

Ad Hoc Clinical Infection and Public Health Forum:  
Plague Outbreak in Madagascar

28 November 2017

# Rodent Situation and Control Strategy in Hong Kong

Pest Control Advisory Section  
Food and Environmental Hygiene Department

# Commensal Rodents in Hong Kong

- ▶ *Rattus norvegicus*  
(Sewer rat)



- ▶ *Rattus rattus*  
(Roof rat)



- ▶ *Mus musculus*  
(House mouse)



# Public Health Importance

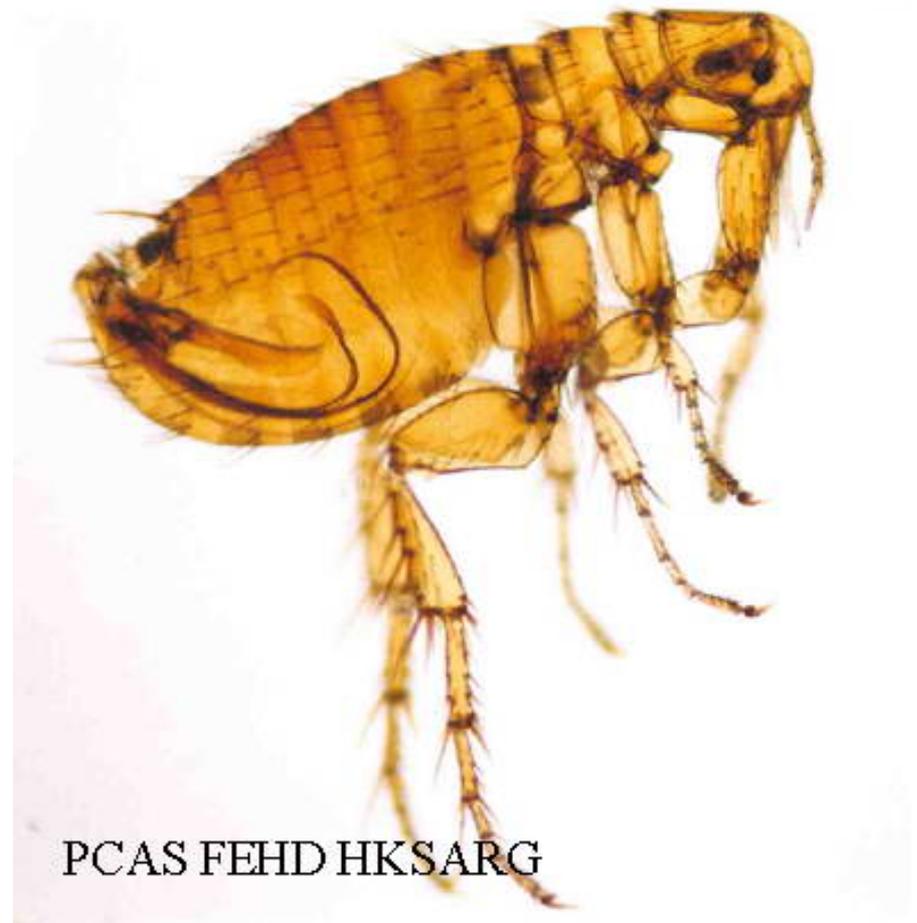
- ▶ Rodents are carriers of viral, rickettsial and bacterial diseases. The causative agents enter our body:
  - through the ectoparasites of rodent (e.g. fleas, ticks and mites)
  - by food or water contaminated by rodent excreta
  - through direct contact with rodent excreta
  - by rat bite

# Rodent-borne Diseases

- ▶ **Plague (鼠疫)**
- ▶ Hantaviral infection (漢坦病毒感染)
- ▶ Leptospirosis (鈎端螺旋體病)
- ▶ Rickettsial Diseases (立克次體病)
  - Urban typhus (城市斑疹傷寒)
  - Scrub typhus (叢林斑疹傷寒)
  - Spotted fever (斑疹熱)

# Vector of Plague

- ▶ *Xenopsylla cheopis* (oriental rat flea)
  - Worldwide distribution



# Vector Survey by FEHD

- ▶ Rat-flea Survey (鼠蚤調查)
- ▶ Rodent Infestation Survey (鼠患調查)

# Rat-flea Survey

- ▶ Biotope-based survey
- ▶ Rat-flea Index (RFI) (鼠蚤指數) =

$$\frac{\text{No. of flea collected from examined rodent}}{\text{No. of rodent examined}}$$

# Rat–flea Survey

- ▶ A RFI greater than **1** implies the area under survey is susceptible to plague transmission once the plague antigen is introduced into the rodent population.
- ▶ Immediate flea control should be done in the entire biotope.

# Rat-flea Survey

## ▶ Scope

- All Port Areas: Airport & other ports
- Strategic Biotopes: on yearly basis
  - 2016 & 2017 – Industrial Area

## ▶ Capture rodents by rat cages set in selected locations

## ▶ Rodents collected

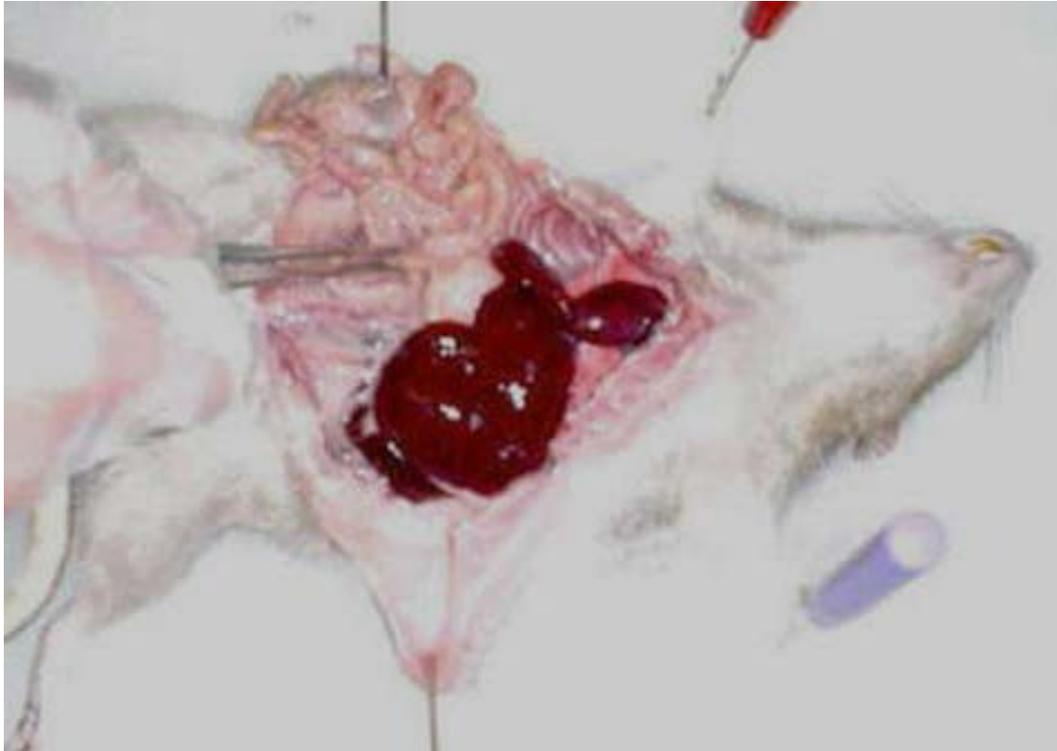
- fleas on body?
- plague-infected symptoms?



# Rat-flea Survey



# Rat-flea Survey



- Inoculation site
- Bubo
- Capillary infusion
- Partially collapsed lung with nodules
- Few small sites of necrosis on liver
- “Salt and Pepper” spleen

# RFI – Port Areas

- ▶ 31 Ports in 6 Groups
  - Hong Kong International Airport
  - Cross Boundary Check Points on Land (7)
  - Private Cargo Working Areas (4)
  - Cross Boundary Ferry Terminals (4)
  - Container Terminals (9)
  - Public Cargo Working Areas (6)

# RFI – Strategic Biotopes

Year	Biotope (生活小區)	Rat–flea Index
2016	Industrial Areas	0.79
2015	Cooked Food Hawker Bazaars/Markets/Centres	0.18
2014	Rural/Semi–rural Villages	0.02
2013	Rear Lanes	0.09
2012	Markets	0.19
	Wholesale Food Markets	0.60
2011	Squatter Areas	0.17
	Fixed Pitch Hawker Stalls	0.64
2010	Typhoon Shelters	0.26
2009	Typhoon Shelters	0.60
2008	Country Parks	0.00
	Reservoirs	0.00
2007	Rural Villages	0.05
	Typhoon Shelters	1.17
2006	Factory Buildings	0.45
	Multi–purpose Buildings	0.00
2005	Rural/Semi–rural Villages	0.05
2004	Fixed Pitch Hawker Stalls	0.09
2003	Shopping Centres	0.27
2002	Rear Lanes	0.57
2001	Wholesale Markets	0.31
2000	Market Buildings	0.89

# Rodent Infestation Survey

- ▶ To assess and monitor the rodent situations in 19 districts
- ▶ 41 target areas covering 3 main biotopes
  - Industrial areas
  - Residential areas
  - Rear lanes
- ▶ Hanging baits (non-poisonous food materials) at selected locations



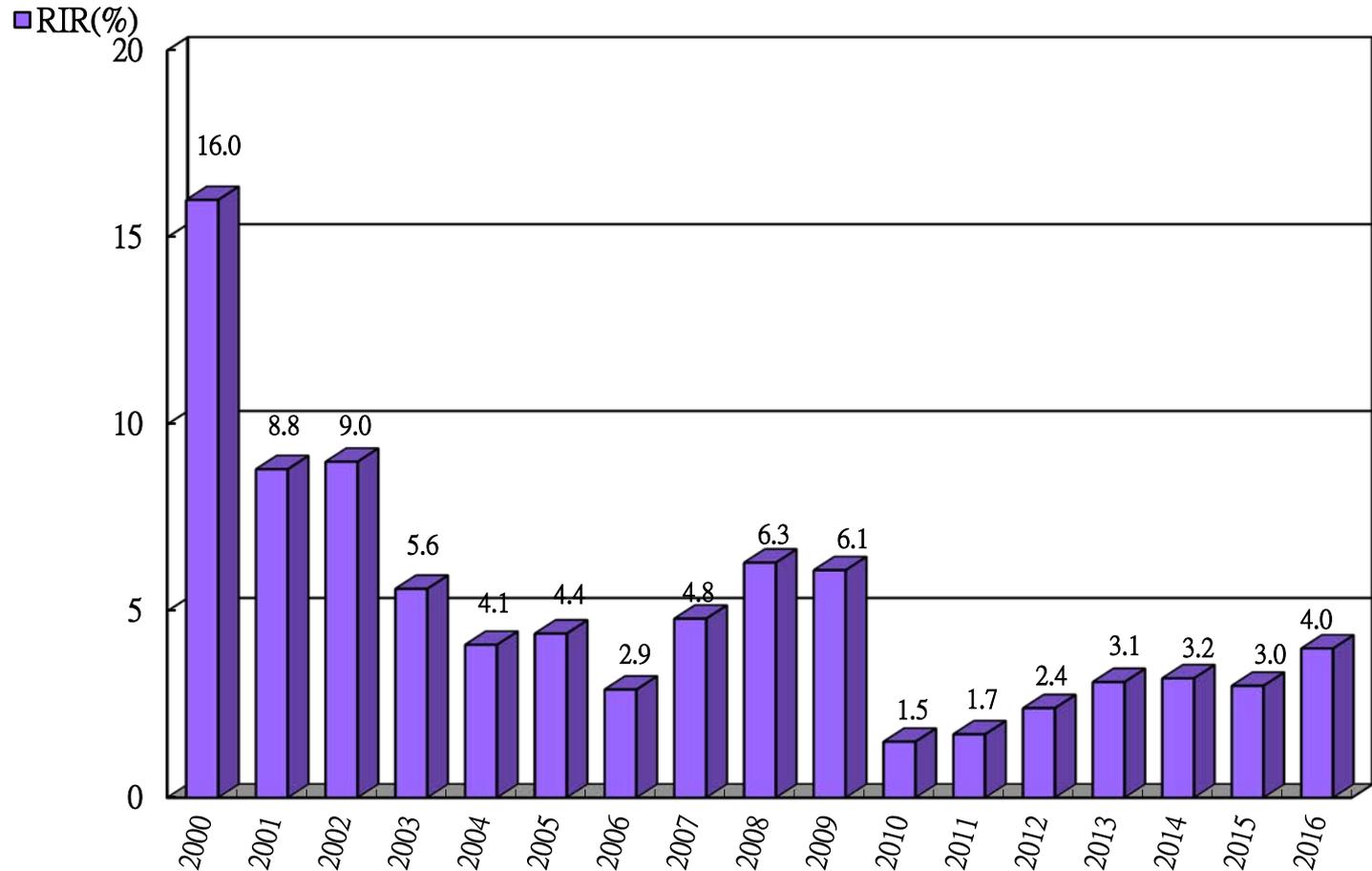
# Rodent Infestation Survey

▶ **Rodent Infestation Rate =**

$$\frac{\text{No. of positive baiting points} \times 100\%}{\text{No. of baits retrieved}}$$

<b>RIR</b>	<b>Level of Infestation</b>
0% to <10%	Level 1
10% to <20%	Level 2
<u>&gt;20%</u>	Level 3

# Rodent Infestation Rate



# Rodent Control

- ▶ Environmental hygiene
- ▶ Trapping
- ▶ Rodenticide
  - Chronic anti-coagulant
  - Brodifacoum, Bromadiolone, Coumatetralyl, etc.
- ▶ Proofing
- ▶ Education & Publicity

# Rodent Control

**防鼠工作做得好 鼠患問題自然冇**  
Eliminate Rodent Nuisance Take Preventive Measures

**妥善處理垃圾及貯存食物**  
Dispose of rubbish and store food properly

**清除雜物**  
Remove disused articles

**封好渠口、門腳和牆窿**  
Seal or install grating to openings and install metal kicking plate to doors

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**食物業處所 防治鼠患須知**  
Prevention and Control of Rodents in Food Premises

妥善處理垃圾及貯存食物  
Dispose of rubbish and store food properly

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Eliminate Rodent Nuisance Take Preventive Measures

**貨物裝卸區 防治鼠患須知**  
Prevention and Control of Rodents in Cargo Handling Areas

妥善處理垃圾及貯存食物  
Dispose of rubbish and store food properly

清除雜物  
Remove disused articles

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**防鼠工作做得好 鼠患問題自然冇**  
Eliminate Rodent Nuisance Take Preventive Measures

**街市/固定小販攤檔/小販市場 防治鼠患須知**  
Prevention and Control of Rodents in Markets / Fixed Pitch Hawker Stalls / Hawker Bazaars

妥善處理垃圾及貯存食物  
Dispose of rubbish and store food properly

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封好渠口、門腳和牆窿  
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**防鼠工作做得好 鼠患問題自然冇**  
Prevent Disease Eliminate Rodent Nuisance

本署已印制多款鼠患預防及防堵公共屋邨、社會在屋邨舉辦的展覽。Education posters and leaflets on rodent proofing are available for public. Exhibitions will also be held in housing estates.

查詢詳情，請電  
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# Flea Control

- ▶ Rat Flea Index > 1.0
- ▶ Flea control (+ Rodent control)
- ▶ Residual insecticide
  - Deltamethrin
  - Rodent harbourages, burrows, runways, etc.
  - Effective for 2–3 months

# Concerted Efforts

- ▶ FEHD Anti-rodent Campaign (2 phases/year)
- ▶ Inter-departmental Working Group on Pest Prevention and Control
  - FEHD + 23 member bureaux/departments
  - Notified of results of RFS & RIS
  - Follow up on rodent control work in their managed areas

**THANK YOU**