TAKEDA VACCINES

INNOVATION FOR GLOBAL IMPACT

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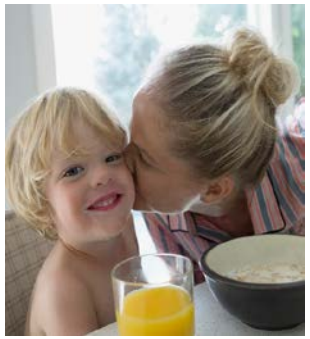
OUR MISSION

Develop and deliver innovative vaccines that tackle the toughest problems in public health and improve the lives of people around the world



WE HAVE BUILT A GLOBAL VACCINE BUSINESS UPON A STRONG FOUNDATION IN JAPAN

1946

Japan vaccine business established

1947

1st Takeda manufactured vaccine

2010

Multiple vaccine products manufactured internally and marketed in Japan

2012

Global vaccine business established

2014

Partnered with Japan government to develop and supply pandemic influenza vaccines for people in Japan

ACQUISITIONS

inviragen — Dengue vaccine candidate

LIGOCYTE PHARMACEUTICALS, INC. — Norovirus vaccine candidate

2016

Global pivotal Phase 3 clinical trial of dengue vaccine candidate initiated: 20,100 participants in 8 countries in 2 regions

2018

Phase 3 clinical trial results of dengue vaccine candidate is expected in H2 FY18

PARTNERSHIPS

Bill & Melinda Gates Foundation — Polio vaccine candidate

U.S. Government- BARDA — Zika vaccine candidate

THE VACCINE MARKET IS AN ATTRACTIVE PLACE FOR INVESTMENT

Vaccine sales growth projected at 7.1% between 2017 and 2024, reaching $44.6 billions in 2024[1]

Durability in sales with limited impact of patent expiry

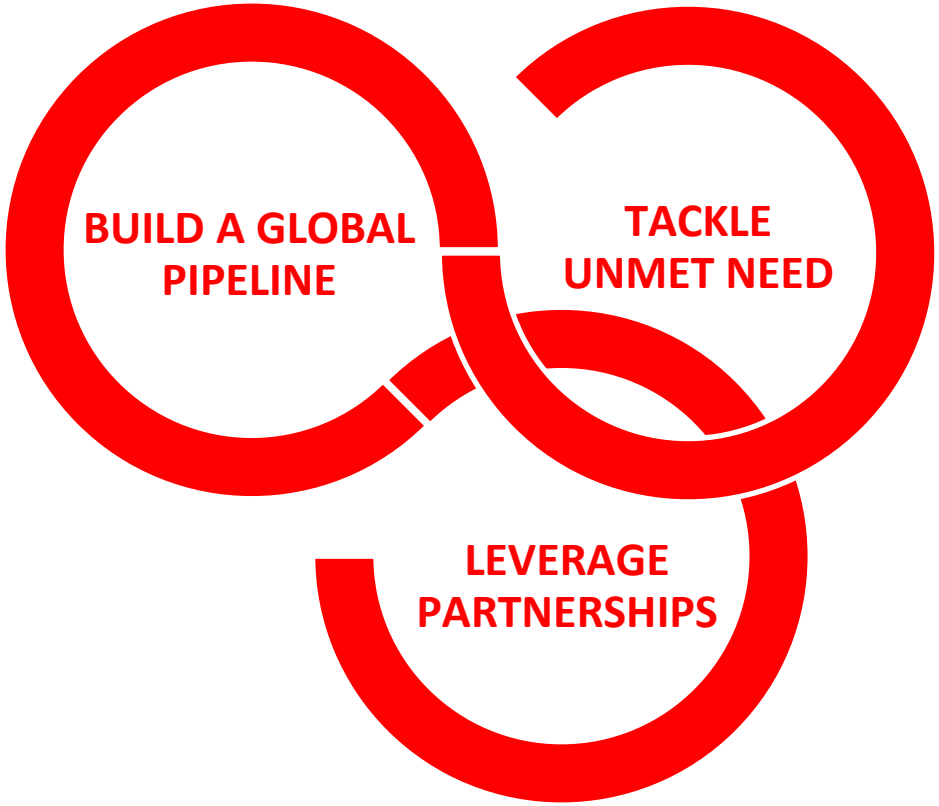
Blockbuster potential in newly launched vaccines

Threat of emerging and existing infectious diseases with epidemic potential

1 Evaluate Pharma report 2018

OUR STRATEGY

Develop vaccines with global relevance and business potential



Target the greatest opportunity in infectious diseases

Partner to de-risk and drive vaccine development

OUR PIPELINE

Discovery/preclinical	Phase 1	Phase 2	Phase 3	Japan Marketed Vaccines	
			DENGUE VACCINE (TAK-003)	H5N1 FLU (BLB-750)	EGG-BASED SEASONAL FLU *DENKA & KM BIOLOGICS*
		NOROVIRUS VACCINE (TAK-214)		MEASLES RUBELLA+	VARICELLA^ *BIKEN*
	BARDA ZIKA VACCINE (TAK-426)	SABIN INACTIVATED POLIOVIRUS VACCINE (TAK-195)		MUMPS	JAPANESE ENCEPHALITIS *BIKEN*
Zydus Cadila CHIKUNGUNYA VACCINE (TAK-507)	ENTEROVIRUS 71 VACCINE (TAK-021)			DIPHTHERIA TETANUS TOXOID‡	

Pipeline as of September 23, 2018

External collaboration

+ Takeda has a measles-rubella combined vaccine, a measles vaccine and a rubella vaccine on the Japanese market.
‡ Takeda has a diphtheria-tetanus combined toxoid vaccine and a tetanus-toxoid vaccine on the Japanese market.
^ Takeda's varicella vaccine has been approved for an additional indication preventing herpes-zoster.

DENGUE THREATENS HALF OF THE WORLD'S POPULATION

Endemic in more than

120

countries[1]

Causes an estimated

390M

infections[1]

Causes more than

20K

deaths each year[2]

In 2015,

>85M

US, Canada, and Japan travelers to endemic countries[3]

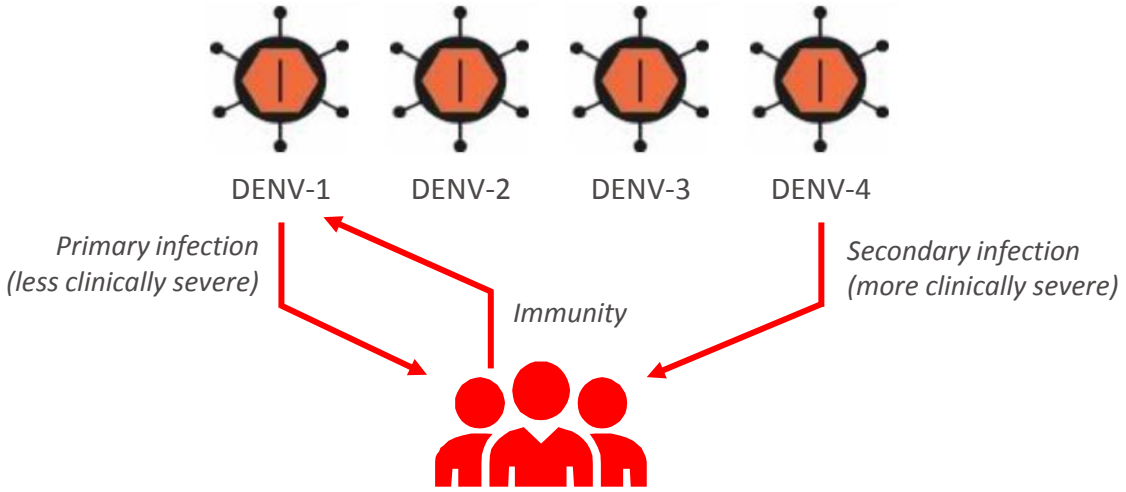
Without safe and effective dengue vaccine

>3.9 BILLION

people around the globe are at risk of dengue[1]

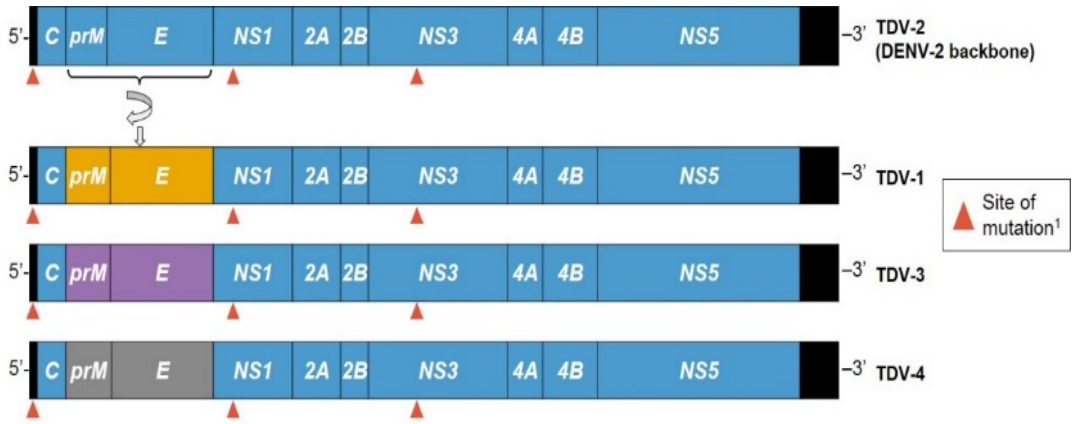
1 World Health Organization. Dengue and Severe Dengue. Retrieved August 2018. http://www.who.int/mediacentre/factsheets/fs117/en/
2 World Health Organization. Dengue. Retrieved August 2018. http://www.searo.who.int/entity/vector_borne_tropical_diseases/data/data_factsheet/en/
3 Travel data from: UNWTO. Yearbook of Tourism Statistics, Data 2011 – 2015 (2017 Edition)

A SAFE AND EFFECTIVE DENGUE VACCINE SHOULD BE DESIGNED TO PROTECT AGAINST ALL FOUR STRAINS OF THE VIRUS



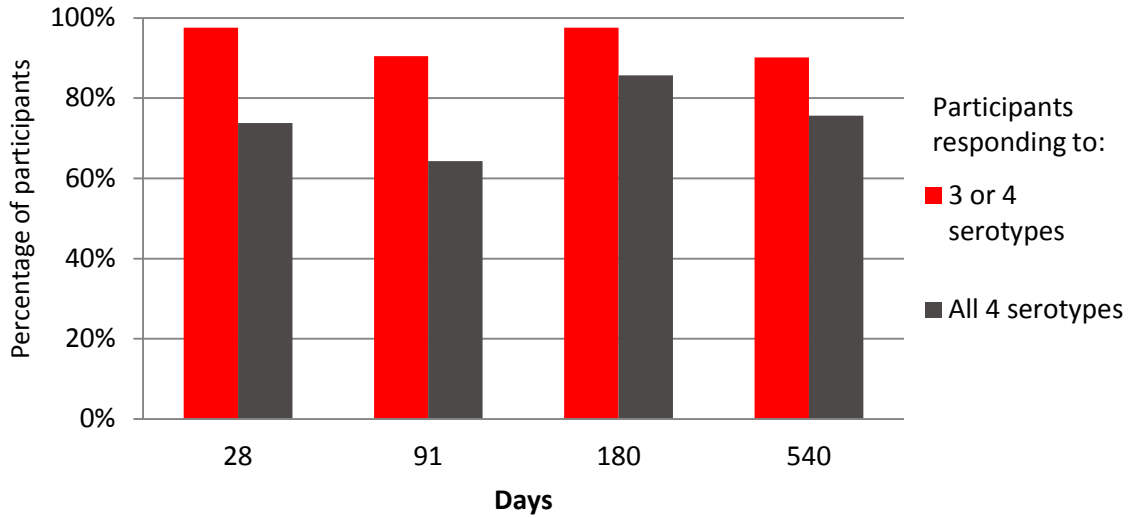
- Dengue is a mosquito-borne disease that can be caused by each of the four strains of the dengue virus (DENV) 1-4
- In people previously exposed to dengue, a subsequent infection with a different strain could lead to more severe disease
- A dengue vaccine must provide broad protection against all four strains of dengue, particularly in persons who have never been exposed to the virus (“naïve”)

TAK-003 IS MODELED ON THE COMPLETE DENGUE VIRUS AND ACTIVATES MULTIPLE ARMS OF THE IMMUNE SYSTEM



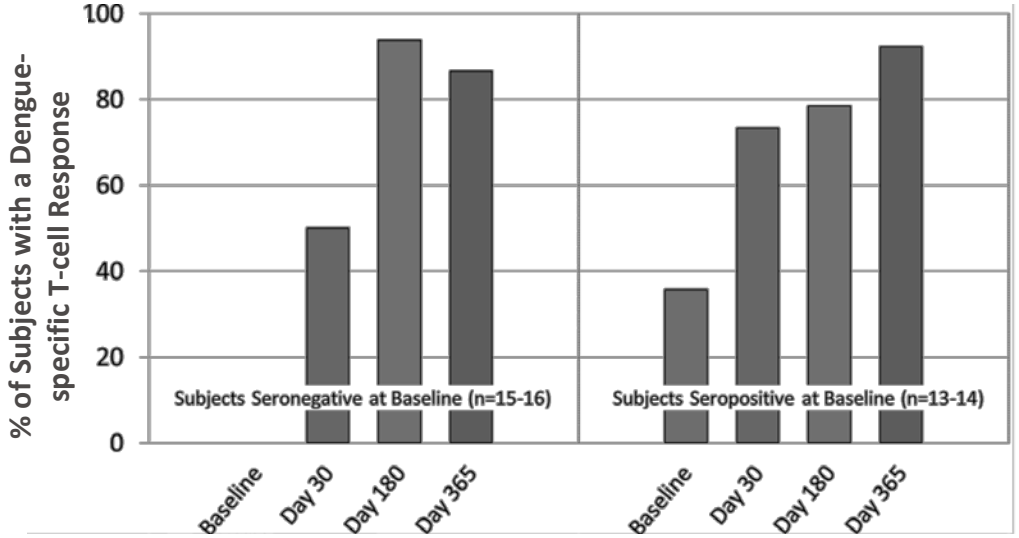
- Live attenuated dengue vaccine based on the complete DENV-2 genome
- Vaccine virus stimulates robust immune response without causing illness
- Components of immune response that are activated include:
  - Neutralizing antibodies
  - Cell-mediated immunity
  - Antibodies to the NS1 protein (NS1 is implicated in severe disease)

TAK-003 TRIGGERS BOTH ANTIBODY AND CELL-MEDIATED IMMUNE RESPONSES



Antibody-mediated immune response in dengue naïve population[1]

- High and sustained antibody response to multiple serotypes after 2 doses (0, 3 month), in participants without prior exposure to dengue



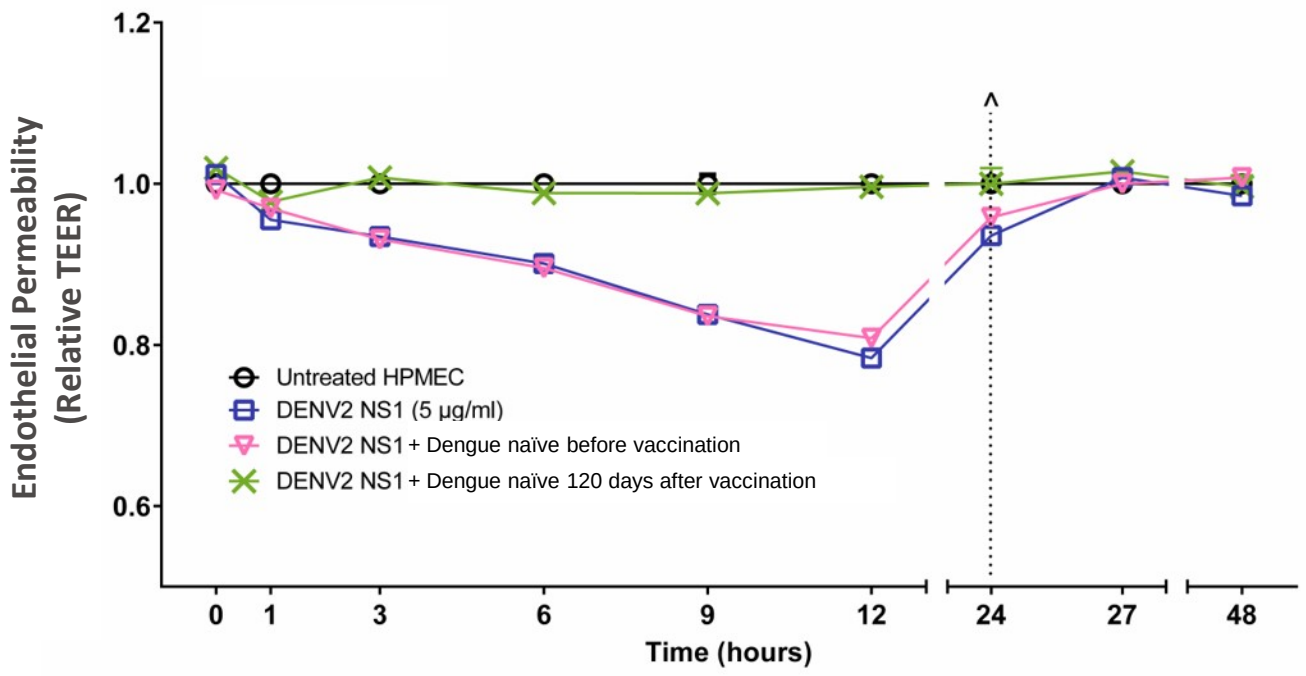
DENV-2 cell-mediated immune response [2]

- >90% of TAK-003 vaccinated participants demonstrate a Dengue-specific T-cell response
- Comparable response between seronegative and seropositive participants at baseline
- Demonstrated cross-reactivity to DENV-1, -3, and -4

1 Lancet Infect Dis 2018; 18: 162–70 Published Online November 6, 2017 http://dx.doi.org/10.1016/ S1473-3099(17)30632-1; results from DEN-204, a Phase 2 study in children living in 3 dengue endemic countries
2 6th Pan-American Dengue Research Network Meeting; results from DEN-205, a Phase 2 study

TAK-003 TRIGGERS NS1 ANTIBODIES THAT PREVENT VASCULAR LEAKAGE IN THE LABORATORY[1]

- Severe dengue is characterized by vascular leakage in the lungs and abdomen
- This vascular leakage is thought to be mediated by the dengue virus non-structural protein 1 (NS1)
- TAK-003-induced NS1 antibodies block NS1-induced vascular leakage in human pulmonary tissue models



[1] 6th Pan-American Dengue Research Network Meeting; results from DEN-203, a Phase 2 study
HPMEC = Human Pulmonary Microvascular Endothelial Cells

TAK-003 WAS GENERALLY SAFE AND REDUCED THE INCIDENCE OF DENGUE IN CHILDREN IN A RECENT PHASE 2 STUDY

STUDY FEATURES

- 1,800 participants received either TAK-003 (1 dose; 2 doses at 0, 3 months; or 2 doses at 0, 12 months) or placebo
- Mean age 7.3 years, range 2 – 17 years
- Approximately 45% of participants were dengue naïve

INCIDENCE OF SYMPTOMATIC DENGUE WAS SIGNIFICANTLY LOWER IN VACCINE RECIPIENTS OVER 18 MONTHS[1]

Dengue Incidence		Relative risk of dengue in vaccines (95% CI)
TAK-003 (%)	Placebo (%)	
1.3	4.5	0.29 (0.13–0.72)

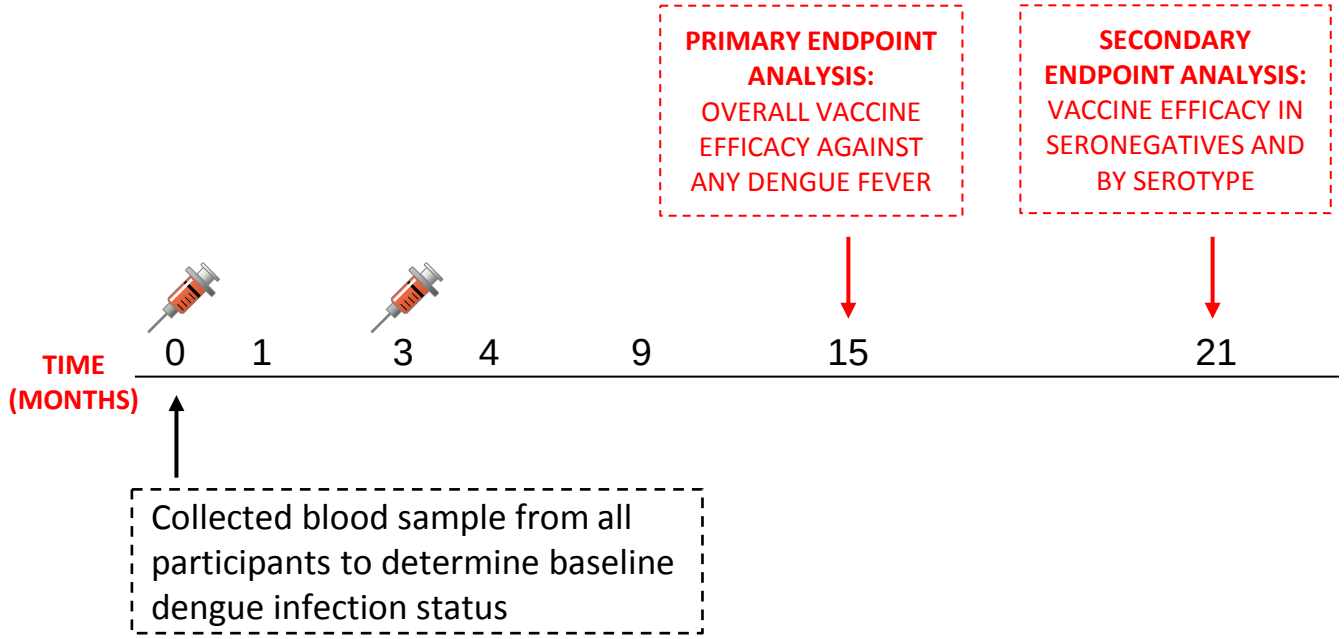
THESE PROOF-OF-CONCEPT FINDINGS REQUIRE CONFIRMATION IN OUR ONGOING PHASE 3 EFFICACY STUDY

[1] Lancet Infect Dis 2018; 18: 162–70 Published Online November 6, 2017 http://dx.doi.org/10.1016/ S1473-3099(17)30632-1; results from DEN-204, a Phase 2 study in children living in 3 dengue endemic countries

OUR PHASE 3 PIVOTAL TRIAL IS DESIGNED TO ANSWER THE MOST IMPORTANT QUESTIONS ABOUT SAFETY AND EFFICACY OF OUR DENGUE VACCINE CANDIDATE

STUDY DESIGN

- **20,100 participants, aged 4 – 16 years old**
  - Age range ensures a mix of dengue exposed and naïve participants
- **Blood sample in all participants at baseline**
  - Enables identification of seronegative subjects
- **8 countries in 2 regions**
  - Brazil, Colombia, Dominican Republic, Nicaragua, Panama, Philippines, Sri Lanka, Thailand
    - Assesses the safety and efficacy of TAK-003 in diverse populations and epidemiological scenarios



PRIMARY ENDPOINT RESULTS EXPECTED IN H2 FY18 FOLLOWED BY REGULATORY FILING IN FY19

TAKEDA HAS THE MOST ADVANCED NOROVIRUS VACCINE CANDIDATE (TAK-214) AND RECENTLY COMPLETED PHASE 2B STUDY

CHALLENGE

- Leading cause of acute gastroenteritis – 600M infections per year
- No vaccine available

OUR PATH

- Most advanced vaccine in development
- Completed Phase 2b study
- Phase 3 preparations underway

OUR GOAL

- Potential for first and best vaccine
- Impact in all markets

TAKEDA HAS PARTNERED WITH THE U.S. GOVERNMENT TO DEVELOP THE FIRST ZIKA VACCINE (TAK-426)

CHALLENGE

- Devastating impact on newborns
- Potential for recurrent outbreaks
- No vaccine available

OUR PATH

- Largest Zika investment by U.S. government
- Proven platform
- Fast track designation

OUR GOAL

- Deliver the first Zika vaccine to market

CONCLUSION

1 STRONG FOUNDATION AND TOP TALENT

- Over 70 years of vaccine manufacturing experience
- Top talent in vaccine development
- Built a high impact global pipeline

2 BEST-IN-CLASS AND FIRST-IN-CLASS POTENTIAL

- Dengue vaccine (TAK-003) in Phase 3
- Norovirus vaccine (TAK-214) in Phase 2b
- Zika vaccine (TAK-426) in Phase 1

3 A PARTNER OF CHOICE FOR VACCINES

- U.S. Government
- Japan Government
- Bill & Melinda Gates Foundation
- Industry Partners


“If you want to save and improve lives around the world, vaccines are a fantastic investment.”
- Bill Gates