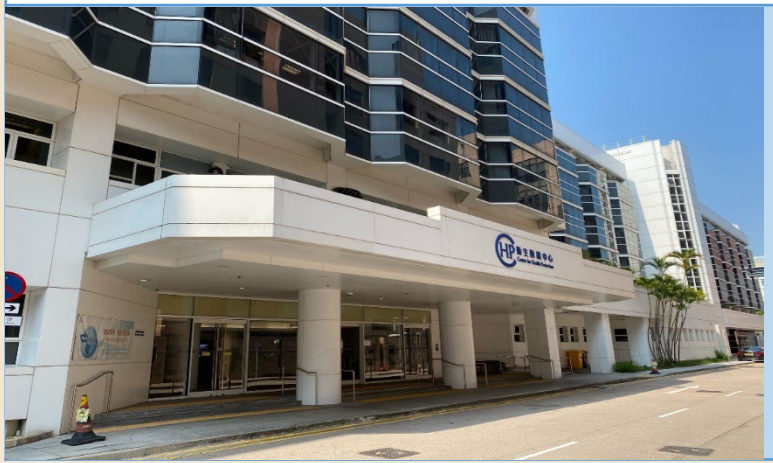
Global and Local Epidemiology of Ebola Disease and Hantavirus infection



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27 May 2026

Ebola disease

The Zoonotic Spillover and Human Transmission Chain

Natural Hosts: Fruit bats (Pteropodidae family).

Intermediate Hosts: Chimpanzees, gorillas, monkeys, forest antelopes, porcupines.

The Spillover Event: Human handling of ill or dead infected animals in the rainforest, or consumption of raw meat.

Zoonotic Spillover

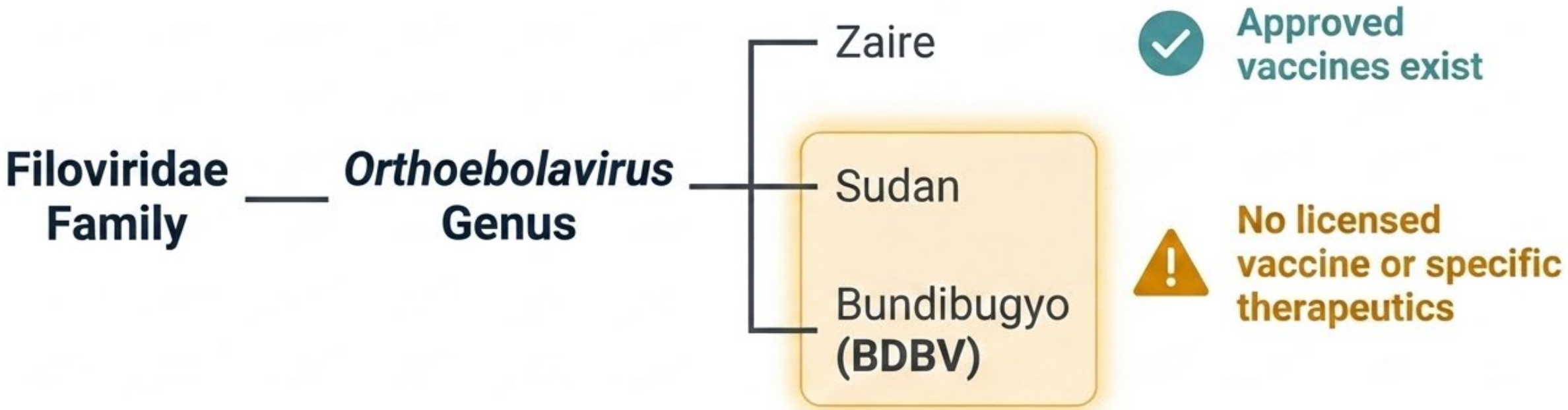
Human-to-Human Transmission

Amplification Zones: Unsafe burial ceremonies involving touching the deceased, and healthcare settings with inadequate Infection Prevention and Control (IPC) measures.

Environmental: Indirect contact with contaminated surfaces (e.g., soiled clothing, bedding).

Mechanism: Direct contact (through broken skin or mucous membranes) with blood, secretions, organs, or bodily fluids.

The Pathogen: *Orthoebolavirus* Taxonomy



Six species of Orthoebolaviruses have been identified to date, with three known to cause large outbreaks (Zaire, Sudan, BDBV). The current outbreak is driven by the **Bundibugyo virus (BDBV)**, which was first identified in Uganda in 2007. While licensed vaccines (e.g., Ervebo) and therapeutics exist for the Zaire species, BDBV currently has no approved medical countermeasures, making infection prevention and supportive care the only current lines of defence.

Clinical Progression and Diagnostic Challenges

Phase 1: Incubation (2–21 Days)

Individuals remain entirely asymptomatic and are non-infectious during this period.

Phase 2: Non-Specific Onset

Sudden fever, intense weakness, muscle pain, and headache.

Phase 3: Escalation

Vomiting, diarrhoea, rash, kidney and liver impairment, and in some cases, severe internal and external haemorrhaging.

Crucial Context:
These symptoms heavily mimic endemic malaria and co-circulating arboviruses, causing critical delays in initial outbreak detection.

Lethality:
Historical Case Fatality Rates (CFR) for Bundibugyo outbreaks range from

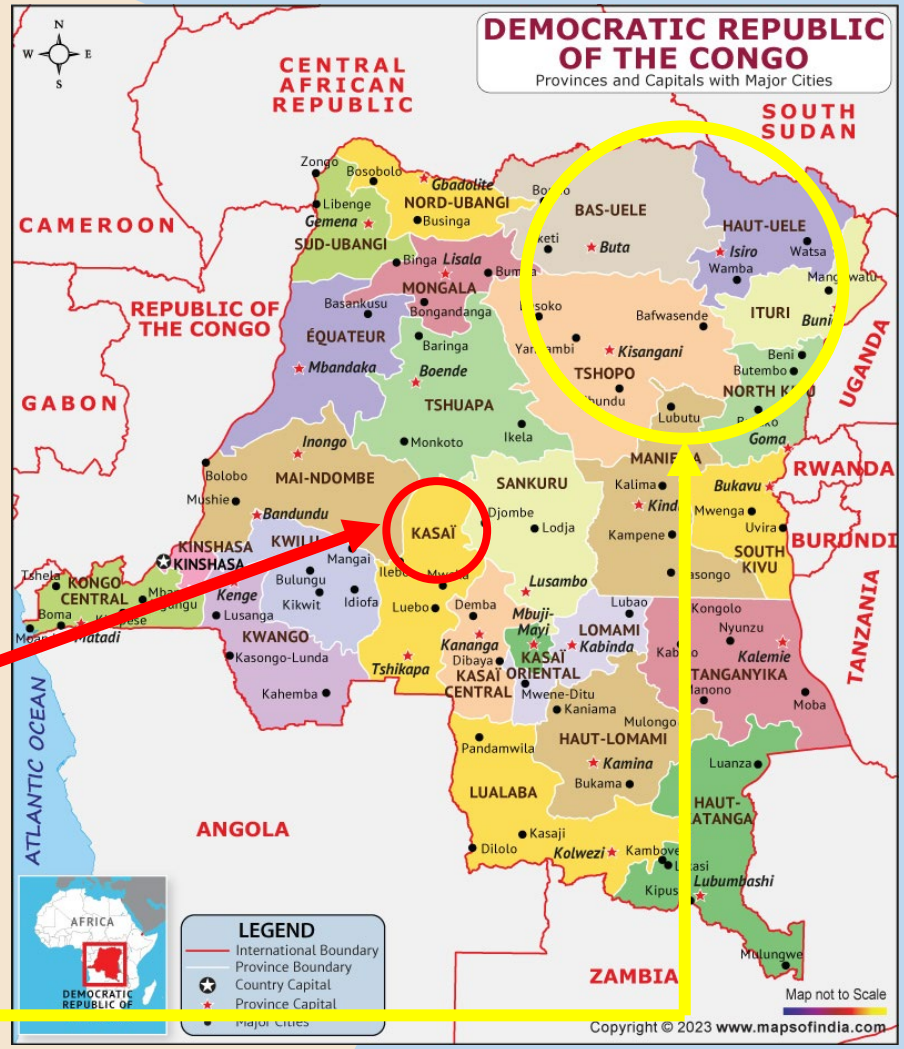
30% to 50%.

Prevention & Control

- Avoid contact with fruit bats or primates and the consumption of bushmeat
- Safe and dignified burial of the deceased
- Ensure proper PPE for health workers
- Patients should be isolated in a designated treatment center for early care and to avoid transmission at home
- Identify and quarantine of people who have been in contact with infected persons for 21 days

Previous Ebola disease outbreaks

- First occurred in 1976 – 2 simultaneous outbreaks in Africa
- Outbreak near Ebola River in DRC
- Largest outbreak recorded in West Africa 2014 – 2016 : 11,325 fatalities
- Last Ebola disease outbreak in DRC in 2025:
  - 4 September 2025 – 1 December 2025
  - 64 cases (53 confirmed, 11 probable), 45 deaths (CFR 70%)
  - Affected six health areas in Bulape Health Zone, Kasai Province
- Last BVD outbreak in 2012:
  - 17 August 2012 – 26 November 2012
  - 59 cases (38 confirmed, 21 probable), 34 deaths (CFR 58%)
  - Affected Province Orientale of DRC



The Detection Gap: Tracing the Virus's Unchecked Amplification

24 April 2026: Symptom onset in presumed index case (healthcare worker in Bunia).

5 May 2026: WHO alerted to an unknown, high-mortality illness.

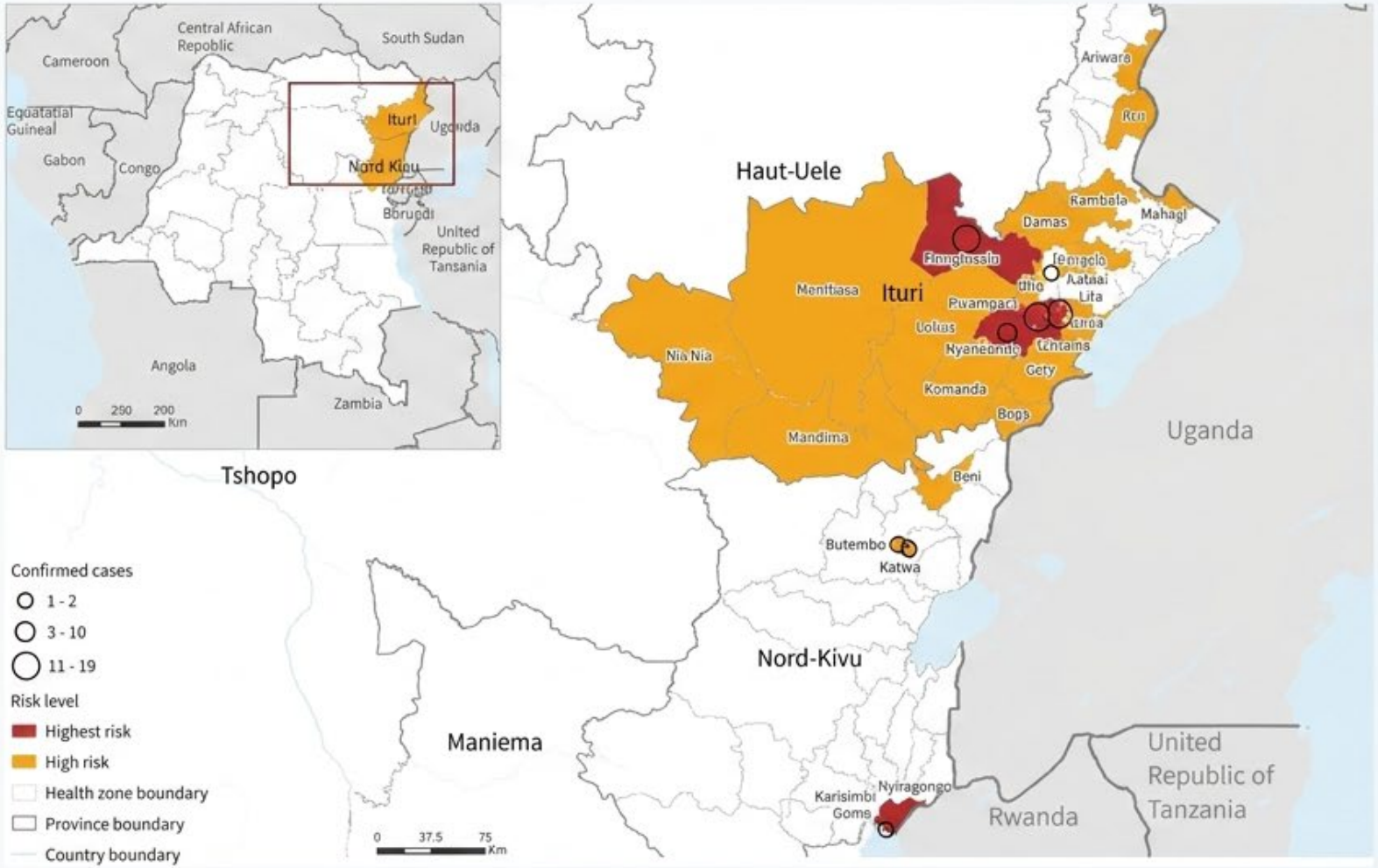
14/15 May 2026: Laboratory confirmation of Bundibugyo virus.

The 4-Week Blind Spot

The virus spread unchecked for nearly a month. Detection was severely delayed by:

- Masking from co-circulating illnesses (malaria, influenza-like illness).
- Critical breaches in Infection Prevention and Control (IPC) in healthcare settings.
- Community transmission exacerbated by unsafe burial practices.

Geographic Expansion: High-Risk Zones



Origin

Mongbwalu Health Zone (high-traffic mining area).

Current Hotspots

Mongbwalu, Rwampara, and Bunia account for 96% of all suspected cases.

Expansion

Outward spread across 15 health zones encompassing Ituri, North Kivu, and South Kivu provinces.

Latest Situation as of 24 May 2026

Data as of 24 May 2026						
Affected countries	**Suspected cases**	**Suspected deaths**	**CFR (%) suspected**	**Confirmed cases**	**Confirmed deaths**	**CFR (%) confirmed**
Democratic Republic of the Congo#	906	223	25%	105	10	10%
Uganda	0	0	0	7	1	14%
Total	**906**	**223**	**25%**	**112**	**11**	**10%**

#Data source: Centre des opérations d'urgences de sante publique (COUSP-DRC)

Severe Occupational Hazard: Healthcare Settings

The Evacuated Surgeon

11 May: Exposure during a medical procedure in DRC.

16 May: Onset of symptoms.

20 May: Laboratory confirmation of BDBV.

Current: Evacuated to a High-Level isolation unit in Berlin, Germany.

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4 Local Healthcare Worker Deaths

(Occurred within a 4-day span at **Mongbwalu General Referral Hospital**, indicating **critical IPC protocol breaches**).

The Operational Reality: Accelerants of Spread

Root Cause Tree

Systemic Friction

Ongoing armed conflict in Ituri province severely restricts movement of Rapid Response Teams and secure transport of laboratory samples.

Follow-up rate is currently only 21%.

Diagnostic Masking

A critical four-week detection gap occurred because early symptoms were heavily masked by co-circulating arboviruses and malaria.

Community Dynamics

High population mobility, complex humanitarian crises (273,000 displaced in Ituri), and unsafe traditional burial practices compound the spread.

Global Alarm: The Rationale Behind the WHO PHEIC Declaration

16/17 May 2026: WHO declares the outbreak a Public Health Emergency of International Concern (PHEIC).

Unusual Severity

High mortality clusters and deaths of healthcare workers indicating amplification within health facilities.

International Spread

Documented cross-border transmission to Kampala, Uganda.

Complex Context

Ongoing insecurity, a severe humanitarian crisis in Ituri, and high population mobility.

Lack of Tools

The complete absence of approved BDBV-specific therapeutics or vaccines.

WHO's Risk Assessment

Ebola Virus Disease in Hong Kong SAR

- Viral haemorrhagic fever including Ebola virus disease is a statutory notifiable disease since July 2008
- Suspected or confirmed cases must be reported to the Centre for Health Protection for investigation
- No confirmed Ebola disease case in Hong Kong

Hong Kong's Risk Profile: Evaluating Local Vulnerability

Overall Risk to Hong Kong SAR: LOW

Geographic Distance

Negligible direct travel links. No direct flights between DRC/Uganda and Hong Kong; travel requires indirect transit (usually via Addis Ababa).

Ecological Shield

The natural reservoirs for Ebolaviruses (specific species of African fruit bats) are completely absent in Hong Kong. No local intermediate primate hosts exist.

Healthcare Readiness

Complete absence of local ecological reservoirs makes sustained wider local transmission highly unlikely, bolstered by world-class isolation infrastructure.

Responses

Risk assessment and preparedness and control measures

Activation of the Preparedness Plan

The HKSAR Government officially activated the Alert Response Level on 17 May 2026.

What this means:

This is the baseline defensive posture, enacted when an outbreak exhibits geographic spread outside Hong Kong but poses no imminent risk of local transmission.

It immediately triggers enhanced border screening, public health education, and heightened clinical vigilance.

OUTBOUND RISK

Red Outbound Travel Alert

The DH assesses the risk of the virus spreading to other global regions as very high. A Red OTA is active for the DRC; citizens must avoid non-essential travel.

INBOUND LOCAL RISK

Alert Response Level Active

The immediate public health impact to Hong Kong is assessed **LOW**. There are no direct flights to affected zones, and Hong Kong has never recorded a local case of Ebola disease.

First Line of Defence: Targeted Port Health Measures

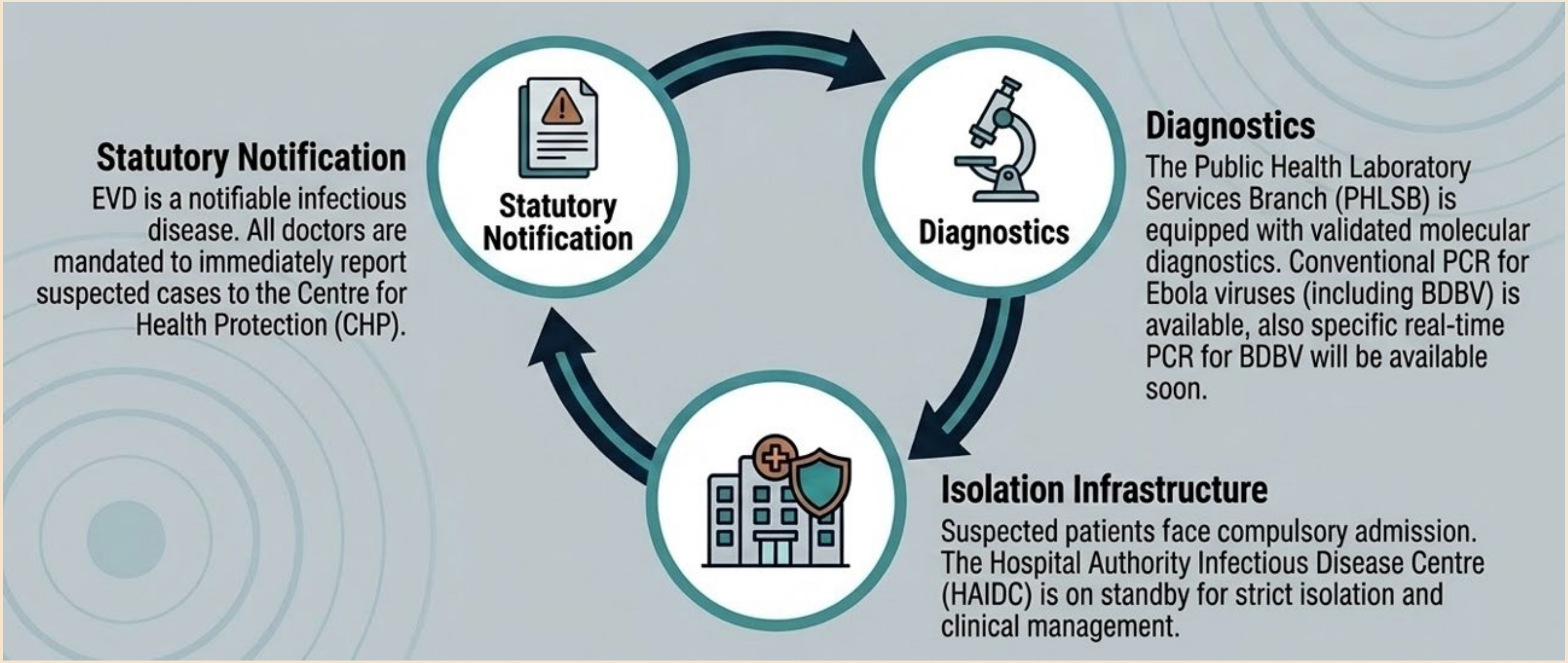
Because there are no direct flights, Port Health focuses on major transit hubs connecting Africa to Hong Kong.

Targeted Screening:
Enhanced temperature checks and health screenings conducted by Port Health staff directly at the bridge exits of arrival gates for flights coming from Addis Ababa.

Active Declarations:
Signage and airport broadcasts urging travellers who have visited DRC or Uganda within the past 21 days to approach Port Health for assessment.

Immediate Action:
Any symptomatic individual is **immediately isolated** and transferred to a public hospital for testing until specimens return negative.

Enhanced surveillance for early case detection



Critical Transport

Fire Services Department Outbreak Control and Response Team (OCRT) deployed. Ambulances equipped with high-efficiency negative pressure systems.

Quarantine Readiness

Penny's Bay quarantine facilities inspected and on standby for immediate activation to safely house any close contacts.

Clinical Vigilance

Direct letters issued to all private and public doctors enforcing a 'highly vigilant' status for febrile patients with a 21-day travel history to affected zones.

Risk Communication and Community Engagement

Travel Restrictions

A Red Outbound Travel Alert (OTA) was issued on 21 May 2026 for the DRC. Residents are strongly advised to avoid non-essential travel.

Targeted Community Outreach

The Department of Health has engaged directly with NGOs serving the African community in Hong Kong, distributing health materials in key areas like Tsim Sha Tsui.

Healthcare Alertness

Letters issued to all private and public medical practitioners, urging them to maintain a "high index of suspicion" and updating them on reporting criteria.

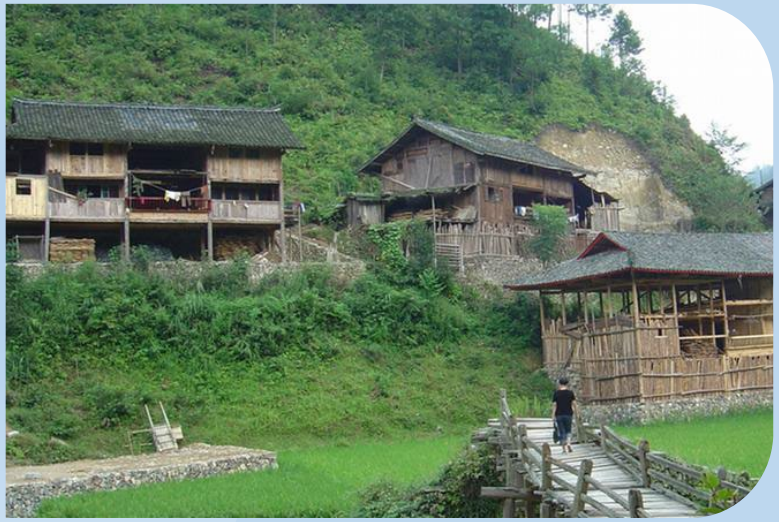
Summary

- The immediate health impact of Ebola disease on the public health in Hong Kong is currently low
- Relevant departments are fully prepared, comprehensive prevention and control measures with established protocols will effectively prevent the spread of the virus in Hong Kong
- Continue to closely monitor the development of the Ebola disease outbreak, and adjust the prevention and control strategies as necessary

Hantavirus infection

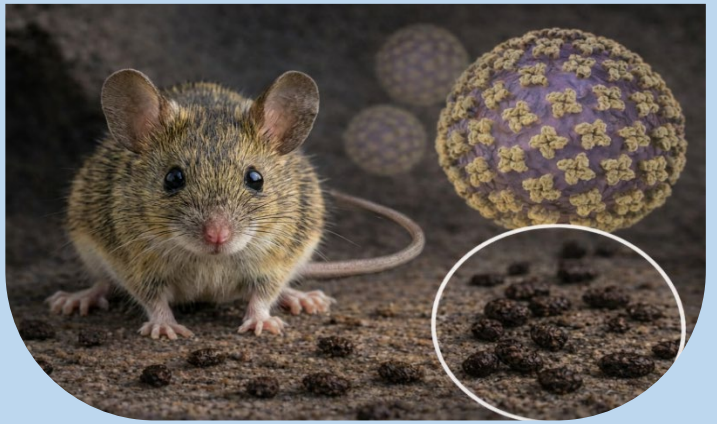
Hantavirus

- Hantaviruses are zoonotic viruses that naturally infect rodents and are occasionally transmitted to humans.
- In the Americas, infection has been known to lead to hantavirus cardiopulmonary syndrome (HCPS), a rapidly progressive condition affecting the lungs and heart
- In Europe and Asia hantaviruses have been known to cause haemorrhagic fever with renal syndrome (HFRS), which primarily affects the kidneys and blood vessels.

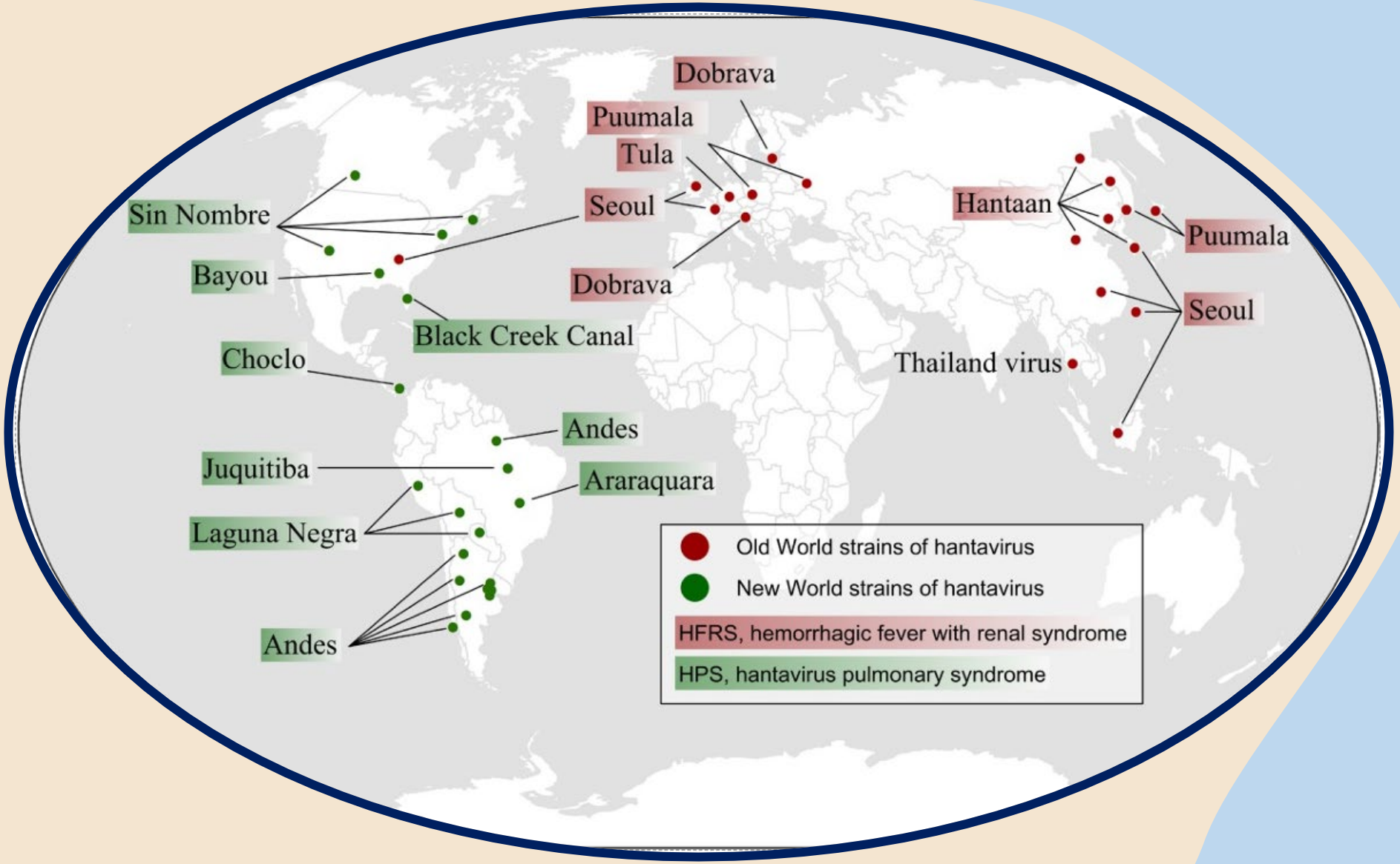


Viral Family and Classification

- Each hantavirus is typically associated with a specific rodent reservoir species, and they have a narrow host specificity.
- Although many hantavirus species have been identified worldwide, only a limited number are known to cause human disease.
- Hantaviruses present in North, Central and South America are known to cause HCPS. The *Andes* virus is part of this family and is known to cause limited human-to-human transmission among close and prolonged contacts, primarily in Argentina and Chile.
- Hantaviruses found in Europe and Asia are known to cause haemorrhagic fever with HFRS. Human-to-human transmission has not been documented in this part of the world.



Map of Old World and New World hantavirus genotypes



	OLD WORLD	NEW WORLD
Geography	Eurasia (e.g., Puumala, Dobrava)	The Americas (e.g., Andes, Sin Nombre)
Clinical Syndrome	HFRS (Haemorrhagic Fever with Renal Syndrome)	HCPS (Hantavirus Cardiopulmonary Syndrome)
Lethality	<1% to 12% Fatality	Up to 50% Fatality
Transmission	Zoonotic only	Zoonotic + Human-to-Human (ANDV)

Transmission

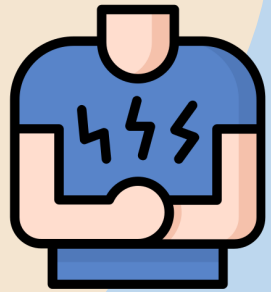
- Transmission through
  - Contact with contaminated urine, droppings or saliva of infected rodents
  - Rodent bites (less common)
- Activities that involve contact with rodents will increase exposure risk
- To date, human-to-human transmission has been documented only for *Andes* virus in the Americas and remains uncommon.
- When it occurs, transmission between people has been associated with close and prolonged contact, particularly among household members and appears most likely during the early phase of illness, when the virus is more transmissible.

Clinical Features

- Symptoms may start to develop around 1 to 8 weeks after exposure.
- In HFRS, initial symptoms begin suddenly and include intense headache, back and abdominal pain, fever, chills, nausea, and blurred vision.
- In HCPS, early symptoms include fatigue, fever and muscle ache. The disease may progress rapidly to cough, shortness of breath, pulmonary oedema and shock. High case fatality rate of up to 40%.

HCPS: Fatigue, Fever and muscle ache

HCPS: cough, SOB, Pulmonary oedema



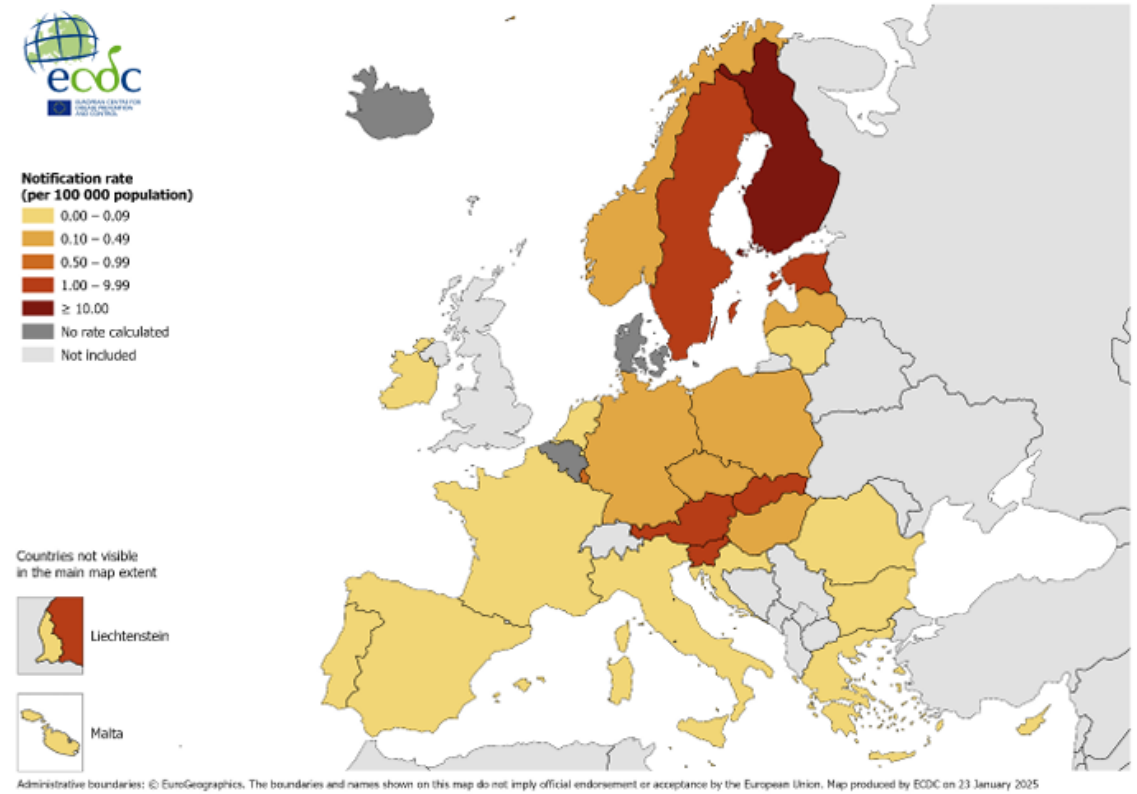
HFRS: abdominal pain, fever, nausea

Global Epidemiology - Europe

- Latest data shows that, for 2023, 28 EU/EEA countries reported 1 885 cases of hantavirus infection (0.4 cases per 100 000 population).
- This marked the lowest rate recorded over the latest 5-year period. During this time, the overall notification rate fluctuated between 0.4 and 1.1 cases per 100 000 population.
- Two countries (Finland and Germany) accounted for 60.5% of all reported cases.
- Puumala virus (PUUV) was the most commonly identified pathogen, accounting for 1 132 (95.6%) of 1 184 cases with available information on the causative agent. Hantaan virus was identified in 32 cases and Dobrava (DOBV) in 20 cases.
- Both PUUV and DOBV are known to cause Haemorrhagic fever with renal syndrome.

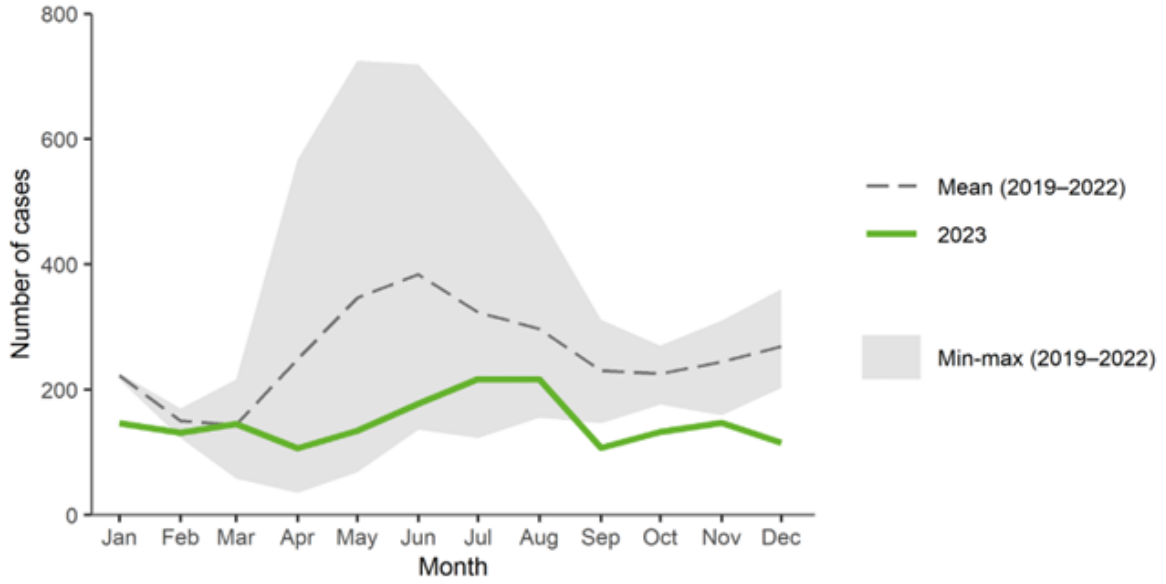
Global Epidemiology - Europe

Figure 1. Distribution of hantavirus infection rates per 100 000 population by country, EU/EEA, 2023



The notification rate for Belgium was not calculated as the surveillance system changed so that it was no longer comprehensive.

Figure 3. Hantavirus infection cases by month, EU/EEA, 2023 and 2019–2022

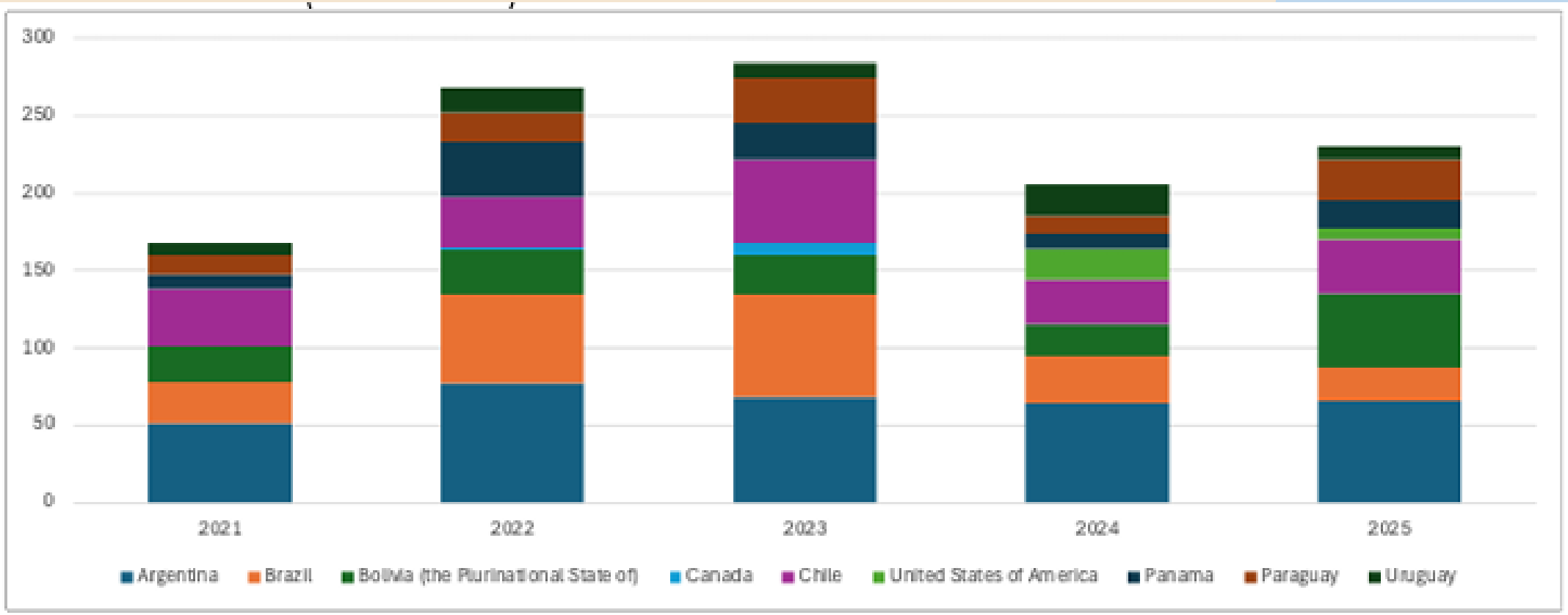


Source: Country reports from Austria, Cyprus, Czechia, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. Belgium, Bulgaria, Croatia, Denmark, Iceland, Liechtenstein and Luxembourg were not included as these countries did not report data for all months from 2017 to 2021.

Global Epidemiology - Americas

- In the Americas, hantavirus infection cases are much rarer, with hundreds of cases reported each year across the continent.
- In 2025 as of epidemiological week 47, 8 countries in the Americas Region have reported confirmed cases of HCPS, with an aggregated total of 229 cases and 59 deaths, corresponding to a regional case fatality rate of 25.7%.
- The Region has a history where human-to-human transmission is suggested, mainly associated with the *Andes* virus. These events, described in previous outbreaks in Argentina (1996 and 2018) and Chile (1997, 2004, and 2014), have occurred in contexts of close and prolonged exposure

Global Epidemiology - Americas

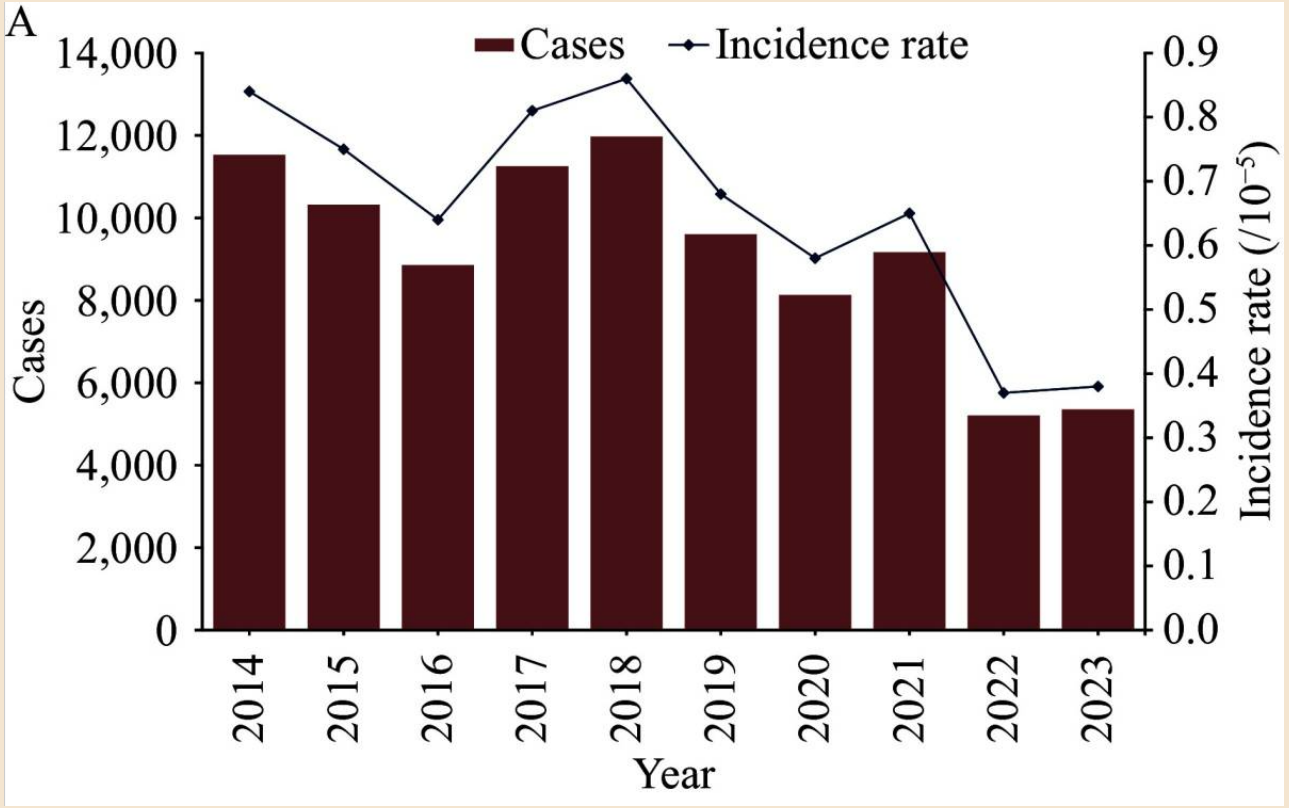


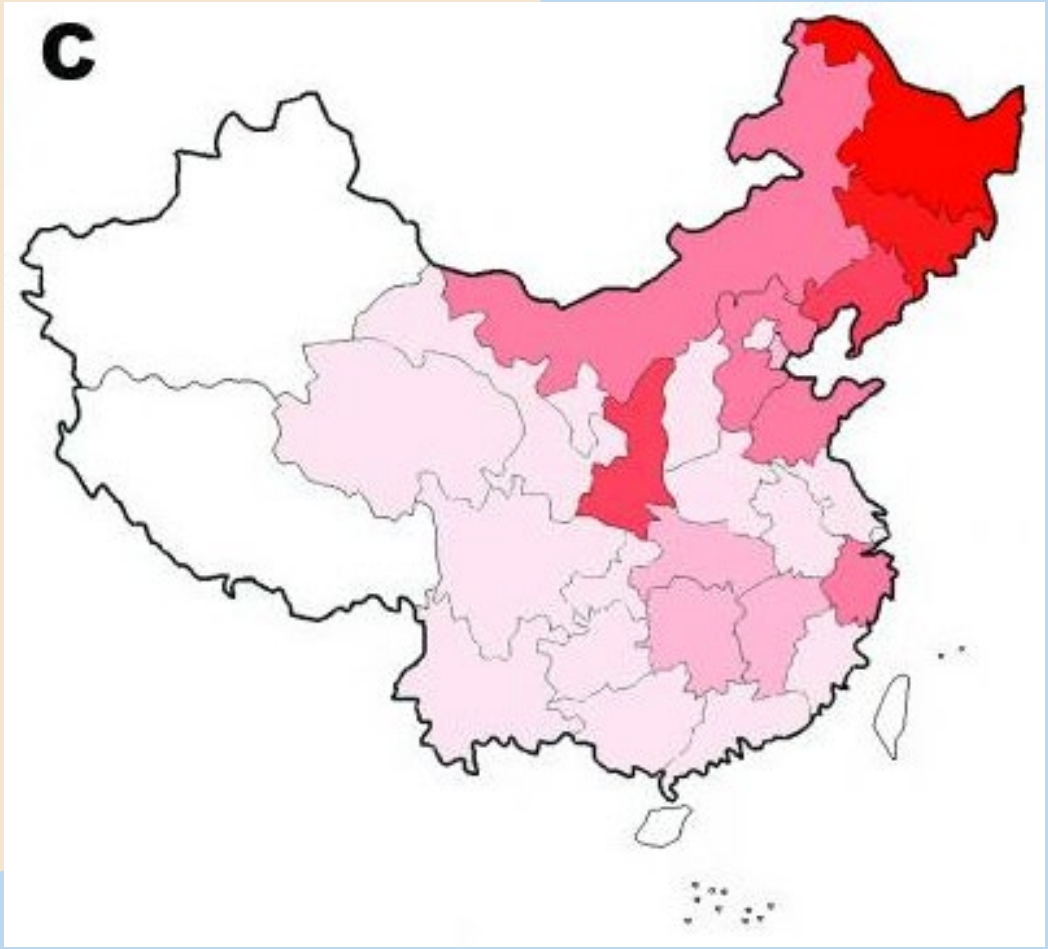
*Note: No data is available for Canada for the year 2024 and 2025 and for the United States of America for the year 2021, 2022, and 2023.

Global Epidemiology - China

- 7 sero/genotypes of hantaviruses have been identified in China. Of these, only Hantaan virus (HTNV) and Seoul virus (SEOV) can cause Haemorrhagic fever with renal syndrome
- In 2007, inactivated vaccines against HNTV and SEOV were included in the national expanding immunization program in China
- After decades of implementing comprehensive prevention and control measures in China, the incidence of HFRS has decreased to a low level (<0.4/100,000)
- A total of 9 Provinces reported average annual incidence rates higher than the national average, including Shaanxi, Heilongjiang, Shandong, Liaoning, Hunan, Jilin, Jiangxi, Fujian, and Hubei.

Global Epidemiology - China

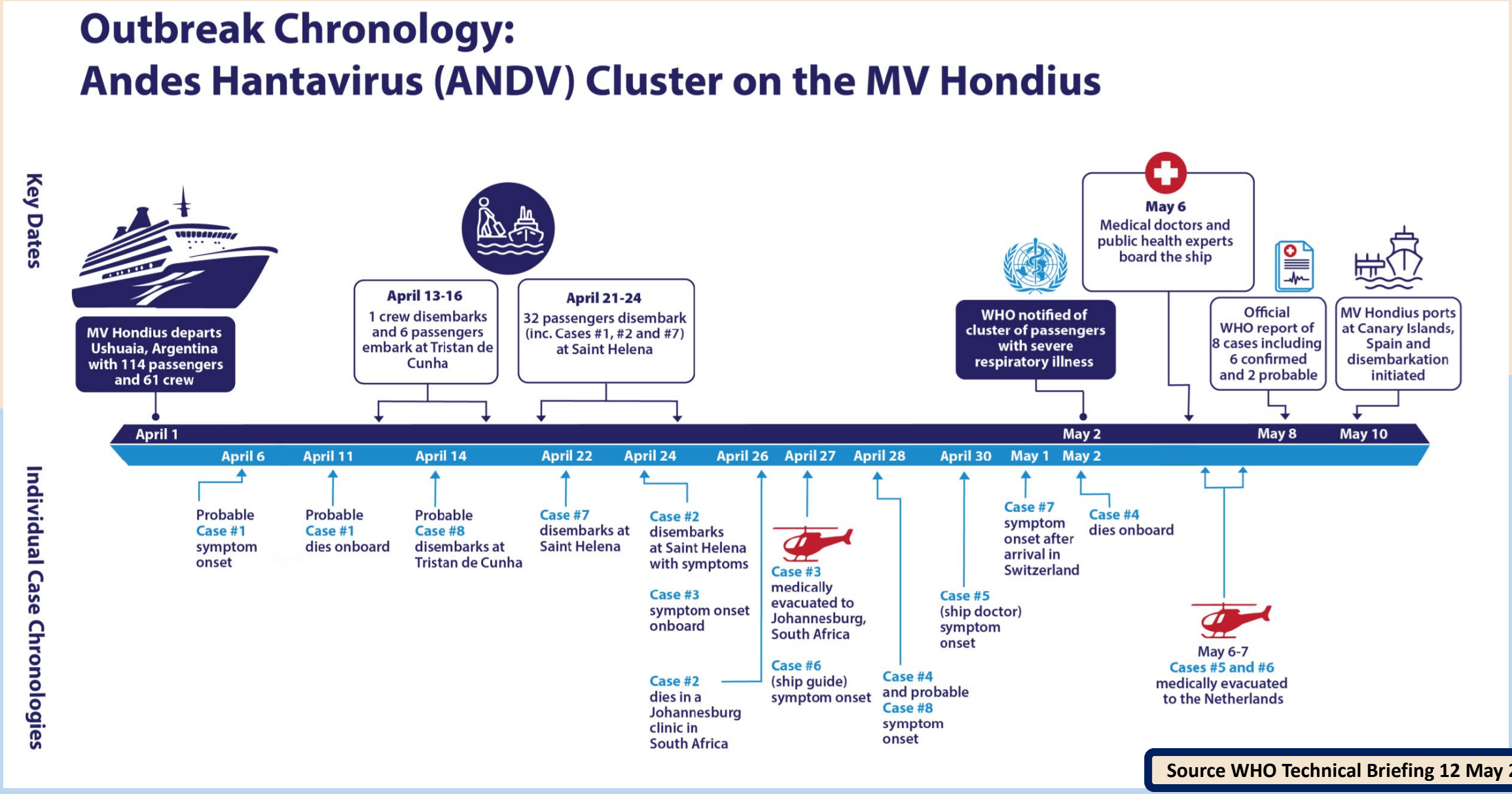




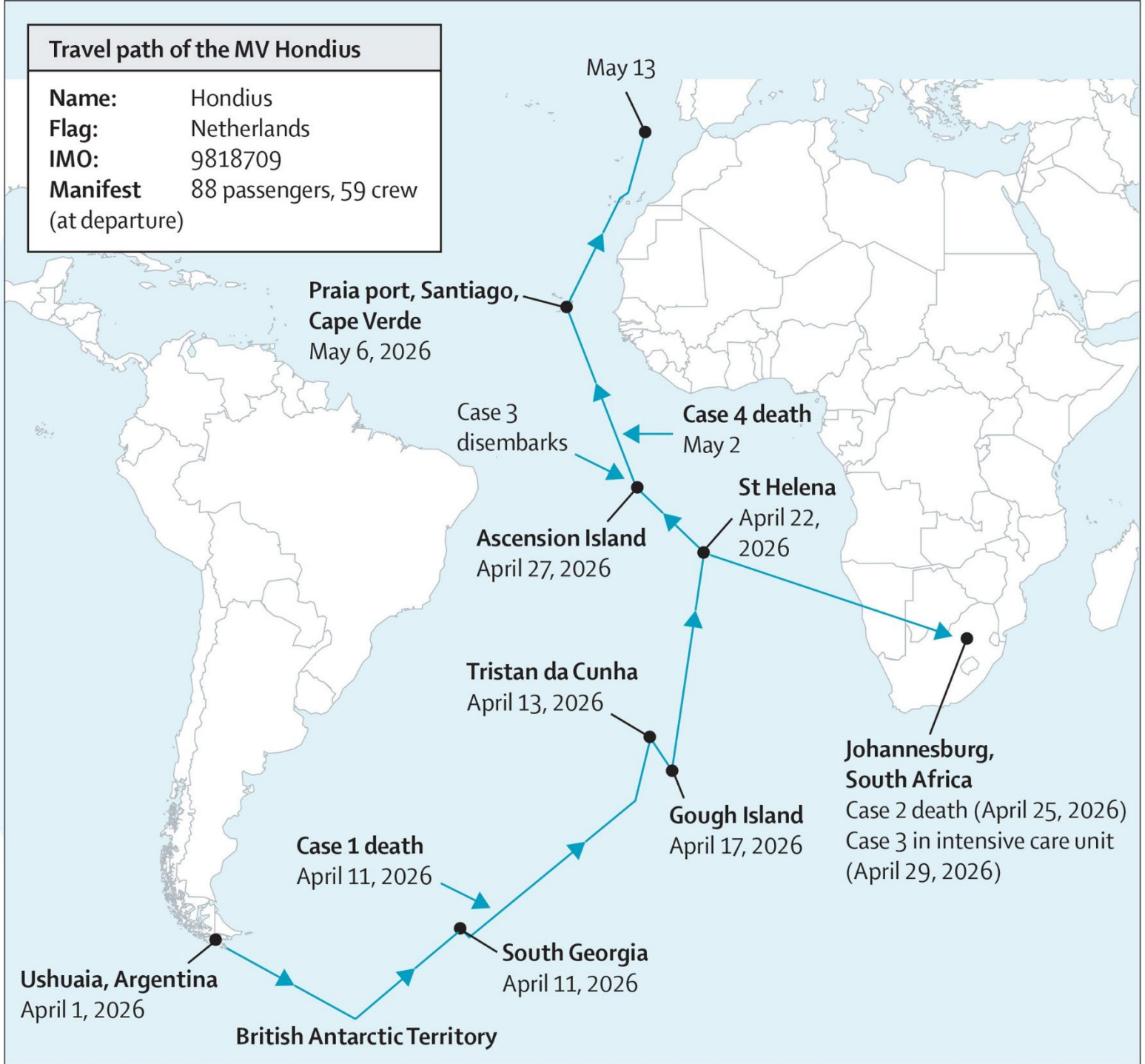
Hantavirus Disease in Hong Kong

- In Hong Kong, Hantavirus-positive rodents are widely distributed across the territory
- 40 sporadic cases were reported to the Department of Health from 1995 to June 2008
- Hantavirus infection has been made notifiable in Hong Kong since 14 July 2008 and a total of fourteen cases (12 local cases, 1 imported case and 1 undetermined case) were notified since then
- The last case recorded was in July 2024. Hong Kong has recorded no cases in 2025 and this year as of May 21, 2026 (0–2 cases/year over the past five years)
- No case of Andes virus are recorded in Hong Kong

MV Hondius Hantavirus Outbreak 2026



Source WHO Technical Briefing 12 May 2026



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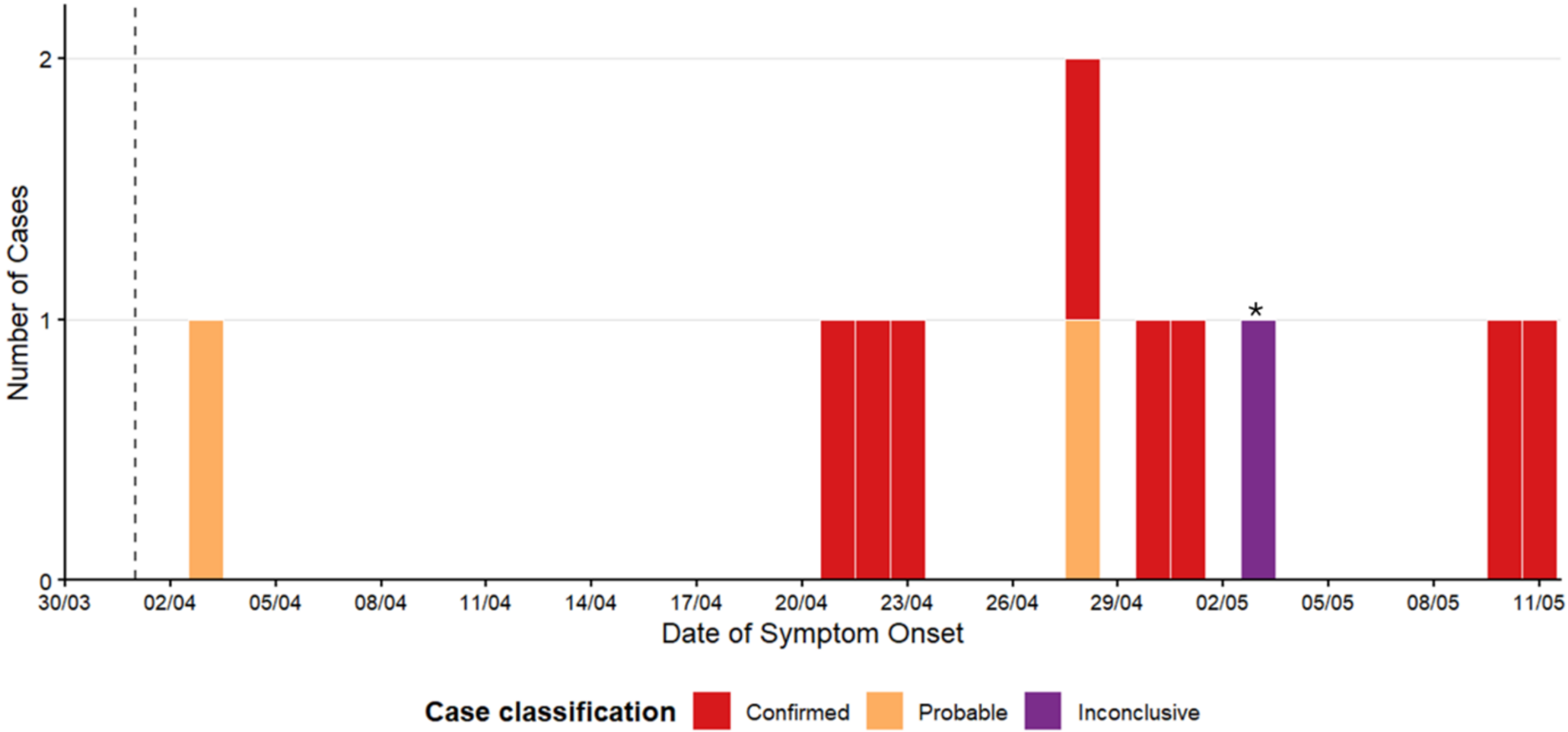
Department of Health



* *Date of sampling*

Data source: WHO | Generated: 2026-05-12

TRANSMISSION PATHWAYS

ENVIRONMENTAL EXPOSURE

Zoonotic spillover. Dead-end host.

HUMAN-TO-HUMAN

Rare. Requires close, prolonged contact.

THE CLOSED-SETTING THREAT

HIGH-RISK DEMOGRAPHICS

Older population (Average age 65) with higher comorbidity risks.

PROLONGED PROXIMITY

Shared cabins and extended face-to-face interactions.

ECOTOURISM EXPOSURE

Pre-boarding mainland excursions in ANDV-endemic regions (Argentina).

HEALTHCARE ISOLATION

Remote ocean transit delays access to advanced ICU/ventilator care.

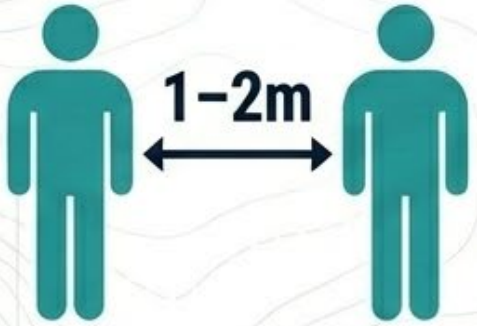
CONTAINMENT PROTOCOLS

ISOLATE

Single cabins for symptomatic individuals. Dedicated bathrooms.

PROTECT

Routine masking outside quarters. Droplet precautions for medical staff.



DISTANCE

Strict 1–2 metre physical distancing.

SANITIZE

Frequent handwashing. Disinfect high-touch surfaces (virus inactivated by bleach/ethanol).

Actions taken

- CHP have exchanged official communication with more than 30 IHR National Focal Points
  - Confirm that no Hong Kong residents were present on the MV Hondius or classified as close contacts
- Provided information on rodent control to relevant parties
- Strengthen environmental hygiene monitoring at all boundary control points
- Issued press release, letter to doctors and hospitals, social media posts

Thank You