

Ebola Virus Disease (EVD)

CDNA National Guidelines for Public Health Units

Revision history			
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1.0	15 August 2014		Interim version endorsed by CDNA
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2.0	26 June 2015	EVD SoNG working group	New Appendix (appendix 13) on cleaning in residential settings, revised fact sheets, new section on border and monitoring measures during an outbreak with widespread and intense transmission. Endorsed by CDNA, noted by AHPPC

The Series of National Guidelines ('the Guidelines') have been developed by the Communicable Diseases Network Australia and noted by the Australian Health Protection Principal Committee (AHPPC). Their purpose is to provide nationally consistent guidance to public health units (PHUs) in responding to a notifiable disease event.

These guidelines capture the knowledge of experienced professionals, and provide guidance on best practice based upon the best available evidence at the time of completion.

Readers should not rely solely on the information contained within these guidelines. Guideline information is not intended to be a substitute for advice from other relevant sources including, but not limited to, the advice from a health professional. Clinical judgement and discretion may be required in the interpretation and application of these guidelines.

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Ebola Virus Disease (EVD)

CDNA National Guidelines for Public Health Units

1. Summary

This protocol is specifically for responding to EVD, but would also be relevant for responding to a suspected/confirmed case of Marburg haemorrhagic fever.

It is not directly applicable for Lassa fever, or for vector-borne viral haemorrhagic fevers (VHFs) such as Crimean Congo Haemorrhagic fever (CCHF) or Rift Valley Fever (RVF).

These guidelines form the national minimum standard for infection control for EVD, which is based on the latest available evidence. Individual organisations may develop policies or institute practices that exceed the national minimum standard. It should be noted that training and procedures are required to use any additional PPE safely.

For detailed guidance on infection prevention and control for EVD, refer to the *Infection prevention and control principles and recommendations for Ebola Virus Disease* document available from [the Department of Health website](http://www.health.gov.au/ebola) (www.health.gov.au/ebola).

Public health priority

Urgent. EVD is a quarantinable disease and is nationally notifiable.

All travellers who arrive in Australia with clinical and epidemiological evidence that suggests the possibility of having contracted a quarantinable VHF including EVD should be immediately notified to the Department of Health in the state or territory.

If a suspected case is notified from an international border, decisions concerning case and contact management, including assessment, transport, isolation and quarantine will be made by the jurisdictional Chief Human Quarantine Officer (CHQO) or delegated by the CHQO to the Human Quarantine Officer (HQO).

Actions in the event of a suspected case

- Consider the possibility of EVD in persons with clinically compatible symptoms and with a compatible travel and/or exposure history.
- Isolate the case and institute appropriate infection control and the use of personal protective equipment.
- Notify the C/HQO through the state or territory Department of Health of all persons under investigation for EVD.
- Conduct a clinical and exposure risk assessment in consultation with the C/HQO and relevant infectious diseases service, using the EVD case definition and the patient assessment flow chart.
- Use the outcome of the risk assessment to determine whether the person under investigation requires laboratory testing for EVD.
- Assess the risk to contacts before or after laboratory confirmation, depending on the circumstances and the C/HQO advice.

Risk assessment

- A clinical and exposure risk assessment must be conducted in consultation with the C/HQO

and relevant infectious diseases service, using the EVD case definition in Section 7 and the patient assessment flow chart (Appendix 4).

- The outcome of the risk assessment will determine whether the person under investigation requires laboratory testing for EVD.

Specimen referral

- If specimens are required for EVD testing, and capacity for preliminary testing does not exist in the jurisdiction, specimens should be sent to the NHSQL (VIDRL) immediately, coordinated by the jurisdiction's highest security public health laboratory.
- Telephone contact with the VIDRL on-call microbiologist is essential before any specimen referral.
- The VIDRL on-call microbiologist can be contacted on mobile 0438 599 437. In case of difficulty, back-up is provided by the VIDRL on-call laboratory manager (0438 599 439), and the Royal Melbourne Hospital Switchboard (03 9342 7000) if all else fails.
- In jurisdictions where facilities for Ebola Virus testing are available (e.g. NSW, QLD, WA), samples should be referred to VIDRL from the jurisdictional public health laboratory for confirmation.
- Further detail on laboratory testing is in Section 8.

Contact management

Public health authorities should identify all contacts of suspect, probable or confirmed cases (depending on patient risk assessment and particular circumstances) from the time of onset of symptoms in the case. The management of contacts is described in Section 11.

Control of environment

Disinfection and environmental decontamination is a key component to control of EVD. Cleaning and environmental decontamination is described in Section 10 and further detail is provided in appendices 12 and 13.

2. The disease

Infectious agents

EVD is caused by an Ebola Virus.

Ebola viruses are in the family *Filoviridae*, which also contains Marburg virus. There are five species. The Zaire, Bundibugyo and Sudan species have been associated with large outbreaks in humans in Africa, while Reston and Tai Forest species have not been associated with human outbreaks.

Reservoir

Fruit bats of the *Pteropodidae* family are considered to be a likely natural host of the Ebola Virus, with sporadic disease and outbreaks amongst other species such as chimpanzees, gorillas, monkeys and forest antelope occurring from time-to-time.

Mode of transmission

Ebola Virus is introduced into the human population through direct contact (through mucous membranes or broken skin) with the blood, secretions, or other bodily fluids of infected animals (often therefore through hunting or preparation of "bushmeat"). In Africa, infection has been documented through the handling of infected chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest.

Ebola Virus then spreads through person-to-person transmission via direct contact (through mucous membranes or broken skin) with:

- the blood or bodily fluids (including but not limited to urine, saliva, feces, vomit, breast milk and semen) of people with EVD, and the bodies of people who have died of EVD. Contact with bodily fluids includes sexual contact.
- objects (e.g. needles, syringes) contaminated with blood or bodily fluids of people with EVD.

Transmission of Ebola Virus is not known to occur prior to the onset of symptoms of EVD. The infectivity is known to be low at the onset of symptoms, and increases as symptoms worsen and as the bodily fluid secretions increase. For example a patient with profuse vomiting and diarrhoea is more infectious than a patient with a fever only. Infectivity is highest at the point of death and after death.

Transmission through sexual contact may be possible after clinical recovery.^{1, 2, 3, 4, 5} Participating in traditional burial ceremonies in affected areas of Africa is a known high risk activity for transmission.

The risk of transmission in healthcare settings can be significantly reduced through the use of appropriate infection control precautions and environmental cleaning.

Airborne transmission to humans, as occurs for tuberculosis or measles, has never been documented.

Incubation period

From 2 to 21 days; most commonly 8 to 10 days.

Infectious period

People with are not known to be infectious until the onset of symptoms of EVD. People are infectious as long as their blood and secretions contain the virus. Ebola Virus was isolated from semen 82 days after onset;⁴ while a case of possible sexual transmission has been described where the contact occurred 179 days after likely onset.⁵ The period of risk for transmission through sexual contact after clinical recovery cannot currently be defined, and as a precaution, should be considered to continue indefinitely until further information is available.

Clinical presentation and outcome

The onset of symptoms is sudden and includes fever, myalgia, fatigue and headache. The next stage may include symptoms that are gastrointestinal (vomiting, diarrhoea), neurological (headaches, confusion), vascular, cutaneous (maculopapular rash), and respiratory (sore throat, cough) with prostration. Cases may develop a profound electrolyte disturbance, a septic shock-like syndrome, and progress to multi-organ failure, sometimes accompanied by profuse internal and external bleeding. The case-fatality rate (CFR) for the Zaire strain of Ebola Virus is estimated to be between 50% and 90%, while for other species, the CFR may be lower. Variability in reported case-fatality rates probably reflects viral strain, host factors and access to and standards of clinical care.

Persons at increased risk of disease

People who are living in or travelling to affected areas of Africa may be at risk of infection; however, this risk is extremely low unless there has been direct exposure to the bodily fluids of an infected person (including unprotected sexual contact with confirmed cases after they have recovered), or infected animal (alive or dead).

Caring for ill relatives or contact with the body after death are known risk factors for infection. Healthcare workers, particularly those in resource poor settings with inadequate infection control, are also at risk.

Disease occurrence and public health significance

EVD was first recognised in 1976 in two simultaneous outbreaks, in Nzara, Sudan, and in Yambuku, Democratic Republic of Congo. As of 10 September 2014, there had been 30 reported outbreaks of EVD in humans with more than 7,000 cases, including 4,047 documented as fatal (overall case-fatality rate 56%).^{3, 6} The largest outbreak to date began in December 2013 in West Africa (involving the neighbouring countries Guinea, Liberia and Sierra Leone, with limited spread in Nigeria), with more than 6,000 clinically-compatible cases as of 21 September 2014 (continuing).

There have also been a number of incidents involving Ebola Reston virus in animals, but never a symptomatic human case. All outbreaks in humans (excluding asymptomatic Ebola Reston infections) have occurred in central Africa (the Congo, Democratic Republic of Congo, Uganda, South Sudan and Gabon) except for the current (at the time of writing) outbreak in West Africa, a single case in Ivory Coast, two laboratory contamination incidents in Russia and an import-related case in South Africa.

With a very high case fatality rate (up to 90% in some outbreaks) and potential for large outbreaks that are difficult to control in resource poor settings, an outbreak of EVD is a public health emergency, with effective control requiring the co-operation of all sectors of the community in-country and the involvement of international agencies.

The significance of EVD to public health in Australia is much lower; with a low risk of imported cases, and even lower risk of spread in the event of an imported case. However, a single case in Australia would require an urgent public health response and would be treated as a communicable disease event of national significance, with considerable community and media interest.

3. Routine prevention activities

Travel restrictions are not routinely recommended for control of EVD, but it is recommended that travellers to countries where EVD occurs avoid areas where outbreaks are occurring.

People travelling in countries affected by EVD should maintain good hygiene practices. Travellers should avoid direct exposure to the body fluids of an infected person or animal (alive or dead), including avoiding the consumption of "bushmeat". Travellers should avoid unprotected sexual contact with EVD cases after they have recovered.

4. Surveillance objectives

- To rapidly identify, isolate and treat cases, and prevent transmission to their contacts
- To identify and provide information to contacts and ensure that they are isolated rapidly should symptoms occur

5. Data management

Probable and confirmed cases of EVD infection should be entered onto the notifiable diseases database ideally within one working day of notification/report. Data for suspected cases should be maintained according to jurisdictional protocols.

6. Communications

Public health units should immediately notify the central state/territory communicable diseases agency of suspected, probable and confirmed cases. Provide the case's date of birth, sex, place of residence, indigenous status, date of onset, travel history, laboratory results, clinical status, likely place of acquisition, and follow-up action taken.

State/territory communicable diseases agencies should immediately notify suspected, probable and confirmed EVD cases to the National Incident Room by telephone 02 6289 3030 or email: health.ops@health.gov.au.

7. Case definition

Person under investigation

Requires clinical evidence and limited epidemiological evidence.

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

Suspected case

Requires clinical evidence and epidemiological evidence.

Probable case

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

Confirmed case

Requires laboratory definitive evidence only.

For surveillance purposes, only probable and confirmed cases are submitted to NNDSS.

Definitions

Clinical evidence requires fever ($\geq 38^{\circ}\text{C}$) or history of fever in the past 24 hours. Additional symptoms such as unexplained haemorrhage or bruising severe headache, muscle pain, marked vomiting, marked diarrhoea, abdominal pain should also be considered.

Limited epidemiological evidence requires travel to an EVD affected area (country/region) in the 21 days prior to onset.

Epidemiological evidence requires a lower risk exposure or higher risk exposure as defined below in the 21 days prior to onset.

Lower risk exposures:

- household contact with an EVD case (in some circumstances this might be classified as higher risk such where the household was in a resource poor setting),

- being within approximately 1 metre of an EVD case or within the case's room or care area for a prolonged period of time (e.g., healthcare workers, household members) while not wearing recommended personal protective equipment (See Section 9),
- having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended personal protective equipment.

Higher risk exposures:

- percutaneous (e.g. needle stick) or mucous membrane exposure to blood or body fluids of an EVD case (either suspected or confirmed)
- direct skin contact with blood or body fluids of an EVD case 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,
- 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,
- consumption of "bushmeat" in country where EVD is known to occur.

Note: The presence of higher versus lower risk exposures, and the patient's clinical condition may influence decisions about the need to transfer the patient.

Note: Exposure to an EVD case in an Australian setting would require the case is probable or confirmed EVD according to laboratory criteria.

Laboratory suggestive evidence includes:

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

- Detection of specific virus by nucleic acid testing, antigen detection assay, or electron microscopy pending confirmation by VIDRL, Melbourne, or 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 VIDRL, Melbourne, or CDC, Atlanta or NIV, Johannesburg; OR
- Detection of IgM to a specific virus pending confirmation by VIDRL, Melbourne, or CDC, Atlanta or NIV, Johannesburg.

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

- 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.

* The first case in any outbreak in Australia will also be confirmed by CDC, Atlanta or NIV, Johannesburg.

8. Laboratory testing

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

To organise testing of a **suspected case**, the treating clinicians should contact their jurisdictional public health reference laboratory for advice on specimen type, collection and transport. Treating clinicians should:

- notify the jurisdictional Communicable Disease Control Branch/Public health Unit as soon as possible for further advice on EVD risk assessment, and public health management if indicated, and
- contact the Public Health Reference Laboratory for advice on appropriate specimen type, collection and transport.

Appendix 4 (EVD Patient assessment flow chart) provides guidance on assessing the risk and deciding whether to test for Ebola Virus. A risk assessment as per the EVD Patient Assessment Flow Chart should be conducted in liaison with the C/HQO and an infectious diseases specialist.

Organising testing

Testing for EVD in Australia is conducted at the National High Security Quarantine Laboratory (NHQSL) at VIDRL. In some jurisdictions facilities exist for the preliminary testing of samples for Ebola Virus. Where preliminary testing is to be conducted at these facilities, samples should be sent to VIDRL from the jurisdictional public health laboratory for confirmatory testing.

Telephone contact with the VIDRL on-call microbiologist is essential before any specimen referral. The VIDRL on-call microbiologist can be contacted on mobile 0438 599 437. In case of difficulty back-up is provided by the VIDRL on-call laboratory manager (0438 599 439), and the Royal Melbourne Hospital Switchboard (03 9342 7000).

Collecting, handling and transport laboratory specimens for a suspected, probable or confirmed case

The primary diagnostic method is detection of Ebola Virus by PCR in blood. PCR on a throat swab or urine may also be used and serology is also available.

The essential specimen for virus detection is venous blood. Throat swabs and urine may also be collected. Blood (in EDTA tubes), throat swabs and possibly urine should be collected as per the *National High Security Laboratory guidelines for management of human quarantine*, available from [the Department of Health website](http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nhsq-qvhf.htm) (<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nhsq-qvhf.htm>).

Appropriate precautions must be used when collecting blood, urine or throat swab specimens. Infection control precautions are the same as those recommended for patient care, noting the particular recommendations for aerosol-generating procedures (see Section 9. Case management, Isolation and Restriction, Appendix 9).

Where tests for Ebola Virus have been ordered, routine haematology and other tests should be minimised since blood is highly infectious. If other tests are required for the immediate management of the patient, these should only be performed in close collaboration with specialist physicians, laboratory staff and public health authorities at the point of care, or in laboratories associated with designated quarantine hospitals, guided by jurisdictional viral haemorrhagic fever or laboratory plans wherever possible.

For laboratories not associated with a designated quarantine hospital, there are guidelines for handling material collected from suspected cases: *Laboratory precautions for samples collected from patients with suspected viral haemorrhagic fevers: guidelines for laboratories that are not associated with a designated isolation hospital* are available from [the Department of Health website](https://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-other-vhf.htm) (<https://www.health.gov.au/internet/main/publishing.nsf/Content/cda-pubs-other-vhf.htm>).

While samples should be ideally processed in laboratories with Physical Containment level 3 (PC3) facilities, these guidelines provide information about enhanced precautions for handling material in PC2 facilities where required. The guidelines provide for the necessary on-site testing for other possible causes of the illness, and other testing required for the immediate and ongoing clinical management of the case. Work should be conducted in a biological safety cabinet.

Ebola Virus is a Tier 1 Security Sensitive Biological Agent (SSBA). Laboratory personnel should refer to the SSBA standards when handling specimens. The standards are available from [the Department of Health website](http://www.health.gov.au/internet/main/publishing.nsf/Content/ssba.htm#standards) (<http://www.health.gov.au/internet/main/publishing.nsf/Content/ssba.htm#standards>). Specimens should be transported in accordance with current regulatory requirements (including SSBA guidelines).

More information about testing, contact details for VIDRL, guidance on the collection and handling of samples and procedures for transportation is available in the *National High Security Laboratory guidelines for management of quarantinable viral haemorrhagic fevers*, available from the Department of Health website (<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-nhsq-l-qvhf.htm>).

Re-testing

If a sample is collected from a patient at the very early stages of illness and that returns a negative result on EVD PCR, then, in the absence of an alternative diagnosis through other testing, and in conjunction with continued illness, a follow-up PCR at least three days post development of symptoms is advisable. Re-testing remains a clinical decision based on the patient's ongoing condition.

9. Case management

9.1 Person under investigation

A **person under investigation** should be placed in a single room. Treating clinicians should contact the jurisdictional Communicable Disease Control Branch/Public health Unit as soon as possible for further advice on EVD risk assessment and to discuss any need for EVD testing. Persons under investigation must not be allowed to leave the hospital except if they are being transferred. Where there is a need to test, the person should be classified and managed as a **suspected case**.

9.2 Suspected, probable and confirmed cases

Response times

Suspected, probable or confirmed cases should be immediately notified to the central state or territory Communicable Disease agency who will notify the National Incident Room urgently. A follow up investigation should begin on the same day as notification.

Response procedure

Case investigation

The response to a notification will normally be carried out in collaboration with the clinicians managing the case, and be guided by the EVD public health unit checklist (Appendix 2), the EVD Patient Assessment Flow Chart (Appendix 4) and the EVD Case Investigation Form (Appendix 5). The presence of higher versus lower risk exposures, and the patient's clinical condition may influence decisions about the need to transfer.

PHU staff should ensure that action has been taken to:

- Confirm the onset date and symptoms of the illness
- For suspected, probable or confirmed cases:
 - Confirm results of relevant pathology tests, or recommend that tests be done
 - Determine if the diagnosis has been discussed with the case or relevant care-giver before beginning any interview
 - Review public health management of cases and contacts
 - Ensure appropriate infection control guidelines are followed in caring for the case
 - Identify the likely source of infection.

Note: If interviews with suspected, probable or confirmed cases or with persons under investigation who are being tested are conducted face-to-face, the person conducting the interview must have a thorough understanding of the indicated infection control practices and be competent in using appropriate PPE. Treating staff may conduct the interview rather than public health staff to reduce the number of people entering the room.

Identification of contacts

The procedures for risk assessment and management of contacts, including contact definitions, are outlined under section *11. Contact Management*.

Education

Provide an EVD Fact Sheet to cases (Appendix 1), if appropriate.

Case treatment

In the absence of pathogen-specific interventions, patient management largely depends on supportive treatment, and vigilance for and prevention of complications.

Empiric therapy for conditions such as malaria and bacterial sepsis may be considered by treating clinicians, particularly if there are likely to be delays in the availability of laboratory test results.

Cases should be managed in the designated quarantine hospital where this is possible, unless alternative arrangements are necessary (e.g. initial presentation in a rural area, patient too ill to be transported, on the basis of risk assessment) or recommended on expert advice.

Infection control, and isolation and restriction

Infection control measures

In summary, these should include – at a minimum:

- Placement of the patient in a single room with private bathroom and an anteroom, with the door closed. In hospitals where such facilities are not available, interim arrangements may be required, such as use of commodes in the patient's room and unoccupied adjacent rooms for anterooms;
- Healthcare worker (HCW) to use a P2/N95 mask, and cover all skin using a suitable combination of PPE, such as a disposable fluid resistant gown, gloves, and eye protection (e.g. goggles or face shield), leg and shoe coverings, overalls when entering a patient care area. Double gloving might also be considered.
- Close attention to hand hygiene.

Use of PPE, especially additional PPE, requires adequate training and supervision – see below:

Staff training on the use of PPE. The use of a “buddy” system, where staff members observe each other in the safe removal of PPE after patient contact, is recommended. A knowledgeable and experienced staff member should be assigned to oversee the safe use of PPE in the patient care area.

Aerosol generating procedures (AGP) should be avoided in an EVD patient. If an AGP is essential, the PPE should include – at a minimum as stated above – a P2/N95 mask, and cover all skin, using a suitable combination of PPE, such as a disposable fluid resistant gown, gloves, and eye protection (e.g. goggles or face shield), leg and shoe coverings, overalls when entering a patient care area. Double gloving might also be considered. Limit the use of needles and other sharps as much as possible.

Visitors should be restricted to a limited number of immediate family members; and only adults who are well. Visitors who come into contact with suspected case, probable and confirmed cases must be protected according to recommended infection control guidelines. Direct contact with the patient should not be allowed. A log should be kept of any visitors, including contact details.

Where a suspected case initially tests negative for EVD, but there is no alternative diagnosis and a high index of suspicion remains, consideration should be given to continued isolation and use of the recommended infection control precautions, pending further testing (see Laboratory testing section) and re-assessment.

Individual organisations may develop institute facility-specific infection control recommendations that exceed the national minimum standard specified here. Training in the use of PPE is particularly important when using any additional measures (beyond usual transmission-based precautions), because without sufficient training, additional PPE can be unsafe.

For hospitals managing the ongoing care of probable or confirmed EVD cases, the United States Centers for Disease Control (CDC) ***Guidance on Personal Protective Equipment to be use by healthcare workers during management of patients with Ebola Virus Disease in U.S. Hospitals, including procedures for putting on (donning) and removing (doffing)*** (<http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html>) are recommended.

The CDC guidance includes recommended administrative and environmental controls for healthcare facilities, principles of PPE, training on correct use of PPE, use of a trained observed, designating areas for PPE donning and doffing, selection of PPE for healthcare workers during management of Ebola patients, recommended personal protective equipment for HCW and for observers and preparation for doffing.

Staff training on the use of PPE

Staff should be thoroughly trained in detailed procedures regarding how to put on and especially to take off PPE, including the correct order to avoid cross contamination and where used, to check that the respirator (P2/N95 mask) with which they are provided fits properly. They must also receive clear instructions on when PPE is to be used and how it is to be disposed of or, as appropriate, decontaminated, maintained and stored. This training should be held regularly.

It is important that training be extended to all staff who may come into contact with suspected, probable and confirmed cases.

The CDC guidance (<http://www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html>) is recommended for donning and doffing for PPE used in ongoing care of probable or confirmed EVD cases, including instructions on use of Powered Air Purifying Respirators (PAPR) or surgical hoods use.

Without detailed and thorough training, the use of PPE beyond that which healthcare workers regularly use may endanger staff. Without training, additional PPE may be ineffective.

Management and monitoring of potentially exposed healthcare workers

Facilities should develop policies for monitoring and management of potentially exposed HCW.

Facilities should keep a log of all staff that are involved in the care of EVD patients.

Persons with percutaneous or mucocutaneous exposures to blood, body fluids, secretions, or excretions from a patient with suspected EVD should:

- Stop working and immediately wash the affected skin surfaces with soap and water. Mucous membranes (e.g., conjunctiva) should be irrigated with copious amounts of water or eyewash solution
- Immediately contact occupational health/supervisor for assessment and access to postexposure management services for all appropriate pathogens (e.g., Human Immunodeficiency Virus, Hepatitis C, etc.)

Release of cases from isolation

A suspected case may be released from isolation and discharged if the medical condition allows after testing negative for EVD, unless a high index of suspicion remains (such as in the absence of an alternative diagnosis). They should be given a fact sheet (Appendix 1) and contact details for the state/territory public health unit (Appendix 3).

Probable and confirmed cases may be released from isolation in consultation with an infectious diseases physician and public health authorities and allowed to return home if recovered sufficiently from the illness. However, convalescent patients must be meticulous about personal hygiene due to the possibility of the presence of virus in bodily fluids, particularly semen, in which the presence of virus been demonstrated for up to three months after recovery.⁴ The case should be given advice about the use of condoms, or abstinence from sex.

Blood donation

The Australian Red Cross Blood Service recommends that a case defers for 12 months from the date of recovery (this is a conservative deferral given the lack of evidence about the duration of viraemia post recovery).

Summary of PPE recommendations for patient management

Suspected, probable or confirmed cases

- Hand hygiene
- Cover all skin using appropriate combination of PPE including, but not limited to:
 - Gloves
 - Fluid resistant long sleeved gown
 - Eye protection (e.g. goggles)
 - P2/N95 respirator
 - Face shields, leg and shoe coverings, overalls.

10. Environmental evaluation

This section applies primarily to probable and confirmed cases, acknowledging there may be a need to consider environmental cleaning for a suspected case with a high pre-test probability of EVD.

Full PPE (covering all skin) must be worn when undertaking environmental cleaning, including a P2/N95 mask, because cleaning procedures have the potential to generate aerosols.

Patient residence

It is not usually recommended that environmental cleaning of a suspected case's residence or other potentially contaminated areas be undertaken prior to receipt of test results for EVD. In most jurisdictions, the time between notification of a suspected case and receipt of the preliminary laboratory test results will be less than 24 hours. If EVD is felt to be unlikely, it may be possible to allow household members to continue to reside in the home and leave potentially contaminated areas of a residence or other facility unused temporarily.

If significant delays are expected, or where areas are urgently required to be cleaned, environmental cleaning may be undertaken – in discussion with the relevant public health unit. If a suspected case is considered to have a high pre-test probability of EVD based on the clinical and exposure risk assessment, and the potentially contaminated areas or objects cannot be isolated until test results are known, environmental cleaning might be undertaken prior to the confirmation of a case.

Appendix 13 provides further detail on undertaking environmental cleaning in domestic premises.

If a suspected case tests negative for EVD, and, re-testing is not required, no further special action is required for waste and isolated objects from the person's residence.

Cleaning and disinfection in healthcare settings

Routine environmental cleaning and disinfection

Disinfection and environmental treatment is a key component to control of EVD. All potentially contaminated personal items and items used in the treatment of the patient should be disinfected with an appropriate viricide. Ebolaviruses are readily inactivated by low-level disinfectants. The preferred disinfectant solution is sodium hypochlorite made up to 1,000 ppm parts per million (ppm) available chlorine (check the manufacturer's instructions) for routine environmental cleaning and 5,000 ppm for spills.

Terminal Cleaning

Once the patient has left the room the entire room should be cleaned with a neutral detergent and with a 1,000 ppm sodium hypochlorite solution. All cleaning equipment should be disposed of into the clinical waste.

Body fluid spill

Appropriate PPE must be worn for cleaning body fluid spills, including gloves, disposable impermeable overshoes or boots, and P2/N95 masks with face shields/goggles and fluid-resistant gowns. Spills should be cleaned using a spill kit. In the absence of a specific kit, spills should be absorbed with paper towels, liberally covered with a 5,000 ppm sodium hypochlorite solution and left to soak for 30 minutes before being wiped up, and disinfect the area again.

Patient equipment and linen

Limit the equipment that enters the patient's room, as it must be dedicated to the patient throughout their stay and cannot be used elsewhere. Disposable equipment and linen should be used wherever possible.

See Appendix 10 for further information on cleaning and disinfection.

Waste treatment and disposal

Items stained or containing body fluids are treated as clinical waste, and double bagged as the waste leaves the room. Waste must be stored securely prior to collection. Toilet waste may be flushed as usual, except where specific local requirements exist to the contrary. Disposable bed pans can be disposed of into the clinical waste after the addition of high absorbency gel, if available.

See Appendix 11 for further information on waste treatment and disposal.

Disposal of the deceased

Requirements for the disposal of bodies are prescribed under state and territory public health legislation (see Appendix 12).

Other factors to consider

Where local transmission of EVD is thought to have occurred, a thorough review of contributing environmental factors should be undertaken. This should include a review of infection control procedures, and opportunities for exposure to environments contaminated by body fluids.

Animal health

If a case has had contact with animals in Australia it may be appropriate to consult with animal health authorities to assess the risk that animals could have become infected. Dogs have previously been shown to have developed antibodies to Ebola Virus, but to date, it has not been reported that dogs have any clinical signs of infection.

11. Contact management

Identification of contacts

Contact tracing is conducted to identify and monitor persons who may have had contact with a probable or confirmed EVD case. Contacts of suspected cases should also be considered for

contact management, particularly if there is likely to be a delay in confirming or excluding the diagnosis in the suspected case.

Contacts should be provided with information about the disease and risk of transmission, and monitored for the development of symptoms for 21 days after the last exposure to the case while the case was likely to be infectious (i.e. the maximum incubation period).

Based on an exposure risk assessment, there may be circumstances where restrictions are considered, such as for contacts who are healthcare workers, or for people planning travel to rural or remote areas with limited access to healthcare.

Contacts who develop a fever within 21 days of the last possible exposure to an infectious case should be immediately isolated, medically evaluated and assessed as per Appendix 4.

Contact definition

Public health authorities should identify all contacts of suspect, probable or confirmed cases (depending on patient risk assessment and particular circumstances) from the onset of symptoms in the case.

Contacts of an EVD case are assessed for their likely level of exposure, and managed according to risk category as per the table below.

Table. Risk assessment and management for contacts of probable and confirmed* cases of EVD

Contact exposure category	Definition	Action and advice
Casual contacts	No direct contact with the patient or body fluids but who have been in the near vicinity of the patient	Reassure about very low risk Provide template contacts fact sheet (Appendix 6);
Lower risk exposures	<ul style="list-style-type: none"> • Household contact with an EVD case (in some circumstances this might be classified as higher risk such where the household was in a resource poor setting) or <p>Close contact in healthcare or community settings where close contact is defined as:</p> <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 personal protective equipment (See Section 9 Case management Infection Prevention, Isolation and Restriction) - having direct brief contact (e.g., 	<p>Explain what is meant by low risk;</p> <p>Twice daily self-monitoring of temperature for 21 days from last exposure; provide thermometer and instructions on use;</p> <p>Notify public health authority if fever or other symptoms⁺ develop.</p> <p>Provide template contacts fact sheet (Appendix 6);</p> <p>Consider daily (or twice daily) active monitoring by Public Health Unit / Jurisdictional communicable disease control branch.</p>

Contact exposure category	Definition	Action and advice
	<p>shaking hands) with an EVD patient while not wearing recommended personal protective equipment</p> <p><i>Healthcare workers (see below).</i></p>	<p>An exposure and clinical risk assessment conducted by public health authorities, as well as an assessment of personal circumstances, will inform what activities and/or restrictions are required as part of an individual management plan.</p>
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 • 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>Inform about risks;</p> <p>Twice daily self-monitoring of temperature for 21 days from last exposure; provide thermometer and instructions on use;</p> <p>Daily (or twice daily) active monitoring by Public Health Unit / Jurisdictional communicable disease control branch.</p> <p>Notify public health authority if fever or other symptoms⁺ develop.</p> <p>Provide template contacts fact sheet (Appendix 6).</p> <p>An exposure and clinical risk assessment conducted by public health authorities, as well as an assessment of personal circumstances, will inform what activities and/or restrictions are required as part of an individual management plan.</p>

*Contact tracing may be undertaken in response to a *suspected* case where there may be a delay in laboratory diagnosis.

+Other symptoms includes headache, joint and muscle aches, abdominal pain, weakness, diarrhoea, vomiting, stomach pain, rash, red eyes, chest pain, difficulty swallowing, bleeding inside or outside the body.

Adapted from United Kingdom Department of Health, Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious disease of high consequence.

Contact assessment

Demographic and epidemiological data should be collected from all persons identified as having had close contact with a probable or confirmed EVD case using the case report form (Appendix 5). Information on close contacts should be managed according to jurisdictional requirements.

Identification and assessment of the close contacts of suspected cases may be deferred pending the results of initial laboratory testing. However, contact tracing should be considered if EVD infection remains high on the list of differential diagnoses, even if initial laboratory results are negative.

In the event of a suspected case on an aeroplane, see Section 12: Special Situations.

Contact testing

Routine laboratory screening for EVD infection is not recommended for asymptomatic contacts.

Prophylaxis

No specific prophylactic treatments are available for contacts.

Education

Contacts should be counselled about their risk and the symptoms of EVD and provided with a fact sheet (Appendices 6,7,8) suitable for their level of exposure, as per the table above.

Quarantine and restriction

Routine home quarantine of asymptomatic contacts is not recommended, but contacts with higher or lower risk exposures to the case are advised to monitor their health for 21 days after the last possible contact with a probable or confirmed EVD case.

An exposure and clinical risk assessment conducted by public health authorities, as well as an assessment of personal circumstances, will inform what activities and/or restrictions are required as part of an individual management plan. For example, measures to reduce body contact and/or social mixing with other people may be recommended based on a risk assessment of the particular circumstances. This may include avoiding sexual contact.

Special arrangements for the monitoring of returning healthcare workers apply (See below "Returning aid workers who have worked in healthcare or community settings during an EVD outbreak", Appendix 7).

Close contacts with higher risk exposures

Work restrictions may be considered for some contacts with higher risk exposures or for healthcare worker contacts (see Table) for 21 days following the last possible contact with the case. Home quarantine is not routinely recommended during this period if these individuals remain asymptomatic, but measures to reduce body contact and/or social mixing with other people may be recommended based on a risk assessment of the particular circumstances.

Management of symptomatic contacts

If the contact develops symptoms consistent with EVD infection within the 21 days following the last contact with the case, the individual should be immediately isolated and managed as per the current clinical recommendations for suspected EVD cases, with a clinical risk assessment (Appendix 4), and depending on the outcome of the risk assessment, urgent testing for EVD

infection. The clinical management of symptomatic contacts should then be guided by Appendix 4, and may include monitoring and repeat testing.

Symptomatic contacts who test negative for EVD by nucleic acid testing (NAT) will still need to be monitored for 21 days after their last contact with a probable or confirmed EVD case. If the symptomatic contact's laboratory specimen was collected during the first three days of illness, re-testing for EVD can be considered, based on clinical judgement and results of other investigations. See Section 8 – Laboratory testing, Re-testing.

Healthcare workers working in Australia

In an Australian clinical setting, healthcare workers who have taken recommended infection control precautions, including the use of appropriate PPE, while caring for a probable or confirmed EVD case are not considered to have had low or high-risk exposures to EVD.

However, given that not all breaches in PPE are obvious and work conditions may elevate anxiety levels, healthcare workers caring for probable or confirmed EVD cases may be advised to monitor their temperature daily. This approach means that healthcare workers are managed as low risk contacts even in the absence of known lower risk exposures, however no restriction in work duties is necessary while the HCW is asymptomatic.

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

If the HCW develop symptoms consistent with EVD infection they should isolate themselves and notify their employer and public health unit immediately.

Returning aid workers who have worked in healthcare or community settings during an EVD outbreak

Public health authorities and/or employers may take a precautionary approach to returned aid workers, particularly those who were involved in direct patient care in an EVD outbreak, during the 21 days since the aid worker has left the EVD-affected country.

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

The returned aid worker must not work in clinical care for their 21 day monitoring period. Employers might consider temporary re-assignment to non-direct patient care duties, or a non-punitive leave policy that covers the 21 day monitoring period.

Separately, the aid worker's host organisation should have a policy for returning workers, including advice on self-monitoring of temperature and/or other symptoms of EVD for 21 days since leaving the EVD-affected country, being within easy travel distance of a designated quarantine hospital or adequate tertiary care, and the need for a period of restriction in clinical care activities during the monitoring period.

Appendix 7 outlines an approach to the management of returned healthcare workers.

Enhanced border and monitoring measures that may apply during outbreaks with widespread and intense transmission

During an outbreak overseas with widespread and intense transmission, the risk of importation to Australia increases and enhanced border screening and post border monitoring may be instituted. Targeted enhanced border screening measures ensure that everyone who could be at risk is detected, safely managed, knows how to monitor their health and knows who to contact if they become unwell.

Border screening

Border authorities may identify incoming passengers who have travelled in affected areas during the previous 21 days. These passengers will be asked about possible exposures to EVD and their body temperature may be measured. Anyone who may have been in direct (unprotected) contact with an infected person or undertaken certain other high risk activities (funeral attendance) without sufficient personal protective measures, has a recent history of fever (previous 24 hours), or who has a measured body temperature of $\geq 37.5^{\circ}\text{C}$ will be referred to a state or territory human quarantine officer for further assessment which may include transfer to a designated isolation hospital. All people who are screened at the border should be given an information pack about what to do if they become unwell, and the pack may include a thermometer for further monitoring.

Post-border monitoring

While the risk of acquiring EVD is very low unless there has been direct contact with the blood or body fluids of an infected person, during an outbreak of widespread and intense transmission, universal daily monitoring for anyone returning from affected countries regardless of risk may be implemented to facilitate early clinical assessment of returning travellers and to assure public safety. Monitoring may be passive, active, daily or twice daily, depending on the individual circumstances of the traveller. Systems such as automated SMS⁷ or call centres may be used to collect monitoring data from returning travellers. During the period of monitoring, where there is interstate travel, there is formal handover between the human quarantine officers (or delegate) in the jurisdictions of travel.

Blood donation

The Australian Red Cross Blood Service recommends that contacts of an EVD case should not donate blood until cleared of infection by the absence of illness 21 days post last contact and an additional 5 weeks has passed.

12. Special situations

Suspected, probable or confirmed case who travelled by aeroplane

An assessment of possible transmission of Ebola Virus on an aircraft should be undertaken on a case-by-case basis. This should occur after careful risk assessment, taking into account the index case status, the presence of symptoms during the flight, any potential exposures during the flight, and the goals of the contact tracing.

Goals of contact tracing

- Prevention of onward transmission and awareness-raising for early detection in

passengers/crew/ground staff who have had direct contact with the index case, or direct contact with the bodily fluids of the index case.

- Reassurance for passengers/crew/ground staff with negligible exposure to the index case and subsequently low/no risk of EVD.

When should contact tracing an aeroplane be considered?

Contact tracing should be considered for suspected, probable and confirmed cases if the case was symptomatic during the flight. To ensure a consistent approach, upon notification of an incident involving a case on an aeroplane, an expert jurisdictional panel consisting of the jurisdictional executive group of CDNA should be urgently convened to assess risk and agree on the approach to contact tracing. Considerations for the expert panel will include whether the case was symptomatic during flight, and whether the symptoms were “wet” or “dry”. A wider radius of follow-up may be required for a “wet” case than the standard +/-1 seat, including the row and the toilets used by the case.

Contact tracing should focus on:

- Any person who reported direct contact with the index case, i.e. direct contact with the bodily fluids, or with objects likely to have been contaminated with such fluids, or with the skin of the patient.
- Passengers who were seated in direct proximity to the index case, i.e. passengers who were one seat away from the index case (+/- 1 seat in all directions) (see Figure 1). In some situations, a more inclusive approach may be appropriate, such as where an ill passenger in a window seat has climbed over two adjacent passengers to access the aisle during the flight.
- Crew members who provided in-flight service in the section of the aircraft where the index case was seated should be included in the trace-back,
- Cleaning staff that cleaned the section and seat where the index case was seated.

Passengers and crew with reported direct contact: Co-travellers and crew members who had reported direct body contact, i.e. direct contact with the bodily fluids, or with objects likely to have been contaminated with such fluids, or with the skin of the index case should be traced. To gather this information, any records of significant events on the flight should be obtained from the airline.

Passengers +/-1 seat: As direct contact is the main route of transmission for Ebola, only the passengers who were seated in direct proximity to the index passenger should be included i.e. only passengers who were one seat away from the index case (+/- 1 seat in all directions). If the index case occupied an aisle seat, the three passengers seated directly across the aisle from the index case should also be traced (see Figure 1)

Crew members of plane section: Crew members who provided in-flight service in the section of the aircraft where the index case was seated should be included as well as other crew members who had direct contact with the patient.

Cleaning staff of plane section: Inform cleaning staff of the suspected case prior to cleaning so that additional infection control precautions can be used. The cleaning staff that cleaned the section and seat where the index case was seated should be traced.

Passengers who shared the same toilet as the index case: Previously published guidance has suggested that in the absence of specific incidents, the use of the lavatory by the index case is not considered a risk for others and therefore not relevant when considering contact tracing.⁸

If there have been specific incidents such as the repeated and/or significant vomiting and/or diarrhoea in one or more of the toilets, efforts should be made to identify these toilet/s and associated aeroplane section and persons who may have been exposed to the case's bodily fluids in this setting.

The index case is a crew member

If a crew member is the suspected EVD case, contact tracing efforts should concentrate on passengers seated in the area where the crew member was working during the flight and all of the other members of the crew.

Persons with no direct exposure to the index case

Public health authorities may wish to communicate with every passenger from the aeroplane, irrespective of their exposure risk, to provide basic information and establish a mechanism for public health follow up if required.

Management of aeroplane contacts

People included in the contact tracing should be managed according to Section 11 Contact Management. This requires an assessment of exposure risk and categorisation into high, low or no risk contacts.

Management consists of one or more of the following:

- Provision of information through fact sheets and discussion with public health authorities.
- Assessment of the need for medical evaluation of the contact if they are reporting symptoms at time of first interview; or following exposure to the index case.
- Advice on the need for self-monitoring for temperature and notification to public health units and/or presentation to health facilities if they develop a fever within 21 days of last exposure to the index case.

Collecting event and passenger information

If a diagnosis cannot be laboratory confirmed in a timely manner, contact tracing should be considered if the evidence strongly suggests EVD as the likely cause of the index case's disease.

The National Incident Room at the Department of Health coordinates the collection of international flight manifests and incoming passenger cards (IPCs) (health.ops@health.gov.au)

Attempts should be made to contact the airline to investigate whether crew members remember (or even recorded) any incidents on board which resulted in potential exposures to crew or passengers.

It is possible that there could be an ill international traveller on a subsequent domestic flight. Public health authorities may be notified of this via airline or airport staff. For the purpose of contact tracing, passenger manifests may be obtained in conjunction with airlines or airport authorities. Given that passenger manifests on domestic airlines may not have complete contact information, it may be necessary to obtain contact details urgently from disembarking passengers.



Figure 1. Relevant areas for VHF contact tracing from [the ECDC website](http://ecdc.europa.eu/en/publications/Publications/1012_GUI_RAGIDA_2.pdf) (http://ecdc.europa.eu/en/publications/Publications/1012_GUI_RAGIDA_2.pdf)

Outbreaks in healthcare facilities.

If one or more suspected, probable or confirmed EVD cases are identified in a healthcare facility, an outbreak management team should be convened, including a senior facility manager, an infection control practitioner and appropriate clinical staff, in consultation with PHU staff. Control measures may include:

- identification and monitoring of close contacts
- active case finding and treatment
- isolation and/or cohorting
- work restriction for healthcare workers who have had close contact (i.e. unprotected exposure) with a suspected, probable or confirmed case
- distribution of fact sheets and other information
- epidemiological studies to determine risks for infection.

Outbreaks in residential care facilities or other residential institutions (e.g. prisons or boarding schools)

There have been few if any reports of EVD outbreaks in institutions other than in healthcare facilities. Nevertheless, it is assumed that fellow residents in an institution may be at greater risk of infection if there has been a confirmed case living at the institution while infectious, particularly if there are shared bathroom/toilet facilities.

If one or more probable or confirmed EVD cases are identified in a residential care facility or institution, an outbreak management team should be convened, including PHU staff.

13. References and additional sources of information

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6. Organization WH. Ebola virus disease in West Africa, situation as of 10 September 2014. 2014. Accessed on. Available from: <http://www.afro.who.int/en/clusters-a-programmes/dpc/epidemic-a-pandemic-alert-and-response/epr-highlights/4274-evd-maps-10-september-2014.html>
7. Tracey L, Regan A, Armstrong P, Dowse G, Effler P. EbolaTracks: an automated SMS system for monitoring persons potentially exposed to Ebola virus disease. *Euro Surveill* 2015;20(1).
8. European Centre for Disease Prevention and Control. Risk assessment guidelines for diseases transmitted on aircraft. Part 2: Operational guidelines for assisting in the evaluation of risk for transmission by transmission. 2010. Accessed on. Available from: http://ecdc.europa.eu/en/publications/Publications/1012_GUI_RAGIDA_2.pdf

Additional information:

World Health Organization (WHO) Global Alert and Response, Ebola virus disease, available from [the WHO website](http://www.who.int/csr/disease/ebola/en/) (<http://www.who.int/csr/disease/ebola/en/>)

United States Centers for Disease Control and Prevention (CDC), Ebola virus disease, available from [the CDC website](http://www.cdc.gov/vhf/ebola/index.html) (<http://www.cdc.gov/vhf/ebola/index.html>)

Public Health England (PHE), Ebola virus disease clinical management and guidance, available from [the PHE website](https://www.gov.uk/government/collections/ebola-virus-disease-clinical-management-and-guidance) (<https://www.gov.uk/government/collections/ebola-virus-disease-clinical-management-and-guidance>)

14. Appendices

- EVD Factsheet
- EVD PHU checklist
- Jurisdictional Public Health Unit Contact Details and isolation hospitals list
- EVD patient assessment flow chart
- EVD case report form
- Template contacts fact sheet

- Low risk close contacts fact sheet
- High risk close contacts fact sheet
- Returning aid workers who have worked in healthcare or community settings during an EVD outbreak
- Guidance for aircrews and cleaning staff in management of EVD
- Summary of infection control measures and procedures
- Cleaning and disinfection
- Waste treatment and disposal
- Post mortem care and examination

15. Jurisdiction specific issues

Links to Australian state and territory public health legislation, and the Commonwealth Quarantine Act and amendments are available at [the Department of Health website](http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-state-legislation-links.htm):
<http://www.health.gov.au/internet/main/publishing.nsf/Content/cda-state-legislation-links.htm>.

Public health staff should be familiar with the Viral Haemorrhagic Fever contingency plan for their jurisdiction where these plans exist.

Appendix 1 Ebola Virus Disease (EVD) factsheet

Ebola

Ebola Virus Disease (Ebola) is a serious and often fatal disease caused by a virus. Early treatment at a hospital can help people survive the disease.

During 2014 and 2015 there has been a large outbreak of Ebola in some West African countries. Poverty and limited healthcare have fuelled the outbreak.

There is no chance of a similar outbreak in Australia.

Symptoms

- If someone has caught the virus, it can take up to 21 days for symptoms to appear.
- Ebola is a serious illness with a sudden onset of fever, muscle and joint aches, weakness, and headache.
- This is followed by vomiting, diarrhoea, rash, and liver and kidney problems.
- Some people may have internal and external bleeding.
- In disadvantaged countries around half of people with Ebola die of the disease.

How it spreads

- Ebola is quite hard to catch.
- Ebola is spread by touching someone who is sick with or who has died from Ebola or by touching their body fluids such as blood, vomit, diarrhoea, or sweat, or through sex.
- It can also be spread by contact with objects contaminated with the bodily fluids of cases.
- Ebola doesn't spread through the air.
- A person with Ebola can only spread the disease **once they become sick**.
- In affected areas of Africa, people can catch Ebola through close contact with the blood, secretions, organs or other bodily fluids of infected animals (e.g. through the hunting or preparation of "bushmeat").

People at risk

People living or visiting affected areas of Africa may be at risk of infection. However, their risk of infection is extremely low unless they have direct contact with the body fluids of an Ebola-infected person or animal (alive or dead).

Preventing infection

Avoiding contact with a person sick with Ebola or their bodily fluids prevents spread of the disease.

There is no vaccine for EVD. Hunting and contact with "bushmeat" in affected areas of Africa should be avoided.

How it is diagnosed

A blood test can diagnose Ebola.

How it is treated

At the moment there is no specific cure for Ebola but intensive medical care can save lives.

How health authorities will prevent its spread in Australia

People who travel from Ebola-affected countries are checked for symptoms at Australian international borders. A person with Ebola symptoms will be taken from the airport to a hospital which is equipped to manage suspected Ebola patients.

Anyone who may be at risk of Ebola but who is well can travel on within Australia, but will be safely managed to protect their health and the community.

It is unlikely that someone with Ebola will arrive and become ill in Australia; but our health system is prepared to safely manage them if they do.

What should a person at risk of Ebola do if they become unwell

Anyone who becomes ill or feels unwell while travelling in areas affected by Ebola should not wait until they arrive back in Australia to seek medical assistance. Instead they should phone a doctor, go to an emergency department or call an ambulance if urgent medical attention is required.

If you have returned within the last 21 days from travel to areas affected by Ebola and you get a temperature 37.5°C or over OR feel sick, withdraw from contact with others, stay at home and call **1800 186 815 Australia-wide** to speak to your public health unit. The public health unit staff will help you and tell you what to do next. If you need immediate medical assistance dial 000 and advise them that you have been in an Ebola affected country.

If you become unwell, you should avoid direct physical contact with any other person, until you have been told it is okay to do so by the public health unit and always wash your hands carefully.

Further information

World Health Organization Ebola updates available from the WHO website:
(www.who.int/csr/disease/)

Australian Department of Health Ebola website
(<http://www.health.gov.au/internet/main/publishing.nsf/Content/ohp-ebola.htm>)

February 2015

Appendix 2: PHU EVD checklist

1. Using the EVD Investigation form, contact the patient's doctor to:

- Confirm the onset date and symptoms of the illness
- Confirm results of relevant pathology tests, or recommend that tests be done in accordance with local laboratory referral protocols
- Find out if the case or relevant care-giver has been told what the diagnosis is before beginning the interview
- Inform the doctor that public health staff will be contacting the patient/next of kin/carer.
- Review case management including infection control measures being used in caring for the case

2. Interview the case or care-giver to complete exposure and contact history and other details

- Complete the exposure history and other sections of the EVD Investigation Form.
- Identify close contacts according to the contact definition.

3. Follow-up patient's contacts to:

- Assess risk of EVD transmission
- Determine current symptoms, if any
- Explain symptoms and need to immediately report any new symptoms
- Explain to healthcare worker close contacts any need for work restrictions during the potential incubation period if there has been exposure
- Provide an EVD Disease Factsheet and recommend any self-monitoring for relevant contacts.

4. Operational considerations for contact tracing

- Contact tracing team members and relevant roles and responsibilities
- Define circumstances where contact tracing will be done by telephone or in person
- Consider need for dedicated call centre and scripts in response to a notified case
- Surveillance data management of contacts

Training for contact tracing team

- EVD transmission
- Rationale for contact tracing
- Training in use of contact interview form and explanation of fact sheets, including if/how jurisdictions will recommend restrictions for contacts of confirmed cases
- Infection prevention and control measures for contact tracers, including use of PPE, and instructions for use of thermometers if face to face interviews or assessments are conducted

Resources

- Contact listing sheets, case and contact interview forms

- Temperature logging forms for contacts
- Information/fact sheets for contacts
- Consideration of thermometers supplied to contacts, or advice on which thermometers to use
- If face to face contact tracing or assessments are conducted, consider need for alcohol-hand rub, supply of PPE– disposable gloves, P2/N95 masks, gowns, goggles; and guidelines on when to use / put on PPE; general guidance for conduct during home visits such as no physical contact with people or objects at location, maintain > 1 metre distance from individuals, don't enter the residence)

Policy *for health monitoring of contact tracers*

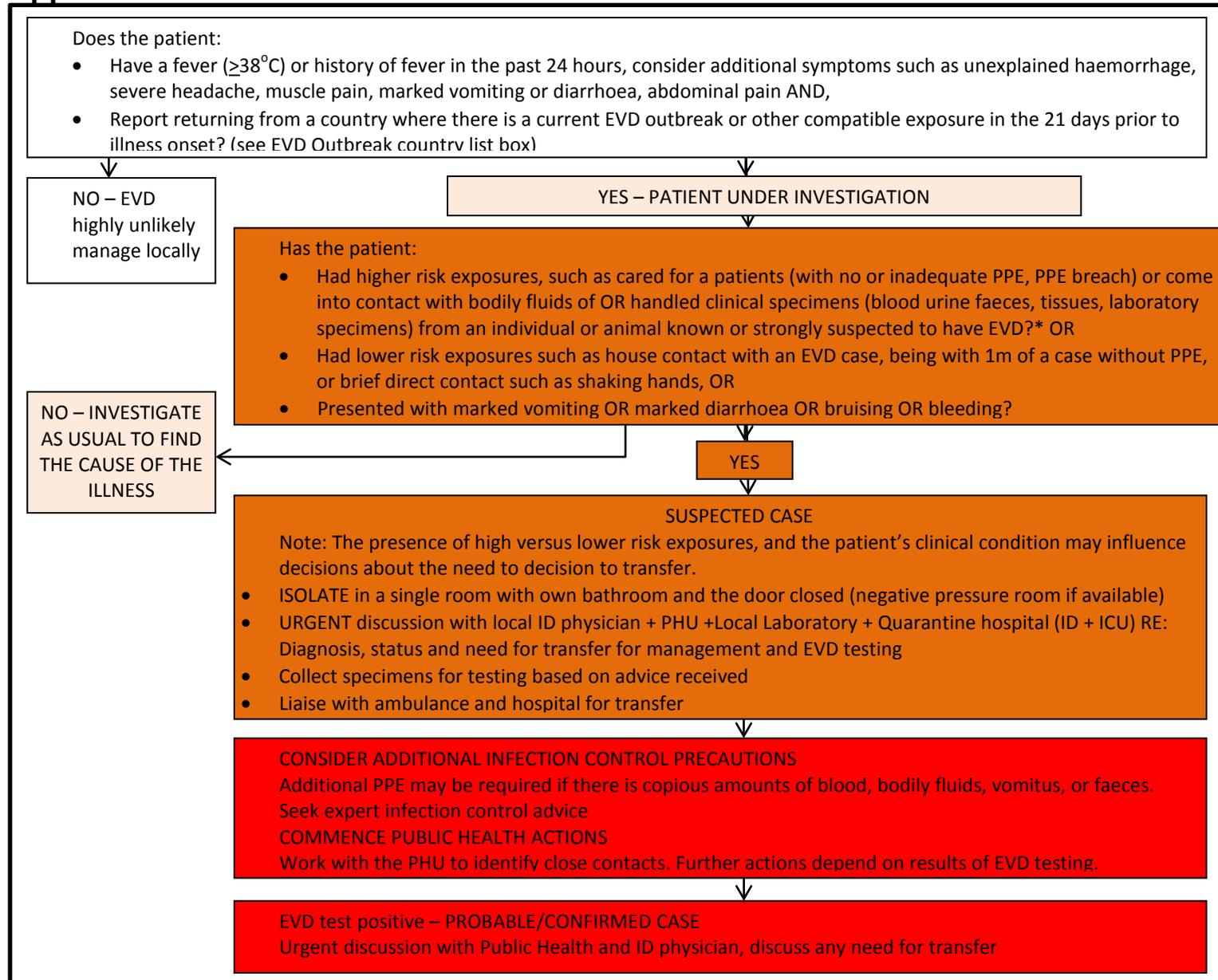
- Consideration of the need for temperature monitoring in the event that face to face contact tracing is required and symptomatic contacts are encountered.
- 5. Notify central jurisdictional communicable disease control agency and Chief Human Quarantine Officer.**
 - 6. Central communicable disease control agency to notify Commonwealth Department of Health, Office of Health Protection.**
 - 7. Consider need for media release and designate a media spokesperson.**

Appendix 3: Jurisdictional public health unit contact details and quarantine hospitals

State/territory	Public health unit contact details
ACT	02 6205 2155
NSW	1300 066 055 Contact details for the public health offices in NSW Local Health Districts (http://www.health.nsw.gov.au/Infectious/Pages/phus.aspx)
NT	08 8922 8044 Monday-to Friday daytime and 08 8922 8888 ask for CDC doctor on call –for after hours
QLD	13 432 584 Contact details for the public health offices in QLD Area (www.health.qld.gov.au/cdcg/contacts.asp)
SA	1300 232 272
TAS	1800 671 738 (from within Tasmania), 03 6166 0712 (from mainland states) After hours, follow the prompt “to report an infectious disease”
VIC	1300 651 160
WA	08 9388 4801 After hours 08 9328 0553 <u>Contact details for the public health offices in WA</u> (www.public.health.wa.gov.au/3/280/2/contact_details_for_regional_population_public_he.pm)

State/territory	Name of quarantine hospital(s)	Contact details
ACT	Canberra Hospital	02 6244 2222
NSW	Westmead Hospital	02 9845 5555
	Children’s Hospital Westmead	02 9845 0000
NT	Royal Darwin Hospital	08 8922 8888 Ask for CDC doctor on call
QLD	Royal Brisbane and Women’s Hospital	07 3636 8111
	Gold Coast University Hospital	1300 744 284
	Cairns Hospital	07 4226 0000
SA	Royal Adelaide Hospital	08 8222 4000
	Women’s and Children’s Hospital Adelaide	08 8161 7000
TAS	Royal Hobart Hospital	Ring 03 6222 8308 and ask for the on-call Infectious Diseases Physician
VIC	Royal Melbourne Hospital	Grattan Street, Parkville 03 9342 7000
	The Royal Children’s Hospital	50 Flemington Road, Parkville 03 9345 5522
WA	Sir Charles Gairdner Hospital	08 9346 3333 and ask for on-call Clinical Microbiologist
	Princess Margaret Hospital for Children	08 9340 8222 and ask for on-call Clinical Microbiologist

Appendix 4: EVD Patient Assessment Flow Chart – Advice for healthcare facilities and staff



EVD OUTBREAK COUNTRY LIST

EVD outbreaks in 2014 in Guinea, Liberia, Sierra Leone, and the Democratic Republic of the Congo. An outbreak in Nigeria was declared over in October 2014.

Outbreaks (not current in 2014) have previously occurred in the Congo, Sudan, Gabon and Uganda.

Check WHO outbreak updates for recent reports:
<http://who.int/csr/don/en/>

INFECTION CONTROL/PPE (SEE APPENDIX 9 FOR DETAILS)

- Single room with own bathroom (with door closed)
- Healthcare worker (HCW) to use a P2/N95 mask, and cover all skin using a suitable combination of PPE, such as a disposable fluid resistant gown, gloves, and eye protection (e.g. goggles or face shield), leg and shoe coverings, overalls when entering a patient care area. Double gloving might also be considered.
- Restricting entry of non-essential staff and visitors
- Avoid aerosol-generating procedures, but if unavoidable, follow PPE recommendations as above.

Appendix 5: Ebola Virus Disease (EVD) case report form

1 NOTIFICATION	Date notified	--/--/----	dd/mm/yyyy
	Notifier name		
	Notifier organisation		
	Telephone		
	Email		
	Treating Doctor		
	Telephone		
	Fax		
	Email		
2 INTERVIEW	Was the case interviewed	<input type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> N/A
	If case not interviewed, state who was interviewed and their relationship to the case		
	Date of first interview	__/__/____	dd/mm/yyyy
	Name of interviewer	Telephone number of interviewer	
3 CASE DETAILS	Name (first name, surname)		
	Date of birth	__/__/____	dd/mm/yyyy
	Age (yrs / months)	__ Yrs	__ Mths
	Sex	<input type="checkbox"/> Male	<input type="checkbox"/> Female
	Occupation - <i>specify</i>		
	English preferred language	<input type="checkbox"/> Yes	If no, <i>specify language....</i>
	Address (permanent)		
	Telephone (home)		
	Telephone (mobile)		

4	CLINICAL DETAILS	Email				
		Temporary address (if different from permanent address)				
		Telephone (temporary home)				
		Telephone (mobile)				
		Email				
		Indigenous Status	<input type="checkbox"/> Aboriginal origin	<input type="checkbox"/> Torres Strait Islander origin	<input type="checkbox"/> Both Aboriginal and Torres Strait Islander origin	
			<input type="checkbox"/> Not Aboriginal or Torres Strait Islander	<input type="checkbox"/> Unknown		
		Ethnicity – <i>specify</i>				
		Country of birth – <i>specify</i>				
		Date of symptom onset	__/__/____	dd/mm/yyyy		
		Febrile phase	<input type="checkbox"/> fever	<input type="checkbox"/> malaise	<input type="checkbox"/> myalgia	
			<input type="checkbox"/> headache	<input type="checkbox"/> pharyngitis	<input type="checkbox"/> conjunctival injection	
			<input type="checkbox"/> vomiting	<input type="checkbox"/> diarrhoea	<input type="checkbox"/> bloody diarrhoea	
			<input type="checkbox"/> abdominal pain	<input type="checkbox"/> rash	<input type="checkbox"/> petechiae	
Other symptoms – <i>specify</i>						
Complications	<input type="checkbox"/> Hypotension	<input type="checkbox"/> Spontaneous bleeding	<input type="checkbox"/> Oedema			
	<input type="checkbox"/> Shock	<input type="checkbox"/> Neurologic involvement	<input type="checkbox"/> Multi-organ failure			
Other complications – <i>specify</i>						
5	HOSPITAL and TREATMENT DETAILS	Hospitalised	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown	
		Date admitted	__/__/____	Date discharged	__/__/____	
		Name of hospital – <i>specify</i>				
		Isolated in single room	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown	
		Admitted to ICU or HDU	<input type="checkbox"/> ICU	<input type="checkbox"/> HDU	<input type="checkbox"/> Unknown	

	Date admitted to ICU/HDU	__/__/____	Date discharged	__/__/____
6 OUTCOME	Patient outcome	<input type="checkbox"/> Alive	<input type="checkbox"/> Dead	<input type="checkbox"/> Unknown
	Date outcome information sought	__/__/____		
7 LABORATORY CRITERIA	<i>Testing must be organised according to the SoNG Laboratory Testing Guidelines in discussion with jurisdictional public health laboratory</i>			
	Specimens collected	<input type="checkbox"/> Blood/serum	<input type="checkbox"/> Throat swab	<input type="checkbox"/> Urine
	Date collected	__/__/____	__/__/____	__/__/____
	Laboratory that received specimens			
	Specimens transferred to Jurisdictional PH lab (if relevant e.g. NSW, QLD)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Detection of virus by PCR in Jurisdictional PH lab (if relevant)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Specimens transferred to NHSQL	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Isolation of virus	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Detection of virus by	<input type="checkbox"/> PCR	<input type="checkbox"/> Antigen detection	<input type="checkbox"/> Electron microscopy
	IgG titre(s)	<input type="checkbox"/> Single high titre	Titre ---	Date __/__/____
		<input type="checkbox"/> Four fold rise	1 st titre ---	Date __/__/____
			2 nd titre ---	Date __/__/____
	IgM positive	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown/not done
	Confirmation by	<input type="checkbox"/> Special pathogens lab Atlanta CDC	<input type="checkbox"/> National Institute of Virology, Johannesburg	
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	
8 EXPOSURE PERIOD	Between dates:	__/__/____ (onset of symptoms minus 21 days)	TO	__/__/____ (onset of symptoms minus 1 day)

During this time was there contact with a confirmed/probable case/s?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Case Contact 1 name			
Case Contact 1 type	<input type="checkbox"/> Living patient	<input type="checkbox"/> Deceased patient	
Specify type of contact	<input type="checkbox"/> Visit sick patient	<input type="checkbox"/> Care for sick patient – <i>specify type of care</i>	<input type="checkbox"/> Bury deceased patient
	<input type="checkbox"/> Exposed to blood, saliva, urine, vomit or faeces of sick patient	<input type="checkbox"/> Exposed to blood, saliva, urine, vomit or faeces of deceased patient	
Case Contact 2 name			
Case Contact 2 type	<input type="checkbox"/> Living patient	<input type="checkbox"/> Deceased patient	
Specify type of contact	<input type="checkbox"/> Visit sick patient	<input type="checkbox"/> Care for sick patient – <i>specify type of care</i>	<input type="checkbox"/> Bury deceased patient
	<input type="checkbox"/> Exposed to blood, saliva, urine, vomit or faeces of sick patient	<input type="checkbox"/> Exposed to blood, saliva, urine, vomit or faeces of deceased patient	
Recent residence or travel in an area with active Ebola disease/outbreak	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
If yes, specify country, region			
Specify dates of travel	__/__/____	To	__/__/____
Animal exposures			
Contact with bats, primates or other animals from disease-endemic area?	<input type="checkbox"/> Yes Details	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
Contact with people who are in close contact with bats or primates from disease-endemic areas b/c of their work?	<input type="checkbox"/> Yes Details	<input type="checkbox"/> No	<input type="checkbox"/> Unknown

	Laboratory exposure	<input type="checkbox"/> Yes Details	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Did the case visit a healthcare facility or hospital during their exposure period?	<input type="checkbox"/> Yes <i>Specify including date last attended:</i>	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	Other high risk settings (e.g. funeral / burial of suspected/confirmed EVD patient) - <i>Specify</i>			
	For any exposure			
	Location of possible exposure			
	Nature of possible exposure- <i>specify</i>			
	Dates of possible exposure	__/__/____	To	__/__/____
7 PLACE INFECTION ACQUIRED	Australian state or territory <i>Specify</i>			
	Country - <i>specify</i>			
8 INFECTIOUS PERIOD	Between dates	__/__/____ (onset of symptoms)	To	__/__/____ (10 weeks after onset or as long as blood/ secretions contain virus)
	Isolation commenced	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	If yes, date isolation commenced	__/__/____		
	Details of isolation			
	Did case travel during their infectious period?	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unknown
	PLACE VISITED	Arrival date	Departure Date	Flight no. or mode of transport
	1			
	2			
3				
4				

	Did the case attend any of the following places during their infectious period?	Name	Telephone	Date attended	
	<input type="checkbox"/> Childcare				
	<input type="checkbox"/> Preschool / School				
	<input type="checkbox"/> Educational/residential facility				
	<input type="checkbox"/> Hospital/healthcare facility				
9	CASE CLASSIFICATION	<input type="checkbox"/> Confirmed	<input type="checkbox"/> Probable	<input type="checkbox"/> Suspected	<input type="checkbox"/> Rejected
10	CONTACT MANAGEMENT	Contact setting	No. of casual contacts*	No. of low risk close contacts*	No. of high risk close contacts*
		Household			
		Ambulance staff			
		Medical/healthcare staff			
		Laboratory staff			
		Work			
		Other - <i>specify</i>			
		Contact surveillance	No. of casual contacts	No. of low risk contacts	No. of high risk contacts
		No temperature monitoring but advice to seek information and health care if symptoms develop			
		Twice daily self-monitoring of temperature for 21 days and reporting to PHU if fever or other symptoms develop			
	Details of contacts hospitalized with fever				
	Name	DOB	UR no.	Telephone	

Appendix 6: Template contacts fact sheet

Ebola

Information for people who may have been exposed to a case

You may have been exposed to a person with Ebola Virus Disease (Ebola). This fact sheet provides information about the disease and what you need to do now.

The risk of acquiring Ebola is very low unless there has been direct physical contact with the body fluids of an infected person (alive or dead). You cannot catch EVD just by sharing the same room or aeroplane without close physical contact and/or direct exposure to the bodily fluids of a person with EVD.

What is Ebola

Ebola is a serious and often fatal disease caused by a virus. Early treatment at a hospital can help people survive the disease.

Even if there is a case in Australia, Ebola **won't** become widespread here like it has in some disadvantaged West African countries.

Symptoms

- Ebola can cause a serious illness with a sudden onset of fever, muscle and joint aches, weakness, and headache.
- This is followed by vomiting, diarrhoea, rash, and liver and kidney problems.
- Some people have lots of internal and external bleeding.
- In disadvantaged countries over half of people with Ebola die of the disease.

What should I do to monitor my health and for how long

Health authorities will contact you to assess your exposure. You will be provided with information about what you should do to monitor your health and what activities you should avoid, if any, for 21 after your possible exposure to Ebola.

It is known that early medical care for Ebola can be life-saving. It is very important to detect the earliest symptoms of Ebola. **If you become unwell, we will help you get treatment and minimise the risk to others.**

This may include measuring and recording your temperature with a thermometer twice a day and monitoring yourself for any other Ebola symptoms for 21 days after your exposure. To protect yourself and other during the 21 days of monitoring we recommend:

- You must be able to leave an event or public area immediately if you begin to feel ill
- You must be contactable by phone at all times
- Discuss any travel plans with your public health unit

Health authorities may contact you daily to check your health.

What should I do if I become unwell

If you get a temperature 37.5°C or over OR feel sick, withdraw from contact with others, stay at home and call **[NUMBER] in [STATE/TERRITORY] OR 1800 186 815 Australia-wide** to speak to your public health unit. The public health unit staff will help you and tell you what to do next. If you need immediate medical assistance dial 000 and advise them that you have been in an Ebola affected country.

If you become unwell, you should avoid direct physical contact with any other person, until you have been told it is okay to do so by the public health unit and always wash your hands carefully.

How it spreads

- Ebola is quite hard to catch.
- Ebola is spread by touching someone who is sick with or who has died from Ebola or by touching their body fluids such as blood, vomit, diarrhoea, or sweat, or through sex.
- It can also be spread by contact with objects contaminated with the bodily fluids of cases.
- Ebola doesn't spread through the air.
- A person with Ebola can only spread the disease **once they become sick**.
- In affected areas of Africa, people can catch Ebola through close contact with the blood, secretions, organs or other bodily fluids of infected animals (e.g. through the hunting or preparation of "bushmeat").

What can I do to protect myself and my family?

The most important thing is that if you become sick, try not to touch anyone else and call **[NUMBER] in [STATE/TERRITORY] OR 1800 186 815 Australia-wide** to speak to your public health unit.

In general we recommend the following:

- Wash your hands after going to the toilet
- Wash your hands before preparing food
- Don't share items that may have blood or bodily fluids on them, such as razors, toothbrushes and towels

Appendix 7: Returning aid workers who have worked in healthcare or community settings in an Ebola outbreak

Aid workers returning to Australia from Ebola affected countries are subject to monitoring and may be asked to comply with a range of restrictions for 21 days after leaving an Ebola-affected country. If possible, the aid worker should fly directly to their final destination in Australia. It is important to note that most returning aid workers are at low to very low risk of developing Ebola, and, persons who may be incubating Ebolavirus but who have not developed symptoms pose no risk to other people.

Category	Aid workers not involved in direct patient care – no known exposures	Aid workers with lower risk exposures	Aid workers with higher risk exposures*
Examples	Aid workers who have worked supporting the Ebola response but who did not work in a laboratory or clinical setting caring for patients with EVD and who did not conduct contact tracing activities in the community.	Majority of HCWs workers involved in routine care of EVD patients and handling of samples wearing appropriate PPE, OR Brief direct contact (i.e. shaking hands) or being in a patient care area for a prolonged period of time while not wearing appropriate PPE	Needlestick injury, unprotected exposure to blood or body fluids (breach of PPE, or not wearing appropriate PPE)
Probability of illness	Very low	Low	High
Public health measures			
<i>Identification of aid worker</i>	Host organisation to notify Australian Government Department of Health of aid workers return to Australia and provide their contact details And Aid worker to self-report to jurisdictional public health unit Public Health authorities to keep a register of aid workers being monitored.	Host organisation to notify Australian Government Department of Health of aid workers return to Australia and provide their contact details And Aid worker to self-report to jurisdictional public health unit Public health authorities to keep a register of aid workers being monitored.	Host organisation to notify Australian authorities (e.g. DFAT and Health) in the event of medical evacuation of HCW with a higher risk exposure. Host organisation to notify Australian Government Department of Health of aid workers return to Australia and provide their contact details where there is a previously unreported exposure; and; aid worker to self-report to jurisdictional public health unit Public Health authorities to keep a register of aid workers being monitored.
<i>Assessment</i>	Public Health authorities will contact each returning aid worker to conduct an exposure and clinical risk assessment, and an assessment of personal circumstances, such as the proximity of the person's usual place of residence to a facility that can test for Ebola.		
<i>Outcome of assessment</i>	The outcome of the risk assessment will determine what type of self-monitoring (temperature checks etc) is required. Public health authorities will put in place an appropriate voluntary plan, including whether any restriction of activities (living, working, movement) is appropriate.		

Options for the public health management may include:

<i>Self-monitoring¹</i>	Self-monitor ¹ health for 21 days since leaving Ebola affected country. Notify public health unit and seek appropriate healthcare if symptoms develop.	Self-monitor ¹ fever and symptoms twice daily for 21 days since leaving Ebola affected country, reporting if symptoms occur. Consider active daily reporting to nominated public health authority	Active daily check of health by nominated public health authority and self-monitor ¹ fever and symptoms twice daily for 21 days since leaving Ebola affected country, reporting if symptoms occur
<i>Travel within Australia</i>	Aid worker may be advised to ensure ready access to medical care, and may be required to discuss travel with public health authorities during the 21 days since leaving the Ebola affect country.	Aid worker may be required to notify public health authorities about their intended travel for the 21 day monitoring period. If travel is agreed, the individual must have timely access to medical care at the destination. Consideration may be given for the aid worker to be in a location with ready access to designated quarantine hospital (capital cities of states and territories). Where there is travel from one jurisdiction to another, there is formal communication and handover between the two CHQOs.	CHQO to decide if returning aid worker to remain at the port of arrival during 21 day monitoring period*. Aid worker must have ready access to designated quarantine hospitals (capital cities of states and territories) during monitoring period. After aid worker reaches final destination in Australia, they are likely to be required to not travel within Australia for 21 days since leaving an Ebola-affected country. Where there is travel from one jurisdiction to another, there is formal communication and handover between the two CHQOs or their delegates.

And based on the outcomes of a risk assessment and assessment of personal circumstances may also include:

<i>Minimise bodily contact with others</i>		If a risk assessment indicates it would be appropriate, the responsible public health unit will develop an appropriate plan under which the aid worker may be asked to limit their social mixing and avoid all bodily contact (e.g. hugging, kissing, intimate contact), and/or restrict activities as much as possible to within the home, during the 21 days since leaving an Ebola affected country.	
<i>Clinical work in Australia</i>	No work in clinical care for 21 days since leaving Ebola-affected country	No work in clinical care for 21 days since leaving Ebola-affected country	No work in clinical care for 21 days since leaving Ebola-affected country
<i>International travel from Australia</i>	Onwards international travel in 21 days since leaving Ebola affected country should be discussed	No onwards international travel in 21 days since leaving Ebola affected country	No onwards international travel in 21 days since leaving Ebola affected country
<i>Informing household members</i>	Household members should be informed about	Household members should be informed about the low risk to	Household members should be informed about the low risk

¹ During an outbreak overseas with widespread and intense transmission, health authorities may implement daily active monitoring for 21 days after leaving an affected country for all returning aid workers, regardless of their risk category.

the very low risks to the returning aid worker, and how to help monitor signs and symptoms.

the aid worker's household members should symptoms develop, and about the need to avoid all bodily contact with them if advised by public health authorities.

to the aid worker's household members should symptoms develop, and about the need to avoid all bodily contact with them if advised by public health authorities.

* Under the World Health Organization declaration of a Public Health Emergency of International Concern (PHEIC) healthcare workers who have been exposed to EVD should not travel unless they are being appropriately medically evacuated and breaches of PPE should be reported immediately in-country. Therefore, healthcare workers in this category should have been notified to the Department of Health as part of the medical evacuation process. However, there is the possibility of a previously unknown or unreported exposure.

Appendix 8: Guidance for aircrews and cleaning staff on the management of EVD

This section provides guidance to aircrews and cleaning staff in the management of EVD. It should be read in conjunction with the fact sheet on EVD (Appendix 1).

Management of ill people on aircraft if EVD is suspected

Crew members on a flight with a passenger or other crew member who is ill with a fever, or one or more other symptoms, including headache, muscle pain, vomiting, diarrhoea, abdominal pain, or unexplained haemorrhage or bruising and who is traveling from or has recently been in an EVD risk area should follow these precautions:

- Keep the sick person separated from others as much as possible.
- Give tissues to a sick person and provide a plastic bag for disposing of used tissues.
- Wear impermeable disposable gloves for direct contact with blood or other body fluids and use an eyemask/goggles.
- Wash hands/use alcohol rubs after the removal of gloves.

Universal Precaution Kits: Airplanes traveling to countries affected with Ebola should carry Universal Precaution Kits, as recommended by the International Civil Aviation Organization [PDF – 30 pages] (ICAO), for managing ill on-board passengers.

General Infection Control Precautions

Personnel should always follow basic infection control precautions to protect against any type of infectious disease.

What to do if you think you have been exposed

Any person who thinks he or she has been exposed to Ebola Virus either through travel, assisting an ill traveller, handling a contaminated object, or cleaning a contaminated aircraft should take the following precautions:

- Notify your employer immediately.
- Monitor your health for 21 days. Watch for fever, chills, muscle aches, severe diarrhoea, vomiting, rash, and other symptoms consistent with EVD.

Health authorities will contact you to provide advice on monitoring your health.

When to contact a health care provider

- If you develop sudden fever, chills, muscle aches, severe diarrhoea, vomiting, rash, or other symptoms consistent with EVD, you should seek immediate medical attention.
 - Before visiting a health care provider, alert the clinic or emergency room in advance about your possible exposure to EVD so that arrangements can be made to prevent spreading it to others.
 - When traveling to a health care provider, limit contact with other people. Avoid all other travel.
- If you are located abroad, contact your employer for help with locating a health care provider.

Guidance for Airline Cleaning Personnel

Ebola virus is transmitted by close contact with a person who has EVD or with their blood or bodily fluids. Treat any body fluid as though it is infectious. Blood or body fluids on interior surfaces can spread Ebola Virus if they get into your eyes, nose, or mouth. Therefore, hand hygiene is the most important infection control measure. Wear disposable impermeable gloves when cleaning visibly contaminated surfaces.

For any ill traveller on board an aircraft, **even if EVD is not considered**, the airline's ground and cleaning crews should be notified so that preparations can be made to clean the aircraft after passengers have disembarked.

When cleaning aircraft after a flight with a patient who may have had EVD, personnel should follow these precautions:

- Wear impermeable disposable gloves while cleaning the passenger cabin and lavatories.
- Wipe down lavatory surfaces and frequently touched surfaces in the passenger cabin, such as armrests, seat backs, tray tables, light and air controls, and adjacent walls and windows with a registered cleaner/disinfectant that has been tested and approved for use by the airplane manufacturers.
- Special cleaning of upholstery, carpets, or storage compartments is not indicated unless they are obviously soiled with blood or body fluids.
- Special vacuuming equipment or procedures are not necessary.
- Do not use compressed air, which might spread infectious material through the air.
- If a seat cover or carpet is obviously soiled with blood or body fluids, it should be removed and discarded by the methods used for biohazardous material.
- Throw used gloves away according to the company's recommended infection control precautions when cleaning is done or if they become soiled or damaged during cleaning.
- Clean hands with soap and water (or waterless alcohol-based hand sanitizer when soap is not available) immediately after gloves are removed.

* Close contact is defined as having cared for or lived with a person with EVD or having a high likelihood of direct contact with blood or body fluids of an EVD patient. Close contact does not include walking by a person or briefly sitting across a room from a person.

Guidance for Air Cargo Personnel

Packages should not pose a risk. Ebola virus is spread through direct contact with blood or body fluids (such as urine or saliva) from an infected person.

- Packages visibly soiled with blood or body fluids should not be handled.
- Cargo handlers should wash their hands often to prevent other infectious diseases.

Appendix 9: Components of Infection Control

For detailed guidance on the components of infection control for EVD, refer to chapter 4 of the *Infection prevention and control principles and recommendations for Ebola Virus Disease* document available from [the Department of Health website](http://www.health.gov.au/ebola) (www.health.gov.au/ebola).

Appendix 10: Cleaning and disinfection

The information in this Appendix primarily applies to those patients who have been categorised as probable or confirmed EVD cases. The PPE requirements for environmental cleaning are the same as those for patient care. As described in Section 10, Environmental Evaluation, there may be situations that require environmental cleaning of a residence or other non-hospital setting prior to the availability of laboratory test results for a suspected case with a high pre-test probability. This should follow the principles outlined in this Appendix, following discussion with public health authorities.

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

Ebola Viruses are readily inactivated by disinfectants. The preferred disinfectant solution is sodium hypochlorite made up to 1,000 ppm parts per million (ppm) available chlorine (check the manufacturer's instructions) for routine environmental cleaning and 5,000 ppm for spills.

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

Routine Environmental Cleaning

Daily clean of the room still applies and the room should be cleaned as per usual practice. A daily clean with neutral detergent is required while the patient is in the isolation room.

Dispose of all cleaning cloths and mop heads into the clinical waste after each clean.

The patient toilet should be cleaned with a 1,000 ppm sodium hypochlorite solution after each use, after the contents have been flushed.

Terminal Cleaning

Terminal cleaning should be performed according to jurisdictional policies and procedures.

Once the patient has left the room the entire room should be cleaned with a neutral detergent then allowed to air dry. Dispose of all cleaning clothes and mop heads into the clinical waste.

Once the room is air dry repeat the cleaning process with a 1,000 ppm sodium hypochlorite solution and ensure the disinfectant is liberally applied to all surfaces within the isolation room. Dispose of all cleaning equipment including buckets, mop handles, mop heads, cloths into the clinical waste after a terminal clean.

Allow the room to air dry. Where negative pressure is being used, maintain the negative pressure during the terminal clean. Then allow an additional 30 minute period after the room has air dried before switching off the negative pressure and allowing the next patient to enter the room.

Body Fluid Spill

Personal protective equipment including gloves, disposable impermeable overshoes or boots, and fluid-resistant masks with face shields/goggles and fluid-resistant gowns should be worn for cleaning up a spill of blood or other body fluid.

Such spills should be covered with absorbent paper towels, liberally covered with a 5,000 ppm sodium hypochlorite solution and left to soak for 30 minutes before being wiped up. Discard the towels into a plastic lined receptacle and place this in an autoclave bag for sterilisation prior to disposal.

Following the removal of the initial material the area of contamination should again be liberally covered with a 5,000 ppm sodium hypochlorite solution and left for 30 minutes before rinsing.

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. Use disposable products when available.

When reusable non-critical equipment leaves the patient room ensure a two stage cleaning with a neutral detergent followed by a second clean with a 1,000 ppm sodium hypochlorite solution. For semi critical and critical equipment ensure routine disinfection/sterilization reprocessing occurs, no additional disinfection or sterilization cycle is required.

Linen

Disposable linen is first choice preference for patient clothing and bed linen.

Linen is treated as clinical waste. For linen wet from body fluids, place into a leak-proof bag and not a cloth linen bag.

Patient clothing should be disposed of in the clinical waste. The patient should wear hospital clothing and gowns and not their own clothes. Patient clothing and linen must not be processed in a domestic washing machine.

For detailed guidance on cleaning and disinfection for EVD, refer to chapter 5 of the *Infection prevention and control principles and recommendations for Ebola Virus Disease* document available from [the Department of Health website](http://www.health.gov.au/ebola) (www.health.gov.au/ebola).

Appendix 11: Waste treatment and disposal

Waste

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

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

Toilet Waste

Toilet waste can be flushed into the sewage system.

Some jurisdictions may recommend additional measures be applied after discussion with local water authorities. Additional measures may include the addition chlorine (in a suitable concentration for a spill) to the toilet waste prior to flushing, and allowing up to 30 minutes, prior to flushing.

In all cases, ensure the toilet lid is down when flushing. If staff are required to flush the toilet, it is recommended they wear a P2/N95 mask in addition to their other PPE in case of aerosols when the toilet is flushed.

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

For detailed guidance on waste treatment and disposal, refer to chapter 5 of the *Infection prevention and control principles and recommendations for Ebola Virus Disease* document available from [the Department of Health website](http://www.health.gov.au/ebola) (www.health.gov.au/ebola).

Appendix 12: Post mortem care and examination

Post-mortem examination

A post-mortem examination on a suspected, probable or confirmed case should not be carried out unless considered absolutely essential by either the medical or legal authority responsible for the case. A post-mortem examination on a person known to have died of EVD exposes staff to unwarranted risk and should not be performed.

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

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

Disposal of the deceased

State and territory public health regulations specify the requirements for handling of bodies for EVD. Requirements under the regulation may include:

- A person must, when carrying out any procedure on a body, comply with the guidelines specified in Part B of the *Australian Guidelines for the Prevention and Control of Infection in Healthcare* published by the National Health and Medical Research Council.
- A person must, when placing a body in a bag or wrapping a body, comply with a particular infection control policy.
- The body of a dead person is not removed from a place unless:
 - o the body has been placed and secured in a bag or wrapping in a manner that prevents the leakage of any bodily exudate or other substance, and
 - o the name of, or an identification of, the dead person is clearly and indelibly written on the top outer surface of the bag or wrapping, and
 - o if the person has reason to believe that the body is infected with a prescribed infectious disease—the bag or wrapping is clearly marked as appropriate.

Bodies with a prescribed infectious disease must not be embalmed or made available for viewing.

The Hospital infection control team should work closely with the relevant funeral director to ensure that all appropriate infection control measures are implemented.

Staff wearing appropriate PPE must place the body of a confirmed or suspected EVD patient in a leak-proof double body bag. Absorbent material must be placed between each bag, and the bag sealed and disinfected with a 1,000 ppm sodium hypochlorite solution or other appropriate disinfectant.

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

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

Appendix 13: Recommendations for decontamination of domestic premises of a probable or confirmed EVD case

For detailed guidance on environmental cleaning for EVD, refer to the *Infection prevention and control principles and recommendations for Ebola Virus Disease* document available from [the Department of Health website](http://www.health.gov.au/ebola) (www.health.gov.au/ebola).

Principles

When planning for environmental cleaning in a non-hospital setting, it is important to consider whether the case was symptomatic, and whether the symptoms were “wet”, with copious vomiting, diarrhoea and other fluids or “dry”:

- There is negligible risk that household items used by a patient who is not producing secretions would contain Ebola Virus, and these items should be cleaned and reused in the normal way unless there is reason to discard them.
- Whilst awaiting laboratory test results for a case in the “wet” phase, it may be possible to isolate any potentially contaminated items, such as by closing off a room.

While there is limited information on the length of time Ebola virus remains viable in the environment, a maximum of six days appears to be the scientific consensus.^{2,3,4} Where possible, to reduce risk to decontamination staff, decontamination should be delayed until six days after the case has been removed from the premises. This could involve for example shutting off a room or area of the house. The presence of other material e.g. faeces (which may provide protection), temperature, relative humidity and ultraviolet (UV) light can affect whether EBOV remains viable in the environment, however, Ebolaviruses are readily inactivated by low-level disinfectants.

Cleaning requirements for low risk/“dry” case

Ensure appropriate PPE is worn, comprising a long sleeved shirt, gloves, mask and goggles or face shield. Areas where hand contact is most likely to have occurred (toilets, hand basins, taps, door knobs, bins, and bench tops) should be wiped down with a weak sodium hypochlorite solution. Used cleaning cloths or other cleaning materials should be bagged and disposed of into the general waste.

Cleaning for a higher risk/“wet” case

Training and PPE requirements for staff

Staff or persons undertaking decontamination must have an understanding of the nature of the EBOV and its modes of transmission and must follow appropriate infection control procedures including:

- Hand hygiene
- Cover all skin using an appropriate combination of PPE including, but not limited to:
 - gloves,

² CDC (2014) Interim Guidance for Environmental Infection Control in Hospitals for Ebola Virus

³ Sinclair et al. (2008) Persistence of Category A Select Agents in the Environment Applied and Environmental Microbiology Vol.74 NO. 3 pp 555-563

⁴ Bausch et al. (2007) Assessment of the Risk of Ebola Transmission from Bodily Fluids and Fomites Journal of Infectious Diseases (Supplement 2) pp s142- s147

- a fluid resistant long-sleeved gown,
- eye protection (e.g. goggles),
- P2/N95 respirator,
- face shields, leg and shoe coverings, overalls.

Planning the cleaning

Conduct an initial inspection of premises to determine:

- Access for unloading / loading of equipment and vehicles to limit the risk of contamination spread;
- The nature and extent of any contamination and the necessary techniques and resources to address the nature and extent of contamination;
- Particular consideration of the need for and method of removing and disposing of any large items such as mattresses; and
- Locations identified for the storing of waste receptacles and furniture or other items, preparing and disposing of cleaning solutions, transfer of materials to prevent (re)contamination, clean sites for the donning and doffing of PPE etc.

Cleaning procedure

Surfaces

Areas where hand contact is most likely to have occurred (door knobs, taps, bench tops) should be decontaminated as a priority in a two stage process – first with a neutral detergent then with a strong sodium hypochlorite solution.⁵ Other surfaces without visible contamination should be wiped down with a weak sodium hypochlorite solution.⁵ Where there is gross contamination of a surface such as by blood, faeces, vomit or other bodily fluids, disinfect any visible surface contamination by covering with absorbent material (e.g. paper towels), then strong hypochlorite solution on to saturate the area, and allow solution to soak into spills for at least 30 minutes before cleaning.

Decontamination of Linen, Clothing, bedding and soft furnishings

- Grossly contaminated materials such as bed linen or clothing should be bagged, or otherwise contained, on site, and transported/disposed of as infectious waste.⁶
- Bed linen, clothing and other materials that are not grossly contaminated should be laundered in the normal way.
- Soft furnishings that are not grossly contaminated may be steam cleaned as a precaution.

Safety precautions and disposal of cleaning equipment

- The generation of contaminated aerosols or splashes (e.g. through pressure sprays) or generation of dusts (e.g. dry sweeping) should be avoided. Areas where any disinfectants are being used should be well-ventilated.

⁵ In this document, strong sodium hypochlorite solutions are those containing 5000–10 000 ppm available chlorine (0.5–1%), depending on the starting product; weak solutions contain 500–1000 ppm (0.05–0.1%). See the factsheet at the [South Australian Department of Health website \[PDF, 66KB\]](#).

⁶ Infectious waste to be packaged for transport as a Category A waste under relevant state or territory requirements

- Use of any chemicals (including recommended contact times) must be as per the manufacturer's instructions and/or Material Safety Data Sheet.
- Any cleaning solutions repeatedly applied from a bucket should be replaced either at the end of cleaning of each room or when contamination of the solution is suspected.
- All used cleaning solutions should be disposed of into the sewer (toilet or laundry).
- All PPE, cleaning cloths and mops should be disposed of as contaminated waste.
- During cleaning, household members should not be present

If a PPE breach occurs during cleaning, procedures for blood and body fluid exposures should be followed.