

THE UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT, GENDER, ELDERLY AND
CHILDREN



Health Services Quality Assurance Division

STANDARD OPERATING PROCEDURES FOR INFECTION PREVENTION AND
CONTROL FOR EBOLA VIRUS DISEASE CASES

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FOREWORD

Ebola Virus Disease (EVD) is a rare and deadly disease most commonly affecting people and nonhuman primates (monkeys, gorillas, and chimpanzees). Ebola virus spreads to people through direct contact with body fluids of a person who is sick with or has died from EVD. This can occur when a person touches the infected body fluids (or objects that are contaminated with them), and the virus gets in through broken skin or mucous membranes in the eyes, nose, or mouth. The virus can also spread to people through direct contact with the blood, body fluids and tissues of infected fruit bats or primates. People can get the virus through sexual contact as well. The average EVD case fatality rate is around 50%. Case fatality rates have varied from 25% to 90% in past outbreaks. Incubation period is from 2 to 21 days.

The Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC), WHO and other stakeholders has therefore formulated Infection Prevention and Control Standard Operating Procedures (SOPs) in order to guide the health workers, stakeholders and community at large when they handle suspected and confirmed EVD. This document also provides a summary of infection prevention and control (IPC) measures for those providing direct and indirect care to patients with suspected or confirmed cases of EVD. These IPC measures should be applied not only by health-care professionals but also by anyone in direct contact with patients (e.g., visitors, family members, volunteers), as well as by those not in contact with patients but potentially exposed to the virus through contact with the environment (e.g., cleaners, laundry, housekeepers, security).

These SOPs will help health service providers and other service providers in health facilities and community to operate with guidance particularly when dealing with procedures that have high risk of transmitting infection without neither contracting infection nor transmitting it to other patients, other health care workers, community and the environment at large. Health care procedures and other non-health procedures result into cross infection particularly when they are poorly conducted without following principles. Management of EVD cases poses high risk of infection when poorly conducted.

Some of the procedures that pose risks are: housekeeping; waste management; insertion of catheter, etc. These procedures if are not carried out by following SOPs may result in contracting filovirus haemorrhagic fever such as Ebola disease. Prevention and control of Ebola disease must be a top priority for health care settings and community.

In the course of health service provision, health workers will be obliged to observe the set SOPs which if not properly followed may lead to the spread of infection of Ebola disease to health workers, patients, communities and environment at large. The MoHCDGEC underlines the safety of Healthcare Providers, patients, community and environment during provision of health services in order to ensure quality health services at all levels.

It is anticipated that, this document will be used by all health service providers and other stakeholders as a reference when providing services in case there are suspected or confirmed cases of EVD. Therefore, the Ministry would like to advise all key stakeholders in

healthcare services to ensure that safety measures and SOPs are adhered to by all health workers in order to prevent the spread of such highly infectious disease.



Prof. Muhammad Bakari Kambi
CHIEF MEDICAL OFFICER

ACKNOWLEDGEMENT

The preparation of the Standard Operating Procedures (SOPs) for Quality Infection Prevention and Control of a patient suspected or confirmed with Ebola Virus Infection in Tanzania has been a timely endeavor given the situation in our neighbouring country, The Democratic Republic of Congo (DRC).

This is an important undertaking made by Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGEC) in collaboration with WHO. The Ministry could not accomplished this assignment alone, hence, I would like to thank all Stakeholders who were involved in one way or another during the development of these IPC Standard Operating Procedures (SOPs) to be used during the care of a clients suspected or confirmed with Ebola virus Disease.

The MoHCDGEC would like to convey gratitude to WHO for financial and technical support towards realization of this document. Also, I personally would like to thank all individuals who have contributed in one way or another during the development processes of theses SOPs.

Once again, on behalf of Ministry of Health, Community Development, Gender, Elderly and Children through Quality Assurance Division and on my own behalf, I thank all those who contributed in the development of these SOPs.



Dr. Mohammed A. Mohammed
DIRECTOR OF HEALTH QUALITY ASSURANCE

ABBREVIATIONS AND ACRONYMS

ARDs	Acute Respiratory Diseases
EVD	Ebola Virus Diseases
ETC	Ebola Treatment Centre
HCWM	Healthcare Waste Management
HAIs	Healthcare Associated Infections
HIV	Human Immunodeficiency Virus
HLD	High Level Disinfection
MoHCDGEC	Ministry of Health, Community Development, Gender, Elderly and Children
MUHAS	Muhimbili University of Health and Allied Sciences
NGO	Non-Governmental Organisation
IPC	Infection Prevention and Control
PEP	Post Exposure Prophylaxis
PPE	Personal Protective Equipment
SOPs	Standard Operating Procedures
RRT	Rapid Response Team
RT-PCR	Reverse Transcription Polymerase Chain Reaction
WHO	World Health Organisation

USERS OF THE SOPS FOR IPC

The expected users of the SOPs include:

- All healthcare providers and trainers from government, faith-based, private for-profit, not for-profit, NGO health facilities and institutions
- People working at community level to promote quality healthcare services, including frontline healthcare providers, facility health management committees and home-based care workers
- Policymakers, health administrators and program officers
- Various health teams including regional and council health management teams
- Emergency responders

1. INTRODUCTION

Ebola virus disease (EVD), formerly known as Ebola hemorrhagic fever, is a human illness caused by infection with an Ebola virus. There are five known species of Ebola viruses, four of which cause human illness. The Zaire Ebola virus was the first Ebola virus ever isolated. The virus caused the first reported outbreaks of EVD in 1976 in the Democratic Republic of the Congo (DRC) and the Sudan. The name of the disease comes from the first recorded outbreak in 1976 in an area that lies on the Ebola River.

The 2014–2016 outbreak in West Africa was the largest and most complex Ebola outbreak since the virus was first discovered in 1976. There were more cases and deaths in this outbreak than all others combined. It also spreads between countries, starting in Guinea then moving across land and sea borders to Liberia and Sierra Leone.

The Tanzania Ministry of Health in collaboration with WHO developed SOPs related to IPC to be used as easy reference for health care workers in providing health services. IPC Standard Operating Procedures are precautionary, short and clear illustrations, diagrams or statement that guides on how to conduct certain procedures in order to prevent Ebola spread. The IPC standard operating procedures described in this document are intended for use in communities, health facilities and Ebola Treatment Centers in Tanzania.

Transmission

Fruit bats of the Pteropodidae family are natural Ebola virus hosts. Ebola is introduced into the human population through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as chimpanzees, gorillas, fruit bats, monkeys, forest antelope and porcupines found ill or dead or in the rainforest.

Ebola then spreads through human-to-human transmission via direct contact (through broken skin or mucous membranes) with the blood, secretions, organs or other bodily fluids of infected people, and with surfaces and materials (e.g. bedding, clothing) contaminated with these fluids.

Health-care workers have frequently been infected while treating patients with suspected or confirmed EVD. This has occurred through close contact with patients when infection control precautions are not strictly practiced. Burial ceremonies that involve direct contact with the body of the deceased can also contribute to EVD transmission. People remain infectious if their blood or body fluids contain the virus.

Sexual transmission

More surveillance data and research are needed on the risks of sexual transmission, and particularly on the prevalence of viable and transmissible virus in semen over time. In the interim, and based on present evidence, WHO recommends:

- All Ebola survivors and their sexual partners should receive counselling to ensure safe sexual practices until their semen has twice tested negative. Survivors should be provided with condoms.
- Male Ebola survivors should be offered semen testing at 3 months after onset of disease, and then, for those who test positive, every month thereafter until their semen tests negative for virus twice by RT-PCR, with an interval of one week between tests.
- Ebola survivors and their sexual partners should either:
 - Abstain from all types of sex, or observe safe sex through correct and consistent condom use until their semen has twice tested negative.
 - Having tested negative, survivors can safely resume normal sexual practices without fear of Ebola virus transmission.
 - Based on further analysis of ongoing research and consideration by the WHO Advisory Group on the Ebola Virus Disease Response, it is recommended that male survivors of Ebola virus disease practice safe sex and hygiene for 12 months from onset of symptoms or until their semen tests negative twice for Ebola virus.
 - Until their semen has twice tested negative for Ebola, survivors should practice good hand and personal hygiene by immediately and thoroughly washing with soap and water after any physical contact with semen, including after masturbation. During this period used condoms should be handled safely, and safely disposed of, to prevent contact with seminal fluids.
 - All survivors, their partners and families should be shown respect, dignity and compassion.

Prevention and control

Community engagement is key to successfully control outbreaks. Raising awareness on Ebola prevention (including vaccination) and infection control) is an effective way to reduce human transmission. Risk reduction messaging should focus on several factors:

- **Reducing the risk of wildlife-to-human transmission** from contact with infected fruit bats or monkeys/apes and the consumption of their raw meat. Animals should be handled with gloves and other appropriate protective clothing. Animal products (blood and meat) should be thoroughly cooked before consumption.
- **Reducing the risk of human-to-human transmission** from direct or close contact with people with Ebola symptoms, particularly with their body fluids. Gloves and appropriate personal protective equipment should be worn when taking care of ill patients at home. Regular hand washing is required after

- **Outbreak containment measures** primarily include prompt reporting of the illness, identifying people who may have been in contact with someone infected with Ebola and monitoring for signs and symptoms for 21 days, separating the healthy from the sick to prevent further spread, safe burial of the dead, personal hygiene and maintaining a clean environment.

Controlling infection in holding room/Isolation and Ebola Treatment Centre

Health-care workers should always take standard precautions when caring for patients, regardless of their presumed diagnosis. These include basic hand hygiene, use of personal protective equipment (to block splashes or other contact with infected materials), safe injection practices and safe burial practices.

- Health-care workers caring for patients with suspected or confirmed Ebola virus should apply extra infection control measures to prevent contact with the patient's blood and body fluids and contaminated surfaces or materials such as clothing and bedding. When in close contact (within 1 (metre) of patients with EVD, health-care workers should wear face protection (a face shield or a medical mask and goggles), a clean, non-sterile long-sleeved gown, and gloves (sterile gloves for some procedures). (Prepare to attend to a patient in full PPE. On arrival/ alert of a suspected, probable or confirmed case health care workers should be in full PPE (standard + Contact + droplet.) Laboratory workers handling samples should also be in full PPE. Samples taken from humans and animals for investigation of Ebola infection should be handled by trained staff and processed in suitably equipped laboratories.

2. STANDARD PRECAUTIONS

Standard precautions are simple set of effective practice guidelines (creating a physical, mechanical and chemical barrier) to protect healthcare workers and patients from infection with a range of pathogens including blood-borne pathogens. Standard Precautions are the basic infection control practices that should be used in the care of all patients, regardless of suspected or confirmed infectious diseases

Health workers cannot always know when a patient's body fluids are infectious, Standard Precautions should be used with all patients in the health care setting, regardless of their infection status.

Standard precautions include:

Protect yourself at all times by:

- Consider every person (patient/clients or staff) as potentially infectious and susceptible to infection
- Use appropriate hand hygiene techniques
- Wear appropriate personal protective equipment
- Appropriately handle sharps, linen and instrument processing
- Appropriately manage patient placement and environmental cleaning.
- Safely dispose of infectious waste materials
- Promptly and carefully clean up spills of blood and other body fluids after the spill event.
- Process instruments by cleaning, and sterilization or high-level disinfection following recommended procedures
- Introduce cough etiquette to patients, caregivers and visitors with signs and symptoms of respiratory illness.
- Provide pre and post exposure prophylaxis
- Provide vaccination

2. TRANSMISSION BASED PRECAUTIONS

Transmission-Based Precautions are the second tier of basic infection control and are to be used in addition to Standard Precautions for patients who may be infected or colonized with certain infectious agents for which additional precautions are needed. Transmission occurs through Contact, Droplet and Airborne

Ebola is only transmitted by contact and droplet, hence, during Ebola Virus Disease outbreaks, in addition to standard precautions, transmission based precautions must cover contact and droplet precautions.

Contact Precautions (EVD, Cholera, C. difficile, Herpes)

- PREVENT direct or indirect Blood or Body Fluids Contact:
- DO NOT share sharps, needles or clothing
- AVOID unprotected sex
- AVOID transfusion of UNSCREENED blood/blood product
- Ensure appropriate patient placement to prevent direct skin contact (isolation of suspects)
- Use personal protective equipment (PPE) appropriately
- Use disposable or dedicated patient-care equipment (e.g., blood pressure cuffs, plates, cups etc.) or clean with water and detergent then disinfect reusable non dedicated patient care equipment by use of alcohol based hand rubs in between patients.
- Effective cleaning and disinfection of patient and staff re-usable items

Droplet Precautions (EVD, ARDs, Meningococcal meningitis)

This is a set of precautions used to prevent transmission of infections through respiratory droplets from the respiratory tract of the infectious individual to mucosal surfaces of the recipient, generally over short distances. Respiratory droplets are generated when an infected person coughs, sneezes, or talk. To prevent Droplet transmission of Ebola Virus Disease the following should be adhered to:

- Maintain at least one meter distance during patient-provider interactions and between patients at service provision with confirmed and suspect cases
- Transport patients in well oxygenated and dedicated ambulances, and avoid public transports as best as possible
- Transportation of suspected and confirmed cases should be done by Rapid Response Team
- Suspected and confirmed cases must be isolated in area with restricted entry

Wear full PPE which in addition to standard precautions. At any level of EVD management, transmission based precautions should be strictly adhered to, to prevent further transmission at the community and at the healthcare setting.

AIRBORNE PRECAUTIONS (Measles, TB)

Additional precautions for infections transmitted by small droplet nuclei

Smaller particles (small droplet nuclei $\leq 5 \mu\text{m}$ in diameter) evaporate quickly; the resulting dried residues settle slowly from the air, and remain suspended in the air for variable lengths of time.

1. Use particulate respirators; N95 mask
2. Maintain a distance of 1m from the patient
3. Minimize or prevent the use of public transport
4. Promote cough and sneeze etiquette
5. Transport patients in well oxygenated ambulances
6. Use adequately ventilated single rooms if available

3. ISOLATION PRECAUTIONS

Isolation precautions are precautions taken at an area in all facilities used for housing patients suspected or confirmed of having highly contagious diseases such as Ebola (ETC, Holding area, isolation). It includes the patient's room or area, isolated latrine or toilet, food and food utensils, family entrance, and changing room. The precaution includes to;

- Isolate the patient.
- Wear PPE in the isolation area,
- Maintain a distance of at least 1 meter between patients beds
- Perform hand hygiene while in isolation area
- Disinfect spills, waste using 2% chlorine solution before disposal, after spill removal clean the surface using 0.5% chlorine solution.
- Clean and disinfect reusable equipment in the isolation area using 0.5% chlorine solution and then rinse with clean and safe water.
- Maintain flow pattern and movements to prevent transmission of infection from high risk zone to low risk zone
- Clean and disinfect soiled linens and laundry from the isolation area safely.
- Use safe disposal methods for non-reusable supplies and infectious waste.
- Provide information about the risk of EVD transmission to health facility staff.
- Reinforce use of EVD Isolation Precautions to all health facility staff.
- Provide information to families and the community about prevention of EVD and care of patients.
- Limit transport and movement of patients from moving out of red zone in ETC or isolation
- Use of special ambulances
- Trained medical personnel should handle transportation of the suspect
- Isolation areas to have limited entry

5. HAND HYGIENE

Hands are the commonest vehicle of infection transmission. Hand Hygiene must be performed frequently to minimize or prevent healthcare associated infections

Standard operating procedures for hand hygiene

a. Perform *hand hygiene*:

- Before donning gloves or wearing PPE
- Before any clean/aseptic procedure is performed on a patient,
- After any exposure risk or actual exposure with the patient's blood and body fluids, after touching contaminated surfaces/items/equipment in the patient's surroundings,
- After removal of PPE or Gloves, upon leaving the patient's care area.
- In isolation rooms/areas every time it is needed during care to a patient, along with change of gloves.
- When caring for different patients in the same room, it is essential to perform hand hygiene after completion of care to each patient before moving to the next patient even when wearing gloves

NB: Neglecting to perform hand hygiene during and after PPE removal will reduce or negate any benefits of the protective equipment.

b. Perform hand hygiene, either using an alcohol-based hand rub, 0.05% OR 0.5% (gloved hands) chlorine solution

- i. Always perform hand hygiene with soap and running water when hands are visibly soiled.
- ii. Alcohol-based hand rubs should be used for hand hygiene when the hands are not visibly soiled.
- iii. Alcohol-based hand rubs should be made available at every point of care (at the entrance and within the isolation rooms/areas). However, if alcohol-based hand rubs are unavailable, perform hand hygiene with soap and running water every time necessary
- iv. In EVD settings 0.05% chlorine solutions or liquid soap and running water are used for hand washing.
- v. 0.5% chlorine solutions must be used to decontaminate or wash gloved hands in the ETC.

NB: *In Ebola Treatment Centers (ETC) 0.05% chlorine solution is recommended for hand washing*

Hand hygiene should be performed before putting and after removal of gloves

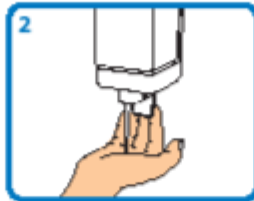
HAND WASHING

STEPS: The following steps will take at least 40- 60 seconds or counts about 15- 20 normal breaths.

Hand-washing technique with soap and water



1
Wet hands
with water



2
Apply enough soap
to cover all
hand surfaces



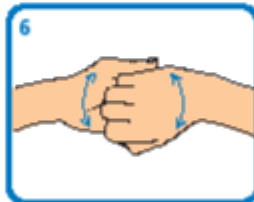
3
Rub hands palm
to palm



4
Rub back of each hand
with palm of other hand
with fingers interlaced



5
Rub palm to palm with
fingers interlaced



6
Rub with back of fingers
to opposing palms with
fingers interlocked



7
Rub each thumb clasped
in opposite hand using a
rotational movement



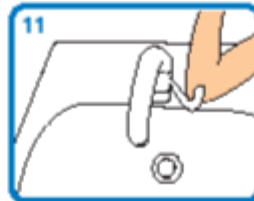
8
Rub tips of fingers in
opposite palm in a
circular motion



9
Rub each wrist with
opposite hand



10
Rinse hands
with water

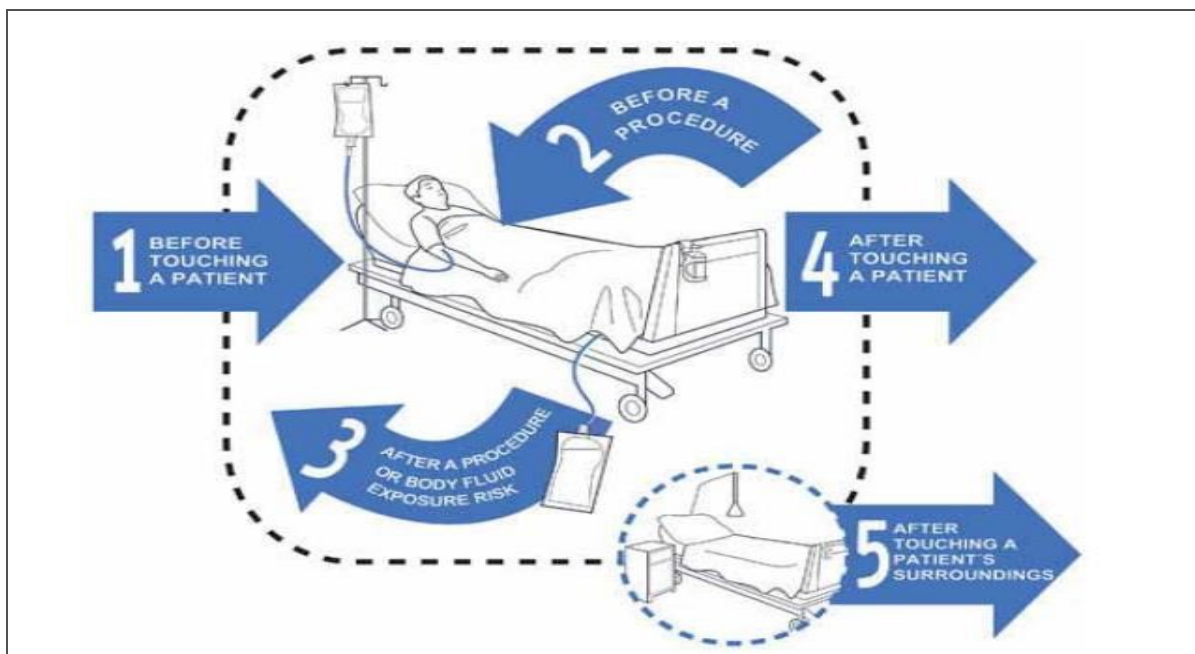


11
Use elbow to
turn off tap



12
Dry thoroughly with
a single-use towel

FIVE MOMENTS OF HAND HYGIENE



Alcohol Hand Rub (Antisepsis)

1. Ensure availability of 60%-90% alcohol-based hand rub in all functional areas
2. Apply enough 60%-90% alcohol-based hand rub about 5 mL for each application at least to cover the entire surface of hands and fingers
3. Hand rub vigorously, especially between fingers and under the nails, until they are dry (15-30 seconds)
4. Wash hands with soap and water when hands become greasy or after every 5-10 applications of hand rub.

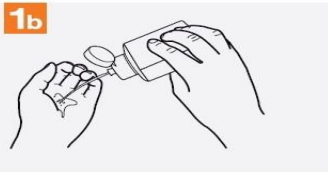
How to Handrub?

RUB HANDS FOR HAND HYGIENE! WASH HANDS WHEN VISIBLY SOILED

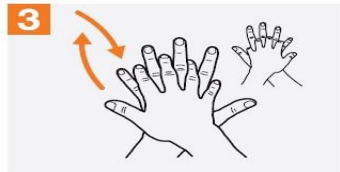
🕒 Duration of the entire procedure: 20-30 seconds



Apply a palmful of the product in a cupped hand, covering all surfaces;



Rub hands palm to palm;



Right palm over left dorsum with interlaced fingers and vice versa;



Palm to palm with fingers interlaced;



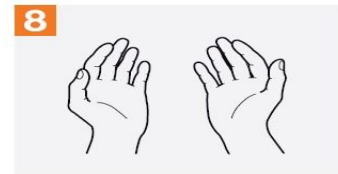
Backs of fingers to opposing palms with fingers interlocked;



Rotational rubbing of left thumb clasped in right palm and vice versa;



Rotational rubbing, backwards and forwards with clasped fingers of right hand in left palm and vice versa;



Once dry, your hands are safe.

NB: Steps in hand washing and alcohol hand rub must be the same.

6. PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal protective equipment is specialized clothing or equipment worn by healthcare workers for protection against health hazards. Personal protective equipment is designed to protect many parts of the body e.g. eyes, face, hands, ears etc.

In EVD perspective PPE are designed to cover all parts of the body and have to be worn (donned) and removed (doffed) under specific guidance for maximum prevention.

Criteria for selection of PPE:

- It should cover all parts of the body
- Should be non-permeable to body fluids
- Water resistant PPE are recommended for Utility works in the ETC
- PPE should be loosely and securely to the wearer. Keep the health care worker free to work
- Easy to remove without predisposing the Healthcare worker to self contamination

Components of PPE suitable for High Risk Exposures

PPE	DESCRIPTION	STATUS
Coverall	Impermeable coveralls provide the ultimate protection against viral infection for medical and non-medical staff in EVD outbreak settings	Disposable
Apron	Rubber, Heavy duty for protection of the front side of the body	Reusable
	Plastic for protection of the front side of the body	Disposable
Gloves	Protection of the hands when performing normal procedures of soft material	Disposable
Utility Gloves	Used to protect the hands when handling waste, during housekeeping, instrument processing	Reusable
N95 Respirator	Protects against high risk airborne and droplet infection	Disposable
Goggles	Protect the eyes and face against splashes from the patient	Disposable or Reusable
Face Shield		
Boots	Protect the feet from infectious and traumatic agents	Reusable (single person use is advisable)
Shoe cover	Protect the feet from infectious agents	Disposable
Head cover	Protect the head	Disposable

Attire based on EVD prevention and control.

In medical field, clothes are used for identification and classification, hygiene promotion and supporting highly infectious disease protection. Ebola being one of the highly infectious diseases can be transmitted through soiled/sweat contaminated clothes. In order to prevent spread of the outbreak in the health facility and protect HCWs from HAIs, clothes used by healthcare workers must be defined according to area of work as follows.

- Home dress- the cloth that HCW comes with from his/her residence to health facility
- Patient management attire – these are medical scrubs and other PPE that are worn while attending to a patient.

All hospital clothing; scrubs and PPE must remain in the hospital. There must be a dedicated changing area where staff put on and remove their respective clothing. Clothes used in one of two areas defined above should not be transferred to other section to prevent transmission of Microbes from one section to another and from hospital to the community.

DONNING OF PPE

The following steps should be followed during wearing of PPE:

A: On entering Green Zone from street

- Step 1: Perform hand hygiene
- Step 2: Remove Street clothes/clinical clothes and put on medical scrub suit and gum boots
Leaving all personal effects such as rings, jewelries, IDs or mobile phones

B: On entering Red Zone from green zone

Prepare yourself by:



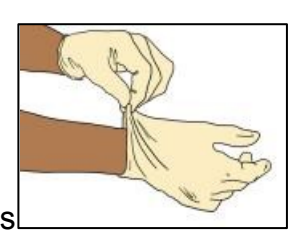


- Emptying your bladder and bowel
- Rehydrating yourself
- Tying back any gorgeous hairstyle, if possible avoid big extended hairstyles.

C: PPE Donning steps

- Step 1: Perform hand hygiene
- Step 2: Inspect your PPE
- Step 3: Put on first pair of gloves
- Step 4: Put on gown/coverall and make thumb hole if not available
- Step 5: Put on mask, mould it to fit and perform seal-check if using N-95 mask
- Step 6: Put on goggles or a face shield
- Step 7: Put on apron
- Step 8: Put on second pair of gloves

- Step 9: Put on head cover or hood
- Step 10: Identification by a label
- Step 11: Supervision

ILLUSTRATED SEQUENCE FOR DONNING PPE

DONNING OF PPE	
DESCRIPTION & PICTURES	PICTURES & DESCRIPTION
<p>1</p> <p>Remove all personal Items (jewellery, watch, phones, pens, etc).</p> 	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%; text-align: center; vertical-align: top;"> <p>2</p> <p>Put on the scrub suit and rubber boots* in the changing room</p>  </div> <div style="width: 45%; text-align: center; vertical-align: top;"> <p>3</p> <p>Put on gloves</p>  </div> </div>
<p>4</p> <p>Put on coverall. Make a thumb (or middle finger) hole in the coverall sleeve to ensure that your forearm is not exposed when making wide movements.</p> 	<p>5</p> <p>Put on face mask and put on face shield OR goggles</p> 



Perform seal-check if using N-95 mask

- Cover the front of the respirator with both hands
- Positive seal check:
- Exhale sharply
- A positive pressure inside the respirator = no leakage
- If leakage, adjust position and/or tension straps.
- Retest the seal and repeat the steps until the respirator is sealed properly
- Negative seal check:
- Inhale deeply
- If no leakage, negative pressure will make the respirator cling to your face
- Respirators should be discarded after every use

DOFFING PPE

This is the crucial period because the PPE are highly contaminated with the virus from the patient. Doffing should be instructed and guided by experienced IPC staff and entails the following steps: At the exit of the ward, perform hand hygiene and dip boots in 0.5% chlorine

- A. Proceed to the red zone portion of the doffing area and perform the following steps
- B. Step 1a: If wearing heavy duty gloves, disinfect and remove
 - Step 1b: Disinfect outer gloves with 0.5% chlorine solution
 - Step 2: Remove external hood if used
 - Step 3: Wash your outer pair of gloves with 0.5% chlorine solution.
 - Step 4: Remove Apron.
 - Step 5: Wash your outer pair of gloves with 0.5% chlorine solution.
 - Step 6: The buddy will inspect the PPE for visible contamination, cuts or tears. If any
wipe with 0.5% chlorine solution
 - Step 7: Remove outer pair of gloves
 - Step 8: Inspect inner gloves to assess for visible contamination, cuts or tears. If any
wipe the area with 0.5% chlorine
 - Step 9: Wash your inner pair of gloves with 0.5% chlorine solution.
 - Step 10: While facing a mirror or being guided by a donning supervisor, remove your
hood and coverall.
 - Step 11: Wash your inner gloves with 0.5% chlorine solution.
 - Step 12: Remove eye protection (face shield or goggle).
 - Step 13: Wash your inner gloves with 0.5% chlorine solution.
 - Step 14: Remove face mask (N 95).
 - Step 15: Wash your inner gloves with 0.5% chlorine solution.
 - Step 16: Step into 0.5% chlorine solution-containing bowl
 - Step 17: Disinfect and remove inner gloves
 - Step 18: Step into another bowl of 0.5% chlorine, then step into clean boots in the
green zone.
 - Step 19: Wash your bare hands with 0.05% chlorine solution, or soap and water
- C. You can now proceed to complete the documentation of your findings.
- D. Go to the relaxation area of the ETC to rehydrate your body and rest.

Sequence for doffing PPE

DOFFING OF PPE

This is most crucial period due to the risk of contamination during taking off the contaminated PPE.

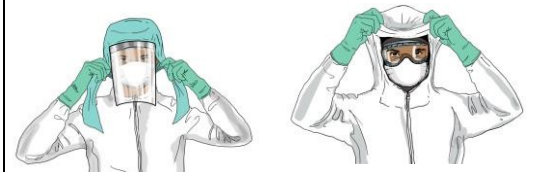
Remove apron leaning forward and taking care to avoid contaminating your hands.



Remove outer pair of gloves



Remove head and neck covering (bonnet or hood) to avoid contamination of face



Remove coverall



Remove eye protection



Remove the mask behind



Remove gloves carefully



a. PPE needed at different areas

SN	Area/Activity done	PPE required
1	Triage area	Boots, Gloves, apron, Mask, goggles and cap
2	Isolation, Holding	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, two pairs of gloves)
3	Transportation (Ambulance)	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, two pairs of gloves) if patient needs assistance of staff in the rear
4	ETC (Green zone)	Scrub suit, closed shoes (standard precaution)
5	ETC (Red Zone)	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, apron shield, mask, cap, hood, two pairs of gloves)
6	Decontamination	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, reusable apron shield, mask, cap, hood, two pairs of surgical gloves and one heavy duty gloves)
7	Burial	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, reusable apron shield, mask, cap, hood, three pairs of gloves including utility gloves)
8	Contact Tracing	Boots, Gloves, Mask and cap
9	Handling of waste	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, three pairs of gloves including utility gloves)
10	Laundry for patient linen	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, three pairs of gloves including utility gloves)
11	Laundry for HCWs linen	Boots, Gloves, Apron, Mask, goggles and cape
12	Housekeeping in red zone	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, three pairs of gloves including utility gloves)
13	Housekeeping in green zone	scrub suit, Boots, apron, utility gloves, Mask, goggles and cap
14	Specimen collection	Full PPE (scrub suit, Boots, coverall/gown, goggles/face, Apron shield, mask, cap, hood, two pairs of gloves)
15	Specimen packaging	scrub suit, Boots, gown, goggles/face, Apron shield, mask, cap, hood, two pairs of gloves
16	Preparation of chlorine	Scrub suit

7. HANDLING OF THE EVD PATIENT

At Home/Community

- After Community alert, an EVD suspected case should remain in house or in an identified location until RRT arrives in the area
- Send the patient to the health facility for isolation in a dedicated ambulance
- Teach households to observe proper hand hygiene
- Start early contact listing and tracing
- Quarantine the area until the suspect is confirmed or released
- Decontaminate the house and environment immediately after confirmation
- Identify and dispose-off utensils used by the patient
- Burn/incinerate all non-decontaminant equipment

At Health Facility

The following measures should be applied in the health facility to prevent spread of infection within the health facility:

Flow pattern at outpatient and emergency department

- Conduct medical screening for patients using the checklist on EVD
- Maintain one meter distance during questioning at service provision points
- Do not allow visitors or relatives at the screening area
- Wear appropriate required PPE (standard) for the screening area

Holding/ isolation area

This is the area where patients are placed while awaiting transfer to the ETC.

- Every facility (health facility and Points of Entry) must have a temporary holding area
- It should be a separate room located near the screening area to ensure quick transfer of suspects and to minimize contact with other hospital patients
- All workers attending to patients at a holding room must be in full PPE
- The holding area should be:
 - ✓ Distant from other crowded areas
 - ✓ Well ventilated / adequate ventilation
 - ✓ Own sink and toilet facilities
 - ✓ Have adequate sunlight
 - ✓ Beds should be spaced at least one meter apart
 - ✓ Known to everyone in the facility

IPC practice in the health Facility

- Use appropriate PPE during patient management
- There should be Hand hygiene facilities (liquid soap, running water, elbow operated tap) in all areas of service provision in health facilities

- hygiene, safe sharp handling, HCWM, etc.)
- Use Ebola waste management principles for wastes generated at the holding/isolation area.
- Use safe and dignified burial principles for all Ebola associated deaths

At the Point of Entry

A. IPC measures for disembarking passengers arriving from affected countries.

- i. The Port Health Officers should adhere to infection prevention and control measures while handling arriving and transiting passengers from countries affected by EVD
- ii. Temperature screening should be conducted using hand held thermo scanner or walk through thermo scanner to prevent direct contact with the suspected travelers.
- iii. Investigate for the presence of other signs and symptoms (vomiting, diarrhea, bleeding, headaches, muscle aches, joint aches and weakness), among travelers with fever using a screening form at the designated special area or room
- iv. Maintain one-meter distance during temperature taking and interview
- v. If the traveler meets the criteria for suspected case of EVD, immediately isolate him/her and arrange for the case to be transferred to a designated treatment center outside the PoE, when confirmed.
- vi. Communicate with the designated ETC and relevant Authority

NB: Wear full PPE when handling suspected EVD case at temporary holding facility and apply other IPC measures.

B. IPC measures for International Conveyances with suspected case on board

1. Before the arrival of the conveyance the Port Health Officer should;
 - Separate the suspected case from other travelers;
 - Designate a toilet for the suspect if available;
 - Adhere to the Infection Prevention Control precautions during the discharge of his/her function.
2. If there are passengers/crews that have been reported to show signs and symptoms consistent with EVD, the Port Health Officer should; -
 - Mobilize a response team and the necessary PPE, decontaminants/disinfectants and other equipment
 - Notify staff and other stakeholders at the PoE to take necessary IPC measures.
 - Identify the possible evacuation routes;
 - i. At ground crossing; request and arrange for an area to evaluate the vehicle
 - ii. At port; request for a remote outer anchorage for the arriving vessel.
 - iii. At airport; request for a remote parking for the flight.

Evacuation routes of exit of the passengers/ crew from the conveyance

- Alert Port Authority for crowd management and alert other staff to avoid movement in the specified evacuation routes.
- Decontaminate the conveyance according to the manufacturer's instructions if the capacity is available, otherwise make arrangement for decontamination

C. IPC measures for disembarking passengers from conveyance with suspect case on board

Port Health Officer should: -

- Put on appropriate PPE
- Enter the conveyance to assess the position of the suspect and contacts to facilitate the disembarking.
- Request the travelers to disembark in groups (Other passengers, Contacts, Suspects cases) based on the convenience of the exit.
- Direct the groups to their identified evacuation routes

IPC measures during isolation and transfer of suspected cases to designate treatment center

If the suspected case meets the standard case definition for Ebola Virus Disease, the Port Health Officer should: -

- Move the traveler/crew immediately to a separate room/ temporary holding facility.
- Notify the District Medical Officer or isolation center immediately to transport and manage the ill traveler/ crew to the designated healthcare facility.
- Inform the Ministry of Health Headquarters (Port Health Services; Epidemiology and Diseases Control Section; and IHR Focal Point)
- Ensure the traveler/crew is not in direct physical contact with any persons, including clinical staff, until the ambulance team arrives.
- Administer care while wearing full PPE and apply other measures of IPC.
- Areas soiled with vomitus, diarrhea or bleeding should be decontaminated with 0.5% chlorine solution.
- Decontaminate all the linens, waste, surfaces, equipment and facilities that were in contact with the affected traveler/ crew.
- Ensure safe and proper disposal of the generated health care waste.
- Limit the number of PoE staff attending the case to those trained in handling such patients
-

NB: The holding room should have furniture which can be decontaminated

NOTE: For more information of handling and management of EVD suspected case at PoE refer: *Standard Operating Procedures for Screening and Management of Ebola Virus and Other Viral Haemorrhagic Fever Diseases at Points of Entry 2016*

Transportation of an Ebola Virus Disease Patient to ETC

A suspected case can potentially be a source of EVD transmission, therefore, appropriate IPC measures and PPE must be used while transporting potentially infectious or suspect patients.

- Every EVD suspected case must be transported to the designated treatment centre under supervision
- A designated ambulance that meets standards for EVD patients transport and can be easily decontaminated must be used
- Ambulance specifications for transporting an EVD patient
- Physical separation between the cockpit and the rear of the vehicle
- Rear of the vehicle long enough to transport a lying patient (don't use double cabin pick-up)
- Rear of the vehicle with a minimum of equipment to facilitate cleaning and disinfection.
- Avoid resuscitation equipment in the ambulance
- No metal surfaces unless covered and protected with washable Paint
- A vehicle used to transport patient should not be used to transport staff or equipment



- Transportation staffing
 - ✓ The ambulance escort must compose of a driver, nurse and IPC trained personnel
 - ✓ 1 nurse and 1 IPC trained personnel are needed always to accompany the patient safely.
 - ✓ The sole responsibility of the **driver** is to drive the vehicle, **DRIVERS SHOULD NOT ENGAGE IN PATIENT CARE ACTIVITIES**
 - A trained health worker with full PPE will help load the patient into the ambulance
 - A trained health worker in full PPE will stay with the patient at the rear of the vehicle.
 - If the patient cannot move alone, he will be transported in a stretcher by the stretcher-bearers in full PPE.

Arrival of Ambulance at the ETC

- ✓ Ambulance must enter the Ebola center via the **AMBULANCE ONLY GATE**
- ✓ The **team at the Ebola Treatment Center** will assist patient evacuation from the ambulance and **admit** the patient
- ✓ **The escorting team will remove the PPE** in the area dedicated to this purpose in the ETC
- Waste management
 - ✓ Trash bag will be placed in the ambulance (with the patient) and transported to be processed in the Ebola Treatment Center (ETC).
 - ✓ Material/Equipment apart from PPE used will be disinfected and placed in the 2nd vehicle (RRT vehicle or the 2nd ambulance.)
 - ✓ All items left at the back of the ambulance will be safely discarded by incineration (safe disposal) by the decontamination team at the ETC.
- Ambulance Decontamination
 - ✓ There must be designated site/area for ambulance decontamination and cleaning
 - ✓ Decontamination team of the ETC will clean and disinfect the ambulance
 - ✓ The driver is not responsible for decontamination of the ambulance

At the ETC

Healthcare worker safety relies on more than just putting on PPE. Physical engineering of ETC is another measure for workers safety. The ETC is physically designed to protect staff and patients. ETC setup is designated into two zones which are low risk zone (Green Zone) and a high risk zone (Red Zone). Separation of these zones ensure;

1. Appropriate Flow pattern at ETC
2. Use of IPC practice in the Facility
3. ETC Disinfection
4. Proper waste management at ETC

Use of IPC practice in the ETC

- All Staff in the low risk zone should be in scrubs and boots
- Gloves are not required in the low risk zone but should be used if touching potentially contaminated items like fence.
- Staff entering the high risk zone should be in full PPE
- ETC should be served with trained Health professionals only

ETC Disinfection

In ETC 2%, 0.5% and 0.05% chlorine solution are used for different purposes.

2% chlorine solution is used for:

- High spillages of blood, body fluids, excreta, vomitus;
- Liquid waste before disposal
- Corpses' bag

0.5% Chlorine solution is used for:

- Toilets and bathrooms
- Gloved hands
- Floors
- Beds and mattress covers
- Equipment

0.05% chlorine solution is used for;

- Bare hands and other skin
- Staff laundry
- Plates, cups, eating utensils

Antiseptics (e.g. Alcohol) used for:

- Wiping thermometer

Waste management at ETC

- All waste from the ETC high-risk zone should be treated as highly contaminated
- Waste must be safely collected, handled, transported, and disposed of appropriately
- Staff involved in the management of waste must wear high-risk/full PPE with additional protection for waste management

Discharge procedure

Patients who meet discharge criteria:

1. Patient should take bath with soap and water at the red/green interphase as they

2. All clothing must be disinfected by 0.05% chlorine solution, washed clean with soap and water and air dried or they should be provided with clean clothes
3. All other belongings that cannot be disinfected must be incinerated
4. Male patients should be supplied with Condoms for Safe Sex for at least 90 days or until their semen are tested negative twice
5. For previously blood PCR positive mothers, they should be advised not to breastfeed any child until their breast milk tests negative

8. ORGANIZATION OF ETC

ETC is physically designed to protect staff, patients and community in complement with other infection prevention and control practices. A well designed and organized ETC plays a great role in prevention of the spread of infections.

Selection of Site for EVD Treatment Centre

- The site should not be close to public institutions like school or offices, residential area, market etc, however, it should be accessible by the community
- Proximity of preferably less than 100 metres to an existing improved water source
- Accessible by road, especially for ambulances
- Area should allow expansion of the site if needed – a buffer zone at least 10 metres wide is needed

Community acceptance

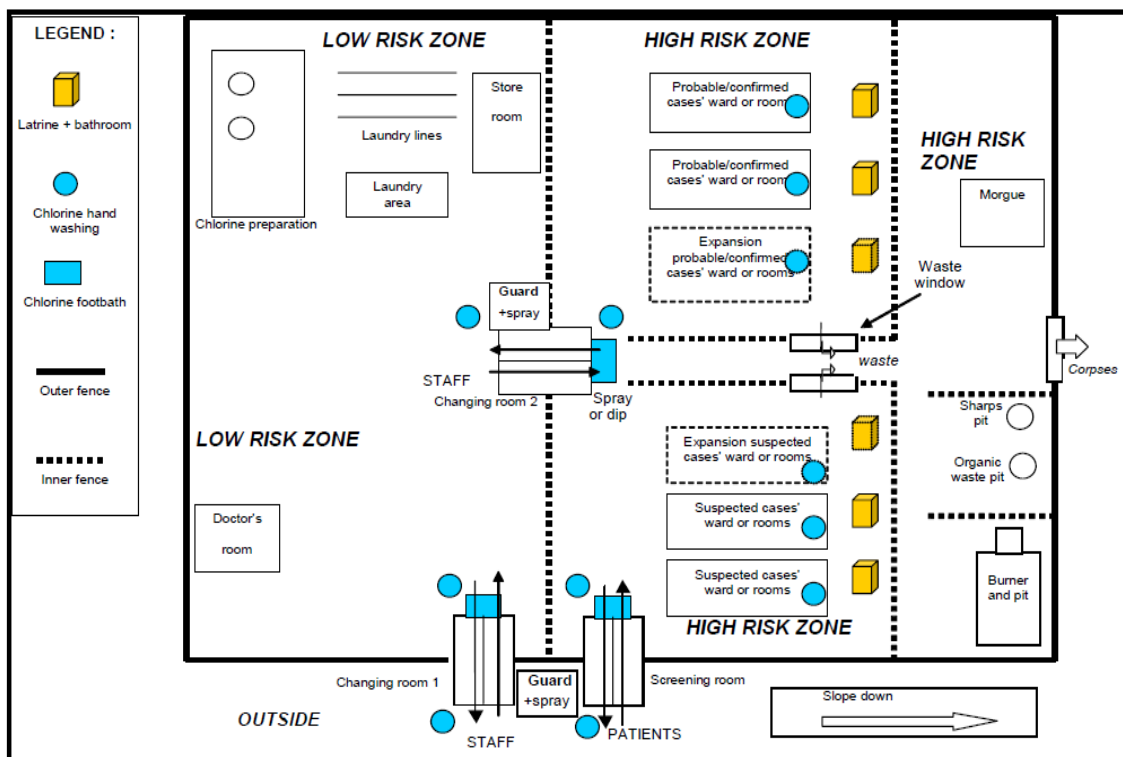
- Centre should be named “Ebola Treatment Unit/Centre” and not Isolation Centre
- Supply of consumables and other medical supplies must be adequate
- Environment should be kept clean and comfortable
- Maintain transparency
- Use low or mesh fences
- Place visitor access areas outside of, but close enough to, the ETC so visitors can talk to patients



Picture of one ETC in West Africa

Facility design can fit in above

- The ETC is designed to have two zones.
- These zones are green (low risk), the red (high risk)
- The low-risk and high-risk zones have a well-defined unidirectional flow and is surrounded by an outer fence
- There will be designated area outside/around the ETC to be accessible to family members
- Each of the two (High and low risk) zones have specific facilities and specific personnels
- The general landscape of the ETC should be such that the slope is from green zone towards red zone and hence, site gradient facilitates natural drainage from the green to red zone (there should be no flow of infected water/waste from red to green zone)
- Floor inside the ETC rooms should be graded, continuous, smooth, and washable.



Green zone/low risk zone

This zone is also known as a low risk zone, it is the area with low risk of disease transmission. It is the area for all activities that do not pose a risk of EVD transmission in the ETC.

- STAFF and authorized visitors allowed in this zone (Medical staff cleaning staff

- Staff must wear Scrub suits, boots (no gloves in general) when working at the green zone
- Main activities at this area are:
- Staff entry/exit between outside and ETC
- Changing areas for donning scrubs and/or PPE
- Staff laundry (scrubs) and drying area
- Pharmacy
- Chlorine solution preparation area
- Storage (PPE, disinfectants and cleaning supplies)
- Staff briefing room/office
- Administration
- Backup generator and water source
- Staff changing rooms (scrubs/boots)
- Canteen/ relaxation area
- If protocols are followed there is no potential for contamination



Red Zone/High risk Zone

This zone also known as High risk zone is the area with a very high risk of infections with confirmed and susceptible cases.

- High-risk zone should be physically separated from low-risk zone using double fencing or existing walls
- This is the main area for Care of patients with suspected and/ or confirmed Ebola virus disease

- Only patients and designated staff are allowed in this zone
- The high-risk zone is inside the low-risk zone (double fence)
- High-risk PPE should be worn by all staff entering this zone
- Patients are admitted in their own clothes
- Collection and processing of contaminated waste is done at this area
- Collection of patient specimens
- Lab testing may be done inside the ETC or at an outside facility
- Everything at this zone is considered to be contaminated (Buildings, cots, personal belongings, paperwork, patients, and exposed PPE worn by staff)
- High risk zone is divided into two areas (suspected patient area and a confirmed patient area) if there is space add a recovery area
- The two areas must be separated to reduce transmission among patients

ETC Arrangement

- Arrangement of beds in patient care areas should be at least 1 metre apart.
- Metal beds are strictly to be used due to easy decontamination
- Each patient in the ETC should be provided with disposable plate, cup, and utensils (spoon, fork). These should not be shared with others and should be disposed immediately after use
- Each patient should be provided with a bedpan and a bucket



Note: Beds in ETC should be metal and not made of wood. The distance between beds should be at least one (1) meter apart

Other Key Functional Areas of ETC

Green Zone

- Triage and screening area
- Nursing station
- Store/ Pharmacy
- Changing/dressing room
- Chlorine preparation area
- Area for donning PPE
- Staff laundry

Red Zone

- Decontamination area for Ambulance and Outer Staffs
- Laundry and drying area for patients' linen
- Incinerator/burning pit, ash pit,
- Morgue
- Doffing area

9. TRAFFIC FLOW AND ACTIVITY PATTERN

Movement of staff and patients should be from clean to more contaminated areas

Entering the ETC

- Suspect and confirmed cases enter directly into high risk zone from Triage area through one –way entrance
- Staff and authorised visitors enter the ETC through low risk zone using separate staff entrance

Leaving the ETC

- Discharged patients leave through dedicated one-way exit via discharge shower area (red/green zone interface)
- Staff and authorised visitors exit ETC from low-risk zone using separate staff exit via decontamination area

Movement within the ETC

- Only staff and authorized visitors enter low-risk zone,
- Patients are not allowed in green zone.
- One-way staff-only passage from low-risk zone to high-risk zone
- Staff don PPE in low-risk zone before moving to high-risk zone
- Separate one-way staff-only passage from high-risk zone back to low-risk zone
- Staff doff PPE before re-entering low-risk zone
- ü All patients are confined to high-risk zone
- Always staff should move from area with suspected cases to the area with confirmed cases and not vice versa
- Patients admitted to suspect area move to confirmed area ONLY if they have a positive lab test for Ebola virus
- Confirmed cases who test negative move to recovery room

Movement of relatives at ETC

- Relatives escorting the patient are not allowed to go beyond triage/screening area
- All relatives coming to ETC for visiting their patient are to stay at visitors bay
- Communication between relative and patient/staff should maintain at least one meter distance
- Movement within the green zone is restricted to one visitor at a time · Visitors are not allowed to enter the red zone

10.WASH AT ETC

WASH (water supply, sanitation, and hygiene) is essential for treatment and preventing the transmission and spread of Ebola.

Water

- The isolation/ETC should have reliable water source
- Maintain adequate water supply in the isolation/ ETC and carry out regular monitoring of water quality
- If the water systems installation is new, it should be handed over to the relevant local authorities, fully functional and maintained.
- Information about the system should be provided to the district water engineers including the borehole log, the blue print of the water network and the water equipment reference and maintenance log book

Water storage:

- The ETC/ isolation area should have adequate water storage tanks (e.g. plastic)
- There should be capacity and equipment (buckets) for preparation of chlorine solution to be used for various purpose in the ETC/ Isolation area (e.g., treating water in storage tank, hand-washing, cleaning waste Bins, etc.)
- Provide schedule for cleaning of water storage tanks and procedures o They should be cleaned with water and a detergent and then disinfected using a 0.5% chlorine solution very meticulously and thoroughly.
- o After cleaning and decontamination, the tanks and buckets may be reused.

Pumping devices at ETC/ isolation area:

- Equipment should be cleaned and maintained according to the manufacturer's maintenance procedures.
- Because of the high chlorination, the systems may be damaged (if pumping devices installed downstream of the chlorination system).
- Equipment that is to be returned to the government /community or donated should be inspected by a Water engineer prior to repurposing.

Pipe network at ETC/ isolation area:

- Pipe networks should also be disinfected with 0.5% chlorine.
- Pumping system or a temporary system should be used to flush the water network.
- The potential for pipe networks to be re-used may be limited. If the site is dismantled, the pipes may be removed to an approved dumping site or cleaned, disinfected and re- used.

In ETC WASH can be categorized as follows;

WASH at ETC environment

WASH infrastructure at ETC is crucial to ensure disease is not spread in the working environment, between patients and health care workers. This includes;

- Construction of septic tank
- Hand washing facilities e.g. running water from basin, sink, bucket and liquid soap
- Ensure adequate water supply treated with chlorine according to the purpose (0.05%, 0.5% or 2%)
- Storage and distribution of chlorinated water
- Latrines and showers with gender separation in both green and red zones to be washed by using 0.5% chlorine solution.
- Faecal and contaminated hard waste materials to be decontaminated using 2% chlorine solution.
- Disinfection of clinical equipment e.g. forceps, scissors using 0.5% chlorine solution
- Use 0.5% chlorine solution: for disinfection of the High Risk area, disinfection of objects coming from the High Risk Area (e.g. PPE and other items) .

WASH by Healthcare provider

- Ensure consistent safe water for sanitation and hygienic practices
- Use 0.05% chlorine solution for bare skin disinfection, laundry, food and drink utensils.
- Target daily chlorinated water supply of 70 litres/ person/day

WASH by Ebola patient

- Target daily chlorinated water supply for patients 50 litres/person/day
- Chlorinated water storage capacity allowing contingency for 3 days
- There should be individualized toilets, showers in suspect wards and shared toilets and showers in confirmed wards in the red zone
- Disposal of water from ETC should follow principles for disposal of liquid waste

11. PREPARATION OF DISINFECTANTS AND ANTISEPTICS

When preparing disinfectants and antiseptics, one should:

- Hand wash before and after each procedure
- Read the manufacturer's guide
- Have the dilution formula
- Measure the required amount of water, antiseptics and disinfectant

Preparing Dilute Chlorine Solutions from Liquid Bleach (Sodium Hypochlorite Solution)

- Chlorine in liquid bleach comes in different concentrations. Any concentration can be used to make a dilute chlorine solution by applying the following formula:
- Total parts (TP) of water = $\frac{(\% \text{ manufacturer concentrate}) - 1}{(\% \text{ desired dilute})}$

Example1:

- To make a 0.5% chlorine solution from 3.5% bleach
- Total Parts (TP) of water = $\frac{(\% \text{ manufacturer Concentrate}) - 1}{(\% \text{ desired dilute})}$
- $\frac{(3.5\%) - 1}{(0.5\%)} = 6.$
- Take 1 part concentrated solution, add 6 parts of water to make a 0.5% chlorine solution
- Example 2: Make a dilute solution (0.1%) from 5% concentrated solution
- Calculate TP (H₂O) = $\frac{(5.0\%) - 1}{(0.1\%)} = 50 - 1 = 49$
- Take 1 part concentrated solution and add to 49 parts boiled (filtered if necessary) water.

Making Chlorine Solution from Dry Powder

- Check concentration (% concentrate) of the powder you are using
- Determine grams of bleach powder needed
- Grams/Litre = $\frac{(\% \text{ Desired dilute}) \times 1000}{(\% \text{ Manufacturer concentrate})}$
- Mix measured amount of bleach powder with 1 litre of water
- Example: To make a 0.5% chlorine solution from calcium hypochlorite powder containing 35% active chlorine:
- $\frac{(0.5\%) \times 1000}{(35\%)} = 0.0143 \times 1000 = 14.3\text{g}$
- Therefore, you must dissolve 14.3 grams of calcium hypochlorite powder in one litre of water to get a 0.5% chlorine solution.
- Use plastic container to keep the content
- Store in a dry dark and cool place

- Ensure appropriate labelling on top of the plastic containers e.g. type of chemical, date of dilution and concentration.
- Ensure the container is well covered
- Don't top-up when refilling, wash the container and dry before refilling
- Ensure that the diluted content is used within seven days for antiseptics and 24 hours for disinfectants. (depends on the manufactures guide)

NB:

- Never mix disinfectants with antiseptics
- Never use antiseptics as disinfectants and vice versa
- **Display formulae** for making a dilute solution from concentrated solution and Formula for making chlorine solutions from dry powders and tablets

- **Preparation of chlorine solutions from tablet formulations**

- Using Chlorine-Releasing Tablets to get Chlorine Solutions:
 - ✓ Follow manufacturer's instructions since the percentage of active chlorines in these products varies.
 - ✓ To prepare the intended concentration, consult the pharmacist

Preparation of different Chlorine solutions from tablets formulations and examples of their uses

	Hand washing and cleaning of linen in Ebola Viral disease (EVD)	Surfaces, boots, beds, utensils and equipment contaminated with blood and other body fluids spills in of EVD (After cleaning)	Spills, excreta, in EVD
Concentration required, expressed in available chlorine	0.05% = 500 ppm	0.5% = 5000 ppm	2% = 20 000 ppm
NaDCC (1 g available chlorine/tablet)	1/2 tab/litre water	5 tab/litre water	20 tab/litre water
NaDCC- tablets (1.5 g of available chlorine/ tablet)	½ tab/litre	4 tablets/litre	16tabs/litter

NB: Chlorine tablets formulations are recommended for making chlorine solutions

Preparation of alcohol hand rubs:

1. Using alcohol and glycerine
 - a. Add glycerine to alcohol (2ml of glycerine in 100ml of 60–90% ethyl or isopropyl alcohol solution)
2. Using alcohol and hydrogen peroxide. Check below figure

PART A: GUIDE TO LOCAL PRODUCTION

Part A is intended to guide a local producer in the actual preparation of the formulation.

Materials required (small volume production)

REAGENTS FOR FORMULATION 1:	REAGENTS FOR FORMULATION 2:
<ul style="list-style-type: none"> • Ethanol 96% • Hydrogen peroxide 3% • Glycerol 98% • Sterile distilled or boiled cold water 	<ul style="list-style-type: none"> • Isopropyl alcohol 99.8% • Hydrogen peroxide 3% • Glycerol 98% • Sterile distilled or boiled cold water

- 10-litre glass or plastic bottles with screw-threaded stoppers (1), or
- 50-litre plastic tanks (preferably in polypropylene or high density polyethylene, translucent so as to see the liquid level) (2), or
- Stainless steel tanks with a capacity of 80–100 litres (for mixing without overflowing) (3 , 4)
- Wooden, plastic or metal paddles for mixing (5)
- Measuring cylinders and measuring jugs (6 , 7)
- Plastic or metal funnel
- 100 ml plastic bottles with leak-proof tops (8)
- 500 ml glass or plastic bottles with screw tops (8)
- An alcoholometer: the temperature scale is at the bottom and the ethanol concentration (percentage v/v) at the top (9 , 10 , 11)

NOTE

- Glycerol: used as humectant, but other emollients may be used for skin care, provided that they are cheap, widely available and miscible in water and alcohol and do not add to toxicity, or promote allergy.
- Hydrogen peroxide: used to inactivate contaminating bacterial spores in the solution and is not an active substance for hand antiseptics.
- Any further additive to both formulations should be clearly labelled and be non-toxic in case of accidental ingestion.
- A colorant may be added to allow differentiation from other fluids, but should not add to toxicity, promote allergy, or interfere with antimicrobial properties. The addition of perfumes or dyes is not recommended due to risk of allergic reactions.



Figure 1. Part A. Guide to local production

METHOD: 10-LITRE PREPARATIONS

These can be prepared in 10-litre glass or plastic bottles with screw-threaded stoppers.

Recommended amounts of products:

FORMULATION 1:

- Ethanol 96%: **8333 ml**
- Hydrogen peroxide 3%: **417 ml**
- Glycerol 98%: **145 ml**

FORMULATION 2:

- Isopropyl alcohol 99.8%: **7515 ml**
- Hydrogen peroxide 3%: **417 ml**
- Glycerol 98%: **145 ml**

Final products:

FORMULATION 1:

- Final concentrations:
- Ethanol 80% (v/v)
 - Glycerol 1.45% (v/v)
 - Hydrogen peroxide 0.125% (v/v)

FORMULATION 2:

- Final concentrations:
- Isopropyl alcohol 75% (v/v)
 - Glycerol 1.45% (v/v)
 - Hydrogen peroxide 0.125% (v/v)

Step by step preparation:



1. The alcohol for the formula to be used is poured into the large bottle or tank up to the graduated mark.



2. Hydrogen peroxide is added using the measuring cylinder.



3. Glycerol is added using a measuring cylinder. As glycerol is very viscous and sticks to the wall of the measuring cylinder, it should be rinsed with some sterile distilled or cold boiled water and then emptied into the bottle/tank.



4. The bottle/tank is then topped up to the 10-litre mark with sterile distilled or cold boiled water.
5. The lid or the screw cap is placed on the tank/bottle as soon as possible after preparation, in order to prevent evaporation.



6. The solution is mixed by shaking gently where appropriate or by using a paddle.



7. Immediately divide up the solution into its final containers (e.g. 500 or 100 ml plastic bottles), and place the bottles in quarantine for 72 hours before use. This allows time for any spores present in the alcohol or the new/re-used bottles to be destroyed.

Quality control

1. Pre-production analysis should be made every time an analysis certificate is not available to guarantee the titration of alcohol (i.e. local production). Verify the alcohol concentration with the alcoholmeter and make the necessary adjustments in volume in the preparation formulation to obtain the final recommended concentration.



2. Post-production analysis is mandatory if either ethanol or an isopropanol solution is used. Use the alcoholmeter to control the alcohol concentration of the final use solution. The accepted limits should be fixed to $\pm 5\%$ of the target concentration (75%–85% for ethanol).



3. The alcoholmeter shown in this information pamphlet is for use with ethanol; if used to control an isopropanol solution, a 75% solution will show 77% ($\pm 1\%$) on the scale at 25°C.

12. DECONTAMINATION

When performing decontamination activities, decontamination team should wear FULL PPE.

Application of disinfectants should be preceded by cleaning to prevent inactivation of disinfectants by organic matter. All environmental surfaces (including furniture, walls, doors, etc.) or objects should be cleaned with water and detergent and then disinfected using 0.5% chlorine solution. After contact time (10 – 20min.) is reached rinse with clean water.

Levels of Decontamination

Cleaning	<p>The physical removal of body materials, dust or foreign material. Cleaning will reduce the number of microorganisms as well as the soil, therefore allowing better contact with the surface being disinfected or sterilized and reducing the risk of soil being fixed to the surface.</p> <p>Removal of soil will reduce also the risk of inactivation of a chemical disinfectant and the multiplication of microorganisms. The removal of contamination from an item to the extent necessary for further processing or for intended use.</p> <p>Cleaning is accomplished by manual cleaning with cleaning chemicals (detergent) and water, brushing or flushing, or by using ultrasonic and or washer disinfectors to remove foreign material.</p>
Disinfection	<p>The destruction or removal of microorganisms at a level that is not harmful to health and safe to handle. This process does not necessarily include the destruction of bacterial spores.</p> <p>General disinfection is accomplished by wiping surfaces with disinfectant solution.</p>
High Level Disinfection	<p>A process that eliminates all microorganisms except some bacterial endospores from inanimate objects. Processes include boiling, steaming or the use of chemical disinfectants.</p>
Sterilization	<p>The complete destruction or removal of microorganisms, including bacterial spores. Sterilization validated process used to render a product free from viable microorganisms.</p> <p>Processes include high-pressure steam (autoclave), dry heat, chemical sterilant or radiation (UV-light).</p>

PROCESSING INSTRUMENTS AND OTHER ITEMS

Clean with enzymatic detergent

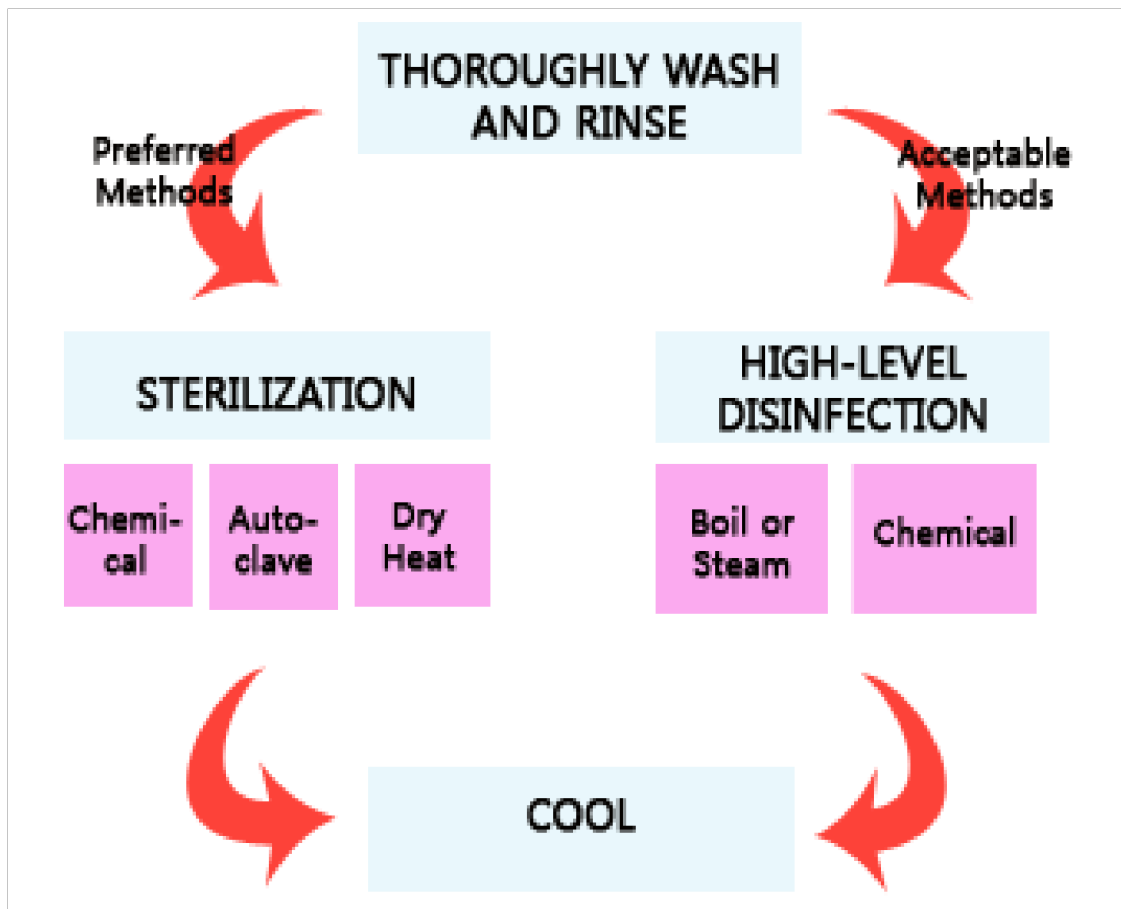
Sterilization

- Chemical: soak in 0.3% ortho-phthalaldehyde (Cidex OPA) for 12 minutes
 - Autoclave: 106 KPA (15 lbs /msq) 121 centigrade (250 F) for 20 Minutes if unwrapped or 30 min if wrapped
- Dry heat: 170⁰ C for 60 minutes

High-Level Disinfection

Boil or steam:

- Boil or steam heat for 20 minutes



Prior to cleaning and disinfection:

- Visually inspect surfaces for sign of wear and tear, decay or overall disrepair (e.g. mattresses, furniture, equipment)
- Safely dispose and incinerate or clean and disinfect all non-intact objects/equipment if still needed for future use
- Safely dispose and incinerate all objects/equipment made of porous/ absorbable material (e.g. linen)
- Surfaces that are intact and can withstand rigorous cleaning may undergo cleaning and disinfection

Decontamination of instrument,

- Use disposable equipment where possible
- If not, rigorously use dedicated equipment
- If not, carefully decontaminate between patients
- Clean equipment
 - At least daily
 - When soiled
 - Upon leaving isolation area
 - After patient discharge

Instructions for cleaning medical equipment:

- Wear full PPE as per Ministry of Health recommendations
- Clean with soap and water to remove any organic matter
- Continue with sterilization or high-level disinfection
- For HLD (High level disinfection/decontamination) prepare appropriate disinfectants (e.g. 0.5% available chlorine solution for equipment or alcohol as per manufacturer's instructions) · Rinse with clean water.
- All water used for cleaning must be considered as infectious waste

Decontamination of surfaces:

- Clean first if there is visible soil
- Should be done as soon as possible
- Use standard hospital disinfectants (e.g. 0.5% chlorine solution)
- Use full recommended PPE as per MoH

Decontamination of PPE (Gum boots, Apron, Goggles/face shield)

- Do not recycle any single use PPE,
- If necessary for re-usable ones disinfect face shield, goggles, apron, boots
- Wear appropriate PPE
- Prepare 0.5% available chlorine solution daily, indicating date and time on container
- Immerse all instruments and other re-usable PPEs separately(sorted) in a container with 0.5% chlorine solution for between 10minutes
- Remove all items after 10 minutes and transfer into a basin containing

- Clean/Wash instruments/PPEs thoroughly with brush/sponge under water in the basin or sink
- Rinse thoroughly with water and air dry or clean with clean towel
- **NB:** Used cleaning materials are infectious waste · Discard all used disinfection solution in a drain

DISINFECTION OF REUSABLE SUPPLIES AND EQUIPMENT

Disinfection kills almost all pathogens. It reduces the number of microorganisms to make equipment and surfaces safer for use. When EVD is suspected in the health facility, all medical, nursing, laboratory and cleaning staff should disinfect:

- Hands and skin after contact with EVD patient or infectious body fluids
- Gloved hands after contact with each EVD patient or after contact with infectious body fluids (when gloves cannot be changed)
- Thermometers and other medical instruments after use with each EVD patient
- Spills of infectious body fluids on the walls and floors
- Patient excreta and containers contaminated by patient excreta
- Reusable supplies such as protective clothing and patient bedding

Note: All health facility staff — including cleaning, waste disposal, and laundry staff who handle, disinfect, or clean EVD-contaminated supplies and equipment should wear Full PPE.

Wear thick gloves for the second pair of gloves. Follow the steps for putting on and taking off PPE.

Gloved Hands between Patients

To disinfect gloved hands between patients:

- Place a bucket of 0.5% chlorine solution in the isolation room.
- If gloved hands are visibly soiled, wash them first in soap and water (0.5% chlorine solution)
- Dry the gloved hands with a one-use (paper) towel, or let the gloved hands air-dry.
- Always there should be chlorine solution for disinfection
- After several rinses in chlorine solution, the gloves may become sticky and will need to be changed.
- If gloves are reusable (only utility gloves), place gloves in a bucket of 0.5% chlorine solution.
- If gloves are not going to be reused, discard them in the container for disposable infectious waste.

Note: outer gloves are cleaned, disinfected and changed in between patients in suspect wards. In confirm ward, the outer gloves are cleaned, disinfected dried and reused between patients.

Cleaning and disinfection of utility gloves for re-use:

- Wear PPE (heavy duty gloves, gown, reusable apron, gum boots, face shield and mask)
- Take the bucket with soaked utility gloves to the EVD laundry area.
- Carefully move the gloves to a bucket with fresh soapy water
- Gently rub the gloves to remove visible soiling and cover with water.
- Soak them for minimum 30 minutes in a bucket of 0.5% chlorine solution.
- Check for holes, fill each glove with rinse water. If any water squirts out, there is a hole in the glove.
- Discard any gloves with holes.
- Air-dry the remaining gloves.
- If available, put talcum powder in dry gloves.
- Return clean utility gloves to the storage shelf in the entry to the isolation area.

Disinfection of thermometers with alcohol solution

In the isolation room, each time health care workers disinfect their hands, they should also disinfect thermometers they have used to examine the patient. Thermo scanners must be used in EVD set up.

- Disinfect thermometers by rubbing with alcohol (70% -90% isopropyl).
- Place the alcohol in a covered container and put it in the patient's room.
- Use a clean cloth or paper towel and squeeze/pour the alcohol solution on it.
- Carefully wipe the thermometer with the cloth around it for 30 seconds.
- Discard the cloth. Allow the thermometer to air-dry.

Disinfection of Bedpan or Waste Bucket

- Cover the contents with 2% chlorine solution.
- Empty the bedpan contents directly into the isolated toilet or latrine.
- Clean the bedpan with soap and water to remove solid waste.
- Pour into toilet or latrine while looking away and cautiously to avoid splashes.
- Clean and put the bedpan in 0.5% chlorine solution for 10min
- Wipe with clean water after 10min
- Return it to patient's room.

Cleaning and Disinfection of Apron

- Clean with water to remove visible soil
- The re-usable apron should be put in 0.5% chlorine solution in a container at least for 10min
- Rinse with water and let it air dry

Cleaning and Disinfection of gum boots

- Place a pan with 0.5% chlorine solution at the exit of the patient's room
· Change the pan often.
- Step into a shallow pan containing 0.5% chlorine solution and wipe boots on chlorine -soaked cloth.

Note: The soles of gum boots are difficult to clean because they are textured. Disinfect them carefully and make sure to reach all surfaces of the textured soles. Gumboots must be sent to laundry for further cleaning and disinfection before reuse

Cleaning and Disinfection of Patient's bedding

For plastic sheeting:

- If the plastic sheeting becomes soiled during its use with the same patient, remove liquid or solid waste with absorbent towels.
- Discard them in the infectious waste container for burning.
- Change the plastic sheeting between patients in suspect ward.
- Plastic sheeting should be cleaned, disinfected and reused in confirmed ward

Mattresses:

- All mattresses used in ETC should be covered with impermeable leather
- If a mattress is heavily soiled, remove it from the isolation area to the outdoors for cleaning and disinfection
- Burn the mattress if heavily soiled and permeable.

Note: Make sure health facility staff wear full PPE when touching and carrying the soiled mattress.

Decontamination of Latrine/Septic tank

- Septic tanks for waste water should be designed to hold waste water for as long as possible.
- A septic tank or latrine that was specifically built for EVD care centre, should be decommissioned
- Treat onsite septic tank with 0.5% chlorine solution
- For latrine used for an EVD facility and is less than 2/3 full should be cleaned and decontaminated with 0.5% chlorine solution.
- A latrine that has been used for an EVD facility and is more than 2/3 full should be decontaminated and closed. A new latrine will need to be built according to the national standards.
- If there is no space to build new latrine, desludging of the latrine should be considered and carried out according to the national policy.

- In a public area, closed pits must be sealed with concrete slabs for safety reasons otherwise pits should be marked with clear signage
- Standard procedures for handling waste water are recommended,

Final steps to reopen or repurpose the isolation/ETC facility

- If a burning pit is used, it should be closed with cement when all procedures are concluded
- Once the cleaning and disinfection has been completed, the District health officer will validate that surfaces have been properly cleaned and disinfected using a specific checklist.
- The facility should be inspected by the CHMT who will assume responsibility for the repurposed structure
- Once it is satisfied to be safe, the facility may be operated as a non-Ebola facility e.g. school; general hospital, etc.

DECONTAMINATION OF THE AMBULANCE

All surfaces of ambulances should always be first sprayed with 0.5% chlorine solution and left for 10 minutes. Then start washing as follows

Staff involved	2 washers
Materials required	PPE: full appropriate PPE (face shield, low risk apron and rubber gloves) Items: buckets, brush, broom, sprayers
Safety	The chlorine is corrosive.
Protocol for decontamination	
1	Driver: Ambulance arrives in Ambulance bay and park backward
2	Driver: stop the engine and stay inside the ambulance (or exit by the “safe zone” of the Red Zone and rest in the Green Zone area
3	Spray handles of the back doors using 0.5% Chlorine Solution wearing appropriate full PPE
4	Open back-doors of ambulance
5	Spray the handles of the handle stretcher
6	Take the handle stretcher out of the ambulance
7	Spray the handle stretcher entirely. Let it dry outside under the sun preferably

8	Spray the ambulance starting from outside to inside (inside of doors, walls, floor, not the ceiling, to avoid drops falling on the head of the staff in PPE)
9	Check if there is any body fluid and treat appropriately according to separate procedure.
10	Spray any waste inside ambulance
11	Place the waste in red garbage bag
12	Spray the wheels stretcher. Focus on the wheels, belts and small parts
13	Spray thoroughly the entire inside of the ambulance starting from inside to outside from far to near (including ceiling, walls, wheels stretcher, floor, inside of doors)
14	Check if any body fluids are remaining on the handle stretcher and treat appropriately according to the procedure (with the adsorbent pad)
15	Spray backside and 2 sides of ambulance
16	Spray the area where the decontamination has taken place
17	Both washers: With brooms, brushes, water and soap, wash inside and outside the ambulance.
18	Both washers: Rinse all the vehicle (inside and outside) with plain water
19	When rinsing is completed, the driver is asked to drive out of the car wash and go for parking out of washing area and let the car to dry

Decontamination Team

The decontamination team should consist of the following:

- The decontamination team is composed of at least six persons, two environmental health officers, (one of them being the Team Leader (TL) for the intervention), two sprayers, 1 psychologist/social worker, one communicator, and one driver

- All personnel should be trained in donning and doffing (putting on and taking off) techniques for personnel protective equipment (PPE).

13. MANAGEMENT OF LINEN

- Linen that has been used on patients can be heavily soiled with body fluids (e.g. blood, vomit) and may contaminate the handler during replacement.
- When handling soiled linen from patients, staff should use the full set of PPEs.
- Handle with minimum agitation to avoid contamination of:
 - Surfaces
 - Persons
- Apply reduced or minimal contacts with soiled linen
- Transport linen in covered containers or closed bags
- Use leak-resistant containers for all linens
- Always carry linen away from body
- Place soiled linen in clearly-labelled, leak-proof bags or buckets at the site of use
- Container surfaces should be disinfected before removal from the isolation room/area. If there is any solid excrement such as faeces or vomitus, scrape off carefully using a flat firm object and flush it down the toilet or in the sluice before linen is placed in its container.
- Disinfect linen with 0.05% chlorine solution. If the linen is transported out of the patient room/area, it should be put in a separate container – it should never be carried against the body
- Linen should be transported directly to the laundry area and laundered promptly
- All wards/units should have separate linen bags for used and soiled linen

NB: ETC managers and supervisors should ensure there are adequate supplies of linen for use

Laundering

Use machines if available

- Wash linen with detergent and water
- Rinse
- Soak in 0.05% chlorine solution for approximately 10 minutes
- Wash with detergent and water, rinse and then dry
- Disinfection and laundry of patients linen/ clothes in red zone

Linen Transport

- The bags should be appropriately labelled e.g., dirty linen and soiled linen

- Place in another waste bag held by person and disinfect the outside surfaces
- Transport directly to the laundry room in dedicated cart – Closed container (tied bag or bucket with lid)
 - Leak proof containers
 - Do not mix with other laundry
 - Do not pre-sort
 - Launder promptly

Sorting and Laundering

- It may be prudent to place laundry immediately in 0.05% chlorine solution prior to sorting or handling and soak to decrease the risk to laundry handlers.
- Organic matter (blood and body fluids, excretions and secretions) can prevent disinfection fully occurring so after soaking linen is still considered contaminated
- PPE as described should be worn for the laundering process
- Laundering should follow standard precautions

Drying, storage and transporting of cleaned linen

- Completely air or machine dry before further processing
- Air dry in direct sunlight is preferred, keeping the linen off the ground
- Clean and dry linen should be ironed and folded
- Cleaned linen should be handled as little as possible and stored in a covered container/covered area
- Cleaned linen should be transported in cart/container that is covered

Handling of Staff linen

- Do not mix staff linen with patient linen
- Do not carry/transport staff linen in the same carts with patient linen
- Staff linen should be processed in different location with a different machine

14. HOUSE KEEPING OF ETC

Wear a full set of PPE and heavy duty/rubber gloves.

SPILL MANAGEMENT

Cleaning process

- Clean and disinfect as soon as possible using standard hospital detergents / disinfectants (e.g. a 0.5% chlorine solution)
- Application of disinfectants should be preceded by cleaning to prevent inactivation of disinfectants by organic matter.
- Change cleaning solutions and refresh equipment frequently while being used during the day, as they will quickly become contaminated.
- Clean floors and horizontal work surfaces at least once a day with clean water and detergent.
- Cleaning with a moistened cloth helps to avoid contaminating the air and other surfaces with air-borne particles. Allow surfaces to dry naturally before using them again.
- Dry sweeping with a broom should never be done. Rags holding dust should not be shaken out and surfaces should not be cleaned with dry rags.
- Cleaning should always be carried out from “clean” areas to “dirty” areas, to avoid contaminant transfer.
- Concentrate on high touch areas like door handles, taps’ cocks, electrical switches, etc.
- WHO discourages spraying occupied or unoccupied clinical areas with disinfectant
- Furthermore, excessive use of spraying creates a wet environment, which is not only inconvenient but may be dangerous as it is slippery and takes longer to dry, especially in a humid environment.

Note: In the context of VHF outbreaks, spraying may be accepted outdoors and in some community settings (e.g. decontamination of EVD victims’ households by a burial team) as the only feasible option. It may be considered also when disinfecting sand or gravel floors. In conclusion, considering its limitations, spraying should be used with caution, and the spraying of people wearing PPE or street clothes and for the routine disinfection of rooms is not recommended. If spraying chlorine solutions is utilized, staff should still maintain maximum attention while manipulating organic material, touching contaminated surfaces, and removing PPE, because the Ebola virus may still contaminate these even after being sprayed.

Managing surfaces spillage

Action	Rationale
Put on full PPE as per EVD	To protect against risk of contamination
Cover spill with disposable, absorbent paper towels	To prevent further handling by others and risk of contamination
Collect the spill together with the absorbent.	To discard the spills into infectious waste (Put 2% and discard).
Wipe with disposable paper towel or cloth to soak up most the spill.	To minimize spread of infection
Mop with 0.5% chlorine solution on the floor surface as promptly as possible and leave for 10 minutes.	For disinfection of the floor
Dry the area by using disposable cloth	To leave the place clean and non-slippery
Discard non-reusable materials into appropriate waste bag.	To prevent risk of contamination
Remove protective equipment and discard in waste bag.	To prevent risk of transmission
Wash hands thoroughly	To prevent transmission of infection

15. FOOD AND FOOD UTENSILS MANAGEMENT

- Wash hands with soap before and after handling food
- Wash hands with soap between handling raw food and cooked or ready-to-eat food
- Keep raw meat separated always from cooked or ready-to-eat foods
- Keep utensils and surfaces used to prepare raw meats separated always from those used for other foods (e.g. chopping boards, knives and plates)
- Promptly wash with soap and disinfecting all surfaces and utensils that have been in contact with raw meat.
- Food should be served using disposable utensils
- Food utensils coming from home once entered ETC should not be returned home; rather be incinerated. Use disposable utensils
- Use 0.05% chlorine solution and soap and water to wash the patient's eating utensils if non-disposable utensils are used.
- Leave the utensils to air-dry.
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16. INJECTION SAFETY AND SHARPS MANAGEMENT

Eliminating unnecessary injections is the highest priority towards preventing injection-associated infections. Appropriate handling and disposal of sharps should be utmost concern to all healthcare workers.

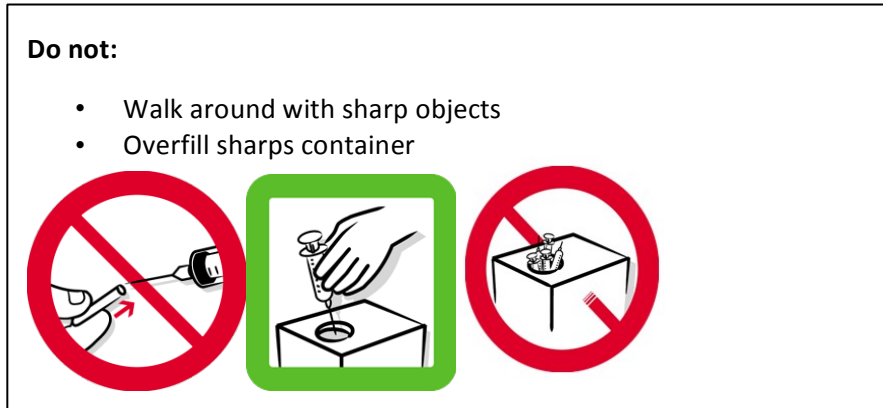
- Inspect packaging for breaches in barrier integrity, and discard a needle or syringe if the package has been punctured, torn or damaged by exposure to moisture
- Be careful when handling, using, cleaning, and disposing off needles, scalpels, and other sharps.
- Limit the use of needles or other sharps as much as possible
- Use a sterile syringe and needle for each injection and to reconstitute each unit of medication;
- Keep the sharps container as close to the point of care as possible
- Do not bend, break, or otherwise manipulate used needles, scalpels, or other sharp instruments
- Do not recap needles
- Discard single-use needles and syringes immediately after use and dispose directly into the sharp container
- Do not pass needles and other sharps directly to another person.
- Use hand free technique/neutral zone technique to pass on sharp instruments to another person if it must be done at all costs.

Prevent Contamination of Injection Equipment and Medication

- Prepare each injection in green zone where blood or body fluid contamination is unlikely;
- Use single dose vials rather than multi-dose vials;
- Select pop-open ampoules rather than ampoules that require the use of a metal file to open them;
- Inspect medications for visible contamination or breaches of integrity (e.g., cracks, leaks); if any are found, discard the medication;
- Discard a needle that has touched any non-sterile surface.

Prevent Needle-Stick Injuries to Healthcare Providers

- Anticipate and take measures to prevent sudden patient movement during and after injection;
- Avoid recapping and other hand manipulations of needles;
- Collect used syringes and needles at a point of use in a sharps container that is puncture and leak-proof and should be sealed when 3/4 full.



Prevent Access to Used Needles

- Seal sharps containers for transport to a secure area in preparation for disposal. After closing and sealing sharps containers, do not open, empty, reuse, or sell them;
- Manage sharps waste in an efficient, safe, environment-friendly way to protect people from voluntary and accidental exposure to used injection equipment.
- Send sharps containers for incineration when they are $\frac{3}{4}$ full.

Needle-Stick Injuries

- In case of injury, Immediately and safely stop any current task
- Leave the patient care area
- Safely and carefully remove PPE
- Wash the affected skin surfaces or percutaneous injury site with soap and water
- Follow the standard PEP protocols

17. SAFE SAMPLE HANDLING

Collecting specimens for Ebola testing

- Assemble the equipment for collecting blood and ensure that all specimen containers and materials are available
- Ensure a designated assistant wears gloves and should be available for receiving the collected sample
- Label the collection containers appropriately and include three unique patient identifiers – name, age and unique identification number
- Put on full EVD PPE
- Collect the blood sample from patient
- Specimens should be obtained when a patient meets the criteria for suspected or confirmed cases
- Follow necessary protective precautions when collecting samples including full PPE.
- For adults, a minimum volume of 4 mL whole blood is preferable. For pediatric samples, a minimum of 1 mL whole blood should be collected in pediatric-sized collection tubes. Blood must be collected in a plastic EDTA collection tubes.
- Do not transport or ship specimens in glass containers or in heparinized tubes.
- Whole blood preserved with EDTA is preferred, but whole blood preserved with sodium polyanethol sulfonate, citrate or with clot activator is also acceptable.
- DO NOT separate and remove serum or plasma from the primary collection container.

Specimens should be packaged (triple packaging) and transported at 2°–8°C with cold-packs to the final testing destination.

Storing Clinical Specimens for Ebola Testing

If necessary, short-term storage of specimens before shipping should be at 4°C or frozen.

Transporting Samples within the Facility

- PPE to be worn during transport within the facility should be determined by a site-specific risk assessment, and may vary among facilities.
- Recommendations for PPE include disposable fluid-resistant closed lab coat, disposable gloves, covered legs and closed-toed

- Before removing patient specimens from the site of care, it is advisable to plan the route of the sample from the patient area to the location where it will be packed for shipping to avoid high traffic areas.
- Before removing patient specimens from the site of care, the outside of the specimen containers should be decontaminated with an approved 0.5% Chlorine solution
- The personnel responsible for the shipment of the infectious substance should be well trained
- After placing in a secondary container, specimens should be hand-carried to the laboratory or packing area. DO NOT use any pneumatic tube system (automated or vacuum specimen delivery system) for transporting specimens.

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Transporting Samples for EVD Testing from Sites to Reference laboratory

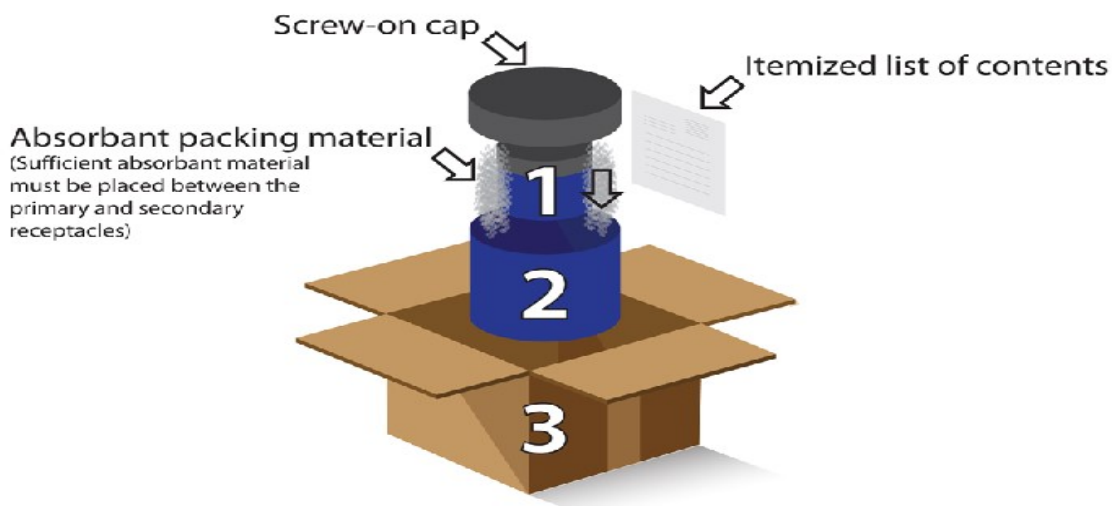
- Samples from patients that are suspected of or confirmed to have EVD should be packaged and shipped as Category A infectious substances
- All persons packing and shipping infectious substances must be well trained.
- Specimens collected for Ebola virus testing should be packed and shipped without attempting to open collection tubes or aliquot specimens.
- Opening the tubes destroys the vacuum seal and thus increases the risk of leakage during transport.
- Specimens for transportation should be packaged following the basic triple packaging system,

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Basic triple packaging system

- Assemble the packing container and record the required information
 - a primary container (a transparent, sealable specimen container) wrapped with absorbent material,
 - a secondary container (watertight, leak-proof)
 - An outer transporting packages.
 - Collector or cold box
- The assistant will receive the collected specimen into a secondary container after the outside of the primary container has been decontaminated
- The assistant will help in packing the specimen into transportation

Packing and Shipping Clinical Specimens for Confirmation at Reference laboratory



1. Primary receptacle (leakproof, 95kPa)
2. Secondary receptacle (leakproof)
3. Outer container (w/list of itemized contents)

Packaging Diagram

Steps for transportation of specimen

The following steps should be followed by persons who will ship specimen to reference laboratory

- Contact reference laboratory staff prior to shipment.
- Email Specimen submission form to the Contact reference laboratory
- Ship to: (write clear address of reference laboratory)

Diagnostic Testing for Ebola Virus

- The testing will be performed at BSL 3 laboratory by competent personnel.
- Molecular Detection of nucleic acid will be performed by using Real-time PCR to detect Ebola virus.
- The virus antigen will be detected by ELISA
- Laboratory confirmation of EVD infection can be achieved by testing for specific IgM and IgG antibodies.

Disposal of the collected sample

All sample collected should be autoclaved and disposed or stored appropriate for further investigation

- After confirmation of results the remaining sample should be autoclaved
- Put the autoclaved samples into biohazard bags and then incinerate them
- If there is a need un-autoclaved sample can be stored for future use

17. INFECTION PREVENTION FOR CATHETERIZATION OF EVD PATIENT

- Placement of an indwelling catheter should be performed only when there is absolute need. Wear full PPE before the procedure
- Condom catheter may be more appropriate
- Hand hygiene should be done immediately before and after any manipulation of the catheter site or apparatus.
- Catheters should be inserted using aseptic technique and sterile equipment.
- Gloves, drapes, sponges, an appropriate antiseptic solution for peri-urethral cleaning, and a single-use packet of lubricant jelly should be used for insertion.
- Indwelling catheters should be properly secured after insertion to prevent movement and urethral traction.
- The catheter collection system should remain closed and not be opened unless absolutely necessary for diagnostic or therapeutic reasons.
- If breaks in aseptic technique, disconnection, or leakage occur, the catheter and collecting system should be replaced using aseptic technique and sterile equipment.
- If small volumes of fresh urine are needed for examination, the distal end of the catheter, or preferably the sampling port if present, should be cleansed with a disinfectant, and urine then aspirated with a sterile needle and syringe.
- Un-obstructed flow should be maintained.
- The catheter and collecting tube should be kept free from kinking. Collecting bags should always be kept below the level of the bladder.
- Do not rest the collecting bag on the floor.
- Indwelling catheters should not be changed at arbitrary fixed intervals.

Peripheral inserted intravascular catheter / intravenous line

- A competent trained staff should insert the Peripheral Venous Catheters (PVC)
- Wear full PPE as recommended for EVD
- Sterile gloves should be worn for the insertion
- Select the catheter, insertion technique, and insertion site with the lowest risk for complications for the anticipated type and duration of IV therapy

- Inserted site should be covered with semipermeable transparent dressing materials
- Do not replace peripheral intravascular catheters routinely unless there is infection or other complications.
- Replace peripheral venous catheters if there is sign or risk of infection and phlebitis in adults.
- Leave peripheral venous catheters in place in children until IV therapy is completed, unless complications (e.g: phlebitis and infiltration) occur
- Record date and site of insertion in the patient note kept at the low risk area

19. INFECTION PREVENTION FOR INTRAVASCULAR DEVICE

NOTE: Procedures involving the insertion of arterial, central, and midline catheters, intubation, dialysis or any other invasive procedures are not recommended in the EVD cases. If the need arises for invasive procedures, the following procedure are under taken.

Aseptic technique during catheter insertion and care

- Wear full PPE as recommended for EVD
- Sterile gloves should be worn for the insertion of arterial, central, and midline catheters.
- Maintain aseptic technique for the insertion and care of intravascular catheters.
- Change the dressing on intravascular catheters using aseptic technique.
- Use Sterile sheet for the insertion of Central venous catheter (CVCs, including peripherally inserted central catheter- [PICC]) or guidewire exchange.

Catheter Site Dressing Regimens

- Use either sterile gauze or sterile transparent gauze or semipermeable dressing to cover the catheter site.
- Replace the catheter site dressing if the dressing becomes damp, loosened, or visibly soiled.
- Replace dressings used on short-term CVC sites every 2 days for gauze dressings.
- Replace dressings used on short-term CVC sites at least every 7 days for transparent dressings, except in those paediatric patients in which the risk for dislodging the catheter may outweigh the benefit of changing the dressing.
- Monitor the catheter sites visually through the intact dressing on a regular basis, depending on the clinical situation of individual patients.
- Ask If patients have tenderness at the insertion site, fever without obvious reasons, or other manifestations suggesting local or BSI (Blood Stream infections),
- Transparent Dressing should be used to allow thorough examination of the site.

Prevention of Catheter Related Blood Stream Infections (CRBSI)

- Select the catheter, insertion technique, and insertion site with the lowest risk for complications for the anticipated type and duration of IV therapy.

- Avoid using the femoral vein for central venous access in adult patients.
- Use a subclavian, rather than a jugular or a femoral site, in adult patients to minimize infection risk for non-tunneled CVC placement.
- Promptly remove any intravascular catheter that is no longer essential.
- Do not replace central venous or arterial catheters routinely unless there is infection or other complication.
- Replace peripheral venous catheters if there is sign or risk of infection and phlebitis in adults.
- Leave peripheral venous catheters in place in children until IV therapy is completed, unless complications (e.g. phlebitis and infiltration) occur

20. INFECTION PREVENTION FOR WOUND MANAGEMENT

- Sterile technique should be applied during wound dressing.
- Arrange required equipment needed for wound dressing including appropriate antiseptic into the galipot.
- Wear full EVD PPE
- Assess the client condition,
- Inform the patient about the procedure
- Bring trolley to the patient's bedside at least one meter apart
- Ask the patient to position comfortably and expose old dressings, if the patient is unable, assist him/her to position and expose the old dressings
- Soak gloved hand in 0.5% chlorine solution and dry/use alcohol hand rub (if patient assisted to position and expose the old dressing)
- Open the dressing pack, and create a sterile working field by spreading the sterile towel under the dressing site
- Remove old dressing by loosening the adhesive tapes gently, if dressings are sticky, wet them with normal saline
- Discard the reused forceps into the receiver container
- Observe condition of the wound
- If drains are present, remove the inner dressing layer by layer to avoid pulling the drain
- If drains need shortening, cut the stitch between the drain and the skin before pulling (if first shortening)
- Soak gloved hand in 0.5% chlorine and dry/use alcohol hand rub
- Use sterile forceps to pull the drain and a sterile pair of scissors to cut it
- Replace a sterile safety pin to hold the drain in position
- Dip a gauze swab into the cleaning solution, using a dressing forceps
- Clean the wound from centre outward to wash away exudates from the wound
- Use one gauze swab at one stroke only once. One forceps to be used for picking sterile swabs and the one for cleaning the wound
- When the wound is clean apply sterile gauze swabs as required
- Secure dressings by pieces of adhesive plaster
- Thank the patient
- Reusable equipment is set for decontamination
- Waste should be collected and disposed safely as indicated in this manual
- Procedures for decontamination and doffing of the PPE should be adhered

21. CONSIDERATION FOR SPECIAL GROUPS

- Pregnant patients pose special challenges
- Labour, especially pre-term, may be first symptom of EVD infection

Pregnant patients with Ebola are at increased risk of complications:

- Postpartum haemorrhage (PPH)
- Fetal demise/stillbirth
- Spontaneous abortion

Minimize health worker exposure to blood, other bodily fluids:

- Plan and organize an extra person, before performing procedures
- Wear full PPE
- Blood transfusion may be necessary in bleeding conditions

Special Considerations in Pregnancy

- Full term deliveries are rare in EVD
- Health facility/ETC should be able to manage deliveries, miscarriage, and vaginal bleeding if it occurs
- Pregnant women infected with Ebola should be managed in a separate area
- Strict IPC precautions should be taken given the potential for accidental transmission to health care providers

Management of Pregnant EVD Patients

a. During pregnancy:

- i. Counsel woman and her relatives about the high mortality and morbidity risk associated with Ebola.
- ii. Avoid vaginal examinations in case of vaginal bleeding
- iii. Treat symptomatically including blood transfusion as indicated

b. During labour and delivery:

Birth companions should not be allowed in the labour and delivery area:

- Episiotomy should be avoided as far as possible as it may cause profuse bleeding
- Active management of third stage of labor should be performed in all women following recommended steps:
- Expect excessive bleeding as a rule rather than exception
- Provider must wear double gloves, preferably elbow length gloves
- Keep vaginal examination to the possible minimum and rely on abdominal examinations to monitor progress of labor as well as management of PPH
- Avoid assisted vaginal deliveries such as forceps and vacuum.
- No cesarean section

Important:

- In pregnant women who survive Ebola, fetus may remain positive for Ebola after mother is negative
- So far, 1 documented surviving infant (Sylvana DRC)
- c. Stillborn infants delivered by survivor mothers (PCR negative) were still **HIGHLY POSITIVE** by PCR
- d. **Postpartum:**
Woman:
 - Should not breastfeed because Ebola virus has been found in breast milk
 - Provide replacement feeding
 - Monitor baby for 21 days for fever and other signs and symptoms in new born:
 - Wear PPE while managing new born
 - Support mother to feed the baby
 - Monitor baby for 21 days

Special Considerations for Breastfeeding Women

- If the infant is asymptomatic and the mother is a confirmed case:
- The infant should not be sent home but should also be kept in isolation room outside the confirmed zone.
- If both the infant and mother are confirmed cases:
 - Both should be kept in the same isolation room
 - Closely monitor asymptomatic infant for 21 days
 - Mothers who recover from EVD should get their breast milk tested for presence of Ebola virus
 - Discourage wet nursing
 - Mother may require psychological support

EVD in Children

Special considerations in children

- e. Harder to recognize symptoms
- f. Children may not be able to express complaints

Family Members at the Treatment Centre

- Define an area where the family members can stay and communicate to relatives.
- Explain clearly the rule inside the Treatment Centre.
- Inform the family regularly and inform the patient that his family is around.
- Encourage patients in stable condition to sit outside to communicate with their family across the fence

22. SAFE AND DIGNIFIED BURIAL

The under listed basic 12 steps must be observed in managing dead bodies in the Community during EVD Outbreak

NB: No burial should begin until family agreement has been obtained.

Step 1: Prior to departure: Team composition and preparation of disinfectants must be checked

Step 2: Assemble all necessary equipment

Step 3: Arrival at deceased patient home: counsel and prepare burial with family and evaluate risks

Step 4: Put on appropriate Personal Protective Equipment (PPE)

Step 5: Placement of the body in the body bag

Step 6: Placement of the body bag in a coffin where culturally/religiously appropriate

Step 7: Decontaminate family's environment

Step 8: Remove PPE, manage waste and perform hand hygiene

Step 9: Transport the coffin or the body bag to the cemetery

Step 10: Put on PPE

Step 11: Burial at the cemetery: place coffin or body bag into the grave.

Step 12: Burial at the cemetery: engaging community for prayers to dissipates tensions and provide respectful time.

Step 13: Return to the hospital or team headquarters

Prepare the Body Safely

Burial should take place as soon as possible after the body is prepared in the health facility. Health facility staff (decontamination team/Burial team) should:

- Ensure that handling of human remains (human body) be kept to a minimum.
- Wear the full set of PPE and heavy duty/rubber gloves to handle the dead body of a suspected or confirmed case of Ebola

- PPE should be put on at the site of collection of human remains, before the process of collection and placement in body bags, and should be removed immediately after
- Prepare the body safely
- Be aware of the family's cultural practices and religious beliefs.
- Help the family understand why some practices cannot be done because they place the family or others at risk for exposure.
- Counsel the family about why special steps need to be taken to protect the family and community from illness.
- Identify a family member who has influence with the rest of the family and who can make sure family members avoid dangerous practices such as washing or touching the body.

Preparation of dead body in the health facility:

- Disinfection team/Burial team must be involved in body preparation
- Wear full PPE as recommended before entering the patient isolation area.
- Use thick rubber gloves (utility gloves) as the third pair (or outer layer) of gloves.
- Place the body in a "body bag" (mortuary sack) and close it securely.
- Then spray the body bag with 0.5% chlorine solution.
- Place the body in a coffin if one is available.
- Transport the body to the burial site as soon as possible.
- Assign a health officer or health facility staff person to accompany the body to ensure that the safety precautions remain secure during the journey.

NB: Body preparation should be in well-lit room

Burial ceremony should not be done during nights and when raining

Transporting the body

- Ebola Isolation Precautions should remain in force when the body is being transported to the burial site.
- Plan to take the shortest route possible for security purposes and to limit any possibility of disease transmission through accidental contact.
- After preparation of the body, the health facility staff should doff the PPE and use another car (that is not carrying the dead body) to burial site.

– Note: The driver does not need to wear protective clothing if there is no contact with the body.

- Take a closed container or sprayer with 0.5% and 0.05% chlorine solution in the event of any accidental contact with the body or infectious body fluids.
- Also use it to clean up spills in the transport vehicle.

Prepare Burial Site

- The grave should be at least 2 meters deep in designated area.
- Explain to the family that viewing the body and viewing the burial is allowed from afar.
- Help them to understand the reason for limiting the burial ceremony to family only.
- Burial site should not be close to sources of water

After burial and before removing the PPE check these:

- Gather in a plastic bag, bed linen, clothes and objects of the deceased, if any, that were not placed in the coffin and need to be buried with the coffin. Ensure the bag is tightly closed and spray the outside with disinfectant.
- Always burn the mattresses and other soiled beddings /items of the deceased
- Mattresses, straw mats and other beddings /items soiled with body fluid of the deceased should be burnt
- The supervisor should go through the after-burial checklist to confirm if every step was completed
- Decontamination of the vehicle according to the Standard Operating Procedures of vehicle decontamination.

Burial team

- The Burial Team is responsible for conveying and burial of the corpse. It comprises of:
 - Six Pall Bearers (the ones who carry the dead body)
 - Two Sprayer (Environmental Officer)
 - One Supervisor (environmental officer)
 - One communicator o Two Drivers
 - One Religious Representative (from the community)
- The burial team should observe IPC principles during handling of the dead body.
- All burial team members should be clear on their roles and responsibilities.
- The team must be trained in IPC especially on PPE

23. WASTE MANAGEMENT

What Needs Disposal

When Ebola disease or any other viral haemorrhagic fever is suspected, disinfect and dispose off:

- Infectious blood and other body fluids such as urine, faeces, and vomitus
- Disposable needles and syringes and disposable or non-reusable protective clothing
- Treatment materials and dressings
- Non-reusable gloves
- Laboratory supplies and biological samples
- Used disinfectants

Waste management procedures

At Collection points

- Waste should be segregated at the point of generation to enable appropriate and safe handling.
- Waste should not be stored more than 24 hours before being destroyed.
- Sharp objects (e.g. needles, syringes, glass articles) and tubing that has been in contact with blood or body fluids should be placed inside puncture resistant waste containers. These should be located as close as practical to the patient care area where the items are used, similarly in laboratories.
- All solid, non-sharp, infectious waste should be collected using leak-proof waste bags in covered bins
- All waste from infectious zone should be stored in red bins, food remains can be kept in another red bin (bins and buckets should be labeled) whereas in green zone waste can be stored in black/blue
- Waste material from red zone should not be taken to the green zone
- Waste material will only be moved out through the rear door to the waste management area and laundry

Segregation of Medical waste

NB: In red zone all waste bins are infectious. The black bucket should be used for general waste like food remains, papers etc.

On-site transportation

- Wear a full set of PPE and heavy duty/rubber gloves and goggles when handling infectious waste

- Infectious solid waste should not be transported by hand due to the risk of accident or injury from infectious material or incorrectly disposed sharps.
- Use a covered trolley or a wheeled bin with a lid to reduce the potential for exposure
- Collect wastes including sharp containers (puncture resistant safety boxes) from all generating points at least twice a day or when containers are $\frac{3}{4}$ full or whenever necessary
- For infectious waste generated in laboratories (e.g. specimens and specimen's containers, pipettes, etc.), pre-treat by autoclaving or chemical disinfection prior to transporting it for final treatment/disposal
- Start with non- infectious waste followed by infectious waste
- After each use, all surfaces of the trolleys or bins should be disinfected with 0.5 % chlorine solution
- Wash hands properly after removing PPE

Treatment of Ebola-Contaminated Waste

- Recommended Disposal Methods: Disinfect liquid waste (including patient excreta) with 2% chlorine solution and then dispose of in an isolated latrine or toilet set aside for Ebola cases. (NB: Avoid splashing when disposing of liquid infectious waste)
- Burning is the recommended method for disposal of other Ebola-contaminated waste. A safe and inexpensive disposal system can be made by using an incinerator or a pit for burning.
- There should be well trained staff to manage waste generated at Ebola treatment centre

Select Site for disposing solid Ebola-Contaminated Waste

- Select a disposal point (incinerator/burning pit) on the health facility grounds
- Disposal point should be fenced
- It should be located away from the normal traffic flow and should be fenced, should have a lockable door, the site should not be in public view or in an area where it will attract a crowd.
- Wear appropriate PPE (utility gloves, mask, long sleeved shirt, plastic apron, boots)
- Decontaminate the area in case of spillage around the incinerator/burning pit with 0.5% chlorine solution
- Conduct regular cleanliness, decontamination, maintenance and repairs of the incinerator
- Decontaminate any used receptacles
- Remove ashes from the incinerator and put in the ash pit
- Put a layer of soil on top of ashes

- Wash hands after removal of PPE

24. WORKERS' SAFETY

Managing Health & Safety during response to EVD emergencies is an integral element of overall capacity building for health workers. It needs to be managed across all levels as well as from preparedness and during response to EVD. It has been evident that, deficiencies in workers' health and safety during EVD outbreaks have led to serious impacts on overall healthcare system

Purpose:

- The purpose is to keep health workforce safe and healthy and effective to manage the EVD suspected cases or EVD case
- To effectively run routine health system functions by helping to retaining health workforce in health facilities.

Ways in which workers can be exposed during EVD emergency

- During handling and management of suspected case of EVD at isolation and or accidental exposure to blood or body fluids and needlestick injuries in healthcare facilities.
- During community contact tracing, environmental decontamination and burial of EVD case
- Handling waste from affected personnel at the community or health care facility
- Handling and managing suspect case of EVD on board in aircraft or ship or bus
- Handling and transportation of suspected case of EVD to the treatment centre· During case investigations among community in the field during outbreak.
- Sample collection, transportation and testing of laboratory samples of blood, body fluids etc., from suspected cases.

Workers Safety measures for prevention of EVD infections

I. Triage

- Sorting sick persons or injured patient into groups based on their need for or likely benefit from immediate medical treatment.
- Triage reduces the risks of infection transmission from patients to workers
- Triage is applied in the field, at outbreak sites, and in hospital emergency rooms or isolation when limited medical resources must be allocated.
- Maintain a distance of at least 1 meter between a patient and triage nurse

II. Precautions

- Standard precautions and transmission based precautions should be adhered to.

III. Pre-exposure Prophylaxis

There is no pre-exposure prophylaxis for EVD. However, other risk associated during responding to EVD are sorted/assessed out and workers are given recommended Pre-exposure prophylaxis as necessary to protect them from other risks.

IV. Post Exposure Prophylaxis

Managing personal post exposure to body fluids including blood

- Immediately and safely stop any current tasks, leave the patient care area, and safely remove PPE.
- Remove PPE carefully according to the steps indicated in this document because exposure during PPE removal can be just as dangerous for HAIs.
- Immediately after leaving the patient care area, wash the affected skin surfaces or the percutaneous injury site with soap and water.
- Accordingly, irrigate mucous membranes (e.g. conjunctiva) with copious amounts of water or an eyewash solution, and not with chlorine solutions or other disinfectants.
- Immediately report the incident to the local coordinator. This is a time sensitive task and should be performed as soon as the HCW leaves the patient care unit.
- Exposed persons should be medically evaluated including for other potential exposures (e.g., HIV, HCV, HBV) and receive follow-up care, including fever monitoring, twice daily for 21 days after the incident.
- Immediate consultation to the nearby health facility or infectious experts for further evaluation and management is recommended for any exposed person who develops fever within 21 days of exposure.
- People suspected of being infected should be cared for/isolated, and the same recommendations outlined in this document must be applied until a negative diagnosis is confirmed.
- Contact tracing and follow-up of family, friends, co-workers and other patients, who may have been exposed to Ebola virus through close contact with the infected health workers is essential.
- Also link the exposed workers to the necessary health care service according to the risk and counseling services

V. Vaccination

- Worker involved in the management of EVD emergency are required to be assessed on their previous vaccination history (e.g. HBV) and other important vaccination according to the national recommendation
- Workers vaccination should be offered according to the need and national immunization schedules.
- Hepatitis B vaccination should be considered for all health workers
- Hepatitis B immunoglobulin should be available for unvaccinated or partly vaccinated health workers in addition to vaccination.
- Once approved, EVD vaccination should be considered

VI. Counselling and Psychosocial stress management in EVD emergency

- Counselling arrangement and expertise should be available to cater for workers and clients
- Provide workers with good quality information on EVD, to provide a sense of being informed and having a sense of control.
- Share up-to-date information for EVD with the Health workforce through clear flow of information.
- Multi-disciplinary team debriefing sessions are important; at least weekly, to exchange concerns.
- Ensure organizational culture through team-building techniques including facilitating communication and conflict management among workers.
- Regulated rest periods; sufficient time for adequate rest and breaks during the EVD response in the isolation/ETC.
- Basic needs, opportunities for promoting physical health including exercise and healthy eating habits, regular communication with family
- Psychological support; venue for workers to express and share fears, worries, etc. in a confidential way.

VII. Workers health Monitoring and Surveillance during preparation

- Brief health workers at all levels of the health system on the nature of the disease and how it is transmitted, and strict adherence to infection control precautions.
- Responding workers should be trained for each job/task they will perform, and need appropriate protection (e.g., burial teams, contact tracing, case management etc.)
- All responding workers should go through medical checks and necessary vaccination

- All workers should have basic knowledge and skills on infection prevention and control practices; they may need refresher training on IPC
- Apply standard measures of precaution in all health care facilities, since other infectious diseases may have symptoms compatible with EVD.

During response

- All health workers and other ETC staff should have their temperatures checked every day when they arrive at the ETC. No exceptions.
- Arrangements should be available such as a small clinic for health workers to report sicknesses and incidents and to be assessed for exposures and treated for signs and symptoms.
- No sharing of personal items and no close contact (no handshakes and no contact less than 1 meter).
- If worker is sick, he/she should stay at home.
 - Do not let anyone enter your room, including medical colleagues.
 - Immediately report to your supervisor or designated occupational health person.
 - Do not panic. Almost always the symptoms are NOT due to Ebola. Workers should keep to the job that they have been prepared for.
- Avoid taking care of patients in the community during an outbreak without adequate PPE and other IPC measures. After response/ending of the emergency
- Self-monitoring of temperatures for 21 days
- Services for EVD post-traumatic stress disorder, contracted through occupational exposure, are in place such as compensation, rehabilitation and curative services.

VIII. Incentives and Compensation for front line workers

There must be arrangement or mechanism for incentives and compensation of front line workers in EVD settings.

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26. ANNEXES

1. CHECKLIST FOR DONNING AND REMOVING PPE

CHECKLIST FOR DONNING PPE					
STEP/TASK	CASES				
PREPARATION					
1. Check that all are available a. Scrub suit, appropriate boots, hand hygiene supplies b. All the PPE you need (gloves x2 pair [at least one long cuff], plastic apron, coverall/gown, mask or N95 respirator, goggles or face shield, head cover, additional Hood and foot cover [not needed if footbath is available])					
2. Ensure that there is a supervisor to guide and assist you in putting on and removing PPE; if not, use a mirror					
3. Ensure that there is a buddy to assist and observe you while working in the ETC					
4. Tie back hair, and secure with tape, remove eye glasses, remove jewelry/ID/ cell phone					
5. Empty bowel, bladder and use bathroom					
6. Wash hands with soap or use alcohol-based hand rub					
7. Put on scrub suit and appropriate sized rubber boots in the changing room. If rubber boots are not available, wear closed, puncture-and fluid-resistant shoes with no laces.					
8. Drink at least 500 mls of water					
9. Perform TIMOUT to review plan for time in isolation area and ensure all needed equipment is ready					
PUTTING ON PPE – DONNING (PPE is put on in the low-risk area)					
Buddy reads the following to the healthcare worker step-by-step:					
1. Hand Hygiene with ABHR or soap and running water then dry your hands					
2. Put on 1 st pair of gloves (if you have a pair with a short cuff put them on now)					
3. Coverall: Put on coverall and ensure it is large enough for free movement					
4. Coverall: Zip up and fasten the zip and neck tabs of the coverall.					
5. Tuck cuffs of inner gloves under sleeves					
6. Cut thumb holes at border of cuff and sleeves and insert thumbs					
7. a) Medical Mask: Put on, tie securely and pinch the bridge of the nose to ensure that the mask is correctly positioned					
7 b) N-95 respirator: a. Cup the respirator in hand with the nosepiece at fingertips b. allow the headbands to hang freely below hand c. Position the respirator under chin with the nosepiece up d. Pull the bottom strap over head and position it around the neck below the ears					

e. Pull the top strap overhead, rest it high at back of head.					
f. Place fingertips of both hands at the top of the metal nosepiece and mold the nosepiece (USING TWO FINGERS OF EACH HAND) to the shape of your nose (Note: pinching the nosepiece using one hand may result in less effective respirator performance)					
g. Perform seal-check <i>Exhale sharply.</i> If positive pressure builds inside, there is no leakage. If pressure does not build, adjust the respirator. <i>Inhale deeply.</i> If there is no leakage, the respirator will cling to the face. If not, adjust the mask.					
8. Put on goggles or face shield and tighten to fit head securely					
9. Put on a plastic apron and tie at the back,					
10. Put on a second pair of gloves (these should have a long cuff pulled over the sleeves of the gown or suit)					
11. Coverall Hood & External hood (if needed): Put on hood, ensuring that head, face, neck is fully covered.					
12. Identify yourself by writing a Name and Time on it					
13. Have the supervisor and buddy: Check all skin is covered Ensure comfort: able to extend the arms, bend at the waist and do range of motions and no skin slows during movement and correctly fix anything that is not in place. If using a mirror, check all PPE and corrects as needed.					
14. Enter the isolation room or patient care area after clearance from supervisor.					
15. DO NOT TOUCH OR ADJUST PPE once in the isolation area, any movement of PPE is considered a breach.					
CHECKLIST FOR REMOVING PPE (DOFFING)					
STEP/TASK					CASES
PREPARATION					
1. PPE is removed in a separate area to putting on and health care worker can step into low risk area when process is complete					
2. Supervisor available completes the following: Reminds HCW to avoid automatic actions that may put them at risk (e.g., touching their face, scratching, wiping sweat) Reads aloud each step of the procedure Ensures HCW repeats back the step they are about perform (talk-back) Confirms visually that the PPE has been removed properly Not wearing PPE: Supervisor at least 6 feet away from HCW. No touching.					
Note: When Removing PPE: Minimize touching the PPE. Decontaminate gloves after any contact.					
3. Have containers with 0.5% chlorine solution ready for disposal of removed PPE to be reprocessed.					
4. Have waste bag in a rigid waste container ready to place used PPE in					

safely.					
5. Inspect the PPE to assess for visible contamination, cuts, or tears before starting to remove. If any, wipe the area with 0.5% chlorine solution					
TAKING OFF PPE - DOFFING (In the red zone)					
1. Disinfect outer gloves with 0.5% chlorine solution					
2. Remove external Hood (<i>if used</i>)					
3. Disinfect outer gloves with 0.5% chlorine solution					
4. Remove plastic apron by rolling contaminated front inward and place it in the waste bag. DO NOT LET FRONT OF APRON TOUCH FACE. If reprocessing, put it in the container with disinfectant.					
5. Buddy Inspect the PPE under the apron to assess for visible contamination, cuts, or tears. If any wipe the area with 0.5% chlorine solution					
6. Disinfect outer gloves with 0.5% chlorine solution					
7. Remove outer gloves and place them in waste bag.					
8. Inspect inner gloves to assess for visible contamination (If any wipe the area with 0.5% chlorine solution) if cuts or tears (perform hand hygiene and continue doffing).					
9. Disinfect inner gloves with 0.5% chlorine solution					
10. Remove Coverall Hood					
11. Remove Coverall: Undo sticky taps or ties (Mirror is useful) <ul style="list-style-type: none"> • Lift chin. • Find zip at the level of your belly and carefully trace your fingers up to find the zip tab and fasteners with one hand. • Hold outside of top of suit with the other hand. • Unzip or unfasten suit completely. • Shimmy shoulders out of coverall and carefully move coverall down body turning inside out and touching only the inside of the coverall. • Do a moon-walk to remove legs over your boots. Avoid contact of scrubs with outer surface of coverall. Carefully place in waste bag					
10 Disinfect inner gloves with 0.5% chlorine solution					
11 Remove face shield: by tilting the head slightly forward, grabbing the rear strap and pulling it over the head, gently allowing the face shield/goggles to fall forward OR. Remove goggles: by lifting back of strap over head, pulling out and away. Place them in waste bag or if reprocessing, put it in the container with disinfectant. Note: Avoid touching the front surface of the shield or goggles					
12 Disinfect inner gloves with 0.5% chlorine solution					
13 Remove mask: Undo bottom tie first then top tie. Holding by ties lift away from face Remove N-95 respirator:					

Grasp first the <u>bottom</u> elastic strap at back of head and pull away from head and up and over then grasp the <u>top</u> elastic strap and pull away from head and up and over. Discard mask or respirator without touching front					
14 Disinfect inner gloves with or 0.5% chlorine solution					
15 First disinfection of boots/shoe in the basin with 0.5% chlorine					
16 Disinfect inner gloves with or 0.5% chlorine solution					
17 Remove inner gloves and place in waste bag contaminated area					
18 Second disinfect of boots by: Dip in the container (basin) with 0.5% chlorine solution then step into clean boots into low-risk area.					
19 Perform hand hygiene on bare hands with ABHR or soap and water.					
20 FINAL INSPECTION OF SCRUBS in low – risk – area					
21 Attend to any breaches washing skin with soap and water or irrigating mucous membranes with water or eye wash solution					
22 Report any breaches using “breach report” to Ebola coordinator					
23 Drink water and attend bathroom					

2. LIST OF PARTICIPANTS FOR THE DEVELOPMENT OF STANDARD OPERATING PROCEDURES FOR QUALITY INFECTION PREVENTION AND CONTROL FOR SUSPECTED OR CONFIRMED CASES OF EBOLA VIRUS DISEASE IN TANZANIA

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9	Ms. Ruth Raymond Ngowi	Laboratory Scientist, Health Services Inspectorate and Quality Assurance Section (MoHCDGEC)
10	Ms. Lucy Issarow	Principal Nursing Officer, Health Services Inspectorate and Quality Assurance Section (MoHCDGEC)
11	Mr. Edwin Mkwama	Principal Nursing Officer, Distance Learning-Health Institute-Morogoro
12	Dr. Bushilugoba	BenjaminiMkapa Hospital – Dodoma
13	Dr. LeloBaliyima	Head of Blood Donors Management – National Blood Transfusion Services, MoHCDGEC
14	Dr. Christopher Mnzava	Disaster Risk Management Specialist, RS Dar es Salaam
15	Mr. Florence TairoEvaristi	Nurse Officer, Emergence Preparednes and Response Section- MoHCDGEC
16	Mr. Said Chibwana	Environmental Health Officer, Jamii Bora Health Network – Mtwara
17	Ms. Jackline Makupa	Environmental Health Officer, Ocupational Health Unit – MoHCDGEC
18	Mr. Lutengano W. Mwanginde	Chemist, Forensic Bureau, Biology/DNA Section – Ministry of Home Affairs
19	Ms. Joyce Lyimo	Epidemiologist, FELTP, MoHCDGEC
20	Ms. Mary A. Makata	Principal Nurse Officer, Emergence Preparednes and Response Section- MoHCDGEC
21	Dr. Mariam Kalomo	Medical Specialist, Non Communicable Disease Section, (MoHCDGEC)
22	Dr. Biita Muhanuzi	Medical Specialist, Emergency Medicine Department, Muhimbili National Hospital

23	Dr. Oresta Mwambe	Assistant Medical Officer, Morogoro Municipal Council
24	Dr Lawrence Ofori-Boadu	WHO-Consultant
25	Dr Mohamed Boie Jalloh	WHO IPC/ Case Management Consultant
26	Dr Rashidatu Fouad Kamara	WHO IPC/ Case management consultant