Delivering a Healthy WA

Contingency Plan for Public Health Management of Cases of Viral Haemorrhagic Fever within Western Australia

Revised September 2007

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INTRODUCTION

Viral haemorrhagic fevers (VHFs) are a group of diseases described in humans in the last twenty years. Several distinct viruses are endemic in specific geographic regions - primarily in Africa. The South American varieties are not dealt with in this document as they are vector borne and not spread by person-to-person contact. The possibility of a case appearing in Western Australia is thought to be remote, but the risk is real because of direct flights between Perth and Harare, as well as Johannesburg. One case of convalescent Lassa fever was diagnosed in a rural hospital in NSW in 1985. Other suspect cases have eventually been diagnosed as malaria, leptospirosis and Human Immunodeficiency Virus seroconversion illness.

Development of facilities for the clinical care and diagnosis of cases of viral haemorrhagic fever in Western Australia face four major problems:

- A changing international perception of the degree of risk to Health Care Workers by aerosol transmission of these viruses. The Centres for Disease Control (Atlanta, USA) still maintain that levels of biological containment sufficient to restrict aerosol transmission must be used in the laboratory during diagnosis of these cases. **Standard Precautions must be followed at all times,** especially in patient management.

- The rarity of patients presenting with viral haemorrhagic fevers in Australia but the potential for severe illness requiring intensive care.

- The clinical presentation (fever, pharyngitis, myalgia, haemorrhagic manifestations) may be non-specific and is likely to be mimicked by more common conditions.

- The variability of clinical presentation, and the liability of clinical state.

VHFs are national quarantinable diseases and are also classified as dangerous infectious diseases in WA. Responsibility for surveillance, treatment and control lies with the Commonwealth Department of Health and Ageing under the Quarantine Act 1908. The Department of Health, WA, however, accepts delegated responsibility with the appointment of the Chief Quarantine Medical Officer to be responsible both for treatment and prevention measures. All additional costs incurred in treating a patient with a suspected quarantinable disease are borne by the Commonwealth.

Sir Charles Gairdner Hospital (SCGH) is the designated hospital for the treatment of quarantinable diseases in WA. Princess Margaret Hospital (PMH) will be used for treatment of children. However, all hospitals must consider that a case of viral haemorrhagic fever could present as an inpatient or be referred to the Accident and Emergency Department by a medical practitioner. Each hospital is therefore required to have in place a contingency plan for the treatment and referral of patients with suspected VHFs.

Minimum requirements are an area for isolation, with an adjoining ante-room. Such facilities need to be identified in each hospital. Contingency plans for transfer of patients to Sir Charles Gairdner Hospital need to be devised. It must however be realised that patients with suspected VHFs present a diagnostic problem, and are clinically labile, so that immediate transfer may not always be possible.

This document aims to provide the framework of a contingency plan, and should assist each hospital in producing such a plan.

OVERVIEW OF VIRAL HAEMORRHAGIC FEVERS (VHF)

VHFs include Crimean-Congo (CCHF), Ebola, Lassa, and Marburg Fevers. These infections all have variable, non-specific clinical manifestations. As an example, Lassa Fever is thought to have an overall mortality rate of 5% but this rises to 15-20% in hospitalised patients. Epidemics and small clusters have been reported in hospitalised patients and staff, strongly suggesting nosocomial transmission, especially with Ebola virus where unsterilised needles have been implicated. In the early phase of these diseases when flu-like symptoms predominate, the risk of transmission is low, but in those who progress to haemorrhage, collapse and organ failure, their body fluids are highly infectious.

Transmission is usually from person to person by contact with contaminated body fluids but transmission by airborne droplets has been suspected in a single episode in a Nigerian hospital in 1970. The communicability of VHFs is probably no greater than other well known agents, e.g. TB. No secondary cases of Lassa Fever have occurred in Britain in about 1,500 people placed under surveillance after the importation of 10 confirmed cases of the disease.[1] Also, about 100 health care workers were in contact with a Swedish student and/or his body fluids (high risk contact) before a diagnosis of VHF was made. No secondary cases occurred.[2] However, the severity and consequence of infection requires that a more elaborate and strict level of containment be consistently maintained for the prevention of nosocomial transmission both at the bedside and in the diagnostic laboratory.

Since the publication of the CDC recommendations for the containment of these infections a case of Lassa fever was diagnosed in a patient in Chicago.[3,4] This patient was managed in a room with double entry doors (i.e. an ante-room before the patient care area) and without negative pressure airconditioning or separate plumbing. All staff involved with patient care wore protective clothing. All laboratory specimens were managed by a high security (C3) mobile laboratory flown to Chicago by the CDC. No nosocomial cases were documented in association with this case. Consequently, both Dr Fred Murphy and Dr Joseph McCormick of the CDC have advised ***verbally*** that the level of containment provided for this case is sufficient. It must be remembered however, that this is anecdotal experience and a revision of the advised protocol may occur with further experience. Thus, the level of containment required for the management of a patient with VHF may be revised in the future. It must be noted that more than 50 laboratory personnel had close contact with the blood of the patient cited in reference 2 before being suspected of incubating VHF. Patients whose blood, urine and other body secretions are contained, do not pose a significant risk to others, and are best transferred at this stage of the illness.

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1. Banatvala JE. Lassa Fever. Br Med J 1986; 293:1256-7.
2. Foberg U, Frydén A, Isaksson B, et al. Viral haemorrhagic fever in Sweden: experiences from management of a case. Scand J Infect Dis 1991;23:143-51.
3. Management of Patients With Suspected Viral Hemorrhagic Fever. MMRW 1988; 37(S-3):1-16.
4. Holmes GP, McCormick JB, Trock SC, et al. Lassa fever in the United States: investigation of a case and new guidelines for management. N Enl J Med 1990;323:1120-3.

SUMMARY OF THE MAJOR CHARACTERISTICS OF THE VIRAL HAEMORRHAGIC FEVERS THAT MAY BE TRANSMITTED IN HOSPITAL SETTINGS

	DISTRIBUTION	RESERVOIR	INCUBATION	CLINICAL PRESENTATION	DIAGNOSIS	FATALITY RATE	TREATMENT	INFECTIOUS MATERIAL
Lassa	West Africa, Nigeria, Sierra Leone, Liberia, Guinea, Senegal, Mali, Central African Republic	A small wild rodent, *Mastomys natalensis*.	6-21 days	Fever, muscle and joint aches, diarrhoea, vomiting, sore throat progressing to swelling of face and neck, general oedema, bleeding, encephalopathy, shock, residual deafness in 25%.	Blood, urine, throat swab for culture. Blood for PCR. Conjunctival scrape for antigen. Serum for IgM & IgG	15%	Ribavirin effective for treatment and prophylaxis.	Blood and body fluids in acute illness. Urine for 3 weeks, semen for 3 months
Ebola	Sudan, Zaire, Ivory Coast, Gabon, Uganda. Reston strain outbreaks in monkey facilities.	Unknown. Humans may be infected from monkeys.	2-21 days	Fever, muscle and joint aches, diarrhoea, vomiting, sore throat, rash progressing to chest pain, blindness, bleeding, shock. Reston strain – no human disease so far.	Blood, urine, throat swab for culture. Blood for PCR. Conjunctival scrape for antigen. Serum for IgM & IgG.	50-90%	None proven. Immune plasma tried.	Blood and body fluids in acute illness. Excreted in semen for up to 10 weeks after clinical recovery. Possible respiratory spread for Reston strain
Marburg	Zimbabwe, Kenya, South Africa, Uganda, Tanzania, Congo	As for Ebola.	3-10 days	Similar to Ebola. May be prolonged recovery with orchitis, hepatitis, uveitis, transverse myelitis.	Blood, urine, throat swab for culture. Blood for PCR. Conjunctival scrape for antigen. Serum for IgM & IgG.	20-30%	None proven.	Presumed same as Ebola
CCHF	Eastern Europe, Middle East, Mediterranean, Central Asia, India, most of Africa	Small mammals. To humans via ticks.	2-9 Days	Non-specific → headache, G-I disturbances, conjunctivitis, jaundice, neurological haemorrhage	Blood, urine, throat swab for culture. Serum for IgM & IgG. Conjunctival scrape for antigen.	2-50%	None proven. Possibly ribavirin, or immune plasma	Blood and body fluids. Highly infectious in hospital settings.

PUBLIC HEALTH MANAGEMENT OF VIRAL HAEMORRHAGIC FEVER (VHF) IN WA

Viral haemorrhagic fevers have not yet been encountered in Australia and the diagnosis may not be suspected for some time into the illness. Therefore the possibility of VHF may be raised at any stage from asymptomatic contacts through all possible phases of an illness to retrospective diagnosis after recovery or death. The suspicion may be raised while the person is still aboard a plane or ship or while they are in the community or after admission to a hospital. Therefore the process of dealing with suspect cases will vary according to these circumstances.

The circumstances that could be confronted are as follows:

1. A suspect case occurring on an aircraft or ship;

2. A febrile patient returning from Africa (with or without haemorrhage). The most likely diagnosis in these cases is malaria or dengue which should be considered. Such a patient may be admitted to a hospital which is not a designated VHF treatment centre, especially if VHF has not been considered as a likely diagnosis.

3. A patient with febrile illness admitted to a hospital in WA who subsequently requires transfer to SCGH when a diagnosis is strongly suspected to be VHF or there is failure to improve and referral is required to a tertiary institution of an individual suffering from a febrile illness having arrived from an endemic country.

4. A severely ill patient with unsuspected or suspected VHF in a WA hospital when the patient is too ill to transfer to a designated VHF treatment centre (i.e. SCGH [adults] or PMH [children]).

5. A patient who is suspected or proven to have VHF following recovery or death and for whom no special precautions had been used.

The method of control for VHF is the isolation of persons diagnosed with VHF and ill persons with a history of exposure. The transmission of VHF during the incubation period has not been documented. Persons who have a high risk of exposure, but are asymptomatic, can be considered to be non-infectious. In all cases the following steps are required:

1. Assess the risk category of suspected cases and their contacts according to the criteria given in this document.

2. Notify the appropriate authority as outlined in the Response Protocol.

3. Patients requiring hospitalisation should initially be cared for at the hospital where they are first seen. When their condition permits they should be transferred to a designated VHF treatment centre, i.e. SCGH (or PMH for children).

MANAGEMENT OF SUSPECTED CASES

Risk assessment and categorisation

Suspected cases of VHF may be categorised into three risk groups.

High risk persons are:

- Those who have been in rural areas or towns where VHF is known to be endemic/epidemic.
- Medical and nursing staff who work in country hospitals in these areas, or who have cared for VHF cases.
- Contacts of confirmed cases.
- Laboratory workers handling specimens, cultures or other dangerous materials from suspect cases of Viral Haemorrhagic Fever.

Medium risk persons are:

- Persons who have been in small towns and country districts known to be associated with VHF, and becoming ill within 21 days of leaving such areas.

Low risk persons are:

- Persons who have had brief stays in major cities in tropical Africa where the risk of contracting VHF is negligible.
- Persons becoming ill more than 21 days after contact with a potential source of infection or having left an infected area.

As suspected cases may require management outside of SCGH or PMH, each hospital requires contingency plans for this situation. While an isolation suite is not required, it does require a single room with an anteroom. These rooms need separate ventilation or be at negative pressure compared with any linking corridors or rooms wherever possible. A single room in the Intensive Care Unit (ICU) may also be needed, and has the same ventilation requirements. As these rooms are unlikely to be required for a VHF case, the modifications should be the minimum required to comply with these guidelines without impairing the day-to-day use of the room. It should also be considered whether the room would be suitable for patients with other communicable diseases, such as some tuberculosis patients. A low/medium dependency room and/or a single occupancy ICU bed should be designated for possible occupancy, adhering to strict Standard and Additional Precautions. **Wherever possible, high or medium-risk patients should be transferred to SCGH or PMH.**

However, the single room in the intensive care unit may be required in any hospital whilst at SCGH the designated quarantine area would be activated if VHF is strongly suspected. Existing single rooms in intensive care units could be used if they are appropriately modified. Duration of stay in the intensive care unit will depend upon severity of illness, timing of diagnosis and response to antiviral agents.

From the above discussion, it is apparent that planning of health resources for a very rare but contagious and potentially fatal disease is extremely difficult, especially as advances in infection control, diagnosis and antiviral treatment are to be expected in the next ten years before such a case may occur. The whole structure of the hospital, including the intensive care unit, may be changed before even a potential case emerges. It is important to plan for cases which might occur however in the next month but realising that nothing may happen for many years. In these situations modifications of rooms, either low or high dependency should be the minimum required to comply with the guidelines and yet not impair the normal day to day functioning of these rooms. A low/medium dependency room and/or a single ICU bed should be designated for possible occupancy and strict Standard Precautions applied; **if possible**, **transfer to SCGH or PMH is the preferred option.**

Laboratory testing

Laboratory testing should be the minimum necessary for diagnostic evaluation and patient care using the precautions outlined below. However, it is important to ensure that there are no delays in performing tests that are essential for the patient's care.

Urgent exclusion of malaria is mandatory.

Other major differential diagnoses include:

- dengue
- typhoid fever
- leptospirosis
- septicaemia (meningococcal, staphylococcal or streptococcal)
- amoebiasis
- plague
- Q fever
- relapsing fever
- typhus.

The pathologist in charge of the laboratory must be informed that the differential diagnosis includes VHFs. He/she will assume responsibility for ensuring urgent tests are performed using suitable precautions. Provided Universal Laboratory Precautions are followed, all tests required for acute patient care should be made available locally.

Where clinically appropriate, all pathology specimens should be referred to the Clinical Virologist, PathWest, where a full range of tests is available. He/she should be consulted on specimens required for virus isolation.

Specimens should be collected in screw top plastic containers taking care not to contaminate the external surfaces. The outside of the specimen container should be swabbed with disinfectant. The specimens should then be double-bagged in secure, airtight and watertight bags and the bags should be sprayed with disinfectant before they are removed from the patient's room.

Laboratory staff should be alerted to the nature of the specimens, which should remain in the custody of a designated person until testing is done.

When possible, testing should be done by laboratories equipped to handle potentially infectious agents using Level 3 precautions. Serum used in laboratory tests should be pre-treated with polyethylene glycol p-tert-octylphenyl ether (Triton X-100). Treatment with 10µL of Triton X-100 per 1mL of serum for 1 hour reduces the titre of haemorrhagic fever viruses in serum, although 100% efficacy in inactivating these viruses should not be assumed.

After inactivation routine procedures can be used for automated analysers. Analysers should be disinfected after use as recommended by the manufacturer or with a 500 parts per million solution of sodium hypochlorite (1:100 dilution of household bleach). Blood smears (e.g. for malaria) are not infectious after fixation in solvents.

The transport of laboratory specimens outside the hospital should be done in accordance with standards set by State authorities, Australia Post and the International Air Transport Authority (IATA).

The primary container holding the specimen should be wrapped in sufficient absorbent material to soak up the contents if breakage occurs and then placed in a secondary watertight container. The outer packaging should be of sufficient strength to protect the secondary container from fracture. Further details and advice are available from the Victorian Infectious Diseases Reference Laboratory (refer to Appendix 3).

Antiviral treatment

The administration of the anti-viral drug ribavirin may be appropriate in some cases. The patient's treating physician will decide the details of anti-viral treatment. A stock of this drug is maintained at SCGH. The Australian supplier for ribavirin injection is:

Valeant Pharmaceuticals
PO Box 473
AUBURN NSW 2144
Phone: (02) 9648 4266
Fax: (02) 9648 4655

The Australian supplier for ribavirin with Interferon-alpha combination is:

Schering-Plough Pty Ltd
11 Gibbon Road
BAULKHAM HILLS NSW 2153
Phone: (02) 9852 7444
Fax: (02) 9852 7500

Discharge and convalescence

A patient with confirmed VHF may be discharged when the medical condition allows. However virus may be present in the semen and the eye for many weeks, as demonstrated with Marburg and Ebola viruses respectively, and in urine, as may occur with Lassa virus. Convalescent patients must be meticulous about personal hygiene.

While data are limited concerning infectivity in the convalescent period, abstinence from sexual intercourse is advised until genital fluids have been shown to be free of the virus for three months. If the patient does engage in sexual intercourse before testing is completed condoms should be used.

Confirmation of diagnosis

Refer to the current National Notifiable Diseases Surveillance System (NNDSS) definitions for the criteria for a confirmed case of VHF (see Appendix 1).

INFECTION CONTROL

Protection of staff

The following personal protective measures are recommended for ambulance personnel, carers and visitors:

- All persons entering the patient's room should wear gloves and gowns to prevent contact with items or environmental surfaces that may be soiled.
- P2 (N 95) respirators and eye protection should be worn by persons coming within one metre of the patient to prevent contact with blood, body fluids or secretions (including respiratory droplets).
- The need for additional barriers depends on the potential for fluid contact, as determined by the procedure performed and the presence of clinical symptoms that increase the likelihood of contact with body fluids. If copious amounts of blood, other body fluids, vomitus, or faeces are present then leg and shoe coverings should be used.
- Standard precautions should be taken to prevent percutaneous injuries associated with the use and disposal of needles and other sharp instruments.
- For patients with VHF who have a prominent cough, vomiting, diarrhoea or haemorrhage, additional precautions are indicated to prevent possible exposure to airborne particles that may contain virus. These patients require a negative pressure room and persons entering the room should wear personal protective respirators such as high-efficiency particulate air [HEPA] respirators.
- Before a person leaves the patient’s room all protective items should be removed and shoes that are soiled with body fluids should be cleaned as described below.
- Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions or excretions should immediately wash the affected skin surfaces with soap and water. Mucous membranes (e.g. conjunctiva) should be irrigated with copious amounts of water or eyewash solution.
- Rubbish including soiled dressings and disposables should be placed in a plastic bag in the patient’s room. The bag should be sealed before removing from the room for immediate incineration.
- Sharps should be placed in a sharps container in the patient’s room for incineration.
- Food should be served on disposable crockery and cutlery and the waste incinerated.
- Staff must no eat or drink in the patient’s room or antechamber.
- A register will be kept of all staff, including ambulance staff, entering the patient’s area. Staff should be kept under daily surveillance at least until a diagnosis of VHF is excluded. This will include a daily record of temperature and of general health. Staff who are off duty must telephone and report their temperature and state of health each day. Staff intending to go on holiday should notify the Public Health Physician of their contact address. If VHF is confirmed, high risk primary contacts will be kept under surveillance for up to 21 days from the date of their last contact with the patient, depending on the VHF being confirmed.

Protection of visitors

Visitors may be allowed at discretion of Physician in Charge. Visitors are to wear protective clothing as used by hospital staff, and no kissing should be allowed.

Cleaning and disinfection procedures

The following cleaning and disinfection procedures are recommended for environments where the patient has spent a significant amount of time while symptomatic, e.g. ambulance, hospital, hotel room, home.

- Environmental surfaces or non-disposable objects contaminated with blood, other body fluids, secretions or excretions should be cleaned and disinfected using standard decontaminating fluids (e.g. glutaraldehyde, hypochlorite). All items, which can withstand autoclaving, should be autoclaved.

- Soiled linens should be placed in clearly labelled leak-proof bags at the site of use and transported directly to the decontamination area. Linens can be decontaminated in a gravity displacement autoclave or incinerated. Alternatively, linens can be laundered using a normal hot water cycle with bleach if they are placed directly into the washing machine without sorting and standard precautions to prevent exposure are precisely followed (refer to Australian Standard —- AS 4146). Disposable items should be placed in a container filled with a disinfectant solution and incinerated.

- Although the transmission of virus via contaminated sewage is unlikely, measures should be taken to reduce the infectivity of bulk blood, suctioned fluids, secretions and excretions before disposal. These fluids should be either autoclaved, processed in a chemical toilet or treated with several ounces of household bleach for $\geq$5 minutes before flushing or disposal to a drain connected to a sanitary sewer.

Suggested supplies to be kept in the ante-room adjoining the patient's room

Whenever practicable, supplies and equipment should be disposable. Reusable items of equipment should be easy to disinfect and preferably capable of withstanding autoclaving.

- Prescribed medications (analgesics, antipyretics, antibiotics)
- Resuscitation equipment
- Material for physical examination
- Portable x-ray machine (easily disinfected)
- Electrocardiogram machine
- Intravenous equipment and supplies
- Tourniquets
- Dry gauze
- Alcohol swabs
- Needles (various sizes)
- Syringes (various sizes)
- Sharps Disposal Container (for disposal of needles and other sharp equipment)
- Tubes for haematologic and biochemical investigations
- Blood culture bottles
- Containers with solution for throat swabs and urine specimens
- Labels
- Marker pens
- Plastic airtight bags (various sizes)

- Plastic rubbish bags
- Disinfectant solutions
- Urinals
- Nursing supplies
- Disposable linen, towels
- Toilet articles
- Gowns, masks, plastic aprons, surgical gloves and protective eye wear for staff
- Housekeeping materials (absorbent towels for spills)
- HEPA (high efficiency particulate air) respirators.

Management of the deceased

- If the patient dies, post-mortem examination should not be carried out unless considered absolutely essential by either the medical or legal authority responsible for the case. In the event that a post mortem examination is required, double gloves, caps and gowns, waterproof aprons, shoe covers and protective eyewear are required. Aerosol formation must be avoided (e.g. electrically powered cutting instruments must not be used). All solid and liquid waste should be decontaminated with disinfectant solution or autoclaved. Liquid waste may then be washed down the drain and solid waste should be incinerated. After the post-mortem has been completed the room should be thoroughly washed with disinfectant solution.

- Unnecessary handling of the body, including embalming should be avoided. Persons who dispose of the corpse must take the same precautions outlined for medical and laboratory staff. The corpse should be placed in a sealed leak-proof bag and cremated or buried in a sealed casket immediately. A CQO must supervise burial or cremation.

MANAGEMENT OF CONTACTS

A contact is defined as a person who has been exposed to an infected person or to an infected person's secretions, excretions or tissues within three weeks of the patient's onset of illness. Contacts may be categorised into 3 levels of risk.

Casual contacts are people who have not had close personal contact with the infected person, e.g. people on the same airplane, in the same hotel or, visitors to the patient's home. Since the agents of VHF are not usually spread by such contact, no special surveillance is indicated unless the infected person had acute respiratory involvement with intense sneezing and coughing. In such situations, casual contacts should be treated as "close contacts".

Close contacts are people who have had more than casual contact with the infected person before the initiation of isolation procedures. Close contact includes living in the same household; nursing, serving, hugging or having skin-to-skin contact; and handling laboratory specimens from the infected person before the diagnosis was suspected and isolation procedures were implemented. Close contacts should be identified if VHF is considered to be a likely diagnosis for the infected person and placed under the same surveillance as "high risk contacts" as soon as the diagnosis is confirmed.

High risk contacts are those with a history of either mucous membrane contact with the patient (kissing, sexual intercourse), or needle-stick or other penetrating injuries contaminated with blood or other body fluids from the patient during their infectious period. As soon as VHF is considered to be a likely diagnosis in the index patient, these contacts should be placed under quarantine surveillance (i.e. kept under surveillance for 3 weeks provided they undertake to notify the Public Health Physician/Quarantine

Medical Officer if suffering from a febrile illness) during the three week incubation period and temperatures should be recorded twice daily.

Any contact who develops a temperature of $\geq 38.3^{o}C$, or any other symptoms of illness, should be immediately isolated and treated as a VHF patient.

Ribavirin (500 mg by mouth every six hours for seven days) should be prescribed as post-exposure prophylaxis for high-risk contacts of Lassa fever cases. Although experience is limited, post-exposure prophylaxis with ribavirin is also recommended for high-risk contacts of patients with Crimean-Congo haemorrhagic fever.

RESPONSE PROTOCOL

An officer has been designated for the coordination of the response to a suspected viral haemorrhagic fever:

Chief Quarantine Medical Officer — (CQMO)

The Chief Quarantine Medical Officer is the Executive Director of Public Health or his delegated representative; currently the Director of Communicable Disease Control Directorate.

The role of the CQMO is to arrange for the appropriate management of cases of VHF, including directing transfer of patients to SCGH or PMH, and for supervising the surveillance of contacts.

The CQMO of WA would supervise contact tracing with the assistance of Public Health Physicians and Medical Officers of the Health Department of WA, and maintain communication with the Director of Human Quarantine (DHQ), at the Commonwealth Department of Health and Aged Care.

See Appendix 1 for Flow Chart.

STAGE 1 — DISCOVERY OF POSSIBLE CASE OF VIRAL HAEMORRHAGIC FEVER (VHF) ON AN AIRCRAFT OR SHIP

OTHERWISE, GO TO STAGE 2

PERSONS INVOLVED

- Captain of aircraft or ship bound for Western Australia.
- Quarantine Officer of the Australian Quarantine Inspection Service (AQIS) at the primary site.

IN THE EVENT OF SYMPTOMS OF

- Sudden or insidious onset of fever, headache, nausea, vomiting, diarrhoea, multifocal haemorrhages and shock. An appropriate travel history to an endemic country is supportive of the diagnosis.

TO CONTACT

- The Australian Quarantine Inspection Service — AQIS Quarantine Officer at airport or seaport.

GO TO STAGE 3

STAGE 2 — DISCOVERY OF POSSIBLE CASE OF VIRAL HAEMORRHAGIC FEVER (VHF) IN AN INPATIENT OR REFERRAL THROUGH ACCIDENT AND EMERGENCY DEPARTMENT

PERSONS INVOLVED

- Any Attending Medical Practitioner.
- Director, Emergency Department at any hospital *or* delegate.
- Administration of any hospital.

IN THE EVENT

- That the patient is an inpatient in a hospital.
- That the patient has reached an Emergency Department.

TO CONTACT

- CQMO (WA)
- Regional Public Health Physician, ***who will in turn,*** contact CQMO.

GO TO STAGE 4

STAGE 3 — INFORMING THE HEALTH DEPARTMENT OF WA

PERSONS INVOLVED

- Australian Quarantine Inspection Service — Quarantine Officer. (To have available isolation room and at least a sphygmomanometer, thermometer, gowns and masks or face shields).

IN EVENT THAT A TRAVELLER IS SUSPECTED OF HAVING VHF

- Sudden or insidious onset of fever, headache, nausea, vomiting, diarrhoea, multifocal haemorrhages and shock. An appropriate travel history to an endemic country is supportive of the diagnosis.

TO CONTACT

- Chief Quarantine Medical Officer (WA) or any State Quarantine Medical Officer.

- Operations Manager of the arrival port/airport.

GO TO STAGE 4

STAGE 4 — ESTABLISHING LINES OF COMMUNICATION

PERSONS INVOLVED

- Chief Quarantine Medical Officer (WA) or State Quarantine Medical Officers.

IN EVENT THAT A TRAVELLER IS SUSPECTED OF HAVING VHF

TO CONTACT

- Chief Quarantine Medical Officer (WA) *who will in turn contact*.
- Director of Human Quarantine (Commonwealth Department of Health and Ageing, Canberra).

GO TO STAGE 5

STAGE 5 — ARRANGING TRANSFER TO HOSPITAL OR BETWEEN HOSPITALS

PERSON INVOLVED

- Chief Quarantine Medical Officer (WA) or State Quarantine Medical Officer.

IN THE EVENT OF

HIGH RISK CASES

ACTION:

- Contact Duty Registrar, Emergency Department, Sir Charles Gairdner Hospital (Princess Margaret Hospital for Children).

- Arrange transport for patient to SCGH or Princess Margaret Hospital.

MEDIUM RISK and LOW RISK CASES

ACTION:

- Contact Hospital Director of Medical Services/Regional Director.

- Transport patient to nearest suitable hospital — preferred option is always SCGH or PMH.

GO TO STAGE 6

STAGE 6 — MOBILISATION OF HOSPITAL

PERSON INVOLVED

- Director of Medical Services, SCGH/PMH; Officer in Charge local hospital.

IN EVENT OF BEING INFORMED OF THE INTENTION TO ADMIT A PATIENT SUSPECTED OF HAVING VHF

TO CONTACT

- Designated Quarantine Physician(s)/local physician.
- Nursing administration (Instruction 2).
- Clinical Virologist, who will, in turn, contact the Victorian Infectious Diseases Laboratory (to receive patient's blood and request medication). Refer to Instruction 3.

GO TO STAGE 7

STAGE 7 — COMMUNICATION AND SURVEILLANCE

PERSONS INVOLVED

- Chief Quarantine Medical Officer (WA) to remain in communication with the Director of Human Quarantine Medical (Commonwealth).

- Chief Quarantine Medical Officer (WA) to arrange surveillance of contacts with the assistance of Public Health staff through Public Health Physicians/Regional Directors.

- Chief Quarantine Medical Officer (WA) to communicate with the Deputy Superintendent, St Johns Ambulance to arrange cleaning and disinfection, if necessary, of ambulance and to arrange surveillance of ambulance crew.

- Media Liaison Unit, Health Department of Western Australia.

- Police Department to assist in transport of Quarantine Medical Officers to Port/Airport, crowd control and security.

APPENDIX 1

NATIONAL NOTIFIABLE DISEASES SURVEILLANCE SYSTEM (NNDSS) DEFINITIONS FOR THE CRITERIA FOR A CONFIRMED CASE OF VHF

CASES

Australian national notifiable diseases case definitions — Viral haemorrhagic fevers (quarantinable –- includes Ebola, Marburg, Lassa and Crimean-Congo fevers) http://www.health.gov.au/internet/wcms/publishing.nsf/Content/cda-surveil-nndss-casedefs-cd_vhf.htm

Reporting

Both confirmed cases and probable cases should be notified.

Confirmed case

A confirmed case requires *Laboratory definitive evidence* only.

Laboratory definitive evidence

Laboratory definitive evidence requires confirmation by the Special Pathogens Laboratory, CDC, Atlanta, or the Special Pathogens Laboratory, National Institute of Virology (NIV), Johannesburg.

1. Isolation of a viral haemorrhagic fever virus.

OR

2. Detection of specific virus by nucleic acid testing, antigen detection assay, or electron microscopy.

OR

3. IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to specific virus.

Probable case

A probable case requires *laboratory suggestive evidence* AND *clinical evidence* AND *epidemiological evidence***.**

Laboratory suggestive evidence

1. Isolation of virus pending confirmation by CDC, Atlanta or NIV, Johannesburg.

OR

2. Detection of specific virus by nucleic acid testing, antigen detection assay, or electron microscopy pending confirmation by CDC, Atlanta or NIV, Johannesburg.

OR

3. IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to specific virus pending confirmation by CDC, Atlanta or NIV, Johannesburg.

OR

4. Detection of IgM to a specific virus.

Clinical evidence

A compatible clinical illness as determined by an infectious disease physician. Common presenting complaints are fever myalgia, and prostration, with headache, pharyngitis, conjunctival injection, flushing, gastrointestinal symptoms. This may be complicated by spontaneous bleeding, petechiae, hypotension and perhaps shock, oedema and neurologic involvement.

Epidemiological evidence

1. History of travel to an endemic/epidemic area within 9 days (Marburg), 13 days (Crimean Congo) or 21 days (Lassa, Ebola) of illness onset. Filoviruses are endemic in Sub-Saharan Africa, Lassa in Western Africa, Crimean Congo in Africa and the Middle East to West China.

OR

2. Contact with a confirmed case.

OR

3. Exposure to viral haemorrhagic fever (VHF)-infected blood or tissues.

APPENDIX 2

CONTACT NUMBERS

(Department of Health, Western Australia – After Hours Emergency Numbers)

OFFICER	TELEPHONE (OFFICE HOURS)	TELEPHONE (AFTER HOURS)
Chief Quarantine Medical Officer (WA) - Dr Paul Van Buynder	(08) 9388 4800 Fax: (08) 9388 4888	(08) 9328 0553 ***or*** Mob: 0423 791 255
Senior Communications Supervisor St John Ambulance	(08) 9334 1234 Fax: (08) 9334 1207	(08) 9334 1234
Team Leader Australian Quarantine Inspection Service (AQIS)	(08) 9475 2600 Fax: (08) 9475 2666 0421 615 816	0421 615 816 AQIS Airport Manager 0400 208 219
Perth Airport Duty Manager Westralia Airports Corporation Perth International Airport	(08) 9478 8501 Fax: (08) 9478 8590	(08) 9478 8501 (24 hours) Control Centre: (08) 9478 8572 Fax: (08) 9478 8574
Perth Airports Manager	(08) 9478 8410 Fax: (08) 9277 7537	(08) 9478 8572
Fremantle Port Authority	(08) 9430 3354 ***or*** 0408 941 648 Fax: (08) 9336 1391	(08) 9335 1300
Office of Health Protection (Commonwealth Department of Health and Ageing)	Director, Quarantine (02) 6289 7857 ***or`*** Principal Medical Adviser 02) 6289 4022 Fax: (02) 6289 1070	(02) 6289 3030 (Duty Officer – National Incident Room 24 hour service)

STATE QUARANTINE MEDICAL OFFICERS

OFFICER	TELEPHONE (OFFICE HOURS)	TELEPHONE (AFTER HOURS)
Dr A Keil (Princess Margaret Hospital)	(08) 9340 8222 Fax: (08) 9380 4474	(08) 9340 8222 (PMH switchboard)
Dr D Smith (PathWest)	(08) 9346 3122 (08) 9346 3333 (switchboard) Fax: (08) 9346 3960	(08) 9346 2536 (PathWest Security)
Dr T Inglis (PathWest)	(08) 9346 3461 (08) 9346 3333 (Page 4450) Fax: (08) 9381 7139	(08) 9346 2536 (PathWest Security)
Dr Andrew Robertson (Health Protection Group)	(08) 9222 2277 0417 908 572	(08) 9328 0553
Dr Gary Dowse (Communicable Disease Control Directorate)	(08) 9388 4849 0407 977 974	(08) 9328 0553
Dr Donna Mak (Communicable Disease Control Directorate)	(08) 9388 4828 0437 781 930	(08) 9328 0553
Dr Tania Wallace (Communicable Disease Control Directorate)	(08) 9388 4818 0407 727 131	(08) 9328 0553

AUSTRALIAN GOVERNMENT

Australian Customs Service

Director Operational Policy and Passenger Processing Australian Customs Service Constitution Avenue CANBERRA ACT 2600	Phone: Fax:	(02) 6275 6265 (02) 6275 6650

Australian Quarantine and Inspection Service

National Manager Border Australian Quarantine and Inspection Service GPO Box 858 CANBERRA ACT 2601	Phone: Fax:	(02) 6272 5499 (02) 6272 3749

Department of Foreign Affairs and Trade

Principal Medical Adviser R G Casey Building Department of Foreign Affairs and Trade BARTON ACT 0221	Phone: Fax:	(02) 6261 3317 (02) 6261 1303

Department of Immigration and Multicultural and Indigenous Affairs

Director Health Policy Section Department of Immigration and Multicultural and Indigenous Affairs PO Box 25 BELCONNEN ACT 2616	Phone: Fax:	(02) 6264 1351 (02) 6264 3378

APPENDIX 3

NATIONAL HIGH SECURITY QUARANTINE LABORATORY

The National High Security Quarantine Laboratory (NHSQL) is operated by the Victorian Infectious Diseases Reference Laboratory (VIDRL) and is located at Jane Bell House, 10 Wrecken Street, North Melbourne, Victoria. The primary role of the NHSQL is to undertake viral diagnostic testing for the four quarantinable viral haemorrhagic fevers (VHF) in a physical containment level 4 (PC4) facility. VIDLR can also undertake other testing for any human quarantine disease if requested. Detailed information on the laboratory testing of samples from persons with a suspected VHF is provided below.

The Unit is equipped and staffed to perform both the specific microbial diagnosis of exotic pathogens and to safely carry out essential clinical pathology testing such as haematology and biochemistry under high level containment on specimens from suspected cases of infectious disease caused by exotic agents.

The number for Royal Melbourne Hospital is (03) 9342 7000. The VIDRL can be contacted during office hours on (03) 9342 2600 and after hours the on call Medical Doctor on 0438 599 437.

Tests Available	Specimen Type
Culture of haemorrhagic fever viruses (Ebola, Marburg, Lassa, Crimean-Congo, Rift Valley Fever	Acute serum Throat swab Urine
Detection of VHF virus antigens (Ebola, Marburg, Lassa, Crimean-Congo, Rift Valley viruses	Conjunctiva scrapings
PCR (Ebola, Marburg, Lassa viruses)	Acute serum
Haemorrhagic fever virus serology (Ebola, Marburg, Lassa, Crimean-Congo, Rift Valley Fever viruses)	Acute serum Convalescent serum

Haematology, clinical chemistry, bacteriology and parasitology under PC4 biocontainment. Dengue, Yellow Fever and Hantavirus serology are also available.

Specimen Collection and Transport

When a patient with suspected quarantinable viral haemorrhagic fever is identified, the NHSQL should be notified through the relevant State or Territory Chief Quarantine Officer. Direct contact with the medical doctor on call at VIDRL is essential to arrange receipt of specimens and for advice regarding specimen collection, safe packaging and transport.

Appropriate specimens include those for specific viral diagnosis, as well as those for differential diagnoses such as enteric fever and malaria. The essential specimens to be submitted for virus isolation are a sample of venous blood, midstream specimen of urine and a throat swab. If post mortem specimens are available, serum, liver, spleen and kidney tissues are desirable.

Acute serum should be referred for viral haemorrhagic fever serology by immuno-fluorescent assay. Both total antibody and IgM antibody may be detected.

Convalescent serum should be referred subsequently to exclude a fourfold rise in total antibody titre.

The following procedures should be followed:

1. Glass containers should not be used. Disposable sharp objects, such as scalpel blades, also should not be handled unnecessarily after use and should be autoclaved or incinerated.

2. Venous blood samples must be collected with extreme care to avoid self-inoculation. Ten millilitres of clotted blood should be placed in a sealed plastic container. Needles should not be recapped, bent, broken, removed from disposable syringes or otherwise handled. Blood-taking equipment should be placed into a rigid plastic container filled with disinfectant solution and autoclaved or incinerated.

3. Midstream urine specimens should be collected by clean catch. Five mL or urine should be placed into a sterile, leakproof, plastic screw-cap container.

4. Throat swabs should be placed in plastic screw-cap containers in 1 mL of sterile, viral transport medium (Minimum Essential Medium plus 2% foetal calf serum, penicillin 100 units/mL, streptomycin 100 ug/mL, neomycin 40 ug/mL and amphotericin B20 ug/mL; available from VIDRL on request).

5. The outside of each specimen container should be swabbed with disinfectant (5000 ppm available chlorine) and a label should be attached bearing the patient's name, hospital identification, the date of collection and the nature of the suspected infection. The specimens should be double bagged in secure, airtight and watertight bags, which have been similarly labelled. Bags containing specimens should be sponged with disinfectant before they are removed from the patient's room.

6. Samples should be classified as infectious substances affecting humans (Haemorrhagic fever viruses) and packaged and handled as required by International Air Transport Instruction (IATA) instruction 602.

In general the specimens should be packaged as follows:

1. Place the specimens for transport in a tightly sealed, watertight container, such as a screw-cap plastic tube or vial, and seal the cap with tape. Make sure plastic containers are resistant to temperatures as low as -80°C.

2. Wrap the primary container in sufficient absorbent material (e.g. tissue) to absorb the entire contents in case the container leaks or breaks.

3. Place the wrapped, sealed primary container in a durable, watertight screw-cap mailing tube or metal can. This secondary container should be sealed with tape. Several primary containers may be placed in one secondary container to a maximum of 50 mL of specimen material.

4. On the outside of the secondary container, attach the specimen labels and other relevant information.

5. Place the second container in a secure box or mailing tube addressed to:

   Victorian Infectious Diseases Reference Laboratory (VIDRL)
   10 Wrecken Street
   NORTH MELBOURNE VICTORIA 3051

6. Transport the specimen for virus isolation chilled on wet or dry ice as appropriate, depending on the duration of shipping.

7. A competent door-to-door courier should be used. Since individual commercial and non-commercial carriers or shipping services may apply different regulations for transporting biologic specimens, contact a representative of the chosen carrier beforehand to ensure all necessary formalities are fulfilled.

8. Notify the on call VIDRL medical doctor of the dispatch of the specimen with flight time and number, courier or air waybill number as appropriate.

9. If transport is by air, a dangerous goods declaration must be made.

Further reading:

Centers for Disease Control and Prevention (1988), management of patients with suspected viral haemorrhagic fever, MMWR, 37:S3:1-16.

World Health Organisation (1997), Guidelines for the safe transport of infectious substances and diagnostic specimens, WHO, Geneva.

IAIA Dangerous Goods Regulations, 48th Edition, (2007).

MANAGEMENT OF VIRAL HAEMORRHAGIC FEVER