



Government of **Western Australia**
Department of **Health**

Viral Haemorrhagic Fever Response Plan for Western Australia

21 July 2015

Version 4.3



Version Control

Version	Date	Revised by	Changes
1.0	February 1994	WA Department of Health	N/A
1.1	June 1998	WA Department of Health	Minor content update
1.2	March 2001	WA Department of Health	Minor content update
2.0	September 2007	WA Department of Health	General content update
3.0	27 October 2014	WA Department of Health	Updated 'Interim' plan released in response to 2014 EVD outbreak in West Africa.
3.1	11 November 2014	WA Department of Health	Extension of 'Interim' plan to include content on EVD ED management, PPE, fact sheets, testing and specimen collection and a case report form
4.0	30 December 2014	WA Department of Health	More definitive version of plan with updated information on EVD public health management, management of returned healthcare/aid workers, waste treatment and disposal, post mortem care and examination and patient transport. Contact fact sheets added and document restructured.
4.1	19 January 2015	WA Department of Health	Minor change to advice regarding skin exposure in Section B.8 <i>Management of HCW exposed to EVD within WA</i>
4.2	9 March 2015	WA Department of Health	Updates to diagnostic tests available, Section A.4 <i>Sampling and diagnostic testing</i> and Appendix 1. Clarification regarding policy for visitors, Section B.1 <i>ED management of EVD</i> and Section B2.5 <i>Infection prevention and control</i> . Further detail provided in Section B.6 <i>Post-mortem care and examination</i> .
4.3	21 July 2015	WA Department of Health	Incorporates Management of neonates and pregnant and lactating women with suspected, probable or confirmed Ebolavirus disease. Updates to EVD factsheets.

CONTENTS

Version Control	2
Abbreviations	5
About this document	6
SECTION A VIRAL HAEMORRHAGIC FEVER	
1. Introduction	8
2. Overview of viral haemorrhagic fevers	10
3. Initial assessment and management.....	13
4. Sampling and diagnostic testing.....	14
SECTION B EBOLAVIRUS DISEASE	
5. Emergency department management of Ebolavirus disease	18
6. Public health management of Ebolavirus disease.....	22
7. Infection prevention and control guidelines for non-quarantine hospitals	33
8. Cleaning and disinfection	38
9. Waste treatment and disposal	41
10. Post-mortem care and examination	44
11. Patient transport	51
12. Management of healthcare workers exposed to Ebolavirus disease within Western Australia.....	54
APPENDICES	60
Appendix 1 Collection and handling of specimens from suspected viral haemorrhagic fever cases in non-quarantine hospitals.....	59
Appendix 2 Guide to interpretation of viral haemorrhagic fever PCR results, and subsequent management of patient.....	62
Appendix 3 National case definitions of Ebolavirus disease	63
Appendix 4 Emergency department assessment of ‘person under investigation’ for Ebolavirus disease	65
Appendix 5 Risk assessment checklist for a ‘person under investigation’ for Ebolavirus disease.....	66

Appendix 6 Personal protective, medical and cleaning equipment	69
Appendix 7 Donning and doffing sequence for use of P2 or N95 personal protective equipment and documentation requirements	72
Appendix 8 Donning and doffing sequence for use of powered air purifying respirator (PAPR) and documentation requirements	80
Appendix 9 Flow chart for management of healthcare and other aid workers returning from Ebola-affected country	88
Appendix 10 Fact sheets	89
FACT SHEET A Ebolavirus disease.....	90
FACT SHEET B Information for WA Health staff	904
FACT SHEET C Information for Contacts	96
Appendix 11 Contact numbers	96
Appendix 12 Ebolavirus disease case report form	98
Appendix 13 Management of neonates and pregnant and lactating women with suspected, probable or confirmed Ebolavirus disease	105

Abbreviations

ABHR	Alcohol based hand rub
AGP	Aerosol generating procedure
AHPPC	Australian Health Protection Principal Committee
BP	Blood pressure
CDCD	Communicable Disease Control Directorate
CDND	Communicable Disease Network Australia
CPAT	Complex patient transport
DOB	Date of birth
DOH	Department of Health
ED	Emergency Department
EVD	Ebolavirus disease
HCF	Health care facility
HCW	Health care worker
NETS	Neonatal Emergency Transport Service
NPIR	Negative pressure isolation room
PAPR	Powered air purifying respirator
PCR	Polymerase chain reaction
PHEOC	Public Health Emergency Operations Centre
PHU	Public Health Unit
PMH	Princess Margaret Hospital
PPE	Personal protective equipment
QEII MC	Queen Elizabeth II Medical Centre
RFDS	Royal Flying Doctor Service
SCGH	Sir Charles Gairdner Hospital
SJA	St John Ambulance
UMRN	Unique medical record number
VHF	Viral haemorrhagic fever
WHO	World Health Organisation

About this document

The *Viral Haemorrhagic Fever Response Plan for Western Australia* replaces the 2007 *Contingency Plan for the Public Health Management of Viral Haemorrhagic Fever within Western Australia*. It is an extensive revision and has been prompted by the large outbreak of Ebolavirus disease (EVD) in West Africa in 2014.

This document is divided into two sections; the first forms an overview of viral haemorrhagic fevers as a group and provides general information on, incubation periods, clinical features, information on initial management and testing and quarantine hospitals. The second part of this document focuses on EVD and provides more detailed guidance on emergency department (ED) and public health management, risk assessment, infection prevention and control policies, how to transport cases and post-mortem care of cases. Checklists, flow charts and forms that may be useful in managing cases of VHF have been included as appendices.

The principles of managing EVD outlined in this document may be applied to the management of other VHFs and so this section may be used to provide further management guidance. Information within this document will continue to be updated, due to the changing nature of the 2014-2015 EVD epidemic.

The target reader of this response plan is anyone who may be involved in the management of a 'person under investigation', suspected, probable or confirmed case of VHF. These may include:

- healthcare workers (HCWs) in emergency departments, infectious disease units, infection prevention and control units, and acute medical units (intensive care units and high dependency units) in WA hospitals
- PathWest QEII Medical Centre laboratory staff
- St John Ambulance and Royal Flying Doctor Service staff
- public health professionals
- bio-security officers based at international ports
- mortuary and funeral industry personnel
- WA police and forensic staff.

SECTION A: VIRAL HAEMORRHAGIC FEVER

1. Introduction

1.1 Background

This document provides the framework to guide the response to suspected and confirmed cases of VHFs in WA, and should assist each hospital in producing a site-specific response plan. Viral haemorrhagic fevers (VHFs) covered by this plan (Ebola virus disease, Marburg virus disease, Lassa fever and Crimean-Congo haemorrhagic fever) are a group of infectious diseases that cause serious illness in humans, with high case fatality rates and the potential for person-to-person transmission, including in healthcare settings. These viruses are endemic in specific geographic regions - primarily in Africa, but also including the Middle East, Eastern Europe and Asia.

Other haemorrhagic fevers that are not characterised by person-to-person spread, such as yellow fever, dengue fever, hantavirus and South American arenavirus infections, are not covered by this document.

VHFs do not occur in Australia and establishment here is unlikely as environmental conditions do not support the natural reservoirs and vectors of these viruses. The possibility of a VHF case being diagnosed in Western Australia (WA) is very low, and relates primarily to travellers from endemic areas. However, the risk may be increased in certain circumstances, such as during periodic epidemics of Ebola virus disease (EVD) that have occurred in central Africa since 1976. The large outbreak of EVD in several West African countries in 2014-2015, including spread to populous urban areas, has posed the most significant risk of spread to Australia and other developed countries, by both returning humanitarian workers and by returning tourists or citizens of these countries travelling to Australia.

To date, the only documented case of significant VHF diagnosed in Australia was a convalescent case of Lassa fever diagnosed in a rural hospital in New South Wales in 1985. Other suspect cases investigated previously have eventually been diagnosed as other febrile illnesses, including malaria, leptospirosis or Human Immunodeficiency Virus seroconversion illness.

Contingency planning for VHFs aims to enable early identification and assessment of suspect cases, laboratory testing and clinical management in a safe environment and prevention of transmission.

Diagnosis and management of VHFs in WA presents several challenges:

- the rarity of patients presenting with VHFs in Australia heightens the risk of misdiagnosis
- the early clinical presentation (e.g. fever, headache, pharyngitis, myalgia) is non-specific and mimics more common and less severe conditions
- the risk for transmission to contacts, including healthcare workers (HCWs), particularly during the early symptomatic phase prior to the diagnosis being considered and appropriate infection prevention and control precautions implemented
- while evidence and international guidelines indicate that suspected, probable and confirmed cases should be isolated in a single room with use of standard and transmission-based (contact and droplet) infection prevention and control precautions, the high level of consequences if transmission of VHFs such as EVD occurs, means that more stringent precautions to prevent aerosol transmission will be used in Australian healthcare settings, where this is possible. This is also reflected in guidelines for handling of specimens in laboratories.

1.2 Legislative basis

VHFs are classified as “dangerous infectious diseases” for purposes of notification and public health management in WA (*Health Act 1911*). This allows the use of additional powers, as defined in Section 251 of the Act, to facilitate public health management of cases and contacts, such as orders requiring isolation, quarantine, testing and disinfection, should this be appropriate.

VHFs are also nationally notifiable and are prescribed quarantinable diseases under the Commonwealth *Quarantine Act 1908*, which in effect means that responsibility for surveillance, cost of treatment and control of these diseases lies with the Commonwealth Department of Health. In practice, however, Commonwealth responsibility is limited to national coordination and activities at international borders, and the WA Department of Health (WA Health) accepts delegated responsibility for clinical and public health management of these diseases, with the Director of the Department’s Communicable Disease Control Directorate (CDCD) being appointed the Chief Human Quarantine Officer for the state, under Commonwealth legislation. Other WA Health medical officers are similarly appointed as Human Quarantine Officers (refer to *Appendix 11 Contact numbers*). Costs incurred in treating a patient with a suspected quarantinable disease are, at least in theory, recoverable from the Commonwealth.

1.3 Quarantine hospitals

In WA, Sir Charles Gairdner Hospital (SCGH) is the designated hospital for the treatment of adults (including pregnant women) with quarantinable diseases, including VHFs. Princess Margaret Hospital (PMH) is the designated quarantine hospital for treatment of children. These hospitals have purpose-built isolation rooms, including in their intensive care units, for patients with VHFs and other high-risk pathogens, in order to minimise the risk of transmission to HCWs, other patients and visitors.

PathWest at the QE II Medical Centre campus, adjacent to SCGH, maintains an accredited physical containment level 3 (PC3) laboratory, with the capacity to undertake a range of microbiological and other diagnostic testing on blood and other specimens from patients being investigated for VHFs.

1.4 Non-quarantine hospitals

All hospitals must consider, that a person in whom a diagnosis of VHF needs to be ruled out, or even a real case, could self-present or be referred to an ED by a general practitioner. Such cases will need to be assessed, managed and in some situations admitted, prior to it being feasible to arrange transfer to either of the designated quarantine hospitals. Each hospital, including those in country regions, should therefore have in place a response plan for the assessment, treatment and referral of patients with suspected VHFs. Plans should include provision for:

- an isolation care area with an adjoining ante-room or an adjacent unoccupied room, with private bathroom facilities, to manage patients until they can be transferred, while recognising that the labile nature of VHF infections may make timely transfer difficult
- appropriate personal protective equipment (PPE) for HCWs managing VHF cases, according to *Appendix 6 Personal protective, medical and cleaning equipment*
- the provision of education to HCWs on necessary infection prevention and control measures and on the use of appropriate PPE
- arrangements for transfer of patients to SCGH or PMH as soon as clinically practicable.

2. Overview of viral haemorrhagic fevers

2.1 Incubation periods

Incubation periods for these diseases are:

i	Lassa fever	6 – 21 days
ii	Ebolavirus disease	2 – 21 days
iii	Marburg virus disease	3 – 10 days
iv	Crimean-Congo haemorrhagic fever	1 – 12 days

2.2 Clinical features of cases of viral haemorrhagic fevers

These infections have variable and non-specific clinical manifestations. As an example, Lassa Fever is thought to have an overall mortality rate of 5% but this rises to 15-20% in hospitalised patients. Mortality rates in outbreaks of EVD in Africa have ranged from 50-90%, with variability probably related to different levels of care available, and perhaps to virulence characteristics of different strains of the virus.

Epidemics and small clusters of VHF due to nosocomial transmission among hospitalised patients and HCWs have been reported, primarily associated with EVD in Africa. In the early phase of these diseases when non-specific influenza-like symptoms predominate, the risk of transmission is thought to be low, but in those who progress to haemorrhage and organ failure, their body fluids are highly infectious.

Ebola and Marburg virus disease: 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 fever: 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 haemorrhagic fever: 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.

2.3 Specific treatments for viral haemorrhagic fever patients

Administration of the anti-viral drug ribavirin may be appropriate in some cases, on the recommendation of an infectious disease physician. A stock of ribavirin is maintained for this purpose in the Pharmacy Department at SCGH. Experimental treatments, albeit in very limited supply, may have contributed to recovery in some HCWs infected with Ebolavirus during the 2014-2015 West African outbreak.

2.4 Transmission

Following initial human infection from an animal source, transmission of VHF is usually from person-to-person contact with contaminated body fluids, either directly or via fomites. Transmission by airborne droplets has not been discounted in some cases.

The severity and consequences of infection with VHFs require that a more elaborate and strict level of containment be consistently maintained for the prevention of nosocomial transmission, both at the bedside and in the diagnostic laboratory.

At the time of writing this plan, transmission of EVD to HCWs in western countries had occurred on three occasions (two from one index case and one from another), during the 2014 outbreak. The reasons for these transmissions is purported to be a breaches in protocols for the use of PPE.

Table 1 Summary of the major characteristics of the viral haemorrhagic fevers (VHFs)

VHF	DISTRIBUTION	RESERVOIR	INCUBATION PERIOD	CLINICAL PRESENTATION	DIAGNOSIS	FATALITY RATE	TREATMENT	INFECTIOUS SOURCE
Lassa fever	Sierra Leone, Nigeria, Liberia, Guinea, Mali, Senegal and Central African Republic	A small wild rodent, <i>Mastomys natalensis</i>	6-21 days	Fever, arthralgia, myalgia, diarrhoea, vomiting, sore throat, progressing to swelling of face and neck, general oedema, bleeding, encephalopathy and shock. Residual deafness in 25%.	Blood, urine, throat swab for culture. Blood for PCR. Conjunctival scrape for antigen. Serum for IgM and IgG	15%	Ribavirin for treatment and prophylaxis	Blood and body fluids in acute illness. Urine for 3 weeks, semen for 12 week.
Ebolavirus disease (EVD)*	Sudan, Democratic Republic Congo, Gabon, Uganda, Ivory Coast, Guinea, Sierra Leone, Liberia	Unknown, bats suspected. Humans usually infected via non-human primates and other bush meat.	2-21 days	Fever, arthralgia, myalgia, headache, diarrhoea, vomiting, sore throat, maculopapular rash, bleeding, shock and multi-organ failure.	Blood, urine, throat swab for culture and PCR. Serum for IgM and IgG.	50-90%	No specific treatments proven. Trials of a number of experimental treatments during 2014 outbreak.	Blood and body fluids in acute illness. Semen for 10 weeks after clinical recovery. Infected animals.
Marburg virus disease	Zimbabwe, Kenya, Angola, Uganda, Tanzania, Democratic Republic Congo	Unknown, bats suspected. Human infections documented via non-human primates.	3-10 days	Similar to EVD. May be prolonged recovery with orchitis, hepatitis, uveitis and transverse myelitis.	Blood, urine, throat swab for culture. Blood for PCR. Conjunctival scrape for antigen. Serum for IgM and IgG	20-30%	No specific treatments proven.	Presumed same as EVD.
Crimean-Congo haemorrhagic fever	Eastern Europe, Middle East, Mediterranean, Central Asia, India and most of Africa.	Small mammals. Humans usually acquire via ticks or slaughtering infected animals.	1-12 days	Headache, fever, gastrointestinal disturbances, conjunctivitis, jaundice, neurological effects and bleeding.	Blood, urine, throat swab for culture and PCR. Serum for IgM and IgG.	15-30%	No specific treatments proven. Possibly Ribavirin or immune plasma.	Blood and body fluids. Highly infectious in hospital settings.

*Reston strain of EVD found in Philippines not documented to cause disease in human

3. Initial assessment and management

This section concerns assessment and management of a person in whom VHF is suspected in an ED of a hospital other than designated quarantine hospitals (SCGH for adults (including pregnant women); or PMH for children). The designated quarantine hospitals have their own VHF management plans.

The following principles should be followed by a medical practitioner/health professional who suspects VHF on the basis of a patient's symptoms (fever, or symptoms of fever, with or without additional symptoms such as headache, myalgia, arthralgia, vomiting, diarrhoea, abdominal pain or unexplained bleeding/bruising in past 24 hours) and travel history (travel to a country where there is an outbreak of a VHF, or contact with a person with a VHF, or the blood or body fluids of a person with a VHF within the incubation period of the VHF (up to 21 days)):

- immediately isolate the patient in a negative pressure isolation room (NPIR) (or single room if NPIR not available) and minimise unnecessary staff and family contact
- discourage the patient from leaving prior to further assessment and/or exclusion of VHF
- ensure appropriate infection prevention and control precautions are taken by all staff (and by parent(s) of a child case if it is essential for them to remain with the patient) who are providing care in the same room
- where available within a health facility, notify the Infection Prevention and Control Practitioner and Infectious Diseases Physician
- obtain clinical and exposure information to allow for an initial risk assessment to be made
- notify the on-call public health physician at the CDCD on (08) 9388 4801 (during office hours) or (08) 9328 0553 (after-hours paging system)
- the risk assessment will be discussed between the attending practitioner, the CDCD on-call public health physician and the on-call microbiologist from the designated quarantine hospital, and further care/management advised
- depending on the final risk assessment, the patient may remain isolated in the hospital ED to which they presented and have samples taken for urgent testing for exclusion of VHF at PathWest QEII Medical Centre (if deemed very low risk), or may be transferred immediately to the designated quarantine hospital (if deemed higher risk).

Clinicians should NOT:

- take a throat swab or undertake any aerosol generating procedure or venepuncture unless immediately essential for clinical care
- call St John Ambulance or the Royal Flying Doctor Service or organise any transport to another health service unless advised to by on-call CDCD public health physician.

The hospital MUST:

- compile a list of patients and staff who were in contact with the patient, including their mobile phone numbers and other contact information for contact follow up if required
- implement other actions as advised by the on-call CDCD public health physician relating to risk management or risk communication to staff and patients.

4. Sampling and diagnostic testing

In view of the risk of transmission of viral haemorrhagic fever (VHFs) through body fluids, careful consideration needs to be given prior to any sampling of a suspected case. These guidelines outline the procedure for making this decision and provide advice on how diagnostic tests should be taken and interpreted.

4.1 Collection and handling of specimens from suspected viral haemorrhagic fever cases in non-quarantine hospitals

The requirements for the collection of specimens from patients with suspected, probable or confirmed VHF are outlined below.

- Specimens for VHF testing must only be collected following advice from the on-call public health physician at CDCD and the on-call clinical microbiologist at PathWest QEII Medical Centre (QEIIIMC) for adults and/or paediatric cases at non-quarantine hospitals.
- The on-call clinical microbiologist at PathWest QEIIIMC will inform the Princess Margaret Hospital clinical microbiologist about any paediatric cases based at non-quarantine hospitals.
- No testing should be performed within laboratories outside the designated quarantine hospitals, without prior discussion with the microbiologist at SCGH or PMH. All specimens are to be collected by health care workers (HCWs) trained in specimen collection and in the use of VHF personal protective equipment (PPE). They must follow their local health care facilities' (HCF's) infection control protocols.
- If available, the PathWest VHF specimen collection kit should be used. These are available from PathWest QEIIIMC and have been distributed to WA metropolitan hospitals and regional resource centres.
- Each HCF's VHF policy should include clear information on where the PathWest VHF specimen collection kits can be accessed, as kits will be distributed to the laboratories servicing that hospital in the first instance. The laboratory will take responsibility for ensuring that the contents of the kit are in-date.
- In the unlikely event of a case presenting initially to a regional resource centre, and where transport of the patient to SCGH/PMH is not feasible, provision may be made for on-site, point-of-care testing in order to assist with ongoing management. This may occur while awaiting definitive testing, or for confirmed cases where the decision is made to continue their care in situ, rather than expose transport staff and the patient to the risks of a long period of transportation. In this case, appropriate equipment and other resources will be mobilised to the regional resource centre.

Refer to Appendix 1 *Collection and handling of specimens from suspected viral haemorrhagic fever cases in non-quarantine hospitals* for more detail on PathWest VHF sampling kits and how specimens should be taken and transported.

4.2 Laboratory testing guidelines

All samples from suspected or proven VHF cases must be referred to the Department of Microbiology at PathWest QE II MC. Ensure that the on-call public health physician from the CDCD is aware of the patient for investigation of VHF. The on-call clinical microbiologist at PathWest QEII MC must be consulted prior to collecting samples and informed when specimens are dispatched and their expected delivery time. The on-call clinical microbiologist will arrange for PC3 laboratory staff to be called in to perform testing.

Specimens delivered to the central reception area will be transferred to the PC3 laboratory unopened.

The following tests can be performed in the PC3 laboratory if suitable samples are provided:

- sodium, potassium, urea, creatinine, chloride, calcium
- carbon dioxide, haematocrit, haemoglobin, anion gap, lactate
- glucose
- arterial blood gas
- troponin
- dengue Ag, IgM, IgG
- malaria Ag

The following tests can be performed in the routine (PC2) laboratory following inactivation of sample in the PC3 laboratory:

- PCR for the suspected virus and for malaria following lysis of the sample
- antibody tests following heat inactivation of plasma
- malaria films following fixation
- gram stains on blood cultures following fixation.

Results will be communicated to the on-call clinical microbiologist who will be responsible for informing the on-call public health physician and the attending medical staff. Results will not be available directly from the laboratory staff.

The following samples will also be sent urgently to the Victorian Infectious Diseases Reference Laboratory for testing:

- samples which are positive by PCR for one of the VHF viruses. These samples will be transported as an Infectious Substance, affecting humans, Category A UN28141
- samples from patients with strongly suspected VHF despite a negative PCR. These samples will be transported as an Infectious Substance, affecting humans, Category A UN28141
- samples requiring tests for VHF viruses that are not available at PathWest QEII MC will be sent

¹National Transport Commission, *Australian Dangerous Goods Code*, Edition 7.3 August 2014.

urgently to the Victorian Infectious Diseases Reference Laboratory for confirmation. Samples from patients with strongly suspected VHF will be transported as an Infectious Substance Category A UN2814. All others will be transported as Biological Substance, Category B UN 3373.

Note: Samples taken for VHF within the first 72 hours of onset of symptoms cannot be used to exclude VHF definitively. In this scenario, a second sample **MUST** be taken, at greater than 72 hours since the onset of symptoms, to exclude VHF.

Refer to Appendix 2 *Guide to interpretation of viral haemorrhagic fever PCR results, and subsequent management of patient* for further information on how to interpret VHF results and whether any subsequent testing is required.

SECTION B:

EBOLAVIRUS DISEASE

The remainder of this document applies specifically to Ebolavirus disease (EVD) and was written in the context of the response to the 2014-2015 epidemic in West Africa. Case definitions are based on those defined by the *Ebola Virus Disease (EVD) CDNA National Guidelines for Public Health Units* and are provided in Appendix 3 *National case definitions of Ebolavirus Disease*.

1. Emergency department management of Ebolavirus disease

The following sections represent the key stages in the journey of a 'person under investigation' for Ebolavirus disease (EVD) through an emergency department (ED). It includes important actions and considerations required at each stage of their management. Each hospital should use these guidelines to develop their own hospital-specific policy and carry out practice exercises to test their preparedness.

1.1 Presentation

Patient arrives and is identified as a 'person under investigation' for EVD (refer to *Appendix 3 National case definitions of Ebolavirus disease* and *Appendix 5 Emergency department assessment of 'person under investigation' for Ebolavirus disease*).

Scenario 1: Patient identified whilst patient outside the ED

- Identify best route to bring patient into ED.
- Consider completing initial risk assessment of the patient outside the ED by interview at >2m from the patient or by mobile phone.

Scenario 2: Patient identified at the triage desk

- Ask patient to:
 - put on a surgical mask
 - remain seated or standing and not touch anything
 - identify where they have been in waiting room.
- Reassure patient and explain that you need to step away to don some personal protective equipment.
- Inform senior medical officer and senior nurse in charge, who should then inform other key staff including the hospital executive.
- Health care worker (HCW) to observe patient from >2m away and collect details from patient.
- Direct other patients/visitors to remain >2m away from the patient, use barriers if available.
- Identify and cordon off where patient has been, use barriers if available.
- Take details of any accompanying friends or relatives. If they fit the criteria for 'person for investigation of EVD' isolate and manage as such.
- Asymptomatic accompanying friends or relatives should be advised to return home and wait for further instructions.
- A 'person for investigation of EVD' or suspected, probable or confirmed cases of EVD are not allowed visitors inside the isolation room with them except in exceptional circumstances.
- Asymptomatic parents of young children may choose to either stay with their child or return home. If parents decide to stay with their child, they should be provided with full PPE and should be trained in how to use it and monitored to ensure that it is safely donned and doffed. As contacts of a suspected case they should advise a healthcare worker straightaway if they begin to feel unwell or develop a fever.

Scenario 3: Patient arrives by ambulance (Note: this is unlikely to occur at hospitals other than SCGH or PMH).

- Discuss early with on-call public health physician at CDCD as patient may be transferred to SCGH/PMH immediately.
- Consider keeping patient in ambulance until isolation room available.

1.2 Assign treating team

- Senior HCWs trained in EVD personal protective equipment (PPE) to don PPE if any chance of being within 2m of patient (refer to *Appendix 6 Personal protective, medical and cleaning equipment*).
- Handover any existing patients to other team members.
- Observer to watch and ensure PPE is correctly donned and complete checklist (*Appendix 7 and 8 Donning and doffing sequences*).

1.3 Preparation of isolation room

- Transfer patient out and clean room as per normal hospital policy.
- Ensure only essential equipment that can be cleaned or disposed of after use is in the room e.g. disposable blood pressure (BP) cuff, pulse oximeter probe.
- Make up bed with disposable sheets and place gown on bed.
- Ensure adequate clinical waste bins and liners are placed in room.
- Donning area to have adequate supplies of PPE, a mirror and be uncluttered.
- Isolation room should ideally have negative pressure and an ensuite or commode, intercom system or speaker phone, and glass window through which the ante-room can be visualised. If no negative pressure room available, use a single room.
- An observer must be stationed outside the isolation room ready to communicate with HCW or patient inside room at all time.

1.4 Transfer of patient to isolation room

- Assess best option for transfer of patient to isolation room, ideally allow patient to walk, but if has active diarrhoea and/or vomiting, or is unsteady, use a wheelchair/trolley.
- Clear path to isolation room, cordon off route where possible. Move any patients or equipment in the corridors along route.
- HCWs to lead and follow walking patient (remaining >2m away if no PPE), or wheel them in a wheelchair whilst wearing PPE; if patient requires a trolley, HCWs wheeling the trolley to don PPE.

1.5 Cleaning of waiting room

- Ensure area is cordoned off, where possible, prior to cleaning.
- Assigned HCW to don PPE (*Appendix 7 or 8 Donning and doffing sequences*).
- Clean and disinfect any areas where patient has been (*Section B.4. Cleaning and disinfection*).

1.6 Risk assessment

- Minimise contact with patient where possible.
- If deemed necessary, ask patient to change into gown and to place all their clothing into a plastic bag and keep it in the room.
- HCW in room to communicate information to other staff using telehealth, intercom systems, telephones, two way radios, white boards or sign language, as appropriate and available.
- Do not take notes/paper out of isolation room.
- Reassure the patient and ensure they understand the importance of remaining within the isolation room, use a telephone interpreter service, if necessary, on speaker phone.
- Complete risk assessment (*Appendix 5 Risk assessment checklist for 'person under investigation' for Ebolavirus disease*) and contact on-call public health physician at CDCD as soon as possible.

1.7 Observations and examination

- Take a set of observations and where possible, leave monitoring equipment on patient and advise the patient that the BP cuff may periodically inflate.
- Use cardiac monitoring only where clinically indicated.
- Consider if further examination is required. If patient looks alert and well, is comfortable and observations are within normal ranges, speak to CDCD straight away.
- If a decision is made to clinically examine the patient, do not use a stethoscope.

1.8 Treatment

- Apply oxygen only if required and avoid performing aerosol generating procedures (e.g. throat swab, suction, nebulisers and intubation). If they are unavoidable, they must be performed in a negative pressure isolation room. HCW to wear a powered air purifying respirator (PAPR).
- In the event of cardio-respiratory arrest in a suspected case of EVD, follow hospital specific strategy which may include not pressing the alarm. Resuscitation at this stage should be limited to staff already in PPE, until others don PPE.
- Avoid venepuncture unless advised by CDCD or unless urgently indicated e.g. hypotensive requiring urgent IV hydration.
- Carefully consider the use of antibiotics, antiemetics and antimalarials. Treat presumptively if clinically warranted.
- Draw up medications and prime IV lines prior to entry into isolation room.
- Blood samples from a suspected case are not to be processed anywhere but at PathWest QEII Medical Centre. Where samples are required to be taken at the presenting hospital, follow guidelines in *Section A.4.1 Collection and handling of specimens from suspected viral haemorrhagic fever cases* and use VHF testing kits provided by PathWest QEII Medical Centre.

1.9 Ongoing general patient care

- Follow specific guidelines on toileting, refer to *Section B.5. Waste treatment and disposal*.
- Use disposable crockery and cutlery where required.
- Where possible, use a monitor located outside the isolation room for monitoring the patient
- Ensure the patient has a means of alerting staff to new symptoms or if they feel unwell and that they are clear on this process.
- Ensure other ED staff are updated on the situation.
- Friends or relatives of a suspected, probable or confirmed case of EVD are not allowed inside the isolation room at any time. In exceptional circumstances or where parents are required to stay with a child, visitors may be trained in the safe donning and doffing of PPE and once deemed competent allowed to enter the isolation room. All visitors wearing PPE must be treated in the same way as a HCW i.e. observed at all times whilst in the room and during donning and doffing of PPE.
- All attempts should be made to ensure that the patient feels supported and that they have a number of options for communication with their friends and family e.g. skype, telephone, video conferencing or view of visitors outside a window to the isolation room. All visitors who are undergoing 21 days of monitoring need to be advised to inform HCWs straightaway if they feel unwell or develop a temperature.

1.10 Leaving the room

- HCW to inform assistant and/or observer that they are ready to leave the room.
- Follow doffing checklist carefully (*Appendix 7 or 8 Donning and doffing sequences*).
- Keep a log of HCWs and visitors entering isolation room.
- HCWs assigned to care for a suspected EVD where a breach in PPE is thought to have occurred/or have sustained high risk exposure should not care for other patients (*Section B.8. Management of healthcare workers exposed to Ebolavirus disease within Western Australia*).

2. Public health management of Ebolavirus disease

WA Health's public health response to a suspected, probable or confirmed case of EVD will be in accordance with the latest version of the Communicable Diseases Network Australia (CDNA) *Ebolavirus Disease (EVD) - National Guidelines for Public Health Units*, available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-ebola.htm> .

The CDNA guidelines provide direction for the public health management of 'persons under investigation', and suspected, probable and confirmed cases of EVD (see *Appendix 5 National case definitions of Ebolavirus disease*), and of contacts of such cases, in Australia, specifically in the context of the 2014-15 epidemic of EVD in West Africa, and the detail is not reproduced here. Rather, this section provides a general overview of responsibilities for public health management of EVD cases and contacts and the application of the CDNA guidelines in WA.

2.1 Responsibility for public health management of Ebolavirus disease

In WA, the CDCD coordinates the public health response to EVD, with assistance from Public Health Units (PHU). The demarcation of responsibilities between CDCD and PHUs will be determined by several factors, including the number of suspected, probable or confirmed cases and the number of contacts requiring follow-up at any one time, their geographic distribution, and the timing of when cases are notified and when follow-up actions need to be undertaken.

The cornerstone of public health control of EVD in WA will be prompt detection, isolation and commencement of care for suspected cases of EVD, which will be facilitated by active temperature and symptom monitoring of:

- all travellers arriving in WA from an EVD-affected country (as defined by the World Health Organization), for 21 days after leaving that country
- all persons who have had close contact with or provided clinical care to confirmed cases of EVD within WA (or other non-epidemic areas), for 21 days after the last potential exposure.

2.2 Identification and notification of 'persons under investigation', suspected and confirmed cases of EVD

'Cases', of whatever category, as defined in the CDNA guidelines, are most likely to first come to the attention of the CDCD on-call public health physician (who also functions as a "Human Quarantine Officer" under Commonwealth legislation – *Quarantine Act 1908*). This could be by:

- notification by Commonwealth Department of Agriculture Biosecurity Officers at Perth Airport, (or less likely from WA sea-ports or airports in the north-west that have limited international flights) of travellers from EVD-affected countries who have fever and/or other symptoms detected or reported at the time of arrival
- self-report t by previously identified at-risk persons (e.g. travellers from EVD-affected countries or healthcare worker contacts of cases diagnosed in WA) who are undergoing 21 days of monitoring in the community and who develop a fever and/or other symptoms
- notification by doctors after individuals present for assessment. Any such direct presentations are

most likely to be at designated quarantine hospitals (SCGH or PMH) or possibly at other major metropolitan hospitals, as at-risk persons (either those coming from EVD-affected countries or contacts of any confirmed cases in WA) should have been pre-identified and given instructions on where and how to present for medical attention if they become ill. Presentation to general practice (GP) clinics or to non-metropolitan hospitals is unlikely, as at-risk individuals will have been specifically instructed not to present to GPs, and those with higher levels of exposure will ordinarily be required to stay in the Perth metropolitan area until the completion of their 21-day monitoring period.

Staff of metropolitan or country PHUs may also receive calls from GPs or doctors or other staff at local hospitals who are concerned about the possibility of EVD in patients. Such reports should be assessed on merit, although in most instances it is likely that such persons will not meet epidemiological and clinical criteria for EVD. However, if cases do meet case criteria, then the information should be conveyed immediately to the **on-call CDCD public health physician (phone 9388 4801 during office hours, or after hours via 9328 0553)** so that a risk assessment and plans for investigation, clinical management and referral can be formulated, in consultation with the treating clinicians, on-call clinical microbiologist at SCGH/PMH, and others, as appropriate.

2.3 Identification of persons for active surveillance and arrangements for monitoring

Persons assessed as having exposures that place them at potential risk for EVD will be placed under active surveillance for 21 days from their last possible exposure. As of 4 December 2014, WA is taking a precautionary approach and those to be monitored include:

- all persons identified at the border as travelling from EVD-affected countries, irrespective of whether or not they have identified exposure risks (e.g. HCWs from EVD treatment centres; attendance at local funerals; or household contacts of suspected, probable or confirmed EVD cases)
- contacts of probable or confirmed cases of EVD within WA (or other non-epidemic areas). These contacts include those defined in the CDNA guidelines as having 'lower risk' or 'higher risk' exposures, but not 'casual contacts'.

Active surveillance will include provision of an Ebolavirus self-monitoring pack. This pack includes:

- information about EVD
- a digital thermometer and instructions for its use
- a sheet for logging temperature, movement and contacts during the 21-day monitoring period
- instructions on the SMS alert system.

Management of contacts is premised on the evidence that people with Ebolavirus infection are not infectious during the incubation period, prior to the development of symptoms. As long as contacts are well, irrespective of the type of exposure they have had and the assessment of their risk of infection, they should not pose a threat to those around them.

2.3.1 EbolaTracks SMS monitoring system

EbolaTracks is an automated SMS monitoring system designed to facilitate temperature and symptom monitoring of persons assessed as having exposures that place them at potential risk for EVD, for a period of 21 days following their last possible exposure. The system sends these individuals an SMS message once per day during the 21 day follow-up period.

Enrolment will ordinarily occur via one of the two pathways described below.

2.3.1.1 Persons travelling from EVD-affected countries

- These will be identified at ports of entry (primarily Perth International Airport) by border staff using electronic passenger data and information on passenger travel declarations.
- **Symptomatic traveller:** Should a passenger be identified with symptoms or a measured temperature of $\geq 37.50\text{C}$ the border Biosecurity Officer will discuss the case with the on-call public health physician from CDCD, and direct referral by ambulance to SCGH or PMH will be arranged if the individual meets the CDNA criteria for a 'person under investigation' or suspected case. In some circumstances the on-call CDCD public health physician or nurse may attend the airport to assist with the assessment of symptomatic travellers and airline contact management.
- **Well traveller:** In the more likely scenario of an asymptomatic and afebrile passenger, they will be provided with an EbolaTracks self-monitoring pack by Biosecurity Officers and released from the airport, with or without conditions on further travel, movement and social interactions, depending on their type and level of potential exposure to Ebolavirus, as defined in the CDNA Guidelines. A CDCD staff-member will subsequently contact them by phone, usually within 24 hours, to complete the EbolaTracks enrolment procedure.
 - **No identified exposure:** Persons who have had been in an EVD-affected country but who have no identified exposures to suspect/confirmed cases or other risk factors will ordinarily be permitted to travel to their home anywhere in WA and to work and move freely in the community, provided they cooperate with the twice daily monitoring system and remain asymptomatic.
 - **Identified exposure:** Conversely, persons with identified exposures, such as healthcare workers who have provided care to patients with EVD in a treatment centre in West Africa, will be required to stay within the Perth metropolitan area and will not be able to work in a patient care environment during their monitoring period. Depending on their risk categorisation (lower versus higher risk exposures, such as a breach of PPE) there may also be additional restrictions on their movement in the community (e.g. use of public transport and attendance at crowded events).
- **Responsibility for monitoring**
 - **CDCD role:** CDCD will ordinarily be responsible for the ongoing monitoring and management of persons travelling from EVD-affected countries who are released to the community, via the EbolaTracks system. This will include enrolment of the traveller (usually by phone) within 24 hours of their arrival, follow-up calls to those who do not respond to a scheduled SMS or who report a temperature or other symptoms, and arrangement of referral and transport to a hospital for assessment, if necessary.

CDCD will establish a process to advise PHUs of the number of individuals residing within their region who have travelled from EVD-affected countries and are being monitored by EbolaTracks.

- Public Health Unit role: There may be occasions when PHUs will be asked by CDCD to assist in follow-up of these individuals, such as when they have not responded to one or more scheduled SMS alerts, plus follow-up calls. Such action may include the need for home visits to try to ascertain the whereabouts of a non-responding individual. In country areas in particular, other WA Health employees, such as Community Health staff, or even local government Environmental Health Officers or police officers may need to be asked to assist, depending on circumstances.

2.3.1.2 Contacts of probable and confirmed cases of EVD within WA (or other non-epidemic areas)

This applies to the unlikely but not impossible scenario of a case of EVD being diagnosed in WA. In this circumstance there will be a range of potential contacts, including family and other household members, work associates, casual community contacts and healthcare workers who need to be identified, categorised according to the risk matrix in Section 11 of the CDNA Guidelines, provided with information, and enrolled in the EbolaTracks monitoring system where indicated.

- In the event of a local case of EVD being diagnosed, the Public Health Emergency Operations Centre (PHEOC) at Grace Vaughan House will most likely be activated, with response centrally coordinated via this centre.
- Completion of Case Report Form: The identification of close contacts, via completion of the EVD Case Report Form (refer to *Appendix 12 Ebola Disease case report form*) may be undertaken by the PHU, CDCD and/or clinical staff interviewing the patient, depending on the timing of the diagnosis of the case, their condition and the availability of relatives or other key informants.
- PHUs and on the balance of probabilities, Perth metropolitan PHUs - will ordinarily be responsible for initial follow-up of contacts of suspected/probable/confirmed cases of EVD in WA. Irrespective of how the case form is completed and contacts are identified, PHUs will be responsible, at least within office hours, for ensuring that all contacts are provided with information on EVD and their risk of contracting the disease. In addition, those with lower or higher risk exposures will need to be provided with an Ebolavirus disease self-monitoring pack and an explanation of the EbolaTracks SMS system. PHUs should then email or fax the completed SMS system enrolment form to the PHEOC.
- HCW and patient contacts: While the PHU has ultimate responsibility for identifying contacts, providing information and enrolling them in EbolaTracks (if indicated), in healthcare settings they should work closely with hospital infection control staff who may be able to assist, subject to agreement and clear delineation of responsibility.
- Delivery of Ebolavirus disease self-monitoring pack: Collection of details and delivery of packs may be undertaken by different mechanisms, depending on circumstances associated with the individual contact and logistic factors. Hence, home or work-place visits may be necessary in

some instances, while in others telephone explanation and courier delivery of the pack may be necessary. The contact will use the tools in this pack to monitor their temperature and other symptoms, and report to the Department of Health via daily SMS messages.

- CDCD, via PHEOC, will ordinarily be responsible for the ongoing monitoring and management of these 'WA local EVD contacts' via the EbolaTracks system. This will include follow-up calls to those who do not respond to a scheduled SMS or who report a temperature $\geq 37.50\text{C}$ or other symptoms. Where the contact meets the CDNA criteria for a 'person under investigation' or suspected case, the on-call public health physician from CDCD will discuss the case with the on-call clinical microbiologist at SCGH/PMH and arrange referral and transport to a hospital for assessment, if necessary. In the Perth metropolitan area, arranged referrals will ordinarily be directly to SCGH or PMH, as appropriate.
- If a symptomatic contact is in a country area, referral to the most appropriate local hospital will be arranged by the CDCD on-call public health physician in consultation with senior clinicians at that hospital, and a plan for assessment, testing, management and transfer formulated in the context of the clinical condition of the individual and logistic factors, as outlined elsewhere in this plan. Staff of regional PHUs may be involved at the local level in assisting with public health aspects of management of any such cases.
- If PHUs are called directly by contacts who report symptoms, then the PHU should refer this information promptly to the on-call CDCD public health physician who will facilitate a plan of action regarding the need for referral and assessment.
- There may also be occasions when PHUs will be asked by CDCD to assist in follow-up of these contacts within their regions, such as when they have not responded to one or more scheduled SMS alerts, plus reminder calls. Such action may include the need for home visits to try to ascertain the whereabouts of a non-responding individual. In country areas in particular, other WA Health employees, such as Community Health staff, or even local government Environmental Health Officers or police officers may need to be asked to assist, depending on circumstances.
- CDCD will establish a process to advise PHUs of the number of individuals residing within their region who are contacts of local EVD cases and are being monitored by EbolaTracks. Such contacts may initially have been identified and enrolled into EbolaTracks by staff of other PHUs.

2.4 Summary of risk assessment and management of travellers from EVD-affected countries and contacts of probable or confirmed* cases of EVD within Australia (adapted from CDNA guidelines)

Contact exposure category	Definition	Action and advice
<p>Casual contacts (except those that occurred in West Africa)</p>	<p>No direct contact with an EVD patient or body fluids but have been in the same general area.</p> <p>Casual contact, such as sitting in the same waiting room, travelling on the same airplane, without identifiable direct contact.</p>	<p>Reassure about very low risk.</p> <p>Provide 'Casual contacts fact sheet' (Appendix 10.C).</p> <p>No monitoring.</p>
<p>Lower risk exposures</p>	<p>A) Travel from an EVD-affected country, but no documented exposure risk (i.e. no direct contact with suspected or confirmed cases, no local funeral attendance), or</p> <p>B) Direct contact with the patient, as below:</p> <ul style="list-style-type: none"> • Household contact with an EVD case (this might be classified as higher risk in some circumstances, such as where the household was in a resource poor setting and/or the contact provided care to a patient in the secretory phase) • Healthcare workers providing direct patient care while wearing recommended PPE(see below) • Close contact in healthcare or community settings, where close contact is defined as: <ul style="list-style-type: none"> - being within approximately 1 metre of an EVD patient or within the patient's room or care area for a prolonged period of time (e.g., healthcare personnel, household members) while not wearing recommended PPE - having direct brief contact (e.g. shaking hands) with an EVD patient while not wearing recommended PPE. 	<p>Explain what is meant by 'lower risk'.</p> <p>Provide 'Low risk contacts factsheet' (Appendix 10.D).</p> <p>Enrol in EbolaTracks, with daily SMS monitoring of temperature for 21 days from last exposure; provide thermometer and instructions on use.</p> <p>Contact to notify CDCD if fever or other symptoms⁺ develop.</p> <p>An exposure and clinical risk assessment will inform what activities and/or restrictions are required.</p> <p>Depending on the results of a risk assessment, persons with category A lower risk exposure (e.g. fly-in fly-out miners with no history of exposure to EVD) may be permitted onwards travel interstate or to country areas of WA.</p> <p>Persons with category B lower risk exposures, including healthcare workers who have managed EVD cases in West Africa or WA, will ordinarily be asked to stay in the Perth metropolitan area for their 21-day monitoring period but without further restrictions on local movement. However, they should self-isolate immediately if they develop a fever or other symptoms.</p>

Contact exposure category	Definition	Action and advice
Higher risk exposures	<p>Contacts with higher risk exposures have had direct contact with the patient or their bodily fluids.</p> <ul style="list-style-type: none"> • percutaneous (e.g. needle stick) or mucous membrane exposure to blood or body fluids of an EVD patient, including kissing and sexual contact • direct skin contact exposure to blood or body fluids of an EVD patient without appropriate personal protective equipment (PPE) • laboratory processing of body fluids of suspected, probable, or confirmed EVD cases without appropriate PPE or standard biosafety precautions, or • direct contact with a dead body without appropriate PPE 	<p>Explain what is meant by 'higher risk'.</p> <p>Provide 'high risk contacts factsheet' (Appendix 10.E).</p> <p>Enrol in EbolaTracks, with daily SMS monitoring of temperature for 21 days from last exposure; provide thermometer and instructions on use.</p> <p>Contact to notify CDCD if fever or other symptoms⁺ develop.</p> <p>An exposure and clinical risk assessment will inform what activities and/or restrictions are required.</p> <p>Persons with higher risk exposures, including healthcare workers who have managed EVD cases in West Africa or WA, will be required to stay in the Perth metropolitan area for their 21-day monitoring period, and may be asked to restrict their activities, social mixing and direct contact with other persons. They should self-isolate immediately if they develop a fever or other symptoms.</p>

*Contact tracing may also be undertaken in response to a *person under investigation* or *suspected case* where there may be a delay in laboratory testing and diagnosis, such as a patient in a remote area.

+Other symptoms include headache, joint and muscle aches, abdominal pain, weakness, diarrhoea, vomiting, abdominal pain, rash, red eyes, chest pain, difficulty swallowing, haemorrhage.

2.5 Management of aid workers who have worked in healthcare or community settings in EVD-affected countries

WA Health acknowledges the vital work that aid workers perform in EVD-affected countries and the importance of tackling EVD at its source. Monitoring of aid workers, as outlined above, will be undertaken in order to provide timely and appropriate advice and medical care should they require it, in accordance with the CDNA Guidelines.

Returning aid workers pose varying levels of risk, dependent on the activities that they have undertaken whilst in an EVD-affected country. Those providing direct patient care to confirmed EVD cases in hospitals and treatment centres are clearly at higher risk compared to those involved in coordinating responses and logistics with no direct patient contact.

2.5.1 Priorities of care

- To perform a case-by-case assessment of returning aid workers' risk of exposure in the field, in order to guide public health management.
- To provide timely and accurate advice to returning aid workers and support them during their 21 day monitoring period.
- To actively monitor and manage returned aid workers to ensure that they can be provided with timely, optimal and appropriate care should they fall ill.
- To minimise the risk of transmission of EVD to returning aid workers' close contacts (including family members and colleagues) and in the wider community.
- To minimise the risk of transmission of EVD to healthcare workers who may be required to transport and treat returning aid workers under investigation for EVD.

2.5.2 Travel, work and other restrictions

WA faces a number of challenges in terms of its geographical size and the remoteness of some regions from the state capital. Transport of infectious patients, particularly those in the secretory phase of EVD, across large distances either by air (Royal Flying Doctor Service) or road (St John Ambulance) may pose a risk not only to the patient but also to HCWs involved in carrying out the transfer. Conversely, facilities in country hospitals will not readily be able to provide the degree of laboratory monitoring and intensive care that can be provided in the designated Perth quarantine hospitals, and infection prevention and control risks to staff may also be elevated.

Consistent with CDNA guidelines, returning aid workers from EVD affected countries who have provided care to EVD patients, whether assessed as lower or higher risk, will be required to stay within the Perth metropolitan area or nearby (a maximum range of around one hour drive from SCGH or PMH) for the duration of their 21 day monitoring period. During this period they will not be permitted to **travel interstate, intrastate or beyond one hour land transportation from the central Perth area, and will not be permitted to undertake patient care duties.**

Any intended travel beyond this area must be discussed with the on-call public health physician at CDCD well in advance, but will not ordinarily be permitted. Where the individual does not have access to private accommodation in the Perth area, CDCD will work with them to ensure safe and satisfactory

accommodation is available for the required 21 day monitoring period, at WA Health expense.

During the 21 day monitoring period, except where a risk assessment indicates otherwise, **no further restrictions will be imposed on their daily activities, provided they comply with the twice daily monitoring regimen and remain afebrile and asymptomatic.** Returning aid workers are instructed to isolate themselves from other people and to contact the on-call CDCD public health physician immediately should they develop a fever and/or other symptoms. Please refer to *Appendix 9 Flow chart for management of healthcare and other aid workers returning from Ebola-affected countries.*

2.6 Summary of Communicable Diseases Control Directorate (CDCD) responsibilities

2.6.1 Case management

As outlined above, the CDCD on-call public health physician will ordinarily be the first point of contact for notification of 'persons under investigation', and suspected and confirmed cases of EVD, and will be directly involved in the risk assessment that leads to decisions regarding referral for clinical assessment, testing and transport to a hospital or transfer between hospitals. In addition, CDCD will:

- Ensure prompt notification by email and/or telephone, depending on circumstances, of key WA and Commonwealth Department of Health officials when a person is admitted for investigation of EVD, and of both negative and positive test results for EVD and other pathogens, as these become available. Those routinely notified should include:
 - WA Health CDCD on-call email distribution list
 - WA Health Chief Health Officer; Director-General; Director, Disaster Management, Regulation and Planning; On-call Duty Officer; and Principal Media Coordinator and on-call officer (phone 9222 4333), Communications Directorate
 - Commonwealth Department of Health Chief Medical Officer (also Director of Human Quarantine) and National Incident Room.
- Where a single case of imported EVD is confirmed, consider convening the State Human Epidemic Committee, activating WestPlan Human Epidemic, and opening the Public Health Emergency Operations Centre (PHEOC) at Grace Vaughan House.
- Where there is one or more instances of transmission of EVD in WA, convene the State Human Epidemic Committee, activate WestPlan Human Epidemic, and consider opening the PHEOC at Grace Vaughan House.
- Formulate a communications plan in consultation with the Communications Directorate and nominate a spokesperson or persons (e.g. the Director of CDCD and/or the Chief Health Officer, and a senior clinician from SCGH or PMH), as appropriate.

2.6.2 Contact management

CDCD will provide overall coordination of identification and management of EVD contacts, as outlined in *Section B.2.3.1 EbolaTracks SMS monitoring system*, in cooperation with PHUs. CDCD will:

- Manage enrolment of identified contacts to the EbolaTracks SMS monitoring system, however such contacts are identified.

- Perform a risk assessment based on the exposure history and individual circumstances of contacts under active monitoring and provide advice on any travel, work or social restrictions.
- Maintain active surveillance of contacts being monitored via EbolaTracks, including reminder calls.
- Advise PHUs of the number of individuals residing within their region who are being monitored by EbolaTracks.
- Where contacts do not comply voluntarily with recommended travel, movement or social restrictions, consider the need for making public health orders for imposing involuntary measures (e.g. for home quarantine), using the dangerous infectious disease provisions of the *Health Act 1911*.
- Perform a risk assessment for individuals under active monitoring who develop fever and/or other symptoms while under surveillance, and arrange for referral for clinical assessment, testing and transport to a hospital or transfer between hospitals, as appropriate.

2.7 Summary of Public Health Unit responsibilities

2.7.1 Case management

- If a PHU staff member is advised of a patient under investigation, or a suspected, probable or confirmed case of EVD before CDCD, they should contact CDCD immediately.
- In liaison with CDCD and the clinicians looking after the patient, interview probable and confirmed cases and/or their informants, to complete the EVD case report form (Appendix 12):
 - determine if the case or relevant care-giver has been informed of the possible diagnosis before beginning the interview
 - confirm the onset date and symptoms of the illness
 - determine travel and relevant exposure history details
 - confirm the results of relevant pathology tests
 - review case management including infection control measures being used in caring for the case, in consultation with hospital infection control staff
 - carefully document movements and identify contacts during the likely infectious period (from time of commencement of symptoms), including family and household members, sexual or other intimate contacts, work/school contacts, healthcare contacts, public transport contacts.
- Send the form to CDCD by fax or email to the PHEOC.

2.7.2 Contact management

- Provide relevant directions, advice and alerts to households, workplaces and other identifiable contact groups, such as sporting teams.
- Interview individuals identified as casual, lower risk and higher risk contacts regarding their exposures to inform their risk categorisation.
- For identified lower or higher risk contacts, complete an EbolaTracks enrolment form (either in hard-copy or PDF version) with the person's details and email/fax the form, as appropriate, to the PHEOC.

- Provide contacts with an Ebolavirus disease self-monitoring pack and provided guidance on how to measure and record their temperature and the operation of the SMS system.
- Provide a pre-prepared mobile phone to anyone who does not have their own (within Perth metropolitan areas these will be supplied by CDCD).
- Follow-up contacts residing within the PHU region, who have not responded to scheduled SMS alerts and reminders, as advised by CDCD.
- Assist with monitoring and with enforcement of Public Health Orders, should these be required, for contacts who are not compliant with travel and other restrictions and potentially pose a risk to others or of flight.
- Assist with aspects of public health management associated with any contact who develops symptoms and requires referral for assessment and management, especially if this occurs outside the Perth metropolitan area.

3. Infection prevention and control guidelines for non-quarantine hospitals

This section provides guidance for infection prevention and control of persons under investigation for Ebolavirus disease (EVD) and the subsequent management of any suspected, probable or confirmed cases at hospitals other than designated quarantine hospitals (SCGH for adults and PMH for children).

In healthcare settings, Ebolavirus is spread through direct contact (e.g. through broken skin or through mucous membranes of the eyes, nose, or mouth) with blood or body fluids of a person who is infected with EVD, or with objects (e.g. needles, medical equipment, environmental surfaces) that are contaminated with the virus. There is no epidemiological evidence that EVD is transmitted via the airborne route, however, due to the severe nature of the disease, a preventative approach is being taken and more stringent precautions have been recommended.

Strict adherence to standard precautions and the adoption of transmission-based contact and droplet precautions is essential in the management of these patients. In addition, the correct application of personal protective equipment (PPE) that provides a 'no skin exposed' approach and inclusion of airborne precautions to protect from potential aerosolized droplets is recommended to further reduce the risk of direct or self-contamination.

The two designated quarantine hospitals, SCGH and PMH, have specific policies and procedures in place for their respective settings.

All healthcare workers (HCWs) providing care to suspected and confirmed cases of EVD must have undertaken competency-based training on the correct donning and doffing of the required PPE.

3.1 Infection prevention and control for a 'person under investigation'

Any person presenting to a non-quarantine hospital that meets the criteria for 'a person under investigation' (*Appendix 3 National case definitions of Ebolavirus disease*), shall be asked to wear a fluid resistant surgical mask and placed in a negative pressure isolation room (NPIR) (also referred to as an 'airborne infection isolation room') as soon as possible. If an NPIR is not available, a single room should be used. An initial risk assessment (*Appendix 5 Risk assessment checklist for a 'person under investigation' for Ebolavirus disease*) must be undertaken by the senior ED medical officer.

If the patient's condition allows, the initial risk assessment may simply be the taking of a history from the patient at a distance (greater than 2 meters), or may require physical examination if this is deemed appropriate, and this will govern the level of PPE required. If the patient can be interviewed and assessed with no direct contact and a distance of >2m can be maintained, then no PPE is required. If direct contact with the patient is required, or the patient is symptomatic with vomiting or diarrhoea, the HCW attending the patient should don PPE as outlined in *Appendix 7 or 8 Donning and doffing sequences*, while the initial risk assessment is undertaken.

If a decision is made to test for EVD, the patient's status changes from a 'person under investigation' to a suspected case and they should be managed as outlined below. If the final risk assessment judges the patient not to have EVD, they can be managed in accordance with standard infection prevention and control precautions.

3.2 Infection prevention and control of a suspected case of EVD

Until such time as the patient is either transferred to the designated quarantine hospital, or a definitive negative result is received, the infection prevention and control precautions described in the following sections are the minimum required.

Due to the increased chance that larger metropolitan hospitals will encounter cases of EVD, a pragmatic decision has been made for these hospitals to stock a limited number of higher level PPE ensembles for use in patients who have diarrhoea or vomiting (Jupiter hoods and powered air purifying respirators [PAPRs]) and to improve comfort for staff who may have to remain in PPE for some time.

3.2.1 Patient room placement, staff allocation and visitors

- Allocate patient to a NPIR with ensuite and anteroom. If this preferred accommodation is not available, place in a single room with private bathroom or have a dedicated bathroom facility adjacent. The door should be closed. If a dedicated bathroom is not available, provide patient with urinal/commode using disposal products. Any fluid waste must be solidified with absorbent granules prior to disposal in the clinical waste bin (refer to *Section B.5 Waste treatment and disposal*).
- Clearly identified areas need to be assigned for donning and doffing of PPE, this may require areas of the ED to be cordoned off.
- A HCW shall be assigned as an Observer and stationed outside the patient's room to monitor access, ensure consistent and appropriate PPE use and assist with donning of PPE. A second person, an Assistant, is required to help in doffing of PPE.
- Initiate a log of HCWs entering the patient's room. Only essential medical and nursing HCWs are to enter the room and anteroom. HCWs who are immunocompromised, pregnant or who have non-intact skin e.g. dermatitis or skin abrasions are not to care for the patient.
- Friends or relatives of the patient are not to enter the isolation room at any time. In exceptional circumstances or where parents wish to stay with a child, visitors may be trained in the safe donning and doffing of PPE, and once deemed competent, allowed to enter the isolation room. All visitors wearing PPE must be treated in the same way as a HCW i.e. observed at all times whilst in the room and during donning and doffing of PPE and registered in the log.

3.2.2 Hand hygiene

- Hand hygiene must be performed in accordance with the '5 Moments' and at nominated points in the donning and doffing of PPE.
- Hand hygiene can be performed by washing with antiseptic soap and water or by using alcohol based hand rubs (ABHR).
- In accordance with Hand Hygiene Australia (www.hha.org.au), disinfection of gloved hands with ABHRs is applicable only to care for a patient with suspected or confirmed EVD.

3.2.3 Personal protective equipment (PPE)

- All HCWs entering the patient room (Caregiver) and the Assistants are to change into disposable surgical scrubs prior to donning PPE as detailed in *Appendix 6 Personal protective, medical and cleaning equipment*.
- The Assistant is to remain outside the patient room at all times.
- The Observer is to remain outside of the room or at a distance of 2m from the Assistant and caregiver and is not required to wear PPE.
- When exiting the room, PPE shall be carefully removed in a slow and controlled manner as per *Appendix 7 or 8 Donning and doffing sequences*, following instructions from the Observer.
- The Observer is to read each step aloud, and the Caregiver and Assistant are to wait for each prompt before proceeding to the next step.
- Care shall be taken not to contaminate one's eyes, mucous membranes or clothing with potentially infectious material.
- Any breach or contamination event must be managed appropriately (refer to *Section B.8 Management of healthcare workers exposed to Ebolavirus disease within Western Australia*).
- All PPE should be discarded directly into the clinical waste bins and double bagged.
- All hospitals are to have donning and doffing procedure check lists to assist in this process and complete required documentation (*Appendix 7 or 8 Donning and doffing sequences*).

3.2.4 Patient care 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.
- Disposable equipment is to be used whenever possible.
- Any reusable medical equipment used for patient care must be cleaned and disinfected after each use according to *Section B.4. Cleaning and disinfection* and hospital policies. Any equipment that is soiled with blood or body fluids that cannot be adequately cleaned and disinfected is to be discarded into clinical waste.
- Disposable linen is to be used and disposed of into clinical waste. Disposable crockery and utensils are to be used if required.
- All waste generated within the room, or the donning and doffing areas, is to be double bagged and disposed of into rigid, puncture-proof, sealable clinical waste containers.

3.2.5 Patient care considerations

- Patients to be provided with disposable gown or scrubs and their own clothes are to be double bagged and stored in their room.
- Limit the use of needles and other sharps as much as possible. If used, they must be handled with extreme care by the user and disposed of in a puncture resistant sharps container at point of use.

- Avoid performing aerosol generating procedures (AGPs) e.g. throat swabs, suctioning, and intubation. If they are unavoidable, they must be performed in a NPIR, with restricted HCWs present who must be wearing a powered air-purifying respirator (PAPR). Conduct environmental surface cleaning following any AGPs.
- The patient may use the toilet, but must be instructed not to flush. Toilet waste is to be managed in accordance with *Section B.5. Waste treatment and disposal*. If the patient is unable to use the toilet, disposable bedpans/urinals are to be used. The contents must be solidified by adding a sachet of absorbent granules and disposing of in clinical waste once solidified.

3.2.6 Environmental cleaning

Cleaning and disinfection of the patient's environment is essential to minimise the risk of environmental contamination and subsequent transmission of the virus from environmental surfaces or patient care equipment. Further information on cleaning and disinfection procedures, including spills management are contained in *Section B.4. Cleaning and disinfection*.

All clinical waste is to be quarantined in the anteroom or designated doffing area until notified of a confirmed diagnosis. If EVD is excluded in very low risk cases, handling of clinical waste is as per routine management.

- For higher risk patients being tested for EVD who present within the first 72 hours of their illness, there may be a need to quarantine the clinical waste until a definitive negative result is received at which point waste can be managed as per routine procedures. This will require facilities to identify a suitable area to store waste for this period.
- If a diagnosis of EVD is confirmed, disposal of the clinical waste is to be followed as per *Section B.5. Waste treatment and disposal*.

3.3 Death of suspected EVD case

In the event a suspected case was to die in a non-quarantine hospital, refer to *Section B.6. Post-mortem care and examination*.

3.4 Management of HCWs following occupational exposure

The management of a HCW who sustains an occupational exposure with blood or body fluids from a suspected EVD case is described in *Section B.8. Management of healthcare workers exposed to Ebolavirus disease in Western Australia*.

3.5 Healthcare worker education

All HCWs are required to demonstrate competency in the use of PPE, including donning and doffing, before providing care to patients with suspected, probable or confirmed EVD. They must have received training and have demonstrated competency in the correct donning and doffing of required PPE. It is the responsibility of each HCF to ensure that this training is updated at regular intervals, the frequency will be determined by the level of threat of EVD.

Training ensures that HCWs are knowledgeable and proficient in the donning and doffing of PPE prior to engaging in management of patient with suspected, probable or confirmed EVD. Comfort and proficiency when donning and doffing are only achieved through repeated practice on the correct use of PPE.

In addition, during practice, HCWs and their trainers should assess their proficiency and comfort with performing required duties while wearing PPE.

4. Cleaning and disinfection

This section provides information on the cleaning and disinfection of areas that probable or confirmed Ebolavirus disease (EVD) cases have been cared for, or transported in. This may include health care facilities (HCFs), patient transport vehicles, other vehicles, private residences and/or other accommodation.

4.1 General

The personal protective equipment (PPE) requirements for environmental cleaning are the same as those for patient care (refer to *Appendix 6 Personal protective, medical and cleaning equipment*). There may be situations when environmental cleaning of a residence or other non-hospital setting is required prior to the availability of laboratory test results. This should follow the principles outlined in this section, following discussion with public health officers.

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

Environmental cleaning and/or management of blood or body fluid spills must only be performed by staff trained and deemed competent in the donning and doffing of recommended PPE, and in cleaning and disinfection procedures

Disposable cleaning equipment is to be used and discarded into clinical waste bins as outlined in *Section B.5. Waste treatment and disposal*, after each routine or terminal clean.

4.2 Disinfectants

Ebolaviruses are enveloped viruses that are readily inactivated by disinfectants that are active against the more resistant non-enveloped viruses, such as norovirus and rotavirus. The preferred disinfectant is freshly prepared sodium hypochlorite solution made using powder sachets, granules or tablets, or an in line dispensing system, to 0.1% (1,000 ppm available chlorine) for routine and terminal environmental cleaning and 0.5% (5,000 ppm available chlorine) for spills² (follow manufacturer's instructions).

4.3 Routine environmental cleaning

Any visibly soiled surfaces should be wiped clean with single use detergent cloths until visibly clean, followed by a disinfectant wipe, as soon as possible after soiling has occurred.

A daily two-step clean is required of the patient room, en suite, anteroom and any adjacent rooms or areas utilised for donning and doffing of PPE. If the patient has diarrhoea and vomiting, then the room should be cleaned twice daily.

² The required strength of sodium hypochlorite varies in both international and national documents. This issue and investigation of other suitable virucidal disinfectants has been referred to the Infection Prevention and Control Expert Advisory Group convened by Australian Health Protection Principal Committee (AHPCC).

1. Clean all hard, non-porous surfaces such as floors, toilets, counters, sealable clinical waste bins and high-touch surfaces (e.g. door handles, bed rails, light switches, call bells and tables) in accordance with the HCFs policy using a neutral detergent and allow to air dry.
2. All cleaned surfaces are then disinfected using a freshly prepared 0.1% sodium hypochlorite solution (1,000 ppm available chlorine).

4.4 Terminal cleaning

Terminal cleaning should be carried out once the patient has been transferred out of the isolation room, either to the quarantine hospital or another part of the hospital. Areas to be cleaned include the patient room, ensuite, anteroom and any adjacent rooms or areas utilised for donning and doffing of PPE.

Prior to commencing the clean, the room should be 'stripped':

- all disposable items in the room, including linen and any patient privacy curtains, should be double bagged and placed in a rigid, puncture-proof, sealable containers. The external surface of the container must be wiped over with detergent wipes followed by a disinfectant wipe
- any reusable medical equipment must be cleaned and disinfected according to manufacturer's instructions and hospital policies. Any reusable equipment that cannot be thoroughly cleaned and disinfected must be discarded as clinical waste
- impermeable mattress and pillow covers are to be inspected and if any evidence of damage they are to be discarded as clinical waste.

Once the patient room is empty of all used items, HCWs responsible for cleaning can perform a 2-step clean using detergent and water, followed by disinfection (refer to *Section 4.3 Routine environmental cleaning*).

Dispose of all cleaning equipment including buckets, mop heads and cloths by double bagging and placing in rigid, puncture-proof, sealable containers after a terminal clean. Mop handles can be reused if they can be thoroughly cleaned and disinfected after use.

Allow the room to air dry. If a negative pressure isolation room (NPIR) is used, maintain the negative pressure during the terminal clean, then allow an additional 30 minute period after the room has air dried before allowing the room to be used for a subsequent patient.

The room should undergo a thorough inspection following the cleaning and disinfection process to ensure there is no visible contamination.

4.5 Spills management

Any blood or body fluid spill must be contained and managed as soon as possible after the event has occurred. The HCW managing the spill must be wearing the same PPE as HCWs caring for the patient (*Appendix 6 Personal protective, medical and cleaning equipment*). Remove any bulk matter with disposable cloths and discard in clinical waste. Remove outer gloves, discard and disinfect inner gloves with an alcohol based hand rub (ABHR). Don a new pair of outer gloves. Absorbent granules should be

placed on spills and covered with paper towels to limit the spread of the spill. Leave until all liquid is absorbed, then remove and dispose of the absorbed spill and paper towel into clinical waste with disposable cloths. Following the removal of the initial material, remove outer gloves, discard and disinfect inner gloves with an ABHR and don new outer gloves.

The spill area should then be cleaned with detergent and water, allowed to dry and then disinfected with a 0.5% sodium hypochlorite solution (5,000 ppm available chlorine). Allow 10 minutes of contact time, before removing disinfectant and drying area thoroughly. Remove PPE as per *Appendix 7 or 8 Donning and doffing sequences*.

4.6 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. Any non-disposable medical equipment used for patient care should be cleaned and disinfected according to manufacturer's instructions and hospital policies. Any equipment that is soiled with blood or body fluids that cannot be adequately cleaned and disinfected will need to be discarded as clinical waste.

Disposable linen is to be used and discarded as clinical waste. Any wet linen should be double bagged and placed into rigid, puncture-proof, sealable containers.

4.7 Non-hospital setting decontamination

4.7.1 Ambulance and patient vehicle decontamination: Follow individual organisation's policy for washing of vehicles using non-hose or aerosol-generating method, including use of PPE; debulking of blood or other body fluids, or spills (and wiping and soaking, with disposal into clinical waste) in the vehicle, and use of disinfectants. Avoid high pressure spray due to risk of aerosols. These procedures should be carried out in designated wash down facilities at the destination health care facility.

4.7.2 Private residences or other accommodation: Whenever possible, decontamination should be delayed by 6 days to allow denaturing of infectious virus particles, thereby reducing risk of exposure. Adequate means to ensure that people do not enter the house during this period should be made. However, this may not be possible with household contacts of probable and confirmed EVD cases that have no other options for where to stay during their monitoring period. In these circumstances, forensic cleaners (contact details available through CDCD) should undertake decontamination methods consistent with their own policy, this section and *CDNA EVD National Guidelines for Public Health Units*.

Focus on disposal of porous items and disinfection of non-porous items. EVD appears not be viable outside the human or animal body beyond six days, so, to provide additional surety, premises should be vacated for at least seven days prior to re-occupation where possible.

5. Waste treatment and disposal

This section provides guidelines for the treatment and disposal of waste from the hospital care areas and residences of suspected, probable and confirmed cases of Ebolavirus disease (EVD). These guidelines are based on waste treatment and disposal methods described in *Appendix 13* of the *Ebolavirus Disease (EVD) CDNA National Guidelines for Public Health Units*, and incorporate recommendations from the Environmental Health Standing Committee (enHealth) [a standing committee of the Australian Health Protection Principal Committee (AHPPC)].³

5.1 Definitions for terms used in this appendix

Clinical waste: waste that has the potential to cause disease, sharps injury or public offence including sharps, human tissue waste, laboratory waste and animal waste resulting from medical or veterinary research or treatment or any other waste as specified by the WA healthcare facility (HCF).

5.2 Clinical waste management within a healthcare facility

When managing cases of EVD, clinical waste includes bed linen, patient clothing, disposable personal protective equipment as well as all other disposable items used in their care. Any bulk liquid waste must be solidified using high absorbency granules prior to placing in clinical waste bags/bins.

All waste is to be disposed of in accordance with *WA Health Clinical and Related Waste Management Policy* and Operational Directives (OD) *0258/09 Clinical and Related Waste Management – General Requirements* and *0259/09 (Clinical and Related Waste Management – Clinical Wastes)*.

All items are to be double-bagged in leak-proof, clinical waste bags, which adhere to Australian Standards (AS/NZS 3816:1998), and then placed directly into rigid, puncture-proof, sealable clinical waste containers which are then sealed and the external surface disinfected prior to collection.

Appropriate placement of the sealable clinical waste containers will be determined by the HCF. A system of double bagging the waste at the door of the patient room for transfer to the sealable container should be used. This involves placing the clinical waste bag from the patient room into a clean clinical waste bag using the aid of the assistant.

Clinical waste may be quarantined in the anteroom or designated doffing area, until a definitive EVD test result is received (this may mean a negative test being received on a specimen taken >72 hours after onset of symptoms). If EVD is excluded, handling of clinical waste is per routine management.

Prior to collection by the contractor for transport to external incinerators, the outside of the sealed container must be disinfected with 0.1% sodium hypochlorite solution (1000 ppm available chlorine) and must be stored securely in a designated quarantine area, with access restricted to authorised and trained personnel.

High-temperature incineration is the approved method for disposal of EVD waste in WA. Other disposal methods will require specific Department of Health (DOH) approval.

³ These guidelines are subject to change following finalisation of advice from the Infection Prevention and Control Expert Advisory Group, convened by the Australian Health Protection Principal Committee (AHPPC).

5.3 Effluent waste and toilet procedure within a healthcare facility

International (WHO, CDC) and National (*CDNA EVD National Guidelines for Public Health Units*) EVD guidelines recommend that effluent waste can be safely disposed of direct to mains sewer and septic systems. However, as an added precaution, it is recommended that chlorine tablets are added to the toilet waste to make a concentration used for management of spills (i.e. 0.5% sodium hypochlorite, 5,000 ppm available chlorine), and the waste left for 30 minutes, prior to flushing. This provides further surety in the unlikely event of a breach of mains sewer in close proximity to the HCFs wastewater infrastructure.

HCWs wearing the recommended personal protective equipment (PPE) (*Appendix 6 Protective personal, medical and cleaning equipment*), are to disinfect toilet waste following each toilet use. The patient is not to perform the disinfection process. Ensure the toilet lid is down prior to flushing, as flushing may lead to some aerosolisation of the waste.

The patient toilet should be cleaned with a 0.1% (1000 ppm available chlorine) after each use with lid closed.

If a patient is unable to use the private bathroom, a disposable pan/urinal should be used. The contents of the pan are to be solidified with high-absorbency granules, then both the pan and contents disposed into clinical waste.

5.4 Transport of waste outside a health care facility

All clinical waste from patients with probable or confirmed VHF (EVD, Marburg, Lassa virus and Crimean-Congo haemorrhagic fever) is classified as a *Category A Infectious Substance, affecting humans*, in the *Australian Dangerous Goods Code, Edition 7.3 August 2014*. As such, for any transport outside of a healthcare facility, it must be transported in containers that meet the UN2814 criteria⁴. These containers must be rigid, puncture-proof, sealed and adequately labelled and meet the specific criteria agreed upon by the competent authority in WA, Department of Mines and Petroleum.

In the unlikely event that waste from a suspected case needs to be disposed of prior to confirmation of VHF, it must be transported in the same way as above and marked as a suspected Category A Infectious Substance. Waste should only be transported by the nominated and approved waste contractor. Waste should not be transported from WA into any other states or territories. It is the responsibility of the HCF to ensure that EVD waste is disposed of in a responsible and safe way.

5.5 Waste management outside a health care facility

St John Ambulance and Royal Flying Doctor Services: Waste created during the transport of a suspected or confirmed case of EVD should be double bagged and transferred to rigid puncture-proof and sealable containers at the destination hospital. Liquid waste, produced as a result of decontamination and cleaning of patient transport vehicles, must be disposed of down drains that lead to a mains sewer or holding tank that can be sterilised.

⁴ National Transport Commission, *Australian Dangerous Goods Code*, Edition 7.3 August 2014.

Private residences or other accommodation: Following decontamination of potentially infected homes (Section B.4. *Cleaning and disinfection*), any porous items should be disposed of by transferring to rigid puncture-proof and sealable containers, by first double bagging the waste and placing into the containers. Larger items should be wrapped in plastic and then placed directly into appropriately sized and sealable containers.

5.6 Mortuary waste and funeral premises

See Section B.6 *Post-mortem care and examination* and National Health and Medical Research Council *Australasian Guidelines for the Prevention and Control of Infection in Healthcare*, which outline post-mortem care and disposal of the deceased.

All mortuaries must be constructed according to requirements set out by the Council of Australian Governments, *National Construction Code*, with drainage to sewer. Please note that while cremation is preferred, immediate burial is permissible.

6. Post-mortem care and examination

This section refers to the management of a deceased person within WA, where the deceased may warrant investigation for Ebolavirus disease (EVD) or be a suspected, probable or confirmed case of EVD (*Appendix 3 National case definitions of EVD*). The following recommendations provide guidance on the safe handling of human remains that may contain Ebolavirus and are for use by personnel who perform care of the deceased in hospitals, mortuaries and forensic services.

6.1 Definitions for terms used in this appendix

Bio-seal: A trade name for the tool used to seal plastic body bags by heating the two opposing edges of the bag so that they melt together.

Cremation: The act of reducing human remains to ash by intense heat.

Leak-proof bag: A body bag that is puncture-resistant and sealed in a manner so as to contain all contents and prevent leakage of fluids during handling, transport, or shipping.

Tube bag: A clear plastic body bag (>150µm thick) which is sealed on 3 sides and opens at one end.

Non-natural death: Term used to encompass violent, suspicious deaths and deaths that have not resulted from pathological processes.

6.2 Safe handling of human remains of a patient with Ebolavirus disease

In patients who die after contracting Ebolavirus infection (either from the infection itself or from another cause), virus can be detected throughout the patient's body after death. EVD can be transmitted through:

- sharp's injuries (incisions and puncture wounds) caused by contaminated instruments used during post-mortem care
- direct handling of human remains without appropriate personal protective equipment (PPE)
- splashes of blood or other body fluids (e.g. urine, saliva, faeces) to unprotected mucosa (e.g. eyes, nose, or mouth).

The following are important principles of care for managing deceased cases of EVD:

- remains should not be sprayed, washed or embalmed
- only personnel trained in handling EVD infected human remains should handle remains
- personnel handling any Ebola-infected remains or suspected Ebola-infected remains should observe standard plus contact, droplet and additional respiratory precautions
- recommended PPE (*Appendix 6 Personal protective, medical and cleaning equipment*) should be donned at the site of collection of human remains and worn during the process of collection and placement in a body bag
- handling of human remains should be kept to a minimum
- post-mortems should not be routinely performed on patients who die with EVD
- if a post-mortem is requested, the public health physician on-call from CDCD and the on-call pathologist from PathWest Forensic Pathology should be consulted.

Please note that existing precautions used routinely to prevent blood-borne viruses, such as HIV and Hepatitis C, will afford some level of protection against EVD, but in view of the high lethality of EVD, extra precautions are advised.

6.3 Roles and responsibilities in the care of the deceased

The completion of a death certificate by a medical practitioner is a vital part of the notification process of a death to the Registrar of Births, Deaths and Marriages and enables an authority to be provided to the funeral director to arrange disposal of the deceased. It is also important to ensure that appropriate cremation forms are completed by the next of kin and one of the treating doctors, where cremation is likely. In WA this does not routinely involve examination of the body. If the deceased has an implantable pacemaker a decision should be made between the next of kin, CDCD on-call-physician and chief pathologist as to whether to remove the pacemaker in the mortuary prior to cremation or to proceed with a burial. A death or cremation certificate cannot be issued by a medical practitioner once the death has been reported and accepted as a case for the Coroner. Doctors should be familiar with the criteria for reporting deaths to the Coroner (see Operation Directive 0462/13 – Assessment of the Extinction of Life and the Certification of Death).

Identification procedures must be completed prior to the preparation of the body to avoid the need to reopen body bags later. A person required to identify the body must not have direct contact with the deceased. Any viewing should be done from a separate room, either through a window or via a video link.

A death as a result of EVD would not ordinarily be reported to a Coroner. If a diagnosis of EVD has been made prior to death and there are no other criteria for reporting the death, a death certificate should be completed. Non-coronial post mortem examinations are not to be performed on patients known to have died from EVD.

A non-natural death of someone who is potentially infected with Ebolavirus (recent travel from an Ebola affected country with fever and/or other Ebola like symptoms prior to death) requires proper investigation.

6.4 Personal protective equipment for care of the deceased

Prior to contact with the deceased, post-mortem care personnel must wear and be trained in recommended PPE (*Appendix 6 Personal protective, medical and cleaning equipment*).

Additional PPE such as Jupiter hoods and powered air purifying respirators (PAPRs) may be required in certain situations such as where pathologists, mortuary or forensic staff may be required to stay in close proximity to the body for a prolonged period of time.

Donning and doffing PPE: PPE should be in place **BEFORE** entering the room, contact with the deceased, worn during the process of collection and placement in body bags, and should be removed immediately after and discarded into appropriate EVD waste bins. *Refer to Appendix 7 and 8 Donning and doffing sequences and Section B.5. Waste treatment and disposal.*

6.5 Probable or confirmed EVD case in a healthcare setting

6.5.1 Collection and preparation of the deceased⁵

- Where a suspected case has subsequently died, the result of the confirmatory EVD test should be known prior to collection of the body, wherever possible.
- Contact with the deceased should be minimised.
- All invasive devices such as intravenous lines and/or endotracheal tubes that may be present must be left in place.
- The deceased should not be washed or cleaned. The deceased should not be removed from the isolation room until they have been placed in three body bags, one of which must be leak-proof and not less than 150 µm thick.
- Before a body is handled, an N95 mask should be used to cover the nose and mouth of the deceased to reduce the risk of contamination from expelled body fluids.
- Before moving the body ensure incontinence pads/absorbent material are positioned so as to absorb any leakage from the body. The body should be transferred onto plastic sheeting and any visibly soiled linen in the room should be disposed of as in *Section B.5. Waste treatment and disposal*.
- The mattress should then be checked for any visible soiling and wiped down with appropriate cleaning solution prior to placement of a clean sheet under the plastic sheeting and body. Then the body should be wrapped in the outer linen and inner plastic sheets in the usual way.
- Outer gloves and apron should be changed at this point and then a full environmental clean of all horizontal surfaces performed.
- Following the cleaning of the room HCWs should then remove outer gloves and apron and inspect themselves for visible contamination. If visibly contaminated PPE should be doffed and clean PPE donned.
- Clean body bags can then be passed into the isolation room and the wrapped body should then be placed first into a zippered body bag and then slid into a tube body bag of not less than 150µm thick. This should then be tied off using duct tape or bio-seal.
- Particular care should be taken to ensure that the bags are adequately protected from puncture by any sharp objects either inside the bags (e.g. medical devices left in place) or any external objects.
- Once the body is encased in the second bag (the tube bag), the outer gloves and apron should then be changed and gloved hands disinfected with alcohol based hand rub (ABHR) before new outer gloves are donned.
- The body should then be placed into a final plastic body bag and zippered closed.

⁵ Centers for Disease Control and Prevention, *Guidance for Safe Handling of Human Remains of Ebola Patients in Hospitals and Mortuaries*. Available from: <http://www.cdc.gov/vhf/ebola/hcp/guidance-safehandling-human-remains-ebola-patients-us-hospitals-mortuaries.html>

- Bioseal may be used if it is available from your mortuary and if its use will not cause any delay in transport of body to the mortuary.
- The family name (in uppercase), given name (lower case), DOB and UMRN of the deceased should be clearly and indelibly marked on the top outer surface of the bag and the bag should be clearly marked to show that the deceased is a probable/confirmed case of EVD e.g. 'CONFIRMED CASE OF EBOLAVIRUS DISEASE'. The deceased should be identified by these markings and the bags should not be opened to identify the deceased by their identification band.
- Prior to transport to the mortuary the outer body bag should undergo surface decontamination:
 1. remove any visible surface contamination on bag surfaces with single use detergent cloths and 0.1% sodium hypochlorite solution (1,000 ppm available chlorine) (*Section B.4. Cleaning and disinfection*)
 2. reapply the sodium hypochlorite solution to the entire outer body bag surface and allow to air dry.
- Once the outer body bag has been decontaminated, visibly inspect the floor for any contamination and perform a further clean if necessary. Then remove outer gloves and apron and disinfect gloved hands with alcohol based hand rub (ABHR) before donning new outer gloves.
- Staff outside the isolation room can then open the door from outside and guide a trolley into the room without crossing into the room. Those inside the room can assist and help guide the trolley in as long as they don't touch other staff or step outside the room.
- Staff wearing PPE are to transfer the deceased onto the trolley and perform a final check of the outer body bag and trolley for any leakage or visible soiling.
- Once the body bag has been placed on the trolley and the trolley passed out in similar manner staff should move to the doffing area and follow doffing sequence for removal of PPE (*Appendix 7 and 8 Donning and doffing sequences*).
- Following removal of the body ensure the room is cleaned and disinfected as described in (*Section B.4. Cleaning and disinfection*). Personal belongings of the patient left behind in the room should be treated as contaminated waste.

6.5.2 Transport to mortuary

All cases of probable or confirmed EVD should be transported to the State Mortuary at QEII Medical Centre. Once the body has been sealed in three body bags and the outside has been decontaminated, it can be moved in the usual manner, PPE is not required. A trolley designed for the transport of deceased people, with sides, should be used where available to prevent accidental penetration of the body bags during movement. So long as there has been no leakage of fluid from the body bags and no penetration or opening of the body bags on the trolley they can be cleaned in the usual manner. The body should not be left unattended at any time, until it reaches its final destination.

6.5.3 Individuals driving or riding in a vehicle carrying deceased persons

PPE is not required for individuals driving or riding in a vehicle carrying deceased persons, provided that drivers or riders will not be handling the body and the body is safely contained in disinfected body bags as described above.

6.5.4 Mortuary Care

Do not open the body bags and do not remove remains from the body bags. Bagged remains should be placed directly into a sealed casket. Bodies infected with Ebolavirus should not be embalmed, as the risks of occupational exposure to Ebolavirus while embalming outweighs its advantages.

The body bags should only be opened and the deceased touched or moved when absolutely necessary, and this should only be done by senior mortuary care personnel trained in EVD PPE (*Appendix 6, 7 and 8, Personal protective, medical and cleaning equipment and Donning and doffing sequences*).

In the event of leakage of fluids from the body bag, don PPE if not already wearing it, and thoroughly clean and decontaminate area with recommended disinfectants (refer to *Section B.4.Cleaning and disinfection*).

6.5.5 Disposition of remains

- There should be no viewing of the deceased by family members. The body bags and casket should remain sealed.
- Remains should be cremated or buried promptly in a sealed casket.
- Once the bagged body is placed in the sealed casket, no additional cleaning is needed unless leakage has occurred.
- No PPE is needed when handling the cremated remains.
- The Australian Funeral Directors Association, Funeral Industry Infection Control Guidelines, 2008 can be obtained from: <http://afda.org.au/media/member/ICG.pdf>

6.5.6 Transportation of human remains

Transportation of remains that contain Ebolavirus should be minimised.

6.6 Reported deaths

Police are to alert the on-call public health physician from CDCD if they attend a reported death and suspect that a deceased person may have had EVD. EVD should be considered in any deceased person who is known to have travelled to an Ebola affected country in the last 21 days and who may have had fever with or without additional symptoms, such as headache, myalgia, arthralgia, vomiting, diarrhoea, abdominal pain and/or unexplained bleeding/bruising prior to death.

The on-call public health physician will notify the SCGH on-call microbiologist and the PathWest Forensic Pathology on-call pathologist. PathWest Forensic Pathology will advise WA Police to secure the scene and await further advice. Police will be advised to remain outside the building and/or more than 2m away from any body fluids. Any remaining residents/bystanders are to move to another area, away from the deceased and/or any of their body fluids.

PathWest Forensic Pathology's on-call pathologist, in consultation with the on-call public health physician from CDCD and the SCGH on-call microbiologist, will make the decision to either treat the deceased as a suspected EVD or a normal case. PathWest Forensic Pathology will also notify the Chief Health Officer and the State Coroner immediately.

If the decision is made to treat the deceased as a suspected Ebola case, the deceased is to remain in situ and a PathWest Forensic Pathology pathologist wearing recommended PPE will attend the scene and collect appropriate specimens (ideally a blood sample) in accordance with *Section A.4.2 Viral haemorrhagic fever laboratory testing guidelines*. Samples will be placed in a PathWest VHF sampling kit and the outside of the container will be decontaminated and transported to PathWest QEII Medical Centre by medical courier.

Where possible, the body should remain at the site of death until a result has been received. If the result is negative the body can be processed as normal.

6.7 Probable or confirmed EVD case in the community

6.7.1 Collection and preparation of the deceased

- All contact with the deceased should be minimised.
- Everyone attending the immediate scene of death, areas where there are body fluids and/or photographing or touching the deceased should wear recommended PPE and don in a designated area away from the immediate scene of death or body fluids. (*Appendix 6, 7, 8 Personal protective, medical and cleaning equipment and Donning and Doffing sequences*) This group includes, but is not limited to, general duties police officers, detectives, forensic and coronial investigation unit (CIU) staff and pathologists.
- PPE used by forensic staff may vary from that used in healthcare settings, for example Tyvek suits may be used.
- The deceased should not be removed from the scene of death until they have been placed in three body bags as described above.
- The outer body bag should be decontaminated prior to transport to the state mortuary as described above.
- The name of the deceased, UMRN and WA Police/Coronial Identification number should be clearly and indelibly marked on the top outer surface of the bag.
- The outside of the body bag should be clearly marked so that it is clear that the deceased is a probable/confirmed case of EVD.
- Once the body bag has been decontaminated and marked, staff should move to a designated doffing area and follow doffing sequence for removal of PPE (*Appendix 7, 8 Donning and Doffing sequences*).

6.7.2 Site of death cleaning

The room in which the deceased died should be cleaned and disinfected by a forensic cleaning contractor who has been trained in EVD PPE and cleaning (refer to *Section B.4. Cleaning and disinfection*). Any item that cannot be appropriately cleaned following exposure to a probable/confirmed case of EVD (e.g. soft furnishings which are soiled with body fluids), will need to be removed to a designated hospital and incinerated via the usual clinical waste contract or transported directly to an incinerator by a nominated and approved waste contractor.

6.7.3 Transport to mortuary

All cases should be transported to the State Mortuary at QEII PathWest Medical Centre by an approved contractor. Once the body has been sealed in three body bags and the outside has been decontaminated, it can be moved in the usual manner. Normal procedures should be followed to ensure that the chain of custody is maintained.

6.8 Coronial post mortem examination

A joint decision on whether a post mortem examination (PME) is needed will be made between the PathWest Forensic Pathology, Police and Coroner. Where a Coronial PME is required, the following principals should be followed.

- PME should be performed in designated 'Infectious Diseases' room at State Mortuary.
- Limits should be set where possible (e.g. external examination only with total body CT scan through the bag).
- Only essential staff should be present in the room and they should wear recommended PPE (*Appendix 6 Personal protective, medical and cleaning equipment*).
- All examinations should take place with the body remaining in the body bag.
- The use of needles and other sharps should be limited as much as possible.
- If any incisions of the body are needed, then added protection for staff with the use of chainmail gloves or approved orthopaedic protective gloves should be considered to help prevent sharp injuries from instruments or bones.
- Only essential samples and tissue blocks e.g. for DNA analysis, should be taken. These should be transferred to PathWest QEII Medical Centre laboratory within a VHF sampling kit and fixed and/or deactivated in level three laboratory prior to further analysis.
- Toxicology testing is likely to be limited to those that can be performed in the level three laboratory.
- The outside of the body bag should be decontaminated as described above, prior to returning to the refrigerator.
- All equipment in the PME room should either be decontaminated or disposed of following the PME.
- All waste should be double bagged and placed in a sealable puncture-proof container and transfer securely for incineration.
- Where possible cameras should be placed in suitable 'underwater' plastic bags.
- The room should only be cleaned by staff trained in EVD PPE and cleaning (*Section B.4. Cleaning and disinfection*).

6.9 Mass Fatality Plan

In the case of an outbreak of EVD in WA resulting in a large number of deaths, a State Emergency Group meeting would be held and further guidance provided in line with Westplan Health and the WA Mass Fatality Plan.

7. Patient transport

This section provides guidance on how a suspected, probable or confirmed case of EVD may be transported both within and between HCFs within WA. A 'person under investigation' for EVD should be discussed with the public health physician on-call at the CDCD as soon as possible and a decision made regarding whether they fulfil criteria for a suspect case. An assessment of the risks involved in transporting the patient can be made between the public health physician, PathWest QE II MC or PathWest PMH on-call microbiologist, transport services (SJA and RFDS) and the referring practitioner.

7.1 Factors that influence the decision and timing of transport of cases

7.1.1 Need for transfer of case to a designated hospital

The following patients will generally be transferred to the designated quarantine hospitals (SCGH for adult cases, including pregnant women, and PMH for children) as a matter of urgency:

- a confirmed case of Ebolavirus disease (EVD)
- a suspected case of EVD with high risk exposures and a consistent clinical picture.

7.1.2 Need for immediate transfer to SCGH/PMH before confirmation of EVD

Factors that would indicate a need for immediate transfer to a designated quarantine hospital include:

- Higher likelihood of EVD:
 - clinical features highly consistent with EVD , such as unexplained haemorrhage, and one or more high risk exposure(s) (refer to *Appendix 4 Risk assessment checklist for a 'person under investigation' for EVD*)
 - criticality of patient allied to need for urgent pathology
 - patient is critical or requires intensive care
 - urgent need for general pathology.
- Lower negative predictive value of initial testing to exclude EVD:
 - timeframe since onset of illness is less than 72 hours
 - indeterminate result on initial testing.
- Lower capability of health service to handle a suspected case:
 - health service does not have appropriate infection prevention and control capability
 - health service does not have infectious diseases expertise.
- Distance from SCGH/PMH
 - exposure history and early stage of disease in a person located in a regional location who would require transport via plane and may not be safe to transport once they develop secretory symptoms.

A case that is to be transferred to SCGH/PMH after consideration of the above factors will have all testing, including for EVD and routine pathology, conducted at the receiving hospital.

High risk, asymptomatic contacts of probable and confirmed cases of EVD in regional areas, may be transferred back to Perth, in order to ensure that they will be provided with optimal care should they become unwell and avoid possibility of being too high a risk to transfer once unwell.

For patients who are deemed appropriate to remain at the presenting health facility, specimens will be collected at that facility for transport to PathWest QEII Medical Centre for EVD testing. Ensure only necessary tests are requested (*Section A.4. Investigations for Viral haemorrhagic fevers*).

7.1.3 Location of the patient and risk of transmission during transport

WA faces a number of challenges in terms of its geographical size and the remoteness of some regions from the state capital. The transport of a suspected case of EVD who has active vomiting, diarrhoea and/or bleeding (secretory symptoms) is a high risk activity.

In some instances the challenges of transporting the patient over long distances, including risk of transmission to others, may prove too great and the patient may remain at the presenting hospital, with further support provided.

Careful consideration will be given to the patient's:

- distance from SCGH/PMH
- distance from regional resource centre
- stage of disease and whether they have any secretory symptoms (vomiting, diarrhoea or bleeding)
- availability of isolation pods (IsoPod) for transport.

7.2 Transfer arrangements

Transfers will be activated by the on-call CDCD public health physician and the on-call microbiologist in consultation with the most appropriate transport provider (SJA or RFDS). A medical practitioner should not organise transfer of a patient with suspected or confirmed EVD unless the situation is critical and the on-call CDCD public health physician has not been able to be contacted for any reason. SJA and RFDS are equipped to transfer certain categories of suspected or confirmed cases of EVD in WA.

7.2.1 Metropolitan Perth and surrounding area:

St John Ambulance will transport patients to SCGH/PMH:

- from metropolitan Perth and from within 200km of Perth
- using an IsoPod whenever possible
- using a designated ambulance stocked with recommended PPE, checklists and with unnecessary equipment removed (this vehicle will be based at the central depot and its sole purpose will be for conveying suspected Ebola patients)
- by Complex Patient Transport (CPAT) vehicles, if more than once case occurs at any one time and a second vehicle is needed.

The transport of cases located between 200 and 500 km of Perth will be considered on a case-by-case basis, taking into account the factors discussed above. This may include transport from areas such as Geraldton, Bunbury and Albany. Transport by SJA is not feasible for cases located beyond 500km from Perth, this includes the Kalgoorlie area.

7.2.2 Regional Perth

Transport within regions:

- a nominated SJA volunteer from each region, will be trained in recommended PPE and will transport regional patients. SJA will rely on the PPE stocked at the regional hospitals.

Transport to SCGH/PMH:

- where possible, patients outside regional resource centres will be transported to SCGH/PMH by the Royal Flying Doctor Service
- careful consideration will be given to patients already located at regional resource centres with regards to a balance of risks faced by HCWs and pilots during air travel and the benefits of care at SCGH/PMH
- where patients are at a regional resource centre and have secretory symptoms, the decision may be made to transport resources, including clinicians, to the patient in situ, rather than transport the patient to SCGH/PMH.

SJA and RFDS will follow standard, contact and droplet precautions whilst transferring suspected cases, either by wearing recommended PPE throughout the transport period and when in close proximity to the patient, or by managing patients in IsoPods. Each organisation should follow their own guidelines regarding safe donning and doffing of recommended PPE.

Following completion of patient transfer, cleaning and disinfection of the vehicle should be undertaken whilst at the destination health care facility and should follow each organisation's guidelines and *Section B.4. Cleaning and Disinfection*. All waste should be double bagged and transferred to sealable puncture-proof containers at the destination health care facility (*Section B.5. Waste treatment and disposal*).

7.3 Paediatric cases

SJA and RFDS will transport paediatric cases as outlined above, taking into account their location and stage of disease and the challenges they may pose.

7.4 Neonatal cases

For a neonatal patient requiring specialised retrieval, PMH will coordinate retrieval through the Newborn Emergency Transport Service (NETS) of WA. NETS will develop a protocol outlining the appropriate transport options for neonatal patients.

7.5 Transport within hospitals

Mode of transport of a suspected, probable or confirmed case of EVD within a hospital will depend on their clinical state and whether they have any active vomiting, diarrhoea or bleeding. When available, a small portable negative pressure isolation pod (IsoArk) may be used to transfer patients between wards.

8. Management of healthcare workers exposed to Ebola virus disease within Western Australia

This section applies to HCWs providing direct care to EVD patients, as well as laboratory personnel and anyone managing the waste stream or cleaning EVD contaminated areas in WA.

In an Australian clinical setting, HCWs who have taken recommended infection control precautions, including the use of appropriate personal protective equipment (PPE), while caring for a suspected, probable or confirmed EVD case are not considered to have had high-risk exposure to EVD. However, HCWs caring for or processing blood or body fluids from a patient with confirmed EVD will be considered at high risk where a breach of PPE is suspected or recommended PPE was not worn.

Individual HCFs will need to implement their own occupational health and safety policies for HCWs caring for, or involved in the care of, EVD cases. This might include hospital management conducting an interview or questionnaire for these HCW at the beginning of each shift to ask about symptoms.

8.1 Exposure Risk

8.1.1 High risk exposure of health care worker

Includes, but is not limited to:

- percutaneous (e.g. needle stick injury) or mucous membrane exposure to blood or body fluids of confirmed EVD patient (either suspected or confirmed)
- direct skin contact with blood or body fluids of a confirmed EVD patient (dead or alive) without recommended PPE
- noted breach of PPE with direct skin contact with blood or body fluids of a confirmed EVD patient
- laboratory processing of blood or body fluids of confirmed EVD case patients without recommended PPE or standard biosafety precautions.

8.1.2 Low risk exposure of health care worker

Includes, but is not limited to:

- majority of HCWs involved in routine care of patients and handling of samples wearing recommended PPE, where no breach of PPE is suspected
- being within approximately 2 metres of an EVD patient or within the patient's room or care area for a prolonged period of time while not wearing recommended PPE
- having direct brief contact (e.g. shaking hands) with an EVD patient while not wearing recommended PPE.

8.2 Immediate management of accidental exposures

Until confirmation is received that the patient does not have EVD, HCWs should be managed in accordance with the following criteria.

If during care of an EVD patient a partial or total breach in PPE (e.g. gloves separate from sleeves leaving exposed skin, a tear develops in an outer glove, a needle stick injury occurs), the caregiver must move immediately to the doffing area to assess the exposure.

They should inform their assistant and observer of their concerns. The next course of action is determined by the site of suspected exposure:

8.2.1 Skin exposure

Both assistant and caregiver to move to anteroom straight away and undertake the following:

- if visible blood or body fluids remove with disinfectant/detergent wipes, taking care not to expose any further skin and then disinfect hands with alcohol based hand rub (ABHR)
- inspect area to determine extent of breach
- both the assistant and caregiver should then remove PPE in a controlled manner to prevent further exposure (refer to *Appendix 7 and 8 Donning and doffing sequences*)
- once PPE has been doffed, wash the area well with soap and water or ABHR
- an on-call infectious diseases physician is to be notified immediately and the public health physician on call made aware of the situation
- the HCW should then follow advice for management of a high risk exposure
- ensure an incident report form is completed.

8.2.2 Mucous membrane exposure (eyes/nose/mouth)

Both assistant and caregiver to move to anteroom straight away and undertake the following:

- both the assistant and caregiver should remove PPE in a controlled manner to prevent further exposure
- as soon as you are safely able, spit out any blood or body fluids that have entered the mouth
- as soon as you are safely able, rinse the mouth with water several times or irrigate the eye or nose with water or normal saline
- an on-call infectious diseases physician is to be notified immediately and the public health physician on call made aware of the situation
- the HCW should then follow advice for management of a high risk exposure
- ensure an incident report form is completed.

8.2.3 Percutaneous exposure (needle stick injury)

Both assistant and caregiver to move to anteroom straight away and undertake the following:

- apply ABHR to gloved hands, remove outer gloves, apply ABHR to inner gloves, and remove

- perform hand hygiene with the ABHR and don clean gloves
- both the assistant and caregiver should then remove PPE in a controlled manner to prevent further exposure
- once PPE has been doffed, wash the affected part well with soap and water or ABHR
- an on-call infectious diseases physician is to be notified immediately and the public health physician on call made aware of the situation
- the HCW should then follow advice for management of a high risk exposure
- ensure an incident report form is completed.

The management of HCW following exposure to blood or other body substances should also be consistent with the current WA Health Operational Directive on *Management of Occupational Exposure to Blood and Body Fluids in the Healthcare Setting* and other relevant guidance.

8.3 Ongoing Management

8.3.1 Management of a health care worker following a high risk exposure

During the 21 day period following a high risk exposure staff are advised to:

- read the EVD factsheets and guidelines in the self-monitoring pack provided (*Appendix 10 A and B, Ebolavirus Disease, Information for WA health staff*)
- monitor their temperature daily using digital thermometer provided and respond to SMS prompts
- advise household and close contact about risks of EVD
- stay within one hour's drive of the Perth metropolitan area
- exclude themselves from clinical work which involves direct physical contact with members of the public
- contact their public health unit officer or the on call public health physician from the CDCD urgently, if they develop fever or symptoms in keeping with EVD
- comply with any additional restrictions or actions required by WA Health
- ensure they have completed an incident report form regarding the incident that resulted in a high risk exposure.

8.3.2 Management of a health care worker following low risk exposure

In view of the high levels of anxiety regarding exposure to EVD for HCWs involved in a confirmed cases care and that not all breaches in PPE are obvious, the following advice should also be offered to staff classified as a low risk of exposure.

During the 21 day period following low risk exposure (or date of last contact with an EVD patient) HCWs are advised to:

- read the EVD factsheets and guidelines in the self-monitoring pack provided (*Appendix 10 A and B, Ebolavirus disease, Information for WA health staff*)

- monitor their temperature daily using digital thermometer provided and respond to SMS prompts
- stay within one hour's drive from the Perth metropolitan area
- perform usual clinical duties; no restriction in work duties is necessary while the HCW is asymptomatic
- notify their public health unit and manager if they develop fever or symptoms in keeping with EVD
- if they develop symptoms whilst at work, they should remain at the hospital and should isolate themselves in an empty room if possible, until advised by the infection control team and public health physician on call
- comply with any additional restrictions or actions required by WA Health.

APPENDICES

Appendix 1 Collection and handling of specimens from suspected viral haemorrhagic fever cases in non-quarantine hospitals

The PathWest Viral Haemorrhagic Fever (VHF) sampling kit contains:

- blood tubes (2 EDTA, 1 lithium heparin, 1 fluoride, 1 serum, 1 citrate)
- blood cultures (1 anaerobic, 1 aerobic) bottles (*check expiry date*)
- VHF lab request form
- these instructions

All stored in a sealable 5L bucket.

Please note: blood culture bottles have expiry dates. Each kit will be issued from PathWest QEII Medical Centre without these items, with the expectation that each health care facility (HCF) will add these to each kit and monitor and maintain these items to ensure that their expiry dates are not exceeded.

Photo 1: VHF sampling kit



Requirements

- All specimens are to be collected by hospital staff using the institutional infection control protocols.
- Blood collecting apparatus.

Tests to be requested

The following tests are requested on the pre-printed form:

Microbiology

- PCR for suspected virus (EDTA blood)
- blood cultures
- dengue serology
- malaria film and PCR

Other

- urea and electrolytes
- liver function tests
- blood sugar level
- full blood picture
- coagulation studies.

Specimen collection procedure and transport

The following provides instructions on how specimens should be collected and transported. Special handling of pathology specimens for suspected or proven VHF cases is required due to the potential transmission of VHF viruses from blood and body fluids.

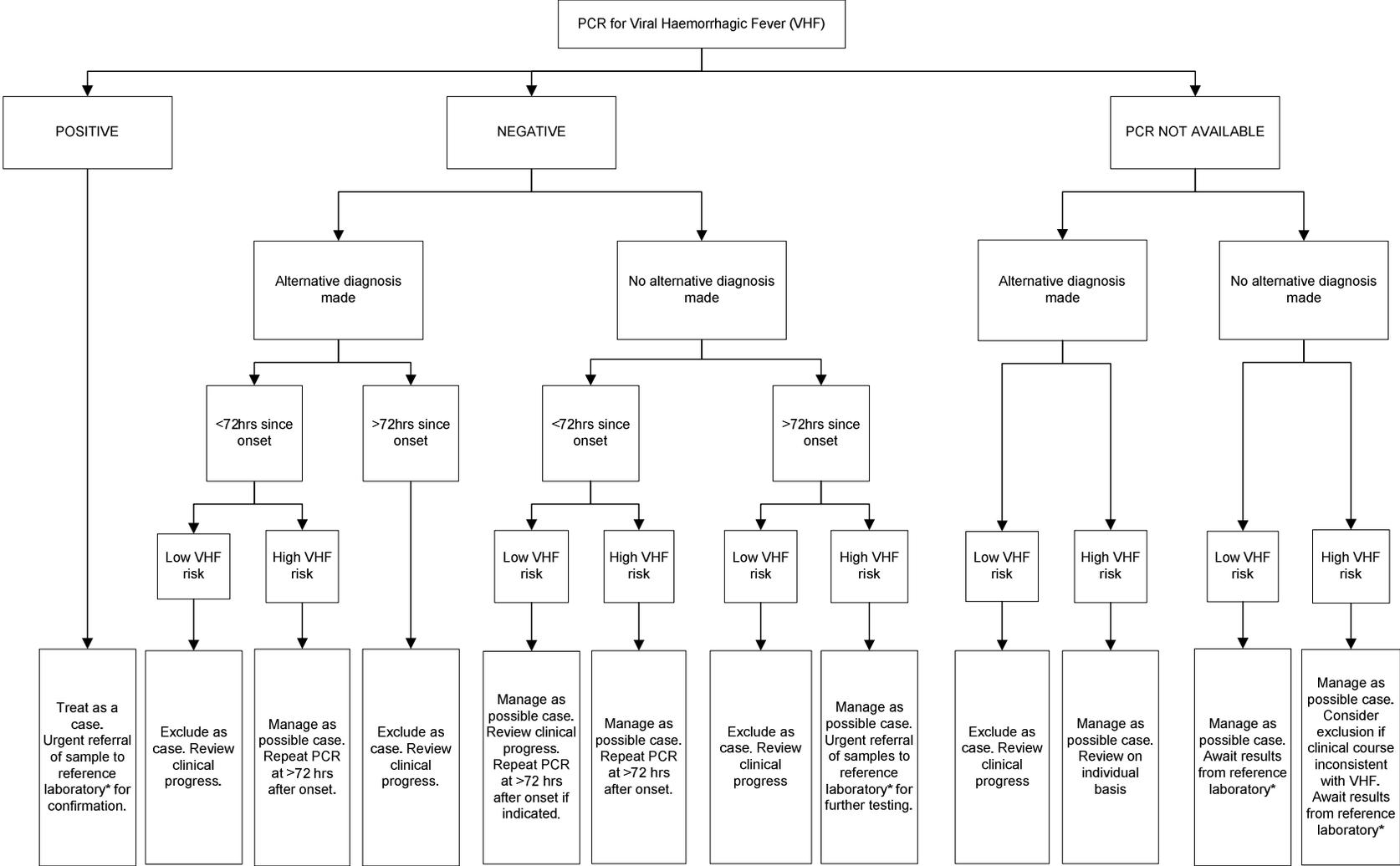
Only limited clinical chemistry and haematology testing in the PathWest QEII MC laboratories will be possible during the initial screening phase.

Specimen collection

- Remove the tubes from the secondary containers into a kidney dish to take into the airborne isolation room. Leave the bucket, biohazard bags and secondary containers in the ante-room.
- Take sufficient addressograph labels into the room for the samples.
- Collect the specimens by routine methods but with appropriate PPE.
- Following collection of the specimen wipe the external surfaces of the vacutainer tubes with 0.5% sodium hypochlorite (5000ppm available chlorine).
- Label the filled blood tubes with the addressograph labels.
- Individually place each labelled blood tube into a separate secondary container held by the assistant in the ante-room.
- The assistant replaces the secondary container lids and places each specimen into biohazard bags.

- In the ante-room complete the request form clearly and place in the request form sleeve of one of the biohazard bags. VHF risk must be clearly written on the request form.
- The biohazard bags are then placed into the bucket and the lid sealed.
- Wipe the external surface of the bucket with 0.5% sodium hypochlorite.
- Place the bucket into a separate rigid secondary container held by the assistant outside the anteroom.
- Seal the secondary container with tape and clearly address it to PathWest Central Reception Area, Ground Floor PP Block, QEII Medical Centre and labelled 'Samples for VHF testing. Do not open'. No special PPE is required for specimen transport.
- Use only a recognised medical courier for transfer of samples.
- For regional cases, ensure expedited medical courier service is activated, to ensure that samples are transported urgently.
- Inform the Clinical Microbiologist at PathWest QEII Medical Centre when the specimen is despatched.
- **DO NOT USE PNEUMATIC TUBE SYSTEMS FOR TRANSPORT OF VHF SPECIMENS.**
- **SPECIMENS MUST NEVER BE LEFT UNATTENDED.**

Appendix 2 Guide to interpretation of viral haemorrhagic fever PCR results, and subsequent management of patient



*Reference laboratory for Australia is the Victorian Infectious Diseases Reference Laboratory (VIDR).

Appendix 3 National case definitions of Ebolavirus disease

Communicable Disease Network Australia National (CDNA) guidelines for Ebolavirus disease (EVD) <http://www.health.gov.au/ebola> classifies patients into the following categories:

Person under investigation

Requires clinical evidence and limited epidemiological evidence.

Clinical evidence requires fever >38°C. Additional symptoms such as unexplained haemorrhage or bruising, muscle pain, vomiting, marked diarrhoea, should also be considered

Limited epidemiological evidence requires only travel to an EVD-affected area.

Suspected case

Requires clinical evidence and epidemiological evidence.

Clinical evidence – as above for ‘person under investigation’

Epidemiological evidence requires a low risk or high risk exposure as defined below.

Lower risk exposures:

- household contact with an EVD case (in some circumstances this might be classified as higher risk such as where the household was in a resource-poor setting)
- being within approximately 1 metre of an EVD patient or within the patient’s room or care area for a prolonged period of time (e.g. healthcare workers, household members) while not wearing recommended personal protective equipment (PPE)
- having direct brief contact (e.g. shaking hands) with an EVD patient while not wearing recommended PPE.

Higher risk exposures:

- percutaneous (e.g. needle stick) or mucous membrane exposure to blood or body fluids of an EVD patient (either suspected or confirmed)
- direct skin contact with blood or body fluids of an EVD patient without appropriate personal protective equipment (PPE)
- laboratory processing of blood or body fluids of suspected, probable, or confirmed EVD cases without appropriate PPE or standard biosafety precautions
- direct contact with a dead body without appropriate PPE in a country where an EVD outbreak is occurring
- direct handling of sick or dead animals from disease-endemic areas or consumption of “bush meat” in a country where EVD is known to occur.

Probable case

Requires clinical evidence and epidemiological evidence, AND, laboratory suggestive evidence of EVD.

Clinical evidence – as above for ‘person under investigation’ and ‘suspected case’

Laboratory suggestive evidence includes:

Isolation of virus pending confirmation by Special Pathogens Laboratory, Communicable Disease Control (CDC), Atlanta or National Institute of Virology (NIV), Johannesburg; or Victorian Infectious Diseases Reference Laboratory (VIDRL), Melbourne OR;

- Detection of specific virus by nucleic acid testing, antigen detection assay, or electron microscopy pending confirmation by CDC, Atlanta, or NIV, Johannesburg; OR
- IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to specific virus pending confirmation by CDC, Atlanta, or NIV, Johannesburg; OR
- Detection of IgM to a specific virus pending confirmation by CDC, Atlanta, or NIV, Johannesburg.

Confirmed case

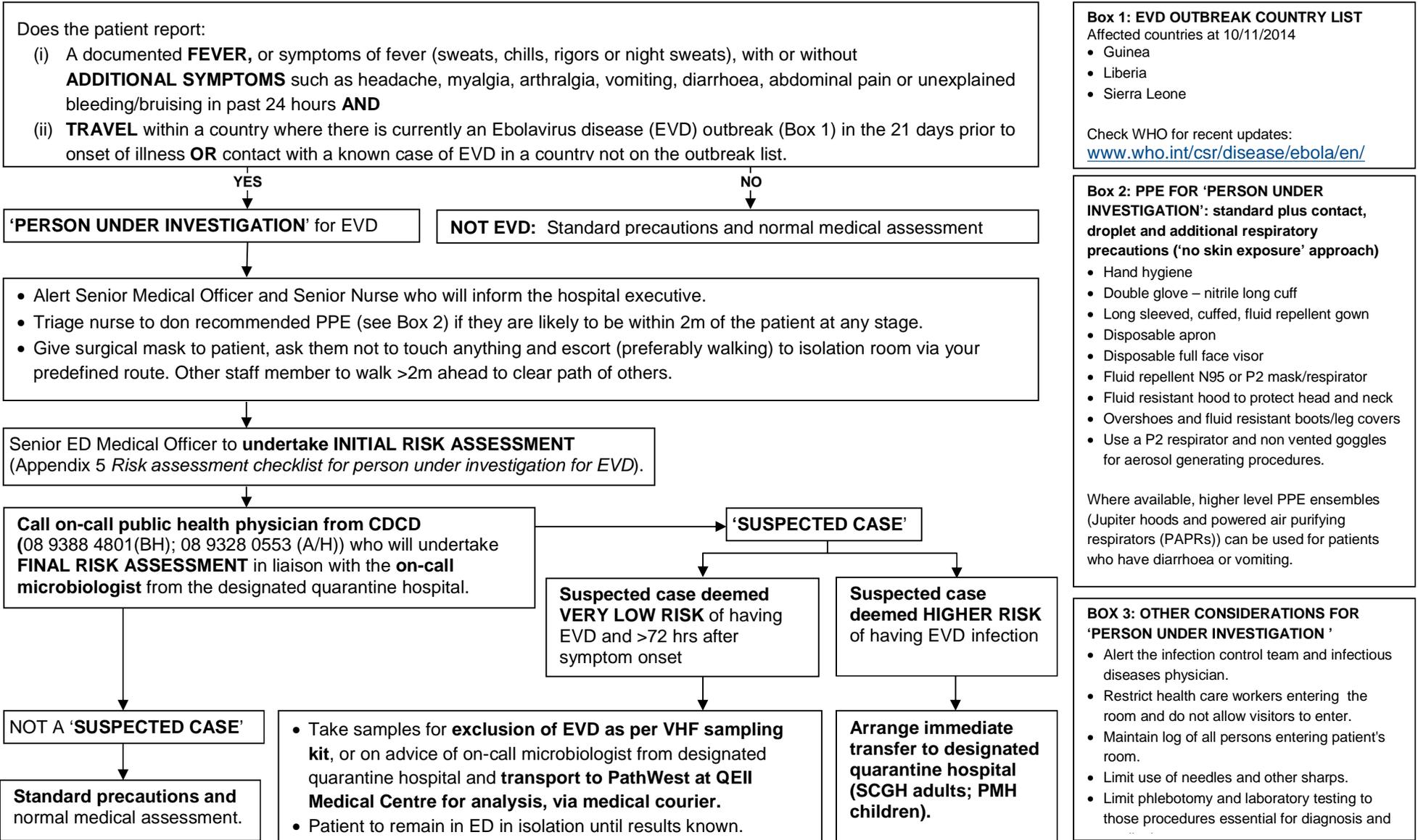
Requires laboratory definitive evidence only.

Laboratory definitive evidence requires confirmation of EVD infection by the Special Pathogens Laboratory, CDC, Atlanta, or the Special Pathogens Laboratory, NIV, Johannesburg or VIDRL, Melbourne.

- Isolation of a specific virus; OR
- Detection of specific virus by nucleic acid testing or antigen detection assay; OR
- IgG seroconversion or a significant increase in antibody level or a fourfold or greater rise in titre to specific virus.

Note: If a risk assessment determines that a person under investigation should be tested for Ebolavirus, the person should be managed as a suspected case from that point forward regardless of clinical and epidemiological evidence.

Appendix 4 Emergency department assessment of 'person under investigation' for Ebolavirus disease



Appendix 5 Risk assessment checklist for a 'person under investigation' for Ebola virus disease

This checklist is for use by medical officers in their initial risk assessment of a person under investigation for Ebola virus disease.

Attach Patient Identification Label

Clinician:.....

Date:..... Time:.....

Attending health care worker (HCW) to wear recommended PPE (*Appendix 6 Personal protective, medical and cleaning equipment*) and to communicate history and findings to HCW outside the room, via telephone, whiteboard, intercom and/or through telehealth where required.

HISTORY			
1. Reason for presentation:			
<input type="checkbox"/> Felt/feels unwell	<input type="checkbox"/> Concerned about possible exposure to someone with Ebola Virus Disease (EVD)	<input type="checkbox"/> Accompanied another patient:.....	Directed to attend by: <input type="checkbox"/> Public Health Unit/CDCD <input type="checkbox"/> GP <input type="checkbox"/> Other:.....

2. Patient's signs and symptoms:			
<input type="checkbox"/> Fever - onset: - timings:	<input type="checkbox"/> Abdominal pain(details):	<input type="checkbox"/> Diarrhoea* <input type="checkbox"/> blood	<input type="checkbox"/> Vomiting* <input type="checkbox"/> blood
<input type="checkbox"/> Lethargy <input type="checkbox"/> Myalgia <input type="checkbox"/> Arthralgia <input type="checkbox"/> Nausea <input type="checkbox"/> Anorexia	<input type="checkbox"/> Sore throat <input type="checkbox"/> SOB <input type="checkbox"/> Cough* <input type="checkbox"/> Sneezing* <input type="checkbox"/> Hiccups	<input type="checkbox"/> Unexplained bruising (locations): <input type="checkbox"/> Rash(locations):	<input type="checkbox"/> Headache (details):
<input type="checkbox"/> Bleeding* - nose <input type="checkbox"/> - eyes <input type="checkbox"/> - vaginal <input type="checkbox"/> - urine <input type="checkbox"/> - sputum <input type="checkbox"/>	<input type="checkbox"/> Chest pain:	<input type="checkbox"/> Other:	

* Secretory symptoms

3. Past medical history:	4. Medications:	5. Allergies:
		6. Occupation:
7. Are any other family members unwell? <input type="checkbox"/> Yes, specify who below <input type="checkbox"/> No		
RISK OF EXPOSURE TO EVD		
8. Travel history in last 21 days:		
To EVD affected country: <input type="checkbox"/> Liberia <input type="checkbox"/> Sierra Leone <input type="checkbox"/> Guinea <input type="checkbox"/> <input type="checkbox"/> Other:.....	Dates:	Accommodation: <input type="checkbox"/> Hotel (details e.g. 5 star)..... <input type="checkbox"/> Stayed with family/friends <input type="checkbox"/> Other:
Cities/towns visited:		Villages/rural regions visited:
Reason for visit:		
9. High risk activities in Ebola affected country:		
Has worked/visited a hospital, clinic, laboratory or other health care setting. <input type="checkbox"/> Yes, provide details below <input type="checkbox"/> No		
Details : (e.g. location, presence of EVD patients)	<p>HIGH RISK EXPOSURES:</p> <input type="checkbox"/> needle stick injury from an EVD patient <input type="checkbox"/> mucous membrane exposed to blood or body fluids from an EVD patient <input type="checkbox"/> direct skin contact with skin, blood or body fluids from an EVD patient without appropriate PPE <input type="checkbox"/> processed blood or body fluids from an EVD patient without appropriate PPE or standard biosafety procedures <input type="checkbox"/> direct contact with a dead body in an Ebola-affected area without appropriate PPE. <p>LOWER RISK EXPOSURES:</p> <input type="checkbox"/> has spent time in care areas of EVD patient without appropriate PPE <input type="checkbox"/> has been within approximately 1m of an EVD patient without appropriate PPE <input type="checkbox"/> has had direct brief contact (e.g. shaking hands) with an EVD patient without appropriate PPE.	
Has had contact with a sick person in the community: <input type="checkbox"/> Yes, provide details below <input type="checkbox"/> No		
	<p>HIGH RISK EXPOSURE:</p> <input type="checkbox"/> household contact of an EVD case in a resource poor setting or when patient had active diarrhoea and/or vomiting. <p>LOWER RISK EXPOSURE:</p> <input type="checkbox"/> has been within approximately 1m of an EVD case without appropriate PPE <input type="checkbox"/> has had direct brief contact (e.g. shaking hands) with an EVD patient without appropriate PPE.	

Appendix 6 Personal protective, medical and cleaning equipment

The following list of personal protective, medical and cleaning equipment should be available for use in the management of all 'persons under investigation', suspected and confirmed cases of Ebolavirus disease.

<p>Personal protective equipment for HCW providing care to patient</p> <ul style="list-style-type: none"> • Disposable surgical scrubs - all sizes • Long cuff nitrile gloves - non-sterile - all sizes - different colours • Long cuff nitrile gloves - sterile - all sizes • Disposable long sleeved fluid resistant gowns (AAMI Level 3 or 4) – selection of sizes • Disposable aprons • Disposable full face shields • Disposable fluid resistant overhoods • P2 or N95 respirators (small and regular) • Disposable fluid resistant boot/leg covers • Disposable fluid resistant overshoes • If using PAPR - PAPR unit which comprises belt, battery pack, PAPR airflow tubing and Jupiter hood (this replaces overhood and P2 or N95 respirator listed above). 	<p>Personal protective equipment for assistants</p> <ul style="list-style-type: none"> • Disposable surgical scrubs - all sizes • Long cuff nitrile gloves - non-sterile - all sizes - different colours • Long cuff nitrile gloves - sterile - all sizes • Disposable long sleeved fluid resistant gowns (AAMI Level 3 or 4) - selection of sizes • Disposable full face shields • Balaclava (fabric theatre style) or overhood • P2 or N95 respirators (small and regular) • Disposable fluid resistant overshoes • Disposable fluid resistant boot/leg covers
<p>Equipment - Designated donning area (outside patient room)</p>	<p>Equipment - Designated doffing area (outside patient room)</p>

<ul style="list-style-type: none"> • Alcohol based hand rub (ABHR) • Waste bin and plastic bags • Stool or chair to enable donning of overshoes/boot covers 	<ul style="list-style-type: none"> • ABHR • Clinical waste bin/clinical waste bags • Stool or chair for doffing foot covers • Absorbent pads for HCW to stand on when exiting patient room • 2 containers for PAPR unit and air flow tube, marked clean and dirty • Detergent wipes • 0.1% sodium hypochlorite solution • Cleaning cloths • Cable ties
<p>Equipment – Inside patient room</p> <ul style="list-style-type: none"> • Disposable aprons • Long cuff nitrile gloves - non-sterile - all sizes - different colours • Long cuff nitrile gloves - sterile - all sizes • ABHR • Digital thermometer • Disposable linen • Waste bin/clinical waste bags • Sharps container • Detergent wipes • Disinfectant wipes • Sodium hypochlorite solution • Chlorine tablets for toilet • Disposable BP cuff • Vomit bags 	<p>Cleaning equipment (location dependent on room set up)</p> <p>As per hospital cleaning policy but must include:</p> <ul style="list-style-type: none"> • Cleanable mop handle and disposable mop heads • Bucket • Disposable cloths • Sodium hypochlorite solution (0.1%) • Sodium hypochlorite solution (0.5%) for spills

<ul style="list-style-type: none">• Disposable wash bowl• Disposable bedpans and urinals (if required)• Fluid absorbent sachets• Pens• Torch• Cable ties	
---	--

Appendix 7 Donning and doffing sequence for use of P2 or N95 personal protective equipment and documentation requirements

The following advice and checklists should be used by all HCWs caring for 'persons under investigation' for EVD as well as suspected, probable and confirmed cases. These sequences should be followed each time PPE is donned and doffed to ensure that no contamination occurs and steps are not missed.

GENERAL INFORMATION - DONNING

- All staff must know their correct sizes for gowns, gloves (sterile and non-sterile) and P2 or N95 mask.
- Staff who are unable to achieve a correct fit with a P2 or N95 mask must not provide care to the patient.
- Two trained staff members will be required for the donning procedure that includes:
 1. The patient **Caregiver** who will provide direct patient care
 2. The **Observer** who will read aloud the donning sequence, assist the Caregiver in donning of PPE and complete the donning / doffing verification record. The Observer does not need to wear PPE.
- Donning of PPE is to be performed under the supervision of an Observer in a designated area outside of the patient's room and anteroom and separate to the designated doffing area.
- A mirror is useful in the designated donning area to assist with donning PPE.
- The Caregiver should ensure he/she has had a hygiene break and is hydrated before donning PPE.
- Caregivers who wear personal glasses should tape them to the side of their face to prevent them from sliding down.
- Sterile or non-sterile gloves can be worn as per staff preference but they are not to be taped to the gown. Using a different colour glove for the outer gloves may assist in doffing process and help identify any breaches in glove integrity.
- Any ties on shoes, aprons or gowns should be tied in a bow to facilitate removal process.
- If the Caregivers outer gloves tear or are visibly soiled during patient care, they are to be removed, inner gloves inspected and disinfected with alcohol based hand rub (ABHR) and replaced with new outer gloves in the patient room.
- If the Caregivers apron becomes visibly soiled during patient care, the apron is to be removed, outer gloves disinfected with ABHR and a new apron put on in the patient room.
- The Observer should ensure that the Caregiver is aware of designated PPE **doffing** area outside the patient room and must wait for assistance before exiting room and removing any PPE.

Note: In this document the term 'disinfect gloves' means to apply ABHR to all surfaces of gloved hands and allow to dry before proceeding to next step.

DONNING SEQUENCE FOR USE WITH P2 or N95 MASK – CAREGIVER

*Prior to donning procedure, the **Caregiver** is to don disposable surgical scrubs after removing uniform/personal clothing (except underwear and footwear) and all personal items, including jewellery, watches, pens, pagers and mobile phones, and ensure long hair is tied back.*

- 1. Observer and Caregiver** to perform **hand hygiene** using soap and water or ABHR.
- 2. Visually inspect** the PPE to ensure it is useable, and that all required PPE is available.
- 3. Caregiver** to don **overshoes** - sit down and don overshoes over own footwear.
- 4. Caregiver** to don **boot/leg covers** - while sitting, tie straps in bow at front.
- 5. Caregiver** to perform **hand hygiene** using ABHR.
- 6. Caregiver** to don **gloves (long cuff)** - first pair (inner) fully extend the glove cuff.
- 7. Caregiver** to don **gown** - opening at the back.
- 8. Observer** to secure velcro/ties at back of neck and at side for the waist, using a bow so it can be easily untied when you begin the doffing process (do not use inner ties). Check that gown completely covers the back, from neck to below the top of the boot/leg covers and arms to end of wrists and allows unrestricted movement. Ensure gown is not touching the floor.
- 9. Caregiver** to don **P2 or N95 mask**- Ensure straps are separated. Place chin into mask. Pass straps over your head. Place the bottom strap at back of head and below the ears. Place the top strap behind your head towards the crown. Mold the mask over the bridge of nose and cheeks to ensure a firm fit.
- 10. Caregiver** to perform **fit check** to ensure a good facial seal. Observer to assess fit check.
- 11. Caregiver** to don **overhood** - with cape on outside of gown, ensuring hair and neck is covered.
- 12. Caregiver** to don **plastic apron**.
- 13. Caregiver** to don **full face shield** - adjust head band, ensure a firm fit with foam resting on forehead.
- 14. Caregiver** to **recheck seal** of P2 or N95 mask seal by performing a fit check.
- 15. Caregiver** to don **gloves (long cuff)** - second pair (outer) **over** gown cuffs.

Observer to:

- check there is no exposed skin
- check cuff of outer gloves is fully extended over gown cuff
- ask caregiver to perform leg and arm movements and ensure there is no exposed skin or movement of PPE following this
- check with Caregiver that they are comfortable
- complete donning/doffing verification record.

DONNING SEQUENCE FOR USE WITH P2 or N95 MASK - ASSISTANT

The **Assistant** is only required to don PPE once Caregiver indicates he/she is ready to exit patient room. Assistant to don disposable surgical scrubs after removing uniform / personal clothing (except underwear and footwear) and all personal items, including jewellery, watches, pens, pagers and mobile phones, and ensure long hair is tied back.

- 1. **Observer and Assistant** to perform **hand hygiene** using soap and water or ABHR.
- 2. **Visually inspect** the PPE to ensure it is useable, and that all required PPE is available.
- 3. **Assistant** to don **overshoes** and **boot/leg covers** - while sitting, don overshoes over own footwear and then don boot/leg covers and tie straps in bow at front.
- 4. **Assistant** to perform **hand hygiene** using ABHR.
- 5. **Assistant** to don **gloves (long cuff)** - first pair (inner) fully extend glove cuff.
- 6. **Assistant** to don **gown** - opening at the back.
- 7. **Observer** to secure velcro/ties at back of neck and at side for the waist, using a bow so it can be easily untied when you begin the doffing process (do not use inner ties). Check that gown completely covers the back, from neck to below the top of the boot / leg covers and arms to end of wrists and allows unrestricted movement. Ensure gown is not touching the floor.
- 8. **Assistant** to don **P2 or N95 mask**- Ensure straps are separated. Place chin into mask. Pass straps over your head. Place the bottom strap at back of head and below the ears and the top strap behind your head towards the crown. Mold the mask over the bridge of nose and cheeks to ensure a firm fit.
- 9. **Assistant** to perform **fit check** to ensure a good facial seal. Observer to assess fit check.
- 10. **Assistant** to don **balaclava** to ensure hair remains off face or overhood if preferred.
- 11. **Assistant** to don **full face shield** - adjust head band, ensure a firm fit and foam is resting on forehead.
- 12. **Assistant** to **recheck seal** of P2 or N95 mask by performing a fit check.
- 13. **Assistant** to don **gloves (long cuff)** - second pair (outer) **over** gown cuffs.

Observer to:

- check cuff of outer gloves is fully extended over gown cuff
- check with Assistant that they are comfortable
- complete donning/doffing verification record.

GENERAL INFORMATION - DOFFING

- Doffing of PPE is to be performed in a designated area outside of the patient's room in an anteroom if available, or a designated area separate to the donning area.
- Two trained staff members are required to assist the **Caregiver** in doffing PPE:
 1. The **Assistant** is required in the ante room or designated doffing area and must be wearing the PPE listed for an Assistant.
 2. The **Observer** is required to be outside the ante room or at a distance of 2 meters from the designated doffing area and is required to:
 - read aloud the step by step removal sequence
 - visually inspect for visible contamination or breaches in PPE integrity
 - regularly remind Caregiver to avoid actions that may put them at risk e.g. touching face
 - to complete donning /doffing verification documentation.
- When removing PPE use slow and controlled movements.
- To disinfect gloved hands, the Caregiver is to use an automated ABHR dispenser, or alternatively, the Assistant will need to dispense a measured dose of ABHR onto the gloved hands of the Caregiver.
- Each piece of PPE must be discarded directly into a clinical waste bin as it is removed.
- The Caregiver and Assistant are to shower on completion of their shift and change in to own clothes.

DOFFING SEQUENCE FOR USE WITH P2 or N95 MASK – CAREGIVER

At this point the Caregiver remains in patient room

- 1. **Caregiver** to disinfect outer gloves.
- 2. **Caregiver** to remove plastic apron. Remove by gently breaking the neck and waist straps and rolling from inside to outside and away from your body and discard.
- 3. **Caregiver** to disinfect outer gloves.
- 4. **Assistant** to observe remaining PPE on **Caregiver** for any visible tears or contamination that may splash or fall/leak off during the PPE removal process. If present, **Caregiver** is to use detergent or disinfectant wipes to remove. Disinfect outer gloves.
- 5. **Assistant** to place absorbent pad on floor of designated doffing area for Caregiver to step on and ensure it is adjacent to chair/stool for boot/leg cover removal.
- 6. **Assistant** to open door of patient room.

At this point the Caregiver enters the designated doffing area

- 7. **Caregiver** to exit patient room without touching any surfaces and stands on absorbent pad.
- 8. **Caregiver** to remove outer gloves being careful not to contaminate or tear the inner glove, Pinch the outside of outer glove at wrist end with the other outer gloved hand, peel off completely into a ball and hold it in palm of other outer gloved hand. Slide a finger of inner gloved hand under remaining outer glove at wrist and peel remaining outer glove off until balled around the other removed glove and discard.
- 9. **Caregiver** to disinfect inner gloves. Inspect inner gloves for tears or visible soiling. (If inner gloves have tears or are visibly soiled, remove and perform hand hygiene with ABHR and don new gloves).
- 10. **Caregiver** to sit on chair/stool and pull up gown to expose boot/leg ties and extend legs.
- 11. **Caregiver** to disinfect gloves.
- 12. **Assistant** to undo ties and remove boot/leg covers one at a time and discard. As each boot/leg cover is removed the **Caregiver** is to place foot on floor - off the pad. Overshoes remain on.
- 13. **Assistant** is to pick up the absorbent pad and discard.
- 14. **Assistant** to disinfect outer gloves.
- 15. **Assistant** to wipe over stool with disinfectant wipe and discard.
- 16. **Assistant** to disinfect outer gloves.
- 17. **Assistant** to remove outer gloves (as per point 8) and discard.
- 18. **Assistant** to disinfect inner gloves. Inspect for tears or visible soiling. (Note: If inner gloves have tears or are visibly soiled, remove and perform hand hygiene with ABHR and don new gloves).
- 19. **Assistant** to don new outer gloves.
- 20. **Caregiver** to remove face shield by tilting head forward and grasping the headband at the back of head and pull it forward lifting away from face and discard.

- 21. Caregiver** to disinfect gloves.
- 22. Caregiver** to remove overhead by tilting head forward and grasping the cape of the hood at the chin level to stretch elastic and at the crown of the hood and pull the overhead forward and away from the body and off the head.
- 23. Caregiver** to disinfect gloves.
- 24. Assistant** to unfasten velcro and ties on **Caregiver** gown and to peel gown away from neck and shoulders, by grasping the gown ties or outside of the gown at the back of the shoulders, avoid contact with scrubs.
- 25. Assistant** to disinfect gloves.
- 26. Caregiver** pulls one arm at a time from the sleeves of the gown, so that the gown arms are bunched at the wrists. Then gently roll the exposed side of the gown inward and away from the body, into a small bundle and discard.
- 27. Caregiver** to disinfect gloves.
- 28. Caregiver** to remove gloves.
- 29. Caregiver** to perform hand hygiene with ABHR.
- 30. Caregiver** to don new gloves.
- 31. Caregiver** to remove P2 or N95 mask. Tilt head forward and place thumbs under the bottom strap on each side of head and slide upwards, collecting the top strap, pull to the sides then over the head until the mask falls forward away from face and discard.
- 32. Caregiver** to disinfect gloves.
- 33. Caregiver** to sit down and remove overshoes and discard.
- 34. Caregiver** to disinfect gloves.
- 35. Caregiver** to remove gloves and perform hand hygiene including wrists and lower arms using water and antiseptic soap or ABHR.
- 36. Observer** to perform final inspection of caregiver for any visible contamination of disposable scrubs. If contamination identified, shower immediately and contact on-call microbiologist for further advice.
- 37. Caregiver** can now exit the ante room or designated doffing area.
- 38. Observer** to complete donning/doffing verification documentation.

DOFFING SEQUENCE FOR USE WITH P2 or N95 MASK - ASSISTANT

Observer is to remain outside the ante room or designated doffing area and read aloud the step by step sequence for doffing the PPE.

Assistant to:

- 1. Disinfect** outer gloves.
- 2. Remove boot/leg covers** by sitting in chair, and grasping toe and heel and pulling away from self, being careful not to contaminate scrubs.
- 3. Disinfect** outer gloves.
- 4. Assistant** to remove outer gloves being careful not to contaminate or tear the inner glove, Pinch the outside of outer glove at wrist end with the other gloved hand, peel off completely into a ball and hold in palm of other gloved hand. Slide a finger of inner gloved hand under remaining outer glove at wrist and peel remaining outer glove off until balled around the other removed glove and discard.
- 5. Disinfect** inner gloves. Inspect inner gloves for tears or visible soiling. (If inner gloves have tears, or are visibly soiled, remove and perform hand hygiene with ABHR and don new gloves).
- 6. Remove** face shield by tilting head forward and grasping the headband at the back of head and pull it forward lifting away from face and discard.
- 7. Disinfect** gloves.
- 8. Remove** balaclava by releasing ties, grasp at crown and pull back and discard.
- 9. Disinfect** gloves.
- 10. Remove** gown by unfastening velcro and ties. Pull one arm at a time from the sleeves of the gown so that the gown arms are bunched at the wrists. Then gently roll the contaminated side of the gown inward and away from the body, into a small bundle and discard.
- 11. Disinfect** gloves.
- 12. Remove** gloves and perform hand hygiene with ABHR.
- 13. Don** new gloves.
- 14. Remove** P2 or N95 mask. Tilt head forward and place thumbs under the bottom strap on each side of head and slide upwards, collecting the top strap, pull to the sides then over the head until the mask falls forward away from face and discard.
- 15. Disinfect** gloves.
- 16. Sit** down and remove **overshoes** and discard.
- 17. Disinfect** gloves.
- 18. Remove gloves.** Perform hand hygiene, including wrists and lower arms using water and antiseptic soap or ABHR.
- 19. Observer** to perform final inspection of **Assistant** for any visible contamination of disposable scrubs. If contamination identified, shower immediately and contact on-call microbiologist for advice.
- 20. Assistant** can exit the anteroom or designated doffing area.
- 21. Observer** to complete donning / doffing verification documentation.

DONNING / DOFFING VERIFICATION RECORD - To be completed by the Observer

Attach Patient Identification Label

Date: ___/___/___

Caregiver Name: (Print Clearly)

Time Entered Room:

Time Exited Room:

PPE donned correctly:

Yes No

Visible soiling of PPE prior to removal?

Yes No

Any recognised breaches noted when removing PPE?

Yes No

Immediate action taken if Yes to above:

.....
.....
.....
.....

Assistant Name: (Print Clearly)

PPE donned correctly

Yes No

Visible soiling on PPE prior to removal?

Yes No

Any recognised breaches noted when removing PPE?

Yes No

Immediate action taken if Yes to above:

.....
.....
.....
.....

Observer Name: (Print Clearly)

Signature: Date: ___/___/___

THIS RECORD IS TO BE RETAINED AS PER HOSPITAL PROCEDURE

Appendix 8 Donning and doffing sequence for use of powered air purifying respirator (PAPR) and documentation requirements

The following advice and checklists should be used by all HCWs caring for 'persons under investigation' for EVD as well as suspected, probable and confirmed cases. These sequences should be followed each time PPE is donned and doffed to ensure that no contamination occurs and steps are not missed.

GENERAL INFORMATION - DONNING

- All staff must know their correct sizes for gowns and gloves (sterile and non-sterile)
- All Staff using PAPR must be familiar with the technical aspects of the units, performance check parameters and have been certified competent in donning and doffing the PAPR.
- Three trained staff members will be required that includes:
 1. The patient **Caregiver** who will provide direct patient care
 2. The **Assistant** who will assist the Caregiver in donning the PAPR and PPE. The Assistant **does need** to wear PPE.
 3. The **Observer** who will read aloud the donning sequence and complete the donning / doffing verification record. The Observer **does not** need to wear PPE.
- Donning of PPE is to be performed under the supervision of an Observer in a designated area outside of the patient's room and anteroom and separate to the designated doffing area.
- A mirror is useful in the designated donning area to assist with donning PPE.
- The Caregiver should they have had hygiene break and is hydrated before donning PAPR and PPE.
- Caregivers who wear personal glasses should tape them to the side of their face to prevent slippage.
- Sterile or non-sterile gloves can be worn as per staff preference; however they are not to be taped to the gown. Using a different colour glove for the outer gloves may assist in doffing process and help identify any breaches in glove integrity.
- Any ties on shoes, aprons or gowns should be tied in a bow to facilitate removal process.
- If the Caregivers outer gloves tear or are visibly soiled during patient care, they are to be removed, inner gloves inspected and disinfected with alcohol based hand rub (ABHR) and replaced with new outer gloves in the patient room.
- If the Caregivers apron becomes visibly soiled during patient care, the apron is to be removed, outer gloves disinfected with ABHR and a new apron put on in the patient room.
- The Observer should ensure that the Caregiver is aware of designated PPE **doffing** area outside the patient room and must wait for assistance before exiting room and removing any PPE.

Note: In this document the term 'disinfect gloves' means to apply ABHR to all surfaces of gloved hands and allow to dry before proceeding to next step.

DONNING SEQUENCE FOR USE WITH PAPR - CAREGIVER

*Prior to donning procedure, the **Caregiver** is to don disposable surgical scrubs after removing uniform /personal clothing (except underwear and footwear) and all personal items, including jewellery, watches, pens, pagers and mobile phones, and ensure long hair is tied back.*

- 1. Observer, Assistant and Caregiver** to perform **hand hygiene** using soap and water or ABHR.
- 2. Visually inspect** the PAPR and PPE to ensure it is useable, and that all required PPE is present.
- 3. Assistant and Caregiver** to undertake PAPR performance check.
- 4. Caregiver to check** Jupiter headpiece or hood and adjust headband to own head size and ensure a firm but comfortable fit.
- 5. Caregiver** to don **overshoes** - sit down and don overshoes over own footwear.
- 6. Caregiver** to don **boot/leg covers** - while sitting, tie straps in bow at front.
- 7. Caregiver** to perform **hand hygiene** using ABHR.
- 8. Caregiver** to don **gloves (long cuff)** - first pair (inner) fully extend glove cuff.
- 9. Caregiver** to don **gown** - opening at the back.
- 10. Assistant** to secure velcro/ties at back of neck and at side for the waist, using a bow so it can be easily untied when you begin the doffing process (do not use inner ties). Check that gown completely covers the back, from neck to below the top of the boot/leg covers and arms to end of wrists and allows unrestricted movement. Ensure gown is not touching the floor.
- 11. Assistant** to **hold PAPR** at the small of the back of the Caregiver, while **Caregiver** fastens the belt unit firmly around their waist on the outside of the gown and secures any loose straps.
- 12. Assistant** to **connect** the bottom end of the hose to the outlet and lock into position
- 13. Assistant** to turn on the PAPR unit.
- 14. Caregiver** to don **Jupiter hood**, pulling the inner jersey (if present) around their neck.
- 15. Assistant** to check hood and cape sitting correctly
- 16. Assistant** to attach the PAPR airflow tube to the hood, ensuring it clicks into the locked position.
- 17. Caregiver** to don **plastic apron**.
- 18. Caregiver** to don **gloves (long cuff)** - second pair (outer) **over** gown cuffs.

Observer and Assistant to:

- check there is no exposed skin
- check cuff of outer gloves is fully extended over gown cuff
- ask caregiver to perform leg and arm movements and ensure there is no exposed skin or movement of PPE following this
- check with Caregiver that they are comfortable
- complete donning/doffing verification record.

DONNING SEQUENCE FOR USE WITH PAPR – ASSISTANT

The **Assistant** is only required to don PPE once the Caregiver indicates he/she is ready to exit patient room. Assistant to don disposable surgical scrubs after removing uniform / personal clothing (except underwear and footwear) and all personal items, including jewellery, watches, pens, pagers and mobile phones, and ensure long hair is tied back.

- 1. Observer and Assistant** to perform **hand hygiene** using soap and water or ABHR.
- 2. Visually inspect** the PPE to ensure it is useable, and that all required PPE is available.
- 3. Assistant** to don **overshoes** and **boot/leg covers** - while sitting, don overshoes over own footwear and then don boot/leg covers and tie straps in bow at front.
- 4. Assistant** to perform **hand hygiene** using ABHR.
- 5. Assistant** to don **gloves (long cuff)** - first pair (inner) fully extend glove cuff.
- 6. Assistant** to don **gown** - opening at the back.
- 7. Observer** to secure velcro/ties at back of neck and at side for the waist, using a bow so it can be easily untied when you begin the doffing process (do not use inner ties). Check that gown completely covers the back, from neck to below the top of the boot / leg covers and arms to end of wrists and allows unrestricted movement. Ensure gown is not touching the floor.
- 8. Assistant** to don **P2 or N95 mask**- Ensure straps are separated. Place chin into mask. Pass straps over your head. Place the bottom strap at back of head and below the ears. Place the top strap behind your head towards the crown. Mold the mask over the bridge of nose and cheeks to ensure a firm fit.
- 9. Assistant** to perform **fit check** to ensure a good facial seal. Observer to assess fit check.
- 10. Assistant** to don **balaclava** to ensure hair remains off face or overhood if preferred.
- 11. Assistant** to don **full face shield** - adjust head band, ensure a firm fit and foam is resting on forehead.
- 12. Assistant** to **recheck seal** of P2 or N95 mask by performing a fit check.
- 13. Assistant** to don **gloves (long cuff)** - second pair (outer) **over** gown cuffs

Observer to:

- check cuff of outer gloves is fully extended over gown cuff
- check with Assistant that they are comfortable
- complete donning/doffing verification record.

GENERAL INFORMATION - DOFFING

- Doffing of PPE is to be performed in a designated area outside of the patient's room in an anteroom if available, or a designated area separate to the designated donning area.
- Two trained staff members are required to assist the **Caregiver** in doffing PPE:
 1. The **Assistant** is required in the ante room or designated doffing area and must be wearing the PPE listed for an Assistant.
 2. The **Observer** is required to be outside the ante room or at a distance of 2 meters from the designated doffing area and is required to:
 - read aloud the step by step removal sequence
 - visually inspect for visible contamination or breaches in PPE integrity
 - regularly remind Caregiver to avoid actions that may put them at risk e.g. touching face
 - to complete donning/doffing verification documentation.
- Do not remove the hood or turn off the PAPR unit until the Caregiver has vacated the patient's room.
- When removing PPE use slow and controlled movements.
- To disinfect gloved hands, the Caregiver is to use an automated ABHR dispenser, or alternatively, the Assistant will need to dispense a measured dose of ABHR onto the gloved hands of the Caregiver.
- Each piece of PPE must be discarded directly into a clinical waste bin as it is removed.
- The Caregiver and Assistant are to shower on completion of their shift and change in to own clothes.

Note: In this document the term 'disinfect gloves' means to apply ABHR to all surfaces of gloved hands and allow to dry before proceeding to next step.

DOFFING SEQUENCE FOR USE WITH PAPR - CAREGIVER

At this point the Caregiver remains in patient room

- 1. **Caregiver** to disinfect outer gloves.
- 2. **Caregiver** to remove plastic apron. Remove by gently breaking the neck and waist straps and rolling from inside to outside and away from your body and discard.
- 3. **Caregiver** to disinfect outer gloves.
- 4. **Assistant** to observe remaining PPE on **Caregiver** for any visible tears or contamination that may splash or fall/leak off during the PPE removal process. If present, **Caregiver** is to use detergent or disinfectant wipes to remove and discard and disinfect outer gloves.
- 5. **Assistant** to place absorbent pad on floor of designated doffing area for Caregiver to step on and ensure it is adjacent to chair/stool for boot/leg cover removal.
- 6. **Assistant** to open door of patient room when possible.

At this point the Caregiver enters the designated doffing area

- 7. **Caregiver** to exit patient room without touching any surfaces and stands on absorbent pad.
- 8. **Caregiver** to remove outer gloves being careful not to contaminate or tear the inner glove. Pinch the outside of outer glove at wrist end with the other gloved hand, peel off completely into a ball and hold in palm of other gloved hand. Slide a finger of inner gloved hand under remaining outer glove at wrist and peel remaining outer glove off until balled around the other removed glove and discard.
- 9. **Caregiver** to disinfect inner gloves. Inspect inner gloves for tears or visible soiling. (If inner gloves have tears or are visibly soiled, remove and perform hand hygiene with ABHR and don new gloves).
- 10. **Caregiver** to sit on chair/stool and pull up gown to expose boot/leg ties and extend legs.
- 11. **Caregiver** to disinfect inner gloves.
- 12. **Assistant** to undo ties and remove boot/leg covers one at a time and discard into clinical waste. As each boot/leg cover is removed the **Caregiver** is to place foot on floor - off the pad. Overshoes remain on.
- 13. **Assistant** is to pick up the absorbent pad and discard.
- 14. **Assistant** to disinfect outer gloves.
- 15. **Assistant** to wipe over stool with disinfectant wipe and discard.
- 16. **Assistant** to disinfect outer gloves.
- 17. **Assistant** to remove outer gloves (as per point 8) and discard.
- 18. **Assistant** to disinfect inner gloves.
- 19. **Assistant** to turn off the PAPR system and detach the airflow tube from hood. While the Assistant holds the PAPR unit in his/her hands, the Caregiver is to undo the belt. The Assistant can then place the PAPR unit and air flow tube into a designated 'dirty' container for later cleaning and disinfection.
- 20. **Assistant** to disinfect inner gloves.

- 21. Assistant** to prepare for **hood removal** by grasping the outside of the hood cape at the back and rolling up towards the top of the shoulders to form a cuff. The Observer, will then signal for the **Caregiver** to remove the hood by grasping the hood with both hands near the ears, bending forward at the waist, and pulling the hood slowly and methodically down and away from your head until it's at waist level and then discard.

Note: It is very important to avoid touching your face after the hood has been removed.

- 22. Caregiver** and **Assistant** to disinfect gloves.
- 23. Assistant** to unfasten velcro and ties on **Caregiver** gown and to peel gown away from neck and shoulders, by grasping the gown ties or outside of the gown at the back of the shoulders, avoid contact with scrubs.
- 24. Assistant** to disinfect gloves and wait for Caregiver to complete doffing.
- 25. Caregiver** pulls one arm at a time from the sleeves of the gown so that the gown arms are bunched at the wrists. Then gently roll the contaminated side of the gown inward and away from the body, into a small bundle and discard.
- 26. Caregiver** to disinfect gloves.
- 27. Caregiver** to sit down and remove overshoes and discard.
- 28. Caregiver** to disinfect gloves.
- 29. Caregiver** to remove gloves and perform hand hygiene including wrists and lower arms using water and antiseptic soap or ABHR.
- 30. Observer** to perform final inspection of Caregiver for any visible contamination of disposable scrubs. If contamination identified, shower immediately and contact on-call microbiologist for further advice.
- 31. Caregiver** can now exit the ante room or designated doffing area.
- 32. Observer** to complete donning /doffing verification documentation and hours of battery use in register / log book.
- 33. Assistant** to don **new outer gloves** to clean and disinfect PAPR unit. Clean all surfaces of the PAPR unit, including air flow tube, battery pack and belt with detergent wipes. Following this, disinfect all surfaces with 0.1 % (1,000 ppm) sodium hypochlorite and then place in clean container. Clean and disinfect 'dirty' container and leave in the room. These containers should be clearly identified by labelling or colour coding, to distinguish between clean or dirty equipment. Assistant is now ready to doff own PPE.

DOFFING SEQUENCE FOR USE WITH PAPR – ASSISTANT

Observer is to remain outside the ante room or designated doffing area and read aloud the step by step sequence for doffing the PPE.

Assistant to:

- 1. Remove boot/leg covers** by sitting in chair, and grasping toe and heel and pulling away from self, being careful not to contaminate scrubs.
- 2. Disinfect** gloves
- 3. Remove** outer gloves being careful not to contaminate or tear the inner glove. Pinch the outside of outer glove at wrist end with the other gloved hand, peel off completely into a ball and hold in palm of other gloved hand. Slide a finger of inner gloved hand under remaining outer glove at wrist and peel remaining outer glove off until balled around the other removed glove and discard.
- 4. Disinfect** inner gloves. Inspect for tears or visible soiling. (Note: **If** inner gloves have tears or are visibly soiled, remove and perform hand hygiene with ABHR and don new gloves).
- 5. Remove** face shield by tilting head forward and grasping the headband at the back of head and pull it forward lifting away from face and discard.
- 6. Disinfect** gloves.
- 7. Remove** balaclava by releasing ties, grasp at crown and pull back and discard.
- 8. Disinfect** gloves.
- 9. Remove** gown. Pull one arm at a time from the sleeves of the gown, being careful not to touch scrubs, until both gown arms are bunched at the wrists. Then gently roll the exposed side of the gown inward and away from the body, into a small bundle and discard.
- 10. Disinfect** gloves.
- 11. Remove** gloves and perform hand hygiene with ABHR.
- 12. Don** new gloves.
- 13. Remove** P2 or N95 mask. Tilt head forward and place thumbs under the bottom strap on each side of head and slide upwards, collecting the top strap, pull to the sides then over the head until the mask falls forward away from face and discard.
- 14. Disinfect** gloves.
- 15. Sit** down, remove overshoes and discard.
- 16. Disinfect** gloves.
- 17. Remove gloves.** Perform hand hygiene, including wrists and lower arms using antiseptic soap and water or ABHR.
- 18. Observer** to perform final inspection of **Assistant** for any visible contamination of disposable scrubs. If contamination identified, shower immediately and contact on-call microbiologist for advice.
- 19. Observer** to hold a plastic bag open to receive the clean PAPR unit from the Assistant, prior to he/she exiting the anteroom or designated doffing area and perform hand hygiene on exit.
- 20. Observer** to store PAPR unit and then complete donning / doffing verification documentation.

DONNING / DOFFING VERIFICATION RECORD - To be completed by the Observer

Attach Patient Identification Label

Date: ___/___/___

Caregiver Name: (Print Clearly)

Time Entered Room: Time Exited Room:

PPE donned correctly: Yes No

Visible soiling of PPE prior to removal? Yes No

Any recognised breaches noted when removing PPE? Yes No

Immediate action taken if Yes to above:

.....
.....
.....
.....

Assistant Name: (Print Clearly)

PPE donned correctly Yes No

Visible soiling on PPE prior to removal? Yes No

Any recognised breaches noted when removing PPE? Yes No

Immediate action taken if Yes to above:

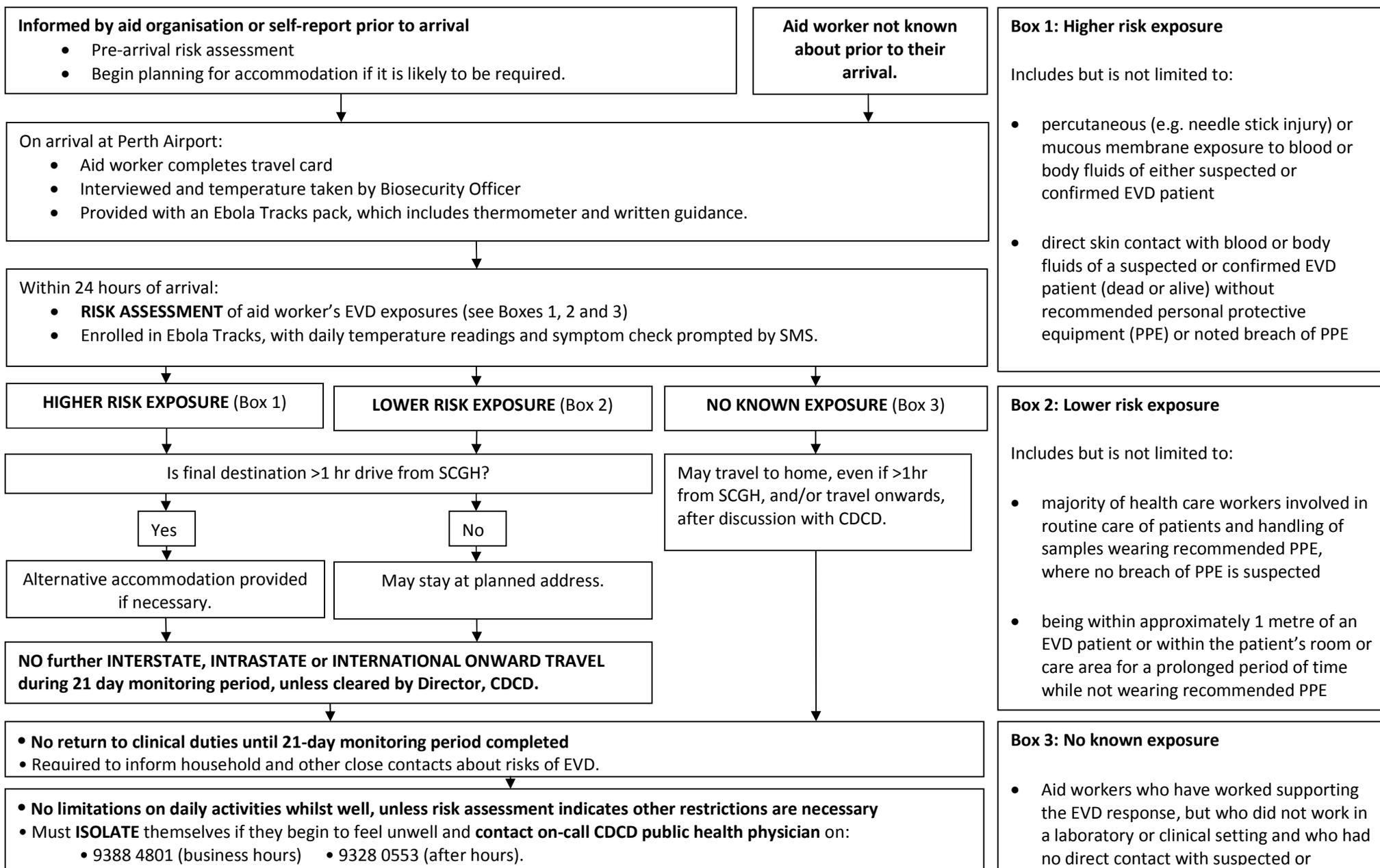
.....
.....
.....
.....

Observer Name: (Print Clearly)

Signature: **Date:** ___/___/___

THIS RECORD IS TO BE RETAINED AS PER HOSPITAL PROCEDURE

Appendix 9 Flow chart for management of healthcare and other aid workers returning from Ebola-affected country



Appendix 10 Fact sheets

A) Ebolavirus disease

B) Information for WA Health staff

C) Ebolavirus Disease Contacts Information



Ebolavirus disease

What is Ebolavirus disease?

Ebolavirus disease (EVD) is a serious and often fatal infection caused by Ebolavirus. The virus can cause disease in humans, other primates (apes and monkeys) and some other animal species. Since Ebolavirus was first identified in 1976, there have been occasional small outbreaks of disease in humans in rural areas of sub-Saharan and central Africa. The recent outbreak in West Africa, which commenced in 2013, is the largest ever recorded and the first to spread to major urban areas and to multiple countries.

Scientists have identified four species of Ebolavirus across the central part of Africa and believe that it occurs naturally in fruit bats. A fifth species of the virus has been identified in monkeys in parts of Asia but does not appear to cause human disease. There is no evidence that Ebolavirus occurs in bats or other animals in Australia.

How is it spread?

Humans may become infected with Ebolavirus through direct contact with the blood, bodily fluids or tissues of an infected animal, usually during hunting and preparation of 'bushmeat'. Once a human is infected, the virus can then spread from person-to-person via contact with the blood or other bodily fluids of a sick or dead person, or via contact with contaminated objects.

Ebolavirus is not known to spread through the air or by water. The virus has been found in blood, saliva, vomit, faeces, urine, semen, tears, and nasal secretions of infected people. The virus in the blood or other bodily fluids infects another person through broken skin or mucous membranes, such as the mouth, eyes or nose.

Traditional burial ceremonies conducted in affected areas of Africa are a high-risk activity for transmission because the virus can survive in bodily fluids of the deceased for several days.

What are the symptoms?

Humans are not thought to be infectious to other people until they develop symptoms. Symptoms of EVD begin between 2 to 21 days (average 8 to 10 days) after exposure to the virus. Initially, symptoms may be difficult to distinguish from other more common infectious diseases that occur in Africa such as malaria, typhoid fever and meningitis.

The first symptoms typically include fever, severe headache, muscle and joint aches and weakness. This is followed by sore throat, vomiting, diarrhoea, stomach pain and rash and in some cases by internal and external bleeding progressing to multi-organ failure and death. Between 50 and 90 per cent of EVD cases in Africa die of the disease.

Who is at risk?

People who live in, or travel to, affected areas of Africa may be at risk of exposure to Ebolavirus. However, the risk of infection is extremely low unless there has been direct contact with the bodily fluids of an infected person or animal, whether alive or dead.

Carers of ill relatives and healthcare workers who are in contact with infected people are at risk of infection, particularly those in resource-poor settings where there may be limited access to hand-washing facilities and protective equipment. Protective clothing and equipment (including masks, gloves, gowns and goggles) should be worn when caring for a sick person.

How is it prevented?

There is currently no vaccine to prevent EVD. The best prevention is to avoid close contact with infected animals and people, including bodies of the deceased. Hunting and contact with 'bushmeat' in affected areas of Africa should be avoided. Where contact with people with suspected or confirmed EVD is necessary, recommended infection prevention and control procedures, including meticulous attention to hygiene and use of appropriate personal protective equipment, is necessary.

How is it diagnosed?

EVD is confirmed by a test on blood or other body fluids. Testing for EVD is only performed at designated laboratories with special biosafety facilities.

How is it treated?

There are currently no specific treatments available for patients with EVD, although new experimental vaccines and drug therapies treatments are being developed and tested in West Africa. Early diagnosis and prompt supportive therapy, such as intravenous fluid replacement, can be life-saving.

What is Western Australia's public health response?

WA hospitals have procedures in place to identify suspected cases of EVD and to ensure suspected cases are isolated, tested and managed to minimise the risk of transmission to other patients or hospital staff. Suspected cases of EVD are referred to designated hospitals for testing and management in special isolation facilities.

There are national and state plans and guidelines for identification, investigation and management of suspected or confirmed cases of EVD, should the disease be imported into Australia.

Information current as of 17 July 2015

© Department of Health 2015

This document can be made available in alternative formats on request for a person with a disability.

Copyright to this material is vested in the State of Western Australia unless otherwise indicated. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the provisions of the *Copyright Act 1968*, no part may be reproduced or re-used for any purposes whatsoever without written permission of the State of Western Australia.



Information for WA Health Staff

WA Health staff who work in West Africa

A number of Western Australians have worked in West Africa as part of the humanitarian response for the World Health Organization (WHO) or various aid agency teams. WA Health will consider supporting any request by staff to use Community Service and other forms of leave to contribute to the international response to the West African epidemic of EVD.

WA Health staff who do undertake work in EVD-affected countries **and** care for or have other contact with persons with EVD will, after returning to WA, be required to monitor their health with twice daily temperature recording and undertake a period of leave from clinical duties for 21 days from the last potential contact with a person suspected or known to have EVD. In addition, it will be recommended that they stay in the Perth metropolitan area during this period to ensure they have access to optimal care should they develop symptoms consistent with EVD that need investigation.

These arrangements are as recommended by the Communicable Diseases Network of Australia (CDNA) in their guidance on the management of healthcare and other aid workers returning from affected countries (see: <http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-ebola.htm>)

Management of suspected or confirmed EVD cases in Western Australia

Returning travellers from EVD-affected countries are identified at the border and actively monitored by WA Health for a period of 21 days after their last possible date of exposure. This system is designed for early identification of any suspected EVD cases, who will be referred by a public health physician to a designated quarantine hospital for management, if appropriate. This should limit the potential for suspected cases to present at other hospitals for medical care.

WA Health staff should refer to the *Western Australia Viral Haemorrhagic Fever Response Plan* for the assessment and management of suspected or confirmed EVD cases. WA Health has ensured that the designated quarantine hospitals (SCGH or PMH), metropolitan hospitals with emergency departments, key regional hospitals and emergency services (St John Ambulance and the Royal Flying Doctor Service) have been supplied, and their staff trained with, the recommended PPE.

What should health care workers do if they have a suspected patient?

The patient should be immediately isolated in a suitable area away from other patients and staff, and direct contact with the patient should only occur if staff are wearing appropriate PPE, in accordance with the *Western Australia Viral Haemorrhagic Fever Response Plan* and hospital-specific guidelines. **Suspected EVD cases should be reported immediately to the on-call CDCD public health physician on 9388 4801 (office hours) or 9328 0553 (after hours) for guidance on management.**

WA Health staff who care for a suspected or confirmed EVD case

Anyone who cares for an infected person, or handles or comes in contact with their blood or other body fluids, is at risk of becoming infected. Family members, HCWs and laboratory workers are at greatest risk. Meticulous adherence to infection prevention strategies and appropriate use of personal protective equipment (PPE) to prevent transmission is extremely important.

In a WA clinical setting, HCWs who have taken recommended infection prevention and control precautions, including the use of appropriate PPE, while caring for a suspected, probable or confirmed EVD case are not considered to have had high-risk exposure to EVD. However, HCWs caring for or processing blood or body fluids from a patient with confirmed EVD will be considered at high risk where a breach of PPE is suspected or recommended PPE was not worn.

If during the care of an EVD patient a partial or total breach in PPE (e.g. gloves separate from sleeves leaving exposed skin, a tear develops in an outer glove, a needle stick injury occurs), the caregiver must move immediately to the doffing area to assess the exposure and notify their Assistant.

A HCW who sustains an occupational exposure to Ebolavirus will be managed in accordance with the criteria outlined in *Section 8 Management of HCWs exposed to EBD within WA* or until confirmation is received that the patient does not have EVD. In general, any HCW sustaining an occupational exposure in these circumstances will be:

- Provided with support and counselling
- monitored for a 21 day period
- be requested to monitor their temperature twice daily and immediately contact their public health unit officer or the on call public health physician from the CDCD urgently, if they develop fever or symptoms in keeping with EVD
- stay within one hour's drive of the Perth metropolitan area
- advise household and close contacts about risks of EVD
- be excluded from clinical work which involves direct physical contact with members of the public

Information current as of 17 July 2015

© Department of Health 2015

This document can be made available in alternative formats on request for a person with a disability.

Copyright to this material is vested in the State of Western Australia unless otherwise indicated. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the provisions of the *Copyright Act 1968*, no part may be reproduced or re-used for any purposes whatsoever without written permission of the State of Western Australia.



Information for Contacts of Ebolavirus Disease

You have been identified as a contact of a person who may have or has, Ebolavirus disease (EVD).

The risk of getting EVD is very low unless you have had direct contact with an infected person or their bodily fluids. You cannot catch EVD just by being in the same general area as an infected person, such as a room or aeroplane. This fact sheet provides information about what you need to do now.

What is my risk and what am I required to do?

A WA Department of Health staff member and an infectious diseases expert will assess the likelihood that the ill person you have had contact with has EVD. If this person is confirmed to have EVD you will be classified into one of three categories of contact type – casual, lower-risk or higher-risk, based on the type of contact you have had. Depending on this level of contact you may be asked to monitor your health and modify certain activities as described below.

Classification	Type of Contact	Action Required
Casual contact	You are not thought to have had close contact with the ill person or their bodily fluids, and your risk of getting EVD is very low.	You do not need any special monitoring. However, if you become unwell in the 21-day period after your last casual contact with the EVD case, then please telephone your Public Health Unit (numbers at the end of this Fact Sheet) for advice.
Lower- risk contact	You are thought to have had direct contact (e.g. shaking hands, hugging) with the ill person but not with their bodily fluid and the risk of you getting EVD is low.	You will be required to monitor your temperature and other symptoms for a period of 21 days after your last contact with the ill person. You will be provided with an Ebolavirus Monitoring Pack which contains a thermometer and instructions for monitoring your temperature and health.
Higher-risk contact	You are thought to have had direct contact with the ill person and their bodily fluids and the risk is getting EVD is higher.	You will be required to monitor your temperature and other symptoms for a period of 21 days after the last contact. You will be provided with an Ebolavirus Monitoring Pack that contains a thermometer and instructions for monitoring your temperature and health. You will also be given advice on restrictions on travel and other movements to ensure that you remain in the Perth area so that you can be quickly referred to the right hospital for appropriate care and testing should you become unwell.

What should I do if I become unwell?

If you have been classified as a lower or higher- risk contact, and you develop symptoms in the 21-day monitoring period you should follow the separate instructions provided in your Ebola virus Monitoring Pack, and contact the WA Department of Health on (08) 9388 4801 during office hours (8:30 am to 5:00 pm Monday to Friday) or 9328 0553 (after hours).

Symptoms of Ebola virus Disease

EVD is a serious illness with a sudden onset of fever, muscle and joint aches, weakness and headache. This is followed by vomiting and diarrhoea, rash, and liver and kidney problems. Some people may develop internal and external bleeding.

How do I contact my local Public Health Unit?

Public Health Unit	Phone number
North Metropolitan (Perth)	9222 8588
South Metropolitan (Perth)	9431 0200
Goldfields (Kalgoorlie)	9080 8200
Great Southern (Albany)	9842 7500
Kimberley (Broome)	9194 1630
Midwest (Geraldton/Carnarvon)	9956 1985 / 9941 0500
Pilbara (South Hedland)	9158 9222
South West (Bunbury)	9781 2350
Coastal and Wheatbelt (Northam)	9622 4320

After hours please contact the Department Health Duty Officer on: 9328 0553

More information is available at: <http://www.health.wa.gov.au/ebolavirus/home/index.cfm>

Information current as of 17 July 2015

© Department of Health 2015

This document can be made available in alternative formats on request for a person with a disability.

Copyright to this material is vested in the State of Western Australia unless otherwise indicated. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the provisions of the *Copyright Act 1968*, no part may be reproduced or re-used for any purposes whatsoever without written permission of the State of Western Australia.

Appendix 11 Contact numbers

DEPARTMENT OF HEALTH, WESTERN AUSTRALIA, AFTER HOURS EMERGENCY CONTACT NUMBERS		
OFFICER	TELEPHONE (OFFICE HOURS)	TELEPHONE (AFTER HOURS)
WA Chief Human Quarantine Officer Dr Paul Armstrong	Mob: 0429 153 201 Tel: (08) 9388 4800 Fax: (08) 9388 4888	Mob: 0429 153 201 or Tel: (08) 9328 0553
Manager - State Ambulance Operations St John Ambulance	Tel: (08) 9334 1234 Fax: (08) 9334 1207	Tel: (08) 9334 1234 Fax: (08) 9334 1207
Airport Managers Australian Government Department Of Agriculture (formerly AQIS)	Mob: 0434 305 895 Mob: 0434 664 414	Mob: 0434 305 895 Mob: 0434 664 414
Perth Airport Duty Manager Westralia Airports Corporation Perth International Airport	Tel: (08) 9478 8501 Fax: (08) 94788590	Tel: (08) 9478 8501 (24 hrs) Control Centre: Tel: (08) 9478 8572 Fax: (08) 9478 8574
Perth Airports Emergency Planning Manager	Tel: (08) 9478 8816 Fax: (08) 9478 8889	Mob: 0439 977 820
Manager, Safety Fremantle Port Authority	Mob: 0477 114 115 Tel: (08) 9432 3660 Fax: (08) 9336 1391	Mob: 0477 114 115
Office of Health Protection (Commonwealth Department of Health and Ageing)	Director, Human Quarantine Tel: (02) 6289 8408 Fax: (02) 6285 1994 or Director, Border Health Tel: (02) 6289 2705 Fax: (02) 6289 2600	Duty Officer – National Incident Room - 24 hour service Tel: (02) 6289 3030 Fax: (02) 6289 3040

STATE HUMAN QUARATINE OFFICERS, WESTERN AUSTRALIA		
OFFICER	TELEPHONE (OFFICE HOURS)	TELEPHONE (AFTER HOURS)
Dr Gary Dowse (Communicable Disease Control Directorate)	Mob: 0408 917 799 Tel: (08) 9388 4849	Tel: (08) 9328 0553
Dr Paul Effler (Communicable Disease Control Directorate)	Mob: 0407 727 131 Tel: (08) 9388 4818	Tel: (08) 9328 0553
Dr Donna Mak (Communicable Disease Control Directorate)	Mob: 0437 781 930 Tel: (08) 9388 4828	Tel: (08) 9328 0553
Dr Tony Keil (Princess Margaret Hospital)	Tel: (08) 9340 8222 Fax: (08) 9380 4474	Tel: (08) 9340 8222 (PMH switchboard)
Dr David Smith (PathWest)	Tel: (08) 9383 4438 Tel: (08) 9346 3333 (switchboard) Fax: (08) 9346 3960	Tel: (08) 9346 2536 (PathWest Security)
Dr Tim Inglis (PathWest)	Tel: (08) 9383 4548 Tel: (08) 9346 3333 (Page 4450) Fax: (08) 9382 8046	Tel: (08) 9346 2536 (PathWest Security)
Dr Marisa Gilles Public Health Physician WACHS – Midwest	Mob: 0429 086 740 Tel: (08) 9956 1985	Tel: (08) 9328 0553
Dr Clare Huppatz Public Health Physician WACHS – Goldfields	Mob: 0409 170 056 Tel: (08) 9080 8200	Tel: (08) 9328 0553
Dr Heather Lyttle Public Health Physician WACHS – Pilbara	Mob: 0418 672 063 Tel: (08) 91741302	Tel: (08) 9328 0553
Dr Naru Pal Public Health Physician WACHS – South West/Gt. Southern/Wheatbelt	Mob: 0429 682 998 Tel: (08) 9842 7500	Tel: (08) 9328 0553

Appendix 12 Ebola virus disease case report form

This form is for use by public health staff for contact tracing and ongoing monitoring of those at risk of Ebola virus disease.

Final classification Confirmed Probable Rejected

1. Notifier details			
Date of notification	___ / ___ / ___		
Notifying doctor	Name		
	Organisation		
	Address		
	Suburb/Town		Postcode
	Tel (work)	Tel (mobile)	Fax
	Email		
2. Interviewer details			
Was the case interviewed?	<input type="checkbox"/> Yes Date: ___ / ___ / ___ <input type="checkbox"/> No  <input type="checkbox"/> Unknown <i>If no - name of person interviewed</i> <i>- relationship to case (specify)</i>		
Interviewer	Name		
	Organisation		
	Tel (work)		Fax
3. Case details			
Case name	Family name		Given name(s)
Address and contact details	Address		
	Suburb		State Postcode
	Tel (home)		Tel (work) Tel (mobile)
Demographic details	Date of birth ___ / ___ / ___ <i>dd / mm / yyyy</i>		Age (years)
	Country of birth <input type="checkbox"/> Australia <input type="checkbox"/> Other - <i>specify</i>		Sex <input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Not stated
	Aboriginal status <input type="checkbox"/> Aboriginal <input type="checkbox"/> Torres Strait Islander		<input type="checkbox"/> Aboriginal & Torres Strait Islander <input type="checkbox"/> Other <input type="checkbox"/> Unknown/not stated
	Occupation <input type="checkbox"/> Healthcare worker <input type="checkbox"/> Other - <i>specify</i>		Employer Address

4. Clinical details

Date of onset of symptoms ___ / ___ / ___ (dd / mm / yyyy)		
Symptoms (febrile phase) <i>Tick all that apply</i>		Complications
<input type="checkbox"/> Fever - Temp: _____ °C	<input type="checkbox"/> Myalgia/arthralgia	<input type="checkbox"/> Spontaneous bleeding or bruising
<input type="checkbox"/> Lethargy/malaise	<input type="checkbox"/> Pharyngitis	<input type="checkbox"/> Hypotension
<input type="checkbox"/> Headache	<input type="checkbox"/> Conjunctival infection	<input type="checkbox"/> Oedema
<input type="checkbox"/> Abdominal pain	<input type="checkbox"/> Rash	<input type="checkbox"/> Neurological involvement
<input type="checkbox"/> Vomiting	<input type="checkbox"/> Petechiae	<input type="checkbox"/> Multi-organ failure
<input type="checkbox"/> Diarrhoea	<input type="checkbox"/> Bloody diarrhoea	<input type="checkbox"/> Shock
<input type="checkbox"/> Other symptoms <i>Specify:</i>		

5. Hospitalisation details

Case hospitalised	<input type="checkbox"/> Yes	<input type="checkbox"/> No - go to section 6	<input type="checkbox"/> Unknown - go to section 6
Hospital	Hospital		
	Date admitted (dd/mm/yyyy) ___ / ___ / ___	Date discharged (dd/mm/yyyy) ___ / ___ / ___	
	ICU - Date admitted (dd/mm/yyyy) ___ / ___ / ___	ICU - Date discharged (dd/mm/yyyy) ___ / ___ / ___	
Isolated in single room on admission?	<input type="checkbox"/> Yes	<input type="checkbox"/> No - Date isolated: ___ / ___ / ___	<input type="checkbox"/> Unknown
Case outcome	<input type="checkbox"/> Alive	<input type="checkbox"/> Died - Date of death ___ / ___ / ___	<input type="checkbox"/> Unknown

6. Laboratory details

****Testing to be organised per the EVD SoNG Laboratory Testing Guidelines in discussion with PathWest QEII**

Specimens collected	<input type="checkbox"/> Blood/serum	<input type="checkbox"/> Throat swab	<input type="checkbox"/> Urine	<input type="checkbox"/> Other (specify)
Date of collection (dd/mm/yyyy)	___ / ___ / ___	___ / ___ / ___	___ / ___ / ___	___ / ___ / ___
	Name of laboratory that received specimens			
	Specimens transferred to PathWest QEII? <input type="checkbox"/> Yes - Date ___ / ___ / ___ <input type="checkbox"/> No <input type="checkbox"/> Unknown			
Ebolavirus test results	Ebolavirus isolation	<input type="checkbox"/> Isolated – specimen	<input type="checkbox"/> Not isolated	<input type="checkbox"/> Not done
	PCR	<input type="checkbox"/> Detected – specimen	<input type="checkbox"/> Not detected	<input type="checkbox"/> Not done
	Antigen detection	<input type="checkbox"/> Detected – specimen	<input type="checkbox"/> Not detected	<input type="checkbox"/> Not done
	Electron microscopy	<input type="checkbox"/> Detected – specimen	<input type="checkbox"/> Not detected	<input type="checkbox"/> Not done
	Serology - IgM	<input type="checkbox"/> Detected – date ___ / ___ / ___	<input type="checkbox"/> Not detected	<input type="checkbox"/> Not done
	IgG	<input type="checkbox"/> Single titre – titre	<input type="checkbox"/> Not detected	<input type="checkbox"/> Not done
		<input type="checkbox"/> Four fold rise - 1 st titre date ___ / ___ / ___		
		- 2 nd titre date ___ / ___ / ___		
Other results	Lymphopaenia	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Thrombocytopaenia	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Confirmation of Ebolavirus result	<input type="checkbox"/> NHSQL at VIRDL	<input type="checkbox"/> National Institute of Virology Johannesburg		
	<input type="checkbox"/> Special Pathogens Lab Atlanta CDC			

7. Exposure (source of infection) for this case

Exposure period is in the 21 days prior to date of onset of symptoms:

From ___/___/___ to ___/___/___
Date of onset minus 21 days Date of onset

<p>During the exposure period, did the case:</p>	<p>a) have contact with a confirmed/probable EVD case?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Specify name(s) and type of contact</p> <p>1) Name Status <input type="checkbox"/> Living <input type="checkbox"/> Deceased</p> <p style="margin-left: 40px;"><i>Family name Given name</i></p> <p>Type of contact with case</p> <p><input type="checkbox"/> Visited sick patient <input type="checkbox"/> Buried deceased patient</p> <p><input type="checkbox"/> Exposed to blood or body fluids of sick or deceased patient</p> <p><input type="checkbox"/> Cared for sick patient - specify</p>
	<p>c) visit or work in a health care facility?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Date of contact ___/___/___ Location</p> <p>Type of contact</p> <p>d) work in a laboratory processing Ebola virus specimens?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Date of contact ___/___/___ Location</p> <p>Type of contact</p>
	<p>b) have contact with bats, primates or other animals from Ebola-affected area?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Date of contact ___/___/___ Location</p> <p>Type of contact Animal</p>
	<p>e) visit an Ebola-affected area?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Specify country, region and travel dates</p> <p>1.</p> <p style="margin-left: 40px;">Travel dates: ___/___/___ to ___/___/___</p> <p>2.</p> <p style="margin-left: 40px;">Travel dates: ___/___/___ to ___/___/___</p> <p>See list of Ebola- affected areas: http://www.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/distribution-map.html</p>
	<p>b) have any other possible exposure(s)?</p> <p><input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Unknown</p> <p>Date of contact ___/___/___ Location</p> <p>Type of contact</p>
<p>Place infection acquired</p>	<p><input type="checkbox"/> Australia Specify</p> <p><input type="checkbox"/> Other country Specify</p>

8. Infectious period – log of case movements

Infectious period: _____ to _____
 (Onset of symptoms) (Hospitalisation with appropriate isolation)

Note to interviewer:

Please obtain details on the movements of the case from date of onset of symptoms to date that the case was appropriately isolated in hospital.

During the infectious period, did the case: ↓

a) travel anywhere? Yes ↓ No Unknown

Specify places visited, mode of travel and dates

Place	Mode of transport (specify)	Departure date	Departure date
		__/__/__	__/__/__
		__/__/__	__/__/__
		__/__/__	__/__/__

a) attend a hospital / healthcare facility? Yes ↓ No Unknown
 Name of facility..... Date __/__/____
 Telephone no.

b) attend educational / residential facility? Yes ↓ No Unknown
 Name of facility.....Date __/__/____
 Telephone no.

b) attend childcare? Yes ↓ No Unknown
 Name of childcareDate __/__/____
 Telephone no.

b) attend school? Yes ↓ No Unknown
 Name of school Date __/__/____
 Telephone no.

b) attend other activities?
Specify where, when, who was potentially exposed.

Date	Activity
__/__/__	
__/__/__	
__/__/__	
__/__/__	

9. Contacts identified

Note: All higher and lower risk contacts identified will be monitored daily for temperature and wellbeing using the WA EbolaTracks SMS Monitoring System.

First name	Last name	DOB	Sex	Street address	P/code	PHU	Mobile number (M) Email (E)	Date of last contact with case	Risk type (TRAV, HCW, LOCAL)	Risk level (CASUAL, LOW, HIGH)	EbolaTracks monitoring required
			<input type="checkbox"/> Male <input type="checkbox"/> Female				M: E:				<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No
			<input type="checkbox"/> Male <input type="checkbox"/> Female								<input type="checkbox"/> Yes <input type="checkbox"/> No

10 Contact management summary			
Contact setting	No. of casual contacts	No. of low risk contacts	No. of high risk contacts
Household			
Ambulance staff			
Medical/healthcare staff			
Laboratory staff			
Colleagues			
Other (<i>specify</i>)			
Contact surveillance	No. of casual contacts	No. of low risk contacts	No. of high risk contacts
Information only given - No temperature monitoring but provided phone number in case symptoms develop			
Monitoring of temperature twice daily for 21 days – report if fever >38oC or other symptoms			

Appendix 13 Management of neonates and pregnant and lactating women with suspected, probable or confirmed Ebolavirus disease

1. Introduction

These guidelines are for use by healthcare workers (HCWs) involved in the care of neonates and pregnant women with suspected, confirmed or probable EVD in Western Australia (WA) (for definitions refer to *Appendix 3 National case definitions of EVD*).

The guidelines have been developed by a working group (including public health specialists, obstetricians, gynaecologists, neonatologist and midwives) and from recommendations outlined in the Médecins San Frontiers *Guidance paper Ebola Treatment Centre (ETC): Pregnant and lactating women*, and the Royal College of Obstetricians (UK) *Principals of Management for Pregnant Women with Ebola: A Western Context*.^{6 7}

2. Current situation

The probability of a pregnant woman with EVD presenting to a hospital in WA is exceedingly low, even in the context of the 2014/15 EVD epidemic in West Africa, given :

- restrictions on issuing of Australian visas to residents of affected countries
- relatively low numbers of persons travelling from Ebola-affected countries to WA (a high proportion of those arriving from Ebola-affected countries are returning fly-in-fly out miners and aid workers who have a low likelihood of pregnancy).

A number of general measures have been put in place to identify travellers, who arrive in WA from EVD-affected countries, so that their health can be actively monitored and to facilitate early referral to an appropriate facility for investigation and management should they develop symptoms compatible with EVD. These measures are outlined in *Section B.2 Public health management of Ebolavirus disease*, and are broadly applicable to pregnant women who have travelled from affected countries. These measures should ensure a very low probability of pregnant women at risk of EVD self-presenting to health services within WA. **However, it is important for front-line staff to ask pregnant women who arrive at hospital for medical care about their recent travel history, and, if they have travelled recently in an EVD-affected country, to ask specifically about potential exposure to Ebolavirus.** Patients should be screened for fever and HCWs should be aware of the signs and symptoms of EVD.

3. Previous outcomes of Ebolavirus infection in pregnant women

Evidence regarding the effects of EVD on pregnant women and their infants comes from reviews of previous outbreaks of the virus in Central Africa and more recent case reports of outcomes of infection in pregnant women during the 2014-2015 outbreak in West Africa. The level of care provided in these resource-poor settings is clearly limited and will vary from that which could be provided in WA.

⁶ Médecins San Frontiers, *Guidance paper Ebola Treatment Centre (ETC): Pregnant and lactating women*. MSF-OCB 2014 –v1.4 [Accessed online 21 May 2015] www.rcog.org.uk/globalassets/documents/news/etc-preg-guidance-paper.pdf

⁷ Black B. *Principals of Management for pregnant women with Ebola: A Western Context*. [Accessed online 9 January 2015] www.rcog.org.uk/globalassets/documents/news/ebola-and-pregnancy-western.pdf

There is no evidence to suggest that pregnant women are at increased risk of contracting EVD, other than a general increase in risk due to the fact that women are often the main carers for ill relatives. Limited evidence does suggest, however, those pregnant women are at increased risk of severe disease.⁸

Pregnant women with EVD are at increased risk of spontaneous abortion and pregnancy-related haemorrhage. Neonates born to EVD-positive mothers in developing countries have a very poor chance of survival, with few live births; in an outbreak in Zaire in 1976, all 11 neonates born to mothers with EVD died within 19 days of life.⁹ In the latest outbreak in Guinea, ebola virus was detected in the placenta and cord blood from a pregnant woman recovering from EVD who had tested negative for EVD 32 days previously.¹⁰ There is very limited information regarding cause of death of neonates born to EVD positive mothers and there is no information on outcomes for neonates cared for in highly developed healthcare systems such as in Australia.

4. Principles of care

The following considerations should be followed when caring for a pregnant women and/or neonate with suspected, probable or confirmed EVD:

- the safety of HCWs is a priority. All staff providing care for the patient must have undertaken adequate training in use of EVD personal protective equipment (PPE) and the number of staff caring for the patient should be minimised
- a log of all staff involved in the patient's care must be maintained
- there is currently no evidence base for the prognosis or potential benefits of specific medical/obstetric/neonatal interventions in Ebolavirus-infected pregnant women or neonates in high income countries
- 'persons under investigation' for EVD should be discussed with the on-call public health physician immediately in order to initiate a rapid risk assessment by specialists, a prompt decision regarding testing and location of initial assessment, so as to ensure that treatment is not delayed unnecessarily
- invasive procedures should be kept to a minimum to avoid risk of body fluid exposure and sharps injury
- a negative PCR test for EVD should only be considered definitive after a patient has had symptoms for more than 72 hours. If testing occurs within the first 72 hours of symptoms, a further test may be required to exclude EVD, particularly if there is no confirmed credible alternative diagnosis and the clinical picture remains consistent with EVD
- the clinical management of pregnant patients should focus on supportive care, similar to that of non-pregnant patients, with special attention to monitoring for haemorrhage and its rapid treatment

⁸ Jamieson DJ, Uyeki TM, Callaghan WM, Meaney-Delman D Rasmussen S A. What Obstetrician -Gynaecologists should know about Ebola. *Obstetrics and Gynaecology*. November 2014; 124:5, 1005-1010.

⁹ Jamieson DJ, Uyeki TM, Callaghan WM, Meaney-Delman D Rasmussen S A. What Obstetrician -Gynaecologists should know about Ebola. *Obstetrics and Gynaecology*. November 2014; 124:5, 1005-1010.

¹⁰ Médecins San Frontières, Guidance paper Ebola Treatment Centre (ETC): Pregnant and lactating women. MSF-OCB 2014 –v1.4 [Accessed online 21 May 2015] www.rcog.org.uk/globalassets/documents/news/etc-preg-guidance-paper.pdf

- breastfeeding of infants born prior to or following a diagnosis of probable/confirmed EVD in a mother is not advised, during active disease or during recovery, unless testing of the breast milk has confirmed absence of the virus in the milk
- pregnant women who have survived EVD and are well and PCR-negative should still be considered to be at risk of transmitting EVD through amniotic fluid and of delivering an infant with EVD
- other diagnoses, including causes of fever in travellers from Africa (e.g. malaria, typhoid fever) should be considered early, tested for and treated, as appropriate
- decisions regarding specific treatments and procedures should be made on a case-by-case basis and decisions about limitation of care should only occur after wide consultation by a panel of specialists.

5. Location of care

Pregnant women will be managed at the designated adult quarantine hospital, Sir Charles Gairdner Hospital (SCGH) and paediatric cases (including neonates) will be managed at Princess Margaret Hospital (PMH). The likely prognosis of neonates born to EVD affected mothers in Australia is not known, although such neonates (particularly those born prematurely) are likely to be quite unwell. Management of such neonates should occur on a case-by-case basis, and will be coordinated by the Newborn Emergency Transport Service (NETS) WA and its neonatology consultants. Early consultation with NETS WA (by calling the hotline – 1300 638792) is essential, to arrange transfer of appropriate staff and resuscitation equipment to SCGH (or elsewhere, if necessary).

Obstetric resources (staff and equipment) will be transferred to SCGH from King Edward Memorial Hospital (KEMH) to assist with the management of a pregnant woman with suspected, probable or confirmed EVD. Such cases should be managed in a negative pressure isolation room (NPIR) and their movements be limited to essential transfers only.

6. Transport of patients

For general information regarding capabilities of Saint John Ambulance (SJA) and Royal Flying Doctor Service (RFDS) for transport of patients with suspected, probable or confirmed EVD refer to *Section B.7 Patient transport*. Additional consideration should be given to potential limitations of the use of Isolation pods (IsoPods) with heavily pregnant women and the increased risk of transporting pregnant women who may potentially lose large volumes of infectious body fluids.

7. Initial assessment

A travel history should be sought from all pregnant women arriving at a hospital for medical care, and while the EVD epidemic continues in West Africa, where applicable, they should be asked specifically about travel in the previous 21 days to an Ebola-affected country or contact with a person with EVD. All patients who have had recent travel to an Ebola-affected country or contact with a suspected / probable / confirmed EVD case will then require screening for fever and other EVD symptoms (refer to *Appendix 4 Emergency department assessment of a 'person under investigation' for EVD*). If they have a pertinent travel history or potential exposure to EVD and any relevant symptoms, then they are classified as a 'person under investigation for EVD'.

Patients who fit the criteria for ‘person under investigation’ for EVD should be managed as outlined in *Section B.1 Emergency department management of EVD*. A risk assessment is to be performed (refer to *Appendix 5 Risk assessment checklist for a ‘person under investigation’ for EVD*) and the on-call public health physician at Communicable Disease Control Directorate (CDCD) contacted urgently in order to determine if they warrant further investigation for EVD. This decision will be made as quickly as possible to keep any potential delay in treatment to a minimum. Table 1 outlines possible scenarios and the likely course of management. However, each patient will be assessed on a case-by-case basis.

Note: Laboratory testing for EVD can only be performed at PathWest QEII Medical Centre, Nedlands. Additionally, all other routine pathology testing must be undertaken at PathWest QEII, unless decided in consultation between managing clinicians, the on-call Clinical Microbiologist from PathWest/SCGH, the on-call public health physician at CDCD and others, as appropriate. That is, even if circumstances dictate that a pregnant patient with suspected/probable/confirmed EVD needs to be managed at a facility other than SCGH, it will usually be necessary to transfer any specimens to PathWest QEII for testing using appropriate precautions and designated equipment in the PC3 laboratory. Refer to *Section A.4 Sampling and diagnostic testing* for further information.

Table 1 Possible scenario for presentations of obstetric patient with suspected EVD and suggested management.

Scenario	Management
<p>Known pregnant women (all gestations) who are enrolled in active 21 day monitoring in the community who:</p> <ul style="list-style-type: none"> - develop symptoms consistent with EVD - develop symptoms that suggest another illness (not EVD) and who require hospital admission - are in predicted normal labour - are in predicted risky labour - are experiencing bleeding or pain related to a pregnancy < 20 weeks gestation and/or thought to require a gynaecological procedure e.g. evacuation of the uterus 	<p>Arrange referral or transfer to SCGH for investigation and management</p>
<p>Unknown pregnant women who self-present with relevant travel or exposure history for EVD and who:</p> <ul style="list-style-type: none"> - have symptoms consistent with EVD - have symptoms that suggest another illness (not EVD) and who require hospital admission - are in predicted normal labour 	<p>Rapid risk assessment at presenting clinic/hospital with transfer to SCGH arranged if determined to be a suspect case.</p>

<ul style="list-style-type: none"> - are in predicted risky labour - are experiencing bleeding or pain related to a pregnancy < 20 weeks gestation and/or thought to require a gynaecological procedure e.g. evacuation of the uterus 	
<p>Unknown pregnant women who self-present with a travel/exposure history to EVD categorised as “very low” or “low” risk, and who:</p> <ul style="list-style-type: none"> - have symptoms that suggest an alternative diagnosis to EVD - are located more than 500km from Perth 	<p>For non-febrile presentations that are judged to be unrelated to EVD, investigations may be undertaken locally, if appropriate.</p> <p>If applicable, based on clinical assessment, may have sample taken at their presenting hospital for exclusion of EVD with urgent transport of sample to PathWest QEII Medical Centre for analysis.</p>
<p>Pregnant contact of a well returned traveller from an Ebola-affected country</p>	<p>Manage in usual manner, unless any indication that the primary contact is unwell.</p>

8. Infection prevention and control

Guidelines provided in *Section B.3 Infection prevention and control guidelines for non-quarantine hospitals* should be followed, along with the additional specific considerations:

- given the increased risk of exposure to large volumes of bodily fluids in obstetric cases, full PPE should be worn by both carers and assistants (refer to *Appendix 6, 7, 8 Personal protective equipment, medical and cleaning equipment and donning and doffing sequences*)
- powered air purifying respirators (PAPRs) should be used, where available, if carers will need to stay with the patient for prolonged periods of time (e.g. patient is in labour or critically unwell)
- PPE should be worn when caring for or handling any liveborn infants, stillborn infants or products of conception
- PPE should be worn by all HCWs involved in the labour of any women who has had a diagnosis of probable/confirmed EVD during their pregnancy, even if they are now well, recovering and PCR-negative, as amniocentesis and testing of placenta and cord blood in these patients have demonstrated EVD ^{11,12}
- in view of the potential for loss of large volumes of bodily fluids (estimated at 500mls of blood and 500mls of amniotic fluid in a normal delivery¹³), it is important to ensure a ready supply of

¹¹ Médecins San Frontières, Guidance paper Ebola Treatment Centre (ETC): Pregnant and lactating women. MSF-OCB 2014 –v1.4 [Accessed online 21 May 2015] www.rcog.org.uk/globalassets/documents/news/etc-preg-guidance-paper.pdf

¹² Baggi FM, Taybi A, Kurth A, Herp MV, Caro AD, Wolfel R, Gunther S, Decroo T, Declerck H, Jonckheere S. Management of pregnant women infected with Ebola virus in a treatment centre in Guinea, June 2014. *Eurosurveillance*. 11 December 2014, 19;49.

¹³ Médecins San Frontières, Guidance paper Ebola Treatment Centre (ETC): Pregnant and lactating women. MSF-OCB 2014 –v1.4 [Accessed online 21 May 2015] www.rcog.org.uk/globalassets/documents/news/etc-preg-

absorbent granules and 0.5% sodium hypochlorite solution for cleaning spills quickly (refer to *Section B.4 Cleaning and disinfection*)

- attending staff should avoid standing directly in front of the patient during delivery of the foetus or placenta to avoid splashes of blood or other bodily fluids
- stillborn infants, placenta, other products of conception should be managed in accordance with *Section B. 6 Post mortem care and examination*, taking into consideration *the Perinatal Pathology, Guidelines for health-care professionals applicable to all perinatal deaths sent to King Edwards Memorial Hospital*¹⁴ and *Section B.5 Waste treatment and disposal* and as appropriate.

9. Clinical Management

9.1 Maternal care

Pregnant and postpartum patients should be provided with similar supportive care as non-pregnant patients. This may include intravenous fluids, electrolyte replacement and symptomatic management with analgesics (e.g. paracetamol, opiates), anti-emetics (e.g. metoclopramide) and PPIs (e.g. omeprazole). Treatment for other likely diagnoses should be given early (e.g. antibiotics and antimalarial medications).

Specific considerations for obstetric care of patients with suspected/probable/confirmed EVD include:

- obstetric cases with EVD are at higher risk of severe disease and haemorrhage and so intravenous access should be secured early to avoid risk of sharps injury in an emergency situation
- for suspected cases of EVD urgent discussion with a multidisciplinary team is required with regards to fetal and maternal monitoring
- there should be multidisciplinary team input about the appropriateness of an emergency caesarean section based on the prognosis for the woman, considering her overall medical status and the ability of the team to conduct a safe delivery. Caesarean section may only be appropriate when it is likely to save the life of the mother
- the commencement of fetal monitoring should be considered in the context of above discussions and, where deemed appropriate, the fetus monitored externally. Internal fetal monitoring is not recommended due to increased risk of exposure to body fluids for health care workers
- spontaneous vaginal delivery should be anticipated
- vaginal examinations should be kept to a minimum
- artificial rupture of the membranes should be avoided
- episiotomy should not be performed; if the patient develops a vaginal tear, suturing of the tear is not advised due to the high risk of sharps injury

guidance-paper.pdf.

¹⁴ Government of Western Australia, Department of Health. *Perinatal Pathology, Guidelines for health-care professionals applicable to all perinatal deaths sent to King Edwards Memorial Hospital*
http://www.kemh.health.wa.gov.au/brochures/health_professionals/wnhs0074.pdf

- in the event of maternal clinical need for an invasive procedure or surgery, a careful evaluation should be made by the multidisciplinary treating team and the on-call public health physician at CDCD. Consideration should be made of the overall physical condition of the patient, in particular the presence of coagulopathy
- in the case of intrauterine death (which is common in EVD patients), where possible, labour should not be induced until the woman has recovered from acute EVD. Note, however, that high viral loads have been found in amniotic fluid of well-recovering EVD patients who have become PCR-negative in blood specimens, so these patients should still be managed as EVD-positive
- intra-uterine procedures should be avoided
- if spontaneous miscarriage occurs, uterine evacuation should be avoided, if possible. If unavoidable, evacuation should be performed by staff wearing recommended PPE and preferably by manual vacuum aspiration
- surviving women should be provided with access to counselling, family planning and ferrous sulphate/folic acid prior to discharge.

9.2 Neonatal care

In the event of a live-birth to a woman with suspected/probable/confirmed EVD, the infant should be assumed to have EVD until proven otherwise, and should therefore only be cared for by staff wearing recommended PPE. All neonates should be managed on a case-by-case basis, and decisions about limitation of care should only occur after wide consultation, taking into account gestation and condition at birth. Early consultation with a neonatologist via the Newborn Emergency Transport Service (NETS) should be made, in order to facilitate transfer of equipment and staff to SCGH in the event of delivery.

10. Visitors for labouring patients with Ebolavirus disease

All attempts should be made to ensure that the patient feels supported and that they have a number of options for communication with their friends and family (e.g. telephone, video conferencing or view of visitors outside a window of the isolation room).

Friends or relatives of a suspected, probable or confirmed case of EVD should not ordinarily be allowed inside the isolation/delivery room at any time. In exceptional circumstances, visitors may be trained in the safe donning and doffing of PPE and, once deemed competent, allowed to enter the isolation room. All visitors wearing PPE must be managed in the same way as a HCW (i.e. observed at all times whilst in the room and during donning and doffing of PPE).

A risk assessment should be made of the visitor, and if they meet criteria for defining a contact they should be provided with appropriate advice and enrolled in the 21 day post-exposure monitoring program.

11. Breastfeeding

Ebolavirus has been detected in samples of breast milk, however, there is limited data on transmission of EVD from mothers to infants during breastfeeding.¹⁵ There is also limited evidence regarding

¹⁵ Bausch DG, Towner JS, Dowell SF, Kaducu F, Lukwiya M, Sanchez A, Nichol ST, Ksiazek TG, Rollin PE. Assessment of Risk of Ebola Virus Transmission from Bodily Fluids and Fomites. 2007;196:S142-7.

clearance of EVD from breast milk.¹⁶ In Australia and other high income countries, where bottle feeding is a safe alternative to breastfeeding, women with EVD should be advised not to breastfeed any infants at any time following diagnosis of EVD unless testing of breast milk has confirmed the absence of virus in the milk. During the recovery period, milk should be tested every 2-3 days after the mother tests negative for EVD. In order to account for variability in virus shedding, two negative tests on different days should be obtained.¹⁷

Cabergoline should be given to mothers following delivery of a stillbirth or where breastfeeding is not advised. Any breast milk expressed should be disposed of as clinical waste (*Section B.5 Waste treatment and disposal*).

¹⁶ Jamieson DJ, Uyeki TM, Callaghan WM, Meaney-Delman D Rasmussen S A. What Obstetrician -Gynaecologists should know about Ebola. *Obstetrics and Gynaecology*. November 2014; 124:5, 1005-1010.

¹⁷ UNICEF/WHO/IFE Core group. Infant feeding in the context of Ebola. August 2014. [Accessed online 21 May 2015] http://files.enonline.net/attachments/2176/DC-Infant-feeding-and-Ebola-further-clarification-of-guidance_190914.pdf



**This document can be made available in alternative formats
on request for a person with a disability.**

© Department of Health 2015

Copyright to this material is vested in the State of Western Australia unless otherwise indicated. Apart from any fair dealing for the purposes of private study, research, criticism or review, as permitted under the provisions of the *Copyright Act 1968*, no part may be reproduced or re-used for any purposes whatsoever without written permission of the State of Western Australia.