

Question by Mr Gan Thiam Poh

To ask the Minister for the Environment and Water Resources with regard to the increasing number of dengue cases (a) whether current enforcement and fines are sufficient to deter owners of properties that are breeding grounds; and (b) what financial and resource support are provided for research to combat and reduce the Aedes mosquito population.

Reply by Minister Masagos:

1 Over 11,200 dengue cases were reported in 2015, which is lower than in 2013 and 2014. However, in the recent few months, there have been a higher number of cases compared to corresponding periods in previous years. We expect the total number of dengue cases in 2016 to be high, with cases spiking earlier than usual. This increase may be due in part to the change in the main circulating dengue virus serotype. We have also observed an increase in the Aedes mosquito population. The warmer-than-usual year-end weather due to the El Niño phenomenon has aided the breeding and spread of both the Aedes mosquitoes and the dengue virus in Singapore and in the region.

2 Source reduction remains the most effective way to curtail the transmission of dengue. In anticipation of a rise in dengue cases, the National Environment Agency (NEA), together with members of the Inter-Agency Dengue Task Force, has stepped up source reduction efforts earlier than usual. From November to December 2015, NEA conducted more than 193,000 inspections and removed more than 4,000 breeding habitats, the majority of which were found in homes, such as in containers and flower pot plates. NEA has also stepped up publicity efforts to raise awareness of the 5-Step Mozzie Wipeout and encourage the community to take part actively to prevent dengue.

3 Owners of premises in dengue clusters found with breeding habitats can be fined up to \$5,000 under the Control of Vectors and Pesticides Act. And already, more than 1,000 households in dengue clusters were fined in 2015. The current penalties have been effective in keeping re-offending rates low. Nonetheless, my Ministry will continue to monitor the situation and introduce stiffer penalties if necessary.

4 Besides checking homes, NEA has also intensified checks for other areas, including construction sites, and taken stern action against those found breeding mosquitoes. In 2015, more than 900 Notices to Attend Court were issued to construction site contractors and over 100 court prosecutions were taken against contractors for repeat offences. In this same period, more than 100 Stop Work Orders have been issued to construction sites to ensure that proper mosquito control measures were put in place before construction was allowed to resume.

5 My Ministry has set aside about \$2.5 million each year to conduct multi-disciplinary research in controlling the mosquito population, for example for the development of surveillance and control tools such as Gravitrap. In addition, more than \$3 million has been committed over the next 3 years to develop a novel method of suppressing the Aedes mosquito population through the use of male Aedes mosquitoes that carry Wolbachia, a naturally occurring bacterium that can prevent mosquito eggs from hatching. The Government is also tracking the development of the dengue vaccine, Dengvaxia, and will carefully evaluate the vaccine to ensure that it is safe, of high quality and effective before it is made available in Singapore.

6 As a community, we need to continue to play our part to remove potential breeding habitats from places under our care. My Ministry will also continue to work with our partners to keep up the fight against dengue through a combination of surveillance, public education, enforcement, source reduction, as well as research into new methods of mosquito suppression.

Supplementary Question by Mr Gan Thiam Poh:

I thank the Minister for the comprehensive reply. With the reported outbreak of the Zika virus, which is transmitted through mosquitoes, may I ask what immediate measures have been taken, and what other ways can the Ministry take to help Singaporeans, and to prevent the virus from spreading in Singapore?

Reply by Minister Masagos:

8 We are equally worried about the possible detection of Zika in Singapore. MOH is working with NEA to enhance ongoing laboratory surveillance of Zika infections. Zika is already a notifiable disease under the

Infectious Diseases Act.

9 Zika virus is transmitted by the same mosquito that transmits dengue. Therefore, whatever we do for dengue, if we are effective, will also be effective to prevent Zika from spreading.

10 In the event that Zika is detected in Singapore, through an imported or a local case, NEA will step up its vector control activities around the case's residence and/or the workplace. Should it be a single local case, NEA will also conduct vector control in the residences of the case's contacts. That will be the first step. But beyond that, I think it is important for us to play our part to understand how the dengue mosquitoes breed, how the virus is spread, and the steps we can take to reduce this threat. We, therefore, ask everyone to help prevent mosquitoes from breeding within your homes, do the 5-step Mozzie Wipeout, and if we are effective in these, we can also prevent Zika from spreading in Singapore.

Supplementary Question from Dr Lily Neo:

May I ask the Minister what is the update on the new dengue vaccine? What is the outcome of dengue vaccine which was trialled in Tan Tock Seng Hospital, and whether there are now enough safety studies done for us to administer the vaccine more widely?

Reply by Minister Masagos:

11 This area is under the purview of MOH and I do not have the details to be able to answer the question. If the Member is keen to have the answer, perhaps the Member could file a question with MOH please.

Supplementary Question from Mr Zaqy Mohamed:

I thank the Minister for the response earlier with regards to how we control the spread of dengue on the ground. First and foremost, I think Minister also alluded that majority of cases are in homes. I think the challenge is the perception that most of the cases come from outside. So what proportion of the breeding sites is found in homes compared to the external areas? The second question would be in terms of Minister's mention that there is research being done to use male mosquitoes to control the spread of dengue - what safeguards are in place to ensure that when we take such biomedical, genetically-modified initiatives, that it doesn't mutate to something else, and cause other issues beyond even Zika?

Reply by Minister Masagos:

12 Overall, the number of breeding discovered in residential premises is large. Having said that, the number of enforcement action taken against breeding found in residential premises is almost equivalent to that of construction sites. Those who are caught breeding mosquitoes within their premises for the first time are given stern warnings. When faced with penalties, residents tend to develop the habit of improving checks within their premises.

13 We have been studying Wolbachia since 2005. EHI has been looking at what we can do to suppress the population of the *Aedes aegypti* mosquito, which are particularly prevalent during warm weather.

14 The Wolbachia-carrying *Aedes aegypti* mosquito is not a genetically modified organism, as confirmed by the Genetic Modification Advisory Committee (GMAC) in Singapore. So the Member can rest assured that these are not genetically modified mosquitoes. What we are trying to do is to use the Wolbachia-carrying male *Aedes aegypti* mosquitoes, to compete with wild-type males for wild-type female mosquitoes. The eggs laid by female mosquitoes mated with the male mosquitoes carrying the Wolbachia virus do not hatch. But this, although promising, is something we need to study further. We need to continue to look at the field experiences in other countries that are experimenting on this, and to ensure that when we introduce this in Singapore, there are no adverse effects environmentally or health-wise, or even in its impact on other insect populations.

Supplementary Question by Ms Sylvia Lim:

I have a question for Minister concerning source eradication. We have residents living in private estates who may be staying adjacent or near to private land which is unoccupied. I would like to ask what is NEA's response in such matters, as in how far does NEA go to do checks within such premises, whether with or without owners' consent, and if it is a 100 per cent check on such premises or based on complaints.

Reply by Minister Masagos:

15 Part of our efforts is to be proactive at the start or before the start of the dengue season. As I mentioned earlier, we have carried out many inspections. We have made 1.4 million inspections across Singapore in 2015. In addition to these inspections, we have also put in place Gravitrap to monitor mosquitoes activities. We also test the blood samples of those infected to help us understand the serotype changes. With these, we are able to map the possible risks that can be prevented. When we identify an area that is potentially risky, we will deploy our resources to make sure that the residents in the area also take steps to make sure their homes are not breeding mosquitoes.

16 For the homes that we cannot get access to, we put up notices on the doors. Within a week, if there are still no responses, we have enough powers to get access to the premises to conduct the necessary inspections and destruction of breeding spots.

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