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Due to the effective control measures that have been rolled out here, only about 20 per cent of the Singapore population have had dengue exposure by the age of 20. But sustained community resilience, awareness and mobilisation against dengue remain paramount.
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Community approach still critical in dengue war

A look at progress in dealing with the disease that knows no boundaries as the region marks Asean Dengue Day

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For The Straits Times

Globally, dengue is estimated to affect 390 million individuals annually, mostly in the Western Pacific and South-east Asia regions.

Of this figure, 96 million show symptoms of dengue infection, 0.1 per cent are severely infected and around 20,000 die, costing US\$1,394 (S\$1,925) per hospitalised case of dengue.

And these figures may be underestimated due to poor surveillance and laboratory diagnosis in some countries.

Dengue is a disease which respects no boundaries. Countries have to be united to reduce the dengue burden, aptly echoed by this year's Asean Dengue Day theme, United Fight against Dengue. The event is being marked today.

Sustained community resilience, awareness and mobilisation against dengue remain paramount, despite the availability of a dengue vaccine and the use of Wolbachia bacteria-carrying mosquitoes.

COMPLETELY ELIMINATING MOSQUITOES IS IMPOSSIBLE

The Aedes mosquito is a key risk factor for dengue transmission, and to eliminate dengue, it would have to be completely eradicated. However, this is impossible because of these reasons.

First, the Aedes mosquito breeds very well in a warm and wet climate, typical of the tropics.

Second, these mosquitoes adapt very well to the changing human environment and intensive control measures, including the use of larvicides in water areas and adulticides in fogging. Mosquitoes develop resistance to these pesticides over time.

Lastly, there is the prevalence of potential breeding grounds. The implementation of control measures in every nook and cranny of countries is impossible. While construction sites and residential households are well-known high-risk breeding grounds, the simple occurrence of a rainy day can leave many stagnant water sites. Mosquitoes can breed in pools of stagnant water as small as a 50-cent coin.

PROBLEM OF 'SILENT SPREADERS'

Early diagnosis is critical in dengue control. It alerts the relevant

authorities and communities, raises awareness among primary care physicians to clinically diagnose for suspected dengue, and encourages the use of test tools to detect it more accurately.

It also emphasises the importance of personal protection measures, such as avoiding dengue hot spots, frequently applying mosquito repellent and wearing appropriate clothing to reduce bites. However, there are challenges in this area, such as the level of knowledge and clinical experience of the primary care physicians, and getting people to adopt preventive measures.

Even with early diagnosis among symptomatic patients, about 80 per cent of those infected show no symptoms. These asymptomatic individuals can silently spread dengue within the community when they infect mosquitoes that bite them.

NEW APPROACHES

The recent use of Wolbachia-carrying mosquitoes shows promise in reducing the mosquito population. The wMel Wolbachia strain of bacteria inhibits the replication of viruses such as dengue in the mosquito. Hence, Wolbachia-carrying female mosquitoes, which usually

bite humans for blood, have less potential to transmit dengue.

Within Asean, Singapore, Indonesia and Vietnam have started performing local trials.

Singapore is working on the suppression strategy, which requires the regular release of a large number of Wolbachia-carrying male mosquitoes to mate with wild-type female mosquitoes so the eggs laid will not hatch into larvae – reducing the mosquito population.

The sustainability of this approach largely depends on the mating success of the released mosquitoes in the wild. But more crucially, the community must remain committed to reducing breeding grounds to reduce the population of competing male wild-type mosquitoes, to begin with.

NEW VACCINE PROVIDES HOPE

Only about 20 per cent of the Singapore population have had dengue exposure by the age of 20. This is mainly due to the effective control measures that have been rolled out.

However, Singapore's young adults are vulnerable to large dengue outbreaks. A dengue vaccine that induces the right concoction of antibodies against the four dengue serotypes is needed. The world's

first dengue vaccine was launched in 2015 and, so far, 16 countries have approved it, including Singapore, for the 12 to 45 age group. Overall, the vaccine is effective in reducing 60 per cent of dengue.

However, it offers higher protection against Den-3 and Den-4 compared with the more common serotypes in Singapore, Den-1 and Den-2. The vaccine's long-term effectiveness needs further investigation as well.

Other challenges include its accessibility and availability, and the public's awareness and acceptance of it. A high level of at least 70 per cent vaccination coverage is needed to limit dengue transmission effectively. These challenges re-emphasise the importance of educating local communities.

ASEAN COUNTRIES REMAIN VULNERABLE

Global warming and globalisation facilitate dengue transmission. The former can facilitate an expanded geographical presence of mosquitoes, increasing the growth rate of larvae to adult mosquitoes and the frequency of blood feeding.

With globalisation, meanwhile, there are more people travelling across continents and within

Asean. There are also more people moving out of rural areas to the big cities and back. These trends promote a continuous mixing of susceptible individuals among those who are infected, thus sustaining dengue transmission.

Sustained dengue outbreaks within and beyond the Asean regions will still inevitably occur, with the current limitations of the dengue vaccine and the use of Wolbachia-carrying mosquitoes.

However, while the dengue vaccine and Wolbachia-carrying mosquitoes have great potential to be the “silver bullets” to tackle dengue transmission, limitations still exist. Community resilience is also key to mosquito control, and yet, often neglected.

This involves a constant understanding of the evolving level of knowledge, attitude and practices of our community.

More research is needed to improve community resilience and to guide whole-of-community initiatives. To win the battle against dengue, we must not let up in our community efforts, but be more aggressive.

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