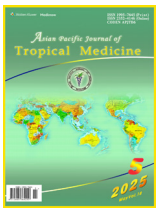

Perspective

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Should Malaysia consider introducing dengue vaccine into routine immunization programs?

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Dengue fever remains a significant public health challenge in Malaysia, with its incidence continuing to rise despite existing control measures. Dengue, a disease caused by the dengue virus and transmitted by *Aedes* mosquitoes, places a substantial burden on healthcare systems and economic productivity. Despite efforts by the Malaysian government, including the release of *Wolbachia*-carrying *Aedes aegypti* mosquitoes in dengue hotspot areas since 2017, the problem persists. In 2023, Malaysia reported 123 133 dengue cases, an 86.3% increase compared to 2022[1]. This highlights the urgent need for more effective interventions, including the potential integration of dengue vaccines into routine immunization programs.

Currently, two dengue vaccines have been licensed: Dengvaxia (CYD-TDV) by Sanofi Pasteur and Qdenga (TAK-003) by Takeda. Dengvaxia, the first licensed dengue vaccine, has significant limitations, as it increases the risk of hospitalization in dengue-naïve individuals due to antibody-dependent enhancement[2,3]. As a result, it is only licensed for individuals with prior dengue infections, necessitating pre-vaccination screening. These constraints make it unsuitable for inclusion in Malaysia's routine immunization programs.

Qdenga (TAK-003), the second licensed vaccine, is a live-attenuated vaccine using DENV2 as the genomic backbone for all four serotype components. Administered in a two-dose series three months apart, phase ||| trials in children and adolescents aged 4-16 years reported an efficacy of 80.2% (95% *CI* 75.2-85.3) in reducing confirmed dengue cases within 12 months post-vaccination[4,5]. Unlike Dengvaxia, Qdenga can be given to both dengue-naïve and previously infected individuals without pre-vaccination screening, making it more ideal for mass vaccinations.

Several countries, including Brazil and Indonesia, have started incorporating Qdenga into their routine immunization programs, prioritizing school-aged children (6-16 years) in areas with significant dengue burdens[6]. However, both countries are still in the pilot phase, with vaccination limited to certain regions. Early reports indicate challenges such as vaccine hesitancy and logistical issues, with Brazil experiencing low uptake rates, where only 17% of vaccine doses were administered a month after the campaign began[7]. These experiences serve as valuable case studies for Malaysia, should it consider implementing a similar program.

In Malaysia, Qdenga has received conditional approval for two years from the Drug Control Authority. During this period, Takeda must provide updates on the vaccine's quality, safety, and efficacy for further evaluation. Currently, Qdenga is available in private clinics at approximately 500 ringgits for two doses. Before integrating the vaccine into routine immunization programs, several challenges must be addressed:

1. Limited data on certain serotypes: While Qdenga shows good overall efficacy, data on its protection against DENV3 and DENV4 serotypes are limited. Additionally, the duration of protection remains uncertain, and booster doses may be required in the future.

2. High cost: Although government procurement may reduce costs, a thorough cost-effectiveness analysis is essential to justify its inclusion in national programs.

3. Public acceptance: Public skepticism toward vaccines, heightened during the COVID-19 pandemic, could pose a significant barrier. Public education campaigns and transparent communication are crucial to addressing concerns and improving uptake.

Given these factors, Malaysia must carefully assess the suitability, safety, and effectiveness of the Qdenga vaccine in both the short

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and long term. Public acceptance and community engagement will play a critical role in determining the vaccine's success. The World Health Organization advises that dengue vaccination should be part of an integrated disease control strategy, including vector control, case management, community education, and engagement. Comprehensive vector control remains a cornerstone of dengue prevention efforts[8].

As Malaysia deliberates the inclusion of Qdenga in its national immunization program, lessons from other countries should guide the decision-making process. While the vaccine presents a promising opportunity to reduce dengue incidence, a cautious and well-informed approach is essential to ensure its long-term effectiveness and public acceptance.

Conflict of interest statement

The author declares that there are no conflicts of interest.

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