Viral haemorrhagic fevers

Epidemiology in New Zealand

Viral haemorrhagic fevers (VHF) are caused by viruses from four taxonomic families (Arenaviridae, Bunyaviridae, Filoviridae and Flaviviridae) and share the following features.

- All are enveloped RNA viruses.
- Most have animal (usually a rodent) or arthropod hosts; humans are not a natural reservoir.
- All are geographically restricted (by the distribution of the host species).
- All cause sporadic and irregular cases or outbreaks in humans.
- Most have the stability and infectivity characteristics (aerosol infectivity) to be able to be used as bioterrorism agents with the potential for large numbers of casualties.

There has never been a reported endemic or imported case of VHF in New Zealand, but it is possible that a sick traveller will bring the disease to New Zealand, where it may spread from person to person.

**Note:** Dengue haemorrhagic fever (under Arboviral Diseases) and yellow fever are discussed in separate chapters.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Geography</th>
<th>Reservoir</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimean-Congo haemorrhagic fever</td>
<td>Africa, Middle East, Balkans, southern Soviet Union and western China</td>
<td>Ticks, mammals</td>
<td>Common in those with animal contact. Nosocomial epidemics occur.</td>
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<tr>
<td>Haemorrhagic fever with renal syndrome</td>
<td>Korea, China, Japan, Russia, Bulgaria, France and Scandinavia</td>
<td>Rodents</td>
<td>150,000 cases per year worldwide. Seasonal. Rural, farming or construction work is a risk factor.</td>
</tr>
<tr>
<td>Hantavirus pulmonary syndrome</td>
<td>Americas, especially southwest United States</td>
<td>Rodents</td>
<td>Indoor exposure in poorly ventilated and rodent-infested buildings or vehicles is a high-risk factor.</td>
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<tr>
<td>Lassa fever</td>
<td>West Africa, especially Guinea, Liberia, regions of Nigeria and Sierra Leone</td>
<td>Wild rodents</td>
<td>The most commonly exported haemorrhagic fever. Major cause of severe febrile illness in West Africa.</td>
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<tr>
<td>Marburg, Ebola</td>
<td>Africa</td>
<td>Unknown</td>
<td>Infected non-human primates sometimes provide link to humans. Outbreaks have included hundreds of cases.</td>
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</tbody>
</table>

## Case definition

### Clinical description

The clinical course varies among the VHFs, but a typical case might experience a prodrome of fever, headache, myalgia, facial flushing, conjunctival suffusion and malaise that lasts 3–4 days, followed by worsening of these symptoms with prostration, evidence of capillary leak (non-dependent oedema, effusions), haemorrhage, shock and impaired consciousness. Low platelets, disseminated intravascular coagulopathy (DIC) and liver damage are common.

Additional clinical features that are relatively specific to the main VHFs include:

- **haemorrhagic fever with renal syndrome**: acute renal failure
- **hantavirus pulmonary syndrome**: pulmonary infiltrate and respiratory failure
- **Lassa fever**: upper and lower respiratory tract symptoms, including exudative pharyngitis. Eighth cranial nerve deafness in 25 percent of survivors
- **Marburg, Ebola**: pharyngitis, diarrhoea and vomiting, maculopapular rash.

### Laboratory test for diagnosis

Discuss laboratory testing with the Institute of Environmental Science and Research (ESR). These tests are not available in New Zealand. Diagnosis is made by viral isolation or serology.

### Case classification

- **Under investigation**: A case that has been notified, but information is not yet available to classify it as probable or confirmed.
- **Probable**: A clinically compatible illness with a history of travel to an appropriate country.
- **Confirmed**: A clinically compatible illness that is laboratory confirmed.
- **Not a case**: A case that has been investigated and subsequently found not to meet the case definition.

### Notification procedure

Attending medical practitioners or laboratories must immediately notify the local medical officer of health of suspected cases. Notification should not await confirmation.
Spread of infection

Table 2 summarises the incubation period, mode of transmission and period of communicability of VHF.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Incubation (range)</th>
<th>Mode of transmission</th>
<th>Period of communicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimean-Congo haemorrhagic fever</td>
<td>Usually 1–3 days (1–12 days)</td>
<td>Tick bite or crushing tick. Health care workers frequently infected by exposure to blood and secretions from cases.</td>
<td>At least for duration of illness.</td>
</tr>
<tr>
<td>Haemorrhagic fever with renal syndrome</td>
<td>2–4 weeks (few days to 2 months)</td>
<td>Aerosol from infected rodent excreta (urine, respiratory secretions, saliva, faeces).</td>
<td>Not well defined: person-to-person transmission is rare.</td>
</tr>
<tr>
<td>Hantavirus pulmonary syndrome</td>
<td>2 weeks (few days to 6 weeks)</td>
<td>Aerosol from infected rodent excreta (urine, respiratory secretions, saliva, faeces).</td>
<td>Not well defined: person-to-person transmission is rare.</td>
</tr>
<tr>
<td>Lassa fever</td>
<td>6–21 days</td>
<td>Aerosol or direct contact with excreta of infected rats (commonly eaten). Needle-stick injury. Contact with case’s pharyngeal secretions or urine. Sexual contact.</td>
<td>Virus present in throat during acute febrile phase, in urine for 3–9 weeks and in semen for 3 months after infection.</td>
</tr>
<tr>
<td>Marburg, Ebola</td>
<td>2–21 days</td>
<td>After handling dead animals in the rainforest or the blood and tissues of infected monkeys. Person-to-person spread through infected blood, secretions, organs, semen and contaminated needles.</td>
<td>Low risk in incubation period. Highest in late stages of illness. Cadaver can be infectious. May be passed through semen up to 7 weeks after illness.</td>
</tr>
</tbody>
</table>

Management of case

Investigation

Obtain a history of travel, contact with animals, insect bites, possible contacts with infected cases, needle-stick accidents, occupation, recreational activities and any other at-risk activities.

Ensure laboratory confirmation has been attempted.
Restriction

In health care facilities, the following isolation precautions are indicated:

- **Crimea-Congo haemorrhagic fever**: contact isolation
- **haemorrhagic fever with renal syndrome**: standard precautions
- **hantavirus pulmonary syndrome**: standard precautions
- **Lassa fever**: droplet and contact isolation
- **Marburg, Ebola**: contact isolation.

Laboratory samples from Crimea-Congo haemorrhagic fever, Lassa fever and Marburg, Ebola virus cases should be kept to a minimum as they represent a significant biohazard. All samples should be handled with gloves and in a biological safety cabinet. Disinfect all surfaces in contact with samples. Serum may be heat inactivated (at least 60°C for at least 1 hour) before testing for heat-stable electrolytes and creatinine.

Cases with Crimea-Congo haemorrhagic fever, Lassa fever and Marburg, Ebola virus may transmit infection through close contact for weeks after illness. Cases should be advised not to have sex for 3 months after illness.

Treatment

Supportive. For Lassa fever, intravenous ribavirin reduces mortality, especially if given within the first week of illness. Ribavirin may also be effective in Crimea-Congo haemorrhagic fever.

Counselling

Advise the case and their caregivers of the nature of the infection and its mode of transmission. Advise on measures to reduce transmission to household or other close contacts. Cases must not donate blood for 3 months.

Management of contacts

Definition

All people who have been exposed to an infected case of Crimea-Congo haemorrhagic fever, Lassa fever or Marburg, Ebola virus or the case’s blood, excretions or tissues during the case’s period of communicability.

Table 3 summarises the requirements for investigation, restriction and prophylaxis for contacts.
### Table 3: Investigation, restriction and prophylaxis for contacts of VHF cases

<table>
<thead>
<tr>
<th>Level of risk</th>
<th>Definition</th>
<th>Investigation, restriction and prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Casual contact</td>
<td>No close personal contact, for example, travelling on the same aeroplane, residing in the same hotel, visiting the case’s home.</td>
<td>Nil.</td>
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<tr>
<td></td>
<td></td>
<td>If becomes unwell, then place under surveillance.</td>
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<tr>
<td>Close contact (without use of personal protective equipment)</td>
<td>Living with case, nursing or serving the case, skin-to-skin contact (for example, hugging), handling laboratory specimens before recognising the disease.</td>
<td>Limit contact with other people (for example, work, school) for a full incubation period after last contact with the case.</td>
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<td>Record temperature twice daily for a full incubation period after last contact with the case and report if greater than 38°C.</td>
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<tr>
<td></td>
<td></td>
<td>If symptoms develop or fever is greater than 38°C, then hospitalise immediately under isolation precautions.</td>
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<tr>
<td>High-risk contacts</td>
<td>Mucous membrane contact from kissing or sexual intercourse, or having a needle-stick or other penetrating injury involving contact with the case’s secretions, excretions, blood, tissues or other body fluids.</td>
<td>As for close contact but consider prophylactic ribavirin if Lassa fever contact.</td>
</tr>
</tbody>
</table>

### Other control measures

#### Identification of source
Check for other cases in the household and community.

#### Disinfection
Clean and disinfect surfaces and articles soiled with the case’s excretions or blood or that the case has had contact with. For further details, see Appendix 1: Disinfection.

#### Health education
Consider a media release and direct communication with local health professionals to encourage prompt reporting of symptoms. In communications with doctors, include recommendations regarding diagnosis, treatment and infection control.
Reporting

Ensure complete case information is entered into EpiSurv.

On receiving a notification, medical officers of health should immediately notify the Director of Public Health at the Ministry of Health.

The International Health Regulations (IHR) National Focal Point in the Ministry must use the IHR Decision Instrument for any event involving cholera, pneumonic plague, yellow fever, viral haemorrhagic fevers, West Nile fever or any unusual or potentially serious public health event, and then notify the World Health Organization if required.

If the case may have acquired a VHF in New Zealand, the Ministry of Health will notify the appropriate staff in the Ministry for Primary Industries so that further investigation of the source can be undertaken.