

Mr Masagos Zulkifli B M M: Madam Speaker, the Minister for Health has given an account of the Zika outbreak and the clinical management of patients diagnosed with Zika in Singapore. I will now highlight the mosquito control measures my Ministry and the National Environment Agency (NEA) have undertaken to control the mosquito population prior to and during the outbreak.

2 As everyone knows by now, Zika and Dengue are conveyed by the same mosquito – the *Aedes aegypti*. Our key strategy for Dengue control, and now Zika, is source reduction – the detection and removal of breeding habitats and larvae. This integrated vector management strategy is in line with the World Health Organisation (WHO)'s recommendations and remains especially critical now as we are in the traditional Dengue peak season.

3 Using a risk-based approach, our officers conduct pre-emptive checks and vector control efforts as precautionary measures in areas identified with high *Aedes* mosquito population. When a Dengue or Zika cluster is identified, we intensify our source eradication efforts by partnering with the community and premise owners to eliminate mosquito breeding habitats. Fogging is also conducted to kill the mosquitos as an additional measure to quickly curtail the transmission of Dengue or Zika.

4 Following the Zika outbreak, we have heard calls for fogging to be conducted at various residential estates. Currently, the NEA carries out indoor spraying of insecticides and outdoor fogging or misting to kill adult mosquitoes in the Zika clusters. This is the same thing we do in the Dengue clusters. These measures are helpful in the clusters because they have infected adult mosquitoes which must be destroyed before they bite and infect more people. However, it would not be wise to conduct fogging indiscriminately outside of the clusters as a preventive measure.

5 Firstly, fogging is only effective if the chemical has direct contact with the mosquitoes. This means that fogging will have to be repeated frequently as new batches of mosquitoes continue to emerge from breeding habitats that are not removed. Routine fogging is not a sustainable vector control measure. Secondly, the right chemical and sufficient number of fogging guns needs to be deployed to achieve an effective kill. Thirdly, the overuse or indiscriminate use of chemical treatment may cause the build-up of resistance in the local mosquito population. Fogging should only be used when there are Zika or Dengue clusters or when the adult mosquito population is observed to be high so that we can mitigate the situation which, again, I qualify, is effective only together with source eradication.

6 I just read an article in *The Economist* where experts fighting the same *Aedes aegypti* mosquito in Florida have come to the same conclusion that fogging on its own is not effective and that the only real solution is in fact “boots on the ground” to destroy the breeding habitats. Given that this particular mosquito likes to be around humans, live in crowded places, and lay eggs in clean water, the only way to mitigate the risk of Dengue and Zika is to prevent the mosquito from emerging in the first place. Indeed, human blood is needed by the female *Aedes* mosquitoes to lay eggs and breed – they will go everywhere where there is human blood to feed on and water to breed their offspring. That is why our NEA officers' boots have been on the ground for years to eradicate breeding spots in accessible and public areas. That is why we have to emphasise repeatedly that every household must constantly do the necessary ground actions to remove potential breeding spots in their own homes where it is not easily accessible to our officers.

7 Yet, in spite of all our efforts, I would like to share that we remain vulnerable to Dengue and other mosquito-borne diseases for a few reasons.

8 Firstly, the Dengue cases have been increasing globally. The WHO reported 2.2 million cases in 2010 and this number has increased to 3.2 million last year.

9 Secondly, we are in a Dengue-endemic region and there are 4 different Dengue virus serotypes circulating concurrently. Historically, a change in the predominant virus is usually followed by a spike in Dengue cases.

10 Thirdly, a large proportion of our population lack immunity to Dengue and other mosquito-borne diseases as a result of intensive mosquito control in the past decades. In many other countries where Dengue is endemic, the affected are often children. This is not the case in Singapore, which is good. Our success has, therefore, paradoxically lowered our herd immunity so that disease transmission occurs easily even with a very small mosquito population.

11 Fourthly, our region's constantly warm climate and high humidity allow the mosquitoes to breed all year round. The warmer climate also supports faster breeding and the maturation cycle of the mosquitoes which contributes to a higher population and the spread of diseases.

12 Finally, our high population density is very helpful to the breeding of *Aedes aegypti*. This specific mosquito has adapted particularly well to our urban environment because it loves human beings as compared with animals etc. and likes to breed, mate and feed near human dwellings.

13 We must acknowledge that all these extraneous factors make it impossible to eliminate the *Aedes aegypti* here. Indeed, if we had done anything less, Dengue and Zika would have spread throughout the whole island more quickly and thoroughly. Therefore, we are far from helpless and can do much to mitigate the risk. We have put in resources for surveillance. NEA has deployed about 37,000 Gravitraps around Singapore and this number will reach 48,000 by the end of the year. These Gravitraps will allow us to identify areas with a large *Aedes aegypti* population and take targeted mosquito control measures there proactively even if there are no Dengue or Zika cases. This sort of risk-based, preventive surveillance work will go on well ahead of any peak transmission season.

14 Inspections and enforcement have also been useful. Dr Tan Wu Meng has asked for the number of site checks conducted by the NEA and the proportion of mosquito breeding habitats found. Around 850 officers are deployed daily to do inspections island-wide. Between January and July this year, we conducted about 748,000 inspections – 638,000 of the inspections were in homes and 4,400 in construction sites. More than 10,000 breeding habitats were destroyed during these inspections – about half were in homes and about 5% were in construction sites. Besides conducting preventive surveillance, we inspect all the premises and public areas within the cluster, conduct indoor spraying of insecticides and outdoor fogging to kill adult mosquitoes, as well as oiling of breeding habitats to kill any mosquito larvae.

15 For the construction sites, we have stepped up enforcement actions and penalties over the years in addition to imposing fines. In 1998, we passed the Control of Vectors and Pesticides Act (CVPA) which allows us to impose Stop Work Orders (SWO) for worksites repeatedly found with poor housekeeping and mosquito breeding habitats. The number of SWOs imposed on errant sites increased from 2013 as a result of a tightened regime. Between January and July this year, the NEA issued around 50 Stop Work Orders, 410 Notices to Attend Court and also proceeded with over 40 court prosecutions of errant contractors for repeat offences.

16 Since 1999, the NEA has required all construction sites exceeding \$50 million in project value to employ full-time Environmental Control Officers (ECO) while sites between \$10-50 million are required to employ part-time ones. There are now around 2,750 ECOs to ensure good housekeeping and proper mosquito control measures in the construction sites all over Singapore. This combination of measures – outreach, inspections, fines, SWOs – has helped bring about a significant reduction in the percentage of inspected construction sites found with mosquito breeding – from 30% in the 1990s to 11% in 2013 to about 9% today.

17 While the NEA has given attention to construction sites, I must reiterate that a large number of mosquito breeding sites is in fact still found in homes. Earlier this year, given the potentially large number of Dengue cases as well as the impending threat of Zika, the NEA renewed the call for everyone to safeguard his own home. Since 14 March 2016, NEA has taken enforcement action against all the home owners found to have breeding, regardless of whether the homes were within the existing Dengue clusters – 2,200 households were fined between January and July 2016.

18 While the current strategy has kept the mosquito population here low, we are exploring new methods to further tackle the mosquito problem. I recently announced plans to trial a novel method of suppressing the mosquito population through the release of male *Aedes aegypti* mosquitoes carrying Wolbachia to mate with wild female Wolbachia-free *Aedes* mosquitoes. Eggs produced from the mating between the male Wolbachia-carrying *Aedes aegypti* mosquito and a wild female *Aedes aegypti* mosquito will not hatch. This trial follows a 4-year intensive study and comprehensive risk assessments by our NEA's Environment Health Institute (EHI), and support shown by the WHO, the US, Australia etc. From October 2016, male Wolbachia-carrying *Aedes aegypti* mosquitoes will be released in 3 selected sites. If successful, this will complement our existing mosquito control efforts and eventually lead to the suppression of the *Aedes aegypti* mosquito population and a possible curtailment of Dengue or Zika transmission. That said, the Wolbachia technology is not a silver bullet and will take some years before we can deploy it in scale. With or without breakthroughs, I want to stress that everyone must still continue with source reduction efforts.

19 Our mosquito control strategy has helped us to suppress Dengue over the years and I will now address the questions raised by Mr Christopher de Souza, Mr Dennis Tan, and Assoc Prof Daniel Goh, to show that this same strategy has prepared us well to tackle our Zika challenge now.

20 Following MOH's announcement of the first locally-transmitted Zika case on 27 August 2016, we immediately alerted the 27 members of our Inter-Agency Dengue Taskforce (IADTF). Every day, around 300 NEA officers, contractors and volunteers carry out vector control efforts and outreach in these clusters. As of 11 Sep 2016, more than 31,000 premises in the various Zika clusters have been inspected for mosquito breeding. More than 200 mosquito breedings have been detected and destroyed in the clusters. In the Zika clusters, thermal fogging outdoors and indoor spraying of premises have been carried out to kill adult mosquitoes and the drains have been flushed to remove any stagnant water as an added precaution.

21 At this point, I would like to thank the residents in the Zika clusters for their show of support and cooperation to our officers. They willingly opened up their homes for our officers to do their inspections and helpfully pointed out areas of concern to them for action. Indeed, we need everyone to step up and forward to help take good care of our homes and neighbourhoods so that we can all maintain good health.

22 The NEA has also inspected the construction sites and workers' dormitories in the Zika clusters. A Stop Work Order (SWO) was issued to the construction site at Sims Drive on 27 Aug 2016 to curtail the local Zika transmission as the site had failed to maintain satisfactory housekeeping and to eliminate potential mosquito breeding habitats. The NEA has in fact been working regularly with the Singapore Contractors Association (SCAL) and SMS Amy Khor recently met them again to drive home the point that their construction sites supervisors would need to be more vigilant about mosquito control and to look out for any workers with Zika symptoms. With the threat of Zika, all SCAL members will be conducting Mozzie Wipeout exercises in their sites in the next few weeks. The NEA has also served CVPA orders to 4 dormitories to impose stricter requirements on them to maintain good housekeeping, check for mosquito breeding, clear stagnant water regularly, carry out thermal fogging if the mosquito population is high, and mandatory residual spraying in their premises on a quarterly basis.

23 Communication is key in any public health situation. Together with MOH, we have provided updates of our efforts and actions through the daily media briefings. Up-to-date information on the Zika clusters has been put on the NEA website since last Wednesday. We have also engaged our community partners to conduct extensive outreach to the residents in the Zika clusters. Over the past 2 weekends, outreach activities supporting the Mozzie Wipeout Movement Against Zika were conducted all over Singapore to remove stagnant water in common areas, dispose discarded receptacles properly, and distribute Zika information leaflets to the residents. Let me reiterate our gratitude for the support of the public and our partners and the many volunteers who have worked tirelessly with us.

24 Madam Speaker, in Malay, please. *[In Malay]* we are on the right track. Our strategy of rigorous mosquito control efforts and our well-coordinated public education efforts has been commended by the World Health Organisation (WHO) and US' Center for Disease Control and Prevention (CDC). Everyone – the Government agencies, premises owners, businesses, residents, the community – has a role in our fight against Dengue and Zika. For home-owners, let us continue to perform the steps to 'Do the Mozzie Wipeout'. For the contractors and dormitory operators, please maintain proper housekeeping at the building sites and dormitories. For the town councils, please help to eliminate the potential breeding sites in the common areas and undertake fogging sensibly. All these efforts are our insurance against a widespread outbreak.

25 Let's all continue to keep our boots on the ground, keep calm and carry on in our fight against this disease.

Thank you.

Ms Foo Mee Har (West Coast): I have two supplementary questions for the Minister of the Environment and Water Resources. I would like to ask the Minister what additional measures would the Ministry contemplate implementing to prevent mosquito breeding in vulnerable locations, such as construction sites and workers' dormitories. For example, would the Minister consider more stringent measures, such as introducing a new regime requiring all construction contractors, large and small, to engage, authorise pest controllers to conduct independent checks and treatments at the construction sites.

Under this arrangement, the Government could spell out specific maintenance and housekeeping standards that all contractors must abide by or risk suspension of their operations until they comply.

All construction sites would need to display clearance reports by these independent pest controllers at the construction sites so that the public can see that they have got a very systematic regime and it is conducted by independent controllers, something like what was implemented by the BCA on the lift maintenance scheme.

Mr Masagos Zulkifli B M M: I thank the Member for the question. I think, firstly, we should not go overboard by implementing more measures and also adding more costs when we can do things well publicly. The combination of the CVPA measures which includes having ECO on site for those \$50 million construction sites and then those between \$10 million and \$50 million, having a part-time one every two weeks, we think this is sufficient.

Again, I would like to stress the importance of having the support of all the premises owners, including construction site supervisors so that they do not let their eyes off the ball. Sometimes, there are dry seasons; the rain may not fall and therefore, there may not be any mosquitoes. But the *Aedes aegypti* mosquito can breed any time of the year.

Therefore, we must never let our vigilance down. We are thankful that the Singapore Contractors Association (SCAL) continues to encourage the supervisors to be on the look-out, always be on their toes, so that whether it is their site or their workers, they must care for them enough not to allow the mosquitoes to breed and, therefore, spread Zika or dengue.

We have also extended our CVPA to the dormitories because I think it is a good precautionary measure, although this is not a construction site. The workers live there and they may also spread or transmit to one another. Therefore, the CVPA will require the dormitory owners to step up their housekeeping of the premises as well as misting quarterly, to ensure that mosquitoes if they were ever to exist in that place will die if they were to land on the walls, because this is where most of them would be during the nights when they are resting. So, we must continue to work with them. We will monitor. And if these actions are not sufficient, if the WHO or other experts tell us to do other things that will help us to fight in this, we will definitely take it up.

Mr Alex Yam (Marsiling-Yew Tee): Thank you, Madam. First of all, I thank the Ministers for their comprehensive Statements. Please also allow me to place on record appreciation to MOH and NEA officers for their hard work on the ground since the start of the Zika infection.

A couple of questions for MOH. First of all, are we able to ascertain, at this point, the original of this particular local transmission? Secondly, I understand from the Minister's Statement that there was a look-back exercise. I would like to ask what we did with the look-back cases that were Zika-positive. Were these patients informed that they were Zika-positive and was this particular exercise helpful in reducing the spread of Zika further?

On microcephaly which is perhaps the most visual and the most frightening aspect of Zika, are there any other causes of microcephaly in babies and how many non-Zika microcephaly cases have there been in Singapore since the tracking began in 1993? Also, in terms of public awareness that both Ministers spoke about, whether both Ministries have ascertained what is the level of public awareness on Zika at this moment, and what more can the Government do to stress the whole-of-society approach to containing Zika and preventing vector breeding?

Last of all, a question for the Minister for the Environment and Water Resources. Under the CVPA, from the start of this year, how many section 36 orders have been served to inspect vacant or non-cooperated households in premises for dengue or Zika areas?

Mr Gan Kim Yong: Madam, perhaps, I can answer some of the questions first and then I will allow my Colleague to answer. First, Mr Yam asked about the origin of the local transmission. I presume he is asking about the first case locally. It is very difficult to determine the first case in Zika because Zika is not transmitted from person to person. For epidemiology study, it is very difficult to trace who passes on to who because there is an intermediary factor, and that is the mosquito. We are unable to trace the mosquito for obvious reasons. Therefore, we do not know who is the first so-called index case.

We also have to be quite careful not to identify the person with the symptom on 31 July as the first case. It may well not be because, again, 80% of the patients actually do not have symptoms. So, it is not necessary that the first person with symptoms is the first case. I hope I have addressed the Member's question. So, the answer is we do not really know who is the index case in this case.

Secondly, I think Mr Yam asked about the look-back exercise. The look-back exercise was important to us in order for us to have a sense of how wide is the cluster and how many patients were involved, to allow us to determine very quickly rather than to have to wait for further cases to investigate and to size up the situation. We decided to look back to allow us to have a quick assessment of the size of the cluster and to also allow NEA to focus its efforts where it matters. It is helpful in that sense.

For patients who are tested positive, we do inform them and for those who are still symptomatic, we isolated them in the beginning, as I had explained earlier, and they were hospitalised for us to observe them, as we want to be sure that they do not have complications either. By the time, in fact, most of the patients in the look-back exercise have already recovered. They were no longer symptomatic because in the look-back exercise, we looked quite far backwards and many of them had already recovered. We were just approaching them and asking them whether they were ill before, what were their symptoms and when did their symptoms start. That is how we did a look-back exercise.

On microcephaly, in fact, Zika is not the only cause for microcephaly. Microcephaly can be due to a number of factors. It could be due to genetic and environmental factors, such as Down Syndrome, exposure to drugs and alcohol as well, Rubella as well as other infectious diseases. Even before we tackled the first case of Zika, microcephaly cases were present in Singapore. Over the last five years, we had, on average, about between five and 12 microcephaly cases per 10,000 live births. For these patients with microcephaly, we continue to provide support and manage them in the same way as we manage children with congenital conditions.

Mr Yam also asked about the level of public awareness, I think those of us who have done home visits would know that the level of awareness is very high among the public. Every door that we knock, I always tell them, "I want to remind you about Zika." They will say, "Yah, Zika I heard of it. I read all this in the newspapers. I watched the TV." Most of them are aware. Based on the recent survey by the Ministry of Communications and Information, more than 90% of Singaporeans found it easy to access information with regard to Zika. And we will continue to raise public awareness. Because this research is still on-going, our knowledge of Zika is still very limited, in terms of scientific knowledge. There will be new discoveries and new developments, and we do need to continue to engage the public and keep them informed of these new developments.

Mr Masagos Zulkifli B M M: Thank you, Mdm Speaker. There was a question about section 36. To date, this year, before the detection of Zika, there were 13 section 36 orders served, and after the Zika, 24 such orders were served. Of these 24, three were found with breeding but with very few larvae.

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Ms Tin Pei Ling (MacPherson): First of all, because part of MacPherson was part of the first general cluster, I would like to also thank MOH, NEA, Town Councils, pest control workers and grassroots leaders for their relentless efforts in the anti-Mozzie and anti-Zika efforts. Thank you.

I have got a few questions. First of all, I would like to ask if Zika is now considered endemic in Singapore and if a full eradication is even possible. Second, I note that WHO has praised Singapore and that we have also complied with the guidelines, in terms of how we can support and advise our pregnant women in Singapore, I am wondering if more help can be given to them.

Until there is greater research and clarity in whether the local strain of Zika will cause more or less damage, in terms of pregnant women and the foetuses, I believe pregnant women will continue to be worried throughout the months of pregnancy, so would regular tests be made available to all pregnant women during the pregnancy and for those who have exhibited symptoms and tested positive, would MOH subsidise expected increase in cost, given the anticipated increase in scans and other follow-ups needed to ensure the well-being of the foetuses?

Thirdly, is the current testing capacity enough to deal with the demand in case of a national outbreak again – hopefully not – and whether there is a need to increase the capacity for testing? Finally, will there be funds specially set aside to conduct Zika research and this is especially so given that mosquitoes are considered endemic in the tropical countries like ours?

Mr Gan Kim Yong: Madam, whether Zika is endemic in Singapore, I think it is too early to say. It is actually not productive for us to decide on terminology, whether it is endemic or otherwise. Our immediate task is to focus on better control, to do our level best, to try to be eradicate as much as we can, if not to minimise as much as we can. That is our immediate task and we should focus on the immediate task. I certainly hope that it will not endemic but it is something that we will have to monitor over a long period of time before we can make a definitive assessment.

On pregnant ladies, WHO did not recommend regular routine testing for non-symptomatic pregnant women because to test them, there is a very narrow window. You have to test them while they are infected. After a period of time when their infection has recovered, it will be very difficult to detect whether the lady has been infected before. Therefore, the window is very narrow and it is not practical to keep testing the lady every day, or every week, or every other week. WHO did not recommend regular testing for those who are non-symptomatic. Our clinical advisory group also advised against it.

For symptomatic pregnant women, the advice is for them to consult their doctors because each case is different, their risk factors are also different. So, it is better for them to consult their doctors how often do they need to be tested, how often do they need to be monitored, and their doctors will be able to advise them accordingly.

Ms Tin also asked about the additional cost. For treatment in our public healthcare or institutions, they will always be accessible to our subsidy framework, if they are subsidised patients, and if they are unable to afford the cost, especially for the lower income families, Medifund is available for them whether for the test or for the treatment.

Ms Tin also asked about the capacity for testing. We have sufficient capacity. In the mean time to handle the daily testing that we are encountering, and we also have measures put in place to be able to increase the capacity, if need be.

On research funding, it is an area that we also are interested in. Our National Medical Research Council (NMRC) has funds to support meaningful research with regard to Zika. It is something that we are discussing with the researchers and if they have worthwhile projects, they can put these up to NMRC, and we will support them accordingly.

Assoc Prof Daniel Goh Pei Siong (Non-Constituency Member): I have three questions, two for the Minister for Health. The first one is, whether the 36 construction workers were discovered to be infected in the look-back exercise, whether they went to a clinic and, if they did, why were the clinics not able to detect an uptrend in the Zika symptoms and report that to MOH?

The second question is, what processes are in place to ensure construction sites' contractors would report large numbers of workers who display symptoms of dengue or Zika infection to MOH in a timely manner, and if none exists, whether there should be such processes?

For the Minister for the Environment and Water Resources, whether, other than size, the location of construction sites should be considered for more stringent surveillance, namely, how close the sites are to residential areas? Thank you.

Mr Gan Kim Yong: Madam, first, on the question of the 36 patients we detected in the look-back exercise, some of them went to the clinics. But the symptoms were very mild; very often, the clinics may not be able to identify them as having potential Zika infection. Members would remember that I had explained how we identified the first case. It was because of a GP clinic that had identified a large number of patients with similar symptoms, and they were not able to determine the cause of the symptoms. They had tested the patients for dengue, they tested them for chikungunya, and they were not able to determine what infection the patients had. And so, they alerted us. That is part of our surveillance system.

As I had also explained in my reply, our primary care system is, in fact, at the frontline of our surveillance. They are more sensitive because they are trained. They are on the lookout for unusual trends. If they are able to identify trends like what I mentioned earlier, they will then be able to alert us and then, we would go in and investigate.

In addition to the GPs network that we work with to identify unusual trends, we also have a sentinel surveillance system, where we work with partner GPs at our polyclinics to monitor and to test selected samples regularly to ensure that even if they have no significant symptoms, if we are not able to determine the cause of the symptoms, we also test them for Zika to make sure that we are able to identify Zika infections if it is transmitted in the community.

Most of the clinics, when they do testing, under normal circumstances, the focus is on imported cases as well. So, if they see symptoms that resemble Zika, even if they are light symptoms, they would check the travel history. If the patient has been to Zika-infected countries, then the alarm or alert level will be raised. And they would then be alerted and inform us. That is also part of the system where we track imported cases. That was also how the first case in Watten Estate was discovered, because he had a travel history to Brazil. When he returned, we discovered that he had this symptom and therefore we sent his blood for testing and we discovered Zika that way.

Your second question on a large number of patients in the construction sites, again, as I had explained that the key gatekeeper is our primary care system. We work through our GPs when they noticed unusual trends, whether it is Zika or any other infection. We are on the lookout not just for Zika; there are also other potential infectious diseases, including diseases that we may not be aware of as well. So, our frontline GPs are the most important. When they see cases that they have doubts about, or when they see patterns that are unusual which they cannot explain, they will usually alert MOH and we will work together with them to find out the truth. This is how we discovered a locally transmitted case in the first instance.

Mr Masagos Zulkifli B M M: On the question whether we should focus more on construction areas near residential sites. Singapore is a very built-up area. So, most construction sites are around homes. Therefore, it is not the primary factor why we go to that site or not. We have risk factors. And now indeed, we have extended the coverage to beyond the construction sites to the dormitories where the workers come from.

Mr Dennis Tan Lip Fong (Non-Constituency Member): Thank you, Madam. I have one question for Minister Masagos. It is a very quick question. Regarding what he said about the male Wolbachia mosquito experiment, what is the expected time frame for this experiment before the Ministry decides to introduce it on a bigger scale?

And I have one quick question for Minister for Health. Is the Minister able to confirm whether the current strain of virus in Singapore, is it similar to the one in Brazil and if that is not known yet, when does it expect to know whether it is the same strain?

Mr Masagos Zulkifli B M M: We are calibrating the Wolbachia mosquitoes, so to speak, from October onwards, for about six months. Singapore is a very unique built-up area. In other areas, they just have to fly horizontally. We have to know whether these mosquitoes will fly high and how high and whether they will survive long enough in our urban environment. So, after six months, if successful, and I hope it is successful so that we do not have to recalibrate again, we can then deploy them across for small scale study and field suppression trials. And then if successful, we will roll out for higher risk areas. The whole programme will take up to 2020.

Mr Gan Kim Yong: Madam, let me just make a correction. Earlier on, I said that based on a study, more than 90% of people are aware and find it easy to find the information on Zika. Actually, the survey was done by REACH, and not by MCI – that is the correction.

Just now, Mr Dennis Tan asked about the strain of the current Zika virus in Singapore. Our scientists – between the A*STAR scientists as well as the National Public Health Laboratory scientists – have worked together to sequence the virus and based on their analysis, the Singapore strain that we have discovered so far, came from the Southeast Asian's strain, which is not the same as the strain in Brazil. In fact, the strain

Brazil is a later strain that was transmitted from the Asian strain. So, the strain that we have is an earlier strain which means that it has been circulating in Asia even before Brazil had Zika outbreak, so this is the current strain that we have identified. But research is still on-going.

Mr Christopher de Souza (Holland-Bukit Timah): Thank you, Madam. I would like to ask Minister Masagos, can fogging be done at more areas, but also how effective is fogging and are there any side effects to fogging?

Mr Masagos Zulkifli B M M: As I mentioned in my Statement just now, fogging is effective if done properly, if done by a licensed professional. We have to fog when there is a cluster because it means that there are adult mosquitoes infecting the population or to prevent those mosquitoes which are not yet infecting from infecting. So, that is the primary reason why we do fogging. But we cannot just do fogging. I know everyone likes fogging because it is very visual – everyone can see it and everyone feels better, but it does not solve the problem.

It must be done together with source eradication. Whether it is construction site, whether it is our homes. Indeed, at our homes, whenever the fogging is done, they close up their homes. And, therefore, it does not get into the homes.

The other thing we could do is misting, which means that in some Town Councils as well as dormitories, we do misting to make the chemical stick on the wall and they last long. But we cannot do this very often either. As I mentioned just now, there are also side effects of using the same chemical over and over again so frequently that the mosquitoes may become immune to those insecticide. And this has already happened. In fact, some insecticides are not used at all nowadays because we have overused them.

A word of caution for everybody and I am glad that as I watched my phone, the headlines that are coming out are that there are many myths to fogging and we hope that we are doing accurate, better fogging than just more fogging.

Dr Tan Wu Meng (Jurong): Madam, two supplementary questions for the Minister for the Environment and Water Resources. The first relates to his answer just now on number of venues where breeding sites were destroyed. Minister said that half were in homes. Another 5% were in construction sites. Would Minister be able to share in what other areas, besides these, can these sites of breeding be found?

The second question relates to a back-of-the-envelope calculation that I did base on the figures Minister provided. Minister mentioned that about 5,000 breeding sites were found in the 638,000 homes that were assessed. That adds up to about one breeding site per 128 homes. On the other hand, the 5% figure means 500 breeding sites were found out of 4,400 construction sites studied. That means about one in 9 construction sites has mosquito breeding sites discovered and destroyed.

In light of this, would this Ministry consider taking an even more robust approach to stamping out mosquito breeding sites in construction sites, especially since my own Clementi residents have expressed concern every time a new construction site comes up nearby? Anecdotally, I can share that on walkabouts, my residents and I also find that we are more likely to get bitten by mosquitoes when we are near a construction site that has active construction activity.

Mr Masagos Zulkifli B M M: Madam, I wish the mosquitoes can calculate as well. But mosquitoes do not calculate. They just go to where there are humans and there is water to breed. And whether it is a construction site, whether it is home, it should be of equal concern to us.

The real difference is accessibility. For construction sites, our officers can come in anytime. They can impose appropriate orders on them, to clean up, to put in the right officers, to step up on their housekeeping. But we cannot say similarly for homes. And therefore, even in terms of per home basis, we are actually far better than what has been prescribed by WHO. We should not rest on our laurels.

Every mosquito that hatches, a female mosquito will hatch a further 300 eggs. They grow exponentially. We just leave the breeding untouched. And therefore whether it is home or construction site, we must be as vigilant and I think we also should educate our constituents that it is not just about the construction site. We will do our best to suppress the source of breeding if it occurs there but everyone must do their part to make sure they do the five mozzie wipe out steps as a daily habit to ensure that they do not give the mosquitoes a chance to breed.

Ms Joan Pereira (Tanjong Pagar): Thank you, Mdm Speaker. NEA has been conducting intense inspections, not just in public housing estates but also in condominiums when asked to assist, and my condominium managements are really very appreciative. However, when asked to share their findings with the condominium managements, NEA rejected the request. Would NEA consider sharing such information so that it can be a community effort for follow-up action?

Mr Masagos Zulkifli B M M: May I clarify with the Member what kind of information is not shared?

Ms Joan Pereira: Like when they visit the homes, if they are found to have bred mosquitoes, can such information be shared with the condominium managements?

Mr Masagos Zulkifli B M M: Even for public housing, our HDB flats, we do not specify which unit exactly where the breeding happens. It is enough for the information that in this particular building or block, that is a cluster, because there is more than one and there is a chance that it was infected by one or the other. Therefore, it is enough for people to take heed and to know that some form of transmission is happening and take more precaution to go round their house to eradicate the source of breeding. Therefore, I think it is not important to know the exact unit. That is taken care of by NEA. That is their role. Everyone's role is to ensure that there is no breeding at home and then if there are adult mosquitoes, particularly seen in large numbers in the condominium, to do the fogging as appropriate.

Mdm Speaker: End of clarification time. Introduction of Government Bills. Minister for Manpower.

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