

## Dengue Vaccine- A Ray of Hope

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### Introduction

In the last decade, the incidence of dengue has been on the rise. More than one- third of the world's population lives in areas at risk of infection with dengue virus. Despite sincere efforts, no control measures have proven beneficial to curtail the spread of this disease. The introduction of dengue vaccine has been a revolutionary step forward. For now, it might cause more harm than good, but this project may hold promise for the future.

### Communication

Dengue is a viral illness transmitted to humans by *Aedes aegypti* mosquito which is most commonly found in the tropical and subtropical regions of the world. Currently, the annual incidence of dengue is 400 million cases [1]. In the last decades, the incidence of this virus has increased dramatically with more than one-third of the world's population living in endemic areas at risk of infection. Dengue Virus has four serotypes: Dengue Virus One (DENV-1), Dengue Virus Two (DENV-2), Dengue Virus Three (DENV-3), and Dengue Virus Four (DENV-4). Infection may be asymptomatic, or the patient may present with a severe illness. Symptoms include fever, rash, headache, nausea, vomiting, pain behind the eyes, bone and joint pains, and muscle aches [1]. Whereas, the atypical manifestations of dengue include hepatitis, hemolytic-uremic syndrome, encephalopathy, myocarditis, myositis and acute respiratory distress syndrome. Infection by one serotype confers a life-long immunity to that virus, but a subsequent infection with another serotype causes a more severe dengue disease with a mortality rate of 1-20% [2]. Common complications of disease include hemorrhage and shock [3].

Dengue prevention and control programs have failed to curtail the spread of disease. This may be due to the lack of financial resources in endemic countries. Therefore, the introduction of dengue virus vaccine is seen as a ray of hope in preventing complications and death from dengue fever [2]. Sanofi

Pasteur vaccine, a tetravalent chimeric vaccine, has made it through phase III trials and is considered to be the safest. It is most efficacious against serotypes three and four. In 2016, the World Health Organization approved it for ages 9-45 years (Brazil) and 9-60 years (Paraguay); three doses to be given six months apart [4,5]. Dengvaxia® is a live recombinant tetravalent dengue vaccine developed by Sanofi Pasteur which is formed by splicing four dengue serotypes with the yellow fever virus 17D genes. After two years of phase III trial, it was found that Dengvaxia has better efficacy in those already immune to one of the serotypes. According to the Study on Global Ageing and Adult Health conducted by the World Health Organization, the greatest benefit is achieved in seropositive patients at the time of vaccination. This vaccine significantly reduced the prevalence of mild and severe dengue and the rate of hospitalization in this patient population. However, it might be less useful in travelers to endemic areas.

### Expert Opinion

Dengue vaccine seems promising, but more research needs to be done on the dose and the selection of recipients for this vaccine. In order to eradicate dengue, a number of steps need to be taken. Firstly, it is of utmost importance to provide access to low-cost vaccine in endemic countries. Secondly, implementing appropriate prevention strategies like an effective system of waste disposal, water supply system, insecticide spray and the use of protective clothing by travelers to these regions.

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