Dengue numbers may swell again, so urgent mitigation efforts needed

The 2022 situation in Singapore bears a striking resemblance to the 2020 dengue surge, which offers actionable insights

Chan Kuan Rong

While the world focused on beating back the Covid-19 pandemic over the past two years, another insidious but endemic disease has spread quietly in countries like Singapore. More than 30,000 cases of dengue have been reported in Singapore in 2022 thus far, a steep increase from 2021. Although infections peaked at 1,569 weekly cases in May and seem to be on the decline at 200 to 300 a week, these numbers remain far higher than the 2021 figures.

SIMILARITIES TO THE DENGUE WAVE IN 2020

This 2022 peak bears striking similarities to a wave seen in 2020. When cases surged to 1,792 weekly infections in July, authorities, such as the National Environment Agency (NEA), were caught off guard. This was just after the circuit breaker curbs were lifted and more Singaporeans moved around and encountered work, leisure and other activities. In both cases, the warm mid-year weather conducive to mosquito breeding and the greater movement of people created the perfect storm.

Virological studies confirm that a distinctive version of the dengue virus known as Dengv-3, a less common but founder strain in Singapore’s dengue history for which the population has low herd immunity, caused the 2020 surge. Dengv-3, more than 86 per cent of cases thus far in 2022 were caused by this new, more transmissible and infectious Dengv-3, according to the NEA.

Dengue virus exists as four distinct serotypes, infection with one confers protection against only the infecting serotype and not the other three. Moreover, a second infection with a different serotype can increase the risk of severe dengue symptoms. But the 2022 spike also throws into doubt the 2020 theory that more people caught dengue because they spent more time at home during the day. If anything, the larger numbers of people moving around in Singapore under Covid-19 restrictions were eased in Singapore and travelling overseas as border rules were relaxed might account for the heightened threat.

This is consistent with Duke-NUS Medical School’s Professor Ying Eng Ong’s ground-breaking 2006 study, which proved that dengue transmission largely occurred away from homes. His research found that schools, construction sites and factories had more mosquito-breeding sites than residential areas inspected and that people, especially school-age children, were more likely to contract dengue if they spent more time outside of the home.

The drop in cases in 2021 may be a blip as the surge in Covid-19 infections – which cause symptoms similar to those of dengue, such as fever, muscle aches, nausea and fatigue – may have led to dengue cases going undetected and under-reported.

TACKLING DENGUE WITH NEW ANTIVIRALS AND VACCINES

Dengue is a major public health threat. Dubbed one of the top 10 threats to global health by the World Health Organization just before the onset of Covid-19, the disease infects almost 400 million worldwide each year and kills about 40,000.

Based on the United States Centers for Disease Control and Prevention, approximately one in 20 patients infected with dengue can get life-threatening hemorrhagic fever, which can lead to severe bleeding and organ failure, even though most patients do not present symptoms or have only mild symptoms. The very young, the elderly, the immunocompromised and those who are reinfected are the most vulnerable to severe dengue.

But countries have learnt from the history of medicine as well as from our collective Covid-19 experience that vaccination against endemic diseases is the most cost-effective strategy to reduce the burden of disease, and have moved swiftly to employ this strategy in tackling the scourge of dengue.

Although the currently licensed dengue vaccine in Singapore, Dengavox, is less effective for those with prior exposure, the other leading vaccine, Qdenga, developed by Japanese pharmaceutical company Takeda and which uses the attenuated Dengv-2 serotype as its genetic backbone, was recently approved for use by the European Union and is undergoing a fast-tracked review by the US Food and Drug Administration.

Another dengue vaccine, Rezanutrin-DV, which uses inactivated forms of the four serotypes, has also shown promising outcomes in a recent study performed in Brazil. These vaccines should help reduce the severity and spread of dengue worldwide if clinical trials show strong efficacy and if they are eventually approved by the authorities for use.

A second lesson learnt from Covid-19 is that antiviral therapeutics can be a valuable addition to our toolkits in helping vulnerable patients manage disease symptoms. Currently, there are no licensed therapeutics that directly target the dengue virus.

But recent phase-one clinical trials carried out by Johnson & Johnson found an antiviral compound, which blocks virus replication, to be safe and effective when administered in a prophylactic setting in animals. More studies will be needed to assess the efficacy of the drug in larger population cohorts and in human beings. The authorities will also need to ensure that we get the right vaccines and antiviral therapeutics that offer protection from specific emerging dengue virus variants in Singapore.