

وقاية

هيئة الصحة العامة  
PUBLIC HEALTH AUTHORITY

# HANTAVIRUS

**Surveillance, Diagnosis, Management,  
and Public Health Measures**

**Clinical and Public Health Guidance**

**Version 1.0**  
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## 1. Introduction

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Hantaviruses are zoonotic viruses that primarily infect rodents and can occasionally be transmitted to humans. When humans become infected, it can lead to severe illness and, in some cases, death. The type of disease experienced can vary based on the specific virus and geographical location. In the Americas, hantavirus infection can cause hantavirus cardiopulmonary syndrome (HCPS), a rapidly progressive illness that affects the lungs and heart. In Europe and Asia, hantaviruses are known to cause hemorrhagic fever with renal syndrome (HFRS), which primarily impacts the kidneys and blood vessels.

Hantavirus infections may be relatively rare on a global scale, but they pose a serious public health threat, with case fatality rates ranging from less than 1% to 15% in Asia and Europe, and soaring to 50% in the Americas. Each year, it is estimated that between 10,000 and over 100,000 people are infected worldwide, with Asia and Europe shouldering the largest burden of these infections.

In East Asia, particularly in China and the Republic of Korea, Hemorrhagic Fever with Renal Syndrome (HFRS) remains a significant concern, causing thousands of cases annually, though the incidence has seen a downward trend in recent years. In Europe, thousands of cases are reported each year, mainly from northern and central areas where the Puumala virus is prevalent. In contrast, Hantavirus Cardiopulmonary Syndrome (HCPS) is much rarer in the Americas, with hundreds of cases across the continent. The United States reports fewer than 1,000 cases annually, while South American nations like Argentina, Brazil, Chile, and Paraguay report only small numbers each year. However, despite its lower prevalence, HCPS carries a high case fatality rate, often between 20% and 40%, underscoring the urgent need for heightened awareness and effective prevention measures.

There is currently no specific treatment to cure hantavirus diseases; however, early supportive medical care is crucial for improving survival rates. This care focuses on monitoring and managing complications related to the respiratory system, heart, and kidneys. Prevention efforts primarily involve reducing contact between humans and infected rodents.



# Surveillance Section



## 2. Case Definition

### 2.1 Clinical Case Definitions

Case Classifications	Case Definitions
Suspected Case	<p><b>A person who meets the following clinical picture:</b></p> <ul style="list-style-type: none"> <li>• Febrile illness (Fever 38 °C or above) with an acute respiratory distress syndrome requiring supplemental oxygen AND bilateral diffuse infiltrates developed within 72 hours of hospitalization in a previously healthy person.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• An acute febrile illness with sudden onset of abdominal or lower back pain, hypotension with proteinuria, thrombocytopenia, leukocytosis, hemoconcentration, oliguria, and elevated BUN in the absence of an alternate diagnosis.</li> </ul> <p style="text-align: center;"><b>OR</b></p> <ul style="list-style-type: none"> <li>• Unexplained illness resulting in death, plus an autopsy examination demonstrating noncardiogenic pulmonary edema without an identifiable specific cause of death</li> </ul>
Probable Case	<p><b>A person who meets the above suspected case criteria + epidemiological links.</b></p> <p><b>Epidemiological link contains:</b></p> <ul style="list-style-type: none"> <li>• Evidence of exposure to rodents or their environment within 6 weeks before illness onset.</li> <li>• History of travel to the area where hantavirus is present or contact with rodents within 8 weeks of onset.</li> <li>• Anyone who shared or visited a conveyance where there has been a confirmed or probable ANDV case</li> <li>• Contact with a confirmed or probable ANDV case.</li> </ul>



**Confirmed Case**

**A person who meets the above suspected case criteria + confirmatory tests.**

**Confirmatory tests include:**

- The presence of hantavirus-specific IgM antibodies or a 4-fold or greater increase in IgG antibody titers or hantavirus-specific IgG seroconversion.
- A positive reverse transcriptase-polymerase chain reaction (RT-PCR) results for hantavirus RNA.
- Positive immunohistochemical results for hantavirus antigens.

**Non-Hantavirus Cardio-Pulmonary Syndrome (HCPS) Hantavirus Infection**

Laboratory-confirmed hantavirus infection with fever but without cardiopulmonary symptoms. Patients present with non-specific viral symptoms including fever, chills, headache, and fatigue.

**2.2 Laboratory Criteria for Confirmation**

**Laboratory evidence includes one or more of the following:**

1. Detection of hantavirus-specific IgM antibodies.
2. Four-fold or greater rise in hantavirus-specific IgG antibody titers between acute and convalescent sera.
3. Detection of hantavirus RNA by RT-PCR in clinical specimens.
4. Detection of hantavirus antigen by immunohistochemistry in tissue samples.

**Laboratory testing should be performed or confirmed at the PHA laboratory. Early testing (within 72 hours of symptom onset) may yield false-negative results due to delayed antibody response.**

**2.3 Screening Criteria**

**Due to the non-specific nature of early symptoms and the commonality of ARDS, screening criteria help identify patients for testing:**

- Acute febrile illness with respiratory symptoms.
- Potential rodent exposure within 6-8 weeks.
- Residence in or travel to areas with known hantavirus activity.
- Absence of predisposing conditions that more likely explain ARDS.



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## 3. Notification and Reporting

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Hantavirus is classified as an emerging public health concern; accordingly, all suspected cases must be reported immediately

**Note: Failure to report reportable infectious diseases by healthcare organizations and/or professionals is punishable by law.**

### 3.1 Reporting Process

- Healthcare providers must report to the public health/infection control department at the healthcare facility
- Public health/infection control department at the healthcare facility reports to the Public Health Authority branches.
- Public Health Authority branches report to the Communicable Disease sector at PHA
- Timeline: Immediately for suspected and confirmed cases.

### 3.2 Reporting Channel

- Suspected cases of hantavirus must be reported **immediately** by **phone, HESN+, and email**.
1. First, the healthcare facility must immediately contact the Communicable Diseases Department at the Public Health Authority branch by phone.
  2. Second, the healthcare facility must report the case through the Health Electronic Surveillance Network (HESN+).
  3. Third, the healthcare facility must complete the notification form and send it immediately by email to:
    - The Communicable Diseases Department at the clusters and/or PHA branches/offices.
    - Coordinators at the PHA branches/offices, who will report to the Communicable Diseases Sector at PHA.



### 3.3 What to Report

- Use the **Hantavirus Case Notification / Investigation Form** to notify and investigate required case information. See appendix page 36.
- Use the **Contact Tracing Form** to follow up with contacts. See appendix page 44.

### 3.4 Reporting Timeline

- Timeline: Immediately for suspected and confirmed cases.



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## 4. Epidemiology

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### 4.1 Global Distribution

Hantavirus infections occur worldwide, with geographic distribution largely determined by the presence of specific rodent reservoir species:

- Americas: Predominantly cause Hantavirus Pulmonary Syndrome (HPS) or Hantavirus Cardiopulmonary Syndrome (HCPS).
- Europe and Asia: Primarily cause Hemorrhagic Fever with Renal Syndrome (HFRS).
- Global surveillance indicates 60,000-100,000 cases of HFRS annually, with China accounting for approximately 50% of cases.

### 4.2 Epidemiological Data

Hantavirus infections are fairly rare worldwide. In 2025, eight countries in the Americas reported 229 cases and 59 deaths, with a death rate of 25.7%. In Europe, 1885 hantavirus cases were reported in 2023 (0.4 per 100,000 people), the lowest rate seen from 2019 to 2023. In East Asia, especially China and South Korea, hantavirus hemorrhagic fever with kidney problems (HFRS) still causes many thousands of cases each year, although the number has gone down in recent decades.

Hantavirus infections cause death in less than 1 to 15% of cases in Asia and Europe, and up to 50% of cases in the Americas.

### 4.3 Causative agents

Hantaviruses belong to the family *Hantaviridae*, within the order *Bunyavirales*.

Each hantavirus is typically associated with a specific rodent reservoir, where it causes persistent infection without causing visible illness.

While many hantavirus species have been identified globally, only a few are known to cause disease in humans.

At least 40 hantavirus species exist in nature, and at least 22 may be pathogenic to humans.

- Hantaviruses present in North, Central, and South America are known to cause HCPS. The *Andes* virus belongs to this family and is known to cause limited human-to-human transmission among close, prolonged contacts, primarily in Argentina and Chile.
- Hantaviruses found in Europe and Asia are known to cause hemorrhagic fever with HFRS. Human-to-human transmission has not been documented in this region.



## 4.4 Risk Factors

### Primary risk factors for hantavirus infection include:

- Occupational exposure (farmers, foresters, pest control workers, military personnel).
- Rural residence or activities in areas with rodent infestations.
- Cleaning activities in enclosed spaces with rodent presence.
- Outdoor recreational activities in endemic areas.
- Seasonal patterns: increased incidence in spring and early summer.

## 4.5 Transmission Dynamics

### Transmission occurs through:

- Inhalation of virus-contaminated aerosols (primary route).
- Direct contact with infected rodent tissues or excreta.
- Rodent bites or scratches (rare).
- Limited human-to-human transmission (Andes virus only).

## 4.6 Reservoir

Rodents are the principal natural reservoir for hantaviruses. The proportion of infected rodents varies by species and geographic region. In endemic areas, approximately 1% to 20% of rodents belonging to the predominant reservoir species may demonstrate anti-hantavirus antibodies, indicating previous or current exposure to the virus.

## 4.7 Incubation period

Ranges 1-6 weeks (with longer incubation reported rarely), most commonly reported between two and four weeks (median 18 days).

## 4.8 Infectious period

From the onset of symptoms until the recovery or death of the case.

## 4.9 Period of highest infectiousness

From onset (starting with non-specific febrile presentation) and throughout the prodromal and symptomatic phase (approximately for one week).

**Human-to-human transmission of *Andes virus* has been documented in household settings with close and prolonged contact. Healthcare-associated transmission remains extremely rare with proper infection control measures.**



# Diagnosis Section



## 5. Clinical Diagnosis

### 5.1 Clinical Presentation

In humans, symptoms usually begin between 1 and 8 weeks after exposure, depending on the virus type, and typically include fever, headache, muscle aches, and gastrointestinal symptoms such as abdominal pain, nausea, or vomiting.

Hantavirus infections present with two distinct clinical syndromes, with overlapping initial symptoms but divergent disease progression.

- In HCPS, the disease may progress rapidly to cough, shortness of breath, accumulation of fluid in the lungs, and shock.
- In HFRS, later stages may include low blood pressure, bleeding disorders, and kidney failure

#### 5.1.1 Hantavirus Cardio-Pulmonary Syndrome (HCPS)

HCPS typically follows a biphasic pattern:

##### Prodromal Phase (1-8 days):

- Fever (which may persist for one week),
- Myalgias, particularly in large muscle groups (thighs, hips, back, shoulders)
- Headache, chills, dizziness
- Gastrointestinal symptoms: nausea, vomiting, diarrhea, abdominal pain
- Malaise and fatigue

##### Cardiopulmonary Phase (Days 2-7):

- Cough (typically non-productive initially)
- Tachypnea and dyspnea
- Rapid progression to acute respiratory distress syndrome (ARDS)
- Hypotension and cardiovascular collapse
- Pulmonary capillary leak syndrome
- Cardiogenic shock in severe cases

The transition from prodromal to cardiopulmonary phase can be rapid, occurring within 24 hours. Early recognition and intensive care are critical as patients can deteriorate quickly.



### 5.1.2 Hemorrhagic Fever with Renal Syndrome (HFRS)

- Patients with severe HFRS typically progress sequentially from fever to abrupt hypotension and clinical shock and then to oliguria.
- As thrombocytopenia and DIC progress, patients may develop diffuse hemorrhages such as petechiae, ecchymoses, hematemesis, hemoptysis, and melena.
- If patients survive the acute phase, they typically enter a diuretic phase between days 10 and 14, followed by a convalescent phase that may last several weeks.

## 5.2 Laboratory Findings

- **Characteristic laboratory abnormalities include:**

HCPS	HFRS
leukocytosis	Leukocytosis
Thrombocytopenia	Thrombocytopenia
Elevated liver function tests	Elevated serum creatinine level
Hypoalbuminemia,	Proteinuria
An increase in serum lactate dehydrogenase	Hematuria
Hemoconcentration	

- **Five specific criteria may be helpful in the initial presumptive diagnosis of HCPS:**
  - Thrombocytopenia
  - Left shift of myelocyte lineage.
  - Lack of toxic granulation in the granulocyte lineage.
  - Immunoblasts >10 percent of the total lymphoid series
  - Hemoconcentration

## 5.3 Radiological Findings

Chest imaging in **HCPS** shows:

- Radiographic findings may resemble acute respiratory distress syndrome.
- Bilateral interstitial infiltrates.



Hantavirus Clinical Syndromes	
Diagnosis steps	
Hantavirus Cardio-Pulmonary Syndrome (HCPS)	Hantavirus Hemorrhagic Fever with Renal Syndrome (HFRS)
<p>HCPS is a severe and potentially deadly disease that affects the lungs. Symptoms of HPS usually appear 1 to 8 weeks after contact with an infected rodent.</p>	<p>HFRS is a severe and sometimes deadly disease that affects the kidneys. Symptoms of HFRS usually develop within 1 to 2 weeks after exposure. In rare cases, they may take up to 8 weeks to develop. Initial symptoms begin suddenly.</p>
Symptoms & signs	Symptoms & signs
<ul style="list-style-type: none"> <li>▪ <b>Early symptoms can include:</b> <ul style="list-style-type: none"> <li>- Fatigue</li> <li>- Fever</li> <li>- Muscle aches, especially in the large muscle groups like the thighs, hips, back, and sometimes shoulders</li> </ul> </li> <li>▪ <b>About half of all HPS patients also experience:</b> <ul style="list-style-type: none"> <li>- Headaches</li> <li>- Dizziness</li> <li>- Chills</li> <li>- Abdominal problems, like nausea, vomiting, diarrhea, and abdominal pain</li> </ul> </li> <li>▪ <b>Four to 10 days after the initial phase of illness, the late symptoms of HPS appear.</b> <ul style="list-style-type: none"> <li>▪ These symptoms include: <ul style="list-style-type: none"> <li>- Coughing</li> <li>- Shortness of breath.</li> <li>- Patients might experience tightness in the chest, as the lungs fill with fluid.</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ <b>Early symptoms begin suddenly and include:</b> <ul style="list-style-type: none"> <li>- Intense headaches</li> <li>- Back and abdominal pain</li> <li>- Fever/chills</li> <li>- Nausea</li> <li>- Blurred vision</li> </ul> </li> <li>▪ <b>People may have flushing of the face, inflammation or redness of the eyes, or a rash.</b></li> <li>▪ <b>Later symptoms can include:</b> <ul style="list-style-type: none"> <li>- Low blood pressure</li> <li>- Lack of blood flow (acute shock)</li> <li>- Internal bleeding (vascular leakage)</li> <li>- Kidney failure, which can cause severe fluid overload</li> </ul> </li> </ul>



Prognosis	Prognosis
<ul style="list-style-type: none"> <li>▪ HCPS can be deadly.</li> <li>▪ 38% of people who develop respiratory symptoms may die from the disease.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The severity of the disease varies depending on the virus causing the infection.</li> <li>▪ <i>Hantaan</i> and <i>Dobrava</i> virus infections usually cause severe symptoms, where 5-15% of cases are fatal.</li> <li>▪ In contrast, <i>Seoul</i>, <i>Saaremaa</i>, and <i>Puumala</i> virus infections are usually more moderate, with less than 1% dying from the disease.</li> <li>▪ Complete recovery can take several weeks to months.</li> </ul>
Initial diagnosis	Initial diagnosis
<p>Healthcare providers should test a person for hantavirus if they have HCPS-compatible symptoms and have epidemiological evidence</p>	<p>Healthcare providers should test a person for hantavirus if they have <b>HFRS</b>-compatible symptoms and have epidemiological evidence</p>



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## 6. Laboratory Diagnosis

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Laboratory confirmation of hantavirus infection relies on serology and molecular methods. The choice of testing method depends on the timing of specimen collection and available resources.

The protocol for the collection, storage, and transport of hantavirus specimens emphasizes strict biosafety standards given the potential for aerosol transmission and the severity of clinical syndromes such as Hantavirus Pulmonary Syndrome (HPS) and Hemorrhagic Fever with Renal Syndrome (HFRS).

### 5.1 Specimen Collection and Storage

#### 5.1.1 Optimal Specimens

- **Serum:** The preferred sample for both serology and RT-PCR. Collect in a red-top or serum-separator tube (SST) ,with a minimum volume of 3 ml according to laboratory requirements.
- **Whole Blood:** Highly useful for molecular detection during the early phase of the disease (viremic period). Collect in EDTA (purple-top) tubes, with a minimum volume of 3 ml according to laboratory requirements.

#### 5.1.2 Timing

- Early Phase (Days 1–7): RT-PCR is most effective while the patient is still viremic.
- If the initial test result is negative and clinical suspicion remains high, repeat specimen collection after 48 hours.

#### 5.1.3 Specimen Storage and Handling

- Hantaviruses are enveloped RNA viruses and are sensitive to temperature fluctuations.
- Store serum at 4°C for ≤48 hours, freeze at -70°C for longer storage
- Transport on dry ice or with cold packs
- Use appropriate biosafety measures (BSL-3)
- Label specimens clearly with collection date and clinical information



Storage Duration	Recommended Temperature	Notes
Short-term (< 48 hours)	4°C	Refrigerate specimens; do not freeze if serology is the only test.
Long-term (> 48 hours)	-70°C or lower	Essential for RNA preservation. Avoid standard -20°C freezers if possible.

**Avoid Repeated Freeze-Thaw Cycles:** These significantly degrade viral RNA and can interfere with antibody stability.

## 5.2 Specimens registration in HESN Plus

- In HESN Plus, you can register the case and request the test Hantavirus serology (IgM ELISA, IgG ELISA) and molecular (RT-PCR), select the type of samples and collection sites, and for the destination, select Public Health Laboratory (PHL).
- Label each specimen container with the patient's ID number, HESN requisition ID, and the date the sample was collected.
- Lab Results will be reported to HESN Plus
- Register the case in HESN Plus and request a hantavirus PCR test
- Select specimen type and collection sites
- Set destination as Public Health Laboratory (PHL)
- Label each specimen container with patient ID number, HESN requisition ID, and collection date
- Store specimens at 2-8°C and transport on dry ice.
- Reporting:
  - Lab Results will be reported to HESN Plus
  - The average Turnaround time (TAT) for the lab results is 48 Hours
- 

## 5.3 Specimens Packaging, Shipment, and Transport to Public Health Authority Laboratory

- All materials transported within and between laboratories should be placed in a Triple Packaging System to minimize the potential for breakage or a spill.
  - **Primary Receptacle:** Leak-proof, sealed specimen tube.
  - **Secondary Packaging:** Leak-proof, durable packaging with absorbent material.
  - **Outer Packaging:** Rigid shipping box with appropriate labeling.



- Ship on cold packs (4°C) for short distances or dry ice (-70°C) for long-duration transport.
- Patient specimens from suspected or confirmed cases should be transported as Category A UN 2814, Infectious substance affecting humans.
- All specimens being transported as Category A UN 2814 should have appropriate packaging, labeling, and documentation. Specimens should be put in a sterile, leak-proof container, screwed properly, then sealed with Parafilm tape and placed in a waterproof secondary container, e.g., ziplock bags, after which they should be put in a third container. The cooling agent should be outside the secondary container.
- Paper sheets should be sealed in waterproof bags and kept separated from the specimens
- Samples can be shipped free of charge via SMSA courier to the Public Health Laboratory (PHL) as per regulations.
- Notify the PHL of the dispatch of the specimen and courier or airway bill number as appropriate.
- Shipment addressed to:  
Public Health Laboratory,  
Public Health Authority,  
Al Aarid, Riyadh.  
[phl@pha.gov.sa](mailto:phl@pha.gov.sa)
- The courier service is available for sample transportation and pickup locations throughout the country for the collection of samples from MOH and non-MOH hospitals and other health care facilities.
- Courier services are provided 24 hours / 7 days a week.

## 5.6 Laboratory Safety

- BSL-3 practices for diagnostic specimens
  - Routine molecular testing should be conducted under BSL-3 enhanced precautions.
- All infectious waste must be autoclaved before disposal.

**All suspected hantavirus specimens should be handled with enhanced biosafety precautions, Biosafety Level-3. Contact the Public Health laboratory at PHA for specific requirements.**



# Management Section



## 7. Infection Prevention and Control in Health-Care Settings

Available evidence suggests that the risk of transmitting hantavirus, including the *Andes* virus, in healthcare settings is very low when appropriate infection prevention and control measures are implemented.

- **For all patients**, standard precautions represent the essential infection control measures used for every patient, regardless of their infection status, to help prevent the spread of pathogens. Core components include proper hand hygiene, use of personal protective equipment (PPE), practicing respiratory hygiene, ensuring safe injection practices, managing sharps safely, maintaining environmental cleanliness, and handling laundry and waste appropriately.
- **For patients with suspected or confirmed hantavirus (*Andes* Virus) infection**, use standard precautions along with enhanced transmission-based precautions while providing care.

Appropriate infection control measures are essential to prevent healthcare-associated transmission and protect healthcare workers, patients, and visitors.

### 7.1 Standard Precautions

Apply standard precautions for all patients regardless of suspected or confirmed hantavirus infection:

- Hand hygiene before and after all patient contact.
- Use of appropriate personal protective equipment (PPE).
- Safe handling and disposal of sharps.
- Environmental cleaning and disinfection.
- Respiratory hygiene/cough etiquette.
- Medical waste management.
- Laundry management.

### 7.2 Transmission-Based Precautions

Given the documented potential for person-to-person transmission of *Andes* virus, implementation of enhanced Transmission-Based Precautions is recommended in addition to Standard Precautions. Enhanced precautions are recommended due to documented person-to-person transmission:

- Implement Airborne Infection Isolation precautions.
- Place patients in an Airborne Infection Isolation Room (AIIR).



- Ensure healthcare personnel utilize enhanced personal protective equipment (PPE), including a fit-tested high efficiency respirator or Powered Air-Purifying Respirators (PAPRs) (as an appropriate alternative respiratory protection device for healthcare workers who are unable to achieve required fit test), eye protection, gloves, and isolation gown during patient care activities.
- Limit patient movement and transport outside the isolation room to medically essential purposes only and communicate precaution requirements to receiving departments prior to transfer.
- Restrict visitation to essential caregivers and ensure adherence to recommended infection prevention and control measures, including appropriate PPE use.

**If the infecting Hantavirus species is unknown and the patient has a travel history to an endemic area, apply enhanced isolation precautions (*Andes virus* precautions).**

### 7.3 Environmental Health Considerations

- Use registered hospital-grade intermediate to high level disinfectants for routine cleaning and disinfection of patient care areas and equipment.
- Ensure cleaning and disinfection practices are performed in accordance with manufacturer instructions for dilution, contact time, application method, and safe use.
- Perform routine and terminal cleaning and disinfection of patient room using approved environmental cleaning and disinfection protocols.
- Pay particular attention to high-touch surfaces, including bed rails, bedside tables, monitors, infusion pumps, door handles, light switches, bathroom fixtures, and frequently handled medical equipment.
- Maintain documented environmental cleaning and disinfection checklists, including defined cleaning frequencies, assigned responsibilities, monitoring activities, and supervisory verification processes.
- Ensure environmental services personnel utilize appropriate personal protective equipment (PPE) during cleaning and waste handling activities.
- Avoid dry sweeping, dry dusting, or activities that may aerosolize contaminated dust or particles during environmental cleaning procedures.
- Single-use equipment should be preferred whenever possible. However, if reusable patient-care equipment is used, it must be appropriately cleaned, disinfected, and reprocessed in accordance with healthcare facility-approved protocols before being used for another patient.



- Apply standard medical waste management procedures for all waste generated from patient care activities, in accordance with approved regulations and the healthcare facility's policies and procedures.
- Handle contaminated linen with minimal agitation and process it according to routine healthcare linen management and laundering procedures.

## 7.4 Healthcare Worker Exposure Management

### If healthcare worker exposure occurs:

- All exposure incidents must be immediately reported to and documented in the official incident reporting system, including details of exposure type, duration, PPE used, and procedural context.
- Immediate notification and referral to the Occupational Health Clinic for risk assessment, clinical evaluation, and appropriate post-exposure management.
- Monitor exposed personnel for symptoms for up to 42 days post-exposure, or as guided by the Occupational Health Clinic based on risk assessment.
- Seek immediate medical attention through the Occupational Health Clinic if any symptoms develop during the follow-up period.
- Consider work restrictions as determined by the Occupational Health Clinic with coordination of infection control team.

## 7.5 Autopsy and Mortuary Practices

- Standardized mortuary practices should be followed with strict adherence to body containment procedures, including use of leak-proof body bags.
- The number of personnel involved in autopsy and mortuary procedures should be strictly limited to the minimum essential staff required.
- Healthcare workers must use enhanced personal protective equipment (PPE), including a fit-tested high-efficiency respirator or Powered Air-Purifying Respirators (PAPRs) (as an appropriate alternative respiratory protection device for healthcare workers who are unable to achieve required fit test), eye protection (goggles or face shield), impermeable gown, and gloves.



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## 8. Management and treatment

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Currently, there is no licensed antiviral treatment or vaccine for hantavirus infection. Management is supportive, emphasizing close monitoring and treatment of respiratory, cardiac, and kidney complications. Early intensive care, when indicated, improves outcomes, especially for patients with hantavirus cardiopulmonary syndrome.

Early transfer to designated facilities with intensive care capabilities and ECMO availability is recommended for all suspected HPS cases, even before confirmation.

### 8.1 General Principles

- Early recognition and rapid initiation of supportive care.
- Aggressive management of respiratory and circulatory failure.
- Careful fluid management to avoid exacerbating pulmonary edema.
- Multidisciplinary approach involving intensive care, infectious diseases, and pulmonology.
- Anticipatory care to prevent complications.

### 8.2 Acute Phase Management

#### 8.2.1 Respiratory Support

- Oxygen therapy: Start with nasal cannula or face mask.
- Early intubation and mechanical ventilation if respiratory distress.
- Lung-protective ventilation strategies (low tidal volume).
- Consider prone positioning for severe ARDS.
- ECMO for refractory respiratory failure.

#### 8.2.2 Hemodynamic Support

- Careful fluid resuscitation avoiding overload.
- Invasive hemodynamic monitoring.
- Vasopressors for shock.
- Early use of inotropes.

#### 8.2.3 Renal Support (HFRS)

- Monitor fluid and electrolyte balance carefully.
- Dialysis for severe acute kidney injury.



- Manage oliguria and subsequent polyuria phases.
- Electrolyte replacement during diuretic phase.

## 8.3 Supportive Care Measures

### 8.3.1 Monitoring and Assessment

- Continuous cardiopulmonary monitoring.
- Serial arterial blood gases and lactate levels.
- Daily chest imaging.
- Hemodynamic monitoring (pulmonary artery catheter if indicated).
- Renal function monitoring.
- Neurological assessment.

### 8.3.2 Specific Interventions

- Thrombosis prophylaxis.
- Stress ulcer prophylaxis.
- Nutritional support.
- Physical therapy and mobilization when stable.
- Psychological support.

## 8.4 Prognostic Factors

### Factors associated with poor prognosis include:

- Age >40 years.
- Delayed presentation (>4 days from symptom onset).
- Shock on presentation.
- High lactate levels.
- Severe thrombocytopenia (<50,000/ $\mu$ L).
- Extensive pulmonary infiltrates.
- Need for mechanical ventilation.



## Hantavirus clinical syndromes

Hantavirus Cardio-Pulmonary Syndrome (HCPS)	Hantavirus Hemorrhagic Fever with Renal Syndrome (HFRS)
<p><b>Treatment and recovery</b></p> <ul style="list-style-type: none"> <li>• There is no specific treatment for hantavirus infection.</li> <li>• If <b>HCPS</b> is suspected, provide immediate emergency care in an intensive care unit, even before confirming the diagnosis.</li> <li>• Early intensive care is essential, as patients can deteriorate rapidly and may die without prompt intervention. Treatment is less effective once severe distress develops.</li> <li>• Patient management should include: <ul style="list-style-type: none"> <li>- Monitoring and adjustment of cardiac function.</li> <li>- Carefully administering fluids</li> <li>- Providing supplemental oxygen.</li> <li>- Intubating and ventilating if needed</li> </ul> </li> <li>• Supportive care should include antipyretics and analgesics.</li> <li>• Although <b>HCPS</b> is severe, the critical phase is brief. Cardiopulmonary dysfunction is likely caused by circulating inflammatory mediators, as autopsies of fatal cases show minimal tissue damage.</li> <li>• Starting extracorporeal membrane oxygenation (ECMO) at the first sign of decompensation results in an 80 percent survival rate, even in cases of cardiopulmonary collapse.</li> <li>• Most <b>HCPS</b> patients develop hypotension within 24 hours of initial evaluation, along with worsening pulmonary edema and</li> </ul>	<p><b>Treatment and recovery</b></p> <ul style="list-style-type: none"> <li>• There is no specific treatment for hantavirus infection.</li> <li>• Care for hantavirus infection typically includes supportive therapy: <ul style="list-style-type: none"> <li>• Monitor and manage hydration and electrolyte levels.</li> <li>• Maintain appropriate oxygen and blood pressure levels.</li> <li>• Treat secondary infections as needed.</li> <li>• Dialysis may be necessary to address severe fluid overload.</li> </ul> </li> <li>• Early intravenous administration of ribavirin may reduce illness and mortality from HFRS.</li> <li>• Full recovery may require several weeks to months.</li> <li>• Mortality rates vary by virus, ranging from less than 1 percent for <i>Puumala</i> virus to up to 15 percent for <i>Hantaan</i> virus.</li> </ul>



<p>hypoxia, often requiring mechanical ventilation.</p> <ul style="list-style-type: none"> <li>• Fatal cases often involve severe myocardial depression, progressing to sinus bradycardia, electromechanical dissociation, ventricular tachycardia, or fibrillation.</li> <li>• Poor prognostic indicators in <b>HCPS</b> include plasma lactate above 4.0 mmol/L or a cardiac index below 2.2 L/min/m<sup>2</sup>.</li> <li>• Pulmonary edema and pleural effusions are common, while multiorgan dysfunction is rare.</li> <li>• Mild renal impairment may occur.</li> <li>• Survivors often develop polyuria during recovery and improve quickly.</li> <li>• Intravenous ribavirin, a guanosine analog, has been tested in <b>HCPS</b> patients but has not proven effective.</li> <li>• Without adequate treatment, most <b>HCPS</b>-related deaths occur within 24 to 48 hours after the onset of the cardiopulmonary phase.</li> </ul>	
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### Discontinuation of Isolation Precautions

The duration of required isolation precautions should be determined on an individual basis for each case, in coordination with relevant national public health authorities.

Decision-making should consider, but not be limited to, the presence and severity of clinical symptoms, the timing of symptom resolution, and any relevant clinical, epidemiological, or laboratory factors that may justify the continuation of specific infection control measures.

**Early intensive care has been shown to improve survival rates. Facilities should have protocols for rapid escalation of care for suspected hantavirus cases.**



# Public Health Measures Section



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## 9. Preventive Measures

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Prevention of hantavirus infection focuses primarily on reducing human-rodent contact and implementing environmental management strategies. There are currently no licensed vaccines for hantavirus prevention.

### 9.1 Primary Prevention

#### 9.1.1 Preventive measures (Especially for *Andes virus*)

- Isolate Symptomatic Patients
- Stay separated from others, especially during the early symptomatic phase.
- Avoid crowded settings and close physical contact.
- Avoid Exposure to Body Fluids such as saliva, respiratory secretions, possibly blood, or other bodily fluids.
- Avoid sharing utensils, drinks, cigarettes, or toothbrushes.
- Avoid kissing or prolonged close face-to-face contact.
- Avoid contact with respiratory secretions.

#### 9.1.2 Rodent Control and Exclusion

- Seal holes and gaps in buildings (>6mm diameter).
- Remove food sources and nesting materials.
- Maintain clean environments free of debris.
- Use rodent-proof containers for food storage.
- Install door sweeps and repair screens.
- Trim vegetation around buildings.

#### 9.1.3 Environmental Management

- Remove brush, woodpiles, and debris from building perimeters (maintain 30-foot clearance).
- Elevate stored materials off the ground.
- Maintain proper drainage to avoid standing water.
- Regular inspection and maintenance of buildings.
- Professional pest control in high-risk areas.



## 9.2 Safe Cleanup Procedures

When cleaning areas with potential rodent contamination:

### 9.2.1 Personal Protection

- Wear rubber or plastic gloves.
- Use fit-tested high efficiency respirator or Powered Air-Purifying Respirators (PAPRs).
- Wear protective clothing that can be disinfected or discarded.
- Use eye protection if risk of splashing.

### 9.2.2 Cleaning Protocol

- Ventilate area for 30 minutes before entry.
- Do NOT sweep or vacuum rodent droppings/nests.
- Spray contaminated areas with 10% bleach solution.
- Allow disinfectant to sit for 5 minutes before cleanup.
- Use damp cleaning methods only.
- Double-bag all waste in plastic bags.
- Decontaminate reusable tools and equipment.

**Never use dry cleaning methods (sweeping, vacuuming) in areas with rodent contamination, as this can create infectious aerosols.**

## 9.3 Occupational Safety

### 9.3.1 High-Risk Occupations

- Agricultural workers.
- Forestry and park service personnel.
- Military personnel in field operations.
- Pest control operators.
- Construction workers in rural areas.
- Research personnel handling rodents.

### 9.3.2 Workplace Interventions

- Develop and implement rodent control programs
- Provide appropriate PPE and training
- Establish safe work practices for high-risk activities
- Implement medical surveillance for high-risk workers
- Develop emergency response plans



## 9.4 Travel and Recreational Safety

- Choose accommodations with effective rodent control.
- Inspect sleeping areas for signs of rodent activity.
- Use tents with floors and keep them sealed.
- Store food in rodent-proof containers.
- Sleep on cots or elevated surfaces when camping.
- Avoid disturbing rodent nests or burrows.

## 9.5 Community Education

### Public education should focus on:

- Recognition of risk factors and exposure situations
- Importance of early medical care for compatible symptoms
- Safe cleanup procedures for households
- Rodent control and prevention strategies
- When to seek professional pest control services

## 9.6 Surveillance and Early Detection

- Enhance surveillance in endemic areas
- Monitor rodent populations for viral activity
- Establish sentinel surveillance systems
- Train healthcare providers in recognition and reporting
- Develop rapid laboratory testing capabilities
- Implement outbreak response protocols

## 9.7 One Health Approach

### Integrate human, animal, and environmental health strategies:

- Collaborate with veterinary and wildlife authorities
- Monitor ecosystem changes affecting rodent populations
- Study climate and environmental factors
- Develop interdisciplinary research programs
- Coordinate surveillance across sectors



## 10. Public Health Measures at Ports of Entry (PoE)

In response to the recent outbreak of Hantavirus disease in multiple countries, the Kingdom of Saudi Arabia has implemented procedures for all travelers arriving (refer to the public health measures at ports of entry guideline).

PHA recommends using a risk-based approach to identify, monitor, and manage contacts of probable or confirmed Andes virus (ANDV) cases linked to a global public health event. ANDV has shown limited human-to-human transmission, typically occurring through close and prolonged contact.

### 10.1 Precautionary measures at the point of entry

- Apply a precautionary approach to identifying, classifying, tracing, and following up with contacts, especially for those exposed on board the ship or during travel.
- Classify contacts based on exposure risk, considering factors such as intensity and duration of exposure, proximity to the case, shared or enclosed spaces, and use of personal protective equipment.

### 10.2 Operational case definition at point of entry

Criteria	Definition
<b>Suspected Case</b>	Any individual who shared or visited a location/ conveyance with a confirmed or probable ANDV case and presents with acute symptoms consistent with ANDV infection, such as fever (38°C or above), myalgia, chills, acute gastrointestinal symptoms (nausea, vomiting, diarrhea, abdominal pain), or acute respiratory symptoms (cough, shortness of breath, chest pain, difficulty breathing).
<b>Probable Case</b>	Any individual who exhibited symptoms of a suspected case, with a known epidemiological link to a confirmed or probable ANDV case, and without available laboratory results.
<b>Confirmed Case</b>	A clinically compatible case with laboratory confirmation of ANDV by RT-PCR or serology testing.



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## 11. Contact tracing

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Contact tracing is the systematic process of identifying, assessing, managing, and supporting contacts of infectious individuals.

### 11.1 Identifying the contacts:

**Contact:** an individual exposed to a confirmed or probable case of ANDV during the infectious period through any of the following:

- Direct physical contact with saliva or other bodily fluids (such as caregiving, intimate contact, or sharing a bed);
- Close proximity exposure, defined as being within 2 meters for a cumulative period of more than 15 minutes (such as face-to-face interactions, shared meals, or social gatherings);
- Exposure in enclosed or shared spaces (such as spending multiple days on the same ship or sitting in close proximity on an aircraft or other conveyance);
- Unprotected exposure in healthcare or laboratory settings, particularly during patient care.

### 11.2 Assessing the contacts:

- Classify contacts as high or low risk based on exposure intensity and duration, proximity to the case, type of interaction (such as direct contact or shared spaces), and use of personal protective equipment.
- A contact is classified as **high-risk** if they meet one or more of the following criteria in relation to a probable or confirmed case:
  - The contact shared the same cabin with the probable or confirmed case.
  - The contact was an intimate partner of the probable or confirmed case or had direct physical contact.
  - The contact shared the same bathroom or sleeping area with the probable or confirmed case.
  - The contact was within 2 meters for prolonged periods (more than 15 minutes) in an enclosed space with a probable or confirmed case.
  - The contact shared meals, prolonged social activities, or caregiving activities with the probable or confirmed case.
  - The contact was a healthcare worker who did not adhere to infection control procedures.



- The contact was a healthcare worker who performed aerosol-generating medical procedures on the suspected or confirmed patient without adhering to appropriate personal protective equipment.
- A contact is classified as **low-risk** if they meet one or more of the following criteria:
  - The contact was a crew member or passenger who did not share the same cabin and did not have close and prolonged contact with the probable or confirmed case.
  - The contact was an aircraft passenger but seated far from the seat of the probable or confirmed case.
  - The contact was a passenger with short travel periods or transit passengers at the station who do not meet the definition of high-risk contact.
  - The contact shared activities with the probable or confirmed case in an open space without prolonged interaction with them.
  - The contact was a healthcare provider who adhered to infection control procedures and wore personal protective equipment throughout the exposure period with a probable or confirmed case.

### 11.3 Managing the contacts

#### Regarding high-risk contact

##### Contact Follow-up Methods

The responsible healthcare practitioner communicates with the contact through telephone, video call, or in-person visits to ensure comprehensive monitoring and support throughout the quarantine period.

##### Operational Procedures

1. The public health team at the health cluster should conduct daily follow-up of contacts for **42 days** after the last known exposure to infection.
2. The contact should be quarantined in designated facilities within the healthcare institution to ensure maximum containment and monitoring.
3. The person responsible for contact follow-up should record any symptoms daily according to the attached contact tracking form.
4. The person responsible for contact follow-up should immediately report to the regional branch of the Public Health Authority when symptoms appear in the contact.
5. The competent healthcare facility, in coordination with the PHA branch, should suspend the healthcare worker from work for a specified period if the contact is from the healthcare staff in the high-risk contact category.
6. Coordination with health authorities in the destination country should be done through International Health Regulations channels when transferring the contact outside the jurisdiction of the health authorities responsible for their follow-up.



7. Immediate isolation, clinical evaluation, and testing must be ensured for any contact who develops symptoms consistent with the standard case definition of Hantavirus infection.

### Regarding low-risk contact

#### Contact Follow-up Methods

The healthcare practitioner responsible communicates with the contact either by telephone or video call, to ensure continuous and effective monitoring of the contact's health status throughout the monitoring period.

#### Operational Procedures

1. The health authority should conduct daily follow-up of the contact for 42 days after the last known exposure to infection, as outlined above
2. The contact should be quarantined at home to ensure non-transmission of infection and protect the community
3. The contact should record their temperature daily using a thermometer and document it in the designated contact tracking form
4. The person responsible for contact follow-up should record any symptoms daily according to the attached contact tracking form
5. The person responsible for contact follow-up should immediately report to the regional branch of the Public Health Authority when symptoms appear in the contact
6. Low-risk healthcare workers should inform the occupational health department at their workplace and follow local policy regarding return to work
7. Coordination with health authorities in the destination country should be done through International Health Regulations channels when transferring the contact outside the jurisdiction of the health authorities responsible for their follow-up
8. Immediate isolation, clinical evaluation, and testing must be ensured for any contact who develops symptoms consistent with the standard case definition of Hantavirus infection

### 11.4 Advising the contacts:

#### Regarding high-risk contact

1. The contact is advised to avoid contact with others and remain in the designated facility until the competent authority allows the quarantine to end
2. The contact is advised to avoid contact with family members and maintain staying in a separate room as much as possible
3. The contact is advised to avoid attending human gatherings, especially in crowded enclosed spaces, until the complete monitoring period has passed. If necessary, the contact is advised to wear an N95 mask in human gatherings



4. The contact is advised in human gatherings to practice physical distancing and maintain hand hygiene regularly
5. The contact is advised to avoid local and international travel for 42 days

### Regarding low-risk contact

1. The contact is advised to avoid contact with others and stay at home until the competent authority allows the quarantine to end
2. The contact is advised to avoid contact with family members and stay in a separate room as much as possible
3. The contact is advised to avoid attending human gatherings, especially in crowded enclosed spaces, until the complete monitoring period has passed. If necessary, the contact is advised to wear a surgical mask in human gatherings
4. The contact is advised in human gatherings to practice physical distancing and maintain hand hygiene regularly
5. The contact is advised to avoid local and international travel for 42 days from the date of last exposure to infection

### Key messages to be provided to contacts

The public health team at the health cluster is responsible for providing the necessary support and information to contacts to ensure proper and effective follow-up:

1. Provide written information about disease symptoms to monitor, including early and late symptoms of hantavirus.
2. Provide 24-hour emergency contact numbers for rapid response to any developments.
3. Provide clear and detailed instructions on how to access healthcare facilities to seek advice and obtain required tests.

## 11.5 Follow up the contacts:

Using the contact tracing form in the Appendix



# Appendix Section



## Hantavirus Case Notification / Investigation Form

**CONFIDENTIAL:** This form contains protected health information. Complete all applicable sections. Submit to Public Health AUTHORITY within 24 hours of case identification.

### Section A: Brief Case Information

<b>Case Classification:</b>	<input type="checkbox"/> Suspected	<input type="checkbox"/> Probable	<input type="checkbox"/> Confirmed
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<b>Disease Syndrome:</b>	<input type="checkbox"/> HPS	<input type="checkbox"/> HFRS	<input type="checkbox"/> Non-HPS Hantavirus
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<b>Final Outcome:</b>	<input type="checkbox"/> Alive	<input type="checkbox"/> Dead	<input type="checkbox"/> Unknown
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<b>Hospital Name</b>	
<b>City/District:</b>	

### Section B: Demographic data

<b>Patient name</b>		<b>Patient ID</b>	
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<b>Age</b>		<b>Sex</b>	
<b>Nationality</b>		<b>Occupation</b>	
<b>City</b>		<b>Address</b>	
<b>Contact number</b>		<b>Alternative Contact number</b>	

### Section C: Clinical case profile

<b>Date of Symptom Onset:</b>	
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Date of Hospitalization:	
Hospital Name:	

Attending Physician:		Phone number	
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## Initial Clinical Presentation

Fever ( $\geq 38^{\circ}\text{C}$ ):	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Headache:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Myalgia (muscle aches):	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Fatigue:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Chills:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Dizziness:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Nausea:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Vomiting:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Diarrhea:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Abdominal pain:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

## Respiratory/Cardiac Symptoms

Cough:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Shortness of breath:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Rapid breathing (tachypnea):	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Chest pain:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown



<b>Palpitations:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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**Renal Symptoms (HFRS)**

<b>Back pain:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Decreased urination (oliguria):</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Increased urination (polyuria):</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Blood in urine:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

**Section D: laboratory information**

<b>Date of First Specimen Collection:</b>	
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**Laboratory Tests Performed**

<b>Hantavirus IgM ELISA:</b>	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	<input type="checkbox"/> Indeterminate	<input type="checkbox"/> Not Done
<b>Hantavirus IgG ELISA:</b>	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	<input type="checkbox"/> Indeterminate	<input type="checkbox"/> Not Done
<b>RT-PCR:</b>	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	<input type="checkbox"/> Indeterminate	<input type="checkbox"/> Not Done
<b>Immunohistochemistry:</b>	<input type="checkbox"/> Positive	<input type="checkbox"/> Negative	<input type="checkbox"/> Indeterminate	<input type="checkbox"/> Not Done

<b>Laboratory Name</b>	
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<b>Date Results Received:</b>	
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<b>Viral Species (if identified):</b>	
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**Section E: Exposure assessment**

Complete detailed exposure history for 6-8 weeks before symptom onset. Include ALL activities, locations, and potential rodent exposures.

<b>Period of Potential Exposure (Start Date):</b>	
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<b>Period of Potential Exposure (End Date):</b>	
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**Residence Information**

<b>Type of Residence:</b>	<input type="checkbox"/> Urban	<input type="checkbox"/> Suburban	<input type="checkbox"/> Rural	<input type="checkbox"/> Unknown
<b>Housing Type:</b>	<input type="checkbox"/> Modern home	<input type="checkbox"/> Apartment	<input type="checkbox"/> Old Home	<input type="checkbox"/> Other
<b>Evidence of Rodents at Home:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown	

<b>If Yes, Describe Evidence:</b>	
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<b>Cleaning of Rodent-Infested Areas:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Used PPE During Cleaning:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

**Occupational Exposure**

<b>Occupational Risk:</b>	<input type="checkbox"/> Agriculture	<input type="checkbox"/> Forestry	<input type="checkbox"/> Construction	<input type="checkbox"/> Military	<input type="checkbox"/> Pest Control	<input type="checkbox"/> Laboratory	<input type="checkbox"/> Other	<input type="checkbox"/> None
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<b>Work Location(s) During Exposure Period:</b>	
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<b>Potential Workplace Rodent Exposure:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Describe Workplace Exposure:</b>	
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**Travel and Recreation**

<b>Travel During Exposure Period:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Travel Destinations:</b>	
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<b>Travel Dates:</b>	
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<b>Type of Travel:</b>	<input type="checkbox"/> Business	<input type="checkbox"/> Tourism	<input type="checkbox"/> Family Visit	<input type="checkbox"/> Other
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<b>Accommodations:</b>	<input type="checkbox"/> Hotel	<input type="checkbox"/> Cabin	<input type="checkbox"/> Camping	<input type="checkbox"/> Family/Friends	<input type="checkbox"/> Other
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<b>Outdoor Activities:</b>	<input type="checkbox"/> Camping	<input type="checkbox"/> Hiking	<input type="checkbox"/> Hunting	<input type="checkbox"/> Fishing	<input type="checkbox"/> Other	<input type="checkbox"/> None
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**Specific Rodent Contact**

<b>Direct Contact with Rodents:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Saw Live Rodents:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Saw Dead Rodents:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Saw Rodent Droppings:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Saw Rodent Nests:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
<b>Bitten/Scratched by Rodent:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

<b>Describe Specific Rodent Contact:</b>	
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### Environmental Assessment

<b>Environmental Investigation Conducted:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Planned
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<b>Investigation Date:</b>	
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<b>Investigating sector:</b>	
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<b>Rodent Evidence Found:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Rodents Captured:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Rodents Tested:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Number of Rodents Captured:</b>	
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<b>Number Testing Positive:</b>	
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### Section F: Contact tracing

Complete this section if human-to-human transmission is suspected (primarily for Andes virus cases or unusual circumstances).

<b>Human-to-Human Transmission Suspected:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
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<b>Basis for Suspicion:</b>	
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### Close Contacts

<b>Total Number of Close Contacts Identified:</b>	
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Contact Name	Relationship	Contact Dates	Symptoms

**Section G: Infection control measures**

<b>Isolation Precautions Implemented:</b>	<input type="checkbox"/> Standard	<input type="checkbox"/> Contact + Droplet	<input type="checkbox"/> Not Applicable

<b>Healthcare Worker Exposures:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

<b>If Yes, Number of HCW Exposed:</b>	
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<b>Enhanced PPE Used:</b>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

<b>Describe Infection Control Measures:</b>	
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**Section H: Additional information**

**Additional Comments/Notes:**



**Section I: Investigator information**

<b>Investigator Name:</b>	
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<b>Title:</b>	
<b>Sector :</b>	

<b>Phone:</b>	
<b>Email:</b>	

<b>Signature:</b>	
<b>Date:</b>	



## Contact Tracing Form

### CONTACT TRACING FORM

Name		ID	
Age		Sex	
Nationality		Occupation	
City		Address	
Contact number		Alternative Contact number	

Complete this section if human-to-human transmission is suspected (primarily for Andes virus cases or unusual circumstances).

Human-to-Human Transmission Suspected:	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Last exposure date of confirmed case			
Last exposure place of the confirmed case			

Basis for Suspicion:	
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Did you visit any healthcare facilities?	<input type="checkbox"/> Yes Mention :	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Did you attend any mass gatherings since your last exposure?	<input type="checkbox"/> Yes Mention :	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Did you have travel history	<input type="checkbox"/> Yes Mention:	<input type="checkbox"/> No	<input type="checkbox"/> Unknown



<b>Contact name:</b>							
<b>Last exposure date:</b>							
<b>Last exposure place:</b>							
	Temperature	Fever	Fatigue/ malaise	Muscle Pain	Headache,	Gastrointestinal symptoms,	Respiratory symptoms
Day 1							
Day 2							
Day 3							
Day 4							
Day 5							
Day 6							
Day 7							
Day 8							
Day 9							
Day 10							
Day 11							
Day 12							
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Day 35							
Day 36							
Day 37							
Day 38							
Day 39							
Day 40							
Day 41							
Day 42							





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This document reflects current evidence and recommendations as of May 2026. Guidance should be updated as new evidence becomes available. For the most current recommendations, contact PHA.

