

## EDITORIAL

# DENGUE VACCINE UPDATE

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Dengue, the most common arbovirus infection, affects four billion people in at least one hundred twenty-eight countries and is most prevalent in Southeast Asia, Central and South America<sup>1</sup>. Since 2023, continued transmission and an unanticipated surge have led to over five thousand dengue-related deaths in over eighty countries<sup>2</sup>.

Three key findings have challenged dengue vaccine design nearly 50 years after its development; antibody-dependent boost, cellular immunity safeguarding<sup>3</sup>, and the nonstructural protein 1 (NS1) antigen pathogenicity<sup>4</sup>. Dengue vaccinations should include structural and nonstructural antigens (including NS1) of all four DENV serotypes for maximum protection<sup>5</sup>.

The dengue vaccines that WHO has licensed are Dengvaxia (CYD-TDV) by Sanofi and Qdenga (TAK-003) by Takeda<sup>6</sup>, but only Dengvaxia is approved by the US-FDA<sup>7</sup>. Another vaccine which is in the pipeline just successfully completed phase 3 trial, which is a single administration tetravalent vaccine, Butantan-DV (Instituto Butantan), developed in the National Institute of Allergy and Infectious Diseases laboratory may provide protective immunity against all four DENV serotypes<sup>8</sup>.

Yellow fever virus-derived Dengvaxia is a three-dose vaccine fused chimerically with the structural areas of the four DENV serotypes<sup>9</sup>. Dengvaxia is now accessible to children, adolescents, and adults with laboratory-confirmed prior dengue infection<sup>7</sup>. This vaccine is not widely used due to the need for pre-vaccination dengue screening of previous dengue infection.

The two-dose dengue vaccine TAK-003, commonly known as Qdenga (Takeda), comprises live, attenuated DENV-2 and structural region chimaeras of DENV-1, DENV-3, and DENV-4 (10). WHO does not advocate systematic use of the TAK-003 vaccine in low dengue prevalence areas as the efficacy-risk profile for DENV3 and DENV4 in seronegative people is not well understood.

The dengue vaccine is only a part of a structured protective plan against dengue infection, including

vector control, patient care, community education, and engagement.

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