

Japanese encephalitis vaccine introduction and sustainability in the Mekong region

Supporting lifesaving access and vaccine delivery efforts

THE DISEASE

Japanese encephalitis (JE), spread by infected mosquitoes, is the leading cause of viral encephalitis in Asia. Approximately 3 billion people, including 700 million children, live in areas at risk of JE. An estimated 70,000 cases are reported annually and the World Health Organization (WHO) estimates that JE claims 14,000 to 20,000 lives a year, mostly children under age 15. However, because awareness of JE is low and the disease is difficult to diagnose, these figures may significantly underestimate JE's impact.

Even less recognized is the lifelong toll that JE takes on its survivors. About half of survivors suffer neurological damage that affects them for the rest of their lives. Among survivors, half to three-quarters have long-term disabilities, including intellectual, behavioral, or neurological disabilities like paralysis or the inability to speak. There is no cure or clinical treatment for JE. Because mosquito vector control is not yet sustainable or cost-effective, vaccination is the most important measure to prevent JE.

IMPACT IN THE MEKONG REGION

The Mekong region—spanning Myanmar, Thailand, Laos, Cambodia, and Vietnam—is known for its rich biodiversity and agricultural landscape. However, changes in the ecological conditions over the past 50 years provide prime mosquito-breeding environments. Widespread rice irrigation, wading birds, and pig farming support JE transmission and make more than 300 million people who live in rural areas of the Mekong region among the most at-risk for JE infection.

Vaccination is the single most important measure to protect children from JE and its devastating consequences.

PATH'S KEY MILESTONES IN JE CONTROL

Thanks to longstanding funding from the Bill & Melinda Gates Foundation and funding from others, including the Margaret A. Cargill Philanthropies, PATH's JE projects are focused on reducing morbidity and mortality of JE and ensuring that every at-risk child is protected by a safe, effective, and affordable vaccine.

Through the efforts of PATH and its global partners, there has been unprecedented progress in recording the JE disease burden in endemic countries; ensuring access to safe, effective, and affordable vaccines; and advancing national programs for JE control. JE immunization is now under way in many countries and a priority for others in the near future.



The first morning of Japanese encephalitis vaccination campaigns in a primary school in Xiangkhouang Province, Laos. With PATH's assistance, more than 500 children received protection from life-threatening infection at campaign launch. PATH/Aaron Joel Santos

Advancing the availability of an affordable vaccine.

When PATH began its work to increase JE vaccination, the most commonly used vaccine was expensive, hard to produce, and often unavailable. Looking for an alternative, PATH identified a live, attenuated vaccine known as CD-JEV, manufactured by the Chengdu Institute of Biological Products (CDIBP) and safely used in China since the 1980s. Because this highly effective vaccine was not widely used outside of China, international officials called for specific clinical studies. Collaborating with the manufacturer, WHO, and several ministries of health, PATH conducted pivotal clinical trials to provide more clinical data for the vaccine.

Providing technical and manufacturing support. In 2006, PATH and CDIBP entered into a collaborative agreement to further the manufacturing and commercialization of CD-JEV. Since then, PATH has provided extensive support to help CDIBP meet international Good Manufacturing Practices. These efforts included assisting in the design of a new manufacturing facility to ensure high-quality, adequate, stable, and affordable vaccine supply.

In October 2013, a major milestone was reached: CD-JEV achieved WHO prequalification. This opens the door for low-resource countries to access CD-JEV, as this certification is a requirement for critical funding and financing for vaccines.

Gathering improved data for decision-making. PATH engages in ongoing collaboration with national governments, as well as with WHO and UNICEF, to establish evidence-based guidance for countries considering JE vaccine introduction. This includes cost-effectiveness analyses, case studies to demonstrate how other countries have introduced JE vaccines into national immunization programs, and locally tailored advocacy materials that demonstrate country-specific impact of JE and JE vaccine programs. In addition, PATH has developed a toolkit to help guide country leaders and policymakers through the process of introducing JE vaccine.

Expanding outreach through advocacy. Throughout PATH's work, we are sharing information to raise awareness of JE at global, national, and regional levels. These advocacy efforts are helping to make JE immunization a priority, foster collaboration, and inform strategies for JE control.

Introducing the JE vaccine in low-resource countries.

PATH and its partners continue to provide technical assistance to countries introducing JE vaccines, from developing introduction and rollout strategies, to evaluating immunization programs.

By the end of 2017, the CD-JEV vaccine will have been given to more than 300 million people—a turning point in the battle to protect children from this dreaded disease.

JE VACCINE INTRODUCTION IN THE MEKONG

Several countries in the Mekong region have pioneered the introduction of JE vaccination into national immunization programs, leading the way for other countries to follow.

- **Cambodia:** In 2009, CD-JEV was introduced into routine immunization systems in three provinces. With PATH's support and funding from the largest international supporter of vaccines, Gavi, the Vaccine Alliance (Gavi), the country gradually expanded and introduced the vaccine nationwide in March 2016.
- **Laos:** With technical assistance from PATH, in 2013, Laos began CD-JEV introduction in six high-risk provinces, later expanding into two additional provinces. In 2015, Laos was the first country to apply to Gavi for JE vaccines. This support enabled the JE immunization program to be incorporated into routine immunization programs and expanded nationwide.
- **Myanmar:** With PATH's assistance, Myanmar successfully submitted a Gavi application to conduct national campaigns that will begin in late 2017, followed by the integration of JE vaccine in routine immunization in early 2018.
- **Thailand:** Among other countries in the WHO South East Asia and Western Pacific Regions, Thailand participated in PATH-supported and WHO-led bi-regional meetings that enabled countries to share their experiences related to JE control. After long-standing use of inactivated JE vaccines, Thailand introduced CD-JEV in eight provinces in northern Thailand in 2013 and expanded to nationwide introduction in 2016.
- **Vietnam:** PATH supported JE disease surveillance to collect evidence and advocated for the expansion of JE vaccination nationwide.



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STREET ADDRESS
2201 Westlake Avenue
Suite 200
Seattle, WA 98121 USA

MAILING ADDRESS
PO Box 900922
Seattle, WA 98109 USA