

NSW CONTINGENCY PLAN FOR VIRAL HAEMORRHAGIC FEVERS

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SECTION 1. INTRODUCTION

Overview

The objective of the NSW Contingency Plan for Viral Haemorrhagic Fevers is to provide a guide for a coordinated response within NSW to the importation of suspected and confirmed cases of viral haemorrhagic fever (VHF), and to suggest appropriate management of cases and their contacts.

For the rest of this document, VHF refers to any one of the following four diseases - Crimean–Congo haemorrhagic fever, Ebola virus disease, Lassa fever and Marburg virus haemorrhagic fever.

Rationale

VHFs are severe and life-threatening viral diseases that are endemic to parts of Africa, the Middle East, Eastern Europe, and Asia. VHFs are not indigenous to Australia and environmental conditions here are unlikely to support the natural reservoirs and vectors of any of the haemorrhagic fever viruses.

VHFs are of particular public health importance because: they can spread via human-to-human contact; they present a particular transmission risk within a hospital setting; they are often associated with a high case fatality rate; they can have a long asymptomatic incubation phase, there is no clear differential symptomatology for these infections; they are difficult to test for; and there are few if any effective treatments.

An increased possibility or proven case of one of these VHFs constitutes a public health emergency. The management of VHF patients requires considerable care to prevent further transmission. Although the risk and/or mode of nosocomial transmission differ for each of these viruses, the limited clinical and epidemiological evidence available does not always permit clear distinctions.

Other haemorrhagic fevers that are only rarely if ever associated with person to person transmission (such as hantaviruses, yellow fever, severe dengue, or South American arenavirus haemorrhagic fevers) are not specifically covered by this plan. These infections should be managed with the advice of infectious diseases (ID) physicians and infection prevention and control staff to ensure that appropriate precautions are undertaken as they may still pose a transmission risk in certain hospital settings, particularly to laboratory staff.

Contingency planning for VHFs aims to enable early diagnosis of VHF cases, to provide patients with appropriate clinical care in a safe environment, and to prevent transmission to other people.

Legal basis

VHFs are notifiable infectious diseases and scheduled medical conditions under the NSW Public Health Act (2010).

VHFs are also prescribed diseases under the Quarantine Act 1908 (Commonwealth) and its proclamations, with four VHFs (Crimean–Congo haemorrhagic fever, Ebola virus disease, Lassa fever and Marburg virus haemorrhagic fever) listed as quarantinable.

VHFs are included in the list of aetiological agents that need to be assessed in terms of their potential to cause Public Health Events of International Concern (PHEIC) under the International Health Regulations (2005) (Annex 2).¹

Roles and responsibilities

The role of the Health Protection NSW

The role of Health Protection NSW is to oversee the management of suspected and confirmed VHF cases and their contacts, in consultation with the Chief Health Officer (CHO), the State Health Services Functional Area Coordinator (HSFAC), and the director of the relevant public health unit.

The role of the Chief Quarantine Officer (CQO)

The CQO is a function of Health Protection NSW. The CQO is also responsible for liaising with the Australian Department of Health's Director of Human Quarantine (DHQ).

The role of the public health unit (PHU) director

The local health district (LHD) PHU director is responsible for the public health management of suspect and confirmed VHF cases, and the identification and management of their close contacts during their period of monitoring.

The PHU director works closely with Health Protection NSW, the CQO, the local health district health services functional area coordinator (LHD HSFAC), the clinical team caring for the case and the expert advisory group (if convened), and other PHU directors, as required. The director is assisted by staff from the local public health unit and from the broader public health network if required.

The PHU director also works closely with the senior member of the medical team responsible for the acute care of patients who is responsible for coordinating the investigation, transport and management of suspected and confirmed VHF cases.

The role of CIDMLS-ICPMR

The Centre for Infectious Diseases and Microbiology Laboratory Services (CIDMLS) of the Institute for Clinical Pathology and Medical Research (ICPMR Pathology West), located at the Westmead Hospital site, is the only NSW laboratory equipped to undertake diagnostic testing for VHF in a physical containment level 4 (PC4) laboratory.

The role of Westmead Hospital

Westmead Hospital (WH) is the designated hospital for the treatment of VHF cases in NSW and has isolation rooms for the containment of patients with VHF (or other high risk pathogen) in order to contain the possible spread to healthcare staff, other patients or visitors. Clinical management of a patient with VHF should be undertaken by infectious diseases physicians, intensive care physicians and other specialists as required and on a case-by-case basis; specific treatments cannot be prescribed

¹ World Health Organization. International Health Regulations (2005). Available at: <http://www.who.int/ihr/9789241596664/en/> .

here.

The role of The Children's Hospital at Westmead

The Children's Hospital at Westmead (CHW) is the designated hospital for the treatment of VHF paediatric cases in NSW and has suitable isolation rooms for the containment of patients with VHF. All virological diagnostic testing for such patients would usually be conducted by CIDMLS-ICPMR.

The role of local health districts and hospitals

Local health districts (LHD) must ensure that each hospital has in place a contingency plan for the assessment and management of patients with an increased possibility for a VHF infection who present to their facility.

In some circumstances, the clinical severity of the illness may make it inappropriate to immediately transfer a patient assessed as having an increased possibility for a VHF infection to a designated VHF treatment hospital. In this case, the hospital where the patient is being managed must provide as near as possible complete containment by following the practical guidance in this Plan. This includes:

- An isolation care area with private bathroom facilities and an anteroom to manage patients until they can be transferred, while recognising that the labile nature of VHF infections may make immediate transfer difficult. In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.
- Appropriate personal protective equipment (PPE) for healthcare workers managing VHF cases, with reference to NSW infection control policies and Australian infection control guidelines.^{2,3}
- The provision of education to healthcare workers on necessary infection prevention and control measures and on the use of required PPE.
- Arrangements for transfer of patients to the WH HSIU or CHW if recommended.

This document aims to provide a framework to assist each LHD and hospital to develop their own VHF contingency plans as part of their emergency management arrangements. Active involvement of infection control, nursing, laboratory and public health staff is essential.

Intended users of this guidance

This guidance is for:

- healthcare staff in emergency departments, infectious diseases units, infection control units, microbiology, acute medical units (including intensive care units and high dependency units)
- ambulance staff, who may be required to transport a patient in whom VHF is

² NSW Health Infection Control Policy (PD2007_036) and Environmental Cleaning Policy (PD2012_061).

³ NHMRC (2010) Australian Guidelines for the Prevention and Control of Infection in Healthcare. Commonwealth of Australia.

- confirmed or is considered an *Increased possibility of VHF*
- those working in laboratories dealing with specimens from patients in whom VHF is confirmed or considered to be an *Increased possibility of VHF*
 - public health professionals who may be required to carry out public health actions associated with a VHF case
 - Biosecurity officers at international ports, who may be required to carry out public health actions associated with a suspect VHF case
 - mortuary and funeral industry personnel, who may need to deal with a VHF case.

For definitions of *No Known Exposure* or *Increased Possibility of VHF* see Section 2: Patient Risk Assessment.

SECTION 2. PATIENT RISK ASSESSMENT

How to conduct the patient risk assessment ⁴

The patient risk assessment must be led by a senior member of the medical team responsible for the acute care of patients, for example the emergency care physician or admitting team consultant. An infectious diseases physician and/or clinical microbiologist at the facility where the patient has presented must also be involved. The public health unit must be advised and consulted early in the assessment.

Note that if the patient has already been categorised as *Increased Possibility of VHF* based on a risk assessment done elsewhere (such as at the international airport or another health facility) then they should be isolated and managed as an *Increased Possibility of VHF* case until they are re-assessed.

The patient risk assessment for VHF should be conducted in any person who:

- report having a fever or history of fever in the past 24 hours AND
- has returned from VHF-endemic or outbreak area in the 21 days prior to illness onset OR report having had contact with a known or highly suspected case of VHF within 21 days of illness onset.

Infection control precautions for conducting the risk assessment

Note that if a patient meets the initial fever and travel history/exposure criteria above, the following actions should be immediately followed before continuing the risk assessment:

- No staff member to have contact with the patient unless wearing VHF PPE (see APPENDIX 8).
- Provide patient with a surgical mask (provide a vomit bag if vomiting).
- Escort to facility's designated isolation room for assessment (single room with door closed, with own bathroom and negative pressure if available).
- Urgent discussion with local ID physician (or Westmead Hospital ID Physician) and PHU.

Follow the major steps in the pathway from identification to diagnosis in the VHF patient risk assessment algorithm (see below in this Section). This will establish the patient's VHF risk category, which determines the subsequent management of the patient and the level of protection required for staff.

A similar approach is taken to the risk assessment of a patient already identified as at risk of VHF through close contact with a confirmed VHF case's clinical specimens.

The patient risk assessment for VHF relies upon the assumption that all febrile patients presenting to health services will be asked by clinical staff for any history of recent travel.

The patient risk assessment algorithm deals with the management of the patient,

⁴ **Note:** Health Protection NSW may issue additional risk assessment advice in response to specific outbreak threats if indicated. This will be posted on the NSW Health website and distributed via LHD Chief Executives.

diagnostic testing and the level of staff protection, all of which are dependent on the possibility of VHF infection and the patient's symptoms.

The patient's VHF risk category can change depending on the patient's symptoms and/or results of diagnostic tests. Further information is provided in the subsequent sections of this guidance.

VHF risk categories

Following the application of the VHF patient risk assessment algorithm, the patient will be categorised as *VHF Highly Unlikely, No Known Exposure, or Increased Possibility of VHF*. A patient may be later classified as *Confirmed VHF* following testing.

(1) VHF Highly Unlikely

Patients are categorised as *VHF Highly Unlikely* if they **do not** meet one or both of the following criteria:

- report having a fever or a history of fever in the past 24 hours
- returned from a VHF endemic area within 21 days prior to illness onset OR report having had contact with a known or highly suspected case of VHF within 21 days of illness onset.

These patients should be managed locally.

(2) No Known Exposure

Patients are categorised as *No Known Exposure* if they meet the following criteria:

- report having a fever or a history of fever in the past 24 hours
- returned from a VHF endemic area within 21 days prior to illness onset OR report having had contact with a known or highly suspected case of VHF within 21 days of illness onset.

But do not meet any of the epidemiological exposure risk criteria described under the *Increased Possibility of VHF* category (see following).

See SECTION 3 for guidance on managing patients in this category.

(3) Increased Possibility of VHF

Patients are categorised as *Increased Possibility of VHF* if they meet the following criteria:

- report having a fever or a history of fever in the past 24 hours
- returned from a VHF endemic area within 21 days prior to illness onset OR report having had contact with a known or highly suspected case of VHF within 21 days of illness onset.

AND meet at least one of the following epidemiological exposure risk criteria:

- Come into contact with body fluids of OR handled clinical specimens (blood, urine, faeces, tissues, laboratory specimens) from an individual or animal known or strongly suspected to have VHF
- Participated in a funeral which involved direct contact with the deceased body

- Lived or worked in basic rural conditions in a Lassa Fever-endemic area
- Contact with primates or bats in a Marburg/Ebola endemic area, including visiting bat infested caves or mines.
- Travelled to AND sustained a tick bite OR crushed a tick with their bare hands OR had close involvement with animal slaughter in an area where Crimean-Congo Haemorrhagic Fever is endemic.
- Have been assessed by ID Physician and/or PHU as having increased possibility of VHF.

See SECTION 4 for guidance on managing patients in this category.

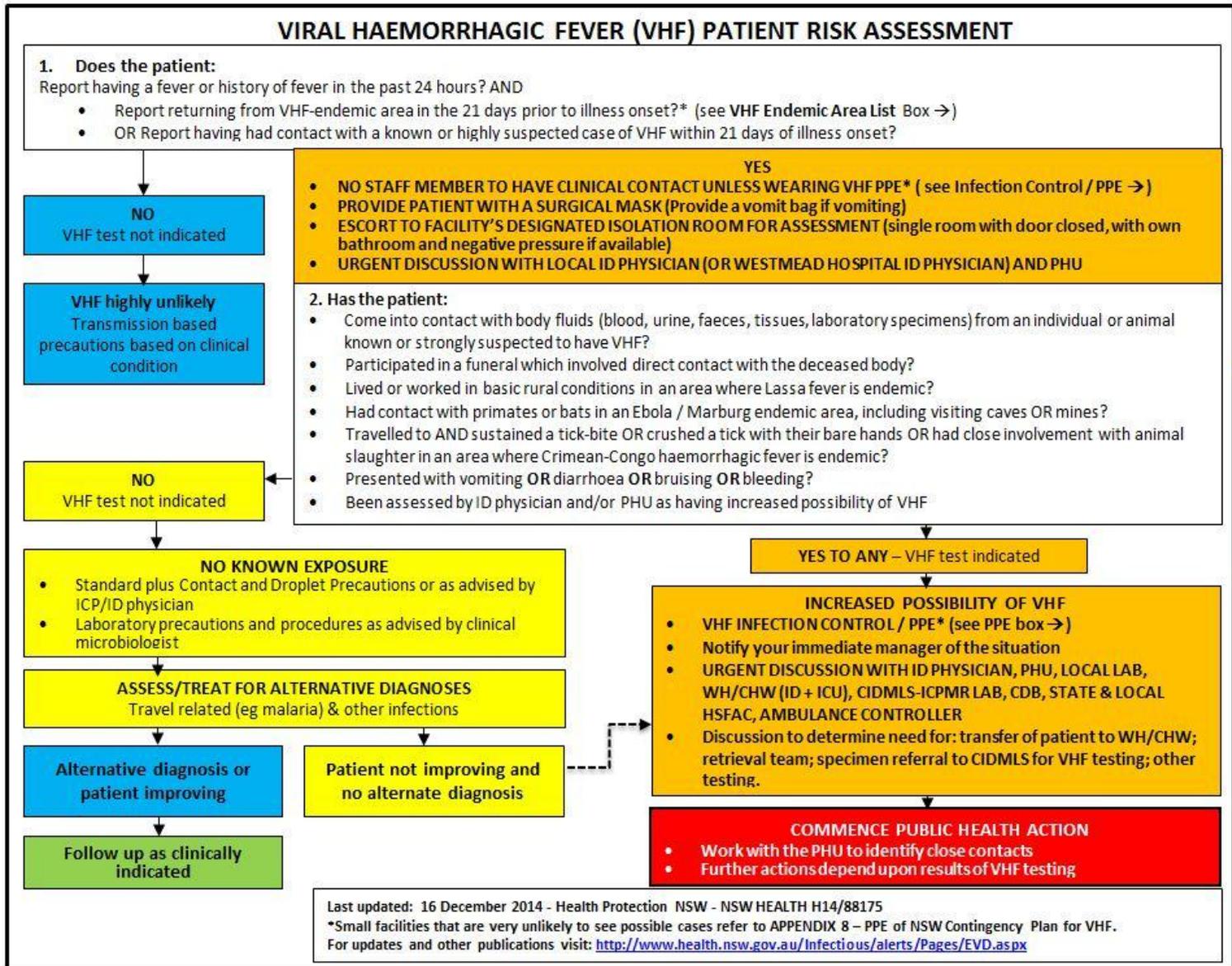
(4) Confirmed VHF

Patients with a fever are categorised as *Confirmed VHF* if that patient has a positive VHF laboratory test result from a VHF reference laboratory.

See SECTION 5 guidance on managing patients in this category.

Note that specimens for VHF testing should only be collected following advice from an ID physician, PHU, the local laboratory and the clinical microbiologist on call at CIDMLS-ICPMR.

VHF patient risk assessment algorithm (note: See APPENDIX 17 for Ebola virus disease specific algorithm for 2014/2015)



VHF ENDEMIC AREA LIST

Ebola (EVD) and Marburg VHF

- Africa - Uganda, Zimbabwe, DR Congo, Kenya, Angola, South Sudan, Gabon, Sierra Leone, Guinea, Liberia

Lassa fever

- West Africa - Sierra Leone, Liberia, Guinea, Nigeria

Crimean-Congo haemorrhagic fever

- Eastern Europe, Mediterranean (Inc. Southern Europe), Central Asia, Africa, Middle East

WHO Disease Outbreak News:
www.who.int/csr/don/

VHF INFECTION CONTROL / PPE*

ENSURE THAT STAFF ARE:

- Rigorously and repeatedly trained
- Donning & doffing PPE in designated area outside of the patient's room
- Not exposing any skin when wearing PPE
- Monitored by a trained PPE observer for donning & doffing compliance; observer must not touch PPE.

Recommended PPE includes:

- Surgical scrubs
- Hand hygiene
- Disposable, fluid repellent long sleeve gown
- Disposable face shield, surgical hood to cover head and neck, and P2/N95 mask OR disposable PAPR hood
- Disposable fluid-repellent below-knee boot covers
- Double gloves (with long cuffs)
- Waterproof apron if vomiting/diarrhoea

NOTE WELL:

- Restrict entry to essential staff and keep a list of staff with patient contact
- Avoid aerosolising procedures
- Wipe visibly contaminated PPE using a hospital-grade disinfectant wipe before removing (do not spray disinfectant)

Standard Precautions plus Contact and Droplet Precautions

Transmission based precautions based on clinical condition

WESTMEAD HOSPITAL (WH) and the CHILDREN'S HOSPITAL WESTMEAD (CHW) ARE THE DESIGNATED HOSPITALS FOR MANAGEMENT OF PATIENTS WITH VHF

NSW Public Health Units (PHU)	1300 066 055 (24 hours)
Westmead Hospital (WH)	(02) 9845 6609; ask for ID physician
Children's Hospital Westmead (CHW)	(02) 9845 0000; ask for ID physician
CIDMLS-ICPMR Laboratory	(02) 9845 6255; AH: Call WH- Ask for Clinical Micro on-call

SECTION 3. MANAGEMENT OF A PATIENT CATEGORISED AS *NO KNOWN EXPOSURE*

For VHF risk categories definitions see SECTION 2: PATIENT RISK ASSESSMENT.

For patients categorised as No Known Exposure:

- No staff member to have contact with the patient unless wearing standard plus contact and droplet precautions unless advised otherwise by infection control practitioner/ID physician.
- Provide patient with a surgical mask (Provide a vomit bag if vomiting).
- Keep patient in isolation room for assessment (single room with door closed, with own bathroom and negative pressure if available). In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.
- A senior member of the medical team who is responsible for the acute care of the patient should be the lead clinician and consult with the local infectious diseases/clinical microbiologist physician where appropriate.
- Discuss with local laboratory. Laboratory precautions and procedures as advised by clinical microbiologist.
- Assess/treat for alternative diagnoses - travel related (e.g. malaria) and other infections. The testing laboratory should be aware that the patient has been categorised as *No Known Exposure*.
- Follow up as clinically indicated where there is an alternative diagnosis or the patient is improving.
- If a patient is not improving and there is no alternate diagnosis the senior member of the medical team should review the patient and consider re-categorising the patient as *Increased Possibility of VHF* in consultation with the local infectious diseases physician or clinical microbiologist AND the clinical microbiologist on call at CIDMLS-ICPMR, Westmead Hospital (ID and ICU), Communicable Diseases Branch, state and local HSFAC, PHU and ambulance controller.
- Re-assess daily and continue other diagnostic investigations.

Infection control measures

All staff in contact with the patient must wear standard plus contact and droplet PPE:

- hand hygiene
- disposable, fluid repellent long sleeve gown
- disposable face shield
- P2/N95 mask
- gloves

As patients in this category will initially have no clear diagnosis, and could have a range of conditions other than VHF (such as influenza) that are potentially spread through the respiratory route, a precautionary approach to infection control is warranted.

A patient categorised as *No Known Exposure* should be isolated in a single room with door closed, with own bathroom and negative pressure if available.

Patients should also be asked to wear a surgical face mask as a precaution prior to placement in their hospital or examination room and during transport. Provide a vomit bag if the patient is vomiting.

Communication with staff about the potential VHF risks and infection control measures is critical. The important risks to make staff aware of are described in SECTION 4 under *Communication with staff about potential infection risks*.

Diagnostic investigations

All samples from patients in the *No Known Exposure* category can be treated as routine samples. Investigations required will include urgent malaria investigations.

Other investigations, as appropriate, including urine, stool and blood cultures, and radiology may be performed locally. However, liaison with the local microbiologist or Infectious Diseases physician is advised.

Malaria is often the most likely diagnosis in patients who have returned from malaria endemic areas. Screening for malaria is important even if the patient has already had a malaria screen performed elsewhere with a negative result. This can be done using malaria immunochromatographic tests (ICT) or thick and thin films.

Testing of specimens taken for patient management may be conducted locally under biosafety containment level 2 conditions, subject to a suitable risk assessment.

Diagnostic test results and patient management

If the malaria result is positive, treatment for malaria should begin immediately.

The patient may be re-categorised as *VHF Highly Unlikely* if they are responding to malaria treatment. However, patients who fail to respond appropriately to antimalarial therapy, particularly if there is the development of further features suggestive of VHF, should be re-evaluated for the possibility of VHF and investigated accordingly.

If the malaria result is negative or the patient is not improving and no alternative diagnosis has been made they should be re-assessed for VHF. In this case an urgent discussion should be arranged with an ID physician, PHU, the local laboratory, Westmead Hospital/Children's Hospital Westmead (Infectious Diseases and Intensive Care Unit), the clinical microbiologist on call at CIDMLS-ICPMR laboratory, Communicable Diseases Branch – Health Protection NSW, state and local HSFAC and ambulance controller.

If the patient is re-categorised as *Increased Possibility of VHF* refer to SECTION 4 for management.

If, following review, the patient is not re-categorised as *Increased Possibility of VHF*, then diagnostic investigations should continue and the patient should be re-assessed at least daily; single room isolation and infection control measures should continue, until an alternative diagnosis is established.

SECTION 4. MANAGEMENT OF A PATIENT CATEGORISED AS *INCREASED POSSIBILITY OF VHF*

For VHF risk categories definitions see SECTION 2: PATIENT RISK ASSESSMENT.

For patients categorised as Increased Possibility of VHF:

- No staff member to have contact with the patient unless wearing VHF PPE (see APPENDIX 8).
- Provide patient with a surgical mask (Provide a vomit bag if vomiting).
- Keep patient in isolation room for assessment (single room with door closed, with own bathroom and negative pressure if available). In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.
- Notify your immediate manager of the situation (Hospital executive must be informed).
- The treating clinician who is responsible for the acute care of the patient must be a senior member of the medical team.
- There must be an urgent discussion with an ID physician, the local laboratory, the PHU, ID physician and Intensive Care Unit at Westmead Hospital (WH) or Children's Hospital Westmead (CHW), the on-call clinical microbiologist at CIDMLS-ICPMR laboratory, Communicable Diseases Branch – Health Protection NSW, state and local Health Services Functional Area Coordinator and ambulance controller. Discussion will determine the need for transfer of patient to WH/CHW, retrieval team, specimen referral to CIDMLS for VHF testing and other testing. Immediate transfer to WH or CHW must be considered and is preferred.
- Please refer to APPENDIX 4 for ambulance transfer of a patient.
- Enhanced infection control measures appropriate to the patient's symptoms and clinical care procedures should immediately be put in place, as described below.
- Arrange for an urgent VHF screen (see APPENDIX 7) and urgent other testing (e.g. malaria screen), considering that this may occur after patient transfer to a designated VHF hospital.
- Consider initiating treatment for other likely causes of disease, such as malaria or bacterial infection, if there is likely to be a delay in the availability of the VHF and malaria screen results.
- Commence early public health actions (see SECTION 6).
- If the patient's VHF screen is positive, arrange urgent transfer to a designated VHF hospital if not already done so (see APPENDIX 4) and launch full public health actions (see SECTION 6).

Infection control measures

- The patient must be isolated in a single room with private bathroom facilities, an ante-room to limit contact, and negative pressure air handling if available. In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.
- The number of staff in contact with the patient must be restricted and compile

a list of staff who have been in contact with the patient. Restrict visitors until a diagnosis of VHF has been excluded.

- Patients with respiratory symptoms must also be asked to wear a surgical face mask whenever possible to contain respiratory droplets.
 - Use the following measures and PPE:
 - surgical scrubs
 - hand hygiene
 - disposable, fluid repellent long sleeve gown
 - disposable face shield, surgical hood to cover head and neck, and P2/N95 mask
- OR disposable powered air purifying respirator (PAPR) hood
- disposable, fluid repellent below-knee boot covers
 - double gloves (with long cuffs)
 - waterproof apron if patient has vomiting or diarrhoea.

If staff have performed prolonged contact or high risk patient care then shower using a neutral soap and change into fresh scrubs. At the end of the shift all HCWs must shower with a neutral soap.

Please see APPENDIX 8 for detailed guidance on PPE.

If the patient is bruised or bleeding or has uncontrolled diarrhoea or uncontrolled vomiting, the treating clinician should urgently discuss patient management with the PHU, and the Infectious Diseases physician on call at WH or CHW.

If patient transfer is recommended, the Infectious Diseases physician on call at WH or CHW will urgently contact the Intensive Care Unit physician on call for consideration of early transfer to a HSIU.

See APPENDIX 2 for WH and CHW contact details and APPENDIX 4 for ambulance transfer information.

Single use (disposable) equipment and supplies should be used. The use of a needle-free intravenous system to eliminate the risk of needle-stick injuries should also be considered.

Guidance on cleaning, disinfection and linen is provided in APPENDIX 10 and guidance on waste management is provided in APPENDIX 11.

Commence early public health actions as soon as the patient is categorised as *Increased Possibility of VHF*, and launch full public health actions if the VHF screen is positive (see SECTION 6).

Communication with staff about potential infection risks

Staff must be informed about and understand the risks associated with a VHF patient, for example:

- The severity of a VHF if infection is confirmed.
- That virus may be present
 - in blood and in body fluids, including urine, vomitus and faeces
 - on contaminated instruments and equipment
 - in waste

- on contaminated clothing
- on contaminated surfaces.
- That exposure to virus may occur
 - directly, through exposure (broken skin or mucous membranes) to blood and/or body fluids during invasive, aerosolising or splash procedures
 - indirectly, through exposure (broken skin or mucous membranes) to environments, surfaces, equipment or clothing contaminated with splashes or droplets of blood or body fluids
 - indirectly through contamination of hands, inadvertent touching of the face and errors when removing PPE.

Diagnostic investigations

Discuss urgent VHF and other appropriate testing with an ID physician, PHU, the local laboratory and clinical microbiologist on call at CIDMLS-ICPMR. This will include consideration of the patient's travel and occupational history collected during the patient risk assessment.

If VHF testing is authorised, results should be available within four to six hours following receipt of the specimen at CIDMLS.

See APPENDIX 2 for contact details for the CIDMLS-ICPMR reference laboratory.

APPENDIX 6 provides guidance on obtaining specimens and APPENDIX 7 on the appropriate laboratory procedures for the processing of specimens from a patient categorised as *Increased Possibility of VHF*.

VHF screen results and subsequent patient management

If a VHF test is positive, a number of urgent actions are required – see SECTION 5 and SECTION 6 for details.

If VHF testing is negative the patient should remain isolated in a single room and the infection control measures should be maintained until an alternative diagnosis is established or further guidance is provided by the State Incident Management Team.

SECTION 5. MANAGEMENT OF A PATIENT CATEGORISED AS *CONFIRMED VHF*

For VHF risk categories definitions see SECTION 2: PATIENT RISK ASSESSMENT. Patients are categorised as *Confirmed VHF* if they test positive for a VHF.

If a patient has a positive VHF test result, the following urgent actions are required:

- No staff member to have contact with the patient unless wearing VHF PPE (see APPENDIX 8).
- Keep patient in isolation room (single room with door closed, with own bathroom and negative pressure if available). In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.
- Transfer to a VHF designated hospital (WH or CHW), unless exceptional circumstances prevent transfer of the patient.
- Full public health actions must be launched.
- Avoid collection of clinical specimens for non-critical tests.
- Restrict the number of staff in contact with the patient and compile a list of all staff who have been in contact with the patient.
- Inform the patient and those in contact with the patient of the positive test, and emphasise infection control procedures to minimise risk of infection.
- Inform your immediate manager of the positive test (Hospital executive must be informed).
- No visitors unless extreme circumstances.
- Review infection control measures appropriate to the patient (as described below).
- Notify the infection control team of the positive VHF test result.
- Notify the local waste contractor of patient with positive VHF result.
- Launch full public health actions (see SECTION 6), including formation of a facility Incident Control Team.

If the condition of the patient is so serious (as judged by the treating clinician) that transfer to the HSIU would adversely affect the patient, an immediate discussion with the lead ID physician, infection control consultant/manager and head of intensive care should take place regarding enhanced risk assessment and control measures.

Testing of specimens for the clinical management of patients that are not transferred to the HSIU should be carried out in consultation with the clinical microbiologist on call at CIDMLS-ICPMR and in accordance with the laboratory procedures described in APPENDIX 7.

Infection control measures

- The patient must be isolated in a single room with private bathroom facilities, an ante-room to limit contact, and negative pressure air handling if available. In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and designating restricted areas outside of the patient's room.

- Patients with respiratory symptoms must also be asked to wear a surgical face mask to contain respiratory droplets.
- Restrict visitors until the patient is no longer considered to be infectious.
- Enhance levels of personal protection for those in contact with the patient
 - surgical scrubs
 - hand hygiene
 - disposable, fluid repellent long sleeve gown
 - disposable face shield, surgical hood to cover head and neck, and P2/N95 mask
OR disposable powered air purifying respirator (PAPR) hood
 - disposable, fluid repellent below-knee boot covers
 - double gloves (with long cuffs)
 - waterproof apron if vomiting/diarrhoea.

If staff have performed prolonged contact or high risk patient care then they must shower using a neutral soap and change into fresh scrubs.

At the end of the shift all HCWs must shower with a neutral soap.

Please see APPENDIX 8 for detailed guidance on PPE.

Single use (disposable) equipment and supplies should be used. The use of a needle-free intravenous system to eliminate the risk of needle-stick injuries should also be considered.

Communication with staff about the potential VHF risks and infection control measures is critical. The important risks to make staff aware of are described in SECTION 4 under *Communication with staff about potential infection risks*.

Should an isolated patient require delivery of a meal tray all equipment provided (e.g. utensils, plates and containers) must be disposable, including the tray. If disposable trays are not available, trays must not be taken into the patient room.

Guidance on cleaning, disinfection and linen is provided in APPENDIX 10 and guidance on waste management is provided in APPENDIX 11.

Discharge and convalescence

A patient with confirmed VHF may be discharged when the medical condition allows and the patient is no longer infectious. 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, patients should be advised to abstain from sexual intercourse until genital fluids have been shown to be free of the virus for three months.

Death of a patient with confirmed VHF

Please see APPENDIX 5 for details on post-mortem examinations and disposal of the deceased.

SECTION 6. PUBLIC HEALTH ACTIONS

When to launch public health actions:

Early public health actions must be launched if a patient has been categorised as *Increased Possibility of VHF*. Early actions are:

- Notification of the increased possibility case.
- Forward notification of the increased possibility case.
- Identification of contacts.

Full public health actions must be launched if a VHF test result is positive. In addition to the above actions:

- Notification of the case by the laboratory.
- Notification of the case by the Chief Quarantine Officer (CQO) to the Australian Department of Health Director of Human Quarantine (DHQ).
- Formation of a hospital Incident Control Team.
- Formation of a state Incident Management Team.
- Categorisation and management of contacts.
- Formation of a public communications plan.

The public health control guidelines for Ebola virus disease (EVD) and *NSW Ebola Virus Disease Public Health Surveillance and Monitoring Plan* are located on the NSW Health website:

<http://www.health.nsw.gov.au/Infectious/alerts/Pages/EVD.aspx>

Notification of cases

Notification of an Increased Possibility VHF case

VHF is a notifiable disease. If the patient's illness is compatible with VHF, it is the legal responsibility of the attending medical practitioner to immediately notify the local public health unit by telephone, preferably the PHU Director (see APPENDIX 2).

The attending medical practitioner should not wait for laboratory confirmation or results of other investigations in order to notify a suspect case.

Forward notification of an Increased Possibility VHF case

The PHU Director will in turn contact the CQO or, if unavailable, the Communicable Diseases Branch on-call Human Quarantine Officer (see APPENDIX 2).

Notification of a confirmed VHF case

VHF is a notifiable disease. If a patient tests positive for a VHF, it is the legal responsibility of the testing laboratory to immediately notify the local public health unit by telephone, preferably the PHU Director. See APPENDIX 2 for contact details.

Forward notification of a confirmed VHF case

The PHU Director will in turn contact the CQO or, if unavailable, the Communicable Diseases Branch on-call Human Quarantine Officer, and the LHD HSFAC.

The CQO will in turn notify the Director, Human Quarantine (Australia) and the Office of Health Protection, Australian Department of Health and the State Public Health Controller. See contact details in APPENDIX 2.

Incident control

Hospital Incident Control Team

A hospital Incident Control Team (ICT) will need to be established as soon as a patient tests positive for a VHF. The ICT should include representatives from the hospital (including clinicians, infection control, laboratory and other relevant hospital departments) and from the LHD, including the PHU Director and the HSFAC. The lead for this will depend on the particular situation.

The Hospital ICT will need to:

- ensure that relevant parties have been informed that the VHF screen result was positive (See as described above)
- liaise closely with Health Protection NSW
- coordinate the safe transfer of the patient to Westmead Hospital HSIU when appropriate
- assign responsibility for the assessment, categorisation and management of hospital contacts
- liaise closely with the PHU officers coordinating contact tracing and management
- after the patient has been transferred, ensure adequate environmental cleaning of the patient care area(s) is carried out.

State Incident Management Team

Health Protection NSW will establish a State Incident Management Team (IMT) and will consult with the Chief Health Officer/Public Health Controller and Director, Health Protection on the need for an incident command structure to support the response.

Health Protection NSW will generally convene and seek advice from an expert advisory group with expertise in public health, infection control, clinical management and laboratory testing to provide advice on the management of *Increased Possibility of VHF* and *Confirmed VHF* cases. This will include the director of the relevant local public health unit, a representative from the clinical team managing the case, and a senior medical virologist from CIDMLS-ICPMR.

Contact tracing

The identification, management and monitoring of contacts of *Increased Possibility of VHF* and *Confirmed VHF* cases is the responsibility of the local PHU, supported by the CQO, Health Protection NSW – Communicable Diseases Branch, and the Hospital ICT (for healthcare worker and other hospital contacts, see above).

The PHU may wish to implement a PHU incident command system (ICS) structure to manage these actions, particularly if there are many contacts identified.

Identification of contacts

The local PHU has ultimate responsibility for contact tracing but works closely with the hospital infection control team, Work Health and Safety team or equivalent with respect to exposed healthcare workers and patients. Contact identification aims to:

- identify, assess, and categorise contacts of a patient with VHF
- ensure the appropriate monitoring of higher risk contacts
- arrange further evaluation for contacts who develop an elevated temperature

- or other symptoms of concern
- consider antiviral prophylaxis where appropriate, and arrange as necessary.

Contacts

A contact is defined as a person who has been exposed to a patient categorised as *Increased Possibility of VHF*, until the diagnosis has been excluded, or *Confirmed VHF* or their blood and body fluids, excretions or tissues following the onset of their fever. This may include contacts that are not in NSW or Australia. For management of staff accidentally exposed see APPENDIX 9.

As soon as a patient has been categorised as *Increased Possibility of VHF*, all those who have had contact with the patient should be identified. This helps to be prepared for the possibility of a positive test, and the subsequent urgent need to monitor all those who have been exposed to the patient.

Each potential contact should be individually assessed for risk of exposure and categorised according to the table below⁵:

Categorisation of contacts	
Risk category	Description
Unclear	Not sure of contact.
No risk	No casual, low risk or high risk contacts.
Casual contact risk	Near vicinity of a VHF case or travel to an area with widespread VHF transmission with no known high or low risk exposures.
Low risk	Direct contact with the patient, e.g. routine medical/nursing care, handling of clinical/laboratory specimens, but did not handle body fluids or wore personal protective equipment appropriately.
High risk	Unprotected exposure of skin or mucous membranes to potentially infectious blood or body fluids, including on clothing and bedding. This includes: <ul style="list-style-type: none"> • unprotected handling of clinical/laboratory specimens • mucosal exposure to splashes • needle stick injury • kissing and/or sexual contact.

⁵ Refer to disease-specific control guidelines for contact categorization and management where available.

Contacts should be managed as outlined in the table below.

Management of contacts	
Risk category	Action and Advice
Unclear	Carefully interview and conduct risk assessment to reclassify; provide PHU surveillance officer contact details should they recall any contact; provide general factsheet.
No risk	Reassure about likely absence of risk; Provide general factsheet.
Casual contact risk	Reassure about very low risk; institute regular passive monitoring of temperature and other disease compatible symptoms for 21 days from last exposure; patient to report to PHU if febrile or symptomatic; provide casual contact factsheet
Low risk	Reassure about low risk; institute daily passive monitoring of temperature and other disease compatible symptoms for 21 days from last exposure; patient to report to the PHU if temperature is elevated or symptomatic; provide low risk contact factsheet.
High risk	Inform about risks; institute daily active monitoring of temperature and other disease compatible symptoms for 21 days from last exposure. The PHU Surveillance Officer to initiate contact by 12 noon each day; further evaluation as necessary. Inform PHU surveillance officer urgently if symptoms develop; provide high risk contact factsheet.

Hospital infection control officers, Work Health and Safety officers or equivalent may undertake active monitoring of healthcare workers and other hospital contacts on behalf of the PHU.

Physical quarantine by self-isolation is not routinely required for asymptomatic contacts in any risk category. Public health units will conduct a detailed risk assessment and provide specific advice.

Prophylaxis for contacts

Antivirals are not generally recommended for contacts due to the absence of evidence of their proven effectiveness for prophylaxis. However, antivirals may be considered for those direct contacts at highest risk, subject to individual risk assessment in consultation with experts at Westmead Hospital/ICPMR.

Antivirals, specifically ribavirin, have been shown to be effective in the treatment of early-stage arenavirus infections, particularly Lassa fever. There is however evidence to suggest that ribavirin may prolong the incubation period for Lassa fever.

APPENDIX 1. OVERVIEW OF VIRAL HAEMORRHAGIC FEVERS

Incubation periods

Note that the incubation periods for these diseases are:

- Lassa 6 – 21 days
- Ebola 2 – 21 days
- Marburg 3 – 10 days
- Crimean-Congo 1 – 12 days (Usually 1 – 3 days)

Clinical features for suspected cases of VHF

Ebola and Marburg: Characterised by the sudden onset of fever, malaise, myalgia, and headache, followed by pharyngitis, vomiting, diarrhoea, and a maculo-papular rash. Haemorrhagic manifestations are seen in less than half of cases. Haemorrhage and shock are more likely in the second week.

Lassa: Characterised by the gradual onset of fever, malaise, myalgia, headache, vomiting and diarrhoea. Pharyngitis and conjunctivitis are prominent. Only 20 per cent have severe symptoms, which may include pleural effusions, haemorrhage, seizures, encephalopathy and oedema of the face and neck.

Crimean-Congo: Characterised by the sudden onset of fever with headache, myalgia, arthralgia, abdominal pain, and vomiting. Conjunctivitis, pharyngitis and palatal petechiae are also common. Bruising and widespread haemorrhage typically starts after four days.

Specific treatments for VHF patients

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 small SAS (Special Access Scheme) stock of the parenteral form of this drug is maintained for this purpose at the Department of Pharmacy, Westmead Hospital. Request for stock should be directed to a Westmead Hospital ID physician.

If it is agreed that parenteral ribavirin is an appropriate treatment, the ID physician will then advise the Department of Pharmacy to release the product to the requesting physician. The requesting physician will need to apply SAS for the drug, make arrangement for ordering for further stock for continual treatment and replacement of the stock supplied by Westmead Hospital's Department of Pharmacy. A copy of the SAS form should also be faxed to the Department (02 98939686).

The oral form of ribavirin is marketed in Australia as a component of either Pegasys RBV Combination Therapy or Pegatron Combination Therapy. Both products are available from pharmaceutical wholesalers.

The Department of Pharmacy at Westmead Hospital also has a stock of these two products.

Quick reference guide for viral haemorrhagic fevers

VHF	DISTRIBUTION	RESERVOIR	INCUBATION PERIOD	CLINICAL PRESENTATION	DIAGNOSIS	FATALITY RATE	TREATMENT	INFECTIOUS MATERIAL
Lassa	Sierra Leone, Nigeria, Liberia, Guinea, Senegal, Mali, Central African Republic	A small wild rodent, <i>Mastomys natalensis</i> .	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, DR Congo, Ivory Coast, Gabon, Uganda, Guinea, Liberia, Sierra Leone	Unknown - bats suspected. Humans usually first infected from non-human primates.	2-21 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.	50-90%	None proven. Possibly ribavirin	Blood and body fluids in acute illness. Excreted in semen for up to 10 weeks after clinical recovery.
Marburg	Kenya, Uganda, Angola, Democratic Republic of Congo, Zimbabwe	As for Ebola.	2-21 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. Possibly ribavirin.	Presumed same as Ebola
CCHF	Eastern Europe, Middle East, Mediterranean, Central Asia, India, most of Africa	Small mammals. Humans usually acquire via ticks.	1-12 days	Non-specific. Fever, headache, gastrointestinal 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.

APPENDIX 2. CONTACT NUMBERS

Please contact Communicable Diseases Branch (CDB), Health Protection NSW, for the list of key contacts in Appendix 2.

CDB Contact details: cdb@doh.health.nsw.gov.au or call 02 9391 9195.

APPENDIX 3. REPORTING A SUSPECTED OR CONFIRMED VHF CASE

The management of the presentation and the consequences of a serious infectious disease associated with travel require the coordination of multiple technical areas.

Local, state, national and international action or measures may be indicated. The rare nature of VHFs and the complexity of some of the diagnostic investigations call for expedient, efficient and coordinated communication among all those involved.

Reporting from international airports or seaports in NSW

The Australian Department of Agriculture provides human quarantine services for international passengers arriving in Australia on behalf of the Australian Department of Health.

Ill passengers or crew identified by the Department of Agriculture Biosecurity Officers at or en route to NSW Airports or Seaports are assessed using standard national protocols and suspected VHF cases are reported to the Health Protection NSW/Chief Quarantine Officer (CQO) or to the Human Quarantine medical officer on-call, under existing arrangements.

If ill passengers are categorised as *Increased Possibility of VHF* then direct transfer to the HSIU (located within Westmead Hospital's ICU) will be recommended unless the severity of the illness requires transfer to a closer facility.

Reporting from a medical practitioner or hospital

If the patient's illness is compatible with or confirmed as VHF, it is the legal responsibility of the attending medical practitioner or hospital chief executive officer to immediately inform the director of their local PHU (or their delegate on-call). See APPENDIX 2 for PHU contact details.

Reporting from PHU Directors to the Health Protection NSW/CQO

The PHU director (or their delegate) must immediately contact Health Protection NSW/CQO (or their Human Quarantine medical officer delegate on-call) regarding any new suspected or confirmed VHF case. See APPENDIX 2 for contact details.

Reporting from the NSW CQO

Following receipt of a notification of an *Increased Possibility of VHF* or *Confirmed VHF* case, the NSW CQO will notify the following:

- Director, Health Protection NSW
- State Public Health Controller – NSW Health
- State Health Services Functional Area Coordinator (NSW HSFAC)
- Director, Human Quarantine
- National Incident Room.

APPENDIX 4. AMBULANCE TRANSFER OF A PATIENT

Arranging an Ambulance transfer

All patients that have been assessed as having an *Increased Possibility of VHF* via the patient risk assessment algorithm (see Section 2) should be considered for transfer to Westmead Hospital for direct admission to the High Security Isolation Unit (HSIU) within the Intensive Care Unit, or to Children's Hospital Westmead Isolation Ward.

Once a patient has been determined to be at *Increased Possibility of VHF* a teleconference should be held between the following parties to determine the need for transfer and the type of transport required (see Appendix 2 for contact numbers):

- Ambulance Controller
- State HSFAC
- Communicable Diseases Branch, Health Protection
- Local public health unit
- Westmead or Children's Hospital Westmead (CHW) ID and ICU physician
- CIDMLS/ICPMR lab
- Local clinicians

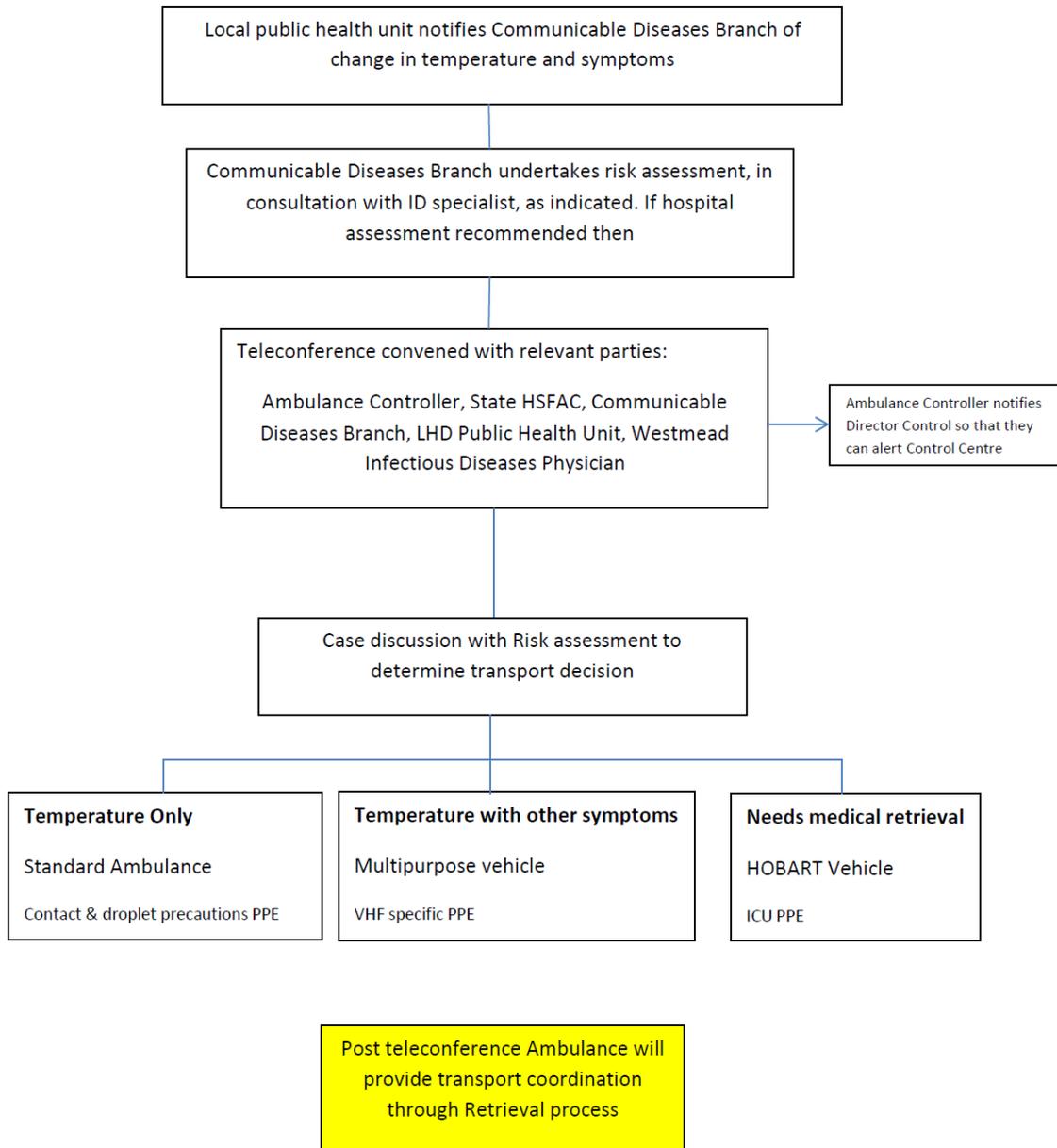
NSW Ambulance have produced transfer decision flowcharts that outline the steps needed to make a transport decision for people with *Increased Possibility of VHF* presenting at the airport, an emergency department, a general practice clinic or at home (see below). These flowcharts provide detail on the process for initiating the case discussion and risk assessment of the patient, determining the type of PPE required for Ambulance staff and type of vehicle most appropriate for transporting the patient.

Patients categorised as *Increased Possibility of VHF* that require ambulance transport must only be transported in NSW Ambulance Service ambulances with NSW Ambulance paramedics and/or doctors.

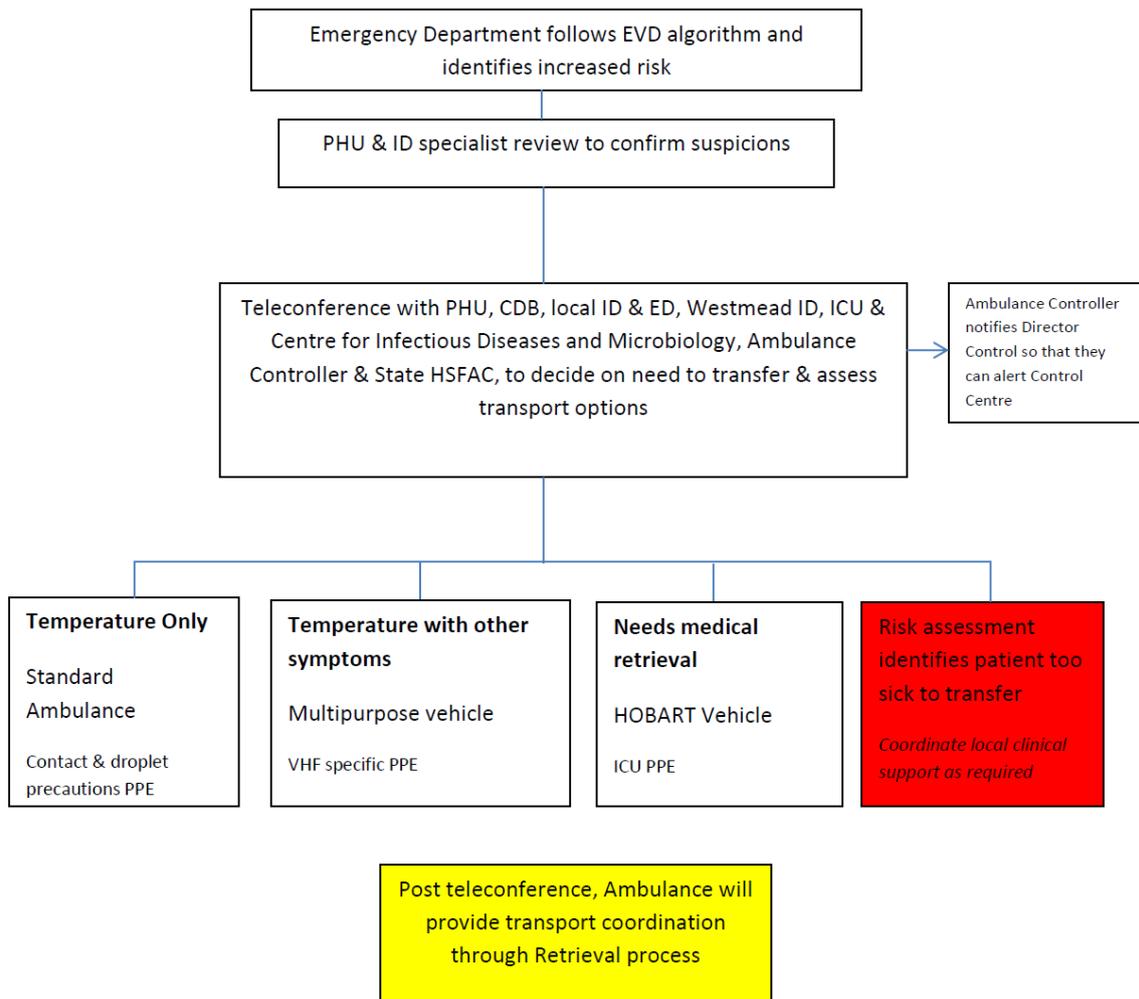
Alternative options should be considered for the isolation, management and transfer (air / land) of patients categorised as *Increased Possibility of VHF* who are located in rural health facilities which may be a considerable distance from Westmead. For example, transfer to another state may be considered if clinically appropriate and the other jurisdiction agrees to accept the patient. Alternatively, if the risk assessment identifies the patient is too sick to transfer, clinical surge staff may be sent to regional or rural facilities which may require support to care for patients locally.

Patients in other hospitals categorised as *No Known Exposure to VHF* should not be transported to Westmead Hospital ICU until appropriate testing for VHF has been performed, unless, after consultation with public health staff and Westmead Hospital ICU and ID physicians, it is considered that the patient's condition warrants early transfer.

Public Health monitoring patient at home

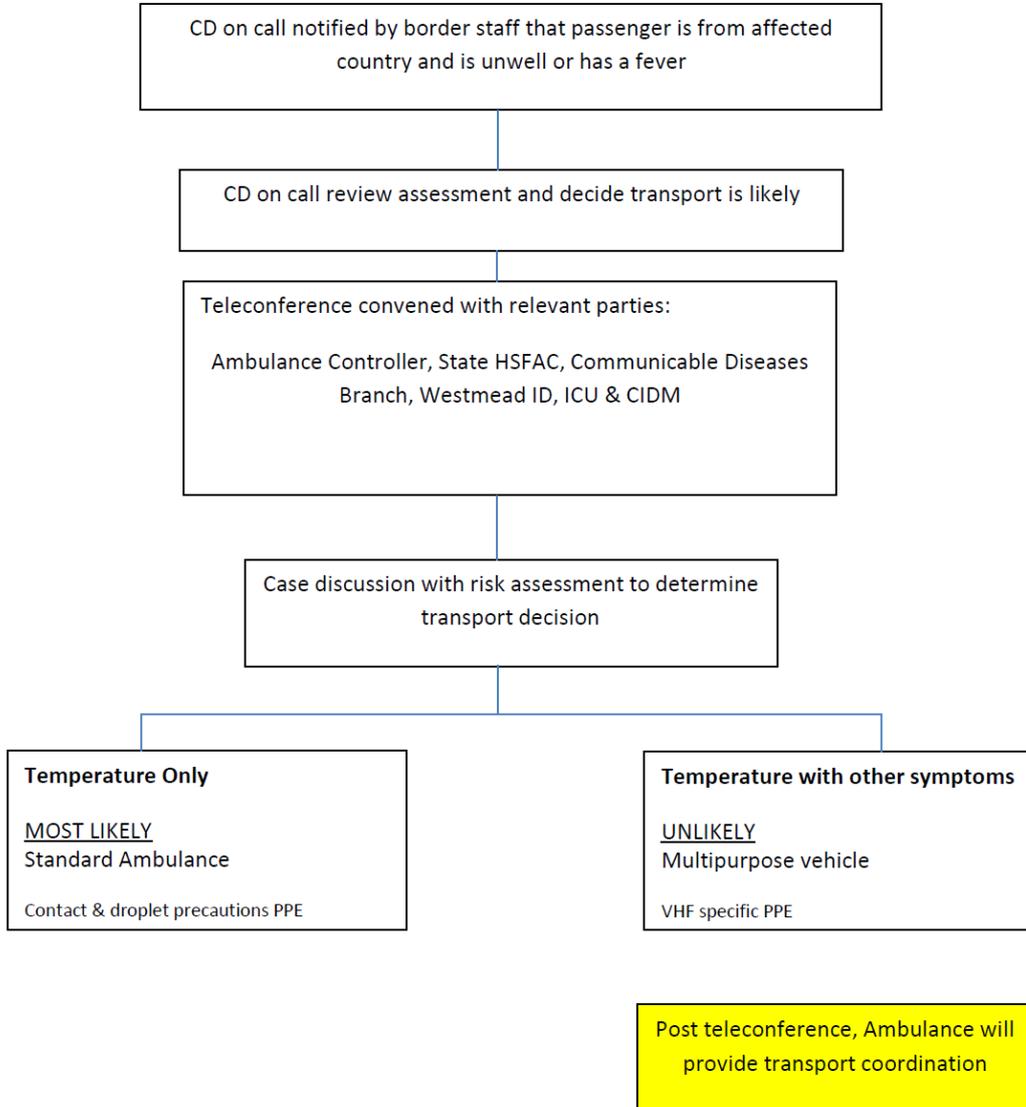


Self-presentation at an emergency department (other than Westmead)

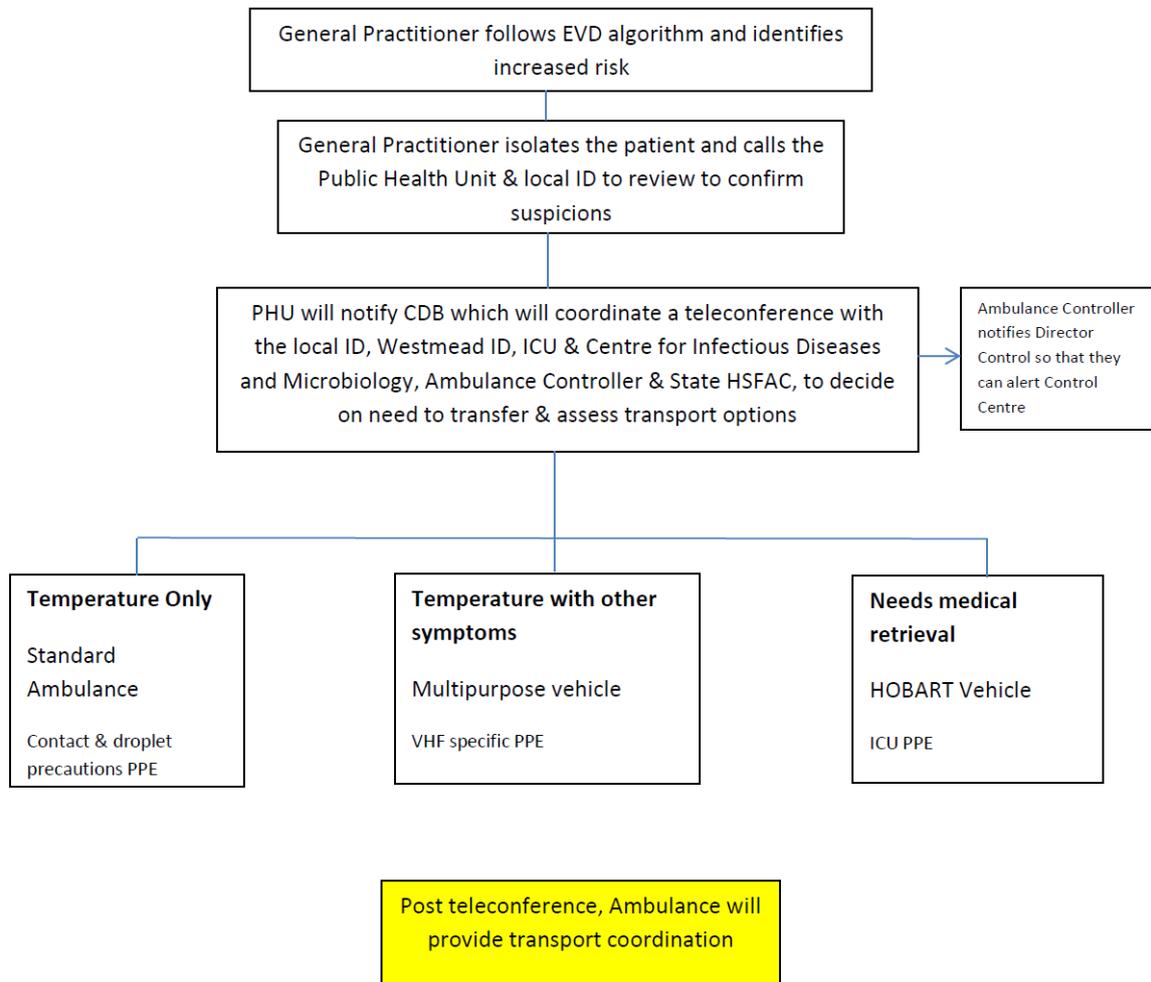


Airport presentation

(NB: Depending on condition, airport staff will call an ambulance at the time of landing or fever may be detected by second line screening)



Self-presentation to a General Practitioner



Communication

The ambulance paramedics and other relevant staff must be made aware of the patient's clinical condition, the possibility of deterioration on the journey and the routes of transmission of VHF. During the journey, maintain close communication with the Westmead Hospital High Security Isolation Unit (HSIU), to give estimated time of arrival, clinical condition of the patient; others involved in the transfer, for example the escort, if applicable.

Protection of ambulance officers

All NSW Ambulance staff involved in transfer of a patient categorised as *Increased Possibility of VHF* or patients with confirmed VHF should follow the latest Clinical Safety Advice on PPE issued by NSW Ambulance Service. Procedures for infection control and the appropriate use of PPE are outlined in this document and include the need for supervision of a NSW Ambulance DOM for safe donning and doffing and disposal of PPE after use. A log of all people attending the patient or handling patient specimens should be maintained.

Managing a spillage of blood or other body fluids

The precautions on how to manage a body fluid spill from patients categorised as *Increased Possibility of VHF* or confirmed VHF cases are outlined in APPENDIX 10. Staff should wear full PPE as per the latest Clinical Safety Advice issued by NSW Ambulance when managing body fluid spills. NSW Ambulance staff may also need to seek LHD/facility support in obtaining sodium hypochlorite solution for decontaminating any spills.

Accidental exposure of staff to blood or body fluids

Local procedures must be in place to deal with any accidental exposure of staff to blood or body fluids from patients categorised as *Increased Possibility of VHF* or confirmed VHF cases.

- Take immediate action to reduce the exposure risk (see APPENDIX 9) and
- Complete an IIMS form and report the incident to the admitting doctor and ambulance controller.

Waste disposal

For patients categorised as *No Known Exposure*, standard precautions for waste management apply. For patients categorised as *Increased Possibility of VHF* enhanced waste management protocols apply (see APPENDIX 11).

Decontamination of the ambulance

The ambulance surfaces must be cleaned and then disinfected using an appropriate disinfectant solution (see APPENDIX 10) by NSW Ambulance paramedics using clean PPE per NSW Ambulance procedures, with special caution to avoid splashes. After completing cleaning, the disposable cloths and mop head must be placed in a bag or container and disposed of as clinical infectious waste.

APPENDIX 5. POST-MORTEM EXAMINATIONS AND DISPOSAL OF THE DECEASED

Post-mortem examination

A post-mortem examination on a person known to have died of VHF exposes staff to unwarranted risk and should not be performed.

In the event that a post-mortem examination is required it should be performed by operators using the highest level PPE appropriate for high risk infectious diseases, as per accepted forensic medicine procedures. Aerosol formation must be avoided (e.g. electrically powered cutting instruments must not be used). All solid and liquid waste must be decontaminated with disinfectant solution or autoclaved, then incinerated. After the post-mortem has been completed the room must be thoroughly cleaned with disinfectant solution.

Where a patient suspected of having VHF dies prior to a definitive diagnosis being made, it may be necessary on public health grounds to conduct limited diagnostic testing after death to establish or eliminate the diagnosis of VHF.

Disposal of the deceased

VHFs are prescribed infectious diseases under the NSW Public Health Regulations (2012) in Division 3 Handling of bodies. This includes the following requirements:

- A person must, when carrying out any procedure on a body, comply with the guidelines specified in Part B of the Australian Guidelines for the Prevention and Control of Infection in Healthcare published by the National Health and Medical Research Council (<http://www.nhmrc.gov.au/guidelines/publications/cd33>).
- A person must, when placing a body in a bag or wrapping a body, comply with the Infection Control Policy published by the NSW Ministry of Health (http://www.health.nsw.gov.au/policies/pd/2007/PD2007_036.html).
- A responsible person⁶ must ensure that the body of a dead person is not removed from a place unless:
 - a) the body has been placed and secured in a bag or wrapping in a manner that prevents the leakage of any body exudate or other substance, and
 - b) the name of, or an identification of, the dead person is clearly and indelibly written on the top outer surface of the bag or wrapping, and
 - c) if the person has reason to believe that the body is infected with a prescribed infectious disease—the bag or wrapping is clearly and indelibly marked with the words “PRESCRIBED INFECTIOUS DISEASE – HANDLE WITH CARE”.

The NSW *Public Health Regulation 2012* also specifies that bodies with a prescribed infectious disease must not be embalmed (section 56) or made available for viewing

⁶ A responsible person means: (a) if the body is at a hospital—the chief executive officer of the hospital or a person authorised by the chief executive officer, or (b) if the body is at any other premises or place—the funeral director or other person removing the body.

(section 60).

An Environmental Health Officer from the local PHU should work closely with the relevant funeral director to ensure that all appropriate infection control measures are implemented.

Staff wearing appropriate PPE must place the body of a confirmed or suspected VHF patient in a leak-proof double body bag. Absorbent material must be placed between each bag, and the bag sealed and disinfected with sodium hypochlorite solution diluted to 5000ppm available chlorine.

Facilities must ensure that appropriate equipment is available to safely contain the body as described and that procedures are in place to ensure that this is carried out without exposing staff members to infectious tissue or contaminated material.

The body must be cremated or buried in a sealed casket as soon as possible.

Persons who dispose of the body must take the same personal protection precautions outlined for medical and laboratory staff.

APPENDIX 6. SPECIMEN COLLECTION AND HANDLING

Note: Specimens for VHF testing must only be collected following advice from an ID physician, PHU, the local laboratory and the clinical microbiologist on call at CIDMLS-ICPMR.

Infection control for collecting and handling specimens for VHF and routine testing

Health care workers must be adequately trained in the procedures recommended in this section. Health care workers collecting or handling specimens must wear personal protective equipment (PPE) appropriate for the patient's VHF category and adhere to engineered safeguards, for all specimens regardless of whether they are identified as being infectious. Please refer to APPENDIX 8 for detailed guidance on recommended PPE. Consideration should be given to incorporating a second health care worker to participate in procedures involving patients categorised as *Increased Possibility of VHF* or *Confirmed VHF*.

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

Packaging and transport of specimens

Specimens must be transported in accordance with current regulatory requirements, including SSBA guidelines and *NPAAC Requirements for the Packaging and Transport of Pathology Specimens and Associated Materials (Fourth Edition 2013)*, available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/health-mpaac-publication.htm>

Specimens from patients categorised as *No Known Exposure*

Infection control precautions for clinical and laboratory staff are given in APPENDIX 8.

Specimens will be packaged and transported as Biological Substances Category B (UN 3373) using IATA Packing Instruction 650.

Specimens from patients with *Increased Possibility of VHF* and *Confirmed VHF*

Infection control precautions for clinical and laboratory staff are given in APPENDIX 8.

Guidelines for collection and handling of specimens for VHF and other routine testing are given in the *Collection, packaging and transport of VHF pathology specimens* (available at: <http://www.health.nsw.gov.au/Infectious/alerts/Pages/EVD-laboratory.aspx>), which includes the protocol below.

VHFs are classified as Infectious Substances Category A UN 2814. The protocol below should be followed for specimen collection, packaging (using Packing Instruction 620), and transport (as Infectious Substances Category A, UN 2814) from the collection location to the local laboratory for final labelling/documentation for external referral for VHF testing to CIDMLS PC4 laboratory.

The protocol is in accordance with the *NPAAC Requirements for the packaging and*

transport of pathology specimens and associated materials (Fourth Edition 2013). Additional information is provided in the *Notes for laboratories for packaging and dispatch of Infectious Substances Category A, UN 2814 and urgent transport through TOLL Priority* (available at: <http://www.health.nsw.gov.au/Infectious/alerts/Pages/EVD-laboratory.aspx>.)

Protocol for specimens for VHF testing (refer to the document for Pictograms)

Materials required

- Three EDTA blood tubes (purple) 3 x 50 mL Falcon tubes (or other external tube per blood tube) containing absorbent material.
- One zip-lock specimen bag.
- One screw top Bio-bottle and accompanying specimen transport box labelled for Category A transport (initially to the local laboratory, then final labelling for referral to CIDMLS PC4 laboratory) including:
 - Name and address of the sender
 - Name and delivery address of receiver: *local laboratory OR CIDMLS PC4 Laboratory*
 - 24 hr Emergency contact: *local contact OR CIDMLS Clinical Microbiologist on-call*
- 0.5% sodium hypochlorite solution (i.e. diluted to 5000 ppm available chlorine) (freshly made each day).
- Paper towels to disinfect blood tubes.
- Routine equipment required for phlebotomy (institution specific).

Prior to entering the patient room

1. Determine the boundaries for contaminated (patient room) and clean areas (anteroom or corridor). The zip-lock specimen bag, request form, Bio-bottle and transport box must remain in the clean area.
2. In the clean room, pre label the blood tubes using a ball point pen with: Patient name, MRN and DOB. Fill out a request form clearly stating that VHF (e.g. EVD) PCR is requested.
3. Appropriate personal protective equipment must be worn.

Inside the patient room

4. Specimens should be collected taking care not to contaminate the external surfaces of the blood tubes.
5. Collect at least 4 mL of blood per tube from an adult and 200 µL from a child. Place the filled tubes on a tray. Disinfect the operator's gloves with 0.5% sodium hypochlorite solution.
6. The operator then disinfects each specimen tube by gently wiping with paper towel saturated with 0.5% sodium hypochlorite solution taking care to disinfect all surfaces, and not to erase labelled patient details.
7. Place each disinfected blood tube into one 50 mL Falcon tube containing absorbent material and firmly secure the screw top lid.
8. Disinfect the Falcon tube by wiping with 0.5% sodium hypochlorite solution taking care to disinfect all surfaces.
9. Move the specimens to the boundary of the contaminated and clean areas and without touching the sides of the specimen zip-lock bag held by an assistant in the clean area, drop each of the disinfected 50 mL Falcon tubes in turn into the

specimen bag.

10. The assistant in the clean area seals the zip-lock bag and places the request form into the form pouch on the bag.
11. Place the specimen bag containing the blood specimens into the screw top Bio-bottle and tighten the lid.
12. Place the Bio-bottle into the pre-labelled transport box for transport to local laboratory for final labelling/documentation for referral to CIDMLS PC4 laboratory. Note the name and address of the sender.
13. The specimens should be transported to CIDMLS at room temperature.
14. Transfer the transport box to CIDMLS PC4 Laboratory using Category A transport according to the following procedures:
 - *Procedure for referral of external specimens for VHF testing to the PC4 Laboratory, CIDMLS Westmead Hospital*
 - *TOLL Urgent specimen transport for NSW public health emergency.*

NOTE: the following documents have been distributed to laboratories in NSW in August 2014, and can be provided by contacting CD on Call on 02 9391 9195 or cdoncall@doh.health.nsw.gov.au :

- *Notes for laboratories for packaging and dispatch of Infectious Substances Category A, UN 2814 and urgent transport through TOLL Priority. (TRIM H14/106389)*
- *Procedure for referral of external specimens for VHF testing to the PC4 Laboratory, CIDMLS Westmead Hospital. (TRIM H14/106390)*
- *TOLL Urgent specimen transport for NSW public health emergency. (TRIM H14/106392)*

APPENDIX 7. LABORATORY PROCEDURES

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.

VHF testing should only be conducted following advice from an ID physician, PHU, the local laboratory and the Clinical Microbiologist on call at CIDMLS-ICPMR. Where tests for VHF have been authorised, routine haematology and other tests should be deferred if possible until the VHF results are available since blood is highly infectious.

Timing of VHF Testing

Note that for some VHF (e.g. Ebola virus disease), virus is only detectable in blood after the onset of symptoms.

Specimens ideally should be taken when a symptomatic patient reports to a hospital and is suspected of having a VHF exposure.

Differential diagnoses

Depending on the specific virus, initial symptoms of VHF infections may be non-specific in nature, and commonly resemble an influenza-like illness.

The differential diagnosis for febrile illnesses in a traveller returning from an endemic VHF area includes an extensive list of infectious diseases that would be more common than VHF. Evaluation for and treatment of these other potentially serious infections, particularly malaria, should not be delayed. Expert advice from an ID physician should be sought.

Urgent exclusion of malaria is required for all suspect VHF cases who have recently travelled in malaria-endemic areas. Screening for malaria can be performed at the local laboratory.

Infection Control for Processing Specimens

All laboratory staff processing specimens follow established standard precautions for blood borne pathogens, which cover blood and other potentially infectious materials. This includes wearing appropriate personal protective equipment (PPE) and adhering to engineered safeguards, for all specimens regardless of whether they are identified as being infectious.

Specimens from patients categorised as *No Known Exposure*

Laboratory precautions and procedures will be as advised by a clinical microbiologist.

Additional recommendations for laboratory testing of specimens from a patient categorised as *Increased Possibility of VHF or Confirmed VHF*:

- Wear a full face shield, P2/N95 mask, double gloves, surgical scrubs or disposable overalls (to be worn under gown), fluid repellent long sleeve gown,

shoe covers (please refer to APPENDIX 8) AND, where applicable, use of a certified class II Biosafety cabinet, as well as manufacturer-installed safety features for instruments.

Processing of specimens in Hospital Laboratories

Routine laboratory testing includes traditional chemistry, haematology, and other laboratory testing used to support and treat patients. VHF diagnostic testing is only available at CIDMLS-ICPMR.

Guidelines from the Public Health Laboratory Network for *Laboratory precautions for samples collected from patients with suspected viral haemorrhagic fevers* are available at:

<https://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-other-vhf.htm> .

Wherever possible, patients with an *Increased Possibility of VHF* and *Confirmed VHF* infection will be managed at a designated VHF hospital (WH or CHW). Routine laboratory testing for these patients will be coordinated under local arrangements and may include testing at ICPMR within the CIDMLS PC4 laboratory or possibly with point of care tests within the isolation unit if circumstances allow.

If the clinical circumstances require urgent testing of specimens while the patient is at a hospital other than Westmead, limited routine testing (particularly malaria point of care tests) may be done if the hospital laboratory is equipped to handle potential VHF infectious agents.

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.

Infection control precautions as described above offer appropriate protection for healthcare personnel performing laboratory testing on specimens from patients with suspected infection with VHF. These precautions include both manufacturer installed safety features for instruments and the environment as well as PPE specified above.

When used according to the manufacturer's instructions, disinfectants routinely used to decontaminate the laboratory environment (bench tops and surfaces) and the laboratory instrumentation are sufficient to inactivate enveloped viruses, such as influenza, hepatitis C, and Ebola viruses (see APPENDIX 10).

Specimens from a patient categorised as *No Known Exposure*

The majority of patients who are categorised as *No Known Exposure* are unlikely to have a VHF; clinical experience has shown that most patients will have infections such as malaria. The overall risk to laboratory workers from specimens from these patients is therefore considered to be minimal, and specimens may be processed using standard procedures and practices at physical containment level 2 (PC2) using the associated controls and PPE.

Specimens from a patient categorised as *Increased Possibility of VHF*

Few patients will be categorised as *Increased Possibility of VHF*, and whilst many of

these are likely to turn out to be negative for VHF, there is an increased risk of infection to laboratory workers when analysing specimens from patients in this category.

Such specimens may be analysed at a minimum PC2 level with some additional precautions:

- Any testing should be undertaken after consultation with the ICPMR high security laboratory that can provide additional safety advice.
- Where possible, specimens should be inactivated before they are tested. However, the results of tests performed on inactivated specimens may not be accurate compared to non-inactivated specimens, and this should be taken into account in the management of such patients.
- The use of point of care testing may be appropriate if such instruments are available at the local laboratory. In general, although such instruments have a limited range of tests available, it should be sufficient in the acute management of patients with an *Increased Possibility of VHF*.
- Senior laboratory staff (e.g. clinical haematology, clinical biochemistry, or medical microbiology) will need to be informed prior to receipt of specimens in order for them to be segregated and processed separately using dedicated equipment.
- The number of specimens taken for laboratory analysis should be kept to the minimum necessary for patient management and diagnostic evaluation.
- Specimen handling and storage should be kept to a minimum.

Where specimen inactivation is not possible or appropriate, the additional controls listed below are necessary:

- Suitable and sufficient disinfection and decontamination procedures validated as effective against VHF must be in place, including those for automated systems.
- Specimens should be processed in a segregated area using a dedicated blood/gas analyser or similar standalone machine. Protocols will need to be in place for safe processing, handling and disposal including waste from the analyser.
- Centrifugation should be avoided where possible.

Specimens from a Confirmed VHF patient

In most cases, patients with a positive VHF screen will be transferred to the High Security Isolation Unit (HSIU) at Westmead Hospital or Children's Hospital Westmead and specimens will be analysed at ICPMR or in the isolation unit.

If the clinical circumstances require testing of specimens while the patient is at a hospital other than Westmead, limited routine testing may be done if the hospital laboratory is equipped to handle potential VHF infectious agents.

Malaria testing

Laboratory tests to exclude or confirm malaria should be carried out as soon as possible. Malaria is a serious infection that can be life threatening and prompt treatment can significantly affect the course of disease.

Point of care testing (POCT) for malaria should be considered if available provided this can be done safely. POCT is likely to give a more rapid result to inform infection control precautions.

For blood smears it is essential that several blood films be examined to exclude this diagnosis, bearing in mind that false negative results occasionally occur. Treatment may need to be considered in the absence of a firm diagnosis.

While following standard protocols, the following additional precautions are recommended at enhanced PC2 for specimens from patients categorised as *Increased Possibility of VHF*:

- Immediate and appropriate disposal of blood film slides is important (note: this does not comply with NPAAC Standards for specimen retention).
- After use, the work surfaces should be disinfected (see APPENDIX 10 for guidance).

Diagnostic Tests for VHF

The physical containment level 4 (PC4) laboratory at CIDMLS-ICPMR, Westmead Hospital is the only facility in NSW approved to carry out VHF testing. The decision to test for VHF should be made in consultation with an ID physician, PHU and the CIDMLS-ICPMR Clinical Microbiologist on call.

See APPENDIX 13 for further information on specialist VHF testing at the CIDMLS-ICPMR high security laboratory and for contact information.

National High Security Quarantine Laboratory (NHSQL) – Doherty Institute

In certain circumstance the CQO may advise direct referral of specimens from an *Increased Possibility of VHF* case to the NHSQL in Melbourne - for example, when a suspect VHF case is identified in a part of southern NSW where transfer to Melbourne is more practicable than to Sydney. Samples from patients managed at Tweed Hospital in Northern NSW are generally managed by Queensland Health.

The NHSQL is operated by the Victorian Infectious Diseases Reference Laboratory (VIDRL) and is located at The Doherty Institute, 792 Elizabeth Street Melbourne Vic 3000.

The NHSQL has provided specimen transport guidance at the following site: <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nhsq-qvhf.htm>

The NHSQL undertakes diagnostic testing for the four quarantinable viral haemorrhagic fevers in a PC4 laboratory.

Direct contact with the medical microbiologist on-call at VIDRL is essential to arrange receipt of specimens and for advice regarding specimen collection, safe packaging and transport.

See APPENDIX 2 for VIDRL's contact details.

APPENDIX 8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Control and containment when managing patients who may have VHF, or have a positive VHF screen, is important to protect staff and the wider community. The diligent use of appropriate PPE is a key risk control measure which supplements the physical isolation of the patient.

To ensure the effectiveness of PPE, care will need to be taken in its initial selection and subsequent maintenance, storage and use, as described in this appendix.

This guidance is based on three key principles:

- 1. All health care workers that are most likely to work with patients with suspected or confirmed VHF undergo rigorous training and are practiced and competent in PPE, including putting it on and taking it off in a systematic manner.**
- 2. No skin exposure when PPE is worn.**
- 3. All workers are supervised by a trained observer who monitors each worker taking off and putting on PPE.**

Criteria for appropriate selection of PPE

When selecting appropriate and practical PPE to control the infection risk, the tasks to be undertaken, the environment in which the PPE is being used and the person using the PPE must be considered.

When selecting PPE for protection of healthcare and laboratory staff the potential exposure routes to be considered are direct contact (through broken skin or mucous membranes) with blood or body fluids, and indirect contact with environments contaminated with splashes or droplets of blood or body fluids. Regarding VHF infection risk:

- Transmission has usually been associated with patient care in the absence of appropriate barrier precautions to prevent exposure to blood and other body fluids.
- Most staff acquiring infection in past outbreaks had multiple contacts with multiple body fluids.
- The risk for person-to-person transmission of VHF viruses is highest during the later stages of illness, when vomiting, diarrhoea, and often haemorrhage, may lead to splash and droplet generation.

PPE selection – general

In patient management, PPE selection should be proportionate to the likelihood of VHF infection as defined in the algorithm below.

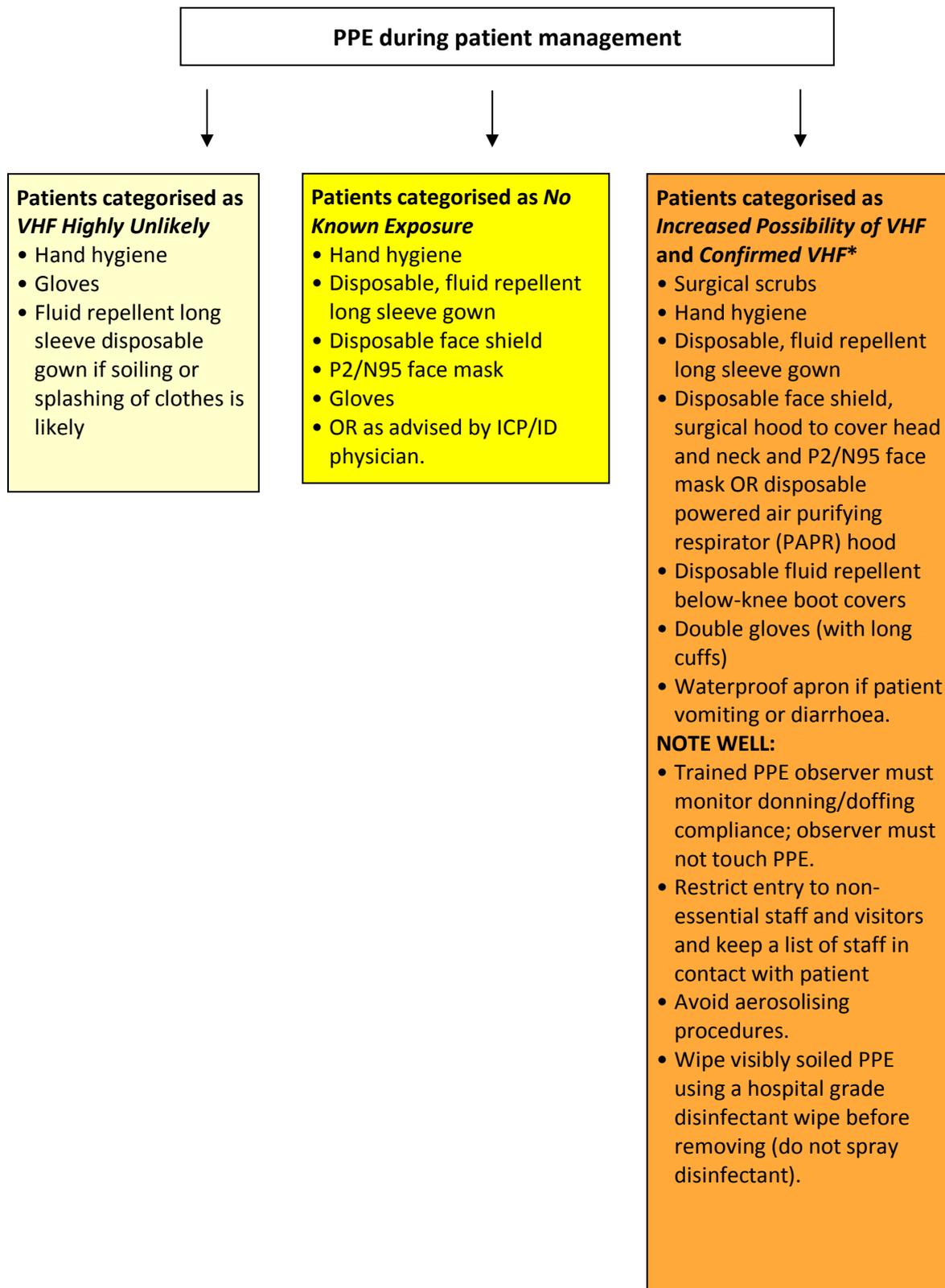
PPE must be chosen to give maximum protection while ensuring minimum discomfort to the wearer. Uncomfortable equipment is unlikely to be worn properly, and inappropriate PPE is unlikely to be removed properly.

More than one type or size of PPE may be needed and should be checked to fit the

wearer. Some types of P2/N95 respirators (masks) are not suitable for staff with beards or facial hair as they will not seal to the wearer's face and achieving a good face fit can be a particular problem for a person with a small face. A powered air purifying respirator (PAPR) is a suitable alternative particularly for ongoing patient care for staff appropriately trained in its use. Expert advice from the infection control team should be sought.

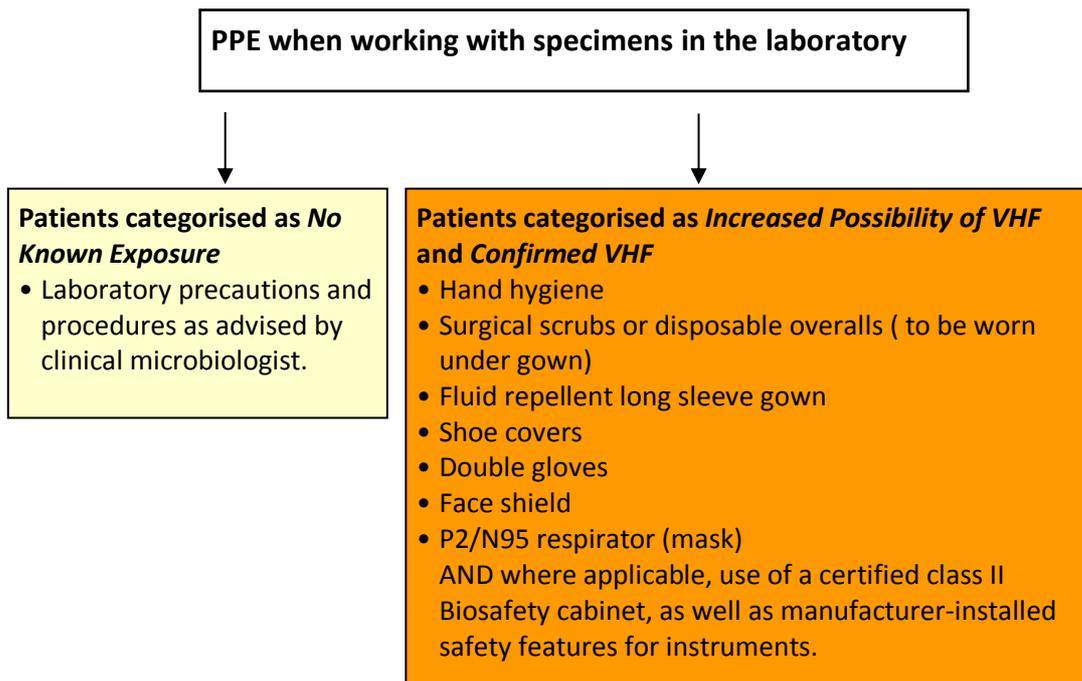
Staff must remove all jewellery from their body (including watches, rings, necklaces, earrings) and leave them outside the room. No wallets, mobile phones, ID tags or personal material to be taken into the room. These items must be removed from a staff member's body before applying PPE and left outside the room.

Additional PPE should be used where there is a risk of body fluid splash.



Seek expert infection control advice.

*For small facilities that are very unlikely to see possible cases please refer to note on application of PPE recommendations in different healthcare settings below.



The PPE selected should be of suitable quality and construction to provide the required level of protection in the particular working conditions.

Application of PPE recommendations in different healthcare settings

The complete VHF PPE recommendations for patient management principally apply to situations in which the possibility of a patient presenting with symptomatic VHF has been anticipated, all items of PPE are available and healthcare workers have been trained in their use e.g. in designated and other major referral hospitals.

In the unlikely event that a symptomatic patient with suspected VHF (based on history at triage of recent travel to a VHF endemic country and compatible symptoms) presented to another healthcare setting (e.g. emergency department of a smaller hospital), the following procedures are recommended:

- Place the patient in a single room. Restrict access to the room.
- Perform a risk assessment to determine the risk of exposure to body fluids.
- Phone the local public health unit.
- **Perform hand hygiene before and after any contact with the patient or her/his immediate environment.**

However, if the patient needs immediate or supportive care the following precautions are recommended:

- Before returning to the room, don appropriate PPE as follows:
 - fluid repellent P2/N95 respirator
 - face shield (or goggles where a face shield is not available)
 - disposable fluid repellent long sleeve gown
 - double gloves.

PPE selection – further considerations for management of patients with a diagnosis of VHF

It is imperative that the PPE provides a barrier of adequate coverage and integrity to prevent staff contact (direct or indirect) with contamination. The barrier function will need to be maintained throughout all clinical/nursing procedures, and when following appropriate procedures for the removal and disposal or decontamination of potentially contaminated equipment by the wearer.

While inhalation is not strongly linked to transmissibility of VHF, as a precaution P2 (N95) respirators (masks) are considered appropriate, with a face shield and a surgical hood to cover the head and neck. Respirators are part of the recommended PPE for patients categorised as *No Known Exposure, Increased Possibility of VHF or Confirmed VHF* as outlined above.

It is important that staff using P2/N95 respirators have undergone face-fit checking to ensure such respirators achieve a good seal. While disposable respirators may be more practical to avoid the need for decontamination, facial hair (a beard or stubble) may prevent a good seal being achieved with a disposable respirator. Staff with facial hair (beard or stubble) should be encouraged to shave prior to donning PPE.

A powered air purifying respirator (PAPR) is a suitable alternative particularly for ongoing patient care in staff appropriately trained in its use. Expert advice from the infection control team should be sought.

Putting on and taking off (Donning and Doffing) PPE

PPE should be put on before starting procedures likely to cause exposure and only removed after moving away from a source of exposure. If there is an anteroom outside of the isolation room then PPE should be put on and removed there.

Where an anteroom is not present, PPE should be put on and removed in a designated area outside the isolation room but not within the vicinity of any main corridors. It is essential that staff follow the correct sequence for removing PPE after leaving the patient's isolation room. If PPE is removed in an incorrect order a staff member may accidentally contaminate themselves with the organism.

It is essential that facilities employ a trained buddy/observer system.

The trained buddy/observer is a staff member who guides and advises staff on removing PPE, instructing staff that PPE removal is a slow and methodical process, to avoid staff becoming contaminated during the removal process. The buddy/observer also helps keep staff calm and focused while removing PPE. The buddy/observer is able to detect any potential breaches staff may make during the removal of PPE and advise the staff member to take further action such as showering.

The buddy/observer is also be used when staff put on PPE and check that the staff have the PPE on correctly and securely before they enter the patient's room. The process to remove PPE is described below. PPE is removed outside the patient isolation room at the door way or in the ante room. Particular attention must be focused on correct hand hygiene technique

PPE should not be a source of further contamination. Used PPE must never be placed on environmental surfaces after removal.

PPE removal process with P2 (N95) mask, face shield and surgical hood

Step 1	<ul style="list-style-type: none"> Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is visibly contaminated, then disinfect using a hospital grade disinfectant wipe and discard wipe into a waste container. Apply alcohol rub to outer gloves and allow them to dry.
Step 2	<p>Remove waterproof apron (if worn)</p> <ul style="list-style-type: none"> Untie apron from the back. Grasp the neck of the apron and remove over the head downwards. Slowly roll the apron down from the inside out. Discard into a waste container. <p>Inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect using a hospital grade disinfectant wipe and discard wipe into a waste container.</p>
Step 3	Disinfect outer pair of gloves with alcohol-based hand rub and allow to dry
Step 4	<p>While sitting down begin removal of below-knee boot covers</p> <ul style="list-style-type: none"> Roll the boot covers down from the inside out to the ankles and pull off over foot. Discard boot covers in a waste container.
Step 5	<p>Remove the outer gloves</p> <ul style="list-style-type: none"> Apply alcohol gel to outer gloves and allow to dry. Grasp outside of glove with opposite gloved hand; peel off. Hold removed glove in gloved hand. Slide fingers of under-gloved hand under remaining glove at wrist. Peel glove off over first glove. <p>Discard gloves into a waste container</p>
Step 6	Inspect inner pair of gloves then disinfect inner pair of gloves with alcohol-based hand rub and allow them to dry.
Step 7	<p>Remove protective face shield</p> <ul style="list-style-type: none"> Assume that the outside of the face shield is contaminated. To remove by head band, slide the band over the head towards the face and remove shield downwards away from the face. Place in a waste container.
Step 8	Disinfect inner pair of gloves with alcohol-based hand rub and allow to dry
Step 9	<p>Remove surgical hood</p> <ul style="list-style-type: none"> Unfasten (if applicable) surgical hood. Tilt your head down. Slide hood from back of head, down and towards floor away from the face and discard. Place in a waste container.

Step 10	Disinfect inner pair of gloves with alcohol-based hand rub and allow to dry
Step 11	<p>Remove Fluid Repellent Long Sleeve Gown</p> <ul style="list-style-type: none"> • Assume that the gown front and sleeves are contaminated. • Unfasten ties. • Avoid contact of scrubs underneath. • Pull away from neck and shoulders, touching inside of gown only. • Turn gown inside out. • Fold or roll into a bundle and discard into a waste container.
Step 12	Disinfect inner pair of gloves with alcohol-based hand rub and allow to dry
Step 13	<p>Remove the inner gloves</p> <ul style="list-style-type: none"> • Apply alcohol hand rub to the gloves. • Grasp outside of glove with opposite gloved hand; peel off. • Hold removed glove in gloved hand. • Slide fingers of un-gloved hand under remaining glove at wrist. • Peel glove off over first glove. <p>Discard gloves into a waste container.</p>
Step 14	Perform Hand Hygiene with alcohol-based hand rub.
Step 15	Don a new pair of gloves. Disinfect this new pair of gloves with alcohol-based hand rub and allow them to dry.
Step 16	<p>Remove face mask</p> <ul style="list-style-type: none"> • Assume that the front of mask is contaminated. • Tilt your head down. • Grasp bottom, then top ties or elastics and remove downwards and away from the face. <p>Discard mask into waste container.</p>
Step 17	Disinfect gloves with alcohol-based hand rub and allow them to dry.
Step 18	Disinfect washable shoes using a hospital grade disinfectant wipe and discard wipe into a waste container.
Step 19	Disinfect gloves with alcohol-based hand rub and allow them to dry.
Step 20	<p>Remove gloves</p> <ul style="list-style-type: none"> • Apply alcohol hand rub to the gloves. • Grasp outside of glove with opposite gloved hand; peel off • Hold removed glove in gloved hand. • Slide fingers of un-gloved hand under remaining glove at wrist. • Peel glove off over first glove. <p>Discard gloves into a waste container.</p>

Step 21	Perform Hand Hygiene with alcohol-based hand rub or with soap and water including forearms and elbows.
Step 22	If you have performed prolonged contact or high risk patient care then shower using a neutral soap and change into fresh scrubs. At the end of the shift all HCWs must shower with a neutral soap.
Step 23	Discard scrubs into routine linen for processing if not contaminated. Contaminated scrubs should be disposed of as clinical waste.

PPE removal process with disposable powered air purifying respirator (PAPR) hood

Step 1	<ul style="list-style-type: none"> Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any PPE is visibly contaminated, then disinfect using a hospital grade disinfectant wipe and discard wipe into a waste container. Apply alcohol rub to outer gloves and allow to dry.
Step 2	<p>Remove waterproof apron (if worn)</p> <ul style="list-style-type: none"> Untie apron from the back. Grasp the neck of the apron and remove over the head and downwards. Slowly roll the apron down from the inside out. Discard into a waste container. <p>Inspect the PPE ensemble to assess for visible contamination or cuts or tears. If visibly contaminated, then disinfect using a hospital grade disinfectant wipe and discard wipe into a waste container.</p>
Step 3	Disinfect outer pair of gloves with alcohol-based hand rub and allow them to dry.
Step 4	<p>While sitting down begin removal of below-knee boot covers</p> <ul style="list-style-type: none"> Roll the boot covers down from the inside out, down to the ankles and pull off over foot. Discard booties in a waste container.
Step 5	<p>Remove the outer gloves</p> <ul style="list-style-type: none"> Apply alcohol gel to outer gloves and allow to dry. Grasp outside of glove with opposite gloved hand; peel off. Hold removed glove in gloved hand. Slide fingers of under-gloved hand under remaining outer glove at wrist. Peel glove off over first outer glove. Discard gloves into a waste container.
Step 6	Inspect inner pair of gloves, then disinfect inner pair of gloves with alcohol-based hand rub and allow them to dry.

Step 7	<p>Remove disposable PAPR hood</p> <ul style="list-style-type: none"> • Remove and discard disposable hood. • Disinfect inner gloves with alcohol based hand rub (ABHR). • Remove headpiece, blower, tubing, and the belt and battery unit. This step might require assistance from the trained observer. Disinfect inner gloves with either an *EPA-registered disinfectant wipe or ABHR. • Place all reusable PAPR components in an area or container. designated for the collection of PAPR components for disinfection.
Step 8	Disinfect inner pair of gloves with alcohol-based hand rub and allow to dry.
Step 9	<p>Remove Fluid Repellent Long Sleeve Gown</p> <ul style="list-style-type: none"> • Assume that the gown front and sleeves are contaminated. • Unfasten ties. • Avoid contact of scrubs underneath. • Pull away from neck and shoulders, touching inside of gown only. • Turn gown inside out. • Fold or roll into a bundle and discard.
Step 10	Disinfect inner pair of gloves with alcohol-based hand rub and allow to dry
Step 11	Disinfect washable shoes using a hospital grade disinfectant wipe and discard wipe into a waste container.
Step 12	Disinfect inner pair of gloves with alcohol-based hand rub and allow them to dry.
Step 13	<p>Remove the inner gloves</p> <ul style="list-style-type: none"> • Apply alcohol hand rub to the gloves. • Grasp outside of glove with opposite gloved hand; peel off. • Hold removed glove in gloved hand. • Slide fingers of ungloved hand under remaining glove at wrist. • Peel glove off over first glove. <p>Discard gloves into a waste container.</p>
Step 14	Perform Hand Hygiene with alcohol-based hand rub or with soap and water including forearms and elbows.
Step 15	<p>If you have performed prolonged contact or high risk patient care then shower using a neutral soap and change into fresh scrubs.</p> <p>At the end of the shift all HCWs must shower with a neutral soap</p>
Step 16	Discard scrubs into routine linen for processing if not contaminated.

It is recommended that staff shower after prolonged contact with a patient and don fresh surgical scrubs at the end of a shift.

Disposal or decontamination

Following removal, disposable PPE will need to be placed into suitable disposal receptacles and treated as clinical infectious waste. If re-usable PPE is unavoidable, it must be decontaminated using an appropriate method prior to storage. Surgical scrubs are disposed of in routine linen if not contaminated with any blood or body fluid.

Staff training on the use of PPE

Staff should be trained in procedures to put on and especially to take off PPE, including the correct order to avoid cross contamination and to check that the respirator with which they are provided fits properly. Staff must also receive clear instructions on when it is to be used and how it is to be disposed of or, as appropriate, decontaminated, maintained and stored. This training should be held regularly.

Visitors

Visitors should be discouraged from visiting the patient while in hospital. However if it is necessary to have a visitor they must be restricted to well adults. No immunocompromised individual or child is able to visit. Visitors must be trained and wear the same PPE as staff and the visitors should be monitored while visiting to ensure they maintain PPE during the visit. Then visitor must then be walked through slowly how to remove the PPE as per this document.

Summary of good practice in the use of PPE:

- PPE must be appropriate, fit for purpose and suitable for the person using/wearing it. A scheme for periodical repetition of face fit checking (either annually, due to change of facial features, or alteration to respiratory function) should be developed and implemented.
- Training must be provided with consideration of susceptibility to human error.
- Effective communication between all members of the healthcare team is imperative for patient safety.
- PPE should be located close to the point of use.
- An observer system should be employed to monitor the correct use of PPE.
- A detailed and pre-defined sequence for putting on and taking off items should be developed, implemented and monitored.
- PPE should be removed in the isolation room anteroom or designated area and disposed of in clinical waste.
- PPE should not be a source of further contamination (e.g., by being removed and left on environmental surfaces), or by being removed inappropriately thus contaminating the wearers hands.
- The use of PPE such as gloves does not negate the need for hand hygiene.
- The integrity of PPE should not be compromised during procedures. It might otherwise potentially lead to exposure to blood or body fluids. For example solvents or certain products such as hand creams, can affect integrity.
- There should be validated procedures for the disinfection of re-useable PPE.
- Stocks of PPE should be stored off the floor, such as on appropriate shelving in a designated, clean and dry storage area to ensure that they are not contaminated prior to use.

APPENDIX 9. MANAGEMENT OF ACCIDENTAL EXPOSURES

Procedures must be in place to deal with any accidental exposure of healthcare workers to blood or body fluids from patients categorised as *Increased Possibility of VHF* or *Confirmed VHF* cases.

Management of high risk exposures

Accidental exposures that need to be dealt with promptly are:

Type of blood or body fluids exposure	Action
Percutaneous injury e.g. Needle-stick injury	Immediately wash the affected part with soap and water #.
Contact with broken skin	Immediately wash the affected part with soap and water #.
Contact with mucous membranes (eyes, nose, or mouth)	Immediately rinse the area with water or saline. If blood or other body substances get in the mouth, spit them out and then rinse the mouth with water several times

Where water is not available use of a non-water cleanser or antiseptic should replace the use of soap and water for washing cuts or punctures of the skin or intact skin.

In all cases, the incident will need to be reported and the individual referred urgently to a Clinical Virologist, Clinical Microbiologist or Infectious Diseases Physician.

The management of healthcare workers after exposure to blood or other body substances should also be consistent with NSW Health policy directive PD2005_311 *HIV, Hepatitis B and Hepatitis C - Management of Health Care Workers Potentially Exposed*⁷ and other relevant guidance.

The affected healthcare worker should be followed up, at a minimum, as a high risk VHF contact – see *Contact management* in SECTION 6 for details.

⁷ Available at: http://www.health.nsw.gov.au/policies/PD/2005/pdf/PD2005_311.pdf

APPENDIX 10. CLEANING AND DISINFECTION

For patients categorised as *No Known Exposure*, precautions, cleaning and decontaminating procedures, including the treatment of laundry, must be aligned with the precautions being applied by healthcare workers who are treating the patient as advised by an infection control practitioner/ID physician.

The information in this appendix applies to those patients who have been categorised as *Increased Possibility of VHF* or have been confirmed with VHF infection. This information may apply to patients categorised as *No Known Exposure*, dependent on advice from infection control practitioner or ID physician.

Cleaning

Diligent environmental cleaning and disinfection and safe handling of potentially contaminated materials is required as blood, sweat, vomitus, faeces and other body secretions represent potentially infectious materials.

VHF viruses are readily inactivated by low-level disinfectants.

The preferred disinfectant is sodium hypochlorite solution at a strength of 1000 parts per million (ppm) available chlorine. Solutions can be prepared using hospital bleach or chlorine tablets, as per facility procedures and following the manufacturer's instructions.

Hydrogen peroxide in 3% concentration is another low level disinfectant which is environmentally friendly and suitable for use in this situation.

Neutral soaps and detergents should be used liberally for washing hands and the patient. Do not use disinfectants as part of routine patient washing.

Facilities must conduct an organisational risk assessment and review Material Safety Data Sheets (MSDS) before using disinfectant products.

Facilities are responsible for ensuring that appropriate staff are trained and are skilled in the use of PPE for cleaning of isolation rooms. This may include a decision that only suitable trained healthcare workers clean rooms; alternatively, cleaning staff may be utilised provided they have undertaken appropriate training and have been assessed as being deemed competent in the use of PPE. All staff entering a VHF isolation room must have the appropriate training and adhere to the infection control principles as outlined in this plan.

Routine Environmental Cleaning

Daily cleaning and disinfection of the isolation room with a sodium hypochlorite solution diluted to 1000ppm available chlorine is required. Before disinfection, cleaning should be performed using a neutral detergent and yellow colour-coded cleaning equipment for infectious/isolated areas, as per the NSW Health Environmental Cleaning Policy (PD 2012_061).

Additionally, the patient toilet should be cleaned with a sodium hypochlorite solution diluted to 5000ppm available chlorine after each use. See APPENDIX 11 for details.

Disposable cleaning cloths, mop cloths, and wipes should be used, and discarded into the clinical waste after each clean. Any reusable equipment (mops, buckets, bottles, heavy-duty gloves) must be disinfected and kept in the isolation room, and then discarded upon patient discharge.

Do not reuse cleaning equipment for other patient areas. This equipment must be discarded once it is no longer in use for the infectious patient.

Personal Protective Equipment (PPE) worn must be sufficient to protect against exposure to potentially infected blood or other bodily fluids (and cleaning chemicals) arising from contact with contaminated surfaces, or from splashes or splatters during cleaning and disinfection activities, and include at the minimum:

- surgical scrubs
- hand hygiene
- disposable, fluid repellent long sleeve gown
- disposable face shield, surgical hood to cover head and neck, and P2/N95 mask OR disposable powered air purifying respirator (PAPR) hood
- disposable, fluid repellent below-knee boot covers
- double gloves (with long cuffs).

Refer to APPENDIX 8 for the correct procedure for putting on and removing PPE.

Terminal Cleaning

Terminal cleaning should be performed according to the NSW Health Environmental Cleaning Policy (PD 2012_061) and Standard Operating Procedures.

Once the patient has left the isolation room the entire room should be cleaned with a neutral detergent then allowed to air dry. All cleaning cloths and mop heads must not be reused and must be disposed of as clinical waste.

Once the room is air dry repeat the cleaning process, disinfecting with sodium hypochlorite solution diluted to 1000ppm available chlorine and ensuring the disinfectant is liberally applied to all surfaces within the isolation room. All cleaning equipment including buckets, mop handles, mop heads, and cloths must not be reused and must be disposed of as clinical waste after the terminal clean. Maintain negative pressure during the terminal clean.

Allow the room to air dry following disinfection, and then allow an additional 30 minute period after the room has air dried before switching off the negative pressure and allowing the next patient to enter the room.

Discard all non-fluid-impermeable pillows or mattresses, and textile privacy curtains as clinical waste, rather than laundering for reuse.

Body Fluid Spills

Follow local procedures in relation to a body fluid spill. The following extra precautions are advised when there is spillage of blood or other body fluids from patients with *Increased Possibility of VHF* or *Confirmed VHF*.

- Personal protective equipment as outlined above is required (see APPENDIX 8).

- Confine the spill by placing a 'bluey' absorbent pad over the area – ensure pad side contacts fluid to absorb the spill and the impervious side is face up to provide protection.
- Discard the bluey absorbent pad into the clinical waste.
- Wipe down the spill area (including a large area around the spill) with sodium hypochlorite solution diluted to 5000ppm available chlorine and allow to air dry.
- Follow up with a wipe down to the area with a neutral detergent solution and allow to air dry.
- Discard all cleaning material into the clinical waste.

Patient Equipment

Limit the equipment that enters the patient's room. The patient must have their own dedicated equipment that remains with them for the duration of their hospitalisation. Preference must be given to using disposable equipment when available.

When reusable non-critical equipment leaves the patient room ensure a two stage cleaning with a neutral detergent followed by a second clean with a sodium hypochlorite solution diluted to 5000ppm available chlorine. For semi critical and critical equipment ensure routine disinfection/sterilisation reprocessing occurs, but no additional disinfection or sterilisation cycle is required.

Should an isolated patient require delivery of a meal tray all equipment provided (e.g. utensils, plates and containers) must be disposable, including the tray. If disposable trays are not available, trays must not be taken into the patient room.

Linen

Disposable linen is first choice preference for patient clothing and bed linen. Discard all linen, such as sheets, towels, blankets as clinical waste, rather than laundering for reuse.

Patient clothing is to be discarded in the clinical waste. The patient is to wear hospital clothing and gowns and not their own clothes.

Patient clothing and linen must not be processed in a domestic washing machine.

See APPENDIX 11 for information on disposal of contaminated waste.

APPENDIX 11. WASTE TREATMENT AND DISPOSAL

For patients categorised as *No Known Exposure*, precautions for waste management must be determined in consultation with infection control practitioner/ID physician.

The information in this appendix applies to those patients who have been categorised as *Increased Possibility of VHF* or have been confirmed with VHF infection.

Waste

Any single-use items (including PPE, cleaning cloths, wipes, microfiber cloths, linens, food service items, privacy curtains, and other textiles) and non-disposable cleaning equipment that are no longer required (including mops, buckets, bottles, heavy-duty gloves) must be placed in leak-proof containment and discarded as clinical waste.

Do not reuse cleaning equipment for other patient areas. This equipment must be discarded as clinical waste once it is no longer in use for the infectious patient.

Items stained or containing body fluids are treated as clinical waste as per the NSW Waste Policy. Clinical waste bags must adhere to NSW Waste Policy and Australian Standards and be leak proof. Facilities should have a system of double bagging the clinical waste. This should involve keeping the first clinical waste bags inside the patient room and then placing these bags inside a second clinical waste bag kept outside the patient room.

To minimise contamination of the exterior of the waste bag, this bag should be placed in a rigid waste receptacle designed for this use (e.g. a clinical waste bin).

Prior to collection by the contractor, waste must be stored securely and access restricted to authorised and trained personnel.

Facilities must work with their local waste contractor to plan and agree on an adequate process for the handling, treatment and disposal of clinical waste that ensures Australian Dangerous Goods Code and EPA regulations and standards are met.

Toilet Waste

For patients who are able to use a toilet, the toilet should be prepared prior to each use as follows:

- Add 200ml of sodium hypochlorite solution diluted to 5000ppm available chlorine. (Alternatively, chlorine tablets can be added directly to the toilet water – check manufacturer's instructions).

When a patient uses the isolation room toilet they should be instructed to not flush the toilet. Staff must then:

- Leave contents for 30 minutes before flushing.
- Ensure the toilet lid is down (where a toilet lid is available) and then flush.
- Always wear VHF PPE (see APPENDIX 8).

If a patient is unable to use the toilet, a pan can be used and emptied in a pan sanitiser, if available within the isolation unit (as in the HSIU). In this scenario, 200 mL of a sodium hypochlorite solution diluted to 5000ppm available chlorine should be added and left for 30 mins before emptying or the sanitiser should be run on a hypochlorite cycle.

If a pan sanitiser is not available within the isolation unit disposable pans should be used. The contents of the pan are to be solidified with high-absorbency gel then both the pan and contents disposed into clinical waste.

If a high-absorbency gel is not available then the contents of the pan can be carefully poured into the isolation room toilet (noting that this will generate aerosols and staff must wear VHF PPE including a respirator as outlined in APPENDIX 8) and follow the procedure described above for when a patient uses the isolation room toilet. Place the now empty disposable pan into the clinical waste.

APPENDIX 12. RISK OF IMPORTATION AND TRANSMISSION WITHIN NSW

Transmission is usually from person to person by direct contact with contaminated body fluids. In the early phase of these diseases when flu-like symptoms predominate, the risk of transmission is low. The risk for person-to-person transmission of haemorrhagic fever viruses is greatest during the latter stages of illness when virus loads are highest.

In Africa, transmission of VHF in healthcare settings has been associated with reuse of contaminated needles and syringes and with the provision of patient care without appropriate barrier precautions to prevent exposure to virus-containing blood and other body fluids (including vomitus, urine, and stool). The transmission risks associated with various body fluids have not been well defined because many of the caregivers who have acquired infection have had contacts with multiple fluids.

Secondary transmission of VHF in developed countries occurs very rarely, with most contact tracing from imported cases showing no onward transmission.^{8 9 10 11} Transmission of Ebola virus disease to healthcare workers from infected patients has occurred in both Spain and the United States of America. The severity and consequence of VHF infections require that a strict level of containment be consistently maintained to prevent transmission to close contacts and laboratory workers.

Epidemiologic studies in humans do not indicate that VHF is readily transmitted from person to person by the airborne route.¹⁴ Airborne transmission was considered as a possible explanation for a hospital-associated cluster of Lassa fever infections in which the index patient had severe pulmonary involvement, but the mode of transmission for that outbreak was not determined.¹² Although unproven, airborne transmission of VHF is a hypothetical possibility, particularly during procedures that may generate aerosols.

Transmission of VHF through semen has occurred after clinical recovery. Virus has been recovered from seminal fluid up to seven weeks after recovery from Ebola and Marburg, and up to three months after recovery from Lassa fever.¹³ Marburg virus was cultured from the anterior chamber of the eye in one patient with uveitis which developed two months after clinical recovery.¹⁴ Transmission to humans has also been documented following exposure to infected animals imported from endemic

⁸ Banatvala JE. Lassa Fever. *BMJ* 1986; 293:1256-7.

⁹ Foberg U, Frydén A, Isaksson B, et al. Viral hemorrhagic fever in Sweden: experiences from management of a case. *Scand J Infect Dis* 1991;23:143-51.

¹⁰ Management of Patients With Suspected Viral Hemorrhagic Fever. *MMRW* 1988; 37(S-3):1- 16.

¹¹ Holmes GP, McCormick JB, Trock SC, et al. Lassa fever in the United States: investigation of a case and new guidelines for management. *N Engl J Med* 1990;323:1120-3.

¹² Carey DE, Kemp GE, White HA, et al. Lassa fever: epidemiological aspects of the 1970 epidemic, Jos, Nigeria. *Trans R Soc Trop Med Hyg* 1972;66:402-8.

¹³ Control of Communicable Diseases Manual – 19th edition. Heymann, DL (Ed). American Public Health Association, 2008.

¹⁴ Gear JSS, Cassel GA, Trappler B, et al. Outbreak of Marburg virus disease in Johannesburg. *BMJ* 1975; 4:489-93.

areas. Laboratory-acquired infections have been reported from Russia and the USA.

No VHF case has been reported in persons whose contact with an infected person occurred only during the incubation period (i.e. before the onset of symptoms).¹⁵

A summary of the four major VHFs – Lassa fever (LF), Ebola virus disease (EVD), Marburg virus disease (MVD), and Crimean-Congo haemorrhagic fever (CCHF) – is provided in APPENDIX 1.

¹⁵ CDC Interim Guidance for Managing Patients with Suspected Viral Hemorrhagic Fever in U.S. Hospitals. May 19 2005.

APPENDIX 13. CIDMLS-ICPMR HIGH SECURITY LABORATORY

The NSW Health High Security Laboratory (HSL) is operated by NSW Health Pathology and is located at the Centre for Infectious Diseases & Microbiology Laboratory Services (CIDMLS), ICPMR, Westmead Hospital.

A primary role of the HSL is to undertake viral diagnostic testing for the four quarantine viral haemorrhagic fevers (VHF) in a physical containment level 4 (PC4) facility. ICPMR can also undertake testing for other human quarantine diseases if requested.

The laboratory is equipped and staffed to perform both the specific microbial diagnosis of exotic pathogens and to safely carry out a limited range of biochemistry and haematology testing under high level containment on specimens from suspected cases of infectious disease caused by exotic agents.

Contact details for CIDMLS-ICPMR

See APPENDIX 2.

Tests available

Any testing for VHF should be discussed with the reference laboratory in advance. Where tests for VHF have been authorised, routine haematology and other tests should be deferred if possible until the VHF results are available since blood is highly infectious.

If other tests are required for the immediate management of the patient, these should only be performed in close collaboration with specialist physicians, laboratory staff (local and CIDMLS-ICPMR) and public health authorities and only in laboratories with appropriate facilities and training to do this work.

Ebola virus and Marburg virus

In NSW, the primary diagnostic method for detection of Ebola virus is PCR in whole blood (4ml collected in EDTA tube). The collection of three samples (3x4mL) is recommended to enable separate referral of specimens to the National High Security Laboratory in Melbourne and/or international laboratories for confirmation if required.

Serology is also available in Australia. Throat swabs and urine may also be recommended for testing for Ebola virus disease in some settings.

Lassa fever virus

Contact the Clinical Microbiologist on-call at ICPMR.

CCHF virus

Contact the Clinical Microbiologist on-call at ICPMR.

APPENDIX 14. MANAGING WORKER SAFETY

This appendix is a summary of NSW work health and safety legislation, NSW Health policy directives and guidance relevant to working with patients infected with a viral haemorrhagic fever (VHF), or in laboratories with specimens potentially contaminated by VHF viruses.

Primary legislation

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011

NSW Health Policy Directives

- Work Health and Safety: Better Practice Procedures (PD2013_050)
- Work Health and Safety: Other Workers Engagement (GL2013_011)
- Injury Management and Return to Work (PD2013_006)

Key principles

- Care of a patient with *Increased Possibility of VHF* or *Confirmed VHF* should be provided by workers who have agreed to provide this care and who have been appropriately briefed on the risks and trained in infection control precautions.
- People who have been infected with VHF viruses are not infectious to others until symptoms develop, and transmission of VHF to others is uncommon in the early stages of the symptomatic illness.
- Workers who have taken recommended infection control precautions, including the use of appropriate PPE without breach, while caring for an *Increased Possibility of VHF* or *Confirmed VHF* case are not considered to have had exposure to VHF. However, as a precaution, workers caring for *Increased Possibility of VHF* or *Confirmed VHF* cases will be advised to monitor their temperature daily and report any fever or new symptoms. No restrictions in work duties or social arrangements are necessary unless the HCW develops symptoms that require investigation for possible VHF infection.

Requirements for managing worker health and safety when caring for patients infected with VHF viruses

The Person Conducting a Business or Undertaking (PCBU) must:

- Ensure their public health organisation/facility has the necessary risk management process in place to identify, assess and eliminate or control risks arising from the provision of care to patients infected with, or potentially infected with, VHF. Ensure that relevant workers are appropriately trained and deemed competent to care for a patient with a VHF, including but not limited to the handling, use, maintenance and disposal of Personal Protective Equipment (PPE).
- Consult with workers and their safety representatives on any health and safety matters, including as part of any risk assessment process.
- Manage, follow-up, and evaluate existing controls for effectiveness, in the

event of recognised dangerous occurrences, accidents or incidents at work which could result in the release of a VHF likely to cause severe human illness or infection, e.g., sharps injuries during surgical and needle-related procedures, including reporting any notifiable incidents to *WorkCover NSW*.

- Keep records in relation to work involving risk of exposure to VHF. Facilities should maintain a log of all staff who have been in contact with a patient with *Increased Possibility of VHF* or *Confirmed VHF*. Where the staff member who has contact with the patient works for a separate PCBU (e.g. HealthShare or NSW Pathology) communication to inform the other PCBU of the staff contact should occur.
- Provide active health monitoring in collaboration with the local public health unit for workers who have been caring for known VHF infected patients, or who have been in contact with known VHF contaminated materials or body fluids. Health monitoring must, at a minimum, include the worker self-monitoring their temperature daily while involved in the care of a known case of VHF and for 21-days after last contact with a case or potential contact with their bodily fluids AND having a system to record the temperature and well-being of each worker at the commencement of each shift. In the event of a suspected case of VHF the health monitoring must be in place for all workers caring for the patient or potentially coming in contact with the patient's body fluids until the diagnosis is excluded or confirmed. (See SECTION 6 *Public health actions* for details). This should be provided by the PCBU where the patient is located.
- Where clinically appropriate, consider additional measures to support workers caring for VHF cases. Advice on requirements for PCBUs to provide alternative staff accommodation will be communicated via correspondence to chief executives.
- Provide information to relevant workers on
 - the potential for exposure to VHF and how exposure can occur
 - the risks posed by this exposure
 - the precautions workers should take to protect themselves and others
 - what procedures they should follow in the event of a potential exposure or other emergency
 - what safe systems of work should be followed.

Workers must:

- Adhere to agreed safe systems of work, e.g., laboratory rules, sharps and waste disposal policies, decontamination and disinfection procedures.
- Participate in any training or instruction provided relating to managing risks associated with caring for a patient with a VHF.
- Use, maintain and dispose of any personal protective equipment (PPE) in the way they have been instructed to, and report any problems.
- Report all instances of dangerous occurrences, accidents or incidents arising out of their work which could result in the release of a biological agent likely to cause severe human illness or infection, or a sharps injury involving a known VHF infected source so that necessary remedial or preventative actions can be taken.
- Participate in the required health monitoring, as required.
- In the event of developing symptoms consistent with VHF infection isolate themselves and notify their employer and public health unit immediately.

Post exposure management of workers

Following an exposure employers will:

- Ensure workers with higher risk exposures to a VHF case (such as a needlestick injury or unprotected exposure to blood or bodily fluids) are assessed by clinical and public health officials and an individual risk management plan developed and implemented. (See SECTION 6 Public health actions and APPENDIX 9 for details).
- Notify the worker of the exposure if they are not aware of it, and ensure they do not undertake clinical duties during any 21-day observation period.
- Ensure workers who subsequently develop symptoms consistent with VHF infection are immediately isolated and assessed as per the VHF patient risk assessment algorithm. In relation to Ebola, the leave arrangements to be applied in relation to any period of isolation away from the workplace are contained in Information Bulletin IB2014_074.
- Apply the usual workers compensation processes if a worker becomes sick, and the cause of the illness arises from working in a NSW Health facility as part of his or her employment with NSW Health. Workers compensation arrangements do not apply to contractors such as Visiting Practitioners.
- Review the effectiveness of the current risk controls.
- Ensure all necessary notifications have occurred e.g. WorkCover.

Returning aid workers who have worked in health care or community settings during VHF outbreaks in other countries

Public health organisations may take a precautionary approach to returned aid workers, particularly those who were involved in direct patient care in a VHF outbreak, during the 21 days since the aid worker has left the VHF-affected country.

An exposure and clinical risk assessment conducted by the public health unit, as well as an assessment of personal circumstances, will inform what type of self-monitoring (e.g. temperature checks, symptom monitoring) is required as part of an individual management plan. Where appropriate, there may be advice given to the aid worker about restricting social mixing and avoiding bodily contact with others and/or being within easy travel to adequate tertiary care or attendance at the workplace.

In relation to Ebola virus disease, the returned aid worker must not work in clinical care for their 21 day monitoring period even if they have taken recommended infection control precautions. This advice differs from health workers in the Australian setting because the high toll of Ebola virus disease infections among healthcare workers in countries with widespread transmission suggests that there are multiple potential sources of exposure in these countries, including unrecognised breaches in PPE and exposure in patient triage areas. Employers might consider temporary re-assignment to non-direct patient care duties, or leave that covers the 21 day monitoring period. In relation to Ebola, leave arrangements to be applied are outlined in Information Bulletin IB2014_074.

Note - The following sections of the NSW Contingency Plan for Viral Haemorrhagic Fevers also provide Work Health and Safety related guidance.

SECTION 2 - *Patient risk assessment*

SECTIONS 3, 4 & 5 - *Management of patients with No Known Exposure, Increased*

Possibility of VHF and Confirmed VHF

SECTION 6 - Public health actions

APPENDIX 4 - Ambulance transfer of a patient

APPENDIX 5 - Post-mortem examinations and disposal of the deceased

APPENDIX 6 - Specimen collection and handling

APPENDIX 7 - Laboratory procedures

APPENDIX 8 - Personal protective equipment (PPE)

APPENDIX 9 - Management of accidental exposures

APPENDIX 10 - Cleaning and disinfection

APPENDIX 11 - Waste management and disposal

APPENDIX 15. COMMUNICATIONS

This appendix details NSW Health's use of communication strategies in both preparedness and response to categorising a patient as *Increased Possibility of VHF* or *Confirmed VHF*.

Communication strategies are an essential part of managing infectious diseases and are essential in the event of a case of VHF. Effective communication during preparedness for, and management of, a case of VHF is vital to assist in:

- preparing for a case of VHF
- responding to a case of VHF
- preventing transmission
- providing adequate clinical care
- providing information to health care workers
- providing information to patients and the wider community.

Communication objectives

Objective 1: To engage the health sector and emergency services in preparing for a case of VHF.

Objective 2: To engage the health sector and emergency services in responding to a case of VHF.

Objective 3: To inform the public about VHF and NSW Health's preparedness and response to a case of VHF.

These communications objectives will be achieved by:

- alerting and mobilising key influencers across New South Wales to prepare for, and respond to, a case of VHF
- informing the citizens of NSW that the NSW Government is leading the preparations for a case of VHF in this state
- providing timely, accurate and accessible information to all citizens of NSW about
 - the risks related to a case of VHF
 - the current situation related to VHF both locally and globally
 - the measures required and underway to protect individuals and those in their care
 - the measures undertaken to protect the New South Wales public
 - the services available to support those diagnosed with a VHF.

Stakeholder engagement – Preparedness and Response

To engage the health sector and emergency services in preparing for, and responding to, a case of VHF the NSW Ministry of Health and Health Protection NSW will alert and mobilise key influencers across NSW.

This will be achieved through the use of existing networks to target a distinct but diverse group of key influencers who will channel the appropriate messages and planning actions through to their respective sectors.

These key influencers include: Australian Health Protection Principal Committee, Communicable Diseases Network Australia, Local Health Districts (including Chief Executives), Health Services Functional Area Coordinators, public health units, Ambulance Service of NSW, Emergency Care Institute, Clinical Excellence Commission, HealthShare NSW, Critical Care Taskforce, ID physicians and emergency care specialists from NSW hospitals, and general practitioners. enHealth, WorkCover NSW and NSW Environmental Protection Authority will be engaged for environmental health issues relating to a case of VHF such as waste management and disposal.

NSW Ministry of Health and Health Protection NSW will work closely with these key influencers to plan and coordinate consistent communications for preparedness and response to a case of VHF.

It is the responsibility of local health districts, PHUs and hospitals to develop communications plans for providing up-to-date information to staff, patients, contacts and visitors.

Information and resources for the general public, travellers, hospitals, NSW public health units and general practice are available on the NSW Health website.

<http://www.health.nsw.gov.au/Infectious/alerts/Pages/default.aspx>

Media

NSW Health Public Affairs will develop a strategy to outline the process for handling media queries, interviews and announcements in NSW. NSW Ministry of Health and Health Protection NSW will develop an integrated communications plan in association with this strategy to coordinate dissemination of content across various channels including the NSW Health website and social media.

Process – Negative case (individual entry or GP referral to health facility)

- Local PHU notifies Health Protection NSW.
- Local media unit notifies MoH Public Affairs Unit.
- MoH Public Affairs Unit develops a holding statement noting that testing is occurring for reactive use only.
- MoH Public Affairs Unit develops a holding statement confirming negative outcome of test for reactive use if no queries during testing phase or proactive use if interim holding statement has been issued.

Process – Positive case (individual entry or GP referral to health facility)

- Local PHU notifies Health Protection NSW.
- Local media unit notifies MoH Public Affairs Unit.
- MoH Public Affairs Unit develops a holding statement noting that testing is occurring for *reactive* use only.
- Test takes 4-6 hours for a result once specimens arrive at Westmead Hospital.
- If the test is positive the Chief Health Officer or delegate will hold an all-in press conference at the Ministry of Health.
- Follow up interviews will proceed as required.
- Condition updates will not be provided by WSLHD or the SCHN – rather they will be provided twice daily by the MoH.
- In the event of a death caused by a case of VHF an announcement will be

made by the Chief Health Officer or delegate only.

Additional notes

- Consultation to occur with Ambulance Media in the event of transfer of a patient who meets case definition for testing from Sydney Airport.
- All media queries regarding viral haemorrhagic fevers (including Ebola Virus Disease) should be directed to MoH, including local media queries.
- This strategy will be updated and circulated to Health Protection NSW, Local Health Districts, Pillars and Specialty Networks as required.
- A generic holding statement in the event of testing taking place will be developed by MoH and circulated on an as needs basis.

APPENDIX 16. ABBREVIATIONS

CCHF:	Crimean-Congo haemorrhagic fever
CIDMLS:	Centre for Infectious Diseases and Microbiology Laboratory Services
CHW:	Children's Hospital Westmead
CNC:	Clinical nurse consultant
CQO:	Chief Quarantine Officer
CXR:	Chest X-ray
DHQ:	Australian Department of Health Director of Human Quarantine
EVD:	Ebola virus disease
HSFAC:	Health Services Functional Area Coordinator
HSIU:	High Security Isolation Unit
ICP:	Infection control practitioner
ICPMR:	Institute for Clinical Pathology and Medical Research
ICS:	Incident Command System
ICT:	Incident control team
ID:	Infectious diseases
IMT:	Incident management team
LF:	Lassa fever
LHD:	Local health district
MVD:	Marburg virus disease
NHSQL:	National High Security Quarantine Laboratory
PHEIC:	Public Health Event of International Concern
PHU:	Public health unit
POCT:	Point of care testing
PPE:	Personal protective equipment
VHF:	Viral haemorrhagic fever
VIDRL:	Victorian Infectious Diseases Reference Laboratory
WMH:	Westmead Hospital

APPENDIX 17. EBOLA VIRUS DISEASE (EVD) PATIENT RISK ASSESSMENT ALGORITHM 2014/15

