

Why S'pore's dengue fight differs from that in some countries

Suppression approach more consistent with Republic's source reduction policy, says prof

Timothy Goh
Health Correspondent

The use of only Wolbachia-infected male mosquitoes to help control dengue suits Singapore better than releasing female ones with the bacterium as well, as it means less chance for the dengue virus to evolve, a smaller mosquito population and fewer bites to put up with.

This was highlighted yesterday by Associate Professor Ng Lee Ching, group director of the National Environment Agency's Environmental Health Institute, when she explained why Singapore has decided on a different method than that used by neighbouring countries such as Malaysia, Indonesia and Vietnam.

Project Wolbachia will be expanded to cover about 31 per cent of Housing Board blocks here, it was announced yesterday.

Under Singapore's "suppression" method, male *Aedes aegypti* mosquitoes infected with Wolbachia are released at selected sites. When female *Aedes* mosquitoes which are not infected with the bacterium mate with the males, they produce eggs which do not hatch, thus reducing the population of *Aedes aegypti* mosquitoes. This method is used by some five other countries, including the United States, China and Thailand.

In contrast, about a dozen countries are using the "replacement" approach. In this method, Wolbachia-carrying males and females are released to mate with mosquitoes in the wild, breeding Wolbachia-carrying offspring. As Wolbachia hampers the reproduction of viruses such as dengue, the plan is to replace the existing wild mosquito population with one that carries Wolbachia and is therefore less likely to transmit dengue and other mosquito-borne illnesses.

The replacement approach is also used in Australia and Sri Lanka.

Speaking at the three-day Asia Dengue Summit, which was organised by Asia Dengue Voice and Action to discuss dengue management strategies for the region and which ended yesterday, Prof Ng cited five reasons why Singapore has chosen the suppression approach and not the replacement one.

First, suppressing the mosquito population leads to a lower risk of dengue transmission.

Singapore has a small mosquito population size, and the replacement strategy, which relies on mosquitoes breeding, may potentially increase this.

A larger mosquito population may mean the Republic is unable to control the ability of the mosquitoes to transmit dengue, said Prof Ng.

Second, the replacement approach carries the risk that viruses may be able to evolve and adapt to overcome Wolbachia's blocking effect in the long run. In contrast, the suppression approach means there is less opportunity for viruses to evolve.

Third, the suppression approach, which releases only male mosquitoes – which do not bite – is more acceptable to the public, said Prof Ng. This approach will also reduce the rate of people getting bitten.

Fourth, the suppression approach is consistent with Singapore's policies and public messaging on the importance of source reduction, which have been emphasised over the past six decades.

Fifth, it is still possible to switch to the replacement approach after carrying out the suppression method, whereas it is more difficult to suppress the population after using the replacement method, said Prof Ng.

She acknowledged that the suppression method is costlier, and requires a sustained effort to maintain.

Nevertheless, Prof Ng added that Project Wolbachia has been successful in Singapore so far.

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Breeding mosquitoes

With over 15,000 dengue cases this year, **Timothy Goh** takes a look inside the National Environment Agency's (NEA) mosquito factory, where Wolbachia-*Aedes* mosquitoes are bred to help fight dengue.

HOW MOZZIES ARE MADE

1 Adult Wolbachia-*Aedes* mosquitoes mate in the facility's insectary and lay eggs.



2



The minuscule eggs, the size of small black dots, are collected and stored on pieces of paper and kept until it is time to produce more mosquitoes. About 36 million eggs are kept on standby in the facility's "egg bank".

3



Once the eggs are submerged in water, they hatch into larvae within half an hour.

4



The larvae are counted using an automatic counter, kept in trays and fed with modified fish food until they turn into pupae.

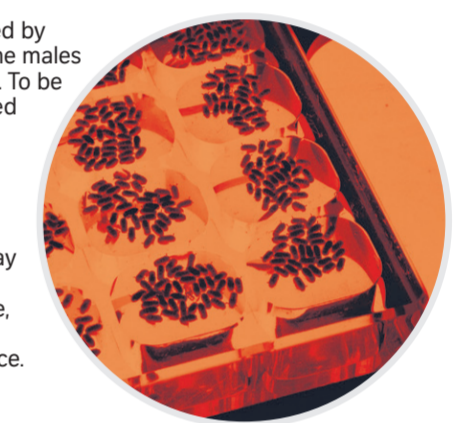
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The pupae are kept in tubes where they grow into adults. The tubes are then taken to estates around Singapore, where the mosquitoes are released.



5

Pupae are sorted by sex, with only the males kept for release. To be extra safe, sorted mosquitoes are given a small dose of X-ray radiation, rendering any females that may have slipped through infertile, so that they cannot reproduce.



Source: NEA
PHOTOS: NG SOR LUAN, ISTOCKPHOTO
STRAITS TIMES GRAPHICS

Elderly at higher risk of severe illness from dengue: NCID head

More attention must be paid to seniors with dengue as they are at a higher risk of severe illness and death, Professor Leo Yee Sin, executive director of Singapore's National Centre for Infectious Diseases (NCID), said yesterday.

She was speaking at the fifth Asia Dengue Summit, a three-day event organised by the Asia Dengue Voice and Action group which ended yesterday at Orchard Hotel.

Citing studies from Singapore's Environmental Health Institute at the National Environment Agency, Prof Leo noted that at least 30 per cent of those aged 60 and above here have never had a dengue infection before.

Recovery from infection by one dengue virus provides lifelong immunity against that particular virus serotype.

"So you can see there's a huge population at risk in Singapore, that's very susceptible to dengue,"

said Prof Leo.

She added that it is also harder to diagnose an older person with dengue. Citing a study from Taiwan, Prof Leo pointed out that fewer older dengue patients show symptoms of the disease, such as fever, aches and pain as well as rashes.

Despite this, elderly people tend to be at a higher risk of needing admission to the intensive care unit for dengue, and have more co-morbidities such as hypertension and renal failure.

Elderly dengue patients also have a higher death rate, said Prof Leo, adding that their age means they are less likely to be able to withstand the toll dengue takes on them.

"We really need to look very hard at how we can better manage older (people with dengue)," she said.

Another speaker at the summit,

Dr Shirin Kalimuddin, who is a senior consultant at the Department of Infectious Diseases in Singapore General Hospital, spoke about the potential long-term effects of dengue infection on patients.

Noting that there have not been many studies on post-dengue chronic sequelae – the persistence of symptoms more than three months after infection – Dr Kalimuddin, who is also an assistant professor at Duke-NUS Medical School, said that the burden of the disease may be underestimated.

In a study, which is still under review, Dr Kalimuddin and other researchers examined about 200 patients, about a quarter of whom had dengue infection.

They found that about three months later, some 18 per cent of them continued to report symptoms, including fatigue, headaches and impaired memory

and concentration.

They also reported functional impairment and a lower health-related quality of life.

Acknowledging that her research was done with a small sample size and other limitations, Dr Kalimuddin said that it nevertheless raised some important questions, including whether vaccines and therapeutics could be tailored towards addressing not just acute dengue, but its chronic symptoms as well.

A third speaker at the summit, Associate Professor Somia Iqtadar from King Edward Medical University in Pakistan, warned that dengue infection during pregnancy is associated with higher maternal and perinatal mortality rates.

"There is a constellation of different problems which we can encounter if we have dengue in a pregnant female," said Prof Somia, citing increased chances of preterm labour, foetal distress and miscarriages as examples.

She said: "We need admission and timely disease management (for) infected pregnant women, because this is of utmost importance to save the life of the mother and the foetus."

Timothy Goh

Jail for site supervisor who ignored safety rules, leading to worker's death

Osmond Chia

A construction site supervisor disregarded demolition safety protocols and told his men to hack away parts of a two-storey house, beginning from the ground level.

As a result, the balcony slab above where a worker was working collapsed, killing him and injuring another worker.

The supervisor, Malaysian Kong Chiew Fook, 55, was yesterday jailed for 11 months after he pleaded guilty to committing a negligent act that endangered others.

Kong was a construction manager at Springview Enterprises and

was supervising workers in a project to reconstruct a house in Aroozoo Avenue in Hougang between December 2018 and August 2019, Ministry of Manpower (MOM) prosecuting officer Mohd Fadhli told the court.

A demolition plan, method statement and structural drawings were drafted and approved by the authorities before the works started.

On March 4, 2019, Kong instructed three workers, whose names were given only as Mr Santo, Mr Ponnir and Mr Ddin Shahab, to carry out hacking work at the premises. He left for another worksite and left the men unsupervised.

While they were hacking the walls on the second floor, a floor



The fallen balcony slab, which trapped a worker beneath it in the incident at a house reconstruction project site in Hougang in 2019. The worker was pronounced dead at the scene, while another worker was injured. PHOTO: MINISTRY OF MANPOWER

slab collapsed, pinning Mr Santo beneath it.

Mr Ponnir, who was working on a one-tier scaffold, was also thrown off and fell to the ground.

Workers used an excavator to lift the floor slab before Mr Santo was pulled out.

He was pronounced dead at the scene and reportedly died of head injuries. Mr Ponnir suffered multi-

ple fractures and was hospitalised for two months.

Investigations showed that Kong was given demolition documents which clearly stated that the works were to be carried out with established safety protocols.

Before the works, he was also reminded by Springview director Heng Kong Chuan to adopt a top-down approach for the demolition

works, a method of starting from the roof to the ground, which would help ensure the building's structural stability, said Mr Fadhli.

But Kong disregarded these rules and told his men to follow an unsafe demolition sequence, hacking away the supporting walls of the back balcony at the ground floor a month before the balcony floor slab above.

As a result, the balcony floor slab was unsupported and left in a cantilevered position without any supporting pillars and was prone to collapse, said the prosecution, adding that this scenario was cautioned against in the paperwork.

Seeking 12 to 14 months' jail for Kong, Mr Fadhli said: "He assumed that the balcony floor slab was strong enough to hold on its own. This assumption was based solely on his experience, contrary to the demolition plan, method statement and instructions prior to the start of works."

The defence, which sought not more than 10 months' jail, said that Kong believed the cantilevered bal-

cony was stable since the first-floor structures supporting it had been removed a month earlier.

The judge said Kong showed a glaring lack of supervision.

MOM said yesterday that Springview and its director have also been charged with failing to take reasonably practicable steps in ensuring their workers' safety.

Mr Sebastian Tan, MOM's director of occupational safety and health inspectorate, reminded contractors to conduct thorough risk assessments for any demolition works and to communicate the plan clearly to the team.

He added: "Under the Workplace Safety and Health Act, we can hold managers or supervisors personally accountable for safety and health lapses, as shown by Kong's imprisonment."

For committing a negligent act which endangers the safety and health of others, Kong could have been jailed for up to two years and fined a maximum of \$30,000.

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