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Fighting Next-Gen Dengue

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Many private players in India are trying to understand the dynamics of dengue diagnosis, control and management



In 2023, and as of October 2, over 4.2 million cases and over 3,000 dengue-related deaths have been reported from 79 countries/territories globally. Within Asia, dengue outbreaks have been reported in India, Bangladesh, Afghanistan, Cambodia, China, Laos, Malaysia, Nepal, Philippines, Singapore, Sri Lanka, Thailand and Vietnam.

Caused by any of four distinct serotypes (DENV 1-4) of single-stranded RNA viruses of the genus Flavivirus, dengue has emerged as the fastest spreading mosquito-borne viral disease globally. In India, dengue is endemic in almost all states. All four antigenically distinct serotypes of the virus that display significant immunological cross-reactivity due to 65–70 per cent homology have been reported from various parts of the country over the years. Combined with a complex transmission cycle and high seroprevalence, dengue evolution in the country has been shaped in complex and unexpected ways.

According to recent reports in India, the more common Dengue 1 strain manifests in symptoms such as fever and body aches, but the new strain Dengue 2, found to be emerging in Uttar Pradesh, can lead to high fever, vomiting, skin rashes and dengue shock syndrome. The new variant is more lethal and it could lead to multiple organ failure in some patients and even death.

A multi-institutional study on dengue led by researchers at the Indian Institute of Science (IISc), Bengaluru shows how the virus causing the disease has evolved dramatically over the last few decades in the Indian subcontinent.

As per the researchers, until 2012, the dominant strains in India were Dengue 1 and 3. But in recent years, Dengue 2 has become more dominant across the country, while Dengue 4, once considered the least infectious, is now making a niche for itself in South India.

As a result, many private players in India are trying to understand the dynamics of dengue diagnosis, control and management by developing new products and strategies. For instance, Pune-based startup Mylab Discovery Solutions has introduced two state-of-the-art tests for the detection of dengue infections, in the form of the dengue rapid gold test and the dengue high accuracy dry luminescence assay test.

Likewise, Bengaluru-based startup GenWorks has launched an immunochromatographic one-step rapid card solution for qualitative early acute dengue detection. Further, the Karnataka government has announced the development of a mobile app, which, along with an artificial intelligence (AI)-based model, can provide dengue predictive analysis.

At present, the National Center for Vector Borne Diseases Control (NCVBDC), Ministry of Health and Family Welfare (MoHFW) is working with identified ministries, states, government institutions and development partners under a common platform to develop a strategic framework for dengue control.

Amidst these developments, India is also getting closer towards producing an effective dengue vaccine. On August 30, Cyrus S Poonawalla, Chairman and Managing Director of Serum Institute of India, revealed that the company plans to develop a dengue vaccine in approximately one year. Few other players such as Hyderabad-based Indian Immunologicals, New Delhi-based Panacea Biotech are also in the process of developing vaccines for dengue in the coming years.

In another recent development this year, the Indian Council for Medical Research (ICMR) has approved a research grant to a group of researchers at the Indian Institute of Technology Delhi (IIT-D) for the development of a nano-vaccine against dengue.

Globally, there are two live attenuated tetravalent vaccines available- Dengvaxia and Qdenga, and this list is awaiting the presence of indigenous vaccines from India.

Due to the immense public health burden from dengue infections in India, it is important to understand the genetic diversity, spatial incidence, effectiveness of vaccines and the potential emergence of new variants of the dengue virus in the region. The public and private sectors should increase their focus and R&D investments in studying this condition, and finding solutions in the best possible way.

Dr Manbeena Chawla

Executive Editor

(manbeena.chawla@mmactiv.com)