

**For discussion on
20 January 2020**

ACFEH Paper 1/2020

**Advisory Council on Food and Environmental Hygiene
Rodent Control Work**

Purpose

This paper briefs members on rodent-borne diseases, work progress of the Government's anti-rodent work and application of technologies in enhancing rodent surveillance.

Rodent-borne diseases

Rat Hepatitis E Virus (HEV)

2. A total of nine cases of human infection of rat HEV have been recorded by the Department of Health (DH) since 2018. The cases involved six males and two females, aged between 17 and 82. All the eight patients had underlying illnesses. Among them, a 74-year-old patient and 17-year-old patient passed away due to unrelated causes. The remaining seven cases were in stable condition. Investigations by DH revealed that they were all sporadic cases with no epidemiological linkage, and the patients' home contacts have remained asymptomatic.

3. Currently there is no scientific information to determine the exact mode of transmission to human at the moment. Possible routes of transmission include ingestion of food or water contaminated by rodents or their excreta, exposure to environments or objects contaminated by rodents or their excreta and direct contact with rodents or their excreta.

Plague

4. Plague is a communicable disease that affects rodents (including rats), some animals and humans. It is caused by the bacteria *Yersinia pestis*, which is transmitted from an infected animal (mainly rodent) to humans through the bite of infected animal's fleas. Besides, people can also contract plague when cuts or other breaks in their skin come into contact with the body fluid or tissue of infected animals, or through inhalation of respiratory droplets from infected patients. There are three main forms of plague infection: bubonic, pneumonic and septicaemic. Plague patients should be isolated and treated with appropriate antibiotics. According to information of DH, no plague cases were recorded in Hong Kong after 1929.

5. Regarding the recent plague cases that occurred in the Mainland, the Centre for Health Protection (CHP) of DH has closely communicated with the National Health Commission (NHC) to obtain information on the latest situation for risk assessment. Since November 2019, four cases of plague infected in Inner Mongolia have been confirmed in the Mainland. These include two cases of pneumonic plague confirmed in Beijing, involving a couple from Inner Mongolia; and two cases of bubonic plague confirmed in Inner Mongolia. CHP issued three press releases on these cases in November 2019 to urge the community to heighten their vigilance against plague. According to the latest information from NHC and the Health Commission of the Inner Mongolia Autonomous Region, all close contacts of the four patients remained asymptomatic and were released from medical surveillance. CHP will maintain close liaison with NHC to monitor the latest situation of plague in the Mainland.

6. The Port Health Division of CHP carries out regular inspections at boundary control points (BCPs) to ensure that good environmental hygiene is maintained and proper rodent control measures are in place. Temperature checks by thermal imaging systems are conducted on an ongoing basis for inbound travellers at all BCPs and suspected plague cases will be referred to public hospitals for isolation, management and follow-up.

7. The Food and Environmental Hygiene Department (FEHD) has been conducting the Rat-flea Survey every year at selected biotopes to assess the risk of plague transmission. A Rat-flea Index¹ would be enumerated and follow up actions against fleas and rodents would also be conducted. The survey was also routinely conducted in the Airport and all sea and land ports in Hong Kong to prevent introduction of plague.

Work Progress of Anti-rodent Work

8. The territory-wide cleansing campaign has been launched between May 2019 and November 2019. During the campaign, the number of enforcement actions taken against rodent infestation and the number of rodents caught have increased, whereas the number of rodent-related complaints has decreased.

Enhanced Rodent Prevention - Rodent Proofing Design

9. With the support of the Pest Control Steering Committee (PCSC), the Buildings Department (BD) promulgated a guideline to the building professionals and registered contractors on incorporating rodent proofing design in new private buildings (such as the distance between pipes and the position of flower beds) in May 2019, and carrying out rodent control work in construction and demolition sites. In June 2019, the Architectural Services Department (ArchSD) promulgated a similar design guide on government works and buildings. FEHD, in conjunction with BD, ArchSD and the Housing Department (HD), organised a talk in November 2019 to brief the trade on the relevant guidelines. The attendees included building professionals from private sectors. The rodent proofing design introduced in these guidelines, which aims at long-term rodent prevention and control, is applicable to construction of new buildings and renovation of existing buildings.

¹ Rat-flea Index is calculated by dividing the total number of flea collected by the total number of rats examined. According to World Health Organization (WHO) that a Rat-flea Index of greater than 1 represents an increased potential plague risk for human.

10. Besides, over 200 talks were organised by FEHD during the territory-wide cleansing campaign to encourage active participation in anti-rodent work by various sectors of the community. The participants included departments' pest control service contractors, property management companies, owners of food premises and operators of market and hawker stalls. Representatives from the Pest Control Personnel Association of Hong Kong were invited as speakers for the talks, during which pest control experience and knowledge of the trade were shared among pest control personnel from the public and private sectors. Details are set out in **Annex 1**.

Enhanced Rodent Prevention - Eliminating Food Sources in Public Markets

11. In July 2019, a three-month intensive anti-rodent operation was put on trial in FEHD's Lai Wan Market, Ap Lei Chau Market and Kam Tin Market. Speedy refuse removal and cleaning of all passages and drains in the markets were carried out every night after the stalls were closed to eliminate rodents' food sources. Besides, rodent trapping devices were placed extensively. The department has concluded its experience and adjusted its anti-rodent operations in view of the ground situation. A new round of operation will be conducted in Lockhart Road Market, To Kwa Wan Market and Sha Tin Market in addition to the original three markets in February 2020. Details are set out in **Annex 1**.

Enhanced Inter-departmental Co-ordination - Eliminating Hiding Places of Rodents and Blocking Dispersal Routes in Back Alleys

12. In May 2019, after taking into account the community's feedback and results of the site inspection, FEHD and the Home Affairs Department (HAD) provided the Highways Department (HyD) with a list containing 99 back alleys with identified environmental hygiene problems. Repair works of different scales were then conducted by HyD. As at December 2019, HyD completed 241 improvement work items, including repairing road surfaces or damaged surface channels as well as local repaving. Details are set out in **Annex 2**.

FEHD and HyD have all along worked closely to conduct joint inspections, with a view to reviewing the situation and effectiveness of the repair works.

Enhanced Inter-departmental Co-ordination - Eliminating Food Sources through Enforcement Actions

13. Improper dumping of food remains by food premises is a common food source for rodents. FEHD has been conducting a special operation targeted at irregularities of food premises such as food preparation, scullery, improper storage of articles and illegal disposal of refuse in back alleys. Between the start of the territory-wide cleansing campaign and 22 December 2019, a total of 694 summonses, 978 Fixed Penalty Notices, 1 235 Notices to Remove Litter / Waste and to Clean Areas, 3 403 advisory letters, 2 073 verbal warnings, 13 warning letters and 5 Nuisance Notices were issued. Besides, the department issued some 6 400 summonses targeted at illegal activities of food premises between January and November 2019, more than some 5 300 summonses issued in the same period in 2018.

Enhanced Inter-departmental Co-ordination - Eliminating Food Sources and Blocking Dispersal Routes in Public Rental Housing (PRH) Estates

14. As a participant of the PCSC and to support the cleansing campaign, the Housing Authority (HA) has examined the rodent proofing structures installed in more than 180 public rental housing estates across the territory with reference to FEHD's advice and technical support. Reinforcement works were completed in end October 2019 to block the dispersal routes of rodents and prevent them from entering the residential units. For new PRH estates, HA will, with reference to BD's guideline, continue to review and enhance rodent proofing design where applicable. Details are set out in **Annex 3**.

15. Between June and October 2019, taking into account FEHD's recommendations, HA installed over 6 500 additional rodent guards on the external walls / pipes of the PRH estates where appropriate. The number of

rodent guards installed thus increased to a total of around 15 000. Besides, HA implemented additional measures in over 37 priority PRH estates to provide additional cleansing services in common areas and to strengthen the implementation of the Marking Scheme for Estate Management Enforcement. Meanwhile, more than 170 pest control talks were organised for residents, commercial tenants and management staff with the assistance of FEHD. The above measures have significantly raised the awareness of the residents and commercial tenants on pest control. Details are set out in **Annex 3**.

Application of Technologies

Enhanced Surveillance – Thermal Imaging Cameras

16. The FEHD is studying the use of thermal imaging cameras with artificial intelligence analytical function for monitoring the areas and extent of rodent activities. Initial test results have shown that the data can quantify and assess the effectiveness of anti-rodent work by directly comparing the rodent population density before and after anti-rodent operations. The technology can also be used to identify rodents' entry points, travel routes and areas they frequently visit, so that rodenticides and trapping devices can be placed in a more effective manner and more targeted rodent control measures can be implemented. The FEHD has planned to conduct field trials in Kowloon City District in early 2020 in order to update and upgrade the quantifying functions of the RIR. Furthermore, thermal imaging cameras will be tested and installed in selected districts before and after anti-rodent operations in designated target areas next year with a view to quantifying and reviewing the effectiveness of the operations.

Cooperation with Hong Kong Science and Technology Parks Corporation (HKSTPC) and Local Universities

17. Through the HKSTPC, FEHD has invited relevant companies to explore technologies that can track rodents' activities in the short and long run with a view to implementing long-term effective and comprehensive rodent

control measures for eliminating rodents' harbourage and dispersal routes. The first meeting and filed visit were conducted with relevant companies on 2 December 2019 and 12 December 2019 respectively.

Visit by British Expert

18. With assistance of the World Health Organisation, FEHD invited a British expert in rodents, a Professor in Ecology at University of Greenwich to visit Hong Kong in early November 2019 to review Hong Kong's rodent prevention and control strategies. He commented that the current procedures for monitoring and reducing rodent activities are well-established. To further improve rodent control work, for surveillance, he recommended automated camera detection system to monitor rodent activities and their movements so as to show the effectiveness of rodent control work. For anti-rodent work, he opined that although the current use of traps and rodenticides are effective, FEHD can put on trial kill traps and mixed baits trapping to evaluate whether they are more effective in controlling rodents than current methods.

19. The most effective rodent prevention and control method is to improve environmental hygiene to deplete food sources for rodent proliferation. The community should be motivated to actively participate in rodent control work together with the Government. The Government will continue to increase cooperation with District Councils and local organisations, and to follow up on the expert's advice on baits and traps.

Conclusion

20. The Government is actively carrying out anti-rodent work given the potential public health risk of rodent-borne diseases. The Government will continue step up rodent control work in order to sustain the effects achieved in the past months since May 2019. Suitable technologies will be explored by engaging companies and universities to enable more targeted rodent control work.

21. Members are invited to note the content of this paper and provide comments.

**Food and Health Bureau
Food and Environmental Hygiene Department
January 2020**

FEHD's work during the territory-wide clean-up

Talks organised for government departments and the private sector

Action items	Progress
Health talks for building management companies of private buildings, owners of food premises, and market and hawker stall operators etc.	202 talks on rodent control were held.
Pest control talks for HD and Leisure and Cultural Services Department in-house staff, property management staff and contractual staff as well as FEHD contractual staff.	6 half-day pest control talks were held between 2 July 2019 and 8 July 2019 with a total of 721 attendees.
Pest control talks for staff of property management companies.	2 half-day pest control talks were held on 30 July 2019 with a total of 235 attendees.
Health talk on rodent control by UK rodent expert Prof. Steven Belmain for FEHD's and other departments' staff.	The talk was held on 7 November 2019 with 83 attendees.
Pest control training for HD and Leisure and Cultural Services Department.	4-day pest control training were held in mid-November and mid-December 2019.

Anti-rodent work in public markets

Action items	Progress
Trials of intensive anti-rodent operation.	<p>Trials in Lei Wan Market, Ap Lei Chau Market and Kam Tin Market were conducted between 17 July 2019 and 25 October 2019.</p> <p>FEHD will carry out another round of trial in February 2020 in Lockhart Road Market, To Kwa Wan Market and Sha Tin Market in addition to the above three markets, incorporating suggestions on improved rodent trapping made by the overseas expert.</p>
Enhanced cleansing work in public markets, including daily gully emptying and thorough cleansing. Stall tenants are advised to clear unused articles to eliminate food sources and harbourage of rodents.	FEHD has already implemented the measures in all its markets and enforcement actions have been stepped up ² .

² Enforcement action is mainly against improper storage of food, littering offences and failure to maintain the stall in a clean and hygienic condition, etc.

HyD's work during the territory-wide cleansing campaign

Action items	Progress
Local repaving of back alleys.	As at December 2019, works for 62 back alleys were completed.
Repairing of cracks and crevices at back alleys and surface channels.	As at 20 August 2019, repair works in 99 back alleys suggested by FEHD and various District Offices in May 2019 were completed.
Filling of cracks and crevices in three districts with confirmed cases of infection of rat Hepatitis E virus.	Works for 80 back alleys ³ were completed in the three districts with confirmed cases of infection of rat Hepatitis E virus.

³ 17 back alleys in Kowloon City, 57 back alleys in Southern District and 6 back alleys in Tuen Mun.

Work of HA and HD for PRH estates during the territory-wide cleansing campaign

Action items	Progress
Review and improvement of rodent proofing structures of buildings.	<p>HA reviewed some 180 existing PRH estates' rodent proofing structures with reference to the checklist provided by FEHD in June 2019. The enhanced rodent proofing works in all PRH estates were completed in October 2019. Between June and October 2019, taking into account FEHD's recommendations, HA installed over 6 500 additional rodent guards on the external walls / pipes of the PRH estates where appropriate.</p> <p>For new buildings, HA will continue to review and install rodent proofing design as appropriate.</p>
Launching of the Estate Cleaning Campaign, which includes stepping up cleansing operations in PRH estates, carrying out additional cleansing work and strengthening enforcement action under the Marking Scheme.	<p>The Estate Cleaning Campaign in PRH estates has been extended to February 2020. Strengthened cleansing operations and enforcement actions under the Marking Scheme have been carried out. Meanwhile, joint inspections were conducted by HD, FEHD and local stakeholders to identify areas for improvement in rodent control, and pest control talks were held in priority estates, including</p>

Action items	Progress
	<p>the 9 estates where anti-rodent operations in designated target areas were conducted with FEHD in mid-2019. HD has reviewed the estate situations and 37 priority estates were selected for the period from December 2019 to February 2020. All PRH estates have stepped up cleansing operations to maintain environmental hygiene and prevent rodent infestation.</p>
<p>Improvement of rodent proofing structures in buildings managed by LINK.</p>	<p>Letters containing a checklist of rodent proofing structures provided by FEHD were issued to LINK by HA in June 2019 to request their parallel actions to improve rodent proofing design in buildings under its purview and maintain environmental hygiene therein. Liaison meeting between HA and LINK was also held.</p>