立法會
Legislative Council

LC Paper No. CB(2)207/18-19(04)

Ref: CB2/PL/FE

Panel on Food Safety and Environmental Hygiene

Background brief prepared by the Legislative Council Secretariat for the meeting on 13 November 2018

Mosquito and rodent control

Purpose

This paper provides background information on the Administration's work in respect of mosquito and rodent control, and summarizes major concerns of members of the Panel on Food Safety and Environmental Hygiene ("the Panel") on the subject.

Background

Anti-mosquito work

2. According to the Administration, apart from causing nuisance to human beings, some species of mosquitoes may pose threat to public health as vectors of diseases, such as dengue fever ("DF"), Zika virus infection and Japanese encephalitis ("JE"). The Food and Environmental Hygiene Department ("FEHD") organizes anti-mosquito campaigns annually on a territory-wide basis to heighten public awareness of the potential risk of mosquito-borne diseases, encourage community participation and promote concerted efforts among relevant government departments in anti-mosquito work.

3. An Anti-Mosquito Steering Committee ("AMSC") has been set up since 2002 to set strategies and directions for territory-wide anti-mosquito efforts. AMSC is chaired by the Permanent Secretary for Food and Health (Food) and comprises members from 12 policy bureaux and departments. FEHD has been maintaining close liaison with other government departments and has provided them with technical assistance in implementing effective anti-mosquito measures in their respective premises.

4. FEHD also implements a dengue vector surveillance programme for monitoring the distribution of *Aedes albopictus* at selected areas and for evaluating the effectiveness of mosquito prevention and control work carried out by various parties. A total of 52 surveillance areas and all major port areas in the community are covered under the dengue vector surveillance programme. Three different indices, namely Area Ovitrap Index ("AOI"), Monthly Ovitrap Index ("MOI") and Port Monthly Ovitrap Index ("PMOI"), are recorded in the surveyed areas. AOI indicates the extensiveness of the distribution of *Aedine* mosquitoes in particular surveyed area, while MOI and PMOI reflect the overall extensiveness of mosquito breeding in the 52 surveillance areas and port areas respectively. The surveillance data thus collected provide an informed basis for timely adjustment to mosquito control strategies and measures.

5. Apart from announcing all the indices each month on FEHD's website and through press releases to give the public a monthly overview of the infestation level of mosquitoes, the rapid alert system targeting the management offices of residential premises, social welfare facilities, schools, construction sites and utilities companies has been enhanced to cover each of the 52 surveillance areas to ensure that anti-mosquito measures are taken promptly when AOI of a particular area reaches the alert level of 20%. Whenever AOI reaches 20%, subscribers to the system whose premises are situated within the surveillance area concerned will be individually notified by the relevant bureaux/departments upon the publication of AOI. Subscribers will be invited to post up specially designed notices in the common parts of their premises, alerting occupants and management staff of the need to take mosquito preventive and control actions promptly.

Rodent prevention and control

6. Since 2000, FEHD has been making use of the rodent infestation rate ("RIR")[1] and the trend movement of RIR to gauge the general situation of rodent infestation in individual districts and as the basis for devising anti-rodent measures and assessing the overall efficacy of FEHD's rodent prevention and disinfestation work. RIR of a district is calculated with reference to the ratio of baits bitten in that district.

7. According to the Administration, FEHD has been adopting a comprehensive approach in its rodent prevention and control work. Targeting districts with relatively high RIRs, FEHD will take a variety of measures

---

1 $$\text{Rodent infestation rate} = \frac{\text{Number of baits bitten by rodents}}{\text{Total number of baits collected from the selected areas}} \times 100\%$$

including poisoning and trapping of rodents and destroying rat holes in related rear lanes, strengthening street cleansing, encouraging active participation of the public in anti-rodent work, and stepping up publicity and education programmes in rodent prevention and control. FEHD has also been taking the lead in organizing territory-wide inter-departmental anti-rodent campaigns on an annual basis to raise public awareness about the importance of rodent prevention and control. When planning the campaigns, FEHD makes appropriate adjustments to its strategies and action plans in light of the actual state of rodent infestation across the territory and in different districts, as well as the effectiveness of previous anti-rodent campaigns.

Members' concerns

8. The subject of mosquito and rodent control has always been high on the agenda of the Panel. Major views and concerns expressed by members at previous Panel meetings are summarized below.

Mosquito surveillance and control

9. Enquiries were raised about the criteria for selecting locations for setting up ovitraps in the surveyed areas and how data were collected from all 52 surveillance areas for compiling AOIs and MOIs under the dengue vector surveillance programme. To enhance monitoring of situation of mosquito breeding, members considered that the Administration should set up more ovitraps in the surveillance areas, especially in places with higher human concentration, such as schools, parks and elderly homes.

10. According to the Administration, FEHD followed the relevant advice of the World Health Organization ("WHO") in setting up ovitraps. FEHD's pest control staff would identify places with higher human concentration and potential for becoming a mosquito breeding ground for the purpose of placing ovitraps. While the existing surveillance areas covered housing estates, schools, hospitals and leisure venues, FEHD would review the locations for placing ovitraps from time to time and continue to keep in view the latest developments, such as the establishment of new housing estates, in deciding the locations for placing ovitraps in the surveillance areas.

11. Some members expressed concern that ovitraps placed at selected locations could only detect the larval breeding rate of *Aedine* mosquitoes but no other mosquito species such as *Culex tritaeniorhynchus* and *Anopheles* mosquitoes which could respectively transmit JE and malaria. In members' view, the Administration should introduce different indices having regard to the behaviour of various mosquito species, so as to reflect more comprehensively the mosquito problem in the territory. The Administration advised that other

than placing ovitraps at selected locations to monitor the distribution of *Aedes albopictus* to guard against DF, FEHD also took preventive and control measures to minimize the risks of other mosquito-borne diseases, including JE and malaria. Since 2015, FEHD had scheduled monthly JE vector surveillance exercises covering seven districts with relatively higher risk of JE transmission. Trapping of adult mosquitoes, including *Culex tritaeniorhynchus*, was conducted in all the selected locations monthly throughout the years for test on JE virus. Besides, some 600 streams in the territory were covered under the malaria vector prevention programme for the prevention of *Anopheles* mosquitoes which could transmit malaria.

12. An enquiry was raised as to whether FEHD would take any targeted measures to tackle the mosquito problem in areas where a high AOI was recorded. The Administration advised that when AOI of a particular area reached the alert level of 20%, FEHD would convene district task force meetings with a view to stepping up the coordination of government efforts in mosquito control. FEHD would also conduct inspections and if necessary, increase the frequency of inspection to eliminate potential mosquito breeding sites within a radius of 100 metres around ovitraps with positive finding.

13. In response to members' question on whether new measures/methods had been/would be introduced to control infestation of mosquitoes, the Administration advised that the dengue vector surveillance programme would be extended in mid-2018 to cover five additional surveillance areas, making up a total of 57 surveillance areas. To lower the risks of *Aedes aegypti* entering Hong Kong via air traffic, the Port Health Office under the Centre for Health Protection ("CHP") of the Department of Health implemented new requirements in April 2017, requiring all inbound aircraft from affected areas of Zika virus infection to provide the Port Health Office with information indicating that disinsection had been conducted prior to arrival. As for aircraft without proof of disinsection, the Port Health Office would require them to carry out on-arrival disinsection. FEHD had also set up four Pest Control Inspection Teams to enhance inspection of construction sites and enforcement against mosquito breeding. FEHD would continue to keep in view the latest development in mosquito prevention and control technologies and take into account recommendations from WHO, experiences from other countries/areas and results of scientific studies when considering the feasibility of introducing such methods into Hong Kong.

<u>Monitoring the infestation of biting midges</u>

14. When following up with the Administration on mosquito control work, members also expressed concern about the infestation of biting midges in Hong Kong. The Administration was called on to formulate relevant indicators for

assessing the infestation/activity of biting midges and alerting relevant departments to take preventive measures in response to index changes.

15. The Administration advised that WHO had not published guidelines for systematic surveillance of biting midges. According to the Administration's understanding, the Mainland, Taiwan, Singapore, Malaysia as well as some countries in America and Europe had not formulated any index for the surveillance of biting midges. To enhance control of biting midges, starting from mid-July 2017, FEHD had commenced a one-year territory-wide survey to investigate the distribution and species diversity of the blood sucking midges, with a view to confirming the presence of any disease-carrying biting midges and collecting reference information for devising more effective measures to control biting midges.

Rodent prevention and control

16. Members were deeply concerned about the worsening rodent infestation problem in various districts, especially in places bustling with human activities such as public markets, public rental housing estates close to construction sites and piers. Members strongly requested the Administration to step up anti-rodent operations across the territory so as to prevent outbreak of diseases transmitted by rodents (e.g. plague or hantavirus infection). There was a view that FEHD should review the effectiveness of its rodent control measures and adopt new measures and techniques by making reference to the experience of the Mainland and other countries.

17. According to the Administration, FEHD had all along adopted multi-pronged strategies to combat the rodent problem, including elimination of food sources and hiding places of rodents as well as blocking their passages, so as to work for a clean and hygienic community. To sustain the effectiveness of rodent prevention and control work at the district level, FEHD had launched two 2-month anti-rodent operations in designated target areas (e.g. rear lanes, refuse collection points and peripheral areas of construction sites) in all districts in May and September 2017.

18. The Administration also advised that the rodenticides and rodent disinfestation methodologies/techniques currently adopted by FEHD were in line with those promoted in the international arena. The rodenticides used by FEHD were regularly tested to ensure their effectiveness. When the current rodenticides were no longer effective, FEHD would consider using other rodenticides as replacement. FEHD would keep in view the latest advances in rodent control methodologies and techniques and would carry out tests to assess the suitability of such methodologies/techniques for local use.

19. Some members enquired about the reasons for the high variation of RIRs in different districts which, in these members' view, were not so dissimilar in terms of human activities and characteristics. The Administration explained that given the high adaptability and reproductive rate of rodents, the state of rodent infestation in individual districts, as reflected in RIRs, often varied with changes in environmental hygiene conditions. When carrying out regular anti-rodent work, apart from making reference to RIRs, individual District Environmental Hygiene Offices of FEHD would also take into account the traits left by rodents, complaint figures and views of the public. Where necessary, appropriate adjustments would be made to the rodent prevention and control strategy.

20. In response to members' query about the reliability of RIRs, the Administration advised that when devising RIR, FEHD had made reference to overseas practices and tried out different methods having regard to a number of factors including Hong Kong's climate and environmental conditions as well as the habits of rodents. FEHD considered that adopting the ratio of baits gnawed by rodents as the infestation rate was the most suitable method for Hong Kong. Since rodents had the habit of biting hard objects (e.g. baits set up by pest control staff), the rates of bait consumption could reflect the effectiveness of FEHD's rodent control work.

21. There was a suggestion that the Administration should consider keeping and nurturing cats to assist in eliminating rodents. Members called on the Administration to conduct studies on the effectiveness of keeping cats to control rodent infestation by making reference to overseas experience. The Administration explained that although cats had the ability to prey on rodents, their predation targets were not limited to rodents. Besides, the keeping of cats in public markets might cause environmental hygiene problem.

Recent developments

22. Since 14 August 2018, CHP has confirmed 29 local DF cases. Following CHP's identification of the source of infection and the mode of transmission, FEHD have taken targeted actions in collaboration with various policy bureaux and government departments to prevent the spread of the disease, including closing the Lion Rock Park in mid-August 2018 to carry out anti-mosquito operations, launching two joint operations in Cheung Chau to disseminate information to the residents on mosquito control and anti-mosquito measures for households as well as organizing health talks on DF.

23. On 28 September 2018, The University of Hong Kong issued a press release (see **Appendix I**), announcing that the Department of Microbiology of Li Ka Shing Faculty of Medicine has identified the first known case of human infection by rat hepatitis E virus. Evidence of rodent infestation was noted in the patient's housing estate, and screening of archived rodent samples from the patient's residential district showed that rat hepatitis E virus circulated in Hong Kong. According to a press release issued by FEHD on 5 October 2018 (see **Appendix II**), in addition to conducting another round of territory-wide anti-rodent operations in designated target areas starting from 8 October 2018, FEHD would strengthen liaison with the Housing Department, the Home Affairs Department and relevant government departments/organizations to organize joint cleaning operations in various districts.

24. The Administration will brief members on its efforts in mosquito and rodent control at the Panel meeting on 13 November 2018.

Relevant papers

25. A list of relevant papers on the Legislative Council website is in **Appendix III**.

Council Business Division 2
Legislative Council Secretariat
7 November 2018

Appendix I

HKU discovers that rat hepatitis E virus can cause hepatitis in humans

28 Sep 2018

A study led by Professor Yuen Kwok-Yung, Chair Professor of Infectious Diseases, and Dr Siddharth Sridhar, Clinical Assistant Professor at the Department of Microbiology of Li Ka Shing Faculty of Medicine, The University of Hong Kong has discovered for the first time that rat HEV can infect humans.

Rat hepatitis E virus (rat HEV) was first discovered in 2010 and circulates in house rats (*Rattusrattus*) and sewer rats (*Rattusnorvegicus*). It is very distantly related to human hepatitis E virus variants. Human infection by rat HEV has never been documented previously. A study led by Professor Yuen Kwok-Yung, Henry Fok Professor in Infectious Diseases, Chair Professor of Infectious Diseases, and Dr Siddharth Sridhar, Clinical Assistant Professor at the Department of Microbiology of Li Ka Shing Faculty of Medicine, The University of Hong Kong (HKU) has discovered for the first time that rat HEV can infect humans.

Findings of the study

While investigating the impact of hepatitis E infection among immunocompromised transplant recipients in Hong Kong, the researchers identified a 56-year-old man who was taking immunosuppressive drugs after deceased-donor liver transplantation. He presented with persistently abnormal liver function tests indicating dysfunction of the liver graft. Rat HEV was identified in several of his clinical samples including stool, blood, and liver tissue. Complete genome sequencing of the virus isolate showed that it was closely related to a rat HEV strain previously identified in Vietnam. Epidemiological investigation could not find any evidence of rat HEV infection in the organ donor or blood product donors excluding these individuals as sources of infection. However, evidence of rodent infestation was noted in the patient's housing estate. Rat HEV could not be detected in rodent fecal samples collected from the

housing estate, but screening of archived rodent samples from the patient's residential district shows that rat HEV circulates in rats in Hong Kong. The patient was given oral ribavirin, an effective antiviral for chronic hepatitis E infections, and the infection has been cured. His liver function has returned to normal.

Significance of the study

This study conclusively proves for the first time in the world that rat HEV can infect humans to cause clinical infection. This discovery has major public health significance and highlights the importance of novel zoonotic infections in immunocompromised patients. As conventional hepatitis E diagnostic tests may completely miss the infection, new diagnostic tests have been developed by researchers so as to diagnose rat HEV infection in subsequent cases. This study highlights the importance for rodent control measures and research on rodent viruses to prevent rat HEV infection and other rodent-transmitted infections in Hong Kong.

This study was accepted for publication by *Emerging Infectious Diseases*, a leading open-access infectious disease journal.

Media enquiries

Please contact Li Ka Shing Faculty of Medicine of The University of Hong Kong by email (medkefa@hku.hk).

Appendix II

Press Releases

Government to step up territory-wide anti-rodent operations
****

As rodents are vectors of a number of diseases, the Government spares no effort to step up rodent prevention and control operations in the territory and will further strengthen inter-departmental co-operation so as to sustain the effectiveness of rodent prevention and control work at the district level and raise public awareness of rodent prevention and control.

Apart from taking the Rodent Infestation Rate as a reference, the Government will continue to take into account signs of rodent infestation, complaint figures and the views of the local community, and will conduct targeted anti-rodent operations at problematic locations in collaboration with relevant departments and organisations. The Food and Environmental Hygiene Department (FEHD) will strengthen liaison with the Housing Department (HD) and relevant organisations to organise joint cleaning operations in various districts. The Home Affairs Department and relevant departments will also provide necessary assistance.

The Secretary for Food and Health, Professor Sophia Chan, said, "The Government has always been concerned about rodent prevention and control. I visited Choi Wan Estate in Wong Tai Sin as well as Tsuen Wan and Kwun Tong districts last Saturday (September 29) and was briefed by FEHD and HD colleagues on rodent infestation in those areas. I have proposed that the rodent prevention and control work should be enhanced throughout the territory, and co-ordination and co-operation among different departments and organisations should be strengthened.

"To prevent rodent infestation effectively, we should eliminate the three survival conditions of rodents, namely food, harbourage and passages, meaning the elimination of food sources and hiding places of rodents, as well as blockage of their dispersal routes. In addition, the FEHD will enhance publicity and education and step up enforcement actions against illegal acts."

She added, "I hope that continued anti-rodent operations will raise public awareness of rodent prevention and control, which will enhance the overall effectiveness of anti-rodent work. I also call on the community to actively support and participate in the anti-rodent operations and work together for a clean and hygienic community."

In view of the fruitful results of the first round of the anti-rodent operations in designated target areas held in April 2018, the FEHD will conduct another round of two-month anti-rodent operations in designated target areas starting from October 8 to continue to intensify the district rodent prevention and control work.

Each District Environmental Hygiene Office of the FEHD, taking into account factors including rodent infestation rates, the number of rodent complaints received, views of the local community and the number of food premises and "three-nil" buildings, will identify target areas in each district and continue to adopt multi-pronged strategies, including improving environmental hygiene and stepping up rodent disinfestation and enforcement actions for carrying out targeted anti-rodent operations.

FEHD staff will enhance street cleaning services and cleaning of public markets and hawker bazaars in the target areas, including sweeping and cleaning of streets and rear lanes, clearing refuse and waste, emptying and cleaning of litter containers, and

clearance of miscellaneous articles and waste in public markets and hawker bazaars, so as to keep the environment clean.

The FEHD will also strengthen rodent disinfestation work at problematic spots such as rear lanes, refuse collection points, markets, hawker bazaars, cooked food markets and peripheral areas of construction sites by placing poisonous baits and traps, destroying rat holes and implementing rodent-proofing measures.

In addition, inspections of food premises will be stepped up. Enforcement actions against food premises causing poor environmental hygiene conditions, scullery and food preparation at rear lanes, and improper handling and disposal of rubbish will be strengthened. The FEHD will also adopt a zero-tolerance approach against common public cleanliness offences and take stringent enforcement actions against illegal disposal of refuse and waste.

As regards enhancing public education and publicity, apart from the broadcast of TV and radio Announcements in the Public Interest and display of posters on public transport, the FEHD will collaborate with District Councils and District Offices of the Home Affairs Department to organise anti-rodent promotional activities. The department will also arrange health talks for building management offices of private buildings, persons-in-charge of food premises, and market and hawker stall operators to provide information and technical advice on rodent prevention and control.

Ends/Friday, October 5, 2018
Issued at HKT 15:25

NNNN

Appendix III

Relevant papers on mosquito and rodent control

Committee	Date of meeting	Paper
Panel on Food Safety and Environmental Hygiene	10.1.2017 (Item IV)	Agenda Minutes
	14.3.2017 (Item V)	Agenda Minutes
Legislative Council	7.6.2017	Official Record of Proceedings Pages 9099 to 9108 (Oral question raised by Dr Hon CHIANG Lai-wan on "Rodent prevention and control")
Panel on Food Safety and Environmental Hygiene	14.11.2017 (Item IV)	Agenda Minutes
	12.12.2017 (Item V)	Agenda Minutes
Legislative Council	25.4.2018	Official Record of Proceedings Pages 8804 to 8808 (Written question raised by Hon Wilson OR on "Rodent prevention and control")
	30.5.2018	Official Record of Proceedings Pages 10992 to 11002 (Oral question raised by Hon Vincent CHENG on "Prevention and control of mosquito and rodent problems")
Panel on Food Safety and Environmental Hygiene	9.10.2018*	Administration's response to the letter from Hon Wilson OR dated 21 September 2018 concerning the Administration's mosquito prevention and control work (LC Paper No. CB(2)2070/17-18(01))

* Issue date

Council Business Division 2
Legislative Council Secretariat
7 November 2018