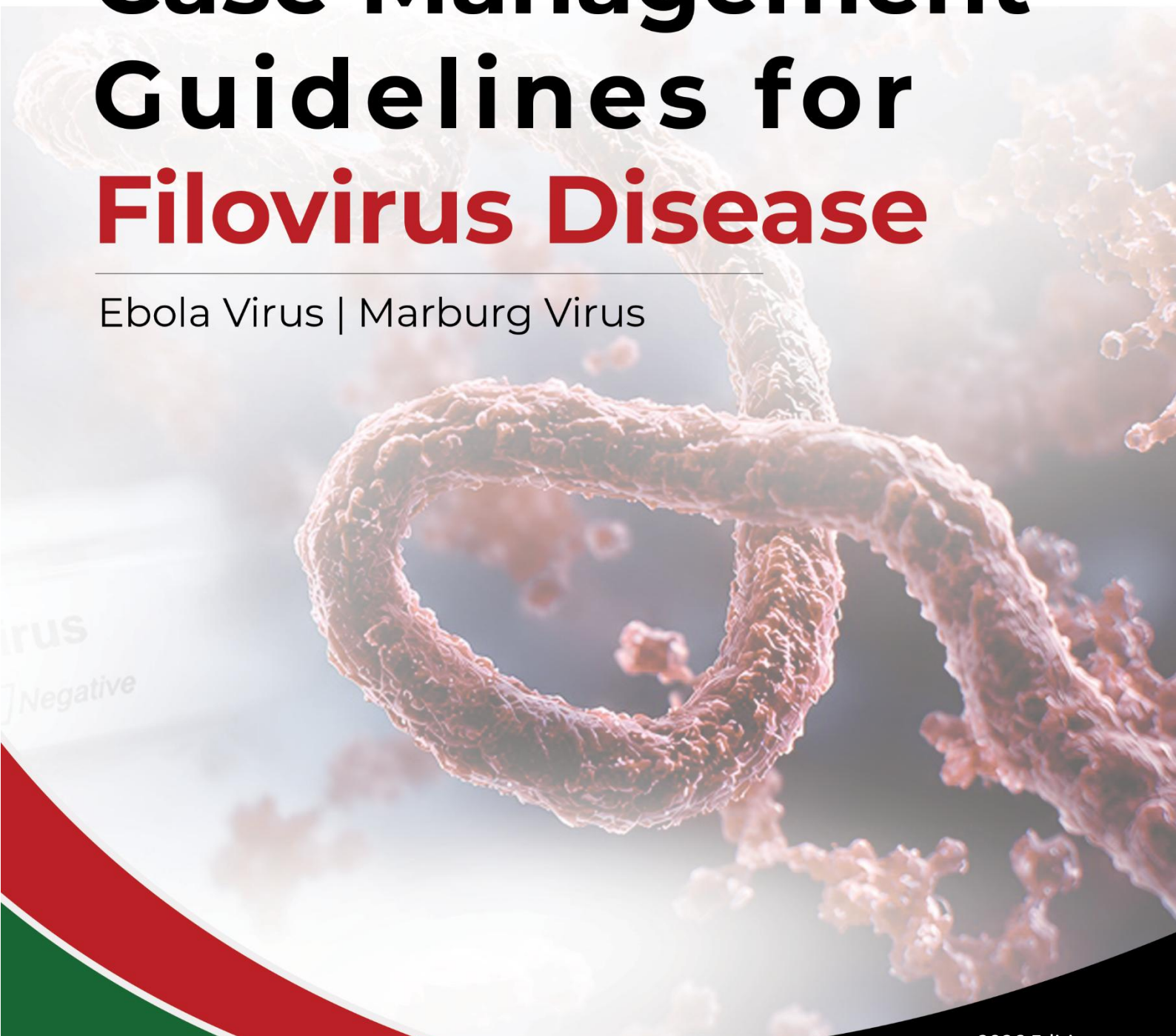
REPUBLIC OF KENYA

MINISTRY OF HEALTH

Case Management Guidelines for Filovirus Disease

Ebola Virus | Marburg Virus



2026 Edition

Case Management Guidelines for

Filovirus Disease

Case Management Guidelines for Filovirus Disease

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These guidelines provide standardised protocols for the screening, diagnosis, isolation, and treatment of patients with filovirus disease in Kenya. They are intended for use by clinicians, nurses, surveillance officers and emergency response teams at all levels of the health system.

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Foreword

On 6th October 2026, the Ministry of Health confirmed Kenya's first imported case of Ebola disease caused by the Bundibugyo virus, in a traveller who had arrived in Nairobi from the Democratic Republic of the Congo, where the region is experiencing one of the largest Ebola outbreaks on record. Bundibugyo virus disease presents a particular challenge. Unlike Ebola disease caused by Zaire ebolavirus, there is at present no licensed vaccine and no approved specific treatment. Our most powerful tools are therefore those within our own hands: early detection and isolation, high-quality supportive care delivered without delay, strict infection prevention and control, safe water, sanitation and hygiene, and safe and dignified burial. Past outbreaks show clearly that optimized supportive care saves lives, and that disciplined infection prevention and control protects those who provide it.

These Case Management Guidelines for filovirus disease set a single national standard for caring for suspected and confirmed patients and managing their contacts. These guidelines are for the management of all filoviruses including Orthoebola and Orthomarburg viruses which share the same management principles. They bring together, in one practical reference, clinical case management, infection prevention and control, safe and dignified burial, WASH, mental health and psychosocial support, and discharge and follow-up of survivors. The Ministry of Health developed them under the coordination of the Kenya National Public Health Institute, drawing on the latest World Health Organization guidance and adapting it to the realities of the Kenyan health system.

The Constitution of Kenya guarantees every person the right to the highest attainable standard of health. In keeping with that right, the Health Act, 2017, the Public Health Act (Cap. 242) and Kenya's obligations under the International Health Regulations (2005), these guidelines are hereby issued for adoption in all public, private and faith-based health facilities, and by all County Departments of Health, port health services and response teams. The Ministry of Health gazetted the Public Health (Declaration of Formidable Epidemic Disease) Order, 2026 (LN 203) or the Public Health (Ebola Disease) Rules, 2026 (LN 204). These govern notification, quarantine, isolation, burial and repatriation. I call upon County Governments, through the Council of Governors, to ensure that health workers are trained and protected and that the necessary supplies and isolation capacity are in place.

Responding to Filovirus disease, in this case, the Bundibugyo virus disease, is not only a clinical task; it is a matter of public trust. I urge all who use these guidelines to treat patients, survivors and their families with compassion and respect, to guard against stigma, and to work hand in hand with communities, religious and local leaders whose cooperation is essential to safe care and safe burial.

This outbreak-response edition will be reviewed as the outbreak evolves and new evidence emerges, including from studies of candidate vaccines and therapeutics. Finally, I pay tribute to Kenya's health workers, who stand on the front line of this response at great personal risk. We owe them not only our gratitude but our full commitment to their safety.



Dr. Patrick Amoth, CBS
Director General for Health
Ministry of Health, Republic of Kenya

Acknowledgement

The development of these guidelines was made possible by the commitment and collaboration of many individuals and institutions. We thank the Cabinet Secretary for Health, Hon. Aden Duale, for leading the national Ebola response and prioritizing the protection of health workers. We thank the Principal Secretary, State Department for Public Health and Professional Standards, Ms. Mary Muthoni Muriuki, and the Director General for Health, Dr. Patrick Amoth, CBS, for their policy direction, technical guidance and oversight throughout the development and validation of this document.

We extend our special gratitude to Dr. Loice Achieng Ombajo, MBS of the University of Nairobi Department of Clinical Medicine and Therapeutics and the Center for Epidemiological modelling and Analysis (CEMA), who chaired the national committee of technical experts who developed these guidelines. Her clinical expertise, leadership and tireless commitment, under the demands of an active outbreak, were central to bringing this work to completion.

Special recognition goes to the members of the National Task Force and the national committee of technical experts, who gave their time and expertise, often outside normal working hours and alongside their response duties, to draft, review and validate these guidelines. We particularly acknowledge the technical working groups on clinical case management; infection prevention and control and occupational health and safety; safe and dignified burial; water, sanitation and hygiene (WASH); surveillance, contact tracing and port health; and mental health and psychosocial support. We also thank the National Public Health Laboratories, especially the National Virology Reference Laboratory, and the Kenya Medical Research Institute (KEMRI).

We thank the County Governments, through the Council of Governors, and the County Health Management Teams, especially those of border and high-risk counties, for their partnership and for the health facilities that received and cared for the first patients, and for sharing their experience so others could learn from it.

We are indebted to the institutions that released their specialists to this work: The University of Nairobi Department of Clinical Medicine and Therapeutics and CEMA; Kenyatta National Hospital; Moi Teaching and Referral Hospital; Jaramogi Oginga Odinga Teaching and Referral Hospital; Defence Forces Memorial Hospital; Aga Khan University Hospital; The Nairobi Hospital; Coptic Hospital; Living Room Hospital; the Nairobi City County Government; and the Council of Governors.

We gratefully acknowledge the technical and financial support of our development partners, in particular the World Health Organization (WHO), the United States Centers for Disease Control and Prevention (US CDC) and the United States Government, UNICEF, AMREF Health Africa, FHI 360 through the STRIDES project, the Africa Centres for Disease Control and Prevention (Africa CDC), the US National Institutes of Health (NIH), The Alliance for International Medical Action (ALIMA), and the Mission for Essential Drugs and Supplies (MEDS). This document draws extensively on WHO guidance on the clinical management, infection prevention and control, and surveillance of filovirus disease, and we thank WHO for permission to adapt it.

We pay special tribute to the health workers and response teams on the front line of this outbreak, including those infected while caring for patients. Their courage and sacrifice are why these guidelines place such emphasis on protecting those who provide care. We also honour the patients, survivors and families affected by Ebola, and the communities whose cooperation makes an effective response possible.

Finally, we thank the guidelines development secretariat and editorial team for coordinating the drafting, consolidation, and editing of this document.



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1. Introduction

Filovirus diseases caused by *Orthoebolavirus zairense, Orthoebolavirus sudanense, Orthoebolavirus bundibugyoense, Orthoebolavirus taïense*, and by *Orthomarburgvirus* continue to cause significant morbidity and mortality, principally within the African continent. Filovirus disease is a general term for the severe, sometimes haemorrhagic, illness caused by viruses of the family Filoviridae, and with a well-documented capacity for explosive amplification within health-care settings when infection prevention and control (IPC) is inadequate.

This guideline focuses specifically on Ebola viruses that carry a risk of person-to-person transmission and are of immediate concern to Kenya, with particular emphasis on **Bundibugyo ebolavirus**. It does not address Lassa fever or Crimean Congo Haemorrhagic Fever (CCHF) (see the Ministry of Health's separate VHF guidelines for those pathogens), nor other viral infections with haemorrhagic manifestations that lack direct person-to-person transmission (e.g. Rift Valley fever, yellow fever).

Ebola virus disease (EVD), formerly known as Ebola haemorrhagic fever, is a highly infectious, severe, and often fatal illness in humans. EVD outbreaks have a case fatality rate ranging from 25% to 90% with an average of about 50%. The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission via contact with body secretions and fluids.

Bundibugyo ebolavirus (BDBV) was first identified during an outbreak in Bundibugyo District, western Uganda, in 2007, and caused a further outbreak in the Democratic Republic of the Congo in 2012. In the current outbreak in DRC the observed cumulative crude mortality as of 6th October 2026 is 48.2%. Kenya reported its first case of BDBV on the 6th of October 2026 and at the time of releasing these guidelines, 9 confirmed cases had been reported.

The quality of supportive care delivered in health facilities is an important determinant of survival and this guideline offers practical guidance on management of patient including supportive care and use of investigational therapeutic agents.

1.1 Purpose

To provide practical guidance on current best practice for the management of filovirus disease including clinical case management, infection prevention and control, and psychosocial support across Kenyan health-care facilities.

1.2 Objectives

- Establish a systematic approach to the comprehensive clinical management of filovirus disease with specific emphasis to Bundibugyo virus disease.
- Build the capacity, skills and confidence of health workers to manage filovirus disease safely and effectively.
- Strengthen the overall Kenyan health-care response to filovirus disease outbreaks, including notification, isolation, laboratory referral and discharge/follow-up pathways.
- Support Integrated Disease Surveillance and Response (IDSR) activities necessary for International Health Regulations (IHR) compliance.

2. Principles of filovirus Disease Management

The diagnosis of filovirus disease rests on three components: history of exposure, detailed clinical assessment, and laboratory investigation.

2.1 Case Definition

The current case definition of filovirus disease in Kenya -

A. **Suspect case definition:** Any person exhibiting any of the following symptoms: fever of sudden onset, headache, body ache, lethargy, abdominal pain, vomiting, diarrhoea or unexplained bleeding, AND/(exposure), a history of travel from or transiting through any country reporting active cases of filovirus/Ebola disease in the last 21 days (epidemiological link) and/or history of exposure to a confirmed/suspect case.

   OR

   An unexplained mortality following a history of any of the following symptoms: fever of sudden onset, headache, body ache, lethargy, abdominal pain, vomiting, diarrhoea or unexplained bleeding, AND/(exposure), a history of travel from or transiting through any country reporting active cases of filovirus/Ebola disease in the last 21 days (epidemiological link) and/or history of exposure to a confirmed/suspect case.

B. **Probable case definition:** Any suspected case, alive or deceased, for whom laboratory results were not available, but who has an epidemiological link to a confirmed case or to a recognized transmission chain containing a confirmed case.
C. **Confirmed case:** Any person or contact meeting the suspect/probable case definition and has a positive RT-PCR laboratory result for filovirus/Ebola disease.
D. **Community lay case definition:** Illness with hotness of the body, diarrhoea or vomiting with no response to treatment and has bleeding from body openings or any unexplained sudden death with a history of bleeding and history of travel to areas currently having an active outbreak of filovirus/Ebola disease.

2.2 Case Identification and Detection

2.2.1 History of Exposure

The single most important diagnostic aid is a history of exposure within 2 to 21 days before symptom onset, the incubation period for filovirus disease.

Transmission occurs via contact with blood or body fluids (including breast milk, semen, sweat, vomit, urine, saliva, vaginal fluids) of a person (or body) with filovirus disease most often while providing care or handling a body of a deceased case without wearing appropriate Personal Protective Equipment (PPE).

The following are the epidemiological risk factors:

Table 1: Epidemiological Risk Factors

High Risk Exposures	Low Risk Exposure
• Percutaneous, e.g. the needle stick, or mucous membrane exposure to body fluids of filovirus disease patient • Direct care or exposure to body fluids of filovirus disease patient without appropriate personal protective equipment (PPE) • Household member providing direct care for filovirus disease patient without appropriate PPE • Laboratory worker processing body fluids of confirmed filovirus disease patients without appropriate PPE or standard biosafety precautions • Participation in funeral rites which include direct exposure to human remains in the geographic area where outbreak is occurring without appropriate PPE • Persons with contact with potentially infected animals (non-human primates, bats), alive or dead e.g. through handling or eating bushmeat, entering caves, or working in fields near fruit-bat roosts. • Children breastfed by a woman with, or convalescing from, Ebolavirus detected in breast milk. • Neonates born to mothers who were infected during pregnancy. • Sexual partners of a male survivor virus can persist in semen for months after clinical recovery.	• Persons with no known exposure were present in filovirus disease outbreak affected country in the past 21 days with no low or high-risk exposure. • Providing direct clinical care to a confirmed patient with filovirus disease while consistently wearing appropriate personal protective equipment (PPE) with no known breaches or exposures.

2.2.2 Detailed Clinical Assessment

Early clinical features of filovirus disease are non-specific and mimic common endemic infections, making early recognition difficult. Health workers must maintain a high index of suspicion in any patient meeting the exposure/case-definition criteria, even when the presentation is mild, and must always keep malaria, upper respiratory tract infections, and other common causes of fever in the differential diagnosis.

Important: Despite the term 'haemorrhagic fever', overt bleeding occurs in fewer than half of confirmed filovirus disease cases. Health workers must not wait for haemorrhage to suspect filovirus disease as it is a late and rare sign.

Table 2: Clinical Features of Filovirus Disease by Phase

Phase	Typical timing	System Affected	Key features
Early	Days 0–4	Nonspecific	Fever ≥38.0°C, profound weakness, headache, myalgia, arthralgia, anorexia, hiccups and lethargy
	Days 3–7	Gastrointestinal	Nausea, vomiting, abdominal pain, diarrhoea (may be bloody), dysphagia
Peak	Days 5–19	Haemorrhagic / vascular	Petechiae, epistaxis, gum bleeding, haematemesis, melaena, bleeding from puncture sites (in a minority of patients)
	Days 7–21+	Renal	Acute kidney injury — requires close fluid/electrolyte monitoring
	Days 7–21	Respiratory	Chest pain, dyspnoea, respiratory distress
	Days 7–28+	Neurological / cardiovascular	Confusion, encephalopathy, seizures; myocarditis, circulatory shock
Recovery	Days 21–28+	Ocular / multi-system	Uveitis, visual impairment; persistent fatigue, post-Ebolavirus syndrome
Mortality: Without early and appropriate management, mortality occurs within 7-10 days of symptom onset			

2.2.3 Initial Response to a Suspected or Confirmed Case

Screening for symptoms and potential epidemiologic links should be routinely undertaken for every person visiting the facility at the point of first contact with a healthcare worker. During screening, IPC measures should be in place including hand hygiene, social distancing and using the no-touch technique and appropriate patient and staff flow (Figure 1). There should be designated donning, doffing and isolation areas. The screening tool (Table 3) below will assist in identifying patients who should be properly screened for the possibility of filovirus disease.

Table 3: Screening Tool

Screening Tool			
Date			
Facility			
Pt. screening ID			
Temperature			
Person conducting screening			
Epidemiological History		**Yes**	**No**
Contact with a suspected or confirmed case in the past 21 days?			
Contact with blood/body fluids of an infected person?			
Contact with a deceased person suspected of having filovirus disease?			
Travel or residence in an area with an active filovirus disease outbreak			
Signs/ Symptoms		**Yes**	**No**
Fever or history of fever			
Headache or body pain			
Weakness or fatigue			
Vomiting or diarrhoea			
Abdominal pain			
Sore throat?			
Unexplained bleeding *This includes vaginal bleeding outside of normal menses			
Skin rash			
Other symptoms: bilateral conjunctivitis, intractable hiccups			

***A suspected case must have 1 epidemiological risk and AT LEAST 1 signs or symptoms**

Below is an example of a triage form that can be used for patients deemed to be suspected cases from screening.

Table 4: Triage Form

Demographics							
Patient name:						Date:	
Sex: M F		Age:				Register no.:	
Address/Location:							
Reason for consultation:							
Time & date illness started:							
Did they receive treatment before coming to the hospital?		Yes	No				
What kind of treatment?							
Where did they receive treatment? Hospital_____ Traditional healer: _____				Health centre (name): _____ Other _____			
Symptoms of Filovirus Disease							
Fever		Yes	No	# Days: _____ Temperature: _____ºc.			
Vomit	Yes	No		Bloody	Yes	No	
Headache		Yes	No				
Diarrhoea		Yes	No	Bloody	Yes	No	
Nausea	Yes	No					
Haemorrhagic eyes		Yes	No				
Other haemorrhage		Yes	No	Location _____			
Breathlessness	Yes	No					
Bone/muscle pain	Yes	No					
Loss of appetite	Yes	No					
Asthenia/weakness		Yes	No				
Abdominal pain	Yes	No					
Swallowing problems		Yes	No				
Intractable Hiccups		Yes	No				
Contact History							
Is there somebody ill in the family?				Yes	No		
Have you visited someone who is ill?				Yes	No		
Has somebody died recently in your family				Yes	No		
Have you been to a funeral recently?				Yes	No		
Suspicion of Filovirus disease			Yes	No			
Patient Plan:							
Remarks:							
Name of Nurse/Doctor:							

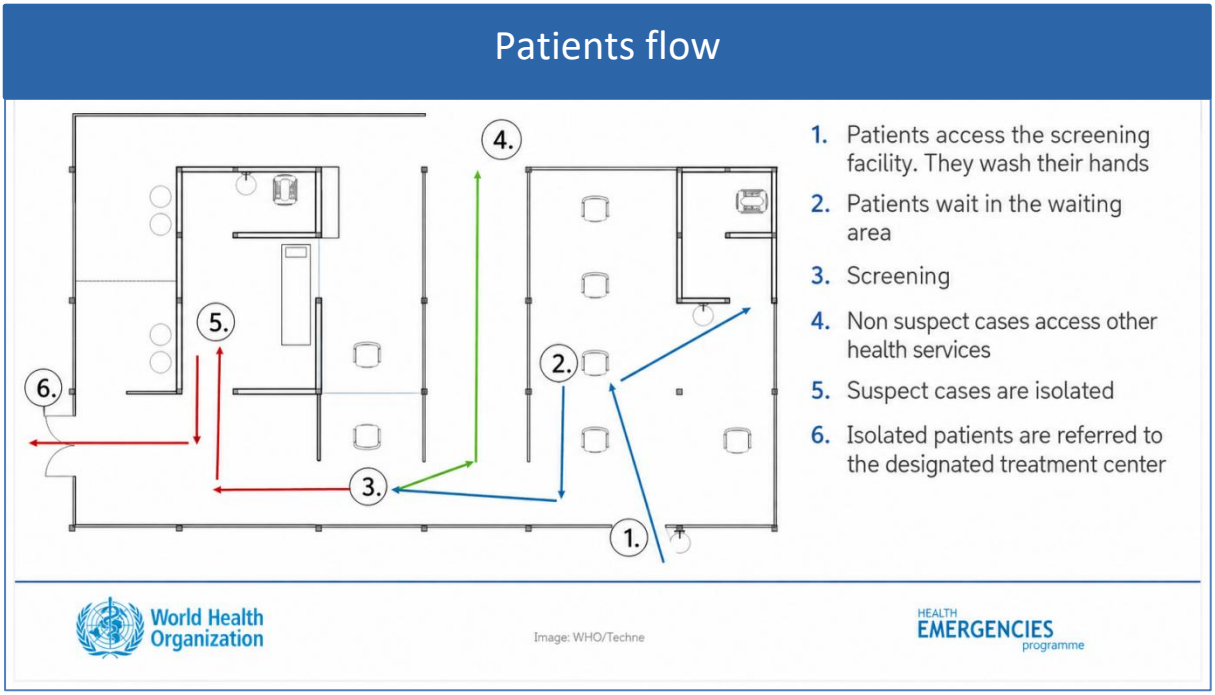


Figure 1: Screening facility patient flow: hand hygiene on arrival, distanced waiting, then screening. *Source: Republic of Kenya Ministry of Health / KNPHI screening job aid.*

Whenever a patient meets the suspect case definition:

1. Notify the Sub-County health office and call the emergency hotline (719/ 0716717717) immediately do not wait for laboratory confirmation.
2. Apply full IPC precautions on PPE and adhere to the donning and doffing protocols (Section 7.4).
3. If conscious and cooperative, explain to the patient what will happen next, the reason for isolation, and the infection-control procedures being followed.
4. Isolate the patient in a designated **area, preferably a self-contained single room** with restricted access; give supportive care immediately do not wait for laboratory confirmation to begin fluid resuscitation, glucose correction or other time-critical care (Sections 3–4).
5. **Collect two sterile EDTA (purple-top) tubes of whole blood. For adults, collect approximately 4 mL into each tube. For children, collect at least 1 mL into each tube.** Complete the case investigation form (Section 2.2.4, Appendix 1).
6. Triple-package the specimen and transport it by the fastest available means to the designated laboratory.
7. Restrict the number of staff and relatives entering the isolation area.
8. Dispose of all waste as per IPC guidelines on filovirus disease waste disposal (Section 7.2.4)

2.2.4 Laboratory Investigations

Appropriate laboratory testing is critical for patients with suspected filovirus disease. These tests can be considered in three categories:

A. Ebola virus testing to be done at arrival using a RT-PCR test.

- The first-choice testing modality is RT-PCR in designated BSL 3 laboratories (National Virology Reference Lab, CDC- Nairobi, KEMRI, KEMRI-CDC Kisumu, mobile border laboratories- Lwakhaha, Busia).

- **Recommendation for retest**: If an initial RT-PCR test for filovirus disease is negative on a blood sample collected **less than 72 hours after the onset of symptoms, a repeat test should be performed with a fresh blood sample drawn** more than 72 hours after symptom onset**.**
- **When a repeat test is not needed:** A negative RT-PCR result from a blood sample collected *after* 72 hours from symptom onset generally rules out filovirus disease. A repeat test is also not required if the patient has completely recovered from the acute illness.

B. Testing that is required for care of sick patients (should be done as point of care tests)

- Complete blood count (CBC), including differential and platelet count
- Sodium, potassium, bicarbonate, blood urea nitrogen, creatinine, and glucose concentrations
- Liver function tests
- Coagulation testing, specifically prothrombin time (PT), expressed as an international normalized ratio (INR)
- Urinalysis if there is a clinical indication
- Rapid diagnostic test for malaria.

All samples from a suspected filovirus disease case must be regarded as highly infectious. Only specially trained personnel who have been trained in the correct IPC measures and safe sampling and correct PPE use should collect specimens.

Testing for diagnosis of filovirus disease

Table 5: Specimen Collection for Filovirus Disease Confirmation

Item	Guidance
Specimen	Whole blood, serum or plasma for PCR/ELISA; oral swab in fatal cases
When	Collect from every suspected case; regard all specimens as potentially infectious
Preparation	Full PPE; refrigerate (do not freeze) for PCR/ELISA
Packaging	Triple packaging: primary leak-proof tube → absorbent material → secondary leak-proof container → rigid outer packaging with biohazard label
Transport	Fastest available means to the designated laboratory; explicitly request *Ebolavirus* and *Marburgvirus* species identification
Results	Typically, available within 24 hours of arrival at the designated laboratory

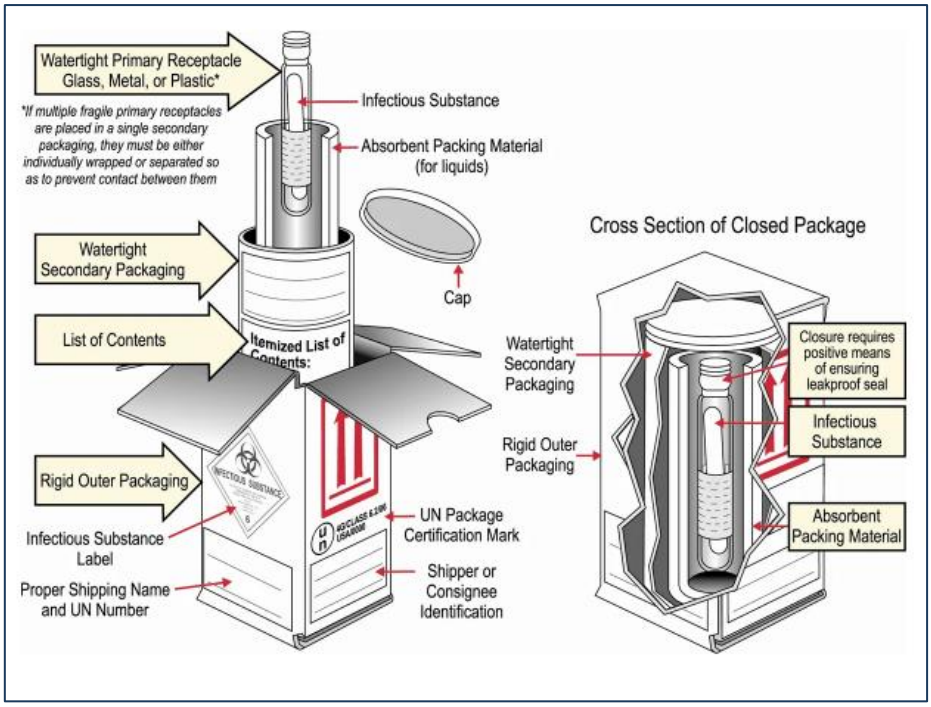


Figure 2: Triple packaging for referral of an infectious substance: primary receptacle, absorbent material, secondary packaging, and labelled rigid outer packaging. *Source: WHO / UN Model Regulations triple-packaging standard.*

A companion step-by-step Laboratory Sample Collection and Testing Job Aid is provided in Appendix 1.

2.3 Notification

Once filovirus disease is suspected, notify the facility surveillance focal person, the Sub-County and County health offices, the KNPHI and Ministry of Health using the fastest available means. Document the event on the case investigation form (MOH-502); record all subsequent suspected cases on a line-listing form (MOH 503).

Table 6: Notification Contacts

Contact point	Role	Means of contact
Emergency Hotline	24-hour national alert line for notification of suspected Filovirus disease cases	Call 719
County Rapid Response Team (RRT)	County-level outbreak coordination, case investigation, contact tracing	County specific hotlines
National Public Health Laboratory (NPHL)	National reference laboratory for Filovirus PCR/serology confirmation	0713260190
National Public Health Emergency Operations Centre (NPHEOC)	National coordination of outbreak response	0716717717

2.4 Isolation

Triaging and isolation of suspect and confirmed cases is a key guiding principle in filovirus disease management, to limit further spread. An isolation area should ideally already be available. If not, immediately identify and set aside a single room with an adjoining toilet/latrine, good ventilation, and restricted access.

- Suspected cases **should not be cohorted together** or with confirmed cases. Confirmed cases can share spaces or rooms (wards, bathrooms and toilets; i.e. can be cohorted).
- Isolation areas should follow unidirectional flow (clean → dirty), with clear signage, dedicated waste bins, sharps containers, a dedicated toilet, a separate donning/doffing space, and dedicated hand-hygiene and cleaning supplies (see Figure 6, Section 7).

3. Management of Suspected and Confirmed Filovirus Disease Cases

Clinical management of filovirus disease is predominantly supportive and should focus on early recognition of severe disease and complications, combined with appropriate symptom management. Control of pain and anxiety are important, and all patients require careful monitoring and psychosocial support (Section 6). Health workers should pay careful attention to appropriate IPC precautions and PPE (Section 7) while providing clinical care.

Suspected and confirmed cases should be isolated in different locations in the unit and should not be allowed to interact.

Units should be equipped with a central monitoring station as well as two-way communication with patients where feasible.

3.1 Initial assessment

3.1.1 Suspected case

- Personnel should be in full PPE and observe all IPC procedures (refer to section 7.4).
- Take samples for the following tests; VHF panel and malaria (this should be sent to the Ebola testing labs).
- Full history and physical examination.
- Manage symptoms as per section 3.2 below.
- Reassess stable patients at least every 8 hours. Unstable patients may require more frequent. assessments, depending on their clinical condition.

3.1.2 Confirmed case

- Personnel should be in full PPE and observe all IPC procedures.
- Where available, the following tests should be done within the unit; U/E/C, liver function tests, random blood sugar, complete blood count, and arterial blood gas if indicated.
- Obtain IV access early in all patients with gastrointestinal symptoms (this is important as patients may develop shock quickly). IV access should be anticipated in the majority of patients.
- Manage symptoms as per section 3.2 below.
- Reassess stable patients at least every 8 hours; refer to the patient assessment checklist on optimised supportive care. Unstable patients may require more frequent assessments, depending on their clinical condition.

3.1.3 Daily Assessment Check-List

Table 7: Daily assessment checklist

Assessment	Plan
1. Is the patient at high risk of complications? a. Airway obstruction or respiratory distress? b. Tachypnoea (RR > 22 or too fast for age) or SpO_2 < 92%? c. Shock? Hypotension, weak or rapid pulse, cold extremities or delayed capillary refill? d. Signs of severe dehydration? e. Altered mentation or seizure? f. Oliguria or anuria, urine output < 0.5 (adult)/1.0 ml (child)/kg/hour? g. Haemorrhagic manifestations? h. Severe hypoglycaemia (glucose < 54 mg/dl or < 3 mmol/l)? i. Severe electrolyte abnormalities? j. Severe weakness with inability to ambulate or eat/drink?	☐ NOT at high risk Regular assessments – three times a day ☐ High risk Increased interval of assessments: _____ ☐ Plan: _____
2. Fluid status assessment a. Able to drink normally? b. Able to drink some but not enough to correct dehydration or meet daily fluid requirements? c. Signs of sepsis or shock (HR > 90, SBP < 90, RR > 22). And for children: cold extremities, weak fast pulse, delayed capillary refill > 3 sec?	☐ Continue oral fluids ☐ Add maintenance fluids ☐ Bolus IV fluids: _____ ml
3. Laboratory assessment a. Does potassium or magnesium need to be replaced? b. Is renal failure present? i. If yes, has the patient been adequately fluid resuscitated? ii. Monitor urine output (Avoid placing a urinary catheter unless absolutely necessary, e.g. where there is urinary obstruction)	☐ Replace potassium ☐ Replace magnesium ☐ Where available, use ultrasounds to assess fluid status
4. Severe hypoglycaemia a. Evidence of hypoglycaemia (glucose < 54 mg/dl or < 3 mmol/l)? i. If yes, are they symptomatic and require D50 or D10? ii. If not, are they able to eat and drink or do they require continuous infusion D10?	☐ Euglycemic ☐D10 or D50 for symptomatic hypoglycaemia ☐ D10 for asymptomatic hypoglycaemia
5. Treatment of potential bacterial co-infections a. Does the patient have features of sepsis? b. Is the patient on antibiotics?	☐ Refer to table 9 ☐ Antibiotics discontinued

c. Does the patient still need to be treated with antibiotics? *Review the need for antibiotics daily and discontinue all unnecessary antibiotics*	
6. Treatment of potential malaria a. Does the patient have signs of severe malaria? i. If yes, is the patient being treated with artesunate? ii. If no, is the patient being treated with an antimalarial medication? b. Can the antimalarials be stopped due to a negative malaria test?	☐ Artesunate ☐ Artemether-lumefantine/artesunate-amodiaquine ☐ Malaria negative ☐ Malaria treatment completed
7. Nutrition a. Is the patient able to eat and drink? i. If yes, can maintenance fluids be stopped?	☐ Able to eat and drink ☐ NOT able to eat and drink and requires maintenance fluids
8. Prevention of hospital acquired infections a. Is there an IV line or another invasive device b. Is the site dirty, swollen or tender? c. Can the IV access be removed? d. Can the urinary catheter be removed? e. Does the patient require assistance walking or can they walk on their own?	Change IV access Remove IV access ☐ Yes ☐ No Remove urinary catheter ☐ Yes ☐ No Patient requires assistance walking ☐ Yes ☐ No
9. Is the patient a pregnant woman? a. Is she having per vaginal bleeding? b. Is she presenting with features of PROM? c. Is she experiencing reduced d. Absent foetal movements? e. Is she having lower abdominal pain or other symptoms of labour?	Date of last menstrual period: _____ EDD: _____ Plan: _____
Notes: D-Dextrose; HR-Heart Rate; RR-Respiratory Rate; SBP-Systolic Blood Pressure; SpO_2 - Oxygen Saturation.	

3.2 Management of Symptoms and Signs

Table 8: Specific Management of Common Symptoms and Signs

Symptom/Sign	Management
Fever (>38.0°C)	Paracetamol 1gm 6-8 hourly in adults, 10-15mg/kg in children Avoid NSAIDS due to the potential for bleeding
Acute significant bleeding / moderate-severe pallor / suspected haemorrhagic shock	Transfuse with whole blood or components per Section 4.4; treat shock per Section 4. Avoid Use of tranexamic acid except in Post-Partum Haemorrhage
Pain	Paracetamol 1gm 6-8 hourly in adults, 10-15mg/kg in children Tramadol if severe 50-75mg 8 hourly in adults Avoid NSAIDs.
Difficulty breathing	Oxygen titrated to SpO2 ≥94%; evaluate for pneumonia, fluid overload, co-infection and manage accordingly.
Diarrhoea, vomiting, dehydration	ORS even without signs of dehydration; refer to section 4 for IV rehydration. Anti-emetics (e.g. metoclopramide, ondansetron) may help facilitate oral rehydration. Loperamide may be used to reduce diarrhoea
Convulsions	**Adults:** Diazepam 5-10mg in acute seizures, followed by: Phenytoin loading dose 20mg/kg, maximum dose 2g, IV, followed by maintenance 100mg every 8 hours Where available Levetiracetam 500 mg 12 hourly **Children:** Diazepam 0.5 mg/kg over 1 min; if convulsions continue> 5min, 2nd dose 0.3 mg/kg over 1 min (Alternatives: lorazepam, buccal midazolam); if convulsions continue 5 min after 2nd dose of diazepam: phenobarbital 15mg/kg as loading dose, followed by maintenance of 3-5mg/kg OD Exclude/correct hypoglycaemia and electrolyte derangement.
Hypoglycaemia	Check glucose (and monitor regularly); if low <3mmol/L, IV dextrose as appropriate); Early feeding and nutritional support.
Dyspepsia	Omeprazole Adults: 40mg every 24 hours Children: 5–10 kg: 5 mg once daily; 10–20 kg: 10 mg once daily; ≥ 20 kg: 20 mg once daily *Double the dose in patients with haemorrhage
Anxiety / confusion	Psychological support (Section 6); calm reassurance; consider diazepam at night if needed; sedation only if aggressive/non-cooperative and unsafe.
Suspected bacterial or malaria co-infection	Empirical antimicrobials and antimalarials per Table 9 (Section 3.2.1); Do a bedside malaria RDT if available

3.2.1 Empirical Antimicrobials for Suspected Co-Infection

Presumptive antibiotics should be used only where sepsis or bacterial co-infection is clinically suspected. Give IV antibiotics within one hour of recognizing septic shock; take samples for blood cultures first where feasible, without delaying treatment.

PRACTICE POINT

- **Avoid use of antibiotics when not indicated. Where infection is suspected, adhere to national empiric treatment guidelines.**

Table 9: Empirical Antimicrobial Approach by Suspected Syndrome

Suspected syndrome	Relevant Investigations	Community Acquired Infections	Hospital Acquired Infections
Bloodstream infection, no clear focus	Blood culture (two sets) before antibiotic administration	IV Amoxicillin-Clavulanic Acid 1.2g 8 hourly **For Children:** IV Amoxicillin-clavulanic acid 45mg/kg 12 hourly	IV Piperacillin+ Tazobactam 4.5g 6 hourly ± aminoglycoside **Children:** IV Piperacillin+ Tazobactam 100mg/kg 6 hourly, max 4g **OR** carbapenem as per AMS guidelines
Malaria	RDT or Smear Microscopy	Oral Artemether/Lumefantrine combination, IV artesunate for severe malaria as per the national malaria guidelines	Refer to National Malaria Control Programme guidance
Suspected typhoid	Blood culture (two sets) before antibiotic administration	IV Ceftriaxone 2g OD; **Children:** 80mg/kg OD Azithromycin 1g OD; **Children** 10mg/kg (may be used as an oral option where cannulation is a challenge)	
Urinary Tract Infection (UTI)	Mid-stream urine culture before antibiotic administration	Nitrofurantoin 100mg PO BD for lower UTI Amoxicillin-Clavulanic acid 1g PO BD for upper UTI; **Children** Oral Amoxicillin-clavulanic acid 45mg/kg 12 hourly	Nitrofurantoin 100mg PO BD for lower UTI IV Amikacin 15mg/kg for upper UTI. **Children:** 15mg/kg OD *Caution with amikacin in the context of kidney injury. In this context, use renal dosed Piperacillin-tazobactam
Pneumonia	Sputum for GeneXpert for any patient with cough of ≥ 2 weeks duration	Oral Amoxicillin 1g 8 hourly for mild pneumonia (CURB-65 score of 1-2) IV Amoxicillin-Clavulanic acid 1.2g 8 hourly + oral Azithromycin 500mg OD for intermediate to severe pneumonia.	IV Amoxicillin-Clavulanic acid 1.2g 8 hourly for mild pneumonia IV Piperacillin-Tazobactam 4.5g 6 hourly ± Aminoglycoside for intermediate to severe pneumonia

		For children: High dose oral Amoxicillin for pneumonia (40-45mg/kg/dose 12 hourly) IV Penicillin + Gentamicin* or Ceftriaxone in severe pneumonia *Where there is kidney injury, use a non-aminoglycoside alternative	**For children:** High dose oral Amoxicillin for pneumonia (40-45mg/kg/dose 12 hourly) IV Penicillin + Gentamicin* or Ceftriaxone in severe pneumonia *Where there is kidney injury, use a non-aminoglycoside alternative
Skin and Soft-Tissue Infection		Flucloxacillin 500mg-1000mg PO 6hourly/ 2g IV 6 hourly; **Children:** 50mg/kg 6 hourly OR Clindamycin 600mg PO 8 hourly/ 900mg IV 8hourly; **Children:** 20mg/kg per day in 3 divided doses	Clindamycin 600mg PO 8 hourly/ 900mg IV 8hourly; **Children:** 20mg/kg per day in 3 divided doses OR In high MRSA settings, consider Vancomycin

Where a patient is suspected to have malaria, antimalarial treatment should not be delayed while awaiting Filovirus results.

3.3 Special Considerations in Pregnancy

- Filovirus disease in pregnancy may be associated with high maternal and foetal mortality (miscarriage, stillbirth, preterm labour, maternal haemorrhage).
- Presentation may be atypical such as the absence of fever and may be confused with other pregnancy related conditions such as symptoms and signs of labour, antepartum haemorrhage, chorioamnionitis, postpartum haemorrhage. Clinicians should have a high index of suspicion when pregnant women present with exaggeration of expected symptoms such as nausea and vomiting.
- Involve the obstetric team early; do not delay isolation or supportive care pending obstetric review.
- Delivery generates large volumes of highly infectious fluid the delivery team must don complete PPE, ideally in a dedicated isolation delivery space with minimum essential staff.
- For postpartum haemorrhage, follow Section 4.4, including the specific tranexamic acid recommendation for PPH.
- Basic delivery facilities and a private area for managing miscarriage/vaginal bleeding should be available within the treatment unit; adhere to IPC precautions to avoid health-worker exposure.
- The mode of delivery is guided by the obstetric indication and the capacity of the treatment unit.
- Elective deliveries should be delayed.
- Where caesarean section is indicated, facilities should adhere to IPC guidelines, with a dedicated operating room and obstetric team trained in management scenarios in Filovirus disease.
- Post-discharge, all recovered pregnant women and women who conceive within 9 months of discharge from the ETU should be delivered under full filovirus disease IPC precautions.
- Convalescing pregnant women should remain in isolation until 2 negative tests 72 hours apart.

- Exposed neonates (7days) born to filovirus disease positive mothers should receive monoclonal antibody such as MBP 134 under a MEURI protocol stated in section 3.7.
- Neonates should be nursed with appropriate PPE until they have 2 negative RT-PCR tests 48 hours apart
- Neonates born to filovirus disease positive mothers should not breastfeed until RT- PCR on breastmilk tests negative twice at least 24 hours apart.
- Pregnant women with acute filovirus disease or following recovery (with conception before filovirus disease) who undergo incomplete or spontaneous abortion should be provided with post-abortion care as described in the post-abortion care guidelines.
- Women should be provided instructions on how to handle potentially infectious specimens (such as products of conception) using Filovirus disease - specific IPC measures and personal protective equipment (PPE).

3.4 Special Considerations in Breastfeeding Women

- Ebola virus and Marburg virus RNA has been detected in breast milk; an infant breastfed by a suspect/confirmed case should be isolated and managed as a suspect case do not send a potentially infected breastfeeding infant home.
- Ideally, a suspected/confirmed mother should stop breastfeeding, and this should be informed by an individual risk assessment and the ability to provide safe replacement feeding. If the mother is conscious, support her to express and discard milk to maintain supply; if unconscious, a health worker in full PPE may assist.
- Provide safely prepared breast milk substitutes and complementary feeds as appropriate
- If both mother and child later test positive, the child may be returned to the mother; if the child tests negative (ideally confirmed twice, 2 days apart), the child may leave isolation and be quarantined and followed up as a high-risk contact.

Scenario 1: Both Mother and Child are contacts and are asymptomatic - quarantine together, the mother is primary caregiver

Scenario 2: Mother is confirmed; child is an asymptomatic contact: Isolate mother and quarantine child with a caregiver using appropriate PPE. A lactating mother should stop breastfeeding, and appropriate breastmilk substitutes provided for the child.

Scenario 3: Mother and child are both confirmed - provide care for both in IDU. However, where there is no milk substitute, breastfeeding mothers may continue breastfeeding.

3.5 Special Considerations for Children

- Presentation may be atypical (non-specific fever, poor feeding, lethargy); dehydration can progress faster than in adults apply paediatric weight-based fluid dosing. (Section 4.3)
- Where suspected treat clinical syndromes; pneumonia, meningitis, shock; as per National guidelines (Basic Paediatric Protocol)
- A single trained, PPE-equipped caregiver may remain with an unaccompanied or young child in isolation; this individual requires the same training and monitoring as facility staff.

- Use weight-based drug and fluid dosing throughout; screen for severe acute malnutrition on admission and apply the relevant national protocol.
- Review and catch-up routine childhood vaccination once medically stable or at follow-up.

3.6 Additional Clinical Considerations and Complications

The complications below occur commonly enough in severe filovirus disease that every clinical team should be able to recognize and manage promptly, in addition to the core supportive care in sections 3–4.

Surgical or invasive procedural care

- Given combined bleeding and transmission risk, defer elective/non-essential invasive procedures.
- Where surgery is unavoidable (e.g. obstetric emergency, acute abdomen): use the minimum necessary trained staff in full PPE, a dedicated theatre and other Filovirus disease IPC measures.

Hypoglycaemia

- Check glucose frequently; symptomatic or severe hypoglycaemia (<3 mmol/L) is a medical emergency; treat immediately with IV dextrose for adults 50mls of D50, children 5ml/kg of D10 and neonates 2.5mls/kg of D10. Re-check after 15 minutes.

Encephalopathy and neurological complications

- Assess level of consciousness using the AVPU scale at every monitoring round; exclude and correct hypoglycaemia, electrolyte derangement, hypoxaemia. Consider complicated malaria in endemic settings.
- Manage seizures per standard protocol (benzodiazepine first-line) and protect the airway; plan for additional staffing due to the increased self-injury and PPE-breach risk posed by a confused or agitated patient.

Acute kidney injury and electrolyte disorders

- Monitor urine output; oliguria (adults <0.5 mL/kg/hour, children 1ml/kg/hour) is an early warning sign. Avoid nephrotoxic drugs and correct hypovolaemia/hypotension promptly; the most common preventable driver of AKI in this setting.
- Hyperkalaemia is life-threatening and often clinically silent: manage with IV calcium gluconate, insulin-dextrose infusion and salbutamol nebulization while treating the underlying cause. Hypokalaemia is common with ongoing vomiting/diarrhoea and potassium should be replaced and rechecked.
- Meticulous fluid, electrolyte and drug-dose management are the primary supportive strategy. Renal replacement therapy should be provided where necessary.
- Where dialysis is indicated and continuous renal replacement therapy is possible, this can be provided under the guidance of a nephrologist with full IPC precautions.

Nutrition

- Early, adequate oral/enteral nutrition supports recovery; offer small, frequent, high-energy, high-protein meals as tolerated. Actively manage anorexia and nausea rather than accepting prolonged poor intake.

Fluid replacement

A. Oral rehydration (patient perfusing and able to drink)

- Administer oral rehydration solution (ORS) in frequent, small sips to optimise absorption.
- Use antiemetic therapy to enhance tolerance and reduce vomiting-related losses.
- Quantify stool and vomitus volumes to guide replacement of ongoing gastrointestinal losses.
- Escalate to intravenous therapy if oral intake becomes inadequate, intolerance develops, or haemodynamic parameters deteriorate.

B. Intravenous fluids (shock or inability to drink - Refer to section 4.1)

- Initiate intravenous balanced isotonic crystalloid preferably Ringer's Lactate for resuscitation in patients with shock or those unable to maintain oral intake.
- Conduct serial haemodynamic assessments to guide fluid resuscitation and titration.
- Replace measurable gastrointestinal losses as part of ongoing fluid management.
- Avoid iatrogenic fluid overload, particularly when pulmonary or myocardial injury is present or evolving.
- Where feasible, use 1L fluid bags with infusion pumps to reduce chances of disruption of fluid flow.
- Patients on fluids should be assessed frequently to monitor fluid status

Use balanced crystalloids (such as Ringer's lactate) rather than 0.9% sodium chloride for acute intravenous fluid resuscitation in patients with suspected or confirmed Filovirus disease.

• This applies to children and adults including pregnant women, who have sepsis, septic shock and/or dehydration.

• Conditions where 0.9% sodium chloride may be preferred include patients with Filovirus disease that have trauma including traumatic brain injury.

Respiratory complications

- Monitor SpO2 as part of routine vital signs; provide supplemental oxygen to maintain adequate saturation. Start with 15L/min using a non-rebreather mask with a reservoir and titrate down to the lowest FiO2 to maintain SPO2 >94%. Consider co-existing bacterial pneumonia, TB or malaria-associated respiratory distress in the differential.
- Focus on oxygen therapy, positioning, treating reversible causes, and early referral where safe transfer is feasible. Mechanical ventilation may be considered if it can be safely provided.
- Procedures that increase the chance of aerosolization should be avoided - this includes non-invasive ventilation

3.7 Therapeutics and Vaccine Considerations for Bundibugyo Virus

There are currently no licensed or registered therapeutics (treatments) and vaccines against Bundibugyo ebolavirus. There are ongoing clinical trials in DRC where a number of experimental therapeutics and vaccines are being tested. Any treatment and vaccine used should be under the national MEURI protocol. Monitored Emergency Use of Unregistered and Investigational Interventions (MEURI) is an ethical framework created by the World Health Organization (WHO) to guide the use of unproven or experimental drugs, vaccines, or treatments outside of formal clinical trials during public health emergencies.

Evidence in this area is evolving and this section will be updated as more information becomes available. A national protocol will be available to guide request and use of these products.

Table 10: Experimental Therapies that may be available in country and may be considered under emergency use authorisation

Preventive Therapy	
Vaccination	Ervebo*
Post-exposure prophylaxis§ should be considered for people with high-risk exposure	Remdesivir, Obeldesivir
Treatment§	
Monoclonal Antibodies	MBP134**, Maftivimab
Antivirals	Remdesivir***, Obeldesivir

* Ervebo is an approved vaccine only for the Orthoebolavirus species Zaire, not Bundibugyo; however, Ervebo is being evaluated for prevention against Bundibugyo virus in ongoing clinical trials in DRC and when available should be provided to front line responders and health care workers under the national MEURI protocol.

** MBP134 dosed at 50mg/kg infused over 1 hour for both adult and paediatric populations.

*** Remdesivir dosed at 200mg IV on day 1 followed by 100mg daily for 9 days in adults.

*** Remdesivir dosing in paediatrics:

- Weight ≥40 kg; Day 1 loading dose: 200 mg IV, THEN 100 mg IV daily for 9 days
- Aged ≥28 days (3 kg to <40 kg); Day 1 loading dose: 5 mg/kg mg IV on day 1, THEN D 2.5 mg/kg IV daily
- Age ≥28 days and weight 1.5 to <3 kg; Day 1 loading dose: 2.5 mg/kg IV, THEN 1.25 mg/kg IV daily
- Age <28 days and weight ≥1.5 kg; Day 1 loading dose: 2.5 mg/kg IV, THEN 1.25 mg/kg IV daily

§ Therapies for post-exposure prophylaxis and treatment should be provided as early as possible (ideally within 72 hours).

Refer to the MEURI protocol for management and reporting of adverse reactions

4. Management of Severe Confirmed or Suspected Cases

4.1 Shock in Filovirus Disease Patients

Shock in filovirus disease patients can result from hypovolemia (e.g. from fluid or blood loss), sepsis or cardiac dysfunction. The intensive supportive care required is the same as for shock from other causes. These patients may also have malaria co-infection contributing to shock (Section 3.2.1).

General signs of shock (poor perfusion): systolic BP <90 mmHg; fast, weak pulse; pallor or cold extremities; capillary refill time (CRT) >3 seconds; dizziness or inability to stand; urine output <0.5 mL/kg/hour adults, <1ml/Kg/hour for children; difficulty breathing; impaired consciousness, agitation or confusion.

KEY PRINCIPLE

Call for senior support early

- Clinical teams should call for help from the most experienced clinician available as soon as a Filovirus disease patient develops shock; this is a critical, time-sensitive event.
- Ideally managed in a critical care unit for close monitoring.
- Severe lactic acidaemia worsens outcome with poor response to most therapies.

4.2 Management of Septic Shock

Clinical diagnosis: suspected infection PLUS hypotension (systolic BP <90 mmHg) PLUS one or more of: pulse >100/min, respiratory rate >24/min, abnormal temperature (<36°C or >38°C). Septic shock is a clinical emergency requiring immediate resuscitation.

KEY PRINCIPLE

Balanced crystalloid, individualized titration

- Use balanced crystalloid (Ringer's lactate) rather than 0.9% sodium chloride, in smaller, more frequent boluses (e.g. ~250 mL) with reassessment every 30 minutes, rather than one large fixed-volume bolus.
- Initiate vasopressor therapy (norepinephrine first-line) EARLY if shock persists despite initial fluids, rather than waiting — this reduces the risk of pulmonary oedema (Appendix 4).
- Use lactate trend and capillary refill time, alongside blood pressure, heart rate, urine output and mental status, to guide ongoing fluid management.

Table 11: Management of Septic Shock in Adolescents and Adults- Actions by Time Period

First 2 hours

Domain	Action
Oxygen	Titrate to SpO2 ≥94%
Fluids	Balanced crystalloid 30ml/kg over 3hrs in adults. Administer as small frequent volumes where possible. Consider existing comorbidities/conditions and tailor the fluid regimen accordingly.
Vasopressors	Start norepinephrine early if shock persists despite fluids; do not wait until hour 2 (Appendix 4)
Antimicrobials	Empirical antibiotics based on local antibiogram and antimalarials within 1 hour as you await laboratory test results
Additional source	Look for and treat any additional source of infection (chest X-ray, sputum, skin infection, urine as indicated)
Monitor	SBP, pulse, respiratory rate, SpO2, mental status (AVPU), CRT, lactate; every 30 minutes
Respond	If Hb <7 g/dL, consider transfusion; if glucose <3 mmol/L, give dextrose; escalate to senior clinician if not improving

2–6 hours

Domain	Action
Reassess	If no improvement in perfusion despite fluids/vasopressors, reconsider diagnosis (internal haemorrhage, undrained infection source); get a second opinion
Oxygen	Continue titration to SpO2 ≥94%
Fluids	If perfusion improving, reduce fluid rate; watch for signs of fluid overload (rising jugular venous pressure JVP, crepitations) and slow down the infusion rate if present
Vasopressors	Titrate to the lowest dose achieving adequate perfusion (Appendix 4)
Monitor	As above, every 30–60 minutes; urine output hourly

6–24 hours and post-resuscitation

Domain	Action
Reassessment	Full clinical reassessment; review all diagnostic results and treat the underlying diagnosis
Oxygen	Titrate to SpO2 ≥94%; discontinue when stable on room air
Fluids	Reduce to maintenance (~2 mL/kg/hour) and switch to oral/enteral as tolerated (For children, use the 4-2-1 rule -4/ml/kg/hr first 10 kg, 2 ml/kg/hr second 10 kgs, any weight above 20 kg use 1 ml/kg/hr for the rest of the weight)
Antimicrobials	Continue and switch to oral route once stable and able to swallow safely; reassess regimen at 48–72 hours (Section 3.2.1)
Nutrition	Introduce oral or NG feeding once safe; small frequent meals; monitor for aspiration risk
Monitor	Every 2–8 hours depending on stability; daily once stable — vitals, mental status, urine output, glucose/Hb if previously abnormal

4.3 Management of Hypovolaemic Shock in Children

Signs of shock in children: cold hands, plus weak or absent pulse, plus either CRT >3 seconds or AVPU less than Alert. Check whether the hand is cold; if so, assess capillary refill (apply pressure to the nail bed for 5 seconds; abnormal if colour does not return within 3 seconds)

Table 12: Normal Pulse Rate by Age (for reference)

Age (years)	Pulse rate (range)
0–1	100–160
1–3	90–150
3–6	80–140

For a child with ongoing gastrointestinal fluid losses, assess and manage as per the National Protocol for management of shock and dehydration. See figures below.

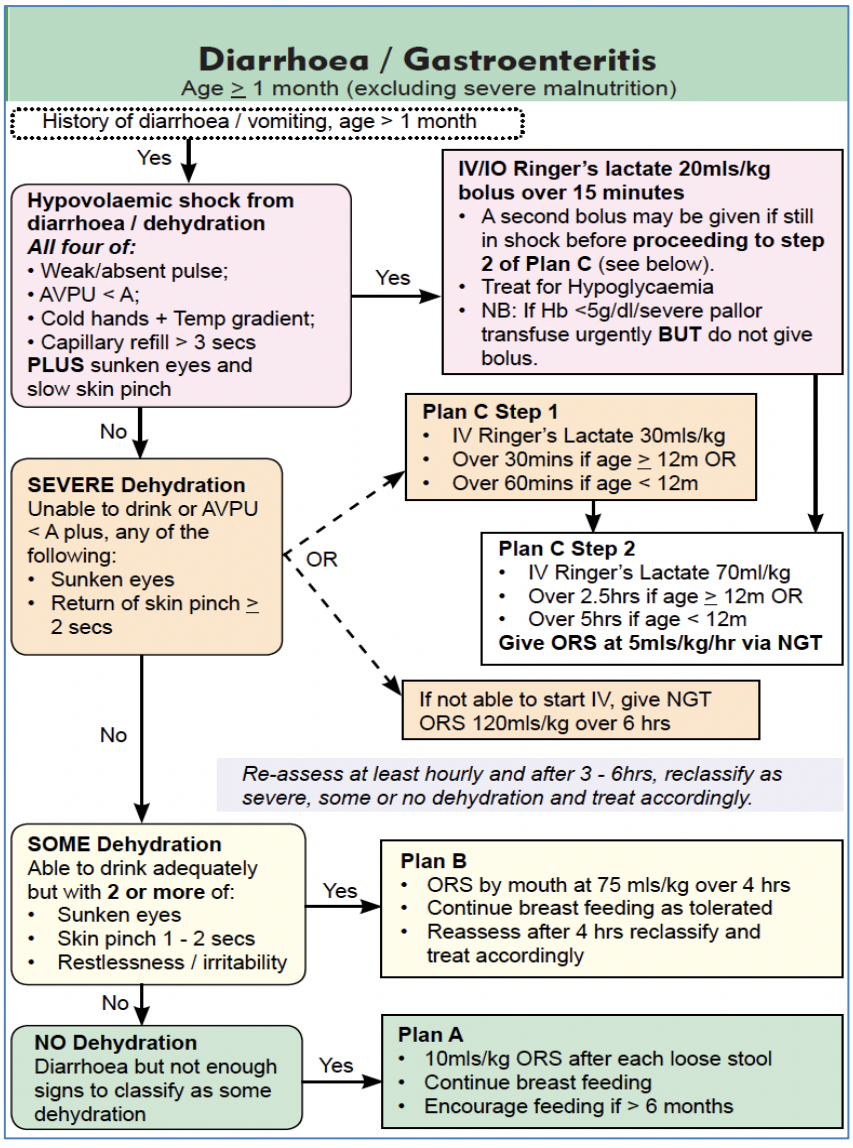


Figure 3: Assessment of dehydration in children > 1 month. Source: Republic of Kenya, Ministry of Health Basic Paediatric Protocols for ages up to 5 years, 5th Edition

Dehydration Management
(Child WITHOUT severe malnutrition/severe anaemia*)

Weight (kg)	Shock, 20mls/kg Ringer's Immediately	Plan C – Step 1	Plan C – Step 2			Plan B - 75mls/kg
		30mls/kg Ringer's	70mls/kg Ringer's			Oral / ORS
		Age <12m, 1 hour Age ≥1yr, ½ hour	Age <12m, over 5 hrs = drops/min**	Volume	Age ≥ 1yr, over 2½ hrs = drops/min**	Over 4 hours
2.00	40	50	10	150	** Assumes 'adult' IV giving sets where 20 drops=1ml	150
2.50	50	75	13	200		150
3.00	60	100	13	200		200
4.00	80	100	20	300		300
5.00	100	150	27	400	55	350
6.00	120	150	27	400	55	450
7.00	140	200	33	500	66	500
8.00	160	250	33	500	66	600
9.00	180	250	40	600	80	650
10.00	200	300	50	700	100	750
11.00	220	300	55	800	110	800
12.00	240	350	55	800	110	900
13.00	260	400	60	900	120	950
14.00	280	400	66	1000	135	1000
15.00	300	450	66	1000	135	1100
16.00	320	500	75	1100	150	1200
17.00	340	500	80	1200	160	1300
18.00	360	550	80	1200	160	1300
19.00	380	550	90	1300	180	1400
20.00	400	600	95	1400	190	1500

*Consider immediate blood transfusion if severe pallor or Hb<5g/dl on admission

Figure 4: Fluid Management for child > 6 months with shock or dehydration with no malnutrition. Source: Republic of Kenya, Ministry of Health Basic Paediatric Protocols for ages up to 5 years, 5th Edition

Reassess after Step 1; reassess again after Step 2. If signs of severe dehydration persist, seek senior/paediatrician's advice — do not mechanically repeat boluses without reassessment.

Fluid Management

in severe acute malnutrition with diarrhoea

Shock: AVPU<A, plus absent or weak pulse plus prolonged capillary refilling (>3s) plus cold periphery with temperature gradient - Give 20 mls/kg in 2 hrs of Ringer's lactate with 5% dextrose (to make this solution, add 50 mls 50% dextrose to 450 mls Ringer's Lactate).

If severe anaemia start urgent blood transfusion not Ringer's.

<u>If not in shock or after treating shock</u>

- If unable to give oral / ngt fluid because of very poor medical condition use / continue with iv fluids at maintenance regimen of 4mls/kg/hr
- **If able to introduce oral or ng fluids / feeds:**
  - **For 2 hours:** Give ReSoMal at 10mls/kg/hour
  - **Then:** Give ReSoMal at 7.5ml/kg over 1 hour then introduce first feed with F75 and alternate ReSoMal with F75 for 10 hours - can increase or decrease hourly fluid as tolerated between 5-10 mls/ kg/hr.
- At 12 hours switch to 3 hourly oral / NG feeds with F75 (next page)

Weight (Kg)	**Fluids for shock complicating malnutrition**		**Oral / NG first 12 hours**	**Maintenance**
	20mls/kg over 2 hrs		7.5mls/kg/hr	4mls/kg/hr
	Ringer's in 5% Dextrose		ReSoMal* / F75 (*10mls/kg first 2hrs)	Ringer's in 5% Dextrose
	IV		**Oral / NG**	**IV**
	Shock *(Over 2hrs)*	***Drops/min*** *adult IV set (20 drops = 1ml)*	**7.5mls/kg/hr** for up to 10 hours	mls / hour
4.00	80	14	30	15
5.00	100	17	37	20
6.00	120	20	45	25
7.00	140	24	52	30
8.00	160	27	60	30
9.00	180	30	67	35
10.00	200	34	75	40
11.00	220	37	82	44
12.00	240	40	90	46
13.00	260	44	97	48
14.00	280	47	115	50
15.00	300	50	122	52

Figure 5: Fluid Management in Severe Acute Malnutrition with Diarrhoea. Source: Republic of Kenya, Ministry of Health Basic Paediatric Protocols for ages up to 5 years, 5th Edition

Watch carefully for signs of fluid overload (early signs are fast breathing, chest indrawing, peri-orbital oedema; late signs are pulmonary oedema, cyanosis). If suspected, stop/slow the infusion and reassess fully.

Vasopressor therapy (Appendix 4) should be considered early if shock persists despite fluid resuscitation, per the principles in Sections 4.2 and 4.3.

4.4 Management of Haemorrhagic Manifestations

Bleeding may be overt or occult (mucosal, skin/puncture-site, gastrointestinal, genitourinary, or rarely intra-abdominal/intracranial) and reflects a combination of disseminated intravascular coagulation (DIC), endothelial dysfunction, thrombocytopenia and impaired hepatic clotting-factor synthesis. Assess for bleeding at every monitoring round (Table 7).

Tranexamic acid: NOT recommended for general filovirus disease bleeding

- Tranexamic acid is **NOT** recommended for general filovirus disease associated haemorrhage (e.g. IV-site, gastrointestinal, mucosal bleeding); DIC-related bleeding may be worsened by stabilizing inappropriate clots
- Tranexamic acid **IS** recommended for postpartum haemorrhage in a filovirus disease patient: give IV within 3 hours of birth alongside standard PPH care (uterotonic, uterine massage, IV fluids, examination of the genital tract, escalation of care).

Immediate management of significant bleeding: ABCDE approach, two large-bore IV lines, balanced crystalloid (Section 4.2), early vasopressors if shock persists, direct pressure on accessible sites, keep the patient warm, minimize non-essential invasive procedures.

Transfusion: arrange an emergency pathway with blood transfusion services in advance; screen all blood per national blood safety protocol even under emergency release; use group O negative or group-specific blood where cross-matching would delay life-saving transfusion; document indication, volume and response to every unit given.

4.5 Management of Severe Respiratory Failure in Filovirus Disease

Causes of Respiratory Failure: Respiratory distress in filovirus disease is rarely a direct primary pulmonary manifestation of the virus alone; it is more frequently secondary to fluid overload, respiratory muscle fatigue, haemoptysis, secondary bacterial pneumonia, or coinfections.

Invasive Mechanical Ventilation: Endotracheal intubation and mechanical ventilation are reserved for well-resourced isolation settings with specialized staff.

Avoid Non-Invasive Ventilation (NIV): NIV and high-flow nasal cannula are generally contraindicated because they generate infectious aerosols and carry a high risk of vomiting and aspiration, endangering healthcare workers.

A. Clinical Criteria for Intubation

The general clinical triggers for mechanical ventilation in severe Filovirus disease mirror standard intensive care protocols for multiple organ failure, typically occurring during the late complications phase (days 7–12) of the disease:

- **Progressive Hypoxemic Respiratory Failure:** Inability to maintain oxygen saturation despite maximizing non-invasive oxygen therapies (e.g., severe acute respiratory distress syndrome or ARDS secondary to systemic inflammation or fluid overload).
- **Hypercapnic Respiratory Failure & Exhaustion:** Respiratory muscle fatigue caused by the metabolic demands of profound diarrhoea, vomiting, and metabolic acidosis.
- **Airway Protection:** Altered mental status or profound neurological deterioration (e.g., encephalopathy, severe uraemia from acute kidney injury) where the patient can no longer protect their airway from aspiration.

> **Intubation should only be considered where there are adequately trained and experienced health personnel, and adequate PPE**

B. Safety & Institutional Criteria

Even if a patient meets clinical criteria, invasive ventilation should only proceed if the following institutional safety benchmarks are satisfied:

- **Aerosol-Generating Isolation:** The procedure must occur in a dedicated, single-patient isolation room.
- **Enhanced PPE Availability:** The intubating team must have full access to high-level personal protective equipment, specifically including a **fluid-resistant particulate respirator** (N95 or PAPR), face shields, and fluid-impermeable body coverings.
- **HEPA Filtration:** The mechanical ventilator **must** be equipped with high-efficiency particulate air (HEPA) filters on the expiratory limb to prevent the virus from exhausting into the ambient room air.
- **Staff Availability:** Sufficient trained personnel and a dedicated safety observer must be present to monitor the precise donning and doffing of PPE.

C. Utility-Risk and Futility Analysis

Because of the immense risk of provider exposure, a strict **utility-risk analysis** must be conducted prior to the procedure:

- **Reversibility Check:** If a patient's respiratory decline is primarily driven by fluid overload from aggressive rehydration, providers will often aggressively manage fluids and oxygen by masks
- **Prognostic Consideration:** In environments where mortality is exceedingly high or resource constraints are severe, invasive ventilation may be withheld if the patient is experiencing end-stage, irreversible multi-organ failure, as the procedure may be deemed medically futile and disproportionately dangerous to the healthcare team.

5. Management of Exposed Individuals (Contacts)

A contact is a person without symptoms who has had physical exposure (contact) with a confirmed, probable or suspected ebolavirus case or their body fluids within the last 21 days (the maximum incubation period). Clinicians or the surveillance focal persons receiving suspected or confirmed Filovirus disease cases should complete the contact recording/listing form.

Any person who has been exposed to a suspected, probable, or confirmed case of Filovirus disease in at least one of the situations listed in table 1 on epidemiological risk should be considered a contact i.e.:

- Has slept in the same household as a case
- Has had direct physical contact with the case (alive or dead) during the illness
- Has had direct physical contact with the (deceased) case at a funeral or during burial preparation rituals
- Has touched the blood or body fluids (including urine, faeces, vomit, tears, or sweat) of a case during their illness
- Has touched items contaminated by the body fluids of someone who is sick or died of Ebola such as clothing, linens, and other items
- A baby who has been breastfed by the case

Note: This should include health workers (including those involved in cleaning, waste management, laboratory technicians, healthcare workers, etc.)

5.1 Obvious Exposure to Blood or Body Fluids

Anyone, including health workers, with skin or mucous membrane exposure to blood, body fluids, secretions or excretions from a suspected Filovirus disease patient should immediately wash the affected skin with soap and water, or irrigate mucous membranes (e.g. conjunctiva) with copious amounts of water.

5.2 Other Types of Exposure

Anyone who shared a room/bed with, cared for, or closely participated in the burial of (e.g. physical contact with the corpse) a probable/suspect/confirmed case is also a contact.

5.3 Managing Contacts

- All high-risk contacts should be quarantined in a designated area for 21 days. Location of quarantine may evolve over time dependent on the prevailing public health guidelines. Quarantine should ideally be in a single room with access to a private bathroom facility. People in quarantine should not be allowed to interact to avoid any further contact should one turn positive. If interaction occurs in the quarantine facility, quarantine for a further 21 days is warranted for all contacts of any new confirmed case.
- Medically evaluate all contacts; take temperature twice daily for 21 days after exposure or if the contact reports hotness of body. Whenever possible, a contact should be provided with their own digital thermometer.
- Contact tracing should be done in person rather than virtually.

- Contact the Rapid Response Teams if any symptoms develop.
- Any contact who develops a fever or other symptoms should be treated as a suspect case and hospitalized immediately in strict isolation.
- Actively participate in or facilitate contact tracing and follow-up of family, friends, co-workers who may have been exposed to cases.

Refer to the MOH contact follow up form for detailed contact follow up procedures.

> **PRACTICE POINT**
>
> At this point of the outbreak, all contacts will have an RT-PCR test for Ebola on day 0, 7, 14 and 21 of quarantine.
>
> * This guidance may change as the outbreak evolves.
>
> * If an asymptomatic contact test positive, the isolation protocol should be followed.

5.4 Discharge from Quarantine

Contacts are discharged from follow up if they don't develop any signs or symptoms consistent with filovirus disease after the 21 day follow up period and the RT-PCR test is negative on a sample collected on day 21.

6. Mental Health & Psychosocial Support

Mental health and psychosocial support should be integrated as part of comprehensive care from identification of a Filovirus disease patient or contact through treatment, monitoring, bereavement, and recovery. It should be extended to contacts, patients, responders, healthcare workers, families, communities and survivors. It should address emotional distress, practical needs, family separation, and stigma alongside medical care while applying informed consent, confidentiality, dignity, safeguarding and infection prevention and control.

6.1 Interventions at each level and needs to be addressed

Table 13: Mental Health and Psychosocial Support Intervention

Level	Providers	Interventions to offer	Needs addressed
Basic services and safety	All response teams	Clear information; practical help; safe communication; symptom care; psychological first aid (PFA) by trained staff.	Fear, uncertainty, unmet basic needs, distress and loss of control.
Family and community	Community Health Promoters (CHPs), counsellors, caregivers and trained peers	Safe family contact; child and caregiver support; bereavement support; voluntary peer groups; anti-stigma and reintegration.	Separation, loneliness, grief, stigma, protection risks and disruption of daily life.
Focused care	Trained nurses, counsellors, psychologists and trained clinicians	Screening and assessment; supportive counselling; group psychoeducation; assessed, structured individual or group therapy; safety planning; treatment and follow-up.	Persistent or disabling distress, depression, anxiety, substance use and existing mental health conditions.
Specialist care	Psychiatrist and other relevant specialists	Assessment of severe or complex illness; specialist psychological treatment; medication review; emergency consultation with medical team.	Psychosis, severe depression, suicide risk and poor response to initial care.

6.2 Proposed Mental Health Psychosocial Support (MHPSS) pathway

Start MHPSS at first Filovirus disease screening or triage; do not wait for a positive test.
The stages below are a proposed operational pathway.

1. **First screening or triage for everyone:** Explain what will happen, offer psychological first aid (PFA) and check immediate safety, distress, practical needs, existing mental illness and medicines. Obtain consent and a safe contact method; identify children and others needing additional support. Address urgent medical needs before questionnaires.
2. **Contacts without symptoms:** Assess needs at entry; briefly check wellbeing during daily monitoring. Explain exposure versus infection; provide coping support, safe family contact, practical assistance and telephone or IPC-approved group support.
3. **Suspected cases awaiting results:** Continue support during isolation and testing. Explain procedures, PPE and uncertainty without predicting results; maintain safe family contact and continuity of medicines. Assess mental health needs, monitor distress during routine care, and prepare the person for either result.
4. **Confirmed positive cases:** Give results privately and compassionately with the treating team. Reassess distress, functioning, suicide risk and family needs; introduce the treatment-centre Mental Health and Psychosocial Support (MHPSS) provider. Offer individual support, symptom

relief and indicated therapy; review during daily rounds and after deterioration or loss. Provide compassionate end-of-life and family support when needed.

5. **Negative results or completion of contact monitoring:** Explain the result and next steps; one negative test does not automatically end isolation or contact monitoring. Before release, reassess needs, address stigma and agree follow-up or referral for ongoing distress, even where Ebola is excluded.

6.3 Group interventions

Offer voluntary coping and psychoeducation groups, supervised peer support, and assessed structured group therapy. In-person groups must follow IPC and cohorting rules; secure virtual groups may be offered.

6.4 Suggested screening and assessment tools

- Use a brief needs and safety checklist at first contact and reviews.
- Trained staff should use age-appropriate validated language versions of the screening questionnaires where available; never delay support for questionnaires. Below are the suggested screening tools.
    - PHQ-2 → PHQ-9: initial adult depression screening followed by full symptom assessment if positive.
    - GAD-2 → GAD-7: corresponding anxiety screening and symptom monitoring.
- Interpret with clinical assessment. Positive screens do not establish diagnosis.
- Ask directly about self-harm and assess intent, plan, access to means, past behaviour and protective supports; do not rely on a PHQ-9 item or total score alone.
- For children use a developmentally appropriate clinical and caregiver assessment; do not apply adult scales indiscriminately.

Remote care through telephone video or telemedicine

- Offer telephone or approved secure video for PFA, screening, counselling, suitable group sessions, family contact, follow-up and clinical consultation; clean shared devices under IPC procedures.
- At each session verify identity, current location, call-back number, privacy and who is present. Obtain consent for remote care; agree an emergency contact, local response pathway and a disconnection plan. Use caregiver consent and child assent as appropriate.
- Screen verbally where appropriate; assess functioning and suicide risk. Agree on actions, referrals and review. Keep secure records; avoid recordings and identifiable group messages without appropriate consent and safeguards.
- Activate local in-person care for imminent danger, delirium, severe agitation or unsafe assessment; remain connected where feasible. Arrange face-to-face review when communication or examination needs limit remote care.

7. Infection Prevention and Control

Infection prevention and control (IPC) is central to reducing spread from patient to health worker, health worker to health worker, and patient to community. Filoviruses are transmitted through direct contact with blood/body fluids (through broken skin or mucous membranes) and indirect contact with contaminated environments. There is no evidence of airborne human-to-human transmission.

Staff flow during patient's admission

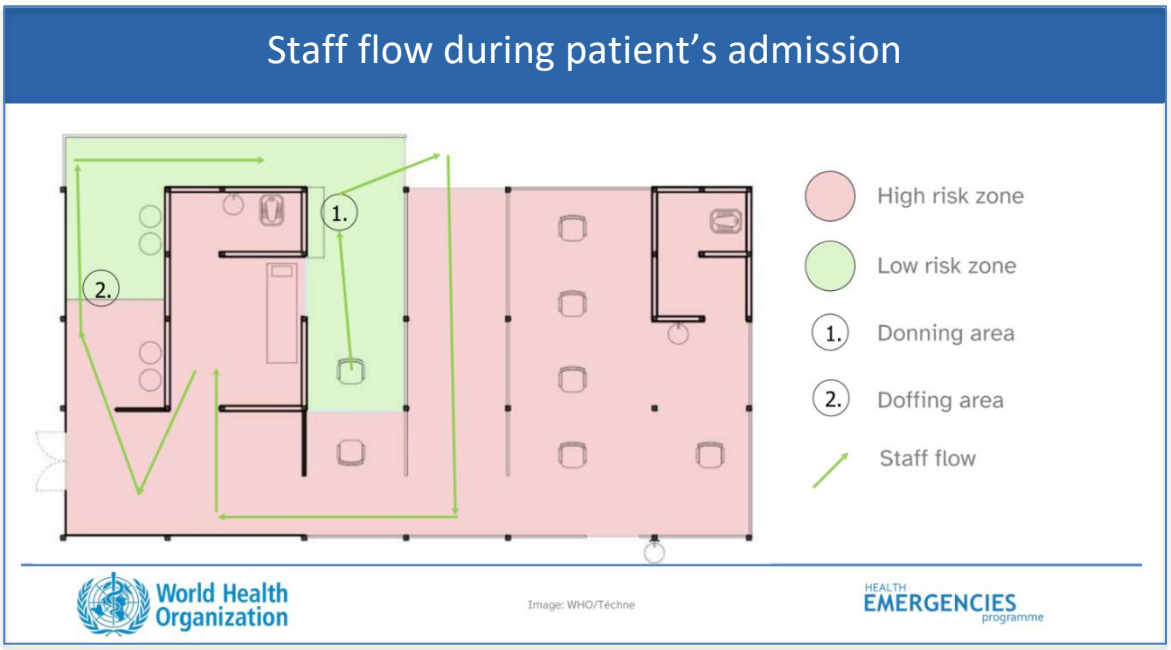


Figure 6: Treatment centre zoning: high-risk zone, low-risk zone, donning area, doffing area and staff flow. *Source: WHO Health Emergencies Programme facility design guidance.*

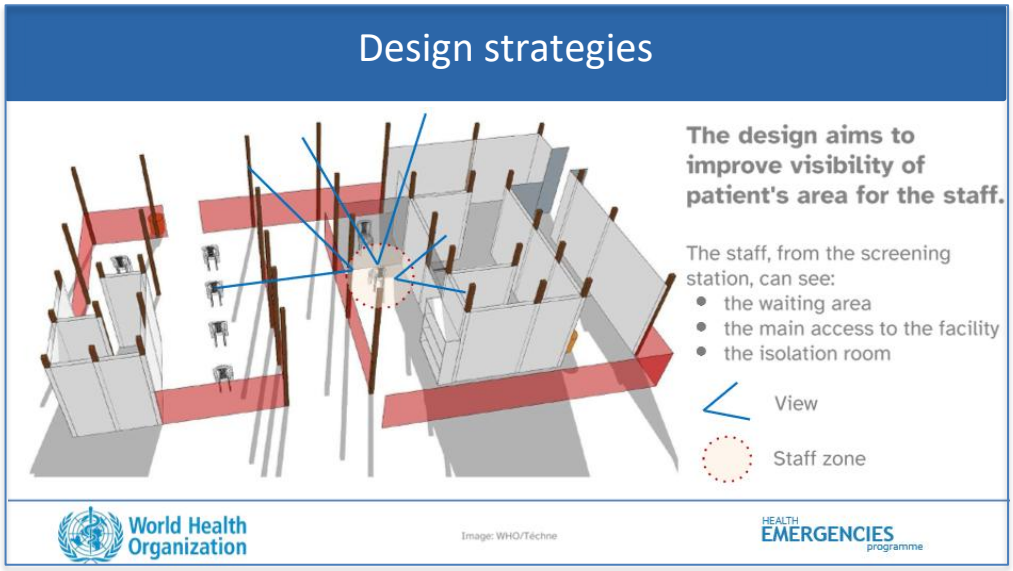


Figure 7: Design strategies to improve staff visibility of the patient area from the staff (low-risk) zone.

Source: WHO Health Emergencies Programme facility design guidance.

7.1 Recommendations for direct patient care

- Restrict access to patient care areas to authorized personnel only.
- Use the WHO 5 moments for hand hygiene.
- Follow the recommended donning and doffing procedures
- Assign clinical and non-clinical staff trained exclusively in care areas during an outbreak.
- Limit all invasive procedures to the bare minimum

7.1.1 Recommendations for management of visitors

- Do not allow visitors to enter the patient's immediate care environment.
- Provide a controlled viewing area separated from the patient by a transparent barrier.
- Restrict visitation to immediate family members who have been screened and authorised before entering the facility.
- Educate visitors on the required IPC measures and ensure that they comply with all instructions while on the premises.

7.2 Standard Precautions at All Times, for All Patients

7.2.1 Hand Hygiene



Figure 8: WHO's Five Moments for Hand Hygiene. *Source: WHO Your 5 Moments for Hand Hygiene.*

- Perform hand hygiene before gloving, immediately after glove removal, before handling invasive devices, after contact with blood/body fluids, and after contact with items in the patient`s immediate environment
- Ensure hand-washing facilities with clean running water, soap, single-use hand towels and alcohol-based hand rub (ABHR) at every point of care; ABHR is the standard of care.
- Wash hands with soap and water when visibly dirty; use ABHR when hands appear clean.
- Keep nails short and natural (no artificial nails/extenders). Avoid rings, watches and bracelets etc.
- Ensure hands are dry before starting any activity

7.2.2 PPE Requirements by Clinical Activity

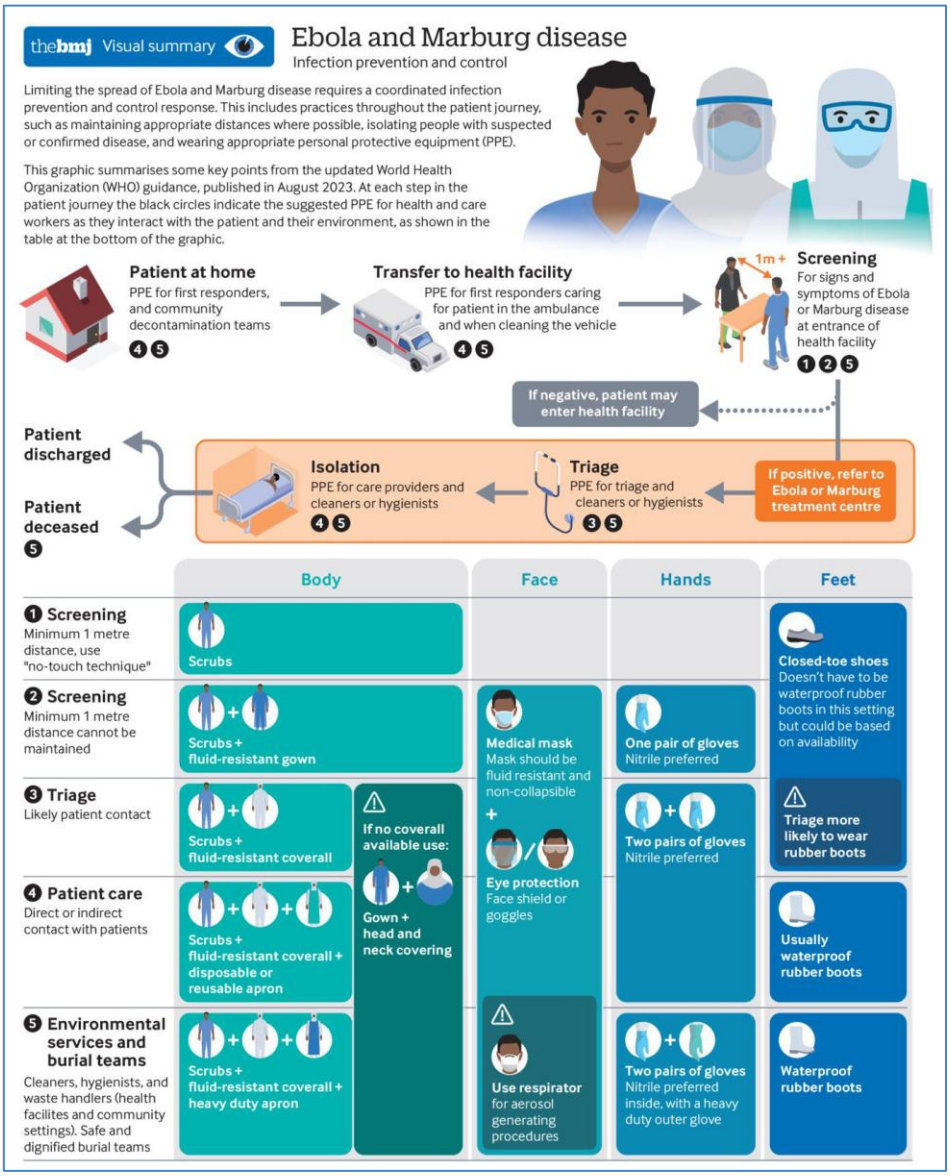


Figure 9: PPE Requirements Summary. Source: the BMJ Summary of WHO infection prevention and control guideline for Ebola and Marburg disease: a call for evidence-based practice (BMJ 2024;384: p2811)

7.2.3 Prevention of Sharps Injuries

- Do not bend, break, manipulate or recap used needles. Keep a sharps container within reach when giving injections; discard needles/syringes directly into it. Seal and send for incineration when containers are 3/4 full.
- Use of safety engineered devices e.g. closed systems for blood collection, retractable cannulas, etc.

7.2.4 Safe Waste Disposal

KEY PRINCIPLE

All Ebola virus-related waste is highly infectious waste

- Waste generated in Ebola Treatment Units (ETUs) is categorized into highly infectious and sharps.
- Segregate waste at the point of generation into sharps, and highly infectious waste.
- Do not store waste in ETU for more than 24 hours before treatment/destruction.
- Directly transfer waste from the ETU to the treatment equipment/area.
- Waste from quarantine and isolation is handled the same as in the ETU.

Note: All waste generated from the care of a patient with suspected or confirmed Ebola disease or Marburg disease, including waste generated during decontamination processes, should be treated as infectious waste.

7.2.5 Cleaning and Disinfection of the Environment

- Clean floors and frequently touched surfaces using soap and water, at least twice a day, working from clean to dirty areas; always clean before disinfecting using 0.5% chlorine solution, or 70% alcohol (ethanol, isopropanol).
- Wipe surfaces with 0.5% chlorine solution
- Never dry-sweep or shake out dusty rags.

7.2.6 Biological Spill Management Procedure Steps:

1. **Restrict access**: Alert staff in the area and use signage to cordon off the spill area. Keep patients and visitors away.
2. **Assess the extent to which the spill has spread**; this will include equipment, environment, personnel, and distance covered by the spill.
3. Ascertain if you can manage the spill.
4. **Put on full PPE** before addressing the spill. (a trained staff should supervise Donning of the PPE to cover full body (all skin and clothing)
5. **Spill Containment:**
   a) **Contain the Spill**: Cover the spill with absorbent material (e.g., gauze, or paper towels, or absorbent pads).
   b) **Debulk**: remove the excess spilled material using absorbent material, or scoop (dustpan). Place all waste in a biohazard bag.

6. **Clean the surface**:
    a) Depending on the type of surface, clean it with soapy water thoroughly ensuring that all the debris is removed.
    b) Rinse the surface with clean water.
7. **Apply Disinfectant**: Pour disinfectant (0.5% chlorine) ensuring all the affected areas are covered. Allow Contact Time. Let the disinfectant sit as recommended (15 minutes)
8. **Rinse the surface**: Use clean water to rinse chlorine residue off surfaces as needed (note that this step is particularly important for metal surfaces of furniture or equipment, which may be prone to damage from chlorine)
9. **Waste disposal**
    - **Biohazard waste**: Place contaminated materials, including PPE, in a biohazard waste bag.
    - **Decontamination and hand hygiene**
10. Clean and disinfect the cleaning tools, allow to dry ready for next use
11. **Remove PPE**: Carefully remove and dispose of the non-reusable PPE in biohazard waste and place the reusable PPE in a container for decontamination before re-use.
12. **Hand hygiene**: Wash hands thoroughly with soap and water after removing PPE.
13. **Incident reporting**
    - Document the spill, actions taken, and any potential exposure on the unit's incident report form. Report any direct exposure immediately to the unit manager/supervisor.
14. Allow access once the area is dry
    NB. This is the same procedure for quarantine or isolation facilities.

7.2.7 Handling of Contaminated Linen

- Contaminated linen poses a high risk of infection and should only be handled in PPE. The steps below describe the procedures for handling linen of suspected, confirmed or probable Filovirus disease cases at the Treatment Centres, isolation units, healthcare facilities, quarantine area or within the community (household).

Step 1: Collect and remove

- Contaminated linen should be bundled and placed directly into impermeable bags or containers at the point of use
- Wearing full PPE, inspect the linen for gross soiling (e.g., with extensive soiling of blood/body fluids and excreta)
- **If not heavily contaminate**d
    - Place linen in a clearly labelled, leak-proof container (leak-proof bag or bucket or waste bag)
    - Disinfect the outside of the container or bag, with 0.5% chlorine before removal from the area
    - Always transport the linen/laundry in its container to the laundry room (washing area) where it will be washed and disinfected following step 2
- **If heavily contaminated** with blood/body fluids and the option for safe disinfection is not possible
    - Place linen in a clearly labelled, leak-proof container (leak-proof bag or bucket or waste bag) at the bedside.

- Disinfect the outside of the container or bag with 0.5% chlorine before removal from the area.
- Take it to the waste management area for incineration.

Step 2: Clean and disinfect

- Take the soiled laundry and empty it into a drum containing water (hot if available) and liquid or powder soap, soak it completely in water and wash well
- Stir it with a stick, then discard the water (repeat as many times as required until satisfactorily clean) and refill the drum with clean water to rinse
- Empty it into a drum containing a 0.05% chlorine solution, use a stick to stir the cloth, and then leave it to soak for up to 30 minutes
- Remove the cloth, rinse in clean water, squeeze out excess water and allow to air dry
- Disinfect the transport container and the environment with 0.5% chlorine

Management of linen using a washing machine

- Check with manufacturer's instructions whether chlorine/bleach can be added to the washing machine; if no, follow option 1 below
- If chlorine/bleach can be added to the washing machine, check the total water volume of the machine, this will be needed to calculate the amount of chlorine powder/bleach needed to achieve 0.05% and follow option 2 below

Option 1: Use of a washing machine in the management of linen when chlorine/bleach cannot be added to the machine

- Step 1: Place the linen in the washing machine and perform a hot wash with detergent (>60 ^{o}C)
- Step 2: Remove the linen from the washing machine and place in a drum containing 0.05% chlorine solution, use a stick to stir the cloth, and then leave it to soak for up to 30 minutes
- Step 3: Remove the linen from the chlorine drum and place back in the washing machine. Perform a washing cycle to remove chlorine residue
- Step 4: Dry the linen in the washing machine or remove and allow to air dry

Option 2: Use of a washing machine in the management of linen when chlorine/bleach can be added to the machine

- Step 1: Place the linen in the washing machine and perform a hot wash with detergent (>60 ^{o}C)
- Step 2: Perform a chlorine wash. The amount of chlorine powder/liquid to add must be calculated based on the water volume of the machine to ensure a final concentration of 0.05%
- Step 3: Perform a washing cycle to remove chlorine residue.
- Step 4: Dry the linen in the washing machine or remove and allow to air dry

- For the transportation of linen, utilize covered and dedicated trolleys or carts, maintaining strict separation between clean and soiled linen.

- Clean and disinfect carts or trolleys used for dirty linen after each use
- Use high-temperature mechanical drying methods or sun-dry linens
- The laundry area requires cleaning and disinfection at least daily
- Clean surfaces, floors, and equipment with soap and water, then disinfect with a 0.5% chlorine solution; allow to dry before next use
- Dispose of wastewater into closed sewer system to avoid transmission of infection to people, and the environment

7.2.8 Cleaning and disinfection of reusable medical devices for patient care

Cleaning and disinfection of reusable PPE and medical equipment should be done as soon as possible after each procedure.

Step 1: Prepare the equipment's to clean and disinfect

- Reusable PPEs - Face shield, goggles, plastic aprons, heavy duty gloves, gumboots, thermometers, stethoscopes
- Patient Equipment - Bed pans, basins, mackintosh, plates, cups, spoon etc

Step 2: Equipment

- Full PPE for each cleaner
- Cleaning and disinfection products:
    - Soap and clean water (for the soap solution)
    - Strong chlorine solution (0.5%, labelled)
    - Weak chlorine solution (0.05%, labelled)
    - Stick for mixing cleaning solutions
    - Plastic wash bins (for soiled linen/laundry)
    - 4 buckets (1 = soapy water, 2 = clean water 3=0.5% chlorinated water, and 4 = clean water)
    - Cleaning cloths (small brush or towels)
    - Infectious waste cart

Step 3: Prepare chlorinated water and soapy water

- Lay out and organize all materials/equipment on plastic sheet at the cleaning point and prepare the chlorinated water and soapy water solutions
- **Preparation:**
    - Use the available concentration of chlorine powder to achieve the desired solution strength.
    - Prepare a fresh chlorine solution daily; discard any leftover solution from the previous day whether used or not.
- **Safety Precautions**:
    - Wear extended PPE: eye protection, face mask, heavy-duty gloves, apron, and gumboots.
- **Mixing Process**:
    - Calculate the amount of chlorine powder required using the following formula: **Grams of chlorine powder per litre of water = (Desired chlorine concentration (%) ÷ Available chlorine concentration (%)) × 1,000**

- **Example:** To prepare a 0.5% chlorine solution using chlorine powder with an available chlorine concentration of 65%: **(0.5 ÷ 65) × 1,000 = 7.7 g of chlorine powder per litre of water**
- Measure the required amount of water and pour it into a clean, empty bucket.
- Add the calculated amount of chlorine powder to the water.
- Mix gently using a stirring stick. Avoid splashing and inhaling the powder or solution.
- Allow the solution to settle for 30 minutes before use.
- Test the concentration using chlorine test strips to confirm that the solution is at the required strength. (See appendix 6)
- Label the bucket clearly i.e.:
    - Chlorine concentration
    - Date and time of preparation
    - Expiry or recommended disposal time
- Keep the bucket covered when not in use.
- Store the prepared solution in a cool, dry place away from direct sunlight.

Step 4: Put on PPE

- Before entering the red zone, the cleaners should wash their hands and put on full PPE. Heavy duty rubber gloves should be worn over latex gloves

Step 5: Develop cleaning and disinfection plan

- Gather all reusable PPE and equipment requiring disinfection and move them to the designated decontamination point.
- Establish the order of processing before beginning.
- Process reusable PPE separately from other equipment, such as, bed-pans to prevent cross-contamination.
- Empty all soiled reusable items containing body fluids—including bed-pans, sputum mugs, plates, and other reusable utensils—at the designated disposal point.
- Follow waste-segregation procedures and place resulting waste in the appropriate bags or bins.
- If sharps are found, place them immediately in a safety box.
- Do not recap, bend, or break used needles.

Step 6: Perform cleaning and disinfection of reusable PPE/other medical equipment

- Perform cleaning and disinfection utilizing the 4-step strategy below:
    1. **Cleaning**
        - Clean reusable PPE and other medical equipment with a soft cloth or brush, scrubbing all surfaces thoroughly.
        - Remove all visible dirt using soap or detergent and water before applying disinfectant.
        - Soak a clean cloth in the soapy water in Bucket 1.
        - Fold the cloth to approximately the size of your hand.
        - Wipe all surfaces, working from the cleanest area to the dirtiest area.
        - Rotate and refold the cloth regularly so that a clean section is used for each area.

- When all sides of the cloth have been used, place it in the designated waste bag if disposable or in the dirty-linen bag for reprocessing if reusable.
- **Always clean before disinfecting.** Applying disinfectant to a surface that still contains dirt or organic material may reduce the effectiveness of the disinfectant.

2. **Rinse**
   - Rinse the equipment with clean water as required.
   - Soak a clean cloth in the clean water in **bucket 2**.
   - Wipe all relevant surfaces using the cleaning technique described above, working from the cleanest area to the dirtiest area.
   - Place the used cloth in the appropriate waste or dirty-linen container, depending on whether it is disposable or reusable.
3. **Disinfect**
   - Use the prepared 0.5% chlorine solution and observe a contact time of **15 minutes**.
   - Soak a clean cloth in the 0.5% chlorine solution in **bucket 3**. Fold the cloth to approximately the size of your hand.
   - Wipe all PPE and medical-equipment surfaces thoroughly, working from the cleanest area to the dirtiest area.
   - Rotate and refold the cloth so that a clean section is used for each area.
   - Ensure that all surfaces remain visibly wet with disinfectant for the full 15-minute contact time.
   - Reapply the solution as necessary to prevent the surfaces from drying.

   NOTE: For reusable PPE and medical equipment, apply disinfectant by wiping as described above; do not spray. Spraying may create inhalable chlorine-containing mist and expose staff. Keep surfaces wet for the specified contact time.

4. **Final Rinse**
   - After the required disinfection contact time, rinse surfaces with clean water as needed to remove chlorine residue.
   - This step is particularly important for metal surfaces, which may be damaged by prolonged exposure to chlorine.
   - Soak a clean cloth in clean water in **bucket 4**.
   - Wipe all relevant surfaces using the technique described above.
   - Place the used surface cleaning clothes in the appropriate waste or dirty-linen container.
   - Dispose of the wastewater from the container in the latrine.
   - Rinse the 4 buckets with soap and water and then with a strong chlorine solution **(0.5%),** leave for 15 minutes.
   - Rinse with clean water and allow the air to dry, preferably in the sun.

Step 7: Removal of PPE

After all equipment has been cleaned, disinfected and potentially infectious material has been removed:

- Remove PPE carefully, following the approved standard operating procedure (SOP).
- Perform hand hygiene immediately after removing PPE.
- Dispose of or send reusable PPE for reprocessing according to the waste-management and decontamination procedures.

Step 8: Reporting

- Report completion of cleaning and disinfection process to the designated supervisor.
- Document the date, time, area cleaned, items processed, chlorine concentration used, and the name of the person who did the activity.

Note:

- Single-use items must never be reprocessed for reuse.
- Reusable medical devices (RMD), when not properly reprocessed, can transmit Filovirus
- Dedicated medical equipment (preferably disposable) should be used
- Appropriate PPE should be used to cover clothes, skin, and all mucous membranes
- All non-dedicated, reusable medical equipment used for patient care should be **cleaned first before disinfection or sterilization**
- Cleaning should be done **using water and detergent** (standard/enzymatic)
- Monitor the decontamination process for effectiveness using physical, chemical, and biological indicators
- Train staff on reprocessing of RMDs

Note: Pre-clean, clean, and pack medical instruments used on Filovirus disease patients within the isolation prior to taking them for sterilization

- Soaking of medical devices in chlorine solution or any other disinfectant before cleaning is **NOT recommended** for the following reasons:
  - Disinfectant gets inactivated by blood and body fluids, which could become a source of microbial contamination and formation of biofilm
  - Transportation to the cleaning area of contaminated items soaked in disinfectant could pose an increased risk to health workers
  - May contribute to the development of resistance to disinfectants

7.2.9 Procedures for Plates, Cups, and Utensils Used by a Sick Patient

- Keep containers holding food covered when they are not in use.
- Dispose of leftover food in the designated infectious-waste container, following the facility's waste-segregation procedures.
- Wash the plates, cups, and utensils thoroughly with soap or detergent and clean water.
- Immerse the items in a prepared 0.05% chlorine solution for 30 minutes.
- After disinfection, rinse the items thoroughly with clean water to remove chlorine residue.
- Allow the items to air-dry completely before reuse or return them to the designated storage area.

7.2.10 Management of Body Fluids

- Keep containers with patient body fluids covered when they are not in use.
- Empty patient body fluids only at the designated disposal point and in accordance with the facility's approved infectious-waste management procedures. **Do not** dispose of them in a latrine unless this has been specifically approved in the facility protocol.

7.3 Disinfection with Chlorine

Filoviruses are susceptible to chlorine disinfection, but visible organic matter (blood, faeces) reduces its effectiveness by both chemical interference and physical shielding; clean before you disinfect, and allow the correct contact time.

7.3.1 Maintaining Chlorine Potency

Chlorine loses potency:

- Over time
- When exposed to sunlight
- When in contact with organic matter such as blood and bodily fluids

To ensure potency:

- Reconstitute chlorine solution daily (Always label date, time and concentration and contact time)
- Best practice is to reconstitute for immediate use.
- Keep the solution in closed containers away from sunlight
- Use only after cleaning with soap and water
- Do not dip dirty cloth in chlorine solution when disinfecting surfaces discard the cloth after wiping

Table 14: Use of Different Concentrations of Chlorine

Concentration	Activity
0.5% (10-minute contact)	General non-porous surfaces (floors, beds, toilets, bathrooms)
0.5% (15-minute contact)	Blood/body-fluid spills
0.05% (40–60 seconds)	Interim hand hygiene / bare-hand and skin disinfection ONLY where ABHR or soap and water are unavailable

PRACTICE POINT

ABHR/soap and water are preferred over chlorine for hand hygiene

- Facilities currently using chlorine for routine hand hygiene should transition to ABHR or soap and water; chlorine at 0.05% remains an acceptable interim measure only where these are genuinely unavailable.

7.4 Steps to Put on and Remove PPE

Donning and doffing errors are a well-documented cause of self-contamination. A trained observer should supervise donning and doffing at every episode. Inspect PPE for any damage prior to donning.

Have a mirror in the donning area to help HCWs to verify that PPE is correct and there are no gaps exposing skin, hair and mucous membrane before entering the patient room.

7.4.1 Steps of Donning PPE (refer to figure 10)

1. Remove all personal items
2. Put on the scrub suit in the changing room.
3. Put on closed footwear (rubber boots preferred in wet/patient-care areas).
4. Perform hand hygiene
5. Select correct size and organize all PPE items
6. Put on the PPE under the guidance and supervision of a trained observer
7. Perform hand hygiene
8. Put on the first (inner) pair of nitrile gloves
9. Put on the coverall/ gown and head cover
10. Put on the N95 respirator
11. Put eye protection (goggles or face shield).
12. Put on the head/neck covering over the eye-protection strap
13. Put on the waterproof apron.
14. Put on the second (outer) pair of gloves (Long or extended cuff surgical gloves), over the coverall cuff

PRACTICE POINT

A trained observer should perform a buddy check and label the name, cadre, and time of entry of the staff into the red zone.

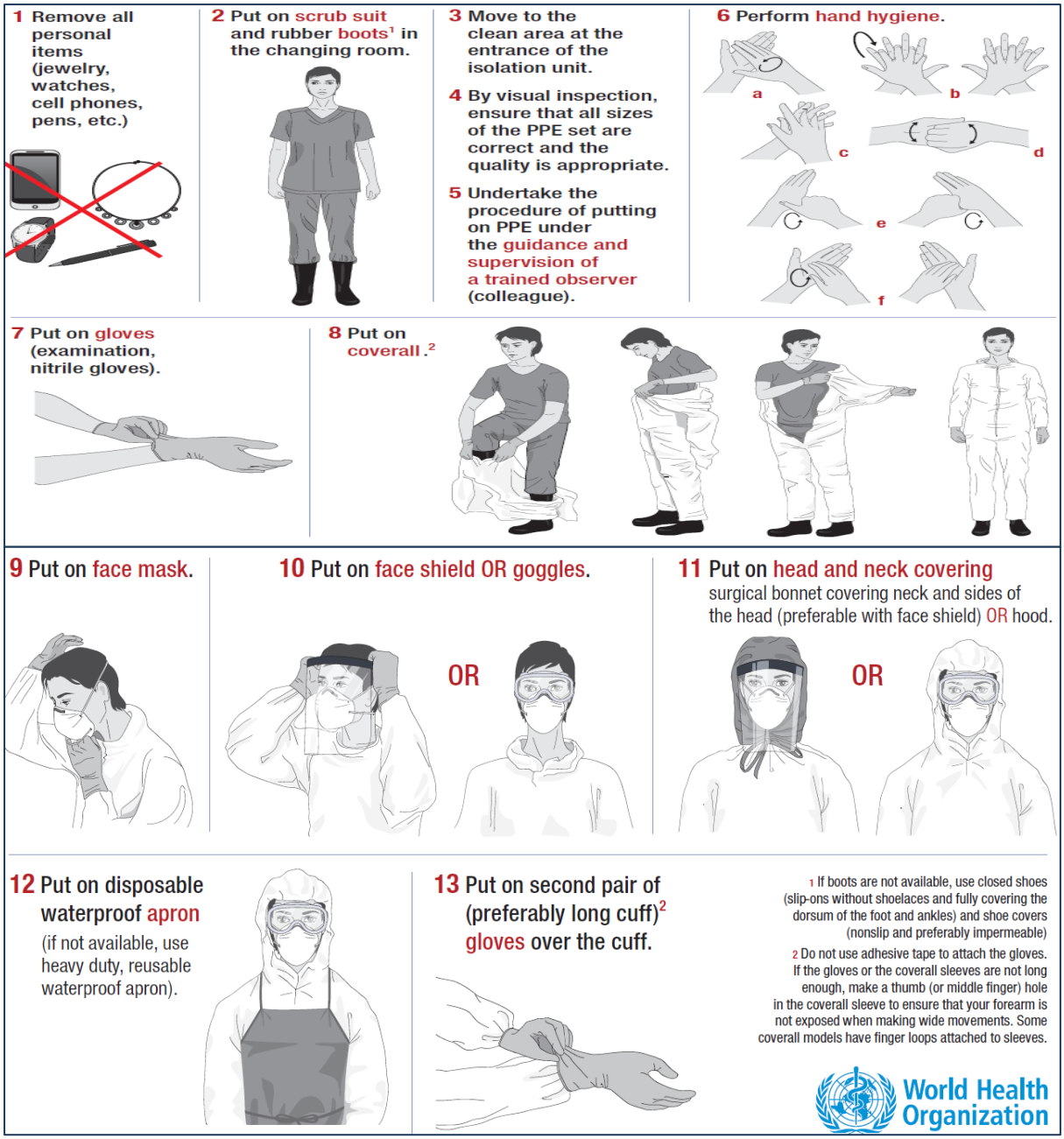


Figure 10: WHO steps to put on PPE for Ebola/Marburg disease (gown and headcover configuration). *Source: WHO Steps to put on PPE for Ebola/Marburg disease.*

7.4.2 Steps of Doffing PPE

1. Always remove PPE under the guidance and supervision of a trained observer.
2. Ensure that infectious waste containers and receptacles for reusable items e.g., goggles and reusable aprons are available
3. Perform hand hygiene on the outer gloves using ABHR and allow to dry
4. Remove the apron by pulling from the chest and waist to release/break the ties while leaning forward and keeping it away from the body and fold it inside out.
5. Perform hand hygiene on the outer gloves
6. Remove head and neck covering (hood), taking care to avoid contaminating your face, by starting from the bottom of the hood into the back, and rolling from back to front, and from inside to outside.
7. Perform hand hygiene on the outer gloves
8. Remove coverall and outer pair of gloves
9. Perform hand hygiene on the inner gloves
10. Leaning forward, remove eye protection by pulling the string from behind of the head
11. Perform hand hygiene on the inner gloves
12. Leaning forward, remove the N95 respirator from behind by removing the bottom strap first, followed by the top strap and dispose.
13. Perform hand hygiene on the inner gloves
14. Remove footwear covers/boots without touching them with bare hands.
15. Perform hand hygiene on the inner gloves
16. Remove the inner gloves carefully with appropriate technique and dispose safely
17. Perform hand hygiene on bare hands and proceed to the shower area.

NB: *Aprons, boots and goggles/face shields intended for reuse should be individually assigned, cleaned to remove gross contamination and disinfected*

> ***Limit continuous time in full PPE per shift to reduce heat stress and dehydration; ensure rest, hydration and food breaks between red-zone rotations.***

7.5 Other IPC measure for consideration within an ETU

7.5.1 Respiratory Hygiene

- Cover the mouth/nose when coughing or sneezing (tissue, or the inner elbow if no tissue/mask available); dispose of tissues in a no-touch receptacle then wash hands.
- Maintain at least 1 m spatial separation from persons with acute febrile respiratory symptoms where possible.

1 Always remove PPE under the guidance and supervision of a trained observer (colleague). Ensure that infectious waste containers are available in the doffing area for safe disposal of PPE. Separate containers should be available for reusable items.

2 Perform hand hygiene on gloved hands.[1]

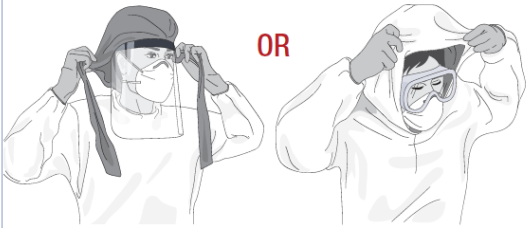
3 Remove apron leaning forward and taking care to avoid contaminating your hands.

When removing disposable apron, tear it off at the neck and roll it down without touching the front area. Then untie the back and roll the apron forward.



4 Perform hand hygiene on gloved hands.

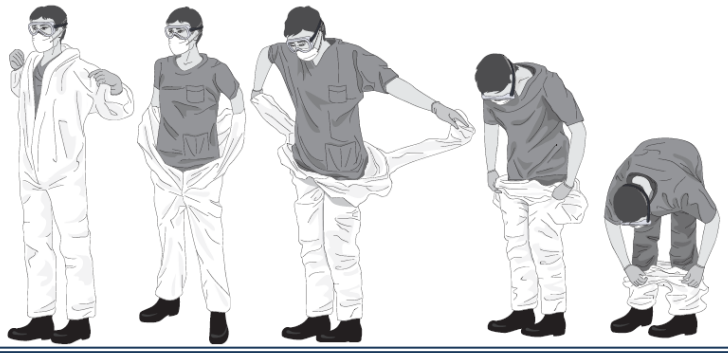
5 Remove head and neck covering taking care to avoid contaminating your face by starting from the bottom of the hood in the back and rolling from back to front and from inside to outside, and dispose of it safely.



6 Perform hand hygiene on gloved hands.

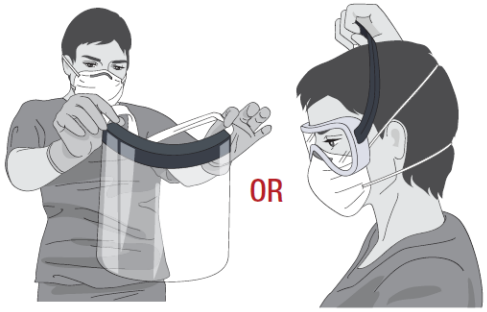
7 Remove coverall and outer pair of gloves:

Ideally, in front of a mirror, tilt head back to reach zipper, unzip completely without touching any skin or scrubs, and start removing coverall from top to bottom. After freeing shoulders, remove the outer gloves[2] while pulling the arms out of the sleeves. With inner gloves roll the coverall, from the waist down and from the inside of the coverall, down to the top of the boots. Use one boot to pull off coverall from other boot and vice versa, then step away from the coverall and dispose of it safely.



8 Perform hand hygiene on gloved hands.

9 Remove eye protection by pulling the string from behind the head and dispose of it safely.



10 Perform hand hygiene on gloved hands.

11 Remove the mask from behind the head by first untying the bottom string above the head and leaving it hanging in front; and then the top string next from behind head and dispose of it safely.



12 Perform hand hygiene on gloved hands.

13 Remove rubber boots without touching them (or overshoes if wearing shoes). If the same boots are to be used outside of the high-risk zone, keep them on but clean and decontaminate appropriately before leaving the doffing area.[3]

14 Perform hand hygiene on gloved hands.

15 Remove gloves carefully with appropriate technique and dispose of them safely.



16 Perform hand hygiene.

1 While working in the patient care area, outer gloves should be changed between patients and prior to exiting (change after seeing the last patient)

2 This technique requires properly fitted gloves. When outer gloves are too tight or inner gloves are too loose and/or hands are sweaty, the outer gloves may need to be removed separately, after removing the apron.

3 Appropriate decontamination of boots includes stepping into a footbath with 0.5% chlorine solution (and removing dirt with toilet brush if heavily soiled with mud and/or organic materials) and then wiping all sides with 0.5% chlorine solution. At least once a day boots should be disinfected by soaking in a 0.5% chlorine solution for 30 min, then rinsed and dried.

World Health Organization

Figure 11: WHO steps to remove PPE for Ebola/Marburg disease (gown and headcover configuration) — mucous-membrane protection removed last. *Source: WHO Steps to remove PPE for Ebola/Marburg disease.*

8. Discharge

Discharge decisions should be based on clinical and laboratory criteria, the ability to monitor the patient after discharge, and consultation among the clinical team caring for the patient. The table below highlights discharge criteria.

Table 15: Discharge Criteria

Case category	Criteria for discharge
Contact in quarantine	Asymptomatic and has had no positive test during quarantine with a negative PCR test at day 21
Suspect case	Afebrile off antipyretics for 24 hours (or an alternative explanation for fever); all Ebola/Marburg-compatible symptoms resolved or explained by an alternative diagnosis; a PCR test taken on day 3 or later after symptom onset is negative.
Confirmed case	Should have completed treatment (e.g. 10 days of remdesivir), ≥3 days without fever or significant symptoms; symptoms suggestive of ongoing viral shedding (diarrhoea, cough, bleeding) fully resolved; significant clinical improvement and reasonably good general condition (can feed/wash/walk independently, accounting for baseline disability); two subsequent negative PCR tests taken 72 hours apart.
Breastfeeding mothers (confirmed)	As above Mothers should be educated on the risk of transmission through breast milk. Refer to section 9

For patients meeting discharge criteria, the ETU discharge flow chart (figure 12) and table 15 provide guidance on the process.

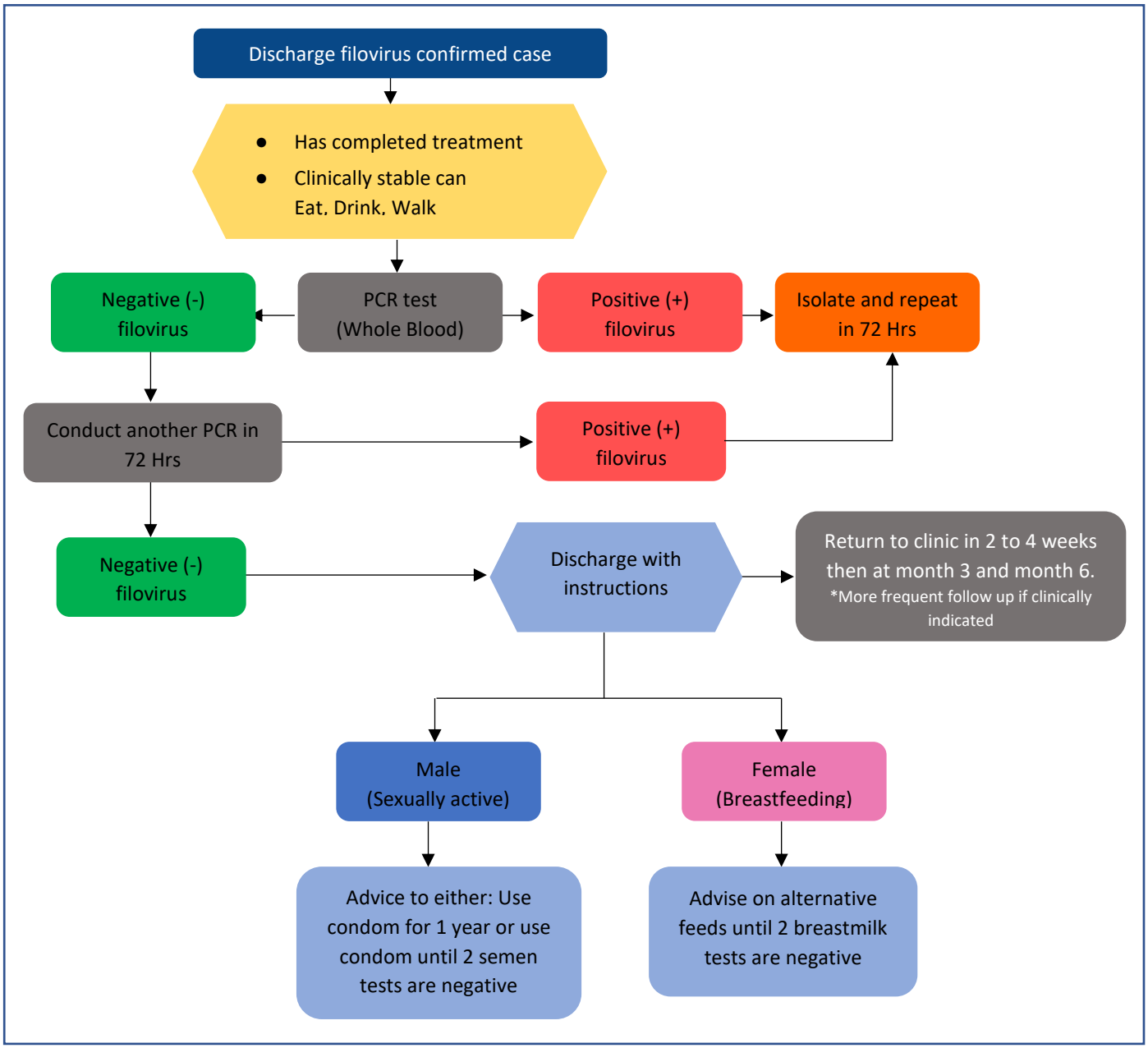


Figure 12: ETU Discharge Flow Chart

Table 16: ETU Discharge Procedure

ETU Discharge Procedure	
Once a patient is ready for discharge as per the discharge criteria, the following steps should be followed. The below procedures ensure that patients can safely re-enter the community and reduce the risk of secondary transmission. Discharge procedures should occur in a dedicated area at or near the red/green zone interface to avoid recontamination. Patients should leave the ETU through a one-way dedicated patient exit.	
Step 1	Prior to discharge, patient should bathe with soap and water. **NOTE: Patient should NOT be bathed with or sprayed with chlorine solution as this is hazardous to their health**
Step 2	At discharge, fresh clothing should be provided to the patient. All clothing that was brought into the unit should be destroyed per IPC recommendations.
Step 3	Mobile phones should be decontaminated using the protocol described below
Step 4	All other personal belongings that cannot be decontaminated should be incinerated
Step 5	Patients should be provided with IPC kits consisting of handwashing, cleaning and disinfection materials for use at home
Step 6	Male patients should be advised on the risk of transmission of virus in semen, provided with guidance on safe sex practices and supplied with condoms for safe sex until their semen tests negative for filovirus/Ebolavirus disease twice
Step 7	Mothers should be advised on the risk of transmission of virus in breast milk, advised not to breastfeed their child until their breast milk tests negative, and provided breastmilk substitute if needed*
Step 8	The patient care environment and any reusable linens should be cleaned and disinfected (or incinerated, if heavily contaminated) after patient discharge according to defined IPC protocols
*Additional information for breastfeeding women • Infants younger than 6 months of age should be provided with a breastmilk substitute (eg, ready-to-use infant formula) that is acceptable, feasible, affordable, sustainable, and safe. • Infants and young children between 6 months and 23 months of age should be provided with a ready-to use infant formula or ultra-high temperature full-cream (or whole) cow's milk along with complementary feeding (this food can be supplemented with micronutrient powders if the nutrient content is expected to be inadequate). • Rapid testing of breast milk of women with recovered filovirus/Ebola virus disease, who would like to continue to breastfeed, should be prioritized. • Women's choices related to stopping breastfeeding or continuing after filovirus/Ebolavirus disease recovery and testing of breast-milk, should be respected and supported by health care workers to facilitate the choice.	
Decontamination of patient mobile phones and other items at point of discharge from the ETU	
Methods to effectively disinfect mobile phones carry a risk of damage to the phone. The below disinfection recommendations should be followed and have been chosen based on effectiveness and least likely to cause damage to the phone. Disinfection of mobile phones should take place in the patient decontamination area prior to leaving the ETU and should be performed by the health worker supervising the patient decontamination procedure following the steps outlined below.	
Step 1	The health worker supervising the patient decontamination procedure should perform hand hygiene and put on a clean pair of examination gloves.

Step 2	Receive the mobile phone and charger from the patient.
Step 3	Examine the mobile phone and charger. If the phone or charger is visibly soiled with body fluids, the phone and charger should be destroyed, and a new phone given to the patient (where resources permit).
Step 4	Ensure the phone is unplugged and turned off during the disinfection procedure.
Step 5	Use a disinfectant pre-impregnated wipe (DPW) with at least 70% alcohol or gauze soaked with alcohol at least 70%) to disinfect the phone, phone cover and charger
Step 6	Wipe all surfaces of the phone continuously for at least 1 minute. Ensuring all surfaces of the phone are covered.
Step 7	Place the phone and cover in a clean bag to avoid re-contamination.
Step 8	Take a new wipe and wipe all surfaces of the phone charger continuously for at least 1 minute.
Step 9	Place the phone charger in the clean bag along with the mobile phone to avoid re-contamination.
Step 10	The health worker should remove examination gloves and perform hand hygiene.
Step 11	Instruct the patient, once they have completed decontamination procedures, to pick up the bag containing the mobile phone and charger and immediately leave the decontamination area.
Step 12	Patients should be instructed not to share their mobile phone with others.
Disclaimer: **a. There could be challenges with thorough decontamination of gadgets with keypads. For the safety of staff, probability of exporting the virus outside the red zone, and risk of damage to the items as we dismantle them, we recommend such items be destroyed in the red zone.** **b. If phone or screen is damaged or cracked, the phone must be destroyed in the red zone as it will be impossible to thoroughly disinfect these areas and will put the health worker at risk.**	

Supportive Treatment for All Discharged Patients

- Nutritional advice on locally available, high-energy and easily digestible foods.
- Condoms use for 12 months OR where semen testing is feasible, condom use should only stop when the semen tests negative twice via RT-PCR spaced at least 1 week apart.
- Breastfeeding women should stop breastfeeding until 2 consecutive negative RT-PCR breastmilk tests for filovirus separated by 24Hrs; provide infant-feeding counselling and support appropriate to the infant's age.
- Anticipate possible community rejection/stigma; counsel the patient, family and any receiving health facility, and provide a medical certificate confirming the patient poses no danger to others.
- Arrange psychological support and follow-up, including advocacy with community leaders where necessary (Section 6, Section 9). Discuss with the patient and if necessary provide a discharge certificate and sick leave.

Table 17: Post-Discharge Follow-Up Job Aid

Follow-up domain	Action	2 weeks to 1 month	3 months	6 months
Viral persistence	Semen/Breast milk PCR per protocol; safe-sex counselling until clearance		☐	☐
Maternal/infant	Breastfeeding risk counselling; enhanced IPC at future delivery	☐	☐	☐
Mental health	Depression/anxiety screening; refer for support if positive	☐	☐	☐
Neurological	Screen for hearing impairment and other deficits	☐	☐	☐
Ophthalmology	Screen for uveitis/visual complications; refer if positive	☐	☐	☐
Nutrition	Nutritional assessment, especially for children	☐	☐	☐
Child vaccination	Review/catch-up routine EPI schedule	☐	☐	☐
Socioeconomic/stigma	Assess impact; link to available support services	☐	☐	☐

Note: The above follow up schedule should be guided by specific patient needs.

9. Follow-Up

All persons who have survived filovirus disease — children and adults — should be offered structured and comprehensive follow-up care after discharge. Discharged convalescent patients may remain weak with persistent symptoms, and often face stigma or rejection on return to their communities; discharge must be accompanied by psychosocial support and community awareness activities.

Components of Structured Follow-Up

- **Reducing onward transmission:** viral screening of semen, breast milk with safe-sex/safe-feeding counselling until clearance.
- **Medical complications:** referral pathways for neurological symptoms (e.g. hearing impairment), nutritional assessment, mental health and psychosocial support, and ophthalmology review for uveitis/visual complications.
- **Psychosocial support:** for survivors, their families, and the families of non-survivors, recognizing the burden of stigma.
- **Suspect cases discharged negative:** if referred to a general ward or sent home, follow up closely, as normal health services and communities may be reluctant to accept them without reassurance from medical authorities.

A structured Post-Discharge Follow-Up Job Aid, formatted as a check-and-date form for use at each visit, is provided in table 16.

10. Appendices

Appendix 1: Laboratory Sample Collection and Testing Job Aid

See Figure 2 (Section 2.2.4) for the triple-packaging schematic referred to throughout this checklist.

Before collection

☐ Full PPE donned and buddy-checked (Section 7.4)

☐ Case investigation form (MOH 502) ready and partially completed

☐ Triple-packaging materials assembled (primary tube, absorbent material, secondary leak-proof container, rigid outer/cooler box, biohazard label)

☐ Receiving designated laboratory notified

During collection

☐ Blood collected in 2 sterile EDTA tubes/vacutainers using safe technique (4 mls per tube for adults and 1ml per tube for paediatrics)

☐ Tube labelled immediately and correctly

☐ Sharps disposed of directly into a puncture-resistant container

Packaging and transport

☐ Primary tube + absorbent material placed inside the secondary leak-proof container

☐ Secondary container placed inside the rigid outer packaging/cooler box

☐ Biohazard label and case investigation form attached to the outer packaging

☐ Refrigerated (not frozen) if transport will be delayed

☐ Fastest available transport arranged; courier briefed on biohazard handling

After dispatch

☐ Facility surveillance focal person and KNPHI informed

☐ Results tracked and communicated to the clinical team immediately on receipt

Appendix 2: Setting Up an Ebola Disease Treatment Unit

A2.1 Basic guidance on Ebola treatment unit (ETU) set-up

- Where patient volumes exceed what a single isolation room can accommodate, plan in advance for a dedicated treatment centre with clearly demarcated high-risk and low-risk zones and strictly unidirectional flow (Figures 6–7, Section 7).
- Minimum functional areas: screening/triage, single-occupancy or cohorted isolation wards, dedicated toilets, donning/doffing stations, a specimen-handling point, a waste-treatment area, a body-storage/SDB area, and a staff rest area outside the high-risk zone. See Ebola and Marburg Treatment Centres: Facility Design and Construction Standards (WHO, 2024) for full technical detail.

A2.2 ETU Design and Layout

Red vs Green Zones

Red Zone – Likely to be highly contaminated

- Provide patient care (suspected, probable, confirmed cases)
- Infectious waste management
- Dead body management

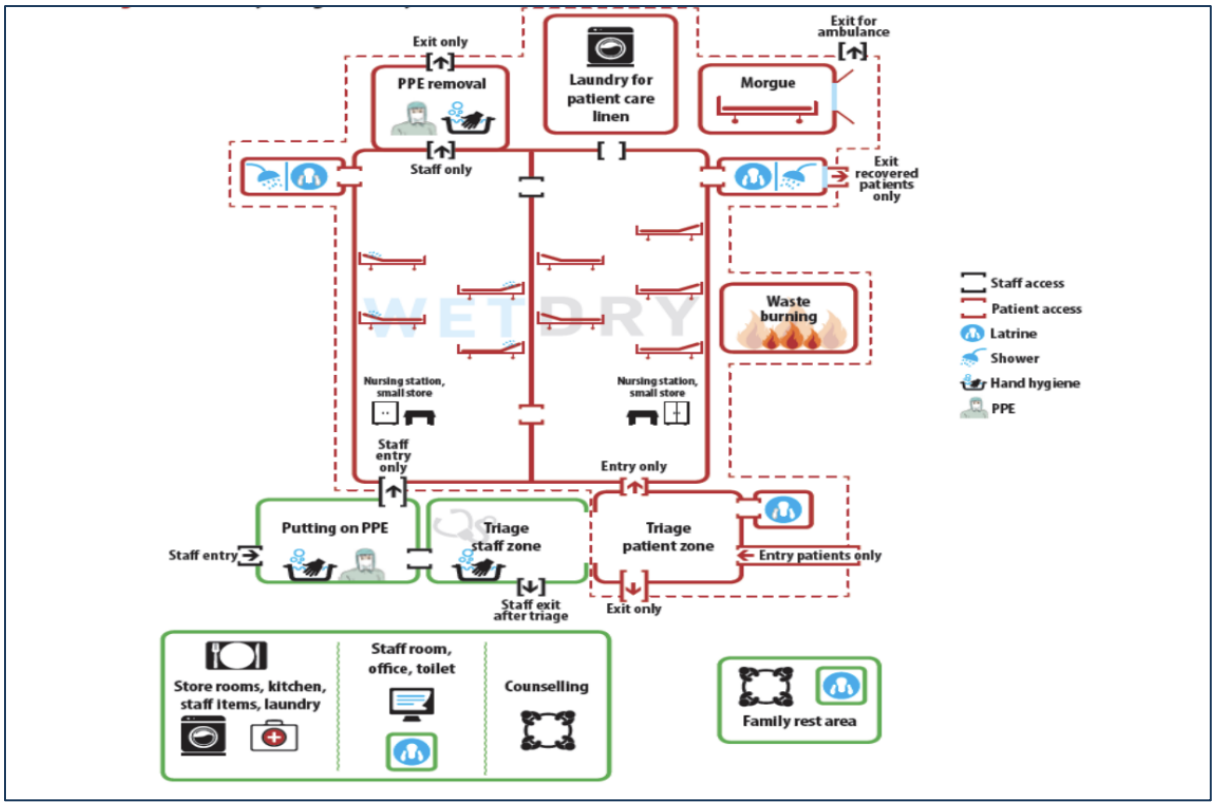
Green Zone

- Prepare chlorine
- Conduct medical staff meetings
- Drying and laundering of reusable materials
- Pharmacy
- Storage rooms

Facility Design

- Beds should be 1 to 2 metres apart
- Each patient should be provided with utensils- not shared
- Fresh 0.5% chlorine solution should be provided every day in each patient area to disinfect any spills after cleaning
- Green zone is for all activities that do not pose a risk of VHF transmission
    - Counselling areas, rest areas for staff and patients' families
    - Supporting services such as data management, administration, stores, pharmacy, kitchen and laundry for staff scrubs and boots
- Activities in both zones are supervised and monitored by designated staff

ETU Design and Layout



Staffing Requirements

Managing staff in a high-risk biosecurity environment requires shifting from standard hospital protocols to specialized metrics:

a) **PPE Operational Tolerances:** Staff cannot work prolonged shifts inside the high-risk "Red Zone" due to the physical toll of wearing heavy Personal Protective Equipment (PPE). Heat stress and dehydration limit continuous active duty inside the Red Zone to **1.5 to 2 hours per shift**.

b) **The "Buddy System":** Staff must never enter high-risk zones alone. All entries, clinical checks, and donning/doffing procedures require a minimum of two individuals to monitor safety and adherence to protocols.

Recommended Staffing Levels & Cadres

An ETU cannot function purely with clinical personnel; a massive footprint of support staff is required to maintain the biosafety envelope.

ETU Staffing Requirements

Cadre Group	Roles Included	Targeted Ratio / Staffing Dynamics
Medical & Nursing Staff	Medical officers, Registered Nurses (RNs), Clinical Officers, Lab officers	**1:1 to 1:3 staff-to-patient ratio** in high-acuity zones. RNs routinely comprise the largest block of the team.
IPC & Hygienist Teams	Cleaners, Disinfection Teams, Waste Handlers	Requires dedicated personnel per shift tasked exclusively with chemical decontamination, managing infectious waste, and cleaning.
Safety and Logistics	PPE Monitors, Water/Sanitation (WASH) engineers, Security	**1 designated monitor per donning/doffing station** to supervise staff entering and exiting the high-risk zone.
Psychosocial & Support	Counsellors, Social Workers, Nutritionists, Physiotherapy	Scaled to patient volume to support families from designated viewing/communication areas.

Calculating the Staffing Multiplier

Because of the 2-hour limitation inside PPE and the mandatory "buddy system," calculating the total number of Full-Time Equivalents (FTEs) requires a high contingency multiplier:

1. **Shift Rotations:** A standard 24-hour cycle typically requires **3 to 4 clinical team shifts**.
2. **Relief Buffers:** Facilities must build a **20% to 30% surge contingency** directly into the roster to account for mandatory rest, sudden exposure isolations, and recruitment lags.

Critical Workforce Challenges

According to retrospective assessments of designated ETUs, facilities routinely face systemic human resource challenges:

- **Training & Retraining Costs:** ETU capabilities are highly perishable. Units require an average of **15+ hours of initial orientation training**, paired with continuous, regular donning/doffing refreshers and just-in-time training protocols.
- **Retention and Attrition:** The psychological and physical stress of high-consequence pathogen environments accelerates staff burnout, demanding an active recruitment pipeline.

Staff health, safety and well-being

- Limit continuous time in full PPE per shift to reduce heat stress and dehydration; ensure rest, hydration and food breaks between red-zone rotations.
- Conduct pre- and post-shift health checks for the duration of the response and for 21 days after last exposure; rehearse a post-exposure protocol (immediate washing, incident reporting, risk assessment, enrolment as a contact — Section 5).

Monitoring and care of health care personnel working in isolation and quarantine facilities

- All health and care workers working in treatment or quarantine facilities who have contact with patients should have daily monitoring for symptoms using the health worker monitoring tool. If a health care worker has symptoms consistent with filovirus disease, they should be referred immediately for screening, triage and isolation.

- All healthcare workers should have observed donning and doffing of PPE. In the event of breach of PPE, the risk of exposure should be assessed and appropriate quarantine instituted with monitoring of symptoms.

- An appropriate and comfortable facility should be provided for staff quarantine staff admitted to the quarantine facility should be managed as per section 5.3.

Health worker monitoring tool

1. Interviewer information			
a. Interviewer name (Last, First):			
b. Interviewer role			
c. Interview date (DD/MM/ YYYY):			
d. Interview time (DD/MM/ YYYY):			
d. Interviewer phone number:			
2. Health and care worker information			
a. Last name:			
b. First name:			
c. Date of birth (DD/MM/ YYYY):			
d. Sex	☐ Male	☐ Female	☐ Prefer not to answer
e. Address Residence:			
g. Phone number:			
h. Occupation:	❒ Medical doctor	❒ Medical doctor intern	
	❒ Clinical officer	❒ Clinical officer intern	
	❒ Nurse	❒ Nurse Intern	
	❒ Midwife	❒ Health records officer	
	❒ Radiology /X-ray technician	❒ Phlebotomist	
	❒ Physical therapist	❒ Nutritionist/dietitian	
	❒ Pharmacist/technician or dispenser	❒ Laboratory personnel	

	❒	Volunteer	❒	Patient transporter
	❒	Office staff/administrator	❒	Cleaner
	❒	Ambulance driver	❒	Catering/food staff
	❒	Mortuary staff	❒	Other specify
3. Symptoms				
	❒	Fever	❒	Fatigue
	❒	Headache	❒	Joint/muscle pain
	❒	Abdominal pain	❒	Sore throat
	❒	Redness of eyes	❒	Nausea/vomiting
	❒	Diarrhoea	❒	Bleeding
	❒	Anorexia/Loss of appetite	❒	Rash
Temperature	_____°C			
4.Exposure information				
Interviewer to ask if the healthcare worker recalls any possible exposures while working at the Ebola treatment facility				
❒ Yes, date/dates (DD/MM/ YYYY):	Specify the circumstances the HCWs think they might have been exposed:			
5.Vaccination status				
Where were you [the health and care worker] working at the time of the possible exposure?	Has the health and care worker been vaccinated against Ebola virus *(once vaccines are available)*? [Determined by asking and confirming, when possible, with records] ❒ Yes ❒ No ❒ Don't know			

Appendix 3: Infection Control — Non-Patient-Care Activities

A3.1: Diagnostic Laboratory Activities

- Pipetting and centrifugation can generate fine aerosols; laboratory staff handling potential Ebola virus specimens should wear full PPE (gown, apron, footwear, gloves, particulate respirator, eye protection, hood) during aliquoting, centrifugation or any specimen procedure.
- Avoid contact between soiled items and the face when removing PPE; perform hand hygiene immediately afterward.
- Place specimens in clearly labelled, non-glass, leak-proof containers; disinfect external surfaces before transport.

Note: Where centrifugation is necessary, use sealed systems and loading and unloading in a biosafety cabinet where feasible.

A3.2: Post-Mortem Examinations

- Limit post-mortem examination to essential evaluations, performed only by trained personnel in full PPE including a particulate respirator.
- Handle specimens and disinfect containers as for diagnostic laboratory activities above.

A3.3: Movement and Burial of Human Remains (Safe and Dignified Burial)

Precautions

- Corpses are highly infectious with viruses and remain infectious for a long time. They can contaminate the isolation unit and any surfaces they come into contact with.
- Do not handle the body unnecessarily.
- Full PPE must be worn at all times by all the teams when handling the body prior to placement in the second body bag.
- Only trained personnel should handle the body.
- Family members should not handle the body at any time.
- Do not wash or embalm the body.
- The body should be placed in 2 airtight body bags.
- The body should be buried/cremated promptly.
- Engage religious and community leaders early to negotiate a burial process that is both safe and respectful — community acceptance has historically been central to outbreak control.

Preparation of the body

- Following the death of a patient in the Ebola Isolation Unit, deceased individuals should be correctly identified and handled with dignity.
- Only trained personnel should handle remains
- The handling of human remains should be kept to a minimum (e.g. only for post-mortem specimen collection, transport or burial of the body).
- Post-mortem examination of patient remains should be limited to essential evaluations only and should be performed by a trained person; alternatives to post-mortem examinations (e.g. needle biopsies) should be considered.
- IPC and safe-burial recommendations should be adhered to in principle, but may need to be adapted to consider cultural and religious concerns (e.g. discussion with religious leader/local chief or equivalent about their practices and adaptations to ensure that the greatest respect is given to removal and disposal of the deceased).

- PPE should be put on at the site of collection of human remains (if collection is in the community); worn during the process of collection and placement of the body into a body bag; and removed immediately afterwards.
- Place the body bag on a stretcher and transport the body to the body holding zone/room in the Ebola Isolation Unit.
- Write the name of the deceased person on the outside of the body bag with a waterproof marker.
- Once the body has been moved, the isolation ward will be cleaned by the cleaners as per terminal cleaning SOP in the Filovirus disease isolation Unit.

Transport of the body out of the body holding zone/room

- Trained staff dressed up in PPE from the Ebola Isolation Unit and farewell home team should put the prepared body (already in the first body bag) on a stretcher.
- Carry the stretcher outside the body holding zone of the Ebola Isolation Unit via the special exit for corpses. The burial car/pick up should be parked close to this exit.
- Write the name of the deceased person on the outside of the second body bag with a waterproof marker.
- The Ebola Isolation Unit/ farewell home team will return dressed to the Ebola Isolation Unit while the burial team continues to the burial vehicle.
- The burial team dressed in full PPE will receive the body covered in 2 body bags and placed on a stretcher for transport to the graveside/ crematorium.
- The place where the Ebola Isolation Unit team walked outside the Ebola Isolation unit should be sprayed (if outside)/ mopped (if inside) with 0.5% chlorine solution.

Procedure for Burials

- Place the body in the 2 body bags at the back of the pick up on top of a stretcher and transport to the graveside.
- Place ropes on the ground at two or three intervals (knee, lower back, upper back) to use to lower the body bag into the grave, and place the body bag on top of the ropes. Heavy industrial gloves need to be used when lowering the body bag.
- 4-6 persons lower the body into the grave using ropes.
- Rinse the vehicle with clean water.
- Upon return to the Ebola Isolation Unit, the vehicle should be disinfected as per the SOP on disinfecting transport vehicles
- Undressing of the burial team is done as per Full PPE doffing protocol upon return to the Ebola isolation unit.

Procedure for Cremation

- The burial team will carry the body from the car to the crematorium
- The body will be cremated at a temperature of 800-1000^{0}C for 90 to 120 minutes.
- Once cremated, the ashes will be removed and placed in an urn labelled appropriately.
- Relatives may be presented with the ashes.

A3.4: Control of Medical Records

Identification of Medical Records

- All Ebola patients' records shall be identified using an index number defining the procedure under which the record was developed and a serial number as well as use of records catalogue**.**
- The files shall be identified using a catalogue showing the patient's name, Outpatients or Inpatient Number

Storage and Protection of Medical Records

- All Ebola Patients records shall be stored in designated safe areas and shall have a stated retention time as determined by legislation and Public Health Regulations.
- All Ebola patients' records shall be kept in the designated areas by a process owner
- Ebola patients' records shall only be accessed by an authorized person.
- Where paper records are kept, the head of process shall ensure that carbon fire extinguishers are in place and fire control procedures are available to staff.
- Where records are kept electronically, access shall be password protected and backed up as in the control of documents procedure.
- To ensure easy retrieval of records, the record officer shall maintain a file movement register and a tracer card where applicable.

Appendix 4: How to Administer Vasopressors (Norepinephrine or Epinephrine)

Norepinephrine is the preferred first-line vasopressor for Ebola virus patients in shock (Section 4.2), given moderate-certainty evidence of reduced mortality and arrhythmia compared with dopamine. Epinephrine is an acceptable alternative where norepinephrine is unavailable, or preferable in patients with cardiac systolic dysfunction.

- Vasopressors may be initiated via a large-bore peripheral IV line rather than waiting for central access, provided the site is checked every 30 minutes for extravasation; transition to central access should still be arranged for ongoing therapy.
- Where central access is required, use ultrasound guidance rather than a landmark technique.
- Use the lowest dose that maintains adequate perfusion (target SBP ≥90 mmHg with resolving signs of poor perfusion); reassess every 15–30 minutes and wean off as soon as the patient improves.
- Stop the infusion immediately if it infiltrates (severe pain/swelling at the site) or if a dangerous arrhythmia develops.

Preparing the infusion

- Adults (central line) add 4 mL of 1:1000 norepinephrine/epinephrine to 46 mL of 5% dextrose = 50 mL at 80 µg/ mL.
- Children, and adult patients via a peripheral line: add 1 mL of 1:1000 solution to 49 mL of 5% dextrose = 50 mL at 20 µg/mL (a more dilute solution to reduce extravasation injury risk).
- Starting dose 0.05 µg/kg/min; increase in increments of 0.1 µg/kg/min; usual maximum 0.5–0.75 µg/kg/min.
- Manage extravasation with phentolamine 0.1–0.2 mg/kg (max 10 mg), diluted and infiltrated at the site, per local protocol.

Infusion Rate (mL/hour) at 20 µg/mL — Peripheral Line or Any Child

Weight (kg)	0.05 µg/kg/min	0.1 µg/kg/min	0.2 µg/kg/min	0.3 µg/kg/min	0.5 µg/kg/min	0.75 µg/kg/min
10	1.5 mL/h	3.0 mL/h	6.0 mL/h	9.0 mL/h	15.0 mL/h	22.5 mL/h
15	2.3 mL/h	4.5 mL/h	9.0 mL/h	13.5 mL/h	22.5 mL/h	33.8 mL/h
20	3.0 mL/h	6.0 mL/h	12.0 mL/h	18.0 mL/h	30.0 mL/h	45.0 mL/h
30	4.5 mL/h	9.0 mL/h	18.0 mL/h	27.0 mL/h	45.0 mL/h	67.5 mL/h
40	6.0 mL/h	12.0 mL/h	24.0 mL/h	36.0 mL/h	60.0 mL/h	90.0 mL/h
50	7.5 mL/h	15.0 mL/h	30.0 mL/h	45.0 mL/h	75.0 mL/h	112.5 mL/h
60	9.0 mL/h	18.0 mL/h	36.0 mL/h	54.0 mL/h	90.0 mL/h	135.0 mL/h
70	10.5 mL/h	21.0 mL/h	42.0 mL/h	63.0 mL/h	105.0 mL/h	157.5 mL/h
80	12.0 mL/h	24.0 mL/h	48.0 mL/h	72.0 mL/h	120.0 mL/h	180.0 mL/h

Infusion Rate (mL/hour) at 80 µg/mL — Adult Central Line

Weight (kg)	0.05 µg/kg/min	0.1 µg/kg/min	0.2 µg/kg/min	0.3 µg/kg/min	0.5 µg/kg/min	0.75 µg/kg/min
50	1.9 mL/h	3.8 mL/h	7.5 mL/h	11.3 mL/h	18.8 mL/h	28.1 mL/h
60	2.3 mL/h	4.5 mL/h	9.0 mL/h	13.5 mL/h	22.5 mL/h	33.8 mL/h
70	2.6 mL/h	5.3 mL/h	10.5 mL/h	15.8 mL/h	26.3 mL/h	39.4 mL/h
80	3.0 mL/h	6.0 mL/h	12.0 mL/h	18.0 mL/h	30.0 mL/h	45.0 mL/h

Frequent monitoring is essential, as pulse and blood pressure can change within minutes. For the initial administration, monitor pulse every minute and blood pressure every 2–5 minutes; adjust the rate up if SBP remains <90 mmHg, or down to the minimum effective dose once SBP >90 mmHg with adequate perfusion.

Appendix 5: Resources Required

General supplies

In the Ebola isolation unit, each patient should have their own items. (NB: Items must **NOT** be shared between patients). Patient items provided at admission include:

Quantity	Item	Check
1	Mattress covered with heavy-duty plastic sheeting	
1	Bed sheet and blanket	
1	**Blue** basin for bathing and laundry	
1	**Red** bucket with lid for collecting liquid waste (vomit, spills, etc.)	
1	**Green** bucket with lid for laundry	
1	Plastic plate	
1	Plastic Spoon	
1	Large plastic cup for drinking	
1	**Yellow** jerry can of 5l for drinking water or ORS	
1	Roll of paper towel	
1	Bar of soap	
5	Absorbent pads	

Medical items

It is expected that most patients will require the following medical items:

Item	Check
Medications	
Paracetamol	
BDBV Regimen; Remdesivir, MBP134	
Oral rehydration salts	
Artemether/Lumefantrine and artesunate	
Metoclopramide	
Ondansetron	
Omeprazole	
Loperamide	
Diazepam	
Tramadol	
Salbutamol	
Insulin	
Calcium gluconate	
Anticonvulsants Phenytoin Levetiracetam	
Antibiotics: Amoxicillin clavulanic acid (oral and IV) Piperacillin tazobactam Nitrofurantoin Amikacin Crystalline penicillin	

Gentamicin	
Vasopressors: Norepinephrine	
Oxygen	
Nutritional Support	
Infant Formula	
Intravenous Therapy Requirements	
IV fluids - Ringer's Lactate - 50% Dextrose - 10% dextrose	
Potassium Chloride	
Magnesium Sulphate	
IV cannula - different gauges	
Central lines and central line insertion kits sterile drapes	
Sample collection kit	
Clean gloves	
Medical Equipment	
Continuous Renal Replacement Therapy	
Haematology Analyzer	
Blood gas analyzer	
Biochemistry Analyzer	
ECG Machine	
Thermogun	
Other Items	
Hand sanitizer	
Face mask, N95 respirator	
Clean gloves	
Extended Cuff Surgical Gloves	
Digital thermometer (for individual patient use)	
Hand Washing Soap	
Strapping/tape	
Face mask	

Appendix 6: How to interpret chlorine test strips:

1. Check the strip container for:
    - The type of chlorine measured—preferably **free available chlorine (FAC)**.
    - The measurement range and units, usually **ppm** or **mg/L**.
    - The manufacturer's required dipping time and reading time.
    - The expiry dates.
2. Collect a sample of the prepared solution in a clean container. Do not test directly from a container containing undissolved powder.
3. Dip the strip for the exact time stated by the manufacturer, then remove it without shaking off the reagent.
4. Wait the specified development time and compare the strip with the colour chart in good lighting. Do not read it too early or too late.
5. Match the colour to the nearest value on the chart and record the result in **ppm (mg/L)**.
6. Compare the result with the required concentration:

Chlorine concentration	Equivalent reading
0.05%	500 ppm
0.1%	1,000 ppm
0.2%	2,000 ppm
0.5%	5,000 ppm

A standard pool test strip may not measure a 0.5% solution because many strips only measure low chlorine levels. Use high-range chlorine strips or dilute the sample according to the manufacturer's instructions. Very high chlorine concentrations can also bleach the test reagent and produce a falsely low or zero reading.

Record the date, time, prepared concentration, test result, and name of the person who performed the test. Always follow the specific instructions supplied with the test strips.

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Case Management Guidelines for Filovirus Disease

Ebola Virus | Marburg Virus

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