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Distinguished Guests and Speakers

Ladies and Gentlemen

Good morning.

2. It is my pleasure to join you all today at the Fourth ASEAN Congress of Tropical Medicine and Parasitology. I wish to first extend a warm welcome to all the participants, especially to our many overseas guests. I would also like to congratulate the Environmental Health Institute of the National Environment Agency, the Regional Emerging Diseases Intervention Center and the Singapore Society for Microbiology and Biotechnology for their good work in co-organising the event.

Importance of tropical diseases

3. In the past few decades, there has been a global resurgence of tropical diseases, particularly vector-borne infections like malaria and dengue. The WHO has estimated at least 1 billion people to be at risk.

4. Singapore is also not spared from this resurgence. After successive decades keeping dengue at bay, we too witnessed increasing episodes of outbreaks in the 1990's, culminating in our worst epidemic in 2005, when some 14,000 cases were reported. Exotic diseases like chikungunya also landed on our shores.

5. What shifted the balance in favour of the pathogens and vectors? Research suggested that the following factors may have played a role in this shift:

- Increased population density due to urbanisation, which increases the contact between the vectors and the people;
- Increased population movement made possible by the availability of economical air travel, which facilitates distribution of the vectors and pathogens;
- Possible effects of global warming, which accelerates the maturity of both the pathogens and vectors, and creates new regions where the climate becomes conducive to disease transmission

All these factors are linked to development, but we cannot turn back the clock. In fact, the pace of development is likely to quicken in the future, especially in the emerging economies. And further complicated by climate and environmental changes.

6. To tackle this growing challenge, we cannot rely on past experience and current best practices. Instead, we must re-examine and refine our approaches continuously based on gathered evidence. I am pleased to note that this will be a recurrent theme for this Congress over the next few days.

7. On that note, I thought it might be worthwhile for me to share with you some lessons that Singapore has learnt from our experience with malaria, dengue and chikungunya. I hope this will trigger more discussion on how we could better help each other fight these endemic diseases.

Need to integrate environment and health sectors

8. Lesson One – the need to integrate the environment and health sector and to adopt a scientific approach. Let me elaborate this with a brief account of our battle against malaria.

9. Malaria was rampant in Singapore in its early days, when it was then largely rural and habitats for the vectors were abundant. In the 1910's, about 2,000 deaths due to malaria were reported annually, making it the second leading cause of death after tuberculosis. The disease was subsequently brought under control after the implementation of a comprehensive system of anti-malarial drainage and oiling programme.

10. However, it resurged in the early 1970's. The rapid urbanisation and industrialisation taking place then led to massive land development that created environmental conditions favourable for the breeding of the vectors. This was compounded by the influx of workers from malaria-endemic countries.

11. The situation only came under control after a new control strategy was introduced, one that emphasised the use of epidemiological and vector surveillance to identify the focus of transmission early to prevent secondary transmission. The strategy proved effective and by 1982, Singapore was certified by the WHO as having achieved the status of malaria eradication.

12. This was an important lesson on how environmental control alone would not be sufficient to match the ever-adaptive vectors and how the systematic gathering and application of scientific evidence can guide vector control operation to greater effectiveness.

A multi-pronged and coordinated approach

13. Lesson Two – the need for a multi-pronged and coordinated approach towards source reduction nation-wide. Take the case of dengue.

14. Singapore has had much early success in controlling the dengue vectors. Our strategies then focused on eliminating mosquito breeding indoor and managing dengue clusters. Intensive search and destroy operation is mounted as soon as a focus of transmission is detected to prevent further disease transmission. This is supported by routine checks by the health inspectors, public education and law enforcement.

15. As a result, we enjoyed a period of relatively low dengue incidence in the 70s and 80s. We happily thought we knew all about controlling the vector – how long it took them to breed, how far they fly, when they bite, where they lay eggs and how to kill them.

16. However, cases started to pickup from the 90s, with outbreaks occurring more frequently and with greater intensity. When we were hit by the epidemic in 2005, it became clear that we did not have a good enough understanding of the ever-changing dynamics of dengue transmission here, which rendered even the tried and tested strategies inadequate. We did not realize soon enough that we shifted from a period of high disease transmission supported by a high mosquito population to one where transmission is sustained by a low mosquito population. The vectors adapted to the intense vector control regime by becoming more elusive and the viruses, more infective. Decades of successful vector control also reduced the overall herd immunity, making our people more susceptible.

17. What followed was a major revamp of the national dengue control programme. Rather than emphasising on identifying and responding to active clusters, the focus of vector control now shifted towards pre-empting and preventing a build-up of vector population during the periods between epidemics. Apart from beefing up our vector surveillance, we also carried out active virus surveillance on patient blood samples submitted by primary healthcare providers, to track the serotypes circulating in the community. This provided an early warning of any switch in predominant serotype, which is typically associated with outbreaks. This information, together with field data collected from vector surveillance and public feedbacks, then guides the vector control operation according to the assessed risk of transmission for a particular area. As a result, overall operational effectiveness improved.

18. At the national level, source reduction efforts undertaken by government agencies, the private sectors and the community are also better coordinated through the formation of the Inter-Agency Dengue Taskforce.

19. Our approach to community outreach also took some dusting, with materials and methods updated to keep up with the changing times. Apart from continuing with open and transparent communication with media and public on the dengue situation, we emphasised the importance of community responsibility by getting everyone into the habit of checking for mosquito breeding in their homes. We also embarked on innovative publicity campaign to make dengue top-of-the-mind recall and to sustain public awareness.

20. The outcomes of these efforts have been encouraging. We saw successive years of decline in dengue incidence since 2007. More significantly, the revamped programme placed us in a good stead to meet the challenge of chikungunya that swept through the region in the last few years. Now, allow me to touch on the final lesson.

Prepare for new emerging threats

21. Lesson Three – the need to prepare for new emerging threats. To illustrate this, I will share with you our experience tackling the latest vector-borne disease to reach our shores – chikungunya.

22. We recognised the threat that chikungunya may pose to Singapore as early as in 2006 and took steps to develop the capability for diagnosis and epidemiological investigation. We expanded the active laboratory-based virus and mosquito surveillance programme to cover this disease. These efforts proved useful as we were able to detect the first chikungunya cases here in 2008 and contained the transmission.

23. The importance of scientific evidence was again demonstrated when, using a combination of molecular epidemiology and entomological techniques, we identified *Aedes albopictus*, instead of the more commonly known *Aedes aegypti*, as the main vector responsible for local transmission. We found that this was possible because the *Aedes albopictus* mosquito was a very efficient vector for a mutant variant of the chikungunya virus that was then circulating in Malaysia and Singapore.

24. These findings led to a revision of the chikungunya vector control strategy in Singapore. We shifted our focus to the control of *Aedes albopictus*, whose habitats are found predominantly in forested areas. It also shaped our risk communication as we focused on workers and residents in close proximity to forested areas. This proved pivotal in our successful response to the epidemic in 2008. Of course, we cannot afford to be complacent. We don't know what new threat may yet emerge.

Need for cross-border research collaborations

25. Our success in controlling pathogens and vectors so far was not just sheer hard work on our part or a stroke of good fortune. We owe a large part to the stellar scientific work that researchers like you have put in. Indeed, active collaboration and sharing of scientific knowledge is critical, not only in expanding our scientific quest, but in uplifting the lives of millions who would benefit from the practical application of the knowledge.

26. This is the reason why Singapore has been supporting efforts by the WHO to build up the scientific capability of the region. Last March, we co-hosted with WHO the first Asia-Pacific dengue workshop, where dengue control programme managers from countries within the Western-Pacific and South-east Asia regional offices get together to acquire laboratory surveillance skills that could strengthen the integration between laboratory and field vector control operation.

27. Likewise, we are also supportive of regional platforms such as the ASEAN Congress of Tropical Medicine and Parasitology, as they provide excellent opportunities for scientists and public health practitioners to share their experience, become more knowledgeable and then apply the learning to address tropical diseases in their respective regions. I hope that such forums would also foster closer working relationship between the scientific community and public health practitioners. Only then can we help to minimize the health burden caused by tropical diseases.

Closing

28. In closing, let me wish all of you a very rewarding and fruitful Congress. I am confident that you will benefit from the sharing of experience that some 300 local and foreign experts are bringing to the Congress. I hope this will enable fruitful discussions to take place and promote greater collaboration in the field of tropical disease prevention and control. And for many of our friends from overseas, I hope that you will find some time during your stay to enjoy the food, the sights and the latest attractions that Singapore has to offer.

Thank you.

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