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Communicable Diseases Watch

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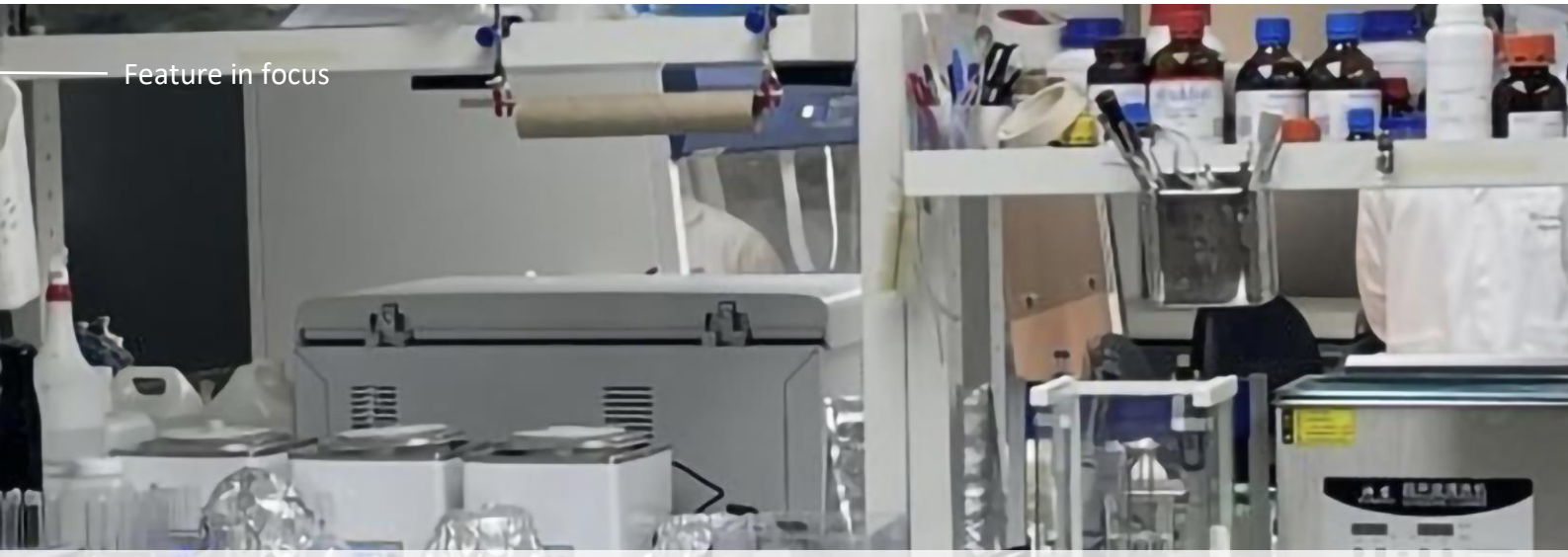
- A local case of whooping cough
- A local case of rubella
- A local case of listeriosis
- A local case of psittacosis



Feature in focus

A Pilot Study of Sewage Surveillance for Seasonal Influenza Between October 2024 and June 2025 in Hong Kong

Reported by Ms Vera CHOW, Scientific Officer, Mr CHAN Chung-lam, Jason, Statistician, Communicable Disease Branch, CHP

Key Points

- Sewage surveillance for seasonal influenza was piloted across 18 districts in Hong Kong from October 2024 to June 2025.
- A strong correlation was found between the sewage indicator and clinical surveillance data, with a one-week lead time, demonstrating its value as a complementary indicator for monitoring seasonal influenza activity.
- Sewage trends differed across sites, likely due to varying population dynamics in different districts. Normalisation of sewage viral loads with a biomarker could improve data intrepretation.

Introduction

Seasonal influenza poses a significant public health burden locally. Building on the success of sewage surveillance for COVID-19, the Centre for Health Protection (CHP) of the Department of Health (DH) has leveraged the established infrastructure to develop a novel sewage-based surveillance indicator for tracking local seasonal influenza activity. It could serve as a complement to conventional surveillance systems, aiming to enhance monitoring and early warning capabilities. This article describes the pilot results of this new indicator and evaluates its utility, covering the 2024/25 winter influenza season, which occurred between January and March 2025 in Hong Kong, when influenza activity significantly increased.

Methods

Sample collection

From October 2024 to June 2025, sewage samples were collected weekly from 18 stationary sites - one from each of the 18 districts across Hong Kong's sewerage network (Figure 1). These sites covered approximately 30% of the local population. At each site, samples were collected once a week, using an auto-sampler to collect sewage continuously for three hours at 15-minute intervals during the morning peak flow period (i.e., 7 am – 10 am).

Laboratory analysis

Viral materials were enriched and extracted from the sewage samples using a magnetic bead-based nucleic acid purification method[1]. Viral loads of influenza A and B were quantified using reverse transcription-quantitative polymerase chain reaction (RT-qPCR)[2,3] (Figure 2). In addition, nine sewage samples were tested weekly for influenza A subtypes (i.e., H1 and H3) during the winter influenza season (January – March 2025).

Statistical analysis

The correlations between the trends in sewage viral loads and the percentage of human respiratory specimens testing positive for influenza were analysed using Pearson correlation.

Figure 1 - Eighteen stationary sampling sites (one from each of the 18 districts) across Hong Kong's sewerage network.

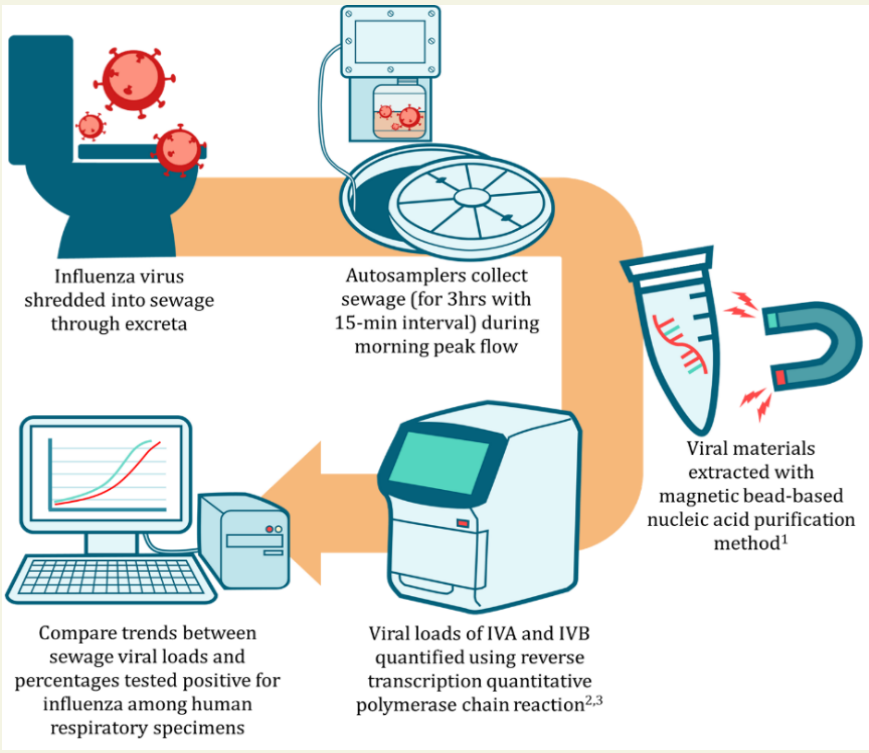


Figure 2 - Workflow of sewage surveillance for seasonal influenza viruses.

Results

Comparison between trends of sewage viral loads and positive percentage among respiratory specimens for influenza A and B

Influenza viral loads in sewage and laboratory surveillance data (i.e., positive percentage among respiratory specimens) showed similar patterns for both influenza A and influenza B throughout the winter influenza season in Hong Kong from January to March 2025. This period was predominated by influenza A(H1) with low levels of virus circulation for both influenza A(H3) and influenza B.

Influenza A viruses

For influenza A, both sewage and human surveillance indicators increased markedly since late December 2024. The sewage indicator first increased from a low level in week 51 of 2024, followed by the laboratory surveillance data in the subsequent

week (i.e., week 52 of 2024). Both indicators fluctuated at high levels until early February 2025, then gradually decreased to low levels by late March 2025 (Figure 3a). The correlation between these two indicators in the same week was strong (r=0.89, p<0.001). When correlating the sewage indicator with clinical data from one week later, an even stronger correlation (r=0.92, p<0.001) was observed, suggesting a one-week lead time of the sewage indicator over clinical surveillance indicators.

Influenza B virus

Although influenza B circulated at low levels during this winter influenza season, both sewage and clinical indicators shared similar gradual increases from January to March 2025, with a strong correlation (r=0.79, p<0.001). However, the highest detection rate among respiratory specimens remained below 1% (Figure 3b).

Site-specific analyses of influenza A

For influenza A, the sewage indicator exhibited greater week-to-week variability when compared with the clinical indicator. For example, there was a spike in week 6 of 2025 following a decreased viral load in week 5 of 2025 (Figure 3a). Upon examining the data site by site, it was found that the spike in week 6 of 2025 was attributable to an exceptionally high viral load from a single site. This prompted further examination of sewage trends for influenza A from individual sites.

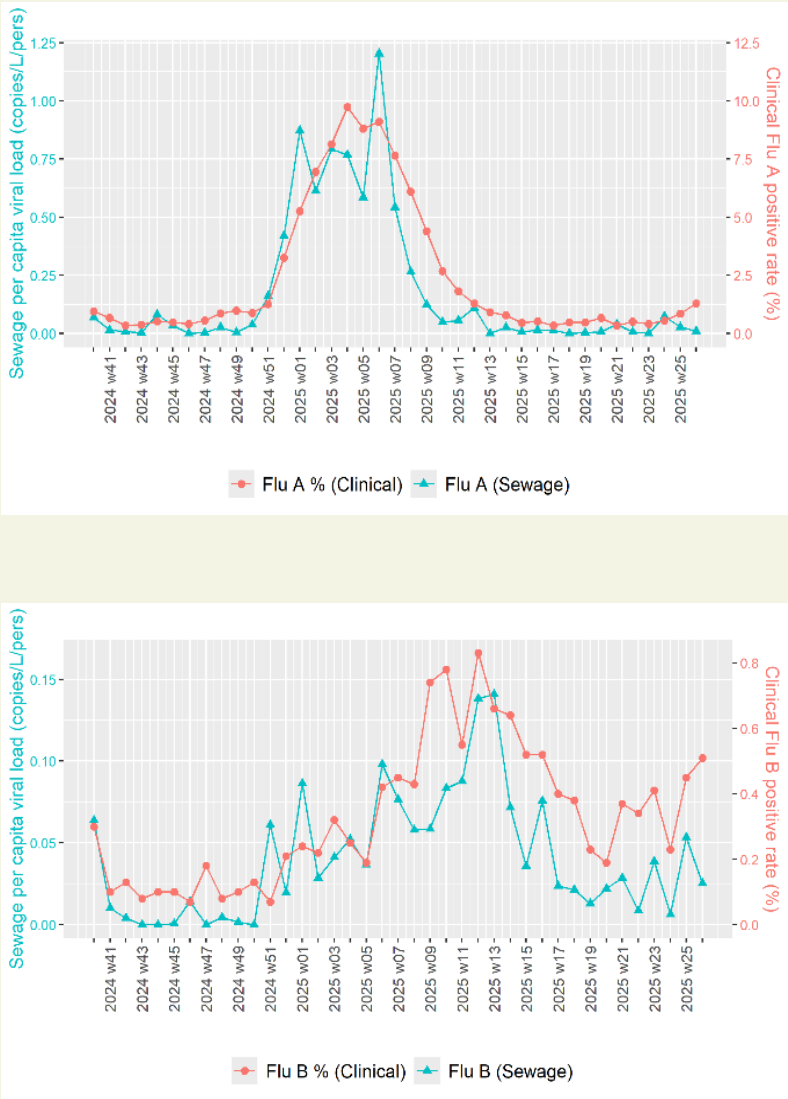


Figure 3 - Sewage viral load of influenza A (a, upper) and influenza B (b, lower) against the respective detection rates from respiratory specimens.

Analyses of sewage trends across different sites showed heterogeneous viral load quantities and patterns for influenza A, reflecting different population dynamics across districts. For example, Sai Kung (Figure 4a) displayed a typical influenza viral load pattern during the winter influenza season, matching the overall trend shown in Figure 3a, with influenza A viral loads fluctuated around 1.0 copies per litre per person. In contrast, viral loads at some sites, such as Islands (Figure 4b) and Southern (Figure 4c) were found to be 5-fold and 10-fold higher than the overall level, respectively.

Moreover, influenza A trends at some sampling sites were more affected by long holidays in January. For example, there were significant drops in influenza A viral loads at Islands (Figure 4b) and Tuen Mun (Figure 4d) during the peak of the influenza season from late January to early February. This suggests that population dynamics (e.g., people travelling abroad during long holidays) may contribute to the variations in sewage surveillance data.

Photo – A sewage sample bottle for a sampling site in Sha Tin district.

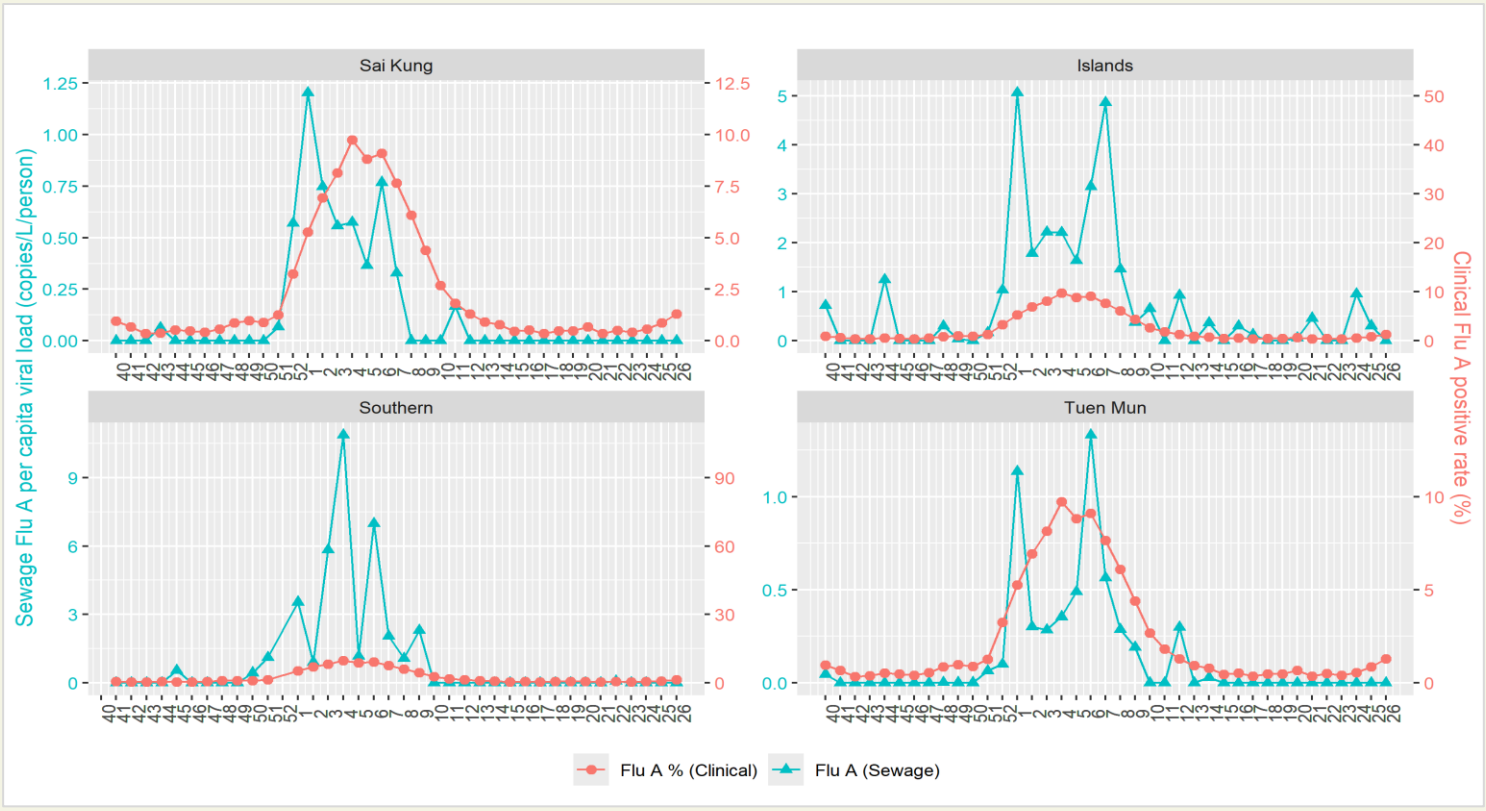


Figure 4 - Trends of influenza A sewage viral load and detection rates among respiratory specimens in Sai Kung (a, upper left), Islands (b, upper right), Southern (c, bottom left) and Tuen Mun (d, bottom right) sites.

Influenza A subtype analysis

Analysis of influenza A subtypes in sewage during the 2024/25 winter infleunza season showed a much higher viral load of influenza A(H1) compard to influenza A(H3) (Figure 5a), aligning with the predominance of influenza A(H1) in laboratory surveillance. A moderate and significant correlation (r=0.63, p<0.01) was found between sewage and laboratory surveillance data for influenza A(H1), though this was weaker than the correlation for overall influenza A. When sewage trends were analysed with a one-week lead time, a strong correlation (r=0.78, p<0.001) was demonstrated with the detection rate among respiratory specimens, again suggesting sewage data could provide a one-week early warning. In contrast, the sewage trend of influenza A(H3) was only weakly correlated (r=0.34, p=0.18) with laboratory surveillance data, likely due to low influenza A(H3) circulation throughout this winter influenza season (Figure 5b).

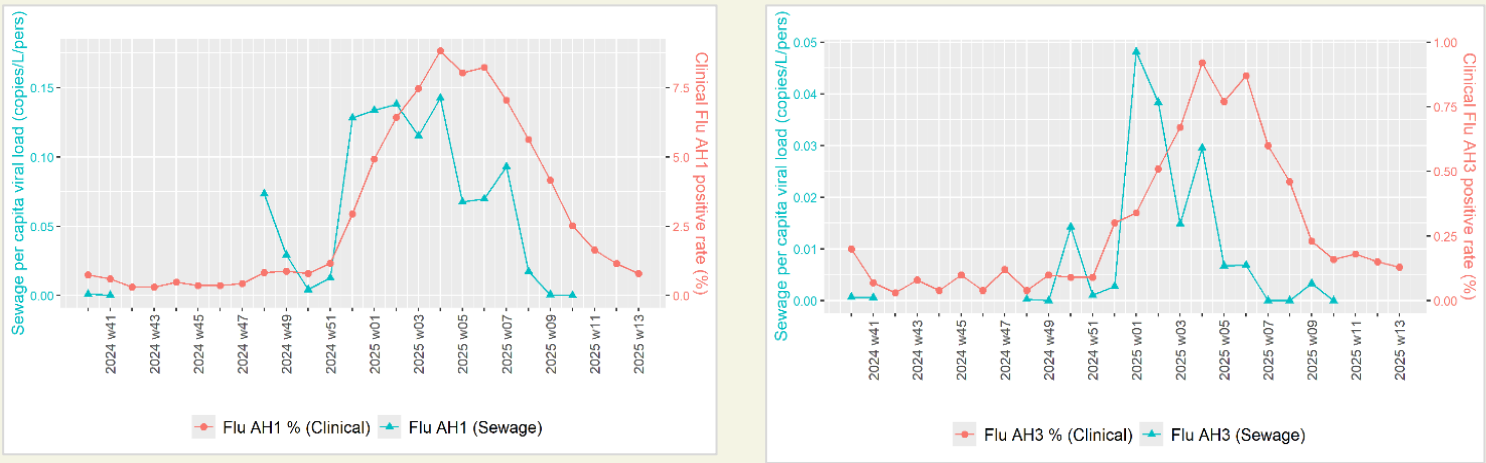


Figure 5 - Sewage viral load of influenza A(H1) (a, left) and influenza A(H3) (b, right) against the respective detection rates from respiratory specimens.

Limitations

The viral load and subtype analyses for influenza A(H3) and influenza B could not be properly evaluated because influenza A(H1) predominated during the 2024/25 winter influenza season, while circulation of influenza A(H3) and influenza B remained low.

Conclusion and Way Forward

Sewage surveillance for seasonal influenza showed strong correlations with laboratory surveillance data, supporting its value for monitoring influenza activity in the community. More importantly, sewage surveillance provided a one-week early warning signal compared to laboratory surveillance data, demonstrating its role as a complementary indicator for monitoring seasonal influenza activity. According to the World Health Organization guideline[4], normalisation of viral loads can be undertaken by adjusting the measured viral loads with biomarkers that reflect the catchment population size. For example, pepper mild mottle virus (PMMoV) is a widely use marker. Such normalisation would improve data interpretation. To reduce variability in sewage data and address site-specific factors (e.g., flow rates, catchment population), data normalisation with PMMoV will be implemented in the second half of 2025.



Photos (from left to right) – An auto-sampler used to collect sewage samples, the storage used for storing the bottles of sewage samples, a centrifuge used during the process of laboratory analysis.

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Acknowledgement

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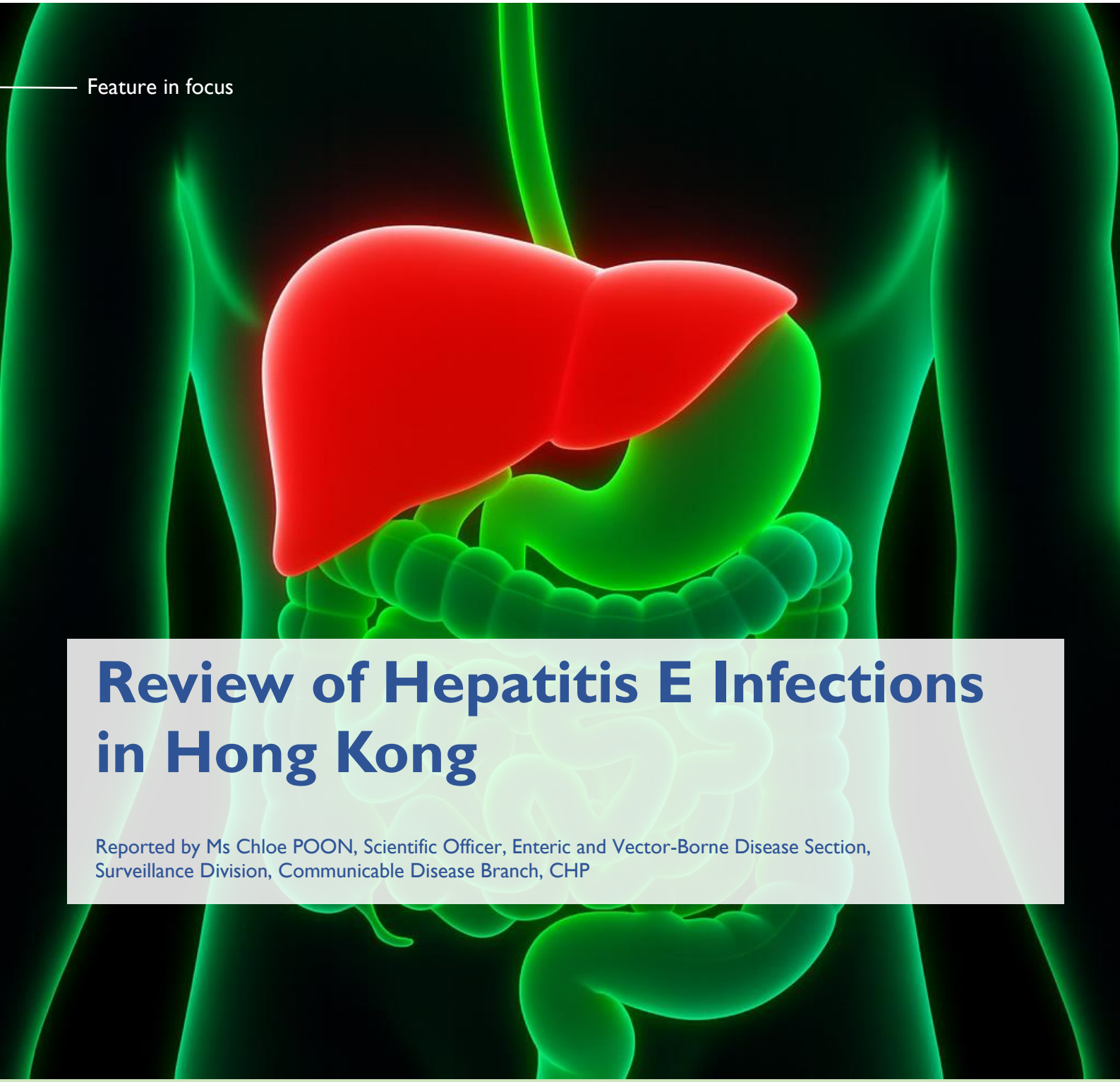
Feature in focus



Review of Hepatitis E Infections in Hong Kong

Reported by Ms Chloe POON, Scientific Officer, Enteric and Vector-Borne Disease Section, Surveillance Division, Communicable Disease Branch, CHP

Key Points

- Hepatitis E infection in Hong Kong is mostly caused by *Orthohepevirus A*. Consumption of undercooked pork and shellfish is considered to be the main route of transmission. Rat hepatitis E (caused by *Orthohepevirus C*) occurs sporadically in Hong Kong. The route of transimssion of rat hepatitis E is unclear and it mostly affected immunocompromised individuals.
- Common symptoms of hepatitis E infections include jaundice and tea-colored urine, with some patients developing liver failure.
- Prevention focuses on good personal hygiene, safe food handling, and rodent control particularly for preventing HEV-C.

Background

Hepatitis E is a liver disease caused by the hepatitis E virus (HEV). HEV is an RNA virus comprising four species, namely *Orthohepevirus A-D* (also known as HEV-A to HEV-D), which circulate in different hosts (Table 1)[1]. While HEV-A is the species usually causing human infection, cases of human infection with HEV-C (also known as rat HEV) have been reported.

Table 1 - Summary of some known hosts or sources of orthohepeviruses for humans[1].

Species	Animal Host or Reservoir
Orthohepevirus A	Human, swine, wild boar, deer, rabbit, camel
Orthohepevirus B	Chicken
Orthohepevirus C	Rat, voles, ferret, brown bear
Orthohepevirus D	Bats

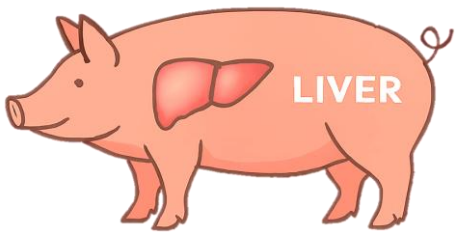
Most human hepatitis E infections caused by HEV-A are asymptomatic or self-limiting. The clinical features of hepatitis E infection include fever, loss of appetite, abdominal pain, jaundice, tea-coloured urine, and enlarged liver, which are often indistinguishable from those of other types of viral hepatitis. Symptoms usually last for one to six weeks, but cases of chronic hepatitis E infection have been reported in immunocompromised persons such as transplant recipients. In rare cases, hepatitis E infection results in fulminant hepatitis, which can be fatal. Fulminant hepatitis occurs more frequently in pregnant women with hepatitis E infection, with mortality rates reaching up to 20%. Regarding rat hepatitis E infection, there is currently insufficient literature on its clinical features, though some studies suggest that it is clinically indistinguishable from infections caused by HEV-A[2].

According to the World Health Organization (WHO), there were an estimated over 19 million cases of hepatitis E infections worldwide in 2021[3]. In Hong Kong, viral hepatitis (including acute hepatitis caused by HEV) is a notifiable disease under the Prevention and Control of Disease Ordinance (Cap 599). In this article, we reviewed the local epidemiology of hepatitis E infections (including rat HEV).

Acute hepatitis E infection caused by HEV-A

Routes of transmission

HEV-A is mainly transmitted through the faecal-oral route via contaminated drinking water in endemic areas. In developed countries, however, transmission occurs mainly through direct contact with infected animals or consumption of uncooked or undercooked meat from infected animals. Swine is known to be one of the major reservoirs of HEV-A, with evidence showing that liver is the main target organ of HEV-A replication in pigs[4].



According to a local study conducted from 2014 to 2016, HEV-A was detected in pig livers purchased from local markets with a prevalence of 1.5%[5]. The study found that the HEVs detected in local human cases and products from retail markets were genetically similar. This study also revealed that HEV-A was also detected in locally purchased pig intestines and oysters, but at lower prevalences (0.4% and 0.2% respectively). As such, foodborne transmission via raw or undercooked contaminated food products is considered to be a main route of HEV-A transmission in Hong Kong.

Other rare transmission routes identified include transfusion of infected blood products, organ transplantation, and vertical transmission from pregnant women to foetuses.

Epidemiology of HEV-A infections in Hong Kong

In the past five years (2020 to 2024), the CHP recorded a total of 442 confirmed cases of acute hepatitis E infection caused by HEV-A, with annual number of cases ranging from 54 to 140 (Figure 1). In 2025 (as of September 30), 90 cases have been reported so far.

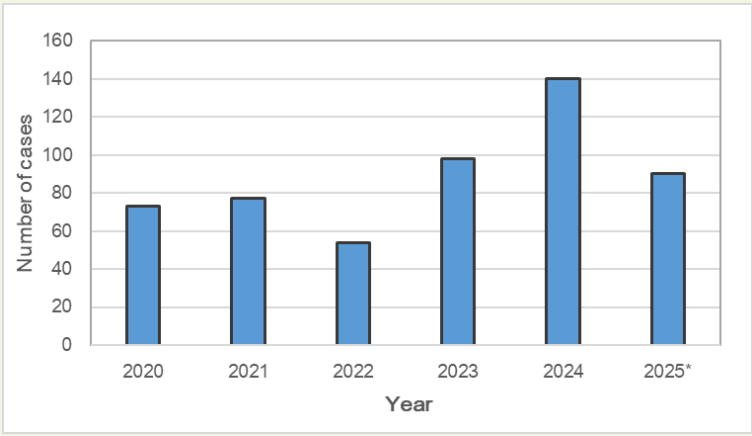


*Figure 1 - Annual number of HEV-A infections in Hong Kong, 2020 - 2025 (*provisional figure as of September 30, 2025).*

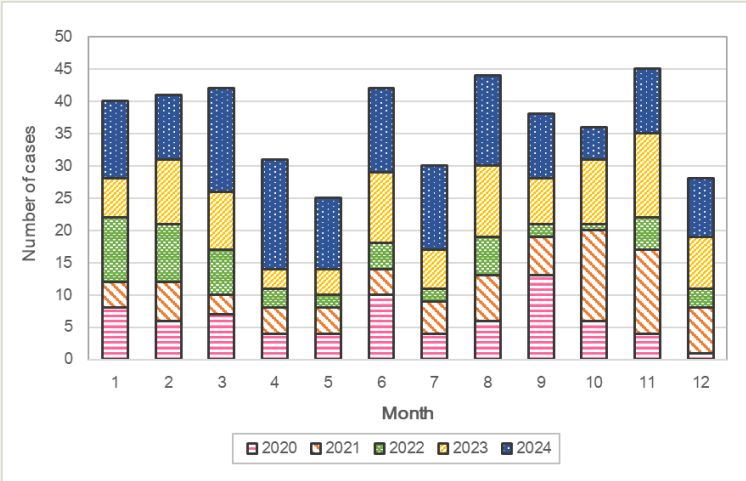


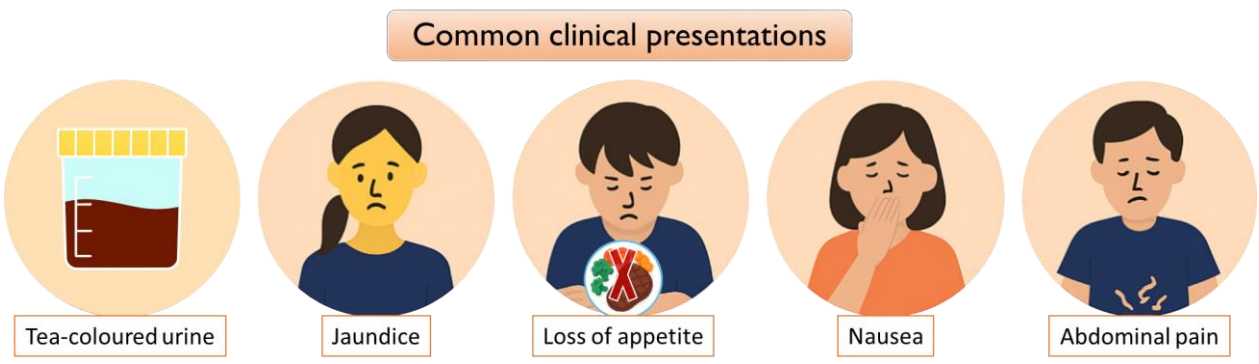
Figure 2 - Number of HEV-A infections in Hong Kong by month, 2020-2024.

The 442 cases recorded in the past five years involved 266 males and 176 females, with ages ranging from 20 to 102 years (median: 62 years). Most cases (405, 91.6%) were locally acquired infections, while 12 cases (2.7%) were imported infections. The places of infection of the imported cases included Chinese Mainland (six cases), Pakistan (two cases), Germany (one case), India (one case), Japan (one case), and Thailand (one case). The places of infection for the remaining 25 cases (5.7%) could not be determined either because the patients had stayed both in and outside Hong Kong during the incubation period, or due to loss to follow-up. The cases were reported throughout the year with no obvious seasonal pattern (Figure 2).

The most common clinical presentation was tea-coloured urine (272, 61.5%), followed by jaundice (204, 46.2%), loss of appetite (162, 36.7%), nausea (133, 30.1%), and abdominal pain (119, 26.9%). The majority of cases (369 cases, 83.5%) required hospitalisation, with a median length of stay of eight days. At least 26 patients (5.9%) developed liver failure. A total of four fatal cases were recorded (case fatality rate of 0.9%). Their ages ranged from 71 to 78 years (median: 77 years), and all were known to have underlying illnesses.

Epidemiological investigations revealed that 384 (86.9%) and 186 (42.1%) patients reported consumption of pork and pig liver during the incubation period, respectively. Among those who consumed pig liver, most had consumed it with hotpot, congee, or noodles, with 20 cases (10.8%) claimed that the pig liver eaten was rare or undercooked.

One hundred and ninety (43.0%) patients reported consumption of shellfish during the incubation period. The most common shellfish consumed was clams (104, 54.7%), followed by oysters (98, 51.6%) and razor clams (54, 28.4%). Among those who had consumed shellfish, 37 (19.5%) reported consuming it raw or undercooked.



Rat Hepatitis E (HEV-C infection)

Routes of transmission

HEV-C, also known as rat HEV, shares only 50% to 60% genetic similarity with HEV-A. The Department of Microbiology of the University of Hong Kong (HKU) first discovered that HEV-C has the ability to infect humans in 2018[6]. As of 2025, apart from Hong Kong, human cases of rat hepatitis E have been reported in Spain, France and Canada[7].

While the transmission of HEV-A is well studied, the exact routes of transmission of rat hepatitis E to humans remain uncertain[8]. Suspected routes include ingestion of food or water and exposure to environments or objects contaminated by rodents or their excreta, as well as direct contact with rodents or their excreta.

Epidemiology of rat hepatitis E infections in Hong Kong

As of September 30, 2025, the CHP has recorded 20 cases of rat hepatitis E infection since 2018, with the latest case reported in September 2024 (Figure 3). The 20 cases involved 15 males and five females aged between 17 and 89 years (median: 64 years). All cases had underlying illnesses, with 15 of them (75%) having immunocompromised conditions. Nearly half of the patients (45%) were asymptomatic, while the remaining patients presented with typical viral hepatitis symptoms such as loss of appetite (25%), malaise (25%), fever (15%), and tea-coloured urine (15%). Among them, three patients passed away due to unrelated causes.

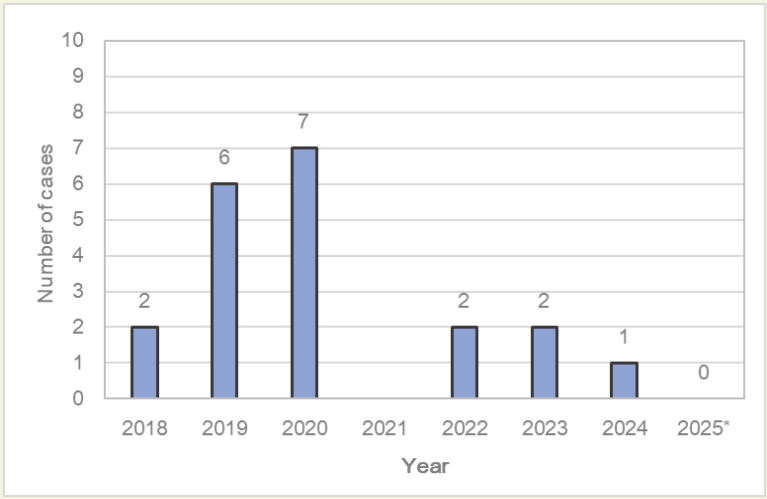


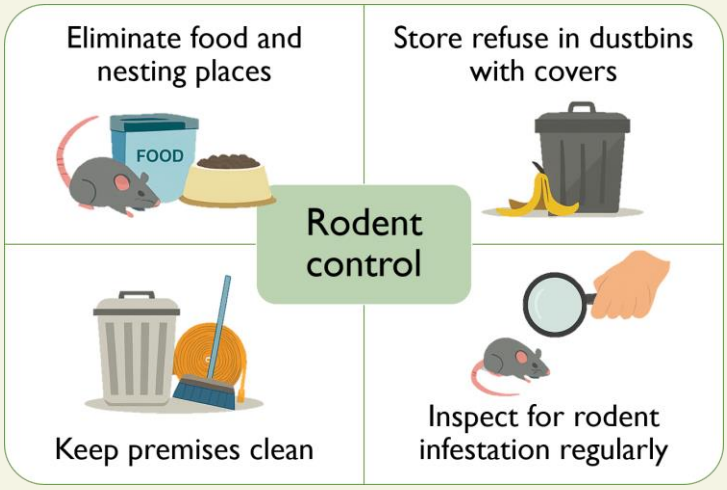
Figure 3 - The annual case number of rat hepatitis E in Hong Kong since 2018 (as of September 30, 2025).

The 20 patients resided in eight different districts in Hong Kong, including Wong Tai Sin (five cases), Kowloon City (five cases), Kwai Tsing (two cases), Southern (two cases), Tuen Mun (two cases), Tai Po (two cases), Kwun Tong (one case), and Yuen Long (one case). The majority (85%) had no travel history during the incubation period. None of the patients reported to have consumed raw pork or pork offal, but three patients reported contact with raw pork at wet market or during cooking process. All patients did not recall having direct contact with rodents or their excreta, but three reported having seen rodents or suspected rodent excreta in the vicinity of their residence, workplace or restaurants visited. All were sporadic cases with no epidemiological linkage, and no symptomatic household contacts were identified.

Prevention of hepatitis E

The mainstay of prevention of hepatitis E infection is maintaining good personal hygiene, especially hand hygiene, and adherence to food and water safety. The risk can be reduced by adopting the Five Keys to Food Safety when handling food, i.e. Choose (Choose safe raw materials); Clean (Keep hands and utensils clean); Separate (Separate raw and cooked food); Cook (Cook thoroughly); and Safe Temperature (Keep food at safe temperature). The public should take extra caution when handling and consuming high-risk foods such as pork, pig offal and shellfish. It is also important to use separate chopsticks for handling raw food and cooked food when eating hotpot to avoid cross contamination.

For rat hepatitis E, the exact mode of transmission remains unknown at the moment. However, given that rodents (such as rats) can transmit multiple diseases to humans directly and indirectly, the public are advised to adopt the following preventive measures:



- Eliminate sources of food and nesting places for rodents in the living environment. Store food in covered containers and handle pet food properly to prevent it from becoming food for rodents;
- Store all refuse and food remnants in dustbins with well-fitted covers. Dustbins must be emptied at least once a day;
- Keep premises, especially refuse rooms and stairways, clean. Avoid accumulation of articles;
- Inspect all flower beds and pavements for rodent infestation regularly;
- Avoid the high-risk activities below to reduce rodent contact:
  - Avoid rodent contact and places dirtied with rodent excreta;
  - Avoid handling rodents with bare hands;
  - Wash hands with liquid soap and water immediately after handling animals, and disinfect contaminated areas; and
  - If a wound appears, clean the broken skin immediately and cover it properly with waterproof adhesive dressings.

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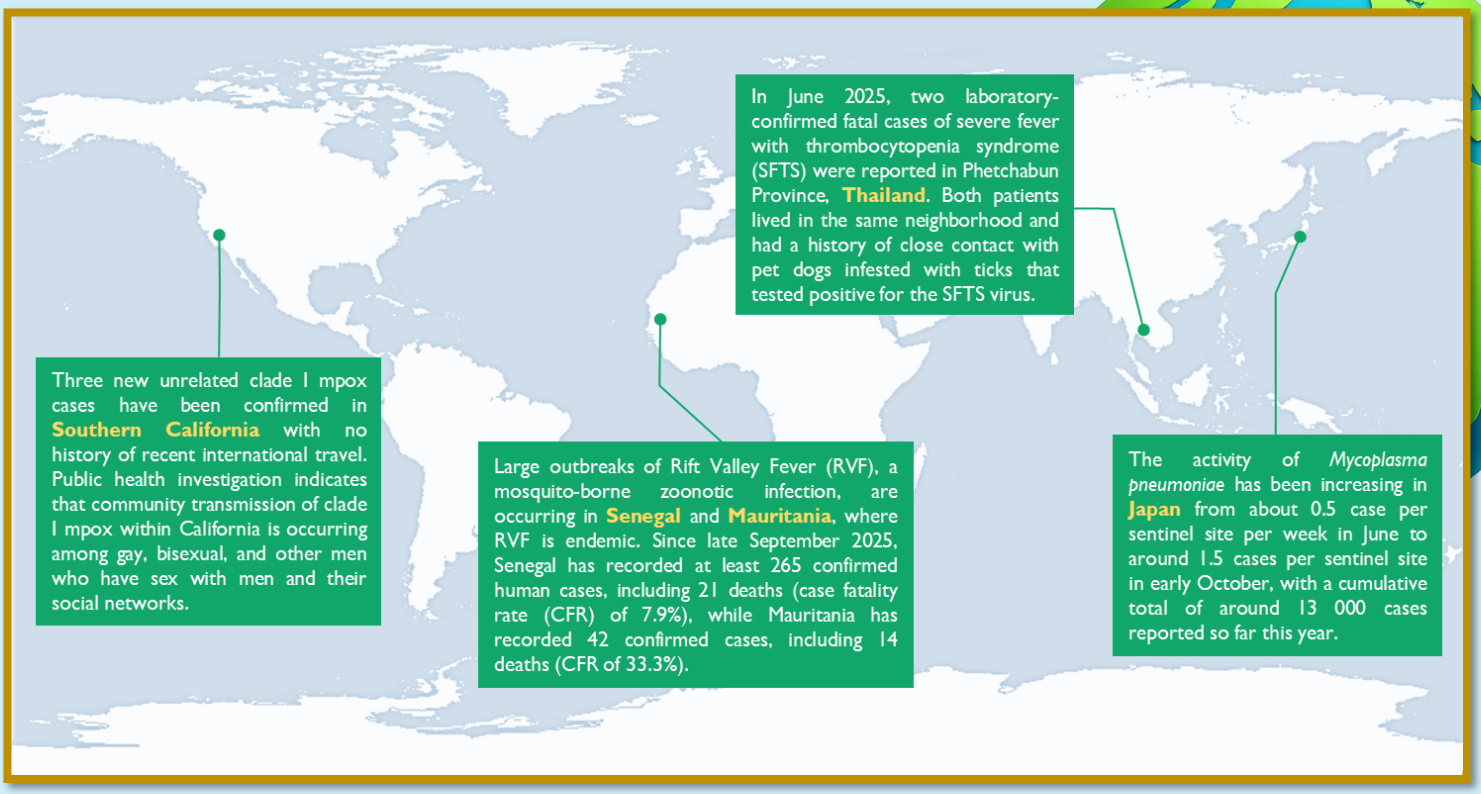
Global Disease Snapshot

Major Outbreaks and Emerging Infections



Source of information

California Department of Public Heath: https://www.cdph.ca.gov/Programs/OPA/Pages/CAHAN/Community-Spread-of-Clade-I-Mpox-Within-California.aspx

Africa Centres for Disease Control and Prevention: https://africacdc.org/download/africa-cdc-epidemic-intelligence-weekly-report-october-2025/

World Health Organization: https://www.who.int/publications/i/item/9789290221685

Japan Institute for Health Security (JIHS): https://id-info.jihs.go.jp/surveillance/idwr/en/rapid/2025/41/index.html
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News in Brief

Three local cases of severe CA-MRSA infection

The Centre for Health Protection (CHP) of the Department of Health (DH) recorded three local cases of severe CA-MRSA on September 25, October 2 and October 15 respectively.

The first case involved an 84-year-old female with underlying diseases residing in Sha Tin District. She developed a back abscess with yellowish pus since September 8. She subsequently developed fever and was admitted to a public hospital on September 13. Her blood and wound swab specimens collected were tested positive for CA-MRSA. The clinical diagnosis was back carbuncle and septicaemia. Incision and drainage was performed. She was treated with antibiotics and her condition was stable. Her household contacts remained asymptomatic.

The second case involved a 54-year-old male with underlying diseases residing in Sham Shui Po. He developed shortness of breath since September 6. His condition worsened and he was admitted to a public hospital on September 16. He was noted to have fever upon admission. His blood specimen was tested positive for CA-MRSA. The clinical diagnosis was pneumonia and septicaemia. His condition further deteriorated despite treatment and he passed away on September 20. His household contact remained asymptomatic.

The third case involved a 55-year-old male with underlying diseases residing in Kwun Tong. He developed multiple abscesses at the back and jaw since mid-September. He subsequently developed fever with chills and enlargement of back abscess. He was admitted to a public hospital on October 4. His blood specimen and wound swab were tested positive for CA-MRSA. The clinical diagnosis was back carbuncle and septicaemia. Incision and drainage was performed. He was treated with antibiotics and his condition was stable. His household contact remained asymptomatic.

Four local cases of necrotising fasciitis (NF) caused by *Vibrio vulnificus* infection

The CHP recorded four local sporadic cases of NF caused by *Vibrio vulnificus* (*V. vulnificus*) infection on October 3, 8, 16 and 19 respectively.

The first case involved a 74-year-old female with underlying illnesses residing in Kwai Tsing. She injured her left middle finger while preparing a raw fish at home on September 30. The fish was bought from Sham Shui Po (SSP). She subsequently developed fever, and painful swelling at left middle finger on the same day. She was admitted to a public hospital on October 1 and was clinically diagnosed with necrotising fasciitis. Surgical debridement of the wound was conducted. Her condition was stable after antibiotics treatment.

The second case involved a 68-year-old male with underlying diseases residing in SSP. He bought a fish from a wet market in SSP on October 3. He injured his left index finger while preparing it at home. He subsequently developed fever, left index finger pain and swelling on October 4, and was admitted to a public hospital on the same day. He was clinically diagnosed with necrotising fasciitis. Excisional debridement of left index finger was performed. His condition was stable after antibiotics treatment.

The third case involved a 49-year-old man with underlying illnesses residing in Tuen Mun. He had a chronic wound on his left leg. He visited a wet market in Yuen Long on October 5 without covering his leg wound. He developed left leg pain on October 13 and was admitted to a public hospital on the same day. He was clinically diagnosed with necrotising fasciitis. Excisional debridement of left leg was performed. His condition was stable after treatment.

The fourth case involved a 76-year-old man with underlying illnesses residing in Kwai Tsing. He sustained right thumb injury while handling raw fish at a wet market in SSP on October 17. He subsequently developed right thumb pain and swelling on October 18 and was admitted to a public hospital on the same day. He was clinically diagnosed with necrotising fasciitis. Incision and drainage of right thumb was performed. His condition was stable after treatment.

A local case of whooping cough

The CHP recorded a local case of whooping cough on October 6, involving a 52-year-old woman with underlying health conditions residing in Wan Chai. She developed a non-productive cough, shortness of breath with wheezing, and post-tussive vomiting starting on September 25. She sought medical attention from a private hospital. A nasopharyngeal swab taken on October 2 tested positive for *Bordetella pertussis*. Her condition remained stable, and she was discharged with a course of antibiotics. She had travelled to Jilin for five days during the incubation period. She did not have contact with anyone exhibiting a cough, both in Jilin or in Hong Kong. Her close contact remained asymptomatic and was provided with chemoprophylaxis.

A local case of rubella

The CHP recorded one local case of rubella involving a 37-year-old male with good past health residing in North District. He developed a fever, sore throat, cough and rash since October 3, and was admitted to a public hospital on October 4. His blood specimen collected on October 6 detected IgM antibody to rubella virus on October 10. He was born in Macao and was uncertain about his vaccination status. His condition was stable and his household contacts remained asymptomatic.

A local case of listeriosis

The CHP recorded a local case of listeriosis involving a 72-year-old female with underlying illness residing in Sham Shui Po. She presented with fever since October 15 and was admitted to a public hospital on the same day for treatment. Blood collected on October 15 grew *Listeria monocytogenes*. She was treated with antibiotics and her condition was stable. She had no travel history and could not recall any high-risk exposure during the incubation period.

A local case of psittacosis

The CHP recorded a local case of psittacosis involving a 73-year-old female with underlying illness residing in Tuen Mun. She presented with fever, cough, headache and myalgia since October 2 and was admitted to a public hospital on October 9 due to worsening symptoms. Chest X-ray showed right upper zone consolidation. Her sputum collected on October 11 was tested positive for *Chlamydia psittaci* DNA. Her condition improved after treatment and she was discharged from hospital. She did not keep any birds at home, but reported having spotted birds while walking along the path near her residence. Her household contact remained asymptomatic. The case was referred to Agriculture, Fisheries and Conservation Department, and Food and Environmental Hygiene Department for follow-up.