Updated information for health professionals: Ebola virus disease (EVD)

2 June 2015

The EVD situation is evolving. Please ensure that you check the health professional's advice on www.health.govt.nz/ebolaguidance for any updated information.

Contents

1 Introduction

This document provides updated information and guidance concerning Ebola virus disease (EVD) which is complementary to or, where there are differences, supersedes the information provided in the Communicable Disease Control Manual 2012 (www.health.govt.nz/publication/communicable-disease-control-manual-2012).

This guidance is largely based on advice from the World Health Organization (WHO) and the Ministry's Ebola Technical Advisory Group (ETAG).

Intended users of this guidance are health care workers, clinicians, laboratory workers and others who may come into contact with potentially infectious material from a suspect or confirmed case of EVD, or be involved in contact tracing.

Health professional organisations have also released statements regarding EVD to their organisations and/or provided links to this Ministry guidance on their websites, for example the New Zealand Nurses Organisation (www.nzno.org.nz) and Medical Council of New Zealand (www.mcnz.org.nz).

1.1 Where to get further information and advice

Please see the webpages below for the latest information:

- *General information for the public:*
  - www.health.govt.nz/ebola
- *Health professional guidance:*
  - www.health.govt.nz/ebolaguidance
- *Situation updates:*
  - www.health.govt.nz/ebolaupdate
  - www.who.int/csr/disease/ebola/situation-reports/en
- *EVD case definitions:*
  - www.health.govt.nz/ebolacasedefinition

General information about EVD can also be found in Appendix 2 of this document.

Health professionals should phone their local public health unit for advice in the first instance, for any person whose history and symptoms raise concern, even if the person does not meet the formal EVD case definition.

If you require urgent advice and cannot reach your public health unit, please contact the Ministry of Health.

The Ministry of Health will provide advice, support and coordination. The Ministry will be able to call on additional expert advice as required.

1.2 Context

EVD is notifiable as a viral haemorrhagic fever under the Health Act 1956. Suspected cases of EVD or any viral haemorrhagic fever must be notified to the local Medical Officer of Health immediately.

EVD is a quarantinable infectious disease. This allows the full range of quarantine provisions to be used to manage suspected cases and contacts at the border, and for the provisions of the Epidemic Preparedness Act 2006 to apply, if required. The Ministry would notify the World Health Organization (WHO) of a case of EVD under the International Health Regulations, 2005.

1.3 Risk assessment

The Ministry's risk assessment currently indicates that it is extremely unlikely that a confirmed case of EVD would be identified in New Zealand. However, it is considered more likely that a traveller or returning worker that meets the suspect case definition for EVD would present and require management until laboratory testing ruled out EVD.

1.4 Local readiness and response plans

District health boards (DHBs) should undertake comprehensive local risk assessments and formulate local readiness and response plans.

Operational guidelines for public health unit border health protection officers (Medical Officers of Health or Health Protection Officers) who may be required to manage ill travellers with suspected symptoms of EVD is available on the Health Emergency Management Information System (EMIS). Please contact your DHB Emergency Planner for further information on Health EMIS if required.

2 Guidelines for health professionals

2.1 Guidance for returned traveller with a health concern

There will be occasions when a person presents at a health care facility who does not meet the case definition but is unwell, and is still self- monitoring for the recommended 21 day period. In these cases:

- The local Medical Officer of Health must be notified (following assessment by a medical practitioner). If the patient has travelled domestically, the local Medical Officer of Health and the Medical Officer of Health where the patient usually resides must be notified.
- On notification, the Medical Officer of Health must inform the Ministry of Health
- standard precautions should be implemented
- manage and treat patient for presenting problem
- the remainder of the 21 day monitoring period must still be completed (in hospital if the patient is admitted).

2.2 EVD case definitions

The current case definitions for EVD are listed below. However, as the situation is evolving, it is important to check the most recent case definitions on the Ministry website: www.health.govt.nz/ebolacasedefinition

Health professionals must phone their local public health unit for advice, regarding any person whose history and symptoms raise concern, even if the person does not meet the case definition for EVD.

For urgent advice when the local public health unit cannot be contacted, call the Ministry of Health.

Public health officers should notify the Ministry of Health of any person with history or symptoms that raise concern, even if they do not meet the case definition.

Suspected case

Given the lack of specificity of initial symptoms, a person will be defined as a suspected case only after a clinical assessment by an Infectious Diseases physician.

A person with a clinical illness compatible with Ebola

Fever (temperature 38^{O}C or above)[1] with or without additional symptoms such as intense weakness, severe headache, myalgia, abdominal pain, sore throat, marked vomiting, marked diarrhoea or unexplained haemorrhage. Initial symptoms are usually not specific, but onset is sudden and intense with symptoms worsening over a few days, often with prostration, rash, evidence of capillary leak, bleeding/haemorrhage, shock and impaired consciousness.

Please note that during the current outbreak in West Africa, haemorrhagic symptoms have been reported less frequently than non-specific symptoms.

AND, within 21 days before onset of illness, a history of travel to the affected areas[2] or a contact with an identified potential source of Ebola virus elsewhere,

WITH EITHER:

- direct contact with a probable or confirmed case[3] **OR**
- exposure to Ebola-infected blood or other body fluids or tissues[4] **OR**
- direct handling of bats, rodents or primates, from Ebola-affected countries **OR**
- preparation or consumption of 'bushmeat'[5] from Ebola-affected countries.

Probable case

A suspected case with no possibility of laboratory confirmation for Ebola either because the patient or samples are not available for testing.

Confirmed case

A suspected case with laboratory confirmation (positive serology or PCR).

2.2 Immediate actions on identification of a suspected case

- Place the suspected case in a single room. Place in a negative pressure room, if available.

[1] Fever may be absent at presentation if the person is taking antipyretic medication.

[2] Affected areas in the countries with transmission in Western Africa (please refer to www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html).

[3] Direct contact includes:

- direct physical contact with the case during the illness (without the appropriate infection prevention and control measures)
- direct physical contact with the case post mortem (without the appropriate infection prevention and control measures)
- having touched case's blood or body fluids during the illness (without the appropriate infection prevention and control measures)
- having touched case's clothes or linens during the illness (without the appropriate infection prevention and control measures)
- having been breastfed by the case.

[4] This includes the semen of a recovered male patient. The presence of virus has previously been demonstrated in semen for up to three months after recovery.

[5] Bushmeat is the meat of African wild animals used as food.

- Use standard precautions plus Contact and Droplet transmission-based precautions, including the use of personal protective equipment (PPE). See Appendix 3 for detailed Infection Prevention and Control Guidance. (For primary care facilities, please also see the separate document 'Patient Management Guideline for Primary Care Ebola virus disease').
- Suspected cases of EVD should only be managed by senior members of staff. Limit number of staff to the minimum required to provide safe care and ensure staff receive frequent rest breaks.
- Suspected cases of EVD must be notified immediately to the local Medical Officer of Health. EVD is notifiable as a viral haemorrhagic fever under the Health Act 1956. The public health unit will coordinate next steps and notify the Ministry of Health. It is important that health professionals phone their local public health unit for advice regarding any person with symptoms that raise concern, even if they do not meet the suspected case definition.
- Local readiness and response plans should be initiated. A suspected or confirmed case of EVD should ideally be managed in a tertiary care facility. Local readiness and response plans should include identification and initial management of a suspected EVD case, as well as transport of a suspected case from the community, or a primary or secondary care facility to a tertiary care facility. Relevant ambulance services should be involved in making these arrangements.
- The preferred tertiary facilities for the management of a suspected or confirmed case of EVD are Auckland, Middlemore, Wellington or Christchurch Hospitals, however other tertiary facilities may also be utilised if required (Appendix 4).
- The Ministry of Health will provide advice, support and coordination. The Ministry will be able to call on additional expert advice as required.

2.3 Management of a suspected case

- Initial assessment of cause of symptoms should include a risk assessment for EVD and for other diagnoses which may present in similar ways. These include exotic infections more common in countries where EVD is circulating such as malaria, typhoid fever, rickettsiosis, leptospirosis, dengue, or cosmopolitan infections common worldwide including bacterial sepsis (meningococcemia, pneumococcal infection, Gram negative sepsis), infective gastroenteritis and influenza.
- Based on clinical assessment and discussion, it may be appropriate to treat for other diseases empirically whilst awaiting diagnostic test results. Recommended approaches may include use of a third generation cephalosporin and empiric malaria treatment.
- Consideration must be given to the possibility of co-infection – the presence of malaria, typhoid or other disease does not rule out EVD, and vice versa.
- Care for EVD is supportive as there is no specific approved vaccine or therapeutic (antiviral drug) options currently available. Early morbidity from EVD is usually due to fluid and electrolyte loss. Adequate hydration and electrolyte replacement is a management priority.
- Clinical waste needs to be carefully managed (Appendix 3).

General recommendations for clinicians and laboratory staff managing suspected EVD cases and samples

- Laboratory testing is used to confirm EVD or other infection, and to optimise supportive care. Until the EVD diagnostic test result is available, tests should be kept to the minimum necessary

to provide care for the patient in order to minimise possible exposure of EVD to laboratory staff and other health care workers.

- A local risk assessment should be conducted by senior clinical (microbiology or infectious diseases) and scientific staff and/or pathologists. This risk assessment should cover collection, handling and disposal of specimens from suspected EVD cases.
- A laboratory plan should be developed regarding the local capacity for diagnostic and supportive care testing. This plan should be communicated with clinical staff that may be assessing or treating patients with suspected EVD.
- All laboratory staff and other healthcare personnel collecting, handling, testing or disposing of specimens must follow established laboratory standards. Refer to: AS/NZS 2243.3:2010: Safety in Laboratories.
- Use of point-of-care diagnostic (e.g., malaria rapid test) and supportive care testing is recommended where available, but should be used based on local risk assessment.
- In line with other jurisdictions, the Ministry has purchased point of care testing devices for use in the management of a suspected or confirmed EVD case. These devices have been distributed to Auckland, Middlemore, Wellington and Christchurch Hospitals. If a patient were to present at another facility and they were not able to be transferred, the Ministry of Health would arrange deployment of the device (and people who are trained in their use) to the appropriate facility.
- There is currently no international consensus as to whether the point of care devices should be used at the bedside or within the laboratory. This decision will be made on a case by case basis, based on a local risk assessment, as it would include consideration of the patient's condition as well as the particular local facilities.
- Staff operating these devices must use personal protective equipment as for handling any specimen and all waste generated by the testing process must be disposed of safely according to established standards.

Laboratory testing for EVD diagnosis

EVD diagnostic testing must be undertaken in an accredited reference laboratory for quality assurance purposes. The Ministry has arrangements in place for testing to be undertaken at the Victorian Infectious Diseases Reference Laboratory (VIDRL), Peter Doherty Institute, Victoria.

> VIDRL has requested that only original samples be submitted, not deactivated samples or extracted nucleic acid.

Instructions for the shipping of samples are included in the 'Sample Shipping Process' document available on the Health Emergency Management Information System (EMIS). Please contact your DHB Emergency Planner for further information on Health EMIS if required.

The timeframe for receiving a result is up to 72 hours.

- If a patient meets the suspected case definition, a negative test within the first three days of the onset of symptoms cannot rule out EVD. A repeat sample should be sent after day three from symptom onset. It is recommended that a patient remain under full isolation precautions until two negative PCR results are obtained (or one negative PCR test if undertaken more than three days after onset of symptoms). Decisions regarding cessation of isolation precautions should be discussed with appropriate local teams and should include liaison with an Infectious Diseases physician, Medical Officer of Health and the Ministry

- Following negative diagnostic results for EVD from a sample gathered at least 72 hours after onset of symptoms, a suspected case may be released from isolation and discharged, if the medical condition allows, unless a high index of suspicion remains (such as in the absence of an alternative diagnosis). They should be given information about EVD and contact details for the local public health unit.

2.4 Contact tracing and contact management

Purpose of contact tracing

- Contact tracing is required for the prevention of onward transmission, awareness-raising and early detection of suspected cases. This will be coordinated by the local public health unit.
- People infected with EVD are not infectious before symptoms develop. The risk of transmission increases in later stages of the disease, with increasing viral titres. Physical contact with infected body fluids is necessary for transmission.

Categories of contacts and management

- Contacts should be categorised, advice provided and monitoring conducted aligned with the guidance in Table 1 'Categories and management of contacts' (pages 8–11). Personal circumstances and other relevant concerns should always be considered as part of the risk assessment informing appropriate advice, actions and monitoring. The public health unit will liaise closely with the Ministry of Health regarding contact tracing and management of identified contacts.
- Contact tracing and management of identified contacts should also consider that it may take several days for confirmatory testing of an EVD case and depending on the time since last potential exposure and the stage of illness, repeat testing may be necessary.

Table 1: Categories and management of contacts

Category of contact/risk	Definition	Advice/action	Monitoring
Casual contact, no risk	No direct contact with an Ebola case or body fluids but may have been in the near vicinity of the patient, for example, travelling on the same aeroplane, residing in the same hotel, visiting the case's home.	Provide advice about absence of risk. Provide fact sheet and health advice.	Nil required.
Direct contact, low risk	Flatting or living in a household with an EVD case, serving the case, skin to skin contact (for example hugging) but no direct contact with body fluids (for example hugging) sharing toothbrush, not kissing, not breastfed, no sexual contact, not cleaning up vomitus or diarrhoea). Close contact in a health care or community setting – where close contact is defined as: • being within 1 metre of an EVD case[5] for a prolonged length of time while **NOT** wearing personal protective equipment (PPE). • brief direct skin to skin contact (eg, hugging) while **NOT** wearing PPE. Health care workers see page 11.	Conduct risk assessment. Personal and other relevant circumstances should be considered as part of the risk assessment informing actions and monitoring. Public health unit staff should liaise closely with the Ministry of Health regarding contact tracing and management of identified contacts. Most people will have no limitations to daily living activities provided they are asymptomatic. Provide advice about likely low level of risk. Provide fact sheet and health advice.	Contact Healthline immediately if symptoms develop, including fever (at least 38 OC). Healthline immediately notifies the local public health unit. Local public health unit will make an assessment and notify the Ministry of Health on 0800 GET MOH (0800 438 664) to arrange clinical assessment and monitoring.

Category of contact/risk	Definition	Advice/action	Monitoring
Direct contact, high risk without PPE	Direct contact with body fluids from EVD case without appropriate PPE. This includes percutaneous injury, sexual contact, being breastfed by a case, laboratory processing of body fluids of suspected EVD cases without appropriate PPE. Direct contact with dead body of an EVD case without PPE. Preparing and/or eating bushmeat or direct contact with bats, rodents or primates in affected countries. Friends or family travelling with a suspected case as they may have been exposed to the same potential source of infection or had direct contact with the suspected case	Conduct risk assessment. Personal and other relevant circumstances should be considered as part of the risk assessment informing actions and monitoring. On a case by case basis Public health staff may require additional controls or restrictions, or consider quarantine (home or facility) within 3 -5 hours road transport of a referral hospital (for at least the first 11 days since the last high risk contact) dependant on risk assessment and compliance with monitoring. Public health unit staff should liaise closely with the Ministry of Health regarding contact tracing and management of identified contacts. Most people will have no limitations to daily living activities provided they are asymptomatic and adhering to monitoring. Provide support and advice about higher level of risk. Provide fact sheet and health advice.	Twice daily monitoring for fever (at least 38 ^{O}C), and other symptoms for 21 days from last potential exposure. At least daily contact (with at least one face to face visit early in the monitoring period) from local public health unit staff. Contact public health unit staff immediately if symptoms develop, including fever (at least 38 ^{O}C). .Public health unit staff will make an assessment and notify the Ministry of Health on 0800 GET MOH (0800 438 664) to arrange clinical assessment and monitoring.

Category of contact/risk	Definition	Advice/action	Monitoring
Direct contact (high risk) with PPE	Healthcare workers who have been assisting in the Ebola response in the Ebola affected countries. This includes patient contact or other high risk exposures (described above) even if PPE is worn.	Conduct risk assessment. Personal and other relevant circumstances should be considered as part of the risk assessment informing actions and monitoring. Provide support and advice about higher level of risk. Most people will have no limitations to daily living activities provided they are asymptomatic and adhering to monitoring. Risk assessment should indicate whether the person should be asked to remain within 3-5 hours by road of a referral hospital for the first 11 days after last high risk contact. People will not return to work in a New Zealand healthcare setting until the completion of the 21 day self-monitoring period. If the person is not working in a healthcare setting, they should discuss with their local public health unit whether they are able to return to work. Onward international travel within the 21 day self-monitoring period is strongly discouraged.	Twice daily monitoring for fever (at least 38 ^{O}C) and other symptoms for 21 days from last day in Ebola-affected country. At least daily contact (with at least one face to face visit early in the monitoring period) from public health staff. Contact public health unit staff immediately if symptoms develop, including fever (at least 38 OC). Public health unit staff will make an assessment and notify the Ministry of Health on 0800 GET MOH (0800 438 664) to arrange clinical assessment and monitoring
Healthcare workers working in New Zealand	Healthcare workers caring for an EVD case working in a New Zealand clinical or laboratory setting who have taken recommended infection control precautions, including use of appropriate PPE while caring for an EVD case[5] or a staff member with unprotected percutaneous or mucocutaneous exposure to body fluids from an EVD case.	Please refer to 'occupational health and blood and body fluid exposure' in Appendix 3 (page 21) for further details on advice and actions.	Twice daily monitoring for fever (at least 38 ^{O}C), and other symptoms from first potential exposure to 21 days after last possible exposure. Please refer to 'occupational health and blood and body fluid exposure' in Appendix 3 (page 21) for further details on monitoring.

2.5 Management of a confirmed EVD case

Care for EVD is supportive, as there are no specific approved vaccines or therapeutic (antiviral drug) options currently available.

The Ministry of Health will continue to provide advice, support and coordination. The Ministry will be able to call on additional expert advice as required.

For a confirmed case in the convalescent phase, the need for PPE may be reviewed as the patient's clinical state improves. Recovered confirmed cases may be released from isolation in consultation with an infectious diseases physician and the local public health unit and be allowed to return home once well. 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). The case should be given advice about the use of condoms or advised to abstain from sex.

2.6 Special situations

Outbreaks in health care 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 the local public health unit. Control measures may include:

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

Outbreaks in residential care facilities or other residential institutions (eg, 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 public health unit staff.

Other factors to consider in the event of local transmission

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

If animals have had exposure to to an EVD case in New Zealand, particularly household companion animals that were in close contact when the case was symptomatic, it may be appropriate to consult with the Ministry for Primary Industries to assess the risk that animals could have become infected.

Appendix 1: Current international situation as of 22 April 2015

An outbreak of EVD has been occurring in West Africa since December 2013. It is the largest outbreak of EVD ever reported, both in terms of the number of cases and the geographical spread. It is also the first time EVD has spread to large cities.

For further information on the situation, see: www.who.int/csr/disease/ebola/situation-reports/en/

A list of countries currently defined as EVD affected countries is available at: www.health.govt.nz/ebolaupdate.

Declaration of a Public Health Emergency of International Concern (PHEIC)

On 8 August 2014, the Director General of the World Health Organization (WHO) declared the ongoing Ebola Virus Disease (EVD) outbreak in West Africa to be a Public Health Emergency of International concern (PHEIC). This decision was based on the advice and assessment of an Emergency Committee convened under the International Health Regulations. It is only the third time a PHEIC has been declared (the first was for the 2009 H1N1 influenza pandemic, the second was in May 2014 in response to the international spread of wild polio virus).

The WHO has issued a series of recommendations for states with EVD transmission, those with potential or confirmed EVD cases and those with land borders with affected states. These recommendations are intended to assist with containing the outbreak and preventing further international spread. The WHO also issued a series of recommendations for all states which are applicable to New Zealand.

Situation updates

The WHO website has latest situation updated and other information: www.who.int/csr/disease/ebola/situation-reports/en

The CDC website has an up-to-date map of countries affected by EVD: www.cdc.gov/vhf/ebola/resources/distribution-map-guinea-outbreak.html

Appendix 2: General information about EVD

Ebola viruses

EVD is caused by a virus of the *Filoviridae* family. Five species of Ebola virus have been identified, namely Zaire, Sudan, Reston, Tai Forest and Bundibugyo, from samples collected during human and non-human primate outbreaks since the first outbreak in the Democratic Republic of the Congo in 1976. Fruit bats of the *Pteropodidae* family are considered to be a likely natural host of the Ebola virus, with outbreaks of EVD occurring occasionally amongst other species such as chimpanzees, gorillas, monkeys and forest antelope. The current outbreak in West Africa is caused by the Zaire strain of Ebola virus.

Transmission

EVD is introduced into the human population through contact with the blood, secretions, other bodily fluids or organs of infected animals (often through hunting or preparation of bushmeat).[6] EVD then spreads person to person through contact and droplet transmission via the blood, secretions, organs or other bodily fluids of infected people, and contact with environments heavily contaminated with such fluids, including in health care settings. The risk for infection in health care settings can be significantly reduced through the appropriate use of infection prevention and control precautions. Transmission through sexual contact could potentially occur up to three months after clinical recovery. Laboratory-acquired infections have also been reported.

Airborne transmission, as occurs for measles or influenza, has never been documented. There is no evidence that simple physical contact (with intact skin and no mucosal exposure) with a sick person is sufficient for contracting EVD. Contact with heavily contaminated objects (such as bedding) can possibly facilitate transmission. Traditional burial ceremonies in affected countries are a known high risk activity for transmission.

The role of the environment in transmission has not been established. Under environmental conditions that favour virus persistence, it has been shown that Ebola virus can survive in liquid or dried material for a number of days. However, Ebola virus is also sensitive to inactivation by ultraviolet light and drying.

Incubation period, signs and symptoms

The incubation period varies from 2 to 21 days, most commonly 8–10 days. People are not infectious before symptoms develop. The onset of symptoms is sudden and includes fever, intense weakness, myalgia, headache, nausea and sore throat. This is followed by vomiting, diarrhoea, impaired kidney and liver function, rash, and in some cases, both internal and external bleeding. Laboratory findings frequently include low white blood cell and platelet counts, as well as elevated liver enzymes. Some cases progress to profuse internal and external bleeding, which can further progress to shock and multi-organ failure. The mortality associated with Ebola virus in developing countries ranges from 50 percent to 90 percent (50–70 percent in this current outbreak) depending on the species of Ebola virus causing disease. The mortality for patients receiving care in developed countries is not known but is expected to be lower.

[6] The meat of African wild animals used as food.

Appendix 3: Infection prevention and control management plan for suspected or confirmed EVD cases

Purpose

This guideline outlines the infection prevention and control management of patients with suspected or confirmed EVD predominantly within New Zealand district health board hospitals. For details on infection prevention and control management in primary care facilities, please also refer to the separate document 'Patient Management Guideline for Primary Care Ebola virus disease'.

These guidelines are based on the available information and the following considerations:

- the lack of a safe and effective vaccine for EVD
- a suspected high rate of morbidity and mortality among EVD infected patients
- absence of confirmed or probable EVD case in New Zealand
- the evolving international situation
- initial diagnosis not likely to be known and patient may have airborne disease rather than EVD.

Guideline principles and goals

This guideline takes a precautionary approach and recommends a higher level of infection prevention and control measures than required for the reasons listed above. As more information becomes known about the situation, changes may be made to the infection prevention and control recommendations.

The guideline provides infection prevention and control guidance for all staff members when in close contact with a **patient either suspected or confirmed to have EVD**.

Key documents this guidance is based on

1. CDC. Infection prevention and control recommendations for hospitalised patients with known or suspected Ebola Haemorrhagic Fever in US hospitals. Updated 20 October 2014. www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html
2. Public Health Agency of Canada. Pathogen Safety Data Sheet – Infectious Substances – Ebola Virus. Ebola Virus. Updated 1 August 2014. www.phac-aspc.gc.ca/lab-bio/res/psds-ftss/ebola-eng.php
3. WHO. Infection prevention and control guidance for care of patients in health-care settings, with focus on Ebola. September 2014. www.who.int/csr/resources/publications/ebola/filovirus_infection_control/en
4. UK Department of Health. HSE Management of Hazard Group 4 viral haemorrhagic fevers and similar human infectious diseases of high consequence. November 2014. www.gov.uk/government/uploads/system/uploads/attachment_data/file/377143/VHF_guidance_document_updated_19112014.pdf

Infection prevention and control

This infection is spread via direct contact and indirect contact with infectious body fluids including secretions and excretions. Spread by small particle aerosols has not been conclusively demonstrated.

The concern and safety of health care workers related to the high mortality rate has been taken into consideration for infection prevention and control measures and a precautionary approach is therefore recommended. For this reason the following personnel restrictions should be put in place.

1. Restrict all non-essential staff from entering the clinical care area.
    - Use of signage.
    - Use of security personnel.
2. Maintain a log of all staff and non-staff (family, friends and whānau) entering the room.
    - Use of a checklist to ensure that all staff and non-staff entering the clinical care area use personal protective equipment (PPE) correctly – the wearing of correct PPE and the safe removal of PPE.
3. Visitors restricted.

Standard precautions and transmission-based precautions should be applied.

Contact and Droplet precautions

Patient placement

- The patient should be placed in an airborne infection isolation room (negative pressure room) because of the high mortality associated with this infection. An ante room and en-suite bathroom is highly desirable. Note: If a negative pressure room is not available, at a minimum a single room, with the door closed, should be used until transfer to a negative pressure room is possible.
- It is important that there is adequate space to allow for placement of PPE, infectious waste bins and disposable/single-patient use equipment for use with patient care. Discuss with IPC staff the optimal set up of 'clean' and 'dirty' areas.
- DHBs should refer to local infection prevention and control guidelines/policy on placement of PPE and waste bins (and refer to *Management of waste*, page 22).

Hand hygiene

- Staff should wash their hands with soap and water if any visible soiling, or use alcohol-based hand rubs (ABHR) in accordance with the '5 moments for hand hygiene'
- Hand hygiene should precede the donning of PPE and during the removal of contaminated PPE, as specified in the instructions on donning and removing.

Personal protective equipment (PPE)

- The donning and removal of PPE must be supervised by a trained observer. Ensure that trained observer is wearing PPE to protect themselves from accidental transmission when assisting in the removal of used PPE, to reduce the risk of accidental skin exposure or self-contamination when removing used PPE.
- Staff should be trained in procedures to put on and take off PPE. Clear instructions should be available on what PPE should be used and disposal of used PPE. Training should be held regularly.

  Please note that the following PPE is a detailed list of equipment but not necessarily required for all scenarios. Please refer to the 'Summary of personal protective equipment requirements' on page 19 for further instruction.

- **Gloves** – Two pairs of gloves should be worn. Single use Nitrile examination gloves with extended cuffs. At a minimum, outer gloves should have extended cuffs. The use of tape to secure gloves to gowns/coveralls should be avoided, as this may interfere with safe removal of gown/coverall because of the need for additional manipulation and the risk of tearing of the gown/coverall, potentially resulting in contamination.
  - If, inadvertently, gloves were not worn by a person providing patient care or during the handling of contaminated patient care equipment or linen, then they must immediately wash their hands with soap and water. They should also inform Occupational Health and Safety.
- **Gowns** – Wear a semi-impervious or impervious disposable isolation gown or an all-in one disposable coverall[7] (consideration should be given to selecting gowns or coveralls with thumb hooks to secure sleeves over inner glove). If there is a risk of significant exposure to blood or body fluids then wear a disposable plastic apron over the gown or coverall.
- **Masks** – Use a fluid resistant surgical mask that does not collapse against the mouth or a particulate respirator (N95/P2 mask)[8] . For all aerosol-generating procedures wear a particulate respirator (see Airborne Precautions below). Ensure that all staff who will be wearing such masks are familiar with 'fit checking'. Guidance should be sought from IPC personnel if staff have any queries. Masks should comply with AS/NZS 1716:2012 respiratory protective devices.
- **Face shield** – wear a disposable single use full facial shield (surgical masks with integral eye shields do not protect the entire face). Goggles can be used in place of face shield if face shield not available.
- **Surgical hood** –disposable single use hood that extends to the shoulders and fully covers the neck. (Not required if coverall has an integral hood).
- **Boot covers** – wear disposable single use fluid resistant or impermeable boot covers that extend to at least mid-calf. Boot covers should allow for ease of movement and not present a hazard to the wearer. (Not required if coveralls have integral shoe covers).
- **Hair covers –** disposable single use hair cover can be worn under surgical hood.

Ensure that all PPE is donned and removed adhering to best practice. Removed PPE should be placed in an infectious waste bin (refer to *Management of waste*, page 22).

7 The use of coveralls rather than long-sleeved disposable gowns should only be considered for staff trained and competent in using such attire.

8 A P2/N95 respirator must comply with AS/NZS 1716:2012. The difference between N95 and P2 classification for respirator face masks is the N95 classification means the masks complies with USA testing requirements and the P2 classification indicates compliance with European testing requirements.

Airborne precautions

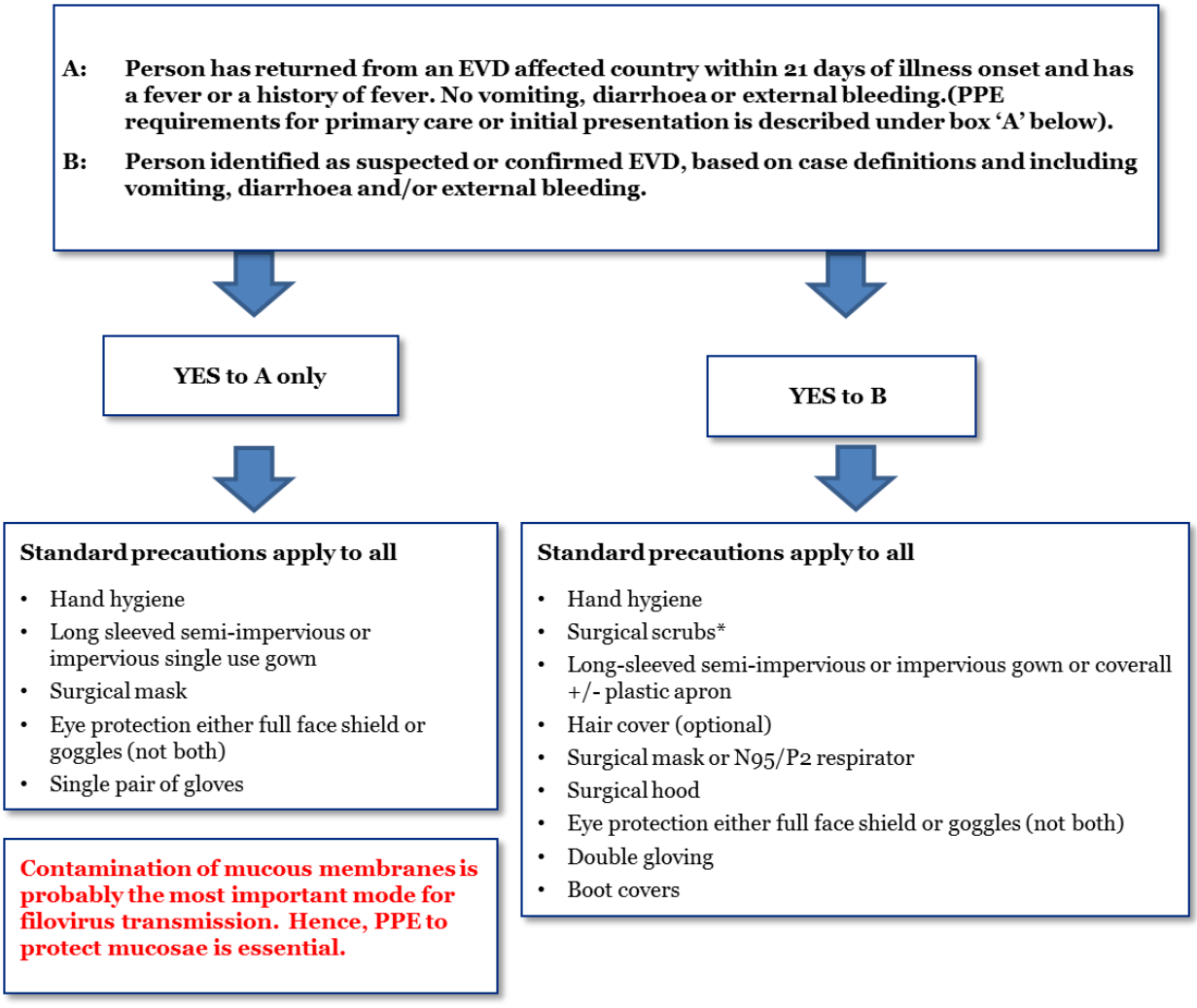
Airborne precautions are to be used in addition to standard and contact precautions for aerosol generating procedures.

Airborne precautions require the wearing of a particulate respirator (often referred to as a N95/P2 mask) and should be followed for all aerosol generating procedures.

Aerosol generating procedures at the bedside include bronchoscopy, open suctioning of airway secretions, resuscitation involving emergency intubation or CPR, bilevel positive airway pressure (BiPAP), sputum induction and endotracheal intubation. Some cleaning procedures can also generate aerosols.

Summary of personal protective equipment requirements

The type of PPE required will vary depending on the level of infectiousness and clinical assessment.



NB: *Consideration should be given to the use of surgical scrubs by staff members who have direct patient contact and a process in place for the laundering of these garments.

Refer to www.cdc.gov/vhf/ebola/hcp/procedures-for-ppe.html for descriptive advice of donning and removal of PPE. For a video demonstration for the donning and doffing (removal) of PPE procedures, please refer to: www.cdc.gov/vhf/ebola/hcp/ppe-training/equipment.html

Please note that the CDC training video is based on PPE being used at Johns Hopkins hospital, and there are likely to be variations in local PPE equipment. Please discuss any queries with your IPC nurse specialist for clarification.

Patient-care equipment

Dedicate the use of non-critical patient-care equipment to the patient. Where possible, use single-patient use equipment. All patient-care equipment that is not single-patient use should be thoroughly decontaminated and disinfected before being reused. If it cannot be adequately disinfected then it should be discarded into the appropriate receptacle. Follow the manufacturers' instructions for disinfecting re-useable equipment.

Patient transport

Limit the movement and transport of the patient from the room to essential purposes only. If the patient is to be transported out of the room, ensure that the staff assisting with the transfer wears PPE (gloves, gown, mask, shoe and hair covers and face shield). The patient is to wear a surgical mask. Avoid transporting the patient through high patient flow or public access areas. If necessary, cordon off the route. Ensure that the clinical area receiving the patient is informed about the timing of the transfer.

Environmental control

It is important that the patient environment remains clean; who undertakes the task should be determined in consultation with the local Infection Prevention and Control Specialists. Staff performing environmental cleaning should be appropriately trained. Care should be taken to avoid contact with blood and body fluids including secretions and excretions. Avoid cleaning procedures which potentially generate aerosols, such as sweeping or vigorously mopping fluids.

Ensure that the appropriate procedures for the routine care, cleaning and disinfection of environmental surfaces, beds, bedrails, bedside equipment and 'high-touch' surfaces are followed.

Heavily soiled areas need to be cleaned with warm water and detergent before disinfection.

Typical household bleach is a solution of sodium hypochlorite (5.25%) containing 50,000 ppm available chlorine. It is important to check the concentration in the formulation before use. The following table is a guide to bleach dilution.

Bleach dilution concentration

Uses	Concentration (%)	Parts-per-million (ppm) available chlorine	How to prepare the right concentration of bleach
Household bleach	≈5.25%	50,000	
Blood and body fluid spills	1%	10,000	Make a 1:5 dilution (200 mls made up to 1 litre with water)

Environmental cleaning of high exposure surfaces, ie, bathrooms, bed rails etc	0.1%	1000	For a 0.1% solution make a 1:50 dilution of bleach (20ml made up to 1 litre with water)

A fresh bleach solution should be made up every 24 hours.

Disposal of body fluids

Safe handling of commode bowls, urinals and bed pans is essential. Full PPE must be worn when handling commode bowls, urinals and bed pans.

Where possible, empty the urinal and the bed pan contents into the ensuite toilet bowl, close the lid and flush the toilet. If no ensuite toilet is available, transport the commode bowl, urinal or bed pan safely in a plastic bag to the dirty utility room and either:

- carefully empty the contents down the sluice sink
- place the commode bowl, urinal or bed pan directly into the flusher sanitiser and run a cleaning cycle
- place contents and cardboard insert directly into macerator and run cycle.

Care must be taken to avoid excessive splashing.

Disinfect the sluice sink are with 1% bleach solution after disposal of contents.

Linen

All linen (disposable or otherwise) will need to be disposed of. Used linen should be placed in an infectious waste bag in the infectious waste bins. If disposable linen is not available then the normal reusable linen should be used and disposed of in the infectious waste bin after use.

See 'Management of waste' for full protocol on disposal. Do not send linen to be laundered.

Occupational health and blood and body fluid exposure

Occupational health

- A record of all staff providing care to a suspected, confirmed or probable EVD case should be maintained. This includes all staff who are providing care, room or other environmental cleaning, and adhere to infection prevention and control best practices.
- All such staff should be provided with written information about the symptoms associated with EVD that they need to watch out for, including fever, and should be advised and assisted as necessary, to monitor their temperature twice daily. There should be clear instructions regarding who they should contact if any symptoms occur. All staff will be monitored by hospital Occupational Health and Safety and/or the local public health unit daily (relevant contact details should be available to the staff member). Any staff member who has been caring for an EVD case in New Zealand should continue monitoring for 21 days from the last date they cared for the patient. If they remain asymptomatic, and there are no other reasons for concern, the staff member should be able to continue work in other clinical settings during this final 21 day monitoring period

- **Staff who become unwell during the incubation period** (from first possible exposure to 21 days after last possible exposure to the patient with suspected, probable or confirmed EVD) should isolate themselves, contact hospital Occupational Health and Safety and/or the local public health unit (relevant contact details should be available to the staff member). Depending on their symptoms, unwell staff may meet the case definition so will need to be discussed with the local Medical Officer of Health (if this has not already occurred), who would then notify the Ministry of Health.
- **Any staff member with unprotected percutaneous or mucocutaneous exposures to blood, body fluids, secretions or excretions from a patient with suspected, probable or confirmed EVD** should immediately stop working. Mucous membrane exposures should be rinsed with copious amounts of water. For cutaneous exposures, the affected area should be washed with soap and water. They should inform their immediate supervisor who will contact hospital Occupational Health and Safety for assessment of the risk and access to post exposure management for blood borne viruses including HIV, Hepatitis B and C, etc.
    - A plan should be put into place for daily monitoring for symptoms consistent with EVD (including twice daily temperature recordings) of any staff member who has had unprotected exposure to a suspected, probable or confirmed EVD case. The staff member should not return to clinical work for one full incubation period (21 days) and have daily contact from the local public health unit. Public health unit staff would immediately notify the Ministry of Health.

Avoiding blood and body fluid exposure

- Take care to avoid injuries when using needles, scalpels and other sharp injuries. Never recap a needle.
- Place sharp objects in a puncture resistant container after use.
- If a needle stick injury is sustained by a staff member then they must immediately rinse the wound with copious amount of water and wash vigorously with medicated soap. They should seek assistance from their colleagues and inform their immediate supervisor.
- Collect all solid, non-sharp, medical waste using leak-proof waste bins with covers.
- Manage all spills according to routine policy. Wear appropriate PPE when cleaning up after a spill.
- Limit the use of phlebotomy and keep laboratory testing to the minimum necessary for essential diagnostic evaluation and patient care.

Management of waste

A risk assessment and management plan should be made for the safe storage and disposal of all waste. Discuss with your local IPC specialist for advice.

All EVD waste is categorised as UN 2814 Infectious Substance – Category A. For waste packaging procedures, see Figure 1 and 2.

- Refer to NZS 4304:2002 Management of Healthcare Waste for guidance on the disposal of infectious waste.
- Prior to removal of a bin from the room or anteroom, the outside of the bin should be wiped with a 1% bleach solution.
- Prior to removal of a bag from the room the bag should be placed in another infectious waste bag.

- All waste should be placed into an infectious (lined) waste bin or bag – this ensures that the waste is contained within three bags, in accordance with waste standards.
- The opening of the bag or the lid of the bin should be sealed so that they cannot be inadvertently opened prior to disposal.
- The bags and bins should be identified and stored in a secured locked area, prior to collection by the waste management service.
- Sharps bins should be sealed and placed into approved drum containers that have been provided by a waste disposal provider.

Figure 1: Waste procedure for packaging of class UN2814 Category A waste in accordance with NZS5433:2012

Summary for designated referral hospitals (other New Zealand hospitals and primary care facilities should refer to Figure 2).

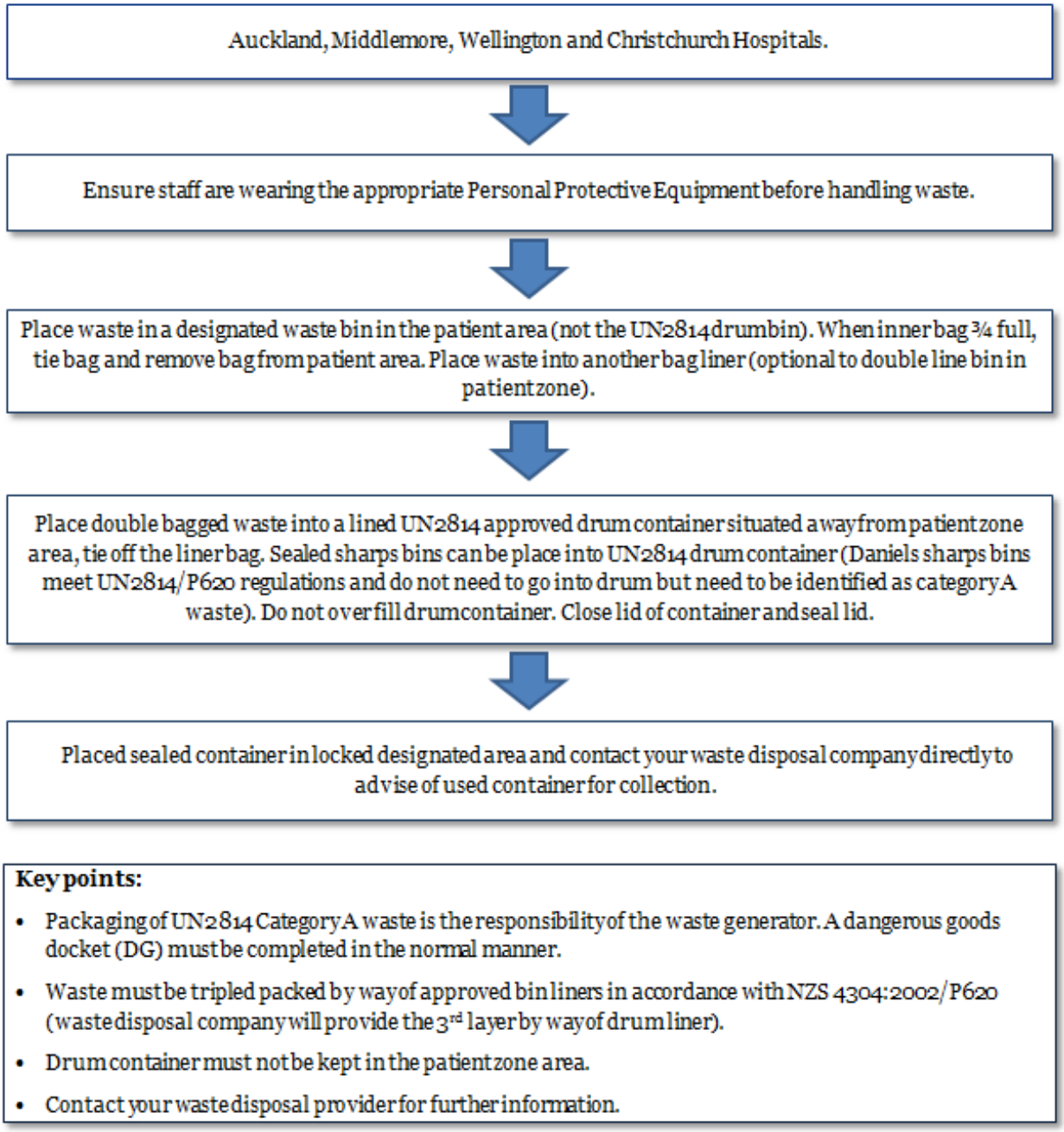
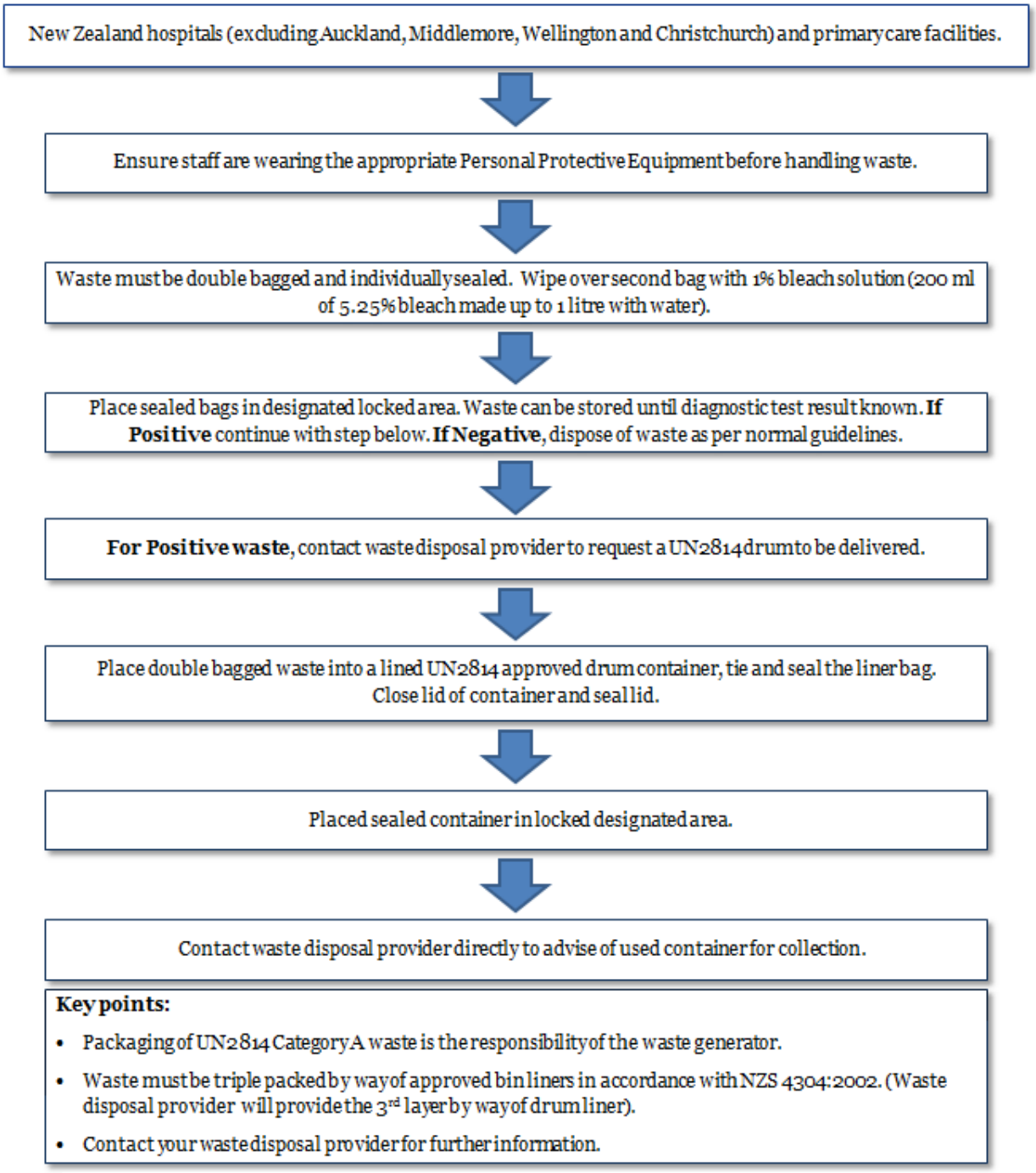


Figure 2: Waste procedure for packaging of class UN2814 Category A waste in accordance with NZS5433:2012

Summary for New Zealand hospitals (excluding the designated referral hospitals of Auckland, Middlemore, Wellington and Christchurch) and primary care facilities.



Movement of deceased bodies

The handling of deceased bodies should be kept to a minimum. Staff handling the deceased body should wear the appropriate PPE (and should be trained in the donning and removal of PPE).

The deceased patient should be placed in a sealed, leak-proof body bag.[9] Unfortunately, leakage may still occur with these bags and for this reason the body bag should be sealed, wiped over with 1000 ppm available chlorine and sealed inside another body bag. The second (external) bag will also be wiped down with the chlorine solution. Absorbent material should be placed between each bag. The body should be transported to the mortuary. Removal of PPE and hand hygiene should be performed once the task is completed.

The Funeral Director should be informed in advance that the body is infectious so the appropriate arrangements can be made by the funeral director.

Post-mortem examinations

- A post-mortem examination on a person known to have died of EVD exposes staff to unwanted risk and **should not be performed**.
- Where a patient has died prior to a definitive diagnosis of EVD, advice should be sought from the local Medical Officer of Health.

Visitors

Visitors (family, friends and whānau) should not be allowed into the patient care area. However, exceptions may be made on a case by case basis.

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 and contact details for their local public health unit.

Cleaning of the room after patient discharge

Discuss cleaning requirement with your local IPC specialist or refer to DHB policy.

[9] Body bags should be of a good quality, zips should have a material underside as vinyl is more likely to tear. Absorbent material should be placed between each bag.

Appendix 4: National referral pathway guideline– Ebola virus disease (EVD)

This guideline has been developed to guide decision making on the most effective clinical management of a suspect EVD Case.[10] This document should be read in conjunction with the remainder of the Ministry of Health's *Updated information for health professionals: Ebola virus disease (EVD)* guidance document which has more detailed information and is kept updated on the Ministry's website: www.health.govt.nz/ebolaguidance

Guiding principles

- The four referral hospitals identified for suspected EVD, or other highly infectious diseases are: **Auckland, Middlemore, Wellington** and **Christchurch.**
- Every secondary and non-referral tertiary hospital in the country is expected to be able to identify a suspected EVD case and provide patient care until the patient is transferred to one of the four referral tertiary hospitals.
- If a suspected case presents in a primary care setting, the local Medical Officer of Health must be contacted immediately. They will liaise with relevant ambulance services and the most appropriate receiving hospital.
- Suspected EVD cases should be transferred as early as possible to one of the four referral hospitals.
- If a suspected case is too ill to be transferred, the four referral hospitals, supported by the Ministry of Health and the Ebola Technical Advisory Group, will provide support and equipment to the treating hospital.

Hospitals must recognise that any suspected case of EVD will create a unique range of challenges for the clinical team and the incident management team involved. These include potentially managing a severely ill patient, staff concern, community concern and considerable media interest.

Whilst all facilities must have a safe system of work for any infectious disease presentation managed in a negative pressure room, the four referral hospitals identified have additional capacity to manage a suspected or confirmed EVD case.

Aeromedical transfers

Aeromedical transfers introduce additional risks to flight crew who cannot wear effective PPE and the aircraft which may be difficult to disinfect if grossly contaminated by a severely ill patient.

St John Ambulance is working with aeromedical providers, Auckland and Middlemore hospitals to place four Isopod Air Isolator Patient Transporters into service to facilitate the emergency transfer of a symptomatic highly infectious patient, if required.

The policy and protocols for use of such equipment are being developed concurrently with other jurisdictions, especially Australia. Nonetheless, it is evident that managing a severely ill EVD case during transfer will be difficult.

[10] Most recent case definitions are located at: www.health.govt.nz/ebolacasedefinition.

Where a clinical decision is made by ambulance services and treating clinicians that transfer by Isopod is required, St John or Wellington Free Ambulance will organise and provide appropriately trained retrieval staff. This may include personnel from ambulance services, the referral hospital and aeromedical providers. Referring hospitals are not required to have trained transfer staff.

Therefore:

- early transfer of a suspect EVD case is required where possible
- ambulance services also need to plan for long road transfers in the event of inability to fly.

Adult Referral Pathway

Referral hospital*	Relevant point of contact in referral hospital	Transferring DHB catchments
Auckland	On-call Infectious Diseases Specialist	Northland Waitemata Auckland
Middlemore	On-call Infectious Disease Specialist	Counties Manukau Waikato Bay of Plenty Taranaki Tairawhiti Lakes
Wellington	On-call Infectious Disease Specialist	MidCentral Hawke's Bay Whanganui Wairarapa Hutt Valley Capital and Coast Nelson Marlborough (where air transfer is available)
Christchurch	On-Call Infectious Disease Specialist	Nelson Marlborough (where air transfer is NOT available to Wellington) Canterbury West Coast South Canterbury Southern

Paediatric Referral Pathway

Referral pathways for suspected paediatric EVD cases will be determined on a case-by-case basis, based on the clinical presentation, likelihood of requiring Paediatric Intensive Care Unit (PICU) level care and other circumstances. Referral and potential for transfer should be discussed between the hospital at which the patient has presented (and paediatricians at their adult referral hospital* as outlined above, if these are not the same) and Starship Hospital (General Paediatrician or PICU consultant if PICU level care is anticipated).

Appendix 5: Ebola Virus Disease Convalescent Sera Request Protocol

Convalescent sera (cs) from patients recovering from Ebola Virus Disease (EVD) is currently a treatment option for confirmed EVD cases, however availability restrictions exist. EVD cs is currently unavailable in New Zealand. In the event that New Zealand has a confirmed EVD case the most likely source for EVD cs is the National Health System Blood and Transplant (NHSBT) of Great Britain, and through the NHSBT the wider European Blood Alliance (EBA).

The process for requesting EVD cs is as follows:

1. When a suspected EVD case is identified, the treating Infectious Diseases physician contacts regional blood bank at the facility providing care (the four referral hospitals host regional blood banks), to obtain contact details for the NZBS National Medical Director (or delegate) via the on-call Transfusion Medicine Specialist.

2. Infectious Diseases physician contacts NZBS National Medical Director and informs of possible request for EVD cs. NZBS will contact Lorna Williamson or Shelia MacLennan (or other appropriate person) at NHSBT and alert them to possible request for EVD cs.

3. Infectious Diseases physician contacts NZBS National Medical Director when EVD test result is available. If EVD is confirmed, NZBS will then confirm request for support with contact at NHSBT.

4. Infectious Diseases physician contacts Ministry of Health to notify that a request has been made.

5. NHSBT organises a teleconference with representatives of the EBA at which requesting New Zealand provider or delegate will present the case for review.

6. NHSBT forwards the request to the United Kingdom Department of Health, if required.

7. If request is approved and appropriate EVD cs is available, NZBS works with providing national blood service to transport EVD cs to New Zealand.

8. NZBS organises distribution to requesting facility in New Zealand.

Regional Blood Bank Contact Information

Auckland	09 307 2834
Christchurch	03 364 0389
Middlemore	09 276 0044
Wellington	04 918 6961

Estimated Timeline

Treating physician contacts NZBS National Medical Director and reports lab-confirmed Ebola positive patient. NZBS Director contacts NHSBT to confirm potential need for convalescent sera (2 hours).

Treating physician contacts Ministry of Health to confirm a request for convalescent sera has been made (1 hour).

NHSBT organises teleconference including members of EBA to provide an opportunity for treating physician or delegate to present the case (2-16 hours, time of day dependent).

NHSBT presents request to Department of Health for approval (24 hours).

With approval NZBS, in cooperation with European partners, arranges packing and transport for cs. Cs shipped to NZ by air. (36 hours)

Upon arrival in NZ NZBS arranges distribution to referral hospital caring for Ebola positive patient (2-12 hours).

Total time needed between positive test result and administration of first dose of cs, dependent on times of day for certain steps, is estimated to be roughly **57 to 73 hours.**

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