For Information
on 21 January 2019

Legislative Council Panel on Health Services

Prevention and Control of Various Mosquito-borne Diseases

PURPOSE

This paper outlines the measures adopted by the Government to prevent and control mosquito-borne diseases.

BACKGROUND

2. Several mosquito-borne diseases are of public health concern in Hong Kong, including chikungunya fever, dengue fever ("DF"), Japanese encephalitis ("JE"), malaria and Zika virus infection ("ZVI"). In recent years, all cases of chikungunya fever, malaria and ZVI recorded in Hong Kong were imported from endemic countries and areas via international travel, while both imported and locally-acquired cases of DF and JE have been recorded.

PREVENTION AND CONTROL MEASURES

3. In general, the most effective measures to prevent mosquito-borne diseases in Hong Kong are mosquito control and prevention of mosquito bites[1]. In this connection, the Government has put in place a series of prevention and control measures to guard against mosquito-borne diseases. The implementation of these measures to prevent and control DF and ZVI (latest

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[1] Specific preventive measures are available for some mosquito-borne diseases, for example, vaccination for JE and chemoprophylaxis for malaria are available for travellers who plan to travel to endemic areas. However, there is no effective vaccine for chikungunya fever and ZVI. For DF, according to the latest recommendation of World Health Organization ("WHO") in 2018, for countries considering vaccination as part of their dengue control programme, pre-vaccination screening is the recommended strategy. With this strategy, only persons with evidence of a past dengue infection would be vaccinated. If pre-vaccination screening is not feasible, vaccination without individual screening could be considered in areas with recent documentation of seroprevalence rates of at least 80% by age 9 years.

situation at **Annex**) will be used as illustration in the ensuing paragraphs.

Measures Taken by the Department of Health

(A) Enhanced Public Health Surveillance

4. A number of mosquito-borne diseases, including chikungunya fever, DF, JE, malaria, West Nile virus infection, yellow fever and ZVI, are notifiable diseases under the Prevention and Control of Disease Ordinance (Cap. 599) in Hong Kong. Medical practitioners are required to report all suspected or confirmed cases of these diseases to the Centre for Health Protection ("CHP") of the Department of Health ("DH") for investigation and follow-up actions as appropriate.

5. In response to the local outbreak of a mosquito-borne disease, CHP would enhance the surveillance on suspected cases in collaboration with public hospitals, private hospitals and private doctors to enable early referral and prompt control measures. For instance, during the outbreak of DF in 2018, CHP enhanced the detection of suspected DF cases with the Hospital Authority ("HA") through activation of an electronic reporting platform "e-Dengue". Doctors were requested to notify CHP and HA when a request of laboratory test for DF was made. The Public Health Laboratory Services Branch of CHP had collaborated with HA to strengthen testing of DF to facilitate clinical diagnosis. The "e-Dengue" platform was deactivated on 10 October 2018 when the local outbreak was considered to have ended, and it is maintained at a standby mode for reactivation in the future if necessary.

(B) Epidemiological Investigations and Control Measures

6. Upon notifications of mosquito-borne diseases, CHP would immediately commence epidemiological investigations. CHP would interview the patients for their local movements both during the incubation period and after symptom onset so as to promptly inform the Food and Environmental Hygiene Department ("FEHD") for vector investigation and mosquito control. As DF patients are infective to mosquitoes during the febrile phase, laboratory-confirmed DF patients with fever were admitted to hospitals for the purpose of isolation in a mosquito-free environment. For local DF cases, CHP would conduct site visits and field investigations by

questionnaire surveys at the patients' residences for active case finding and arranging blood tests as appropriate. Health talks would be organised to educate the public on mosquito control and preventive measures.

(C) Risk Communication

7. CHP has enhanced public health education regarding the prevention of mosquito-borne diseases through a variety of health education materials. CHP has been publishing feature articles on mosquito-borne diseases in its bi-weekly on-line publication "Communicable Diseases Watch" from time to time, aiming to provide healthcare professionals and members of the public with up-to-date news and knowledge on mosquito-borne diseases.

8. In response to the local DF outbreak in 2018, CHP conducted press stand-ups and issued press releases to keep the public informed of the latest situation. CHP issued letters to local doctors and hospitals to alert them to the latest situation of local DF and remind them to enhance surveillance, as well as letters to schools and institutions to remind them to step up mosquito control and preventive measures. Members of the Pest Control Steering Committee and Scientific Committee on Vector-borne Diseases under CHP were also informed about the latest situation. A mini-web on the CHP website was set up to provide the latest information, locations of the residences and local movements of the local DF cases.

(D) Liaison with Other Health Authorities

9. CHP has been maintaining close communications with WHO as well as the health authorities of overseas and neighbouring areas on the latest developments regarding mosquito-borne diseases. In view of the local DF outbreak in 2018, CHP had informed WHO Regional Office for the Western Pacific, the health authorities of Mainland China, Guangdong and Macao about the locally-acquired DF cases.

(E) Port Health Measures

10. The Port Health Office of CHP carries out regular inspections at boundary control points ("BCPs") to ensure that good environmental hygiene is maintained and proper mosquito control measures are in place.

Temperature checks are conducted on an ongoing basis for all inbound travellers at all BCPs and suspected cases will be referred to medical institutions for follow-up actions. Health promotion at BCPs had been enhanced through pamphlet distribution and poster display to remind travellers of the preventive measures against mosquito-borne diseases.

11. Since late April 2017, Port Health Office requires all inbound aircraft from affected areas of ZVI to conduct aircraft disinsection to prevent the importation of diseases through infected mosquitoes. In response to the local DF outbreak in 2018, CHP had written to the Travel Industry Council to urge them to remind travellers to adopt proper personal protective measures during travel and take heed of proper measures after returning from endemic areas.

(F) Travel Health Advice

12. CHP publishes travel health advice regarding mosquito-borne diseases through different channels, including the CHP website and press releases. In general, if going to areas affected by mosquito-borne diseases, travellers should arrange a consultation with a doctor at least six weeks before the trip and adopt extra preventive measures to avoid mosquito bites. Travellers should wear loose, light-coloured, long-sleeved tops and trousers and apply insect repellent containing DEET to clothing and exposed parts of the body.

13. Travellers returning from areas affected by DF and ZVI should apply insect repellent for 14 days or at least 21 days respectively upon arrival in Hong Kong. In addition to general anti-mosquito measures, CHP advised members of the public to take precautions to prevent sexual transmission of ZVI. Special notes for pregnant women and women preparing for pregnancy regarding adverse pregnancy outcomes have been provided to the general public.

(G) Publicity and Public Education

14. CHP has enhanced public health education through a designated website, television and radio stations, CHP Facebook Fanpage, CHP YouTube Channel, 24-hour health education hotline, GovHK notification app and media interviews to promulgate the health advice of prevention of mosquito bites and mosquito proliferation. A variety of health education materials such as

pamphlets, infographic posters, television and radio Announcements in the Public Interest, vector-borne diseases animated videos, giant wall banners and exhibition boards have been produced to raise public awareness. CHP works closely with relevant government bureaux/departments and stakeholders including District Councils, Healthy Cities Projects at the district level and non-governmental organisations, to provide regular updates on the latest disease situation and solicit their collaboration in disseminating relevant health information.

(H) Emergency Preparedness

15. The DH prepares departmental contingency plans which provide the guidance and actions for the detection and response to mosquito-borne diseases occurring in Hong Kong. CHP conducts public health exercises regularly to test the interdepartmental coordination and public health response measures regarding communicable diseases of public health significance[2].

16. To provide a framework for a response system for agreed and coordinated efforts among different government departments and relevant organisations with a view to reducing the public health impact of ZVI on the Hong Kong population, the Government has launched the "Preparedness and Response Plan for Zika Virus Infection", which sets out the preparedness and response plan of the Government when ZVI may have significant public health impact to Hong Kong. The Alert Response Level was activated since then up till the present.

17. In view of the high incidences of DF in the neighbouring countries and areas of Hong Kong and some popular travel destinations, and the presence of dengue vector (i.e. *A. albopictus*) in Hong Kong, there is a substantial risk of local transmission and explosive outbreaks. To consolidate the experience of response gained in the latest local DF outbreak in 2018, foster closer interdepartmental collaboration, and ultimately devise a better preparedness of the whole Government in combating DF, the Government is preparing the "Preparedness and Response Plan for Dengue Fever" to set out the

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[2] By way of example, a public health exercise code-named "Exercise Coral" was conducted to test the Government's preparedness for the possible community outbreak of DF in March 2014. In May 2017, a public health exercise code-named "Exercise Moonstone" was conducted to assess the interoperability of government departments and agencies in response to the detection of a source of ZVI.

preparedness and response plan of the Government when DF may have significant public health impact to Hong Kong.

18. In line with the prevailing emergency response system in Hong Kong and practices adopted in previous government plans for other communicable diseases, both Preparedness and Response Plans adopt a three-tier response level system and include the following key features –

(i) three-tier response level system with each level representing a graded risk of the disease affecting Hong Kong and its health impact on the community;

(ii) key factors to be considered in the risk assessment;

(iii) activation and standing down mechanism;

(iv) public health actions to be taken at each response level; and

(v) key bureaux and departments to be involved.

Measures Taken by the Food and Environmental Hygiene Department

19. The Government has strengthened inter-departmental co-ordination to synergise the pest control efforts of various bureaux and departments. The Anti-mosquito Steering Committee was re-organised and upgraded as the Pest Control Steering Committee in July 2018. FEHD maintains close liaison with other government departments and provides them with technical assistance, including professional training, in implementation of effective pest control measures in premises under their purview.

20. Since 2003, FEHD has put in place a dengue vector surveillance programme for monitoring the distribution of *Aedes albopictus* at selected areas. To enhance such surveillance, FEHD increased the number of surveyed areas from 52 to 57 in July 2018, and the survey frequency increased from one week per month to two weeks per month. To keep the public abreast of the latest situation of mosquito infestation in a timely manner, starting from September 2018, apart from announcing the Area Ovitrap Index and Monthly Ovitrap Index, FEHD also releases two additional phased Ovitrap Indices.

21. It is FEHD's established practice to notify relevant government departments of the above indices so as to promptly carry out targeted mosquito prevention and control work. In addition, inspection, mosquito preventive and control actions and publicity work are stepped up during the inter-departmental anti-mosquito campaign and FEHD's Thematic Mosquito Prevention and Control Special Operations conducted every year. Priority is accorded to areas close to residential premises, schools, construction sites, hospitals and port areas. Multiple promotional channels are used to solicit community support.

CONCLUSION

22. Preventing mosquito proliferation and adopting measures to protect members of the public from mosquito bites are the most important measures in the prevention of mosquito-borne diseases in Hong Kong. In view of the risks of mosquito-borne diseases in Hong Kong, CHP and FEHD will continue its concerted efforts to combat mosquito-borne diseases with other government bureaux/departments, relevant stakeholders and the community.

23. Members are invited to note the content of this paper.

Food and Health Bureau
Department of Health
Food and Environmental Hygiene Department
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Annex

Latest Situation of Dengue Fever and Zika Virus Infection

(1) Dengue Fever

Dengue fever ("DF") is a mosquito-borne disease caused by the dengue virus. The symptoms of first infection of DF are usually mild but subsequent infections with dengue virus of a different serotype are more likely to result in severe dengue. Severe dengue is a life-threatening complication of DF characterised by high fever, haemorrhagic phenomena, low numbers of platelets and sometimes circulatory failure. In severe cases, it may progress to shock and death. There is no specific treatment for DF and the mainstay of management is supportive care and symptomatic relief.

2. DF is mainly transmitted to humans through the bites of infected female *Aedes* mosquitoes. Patients with DF are infective to mosquitoes during the febrile period. When a patient suffering from DF is bitten by a vector mosquito, the mosquito becomes infected and may spread the disease by biting other people. DF can spread rapidly in densely populated areas that are infested with the vectors *A. aegypti* or *A. albopictus*. In Hong Kong, the principal vector *A. aegypti* is not found but *A. albopictus*, which can also spread the disease, is commonly found. Transmission through blood transfusion has also been reported.

<u>Global Situation</u>

3. DF is found in regions with tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas. The global incidence of DF has grown dramatically in recent decades. According to the World Health Organization ("WHO"), up to 50-100 million DF infections are now estimated to occur annually in over 100 endemic countries and areas in Africa, the Americas, the Eastern Mediterranean, South-East Asia and the Western Pacific. The America, South-East Asia and Western Pacific regions are the most seriously affected areas. About half of the world's population is now at risk

of DF. Severe dengue is a leading cause of serious illness and death among children in some Asian and Latin American countries.

Local Situation

4. DF has become a notifiable disease under the Prevention and Control of Disease Ordinance (Cap. 599) since 18 March 1994. In the past decade (2009-2018), the CHP recorded a total of 927 DF cases and the annual number of cases ranged between 30 and 163. Locally-acquired cases had been recorded in 2010 (four cases), 2014 (three cases), 2015 (three cases), 2016 (four cases), 2017 (one case) and 2018 (29 cases). In 2018, 163 cases have been confirmed with 134 and 29 being imported and locally-acquired cases respectively. Please refer to Appendix for details. Among the 134 imported cases, the common countries and areas for acquisition of the infection included Thailand (36 cases), Mainland China (29 cases) and the Philippines (23 cases).

5. An unprecedented local DF outbreak affecting a total of 29 cases occurred in August 2018. The symptom onset dates of the 29 patients ranged from 31 July to 28 August 2018. Epidemiological investigations revealed that they were linked to two separate clusters, one in Lion Rock Park/Wong Tai Sin (19 cases) and the other in Cheung Chau (ten cases). The genetic sequencing results were compatible with the epidemiological findings. All patients had recovered and there was no severe case. No locally-acquired case has been recorded after 4 September 2018. The local DF outbreak was considered to have ended on 10 October 2018 as there had been no new locally-acquired case for six weeks counting from the day of isolation of the last case.

(2) Zika Virus Infection

6. Zika virus infection ("ZVI") is a mosquito-borne disease caused by the Zika virus. ZVI is mainly transmitted to humans through the bites of infected female *Aedes* mosquitoes. Transmission by sexual contact has also been confirmed and transmission through blood transfusion and perinatal transmission are possible. Most ZVI is asymptomatic. Patients who develop symptoms commonly present with skin rash, fever, conjunctivitis, muscle or joint pain and general malaise. Symptoms are usually mild and last for a few days.

7. WHO has concluded that ZVI during pregnancy is a cause of microcephaly and other congenital abnormalities in the developing foetus and newborn. Zika virus is also a trigger of Guillain-Barré syndrome ("GBS"), neuropathy and myelitis. There is no specific treatment for ZVI and the mainstay of management is symptomatic relief.

Global Situation

8. Zika virus was first identified in Uganda in 1947 in monkeys and was later identified in humans in Uganda and the United Republic of Tanzania in the 1950s. Since the 1960s, sporadic cases of human infections have occurred in Africa and Asia and outbreaks have been reported from countries and areas in the Pacific. In March 2015, Brazil reported a large ZVI outbreak which was later found to be associated with GBS and microcephaly in July and October 2015, respectively. Outbreaks and evidence of transmission soon appeared throughout the Americas, Africa and other regions of the world. According to WHO, as of July 2018, a total of 86 countries and areas have reported evidence of mosquito-borne ZVI.

9. A total of five meetings of the Emergency Committee under the International Health Regulations (2005) regarding microcephaly, other neurological disorders and Zika virus were convened by WHO. In the first meeting in February 2016, WHO declared that ZVI and its associated congenital and other neurological disorders constituted a Public Health Emergency of International Concern ("PHEIC"). In the fifth meeting in November 2016, WHO declared the end of the PHEIC but pointed out that Zika virus and its associated consequences remained a significant enduring public health challenge requiring intense action.

Local Situation

10. In Hong Kong, ZVI has become a notifiable disease under the Prevention and Control of Disease Ordinance (Cap. 599) since 5 February 2016. Since 2016, CHP has recorded a total of three imported ZVI cases (two cases in 2016 and one in 2017) who had acquired the infection from affected areas. No locally-acquired case has been recorded.

11. Due to the large volume of international travel, there is always risk of importation of ZVI cases into Hong Kong. As asymptomatic infection is common and the vector *A. albopictus* is present locally, there is a risk of secondary spread of imported infection from silent imported cases in Hong Kong.

Appendix

Number of Dengue Fever Cases in Hong Kong from 2009 to 2018