁹



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



Biological E. Limited
Celebrating Life Every Day

Partnership with Biological E. Limited to develop low-cost combination vaccines for low- and middle-income countries around the globe²⁰

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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