Infection prevention and control of hantavirus infection, including Andes virus disease

Interim regional guidance for suspected or confirmed cases

PAHO
Pan American Health Organization
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Disclaimer

This publication provides interim guidance to support infection prevention and control and public health response to hantavirus infection, including Andes virus disease. It reflects the best available evidence at the time of publication and may be revised as new information emerges.

This guidance does not replace clinical management protocols at national level. The application of this guidance should be adapted to local context and resources.

Abbreviations and acronyms

ANDV	Andes virus
ECMO	extracorporeal membrane oxygenation
PAHO	Pan American Health Organization
PPE	personal protective equipment
WHO	World Health Organization

Introduction

Hantaviruses are enveloped viruses belonging to the family *Hantaviridae*, genus *Orthohantavirus*, which currently comprises approximately 60 species *(1)*. They are broadly classified into Old World hantaviruses, distributed in Asia, Africa, and Europe, and New World hantaviruses in the Americas, which are associated with distinct clinical syndromes: hemorrhagic fever with renal syndrome and hantavirus cardiopulmonary syndrome, respectively *(1, 2)*.

These viruses are maintained in nature through chronic, asymptomatic infection of specific mammalian reservoirs –primarily rodents of the families *Muridae* and *Cricetidae* – with each hantavirus species typically linked to a single reservoir host that sheds virus in urine, feces, and saliva *(2, 3)*. Human infection occurs predominantly through inhalation of aerosolized particles contaminated with infected rodent excreta, particularly in enclosed or poorly ventilated environments, although transmission may also occur via direct contact with contaminated materials or, rarely, rodent bites.

However, in the Americas, person-to-person transmission has been described, primarily associated with *Orthohantavirus andesense* or Andes virus (ANDV), endemic in the Southern Cone. These events have occurred in contexts of close and prolonged exposure, generally in household settings or during the prodromal phase of the index case, particularly in enclosed or poorly ventilated environments *(4-11)*. ANDV is primarily maintained in rodents of the genus *Oligoryzomys*, notably *Oligoryzomys longicaudatus (12)*.

The incubation period for hantavirus infection generally ranges from 1 to 6 weeks, with variability depending on the viral species. Specifically, the incubation period for ANDV infection ranges approximately from 7 to 39 days *(8, 13)*. Hantavirus cardiopulmonary syndrome is characterized by rapid progression from a nonspecific febrile illness to severe cardiopulmonary compromise, which may occur abruptly and has important implications for early implementation of infection prevention and control measures, with case-fatality rates frequently exceeding 30%, whereas hemorrhagic fever with renal syndrome typically manifests with renal involvement and variable severity *(2, 14, 15)*. These epidemiological and clinical characteristics underscore the importance of early recognition and immediate implementation of infection prevention and control measures.

Based on the epidemiological characteristics of hantavirus transmission in the Region of the Americas, two main scenarios should be considered for the public health response, including case follow-up and contact-tracing: (1) zoonotic transmission, which accounts for the vast majority of cases, and (2) suspected person-to-person transmission.

In a zoonotic transmission scenario, one or more simultaneous cases may occur due to a common environmental or zoonotic exposure (e.g., entering a shed in a rural area with rodent presence) without evidence of person-to-person transmission. In this context, contact-tracing is generally not required beyond clinical monitoring of individuals with shared environmental exposure (e.g., household members or persons co-exposed in rural or occupational settings). Public health measures should prioritize identification of exposure sources, risk communication, and implementation of environmental control measures, including rodent control, safe cleaning practices, and reduction of human–rodent contact. In addition, individuals with high-risk exposures may be advised to self-monitor for symptoms – such as fever, myalgia, or respiratory symptoms.

In contrast, in scenarios where person-to-person transmission is suspected, particularly in areas endemic for ANDV, a more intensive public health response is warranted. These outbreaks typically originate from a primary zoonotic case, followed by secondary cases whose only identifiable risk factor is exposure to

the index case. This scenario should be considered when two or more epidemiologically linked cases are identified with an interval compatible with the incubation period, particularly in the absence of a clear common environmental exposure. In these cases, active contact-tracing should be initiated, including identification and classification of contacts according to their level of exposure risk (e.g., household contacts, intimate partners, or healthcare workers with unprotected exposure). High-risk contacts – defined as those with close, prolonged, or direct exposure to the index case during the prodromal phase – should remain under active monitoring from the last exposure, including daily symptom assessment and, where feasible, temperature monitoring. Furthermore, interhuman hantavirus outbreaks have been effectively contained through the isolation of close contacts.

Healthcare-associated transmission of ANDV has been documented but appears to be uncommon and limited to specific exposure conditions. Nosocomial transmission can occur among healthcare workers following close or unprotected contact with symptomatic patients, particularly during the prodromal phase or through exposure to respiratory secretions or contaminated materials. The overall risk in healthcare settings remains low when appropriate infection prevention and control measures are implemented *(5)*. These epidemiological considerations inform the approach to infection prevention and control described in this guidance.

This interim guidance provides practical recommendations for the early recognition and infection prevention and control management, as well as coordination of clinical evaluation and referral of patients with suspected or confirmed hantavirus infection, with particular attention to ANDV disease and hantavirus cardiopulmonary syndrome. Suspected hantavirus infection should be managed as a clinical emergency. Patients may initially present with a nonspecific febrile illness but can deteriorate abruptly, progressing to acute respiratory failure, shock, and cardiopulmonary collapse. When clinical and epidemiological criteria are suggestive, infection prevention and control measures should be implemented immediately and should not be delayed while awaiting laboratory confirmation.

In healthcare settings, patients with a confirmed or suspected ANDV infection should be admitted to an airborne infection isolation room, and staff should wear a gown, gloves, eye protection, and an N95 or higher-level mask when entering the patient's room *(16, 17)*.

For ANDV, person-to-person transmission has been documented and is epidemiologically relevant, although uncommon. Therefore, clinical management should be implemented in parallel with early infection prevention and control measures, including isolation, and standard and transmission-based precautions (including airborne precautions when indicated), together with prompt notification to public health authorities, identification and monitoring of contacts, and safe handling of clinical specimens and potentially contaminated materials.

Key message

- Suspected hantavirus infection is a clinical emergency because deterioration may occur rapidly, with progression to respiratory failure and shock within hours *(18, 19)*.
- Do not delay the initiation of clinical management while awaiting laboratory confirmation when clinical and epidemiological criteria are suggestive.
- For suspected or confirmed ANDV cases, infection prevention and control measures should be implemented early to protect healthcare workers.

1. Objective

The objective of this guidance is to reduce morbidity, mortality, and secondary transmission associated with hantavirus infection by supporting early clinical suspicion, timely diagnostic confirmation, immediate public health notification, appropriate infection prevention and control measures, and appropriate referral and care coordination.

This guidance emphasizes the need to recognize hantavirus infection early, before progression to severe cardiopulmonary disease, and to integrate clinical care with infection prevention and control actions, particularly when ANDV infection is suspected.

2. Scope and intended users

This guidance applies to adult and pediatric patients with suspected or confirmed hantavirus infection evaluated in primary care, emergency departments, hospital wards, intermediate care units, and intensive care units.

It is intended for general practitioners, infection prevention and control teams, emergency physicians, internists, pediatricians, intensivists, infectious disease specialists, nurses, transfer teams, clinical laboratories, epidemiology units, occupational health teams, and public health authorities.

Additional clinical considerations for specific populations, including pediatric patients, pregnant individuals, and patients with comorbidities, are provided in the Pan American Health Organization (PAHO) regional clinical management guideline for hantavirus disease *(20)*.

3. Methods

A scoping review was conducted to support the development of interim regional public health guidance for suspected, or confirmed hantavirus infection, with particular emphasis on ANDV disease and hantavirus cardiopulmonary syndrome. The review was structured around the priority topics addressed in the guidance: etiologic agent, reservoir, and transmission; clinical suspicion; early clinical risk assessment, warning signs and criteria for severe disease; initial diagnostic evaluation; clinical course and case classification; differential diagnosis; initial management and referral; infection prevention and control in healthcare settings; contact identification, monitoring, and quarantine; management of deceased persons; notification and epidemiological investigation; and clinical considerations for special populations. The search and selection process focused on technical documents, operational guidance, clinical guidelines, epidemiological alerts, public health recommendations and other sources providing regional or directly applicable evidence to answer these questions. The guidance is intended for general practitioners, infection prevention and control teams, emergency physicians, internists, pediatricians, intensivists, infectious disease specialists, nurses, transfer teams, clinical laboratories, epidemiology units, occupational health teams, and public health authorities. The evidence was synthesized narratively into practical statements, supported when appropriate by technical supplementary material, flow charts, tables and annexes. The objective was to provide rapid, general and specific guidance to support clinical care, infection prevention and control, public health notification, referral and contact management while more comprehensive evidence-informed documents are being developed.

4. Etiologic agent, reservoir, and transmission

In Argentina and Chile, the most clinically relevant presentation is hantavirus cardiopulmonary syndrome, mainly associated with New World hantaviruses. In Chile, the main reservoir is the long-tailed pygmy rice rat, *Oligoryzomys longicaudatus*, distributed from the southern Atacama Desert to Magallanes.

The main route of transmission is inhalation of aerosols contaminated with urine, feces, or saliva from infected wild rodents. Transmission from rodent reservoirs is related to environmental exposure and does not involve a defined period of transmissibility. It may also occur through mucosal contact, contaminated food, or rodent bites, although these routes are less frequent. The incubation period for hantavirus infection generally ranges from 1 to 6 weeks, with variability depending on the viral species. Specifically, the incubation period for ANDV infection ranges approximately from 7 to 39 days *(8, 13)*.

For ANDV, person-to-person transmission has been documented, initially in Argentina and subsequently in family or cluster investigations in Chile. This route is considered uncommon, but it is epidemiologically relevant and occurs primarily in the context of close and prolonged contact, particularly during the early phases of illness *(2, 4-11)*, including exposure in close proximity and in enclosed and/or poorly ventilated environments.

The period of transmissibility is not precisely defined; however, available evidence from outbreak and cluster investigations suggests that ANDV transmission occurs primarily during the incubation and prodromal phases of infection *(2)*. This justifies strict contact-tracing and reinforced infection prevention precautions when indicated.

5. Clinical suspicion of hantavirus infection

Suspect hantavirus infection in any patient with compatible symptoms plus an epidemiological risk factor within the previous six weeks, with or without suggestive laboratory or imaging findings. In any patient with suspected hantavirus infection, notification should be performed in accordance with national surveillance procedures, and the case should be managed in coordination with public health authorities.

Every suspected case must be notified immediately to the corresponding public health authority, and sample shipment must be coordinated with the national reference laboratory or another authorized laboratory.

Clinical suspicion criteria

- Compatible symptoms: fever, myalgia, headache, chills, abdominal pain, nausea, vomiting, diarrhea, malaise, dizziness, cough, or dyspnea.
- Epidemiological exposure within 6 weeks: residence, work, travel, or recreational activity in rural or wildland areas; cleaning closed houses or storage areas; exposure to rodents or rodent excreta; handling firewood; brush or yard clearing; agricultural or forestry work; camping; hiking; collecting wild fruit; or close contact with a confirmed or suspected case.
- Suggestive laboratory or imaging findings: thrombocytopenia, hemoconcentration, leukocytosis, immunoblasts or atypical lymphocytes, elevated lactate, blood gas abnormalities, chest radiograph with interstitial infiltrates, or pulmonary edema.

6. Early clinical risk assessment, warning signs, and criteria for severe disease

The comprehensive clinical evaluation of hantavirus infection – including prognostic assessment, identification of warning signs and severity criteria, diagnostic evaluation, differential diagnosis, and description of the clinical course – is addressed in detail in the Pan American Health Organization (PAHO) regional clinical management guideline for hantavirus disease *(20)*.

These components should be applied and interpreted according to clinical management protocols. The present publication does not aim to replicate clinical guidance, but rather to highlight those elements that are relevant for infection prevention and control, particularly in relation to early recognition, timing of implementation of precautions, and public health response.

All suspected or confirmed cases should be actively assessed for clinical progression and warning signs of severe disease, as these have implications for infection prevention and control measures.

Hantavirus infection may progress from a nonspecific febrile prodrome to a cardiopulmonary phase, often within hours, with the development of hypoxemia, pulmonary edema, and shock. Clinical warning signs reflect this early deterioration and should be actively monitored to allow timely recognition and escalation of care *(19)*, with important implications for early implementation and reinforcement of infection prevention and control measures.

The presence of clinical warning signs of progression (e.g., respiratory distress, hypoxemia, hemodynamic instability, or altered mental status) should prompt urgent clinical evaluation and escalation of care, as well as reinforcement of infection prevention and control measures.

Criteria for advanced cardiopulmonary support, including extracorporeal membrane oxygenation (ECMO), are addressed in the PAHO regional clinical management guideline *(20)*.

7. Initial management and referral

7.1 General principle

Detailed clinical management, including fluid strategies, vasoactive support, and respiratory care, should follow the PAHO regional clinical management guideline for hantavirus disease.

Initial management should begin at the point of first clinical suspicion and should prioritize early monitoring, and timely clinical evaluation and referral according to clinical management protocols.

Every patient with a well-founded suspicion of hantavirus infection should be managed as potentially severe, even if initially stable. The window for effective intervention is early.

Because transport may be delayed in rural or remote settings, early referral at initial suspicion is recommended to ensure timely access to advanced care.

Do not delay referral while waiting for confirmatory results. Do not delay transfer solely to complete stabilization if this exposes the patient to preventable deterioration. Early transfer to a higher level of care should be considered at the stage of initial suspicion, particularly in settings where clinical deterioration may limit the feasibility or safety of later transfer *(2, 19)*.

Criteria for level of care and escalation should be determined according to clinical severity and risk of progression, following the PAHO regional clinical management guideline.

- Suspected case without warning signs or severity criteria: Hospital observation, serial examinations, epidemiology notification, and referral coordination according to evolution.
- Suspected case with warning signs: Immediate transfer to a hospital with intermediate or intensive care capability.
- Patients with respiratory failure, shock, elevated lactate, progressive hypoxemia, or need for ventilatory support: Management in a high-complexity intensive care unit, ideally with access to ECMO or a defined ECMO referral network.

In all cases, infection prevention and control measures should be implemented at the point of care, including standard precautions and transmission-based precautions. Patients with suspected hantavirus infection should be managed in healthcare facilities with intensive care capacity.

8. Infection prevention and control in healthcare settings

8.1 General principles

Infection prevention and control measures should be implemented as soon as hantavirus infection is suspected. Standard precautions must be applied to all patients at all times.

For suspected or confirmed ANDV infection, **standard and transmission-based precautions** (contact and airborne) should be applied in healthcare settings. These precautions should not be limited to confirmed clusters only, because delays in recognition may increase the risk of exposure among healthcare workers, patients, visitors, and household contacts.

ANDV transmission is usually associated with close contact with a symptomatic person, including direct physical contact, prolonged time in close or enclosed spaces, or exposure to body fluids or respiratory secretions. Therefore, clinical care should be integrated with early isolation in single room, adherence to hand hygiene, appropriate use of personal protective equipment (gowns, gloves, eye protection and fit-tested N95), safe handling of specimens and contaminated materials, environmental cleaning and rapid identification and monitoring of close contacts.

8.2 Administrative measures

The hospital manager or infection prevention and control team should keep a list of all health care workers authorized and trained to enter the isolation area.

A log of all personnel and visitors entering the room should be maintained to facilitate contact identification if needed.

Follow up on employees with unexplained absences to determine their health status.

Keep track of any unprotected exposure. Healthcare workers and visitors should have access to a medical team to report unprotected exposure.

Maintain stocks of personal protective equipment (PPE), infection prevention and control, including hand hygiene supplies available to healthcare workers and visitors all the time.

The infection prevention and control team should periodically verify the availability of infection prevention and control supplies and ensure that healthcare workers remain adequately trained in the implementation of recommended measures, including the strengthening of hand hygiene.

8.3 Screening, triage and emergency room

Where there is an outbreak of hantavirus screening should be established at health facilities to enable prompt identification and isolation of suspect cases. A separated triage area and preferably separate clinical attention space are recommended for patients with febrile syndrome characterized by nonspecific symptoms such as headache, myalgia, chills, and gastrointestinal symptoms, and history of close contact with suspect or confirmed patient with ANDV.

Healthcare workers at the emergency room must follow standard precautions all the time for all patients and transmission-based precautions during clinical management of suspected cases. Healthcare workers must wear PPE, including a gown, gloves, eye protection, and an N95 mask.[1]

8.4 Patient placement and isolation

Patients with suspected or confirmed ANDV infection should be placed in an airborne infection isolation room whenever possible. The room should remain closed and maintain negative pressure. If available, ventilation should provide at least 12 air changes per hour in new or renovated facilities, or at least 6 air changes per hour in existing facilities. Healthcare workers must wear PPE, including a gown, gloves, eye protection, and a fit-tested N95, FFP2, FFP3, or equivalent respirator.

When an airborne infection isolation room is not available, the patient should be placed in a single, well-ventilated room with the door closed. Ventilation should be directed outdoors whenever possible. Portable high-efficiency particulate air filtration units should be considered when negative-pressure isolation is not available.

Standard and transmission-based precautions isolation signage should be posted at the room entrance. Access should be restricted to essential personnel only.

Procedures that may increase aerosol generation (e.g., intubation, tracheotomy, and bronchoalveolar lavage) should, whenever possible, be performed in an airborne infection isolation room or a negative-pressure environment. When such environments are not available, additional mitigation measures should be implemented, including use of appropriate respirators and optimization of room ventilation.

Where transmission-based precautions cannot be ensured, patients should use a nonvalved N95 or FFP2/FFP3 respirator during clinical management, if it is clinically tolerated and feasible. If respirator use is not tolerated, not feasible, or may compromise care or patient safety, a medical/surgical mask should be used instead.

8.5 Personal protective equipment for healthcare workers

All personnel entering the room of a patient with suspected or confirmed ANDV infection should use:

- Fit-tested N95, FFP2, FFP3, or equivalent respirator, or higher respiratory protection according to local policy;

[1] Recommendations may be adapted according to the evolving risk assessment and will be updated as new evidence becomes available.

- Long-sleeved gown;
- Gloves;
- Eye protection (goggles or face shield).

Hand hygiene must be performed in accordance with World Health Organization (WHO) guidelines, before putting on PPE, after removing PPE, after contact with the patient or the patient environment, and after contact with potentially contaminated materials. Gloves do not replace hand hygiene.

PPE should be removed and disposed safely when exiting the isolation room, following supervised or clearly established donning and doffing procedures. Healthcare facilities should ensure that staff are trained and competent in the correct use of PPE.

8.6 Patient movement and transport

Patient movement outside the isolation room should be minimized at all times. Clinical interventions and procedures should be performed in the patient's room whenever feasible.

When this is not possible, standard precautions and appropriate transmission-based precautions should be applied during patient transport. For transport, the patient should wear a medical/surgical mask. Based on a risk assessment, and if patient is clinically able to tolerate and appropriately use it, a nonvalved N95 or FFP2/FFP3 respirator may be considered.[2]

If transport within the facility is necessary, the receiving area should be informed in advance. Personnel involved in transport should use appropriate PPE (gowns, gloves, eye protection and fit-tested N95 respirator), and avoid unnecessary stops or exposure during transfer.

8.7 Visitors and accompanying persons

Visitor access should be restricted. When visits are considered essential, visitors should be instructed on hand hygiene, respiratory hygiene, correct use of PPE (gowns, gloves, eye protection, and Fit-tested N95 mask), and avoidance of direct contact with body fluids or respiratory secretions.

Household members or accompanying persons who had close contact with the patient before admission should be identified and reported to the epidemiology or public health team for follow-up according to national protocols.

8.8 Environmental cleaning, equipment, linen, food service and waste

Cleaning staff should wear the same PPE as healthcare workers to enter a room with patient (long-sleeved gowns, disposable gloves, N-95 mask, and goggles or face shield) or to perform terminal cleaning

Routine environmental cleaning and disinfection should be performed at the end of each round using appropriate disinfectants according to institutional procedures. Frequently touched surfaces and potentially contaminated areas should receive particular attention. High-touch surfaces, such as common areas, tables, hard-backed chairs, doorknobs, light switches, phones, tablets, touch screens, remote controls, keyboards, handles, desks, toilets, and sinks should be cleaned and disinfected more frequently (twice a day).

[2] Recommendations may be adapted according to the evolving risk assessment and will be updated as new evidence becomes available.

Noncritical medical devices, such as thermometers, blood pressure cuffs, and stethoscopes, should be dedicated exclusively to the patient whenever possible. If equipment must be shared, it should be cleaned and disinfected before use with another patient.

Medical waste and used linen should be handled according to existing procedures for infectious materials. Personnel handling waste or linen should use appropriate PPE (long-sleeved gowns, disposable gloves, N-95 mask, and goggles or face shield) and avoid shaking or manipulating materials in ways that may generate aerosols or splashes.

After patient discharge or transfer, room ventilation should continue before cleaning according to local ventilation capacity. If the room must be entered before completion of the ventilation period, environmental services personnel should use the same PPE required while the patient was admitted.

If reusable plates and utensils are used, they should be cleaned with water and soap following the standard procedures.

8.9 Laboratory biosafety and specimen handling

Fresh biological samples from suspected or confirmed ANDV cases should be treated as potentially infectious. Clinical laboratories should be informed in advance before specimens are sent, so that appropriate biosafety precautions, local risk assessment, safe handling, and transport procedures can be implemented.

In the context of postmortem investigations, tissues collected during autopsy, particularly from the lungs, kidneys, heart, and liver, may be obtained for diagnostic purposes. When indicated, samples must be submitted for RT-PCR testing using samples stored frozen at –80 °C. For histopathological examinations, tissue samples should be fixed in 10% formalin and processed using standard paraffin embedding techniques.

Personnel handling clinical specimens should use gloves, gown, N95/FFP2 or higher respiratory protection, and eye protection. Procedures that may generate aerosols, including centrifugation, should be minimized or performed using appropriate containment.

Specimens should be packaged and transported according to national regulations and international guidance for infectious substances, including triple packaging when required. If a procedure cannot be performed safely under local biosafety conditions, specimens should be referred to an authorized reference laboratory.

8.10 Contact identification and monitoring

Healthcare facilities should establish procedures for identifying, documenting, monitoring, and following up healthcare workers, visitors, and household contacts exposed to suspected or confirmed ANDV cases.

High-risk contacts include persons with direct physical contact with the patient, prolonged exposure in close or enclosed spaces, exposure to body fluids or respiratory secretions, or unprotected healthcare exposure. Low-risk contacts are individuals who had no known direct or prolonged close contact with a suspected or confirmed case.

Any exposed contact who develops fever, myalgia, gastrointestinal symptoms, respiratory symptoms, or other manifestations compatible with hantavirus infection should be immediately isolated, clinically evaluated, reported to public health authorities, and tested according to the reference laboratory network.

8.11 Quarantine and follow-up of high-risk contacts

Interhuman hantavirus outbreaks have been effectively contained through the isolation of close contacts. High-risk and low-risk contacts of suspected or confirmed ANDV cases should be managed according to national public health protocols, including contact definitions and in coordination with local epidemiology teams. High-risk contacts may include household members, sexual partners, caregivers, healthcare workers after unprotected exposure, or others who had direct physical contact, prolonged exposure in close or enclosed spaces, or unprotected exposure to body fluids or respiratory secretions.

High-risk contacts should be monitored for symptoms compatible with hantavirus infection during the follow-up period of 42 days after last known exposure as defined above. During this period, the contact should be advised to avoid contact with other persons through remaining in designated facilities or at home, in a separate room depending on national guidelines and capacities*(17)*.

Symptoms requiring immediate notification and clinical and laboratory evaluation include fever, myalgia, headache, gastrointestinal symptoms, cough, dyspnea, malaise, dizziness, or any signs of respiratory or hemodynamic deterioration.

During the monitoring period, high-risk contacts should reduce the risk of exposing others. An evaluation should be performed to guarantee that they should remain in a separate, well-ventilated room and avoid close contact with household members, particularly pregnant persons, children, older adults, and immunocompromised persons. During contact with their household they should wear a well-fitting respirator, such as an FFP2 or N95 when available, or mask, maintain physical distancing, and perform frequent hand hygiene. They should avoid sharing a sleeping area or personal items such as eating utensils, linens, towels, and electronic devices with others. They should handle and launder their bedding and clothing separately. They should clean and disinfect their environment and objects/surfaces with common household disinfectants. Waste should be managed as normal.

If isolation conditions are not feasible at home, high-risk contacts should be offered a stay in a temporary location that complies with the isolation structure and services should be provided to them. Visitor access should be restricted. When visits are considered essential, visitors should be instructed on hand hygiene, respiratory hygiene, correct use of PPE (gowns, gloves, eye protection and fit-tested N95 mask), and avoidance of direct contact with body fluids or respiratory secretions.

High-risk contacts, including healthcare workers after unprotect exposure, should refrain from returning to work or participating in activities that may expose others for the period defined by public health authorities. This is particularly important for contacts who work in healthcare settings, long-term care facilities, schools, childcare settings, or other environments involving close contact with vulnerable populations.

Any high-risk contact who develops symptoms compatible with hantavirus infection should be immediately isolated in a healthcare facility, clinically evaluated, notified to public health authorities, and tested according to the reference laboratory network. Clinical support should not be delayed while awaiting laboratory confirmation if symptoms and epidemiological exposure are compatible with ANDV infection.

More-specific operational recommendations on contact management are available from countries that have managed outbreaks, whose national guidelines should be consulted where relevant *(21)*, while additional recommendations, including WHO recommendations developed in the context of the MV *Hondius* cruise ship outbreak (11 May 2026), are also available for reference *(22)*.

8.12 Duration of transmission-based precautions

The duration of standard and transmission-based precautions should be determined on a case-by-case basis in consultation with infection prevention and control teams and public health authorities. Decisions should consider the clinical stage and procedures, ongoing symptoms, laboratory results, epidemiological context and the possibility of ANDV transmission. In severe cases, viral shedding may be prolonged; therefore, infection prevention and control precautions should be extended to 15 days from symptoms onset *(8, 23)*.

8.13 Management of deceased persons with suspected or confirmed Andes virus infection

Transmission of ANDV from deceased people has not been documented. However, exposure to blood, body fluids, respiratory secretions, contaminated materials, or potentially infectious clinical waste may occur during handling, preparation, transport, or storage of the body. Therefore, deceased persons with suspected or confirmed ANDV infection should be managed using standard and transmission-based precautions.

The management of deceased people should preserve dignity, ensure traceability, protect personnel, and follow national legal, forensic, cultural, and religious procedures. Unnecessary manipulation of the body should be avoided. Handling should be performed by trained personnel using appropriate PPE and supervised donning and doffing procedures.

Personnel handling the body should use gloves and a long-sleeved gown or impermeable apron. Eye protection should be used as well as N95, FFP2, or higher-level respirators.

Hand hygiene should be performed before putting on PPE, after removing PPE, and after any contact with the body, body bag, contaminated materials, or the surrounding environment. Gloves do not replace hand hygiene. Personnel should avoid touching their face or mouth during body handling.

The body should be placed in a leak-proof body bag when leakage of fluids is present or anticipated, when transport is required, or when required by national procedures. If the external surface of the body bag becomes visibly contaminated, it should be cleaned and disinfected before transport. The body and the body bag should be clearly labeled according to institutional and national procedures to ensure traceability and avoid misidentification.

A unique identifier should be assigned to the body and recorded in all related documentation. Identification, documentation, photographs when appropriate, personal belongings, transfer records, and chain-of-custody information should be linked to the same unique identifier. Personal belongings should not be removed unless required for documentation, legal, forensic, or public health reasons; if removed, they should be recorded, packaged, labeled, and kept traceable.

Aerosol-generating or invasive procedures should be avoided unless essential for clinical, legal, forensic, or public health reasons. If such procedures are required, they should be performed by trained personnel using gloves, gown or impermeable apron, eye or face protection, and N95, FFP2 or higher-level respiratory protection. Procedures should be performed in a well-ventilated environment and with the minimum number of personnel required.

Transport of the body should follow national procedures and should minimize unnecessary handling. Personnel involved in transport should be informed of the infection prevention and control precautions

required. The body should be transported in a manner that preserves dignity, prevents leakage, and maintains traceability.

Temporary storage should be organized in a secure, dignified, and traceable manner. Whenever possible, the body should be kept in a body bag or similar container, clearly labeled, and stored in a cool or refrigerated location. The location of the body should be documented so that it can be retrieved and released according to national procedures and family wishes.

Environmental cleaning and disinfection should be performed after removal of the body, with particular attention to surfaces, equipment, stretchers, transport devices, and areas potentially contaminated with blood, body fluids, or respiratory secretions. Linen, waste, and reusable equipment should be handled according to procedures for contaminated materials.

Families should receive clear, compassionate, and culturally appropriate information. Viewing, funeral rituals, burial, cremation, or other final disposition should follow national regulations and local cultural and religious practices, while maintaining infection prevention and control precautions. Families should not be given false reassurance, but should also be informed that transmission of ANDV from deceased persons has not been documented.

These recommendations should be adapted to local regulations, available resources, forensic requirements, and the assessment of exposure risk. When there is uncertainty, infection prevention and control teams, public health authorities, and forensic or mortuary services should be consulted.

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Annex 1. Airborne precautions in addition to standard precautions for the prevention and control of infections

Source: World Health Organization – Eastern Mediterranean Region. Airborne precautions. Cairo: WHO; 2023. Available from: https://www.emro.who.int/images/stories/media/hygiene-day-2023/IPC_poster_Airborne_EN.pdf.

Annex 2. Infection prevention and control resources

Standard precautions for the prevention and control of infections

Aide-memoire

Background

Standard precautions aim to protect both health workers and patients by reducing the risk of transmission of microorganisms from both recognized and unrecognized sources.

They are the minimum standard of infection prevention and control (IPC) practices that should be used by **all** health-care workers, during the care of **all** patients, at **all** times, in **all** settings. When applied consistently, ***standard precautions*** can prevent the transmission of microorganisms between patients, health workers and the environment.

Key elements of *standard precautions* include:

- risk assessment
- hand hygiene
- respiratory hygiene and cough etiquette
- patient placement
- personal protective equipment
- aseptic technique
- safe injections and sharps injury prevention
- environmental cleaning
- handling of laundry and linen
- waste management
- decontamination and reprocessing of reusable patient care items and equipment.

For additional information, refer to WHO's *Minimum requirements for infection prevention and control programmes (1)*.

Important advice for implementation

Health policy

- Promote a safety climate.
- Develop policies which facilitate the implementation of IPC practice.
- Provide resources for IPC programmes and implementation of *standard precautions*.

Risk assessment

- Train health workers on early recognition and assessment of risk of exposure to blood and body fluids – including secretions/excretions, splashes and/or sprays and contaminated surfaces.
- Train health workers on actions to reduce the risk of exposure to infectious agents.
- Perform a risk assessment within health care facilities related to the population they serve, level of care they provide (including common procedures) and available control measures and implement prevention measures and training based on this assessment.

Hand hygiene

- Provide alcohol-based handrub at the point of care.
- Provide handwashing facilities with clean running water and products (including soap and single-use paper or cloth towels).

Personal protective equipment (PPE)

- Train health workers on the rationale for and correct use of PPE, based on risk assessment.
- Provide adequate supplies of high-quality PPE that are continuously accessible at the point of care.

Respiratory hygiene and cough etiquette

- Post visual alerts at the entrance to health care facilities instructing people with respiratory symptoms to practise respiratory hygiene/cough etiquette.
- Place hand hygiene supplies, tissues, masks and no-touch waste bins in waiting areas.

Environment and environmental cleaning

- Provide a clean and hygienic environment, including water, sanitation and hygiene infrastructure and adequate ventilation (natural or mechanical).
- Provide efficient environmental cleaning and disinfectant products.
- Train cleaning staff on the principles and practices of environmental cleaning, including how to prepare and use cleaning and disinfection products.

Injection safety

- Follow safe injection practices according to policy that reflects the 7 steps for safe injections.
- Provide a policy and measures for the surveillance, prevention and management of sharps injuries.

Waste management

- Ensure that the health care facility follows a policy for minimizing, segregating, collecting, transporting, storing, treating and disposing of waste.

Decontamination and reprocessing of reusable medical equipment/devices

- Make a dedicated space available for performing decontamination and reprocessing of reusable medical devices.

World Health Organization

Source: World Health Organization. Standard precautions for the prevention and control of infections: aide-memoire. Geneva: WHO; 2022. Available from: https://www.who.int/publications/i/item/WHO-UHL-IHS-IPC-2022.1.

Key elements at a glance

Risk assessment

Health workers should:

- assess the risk of exposure to blood and body fluids, secretions/excretions, splashes and/or sprays or contaminated surfaces before any health care activity *(2)*, and make this a routine;
- select the appropriate actions to reduce the risk of exposure to infectious agents *(3)*;
- ask themselves prior to any patient interaction:
  - Do I need protection for what I am about to do because there is a risk of exposure to blood and body fluids, secretions, excretions, splashes and/or sprays *(3,6)*?
  - Do I need protection for what I am about to do because the patient has symptoms of undiagnosed infection (e.g. fever, cough, diarrhoea)?
  - Do I need protection for what I am about to do because the patient has symptoms of an undiagnosed infection (e.g. fever, cough, diarrhoea), requiring Transmission-based Precautions?
  - Do I need protection for what I am about to do because the patient has a known infection, requiring ***transmission-based precautions***?

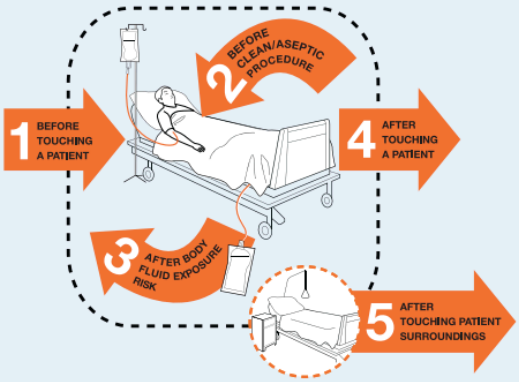
Hand hygiene

Health workers should perform hand hygiene the right way and at the right time, as described below. It is also important to take care of the hands by regularly using a protective hand cream or lotion, at least daily.

Summary technique

- If available, perform handrubbing with an alcohol-based handrub product as the preferred method for hand hygiene in health care, if hands are not visibly soiled *(2,4,5)*. Apply enough alcohol-based handrub product to cover **all areas** of the hands; rub hands until dry (20–30 seconds).
- Perform handwashing with soap and water if hands are visibly soiled. Wet hands and apply soap; rub all surfaces (40–60 seconds); rinse hands and dry thoroughly with a single-use towel; use the towel to turn off the faucet/tap *(2,4,5)*.

Summary indications (5 Moments for hand hygiene)



Source: WHO *(4)*.

Respiratory hygiene and cough etiquette

- Health workers should apply source-control measures to individuals with respiratory symptoms *(6)*, including:
  - asking patients to wear a mask or use a tissue to cover their cough;
  - placing acute respiratory symptomatic patients at least 1 metre (3 feet) away from others in common waiting areas.

Patient placement

- A single room should be used for a patient who poses a risk of transmission to others (for example, if they contaminate the environment or have symptoms of a transmissible infection).

Source: World Health Organization. Infection prevention and control. Geneva: WHO; 2026 [cited 20 May 2026]. Available from: https://www.who.int/teams/integrated-health-services/infection-prevention-control/core-components.

PPE

Health workers should:

- select PPE, based on risk assessment *(3,6,7)*;
- remove and discard PPE when leaving the patient's room and perform hand hygiene;
- discard and replace PPE if it becomes damaged, soiled or wet.

Gloves

Health workers should:

- wear gloves during activities that may involve exposure to blood and other body fluids, for contact precautions and in outbreak situations *(3,6)*;
- remove gloves after caring for a patient – the same pair of gloves should not be worn for the care of more than one patient *(8);*
- change gloves between tasks and procedures if moving from a contaminated body site to another body site on the same patient;
- remember that wearing gloves is **not** a substitute for hand hygiene *(5,8)*;
- wear sterile gloves for aseptic procedures, such as surgery or catheter insertion;
- not reuse gloves after reprocessing or decontamination, as this is not recommended.

Gown

Health workers should:

- wear a gown to protect skin and prevent soiling of clothing during activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions – note: if the gown is not fluid-resistant, and if splashing or spraying is anticipated, a waterproof apron should be worn over the gown *(3)*;
- remove the soiled gown as soon as possible and perform hand hygiene.

Medical masks

Health workers should:

- wear a medical mask (also known as a surgical or procedure mask) to protect mucous membranes of the nose and mouth against splashes or sprays of body fluids, respiratory secretions and chemicals *(3)*;
- wear a medical mask to protect the patient during aseptic procedures (e.g. during surgery or lumbar punctures).

Respirators

Health workers should:

- wear a respirator (e.g. N95, FFP2, etc.) for protection from inhalation of airborne particles (tiny particles that float in the air) and/or when performing aerosol-generating procedures[1] *(3)*;
- do a fit test before using a respirator for the first time, and perform a seal check every time a respirator is used *(3,6)*;
- replace the mask or respirator if it is damaged, soiled or wet, or if breathing becomes difficult.

Eye protection

Health workers should:

- wear either eye protection (eye visor, goggles) or a face shield to protect mucous membranes of the eyes during activities that are likely to generate splashes or sprays of blood, body fluids, secretions and excretions *(3,6);*
- ensure that goggles fit over and around the eyes or personal prescription lenses;
- ensure that a face shield covers the forehead, extends below the chin, and wraps around the side of the face – note that face shields are more comfortable to wear with eyeglasses.

Aseptic technique

Health workers should:

- use sterile items and equipment for all aseptic procedures;
- use aseptic technique for insertion and maintenance of all invasive devices and aseptic/clean clinical procedures for surgical procedures, wound dressing and similar, to prevent infections.

1. Current WHO list of aerosol-generating procedures: tracheal intubation, non-invasive ventilation (e.g., BiLevel positive airway pressure, continuous positive airway pressure), tracheotomy, cardiopulmonary resuscitation, manual ventilation before intubation, bronchoscopy, sputum induction by using nebulized hypertonic saline, dentistry and autopsy procedures.

Source: World Health Organization. Infection prevention and control. Geneva: WHO; 2026 [cited 20 May 2026]. Available from: https://www.who.int/teams/integrated-health-services/infection-prevention-control/core-components.

Safe injections and sharps injury prevention

Health workers should:

- prepare injections in a clean workspace, where there is low risk of contamination from blood, body fluid, splashes or sprays *(9-12)*;
- perform hand hygiene prior to preparing the medication and touching the patient;
- use a sterile, safety-engineered syringe;[2]
- use a sterile medication vial and diluent;
- always use a sterile syringe and needle to withdraw and reconstitute medications, and never leave a needle in the septum of a vial;
- avoid use of multi-dose vials or, if used, dedicate the vial for single-patient use;
- label the multi-dose vial with the date opened, and discard according to the manufacturer's instructions, when sterility is compromised or after 28 days *(12,13)*;
- clean the patient's skin with soap and water or disinfect with 60–70% alcohol prior to the procedure;
- provide a puncture-resistant sharps container for sharps disposal at the point of care;
- not re-cap, bend, break, manipulate or manually remove the needle from the syringe;
- discard the sharps container when it is three quarters full, seal it and store it in a secure area.

Environmental cleaning

Health workers should:

- clean **and** disinfect patient care areas at least once a day, paying particular attention to frequently touched surfaces *(14,15)*;
- deal with spills of blood and body fluid/substance as soon as possible, in accordance with local protocols.

Appropriate handling and transport of linen

Health workers should:

- handle soiled linen and waste carefully (with minimal manipulation or agitation) to prevent personal contamination and transfer to other patients *(5,14,15);*
- remove heavily soiled material (e.g. faeces) from linen, while wearing appropriate PPE, before placing it in the laundry bag;
- store clean linen in a manner that protects it from environmental contaminants.

Waste management

Health workers should:

- treat waste contaminated with blood, body fluids, secretions and excretions as hazardous infectious waste, in accordance with local regulations *(16);*
- treat human tissue and laboratory waste that is directly associated with specimen processing as hazardous infectious waste;
- minimize the amount of waste produced by the health-care facility.

Decontamination and reprocessing of reusable patient care items and equipment

Health workers should:

- handle equipment soiled with blood, body fluids, secretions and excretions in a manner that prevents skin and mucous membrane exposure, contamination of clothing and transfer of pathogens to other patients, or the environment *(17,18)*;
- clean and disinfect (or sterilize, depending on the type and use of patient care equipment) reusable equipment before use with another patients *(4,17,18)*;
- discard single-use devices after each use *(17,18)*;
- clean and disinfect or sterilize reusable equipment/devices according to the manufacturer's instructions, national or international standards, using efficient methods and based on intended use.

2. Safety-engineered devices include syringes with reuse prevention (RUP) features and syringes with sharps injury protection (SIP) features. WHO recommends RUP syringes for all injections. RUP syringes with SIP features are highly recommended wherever possible *(13)*.

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